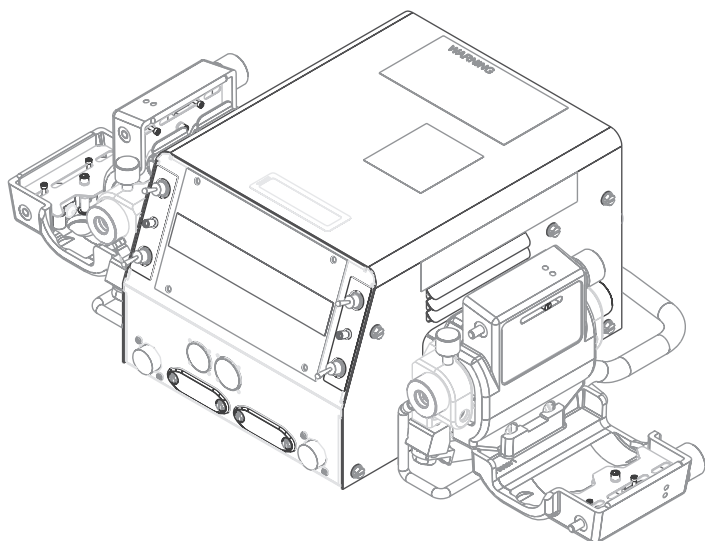




## Operator's Manual

# POWER FEED<sup>®</sup> 10M Dual Bench



For use with machines having Code Numbers:  
**11378, 11899**



**Register your machine:**  
[www.lincolnelectric.com/register](http://www.lincolnelectric.com/register)

**Authorized Service and Distributor Locator:**  
[www.lincolnelectric.com/locator](http://www.lincolnelectric.com/locator)

Save for future reference

Date Purchased

Code: (ex: 10859)

Serial: (ex: U1060512345)

## ⚠ 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.



## 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.**

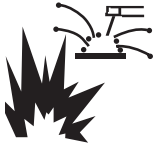
5. b. The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically 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 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 soleil, donc:
  - a. Utiliser un bon masque avec un verre filtrant approprié ainsi qu'un verre blanc afin de se protéger les yeux du rayonnement de l'arc et des projections quand on soude ou quand on regarde l'arc.
  - b. Porter des vêtements convenables afin de protéger la peau de soudeur et des aides contre le rayonnement de l'arc.
  - c. Protéger l'autre personnel travaillant à proximité au soudage à l'aide d'écrans appropriés et non-inflammables.
4. Des gouttes de laitier en fusion sont émises de l'arc de soudage. Se protéger avec des vêtements de protection libres de l'huile, tels que les gants en cuir, chemise épaisse, pantalons sans revers, et chaussures montantes.

5. Toujours porter des lunettes de sécurité dans la zone de soudage. Utiliser des lunettes avec écrans latéraux dans les zones où l'on pique le laitier.
6. Eloigner les matériaux inflammables ou les recouvrir afin de prévenir tout risque d'incendie dû aux étincelles.
7. Quand on ne soude pas, poser la pince à un endroit isolé de la masse. Un court-circuit accidentel peut provoquer un échauffement et un risque d'incendie.
8. S'assurer que la masse est connectée le plus près possible de la zone de travail qu'il est pratique de le faire. Si on place la masse sur la charpente de la construction ou d'autres endroits éloignés de la zone de travail, on augmente le risque de voir passer le courant de soudage par les chaînes de levage, câbles de grue, ou autres circuits. Cela peut provoquer des risques d'incendie ou d'échauffement des chaînes et des câbles jusqu'à ce qu'ils se rompent.
9. Assurer une ventilation suffisante dans la zone de soudage. Ceci est particulièrement important pour le soudage de tôles galvanisées plombées, ou cadmiées ou tout autre métal qui produit des 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 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.

# 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!

## CUSTOMER ASSISTANCE POLICY

The business of The Lincoln Electric Company is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for advice or information about their use of our products. We respond to our customers based on the best information in our possession at that time. Lincoln Electric is not in a position to warrant or guarantee such advice, and assumes no liability, with respect to such information or advice. We expressly disclaim any warranty of any kind, including any warranty of fitness for any customer's particular purpose, with respect to such information or advice. As a matter of practical consideration, we also cannot assume any responsibility for updating or correcting any such information or advice once it has been given, nor does the provision of information or advice create, expand or alter any warranty with respect to the sale of our products.

Lincoln Electric is a responsive manufacturer, but the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying these types of fabrication methods and service requirements.

Subject to Change – This information is accurate to the best of our knowledge at the time of printing. Please refer to [www.lincolnelectric.com](http://www.lincolnelectric.com) for any updated information.

## **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](http://www.lincolnelectric.com)**. Choose "Support" and then "Register Your Product". 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**.



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## TECHNICAL SPECIFICATIONS – Power Feed® 10M Dual Wire Feeder

WIRE DRIVE OR WIRE DRIVE SECTION OF FEEDER							
SPEC.#	TYPE	LOW SPEED RATIO			HIGH SPEED RATIO		
		Speed	Wire Size		Speed	Wire Size	
	Solid		Cored			Solid	Cored
K2234-3 K2316-1	Bench Model Boom Model	50-800 IPM (1.27-20.3 m/m)	.025 - 3/32 in. (0.6 - 2.4 mm)	.035 - .125 in. (0.9 - 3.2 mm)	75 - 1200 IPM (2.0 - 30 m/m)	.025 - 1/16 in. (0.6 - 1.6 mm)	.035 - 5/64 in. (0.9 - 2.0 mm)

CONTROL BOX, WIRE DRIVE AND COMPLETE UNITS								
SPEC.#	TYPE	INPUT POWER	PHYSICAL SIZE			TEMPERATURE RATING		
			Dimensions			Weight	Operating	Storage
			Height	Width	Depth			
K2234-3 Bench Model Feeder	Wire Drive & Reel Stand		19.9" (506 mm)	19.9" (506 mm)	30.6" (777 mm)	90 Lbs (40.8 Kg.)	14°F to 140°F (-10°C to 40°C)	-40°F to 185°F (-40°C to 40°C)

WELDING CAPACITY RATING	
Amp Rating	Duty Cycle
600 A	60%
500 A	100%

Δ Dimensions do not include wire reel.

## SAFETY PRECAUTION



**ELECTRIC SHOCK can kill.**

- Only qualified personnel should perform this installation.

- Turn off the input power to the power source 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 this equipment.
- Do not touch electrically hot parts.
- Always connect the Power Wave® grounding lug (located inside the reconnect input access door) to a proper safety (Earth) ground.

## ELECTRODE ROUTING

The electrode supply may be either from reels, Readi-Reels, spools, or bulk packaged drums or reels. Observe the following precautions:

- The electrode must be routed to the wire drive unit so that the bends in the wire are at a minimum, and also that the force required to pull the wire from the reel into the wire drive unit is kept at a minimum.
- The electrode is “hot” when the gun trigger is pressed and must be insulated from the boom and structure.
- If more than one wire feed unit shares the same boom and are not sharing the same power source output stud, their wire and reels must be insulated from each other as well as insulated from their mounting structure.

## CONTROL CABLE

### CONTROL CABLE CONNECTIONS

- All system control cables are the same.
- All control cables can be connected end to end to extend their length.
- All system equipment must be connected to a control cable.

**NOTE:** The maximum cable length between Power Source and Wire Feeder is 100'(30.5m).

### Typical Bench Feeder Connection:

Control cable is connected from the Power Wave® 455 output receptacle to the input receptacle on the back of the Wire Drive.

## CONTROL CABLE SPECIFICATIONS

It is recommended that only genuine Lincoln control cables be used at all times. Lincoln cables are specifically designed for the communication and power needs of the Power Wave® 455 / Power Feed® system. The use of non-standard cables, especially in lengths greater than 25 feet(7.6m), can lead to communication problems (system shutdowns), poor motor acceleration (poor arc starting) and low wire driving force (wire feeding problems).

Lincoln control cables are copper 5 conductor cable in a SO-type rubber jacket. There is one 20 gauge twisted pair for network communications. This pair has an impedance of approximately 120 ohms and a propagation delay per foot of less than 2.1 nanoseconds. There are two 12 gauge conductors that are used to supply the 40 VDC to the network. The fifth wire is 18 gauge and is used as an electrode sense lead.

## AVAILABLE CABLE ASSEMBLIES

**K1543** Control cable only. Available in lengths of 8'(2.4m), 16'(4.9m), 25'(7.6m), 50'(15.2m) and 100'(30.5m).

## OUTPUT CABLES, CONNECTIONS AND LIMITATIONS

Connect a work lead of sufficient size and length (Per Table A.1) between the proper output terminal on the power source and the work. Be sure the connection to the work makes tight metal-to-metal electrical contact. To avoid interference problems with other equipment and to achieve the best possible operation, route all cables directly to the work or wire feeder. Avoid excessive lengths and do not coil excess cable.

Minimum work and electrode cables sizes are as follows:

TABLE A.1

(Current (60% Duty Cycle))	MINIMUM COPPER WORK CABLE SIZE AWG
	Up To-100 Ft. Length (30 m)
400 Amps	2/0 (67 mm <sup>2</sup> )
500 Amps	3/0 (85 mm <sup>2</sup> )
600 Amps	3/0 (85 mm <sup>2</sup> )

NOTE: K1796 coaxial welding cable is recommended to reduce the cable inductance in long distance Pulse applications up to 300 amps.



### CAUTION

When using an inverter type power source like the Power Waves®, use the largest welding (electrode and work) cables that are practical. At least 2/0 copper wire - even if the average output current would not normally require it. 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.

Output connections on some Power Waves® are made via 1/2-13 threaded output studs located beneath the spring loaded output cover at the bottom of the case front.

Most welding applications run with the electrode being positive (+). For those applications, connect the electrode cable between the wire feeder and the positive (+) output stud on the power source (located beneath the spring loaded output cover near the bottom of the case front). Connect the other end of the electrode cable to the wire drive feed plate. The electrode cable lug must be against the feed plate. Be sure the connection to the feed plate makes tight metal-to-metal electrical contact. The electrode cable should be sized according to the specifications given in the work cable connections section. Connect a work lead from the negative (-) power source output stud to the work piece. The work piece connection must be firm and secure, especially if pulse welding is planned.

For additional Safety information regarding the electrode and work cable set-up, See the standard "SAFETY INFORMATION" located in the front of the Instruction Manuals.



### CAUTION

Excessive voltage drops caused by poor work piece connections often result in unsatisfactory welding performance.

## NEGATIVE ELECTRODE POLARITY

When negative electrode polarity is required, such as in some Innershield applications, reverse the output connections at the power source (electrode cable to the negative (-) stud, and work cable to the positive (+) stud).

## ELECTRODE SENSE POLARITY

This options allows for the setting of negative polarity sensing when a negative polarity welding process is performed.

When negative electrode polarity is required, such as in some Innershield applications, reverse the output connections at the power source (electrode cable to the negative (-) stud, and work cable to the positive (+) stud).

When operating with electrode polarity negative the Wire Feeder must be set to recognize this option.

### To Set the Electrode Sense Polarity Switch



### WARNING



#### ELECTRIC SHOCK can kill.

- Turn the input power OFF at the disconnect switch before working on this equipment.
- Do not touch electrically hot parts.



### CAUTION

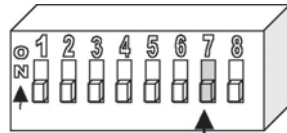
When changing the electrode polarity, the weld cables must be changed at the power source studs and the DIP switch inside the Power Feed® 10M Dual must be properly set. Operation with the DIP switch in the wrong position will cause erratic arc performance.

The Power Feed® 10M Dual Wire Feeder is factory set for Electrode Positive welding.

Most welding procedures use Electrode Positive welding. Some Innershield procedures may use Electrode Negative welding. For most applications, the Power Feed® 10M Dual Wire Feeder will have both sides of the Wire Drive set to the same polarity. To weld with opposite polarities, each head would have to be welding on isolated work pieces and the weld cable attaching the two feed heads would have to be removed.

To change the DIP switch inside the Power Feed® 10M Dual Wire Feeder for electrode polarity:

1. Turn off power at the welding power source.
2. Remove the rear access panel on the wire drive.
3. Locate DIP switches on BOTH Wire Drive Boards.
4. Set DIP switch #7 on BOTH Wire Drive Boards to the desired polarity.



DIP Switch #7 Position  
Polarity

ON (Up) - (negative) polarity  
OFF (Down) + (positive) polarity

5. Assemble the rear access panel to the wire drive.
6. Restore power.

## VOLTAGE SENSING

The best arc performance occurs when the Power Waves® have accurate data about the arc conditions. Depending upon the process, inductance within the electrode and work lead cables can influence the voltage apparent at the studs of the welder. Voltage sense leads improve the accuracy of the arc conditions and can have a dramatic effect on performance. Sense Lead Kits (K940-xx) are available for this purpose.



### CAUTION

**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.**

The ELECTRODE sense lead (67) is built into the control cable, and is automatically enabled for all semi-automatic processes. The WORK sense lead (21) connects to the Power Wave® at the four pin connector located underneath the output stud cover. By default the WORK voltage is monitored at the output stud in the Power Wave® 455. For more information on the WORK sense lead (21), see "Work Voltage Sensing" in the following paragraph.

Enable the voltage sense leads as follows:

**TABLE A.2**

Process	Electrode Voltage Sensing 67 lead *	Work Voltage Sensing 21 lead
GMAW	67 lead required	21 lead optional
GMAW-P	67 lead required	21 lead optional
FCAW	67 lead required	21 lead optional
GTAW	Voltage sense at studs	Voltage sense at studs
GMAW	Voltage sense at studs	Voltage sense at studs
SAW	67 lead required	21 lead optional
CAC-C	Voltage sense at studs	Voltage sense at studs

\* The electrode voltage 67 sense lead is integral to the control cable to the wire feeder.

### Work Voltage Sensing

The standard Power Wave® 455's default to the work stud (work sense lead disabled)

For processes requiring work voltage sensing, connect the (21) work voltage sense lead (K940) from the Power Wave® work sense lead receptacle to the work piece. Attach the sense lead to the work piece as close to the weld as practical, but not in the return current path. Enable the work voltage sensing in the Power Wave as follows:

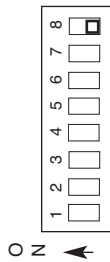
#### WARNING



- Do not touch electrically live parts or electrodes with your skin or wet clothing.
- Insulate yourself from the work and ground.

- Always wear dry insulating gloves.

1. Turn off power to the power source at the disconnect switch.
2. Remove the front cover from the power source.
3. The control board is on the left side of the power source. Locate the 8-position DIP switch and look for switch 8 of the DIP switch.
4. Using a pencil or other small object, slide the switch right to the OFF position if the work sense lead is NOT connected. Conversely, slide the switch left to the ON position if the work sense lead is present.
5. Replace the cover and screws. The PC board will "read" the switch at power up, and configure the work voltage sense lead appropriately.



### WIRE DRIVE GEAR RATIO (HIGH OR LOW SPEED)

The speed range capability and drive torque of the Power Feed® wire drives can be easily and quickly changed by changing the external drive gear. The Power Feed® Wire Feeders are shipped with both high speed and a low speed gears. As shipped from the factory, the low speed (high torque) gear is installed on the feeder. If this is the desired gear ratio, no changes need be made.

If a change in gear ratio is desired, the systems needs to be made aware of which gear has been installed on the Wire Drive, low or high speed. This is accomplished through the selection of a dip switch on the wire drive PCB.

### SELECTING THE PROPER GEAR RATIO

See Technical Specifications at the front of the Installation Section for feed speed and wire size capabilities with high and low speed gear ratios. To determine whether you should be using the high or low speed ratio use the following guidelines:

- If you need to operate at wire feed speeds above 800 IPM (20 m/m), you will need to install the high speed gear (large 30 tooth, 1.6 inch diameter gear).
- If you do not need to run at wire feed speeds in excess of 800 IPM (20 m/m), you should use the low speed gear (small, 20 tooth, 1.1 inch diameter gear). Using the low speed ratio will provide the maximum available wire driving force.

Note: If you are feeding only small diameter wires you may, at your option, install the high speed ratio.

### Electrode Voltage Sensing

Enabling or disabling electrode voltage sensing is automatically configured through software. The 67 electrode sense lead is internal to the cable to the wire feeder and always connected when a wire feeder is present.

#### CAUTION

**Important: The electrode polarity must be configured at the feed head for all semi-automatic processes. Failure to do so may result in extremely high welding outputs.**

## CHANGING THE WIRE DRIVE GEAR RATIO

Changing the ratio requires a gear and a dip switch setting change. The Power Feed® Wire Feeders are shipped with both high speed and a low speed gears. As shipped from the factory, the low speed (high torque) gear is installed on the feeder. For identification purposes, the low speed (high torque) gear has 20 teeth and is 1.1 inches in diameter. The high speed gear has 30 teeth and is 1.6 inches in diameter.

### WARNING

**Power down the Power Feed® 10M Dual Wire Feeder by turning off its companion Power Wave® power source. For maximum safety, disconnect the control cable from the Power Feed® 10M Dual Wire Feeder.**

### GEAR RATIO CHANGE PROCEDURE:

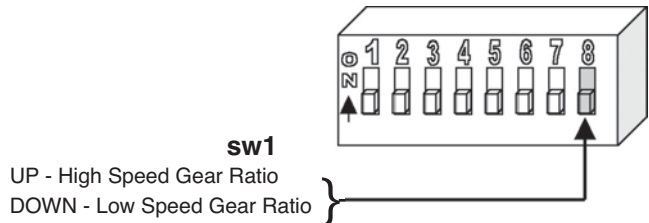
1. Pull open the Wire Drive Door.
2. Remove the Phillips head screw retaining the pinion gear to be changed and remove the gear. If the gear is not easily accessible or difficult to remove, remove the feed plate from the gearbox. To remove feed plate:
  - a. Loosen the clamping collar screw using a 3/16" Allen wrench. The clamping collar screw is accessed from the bottom of the feed plate. It is the screw which is perpendicular to the feeding direction.
  - b. Loosen the retaining screw, which is also accessed from bottom of feeder, using a 3/16" Allen wrench. Continue to loosen the screw until the feed plate can be easily pulled off of the wire feeder.
3. Loosen, but do not remove, the screw on the lower right face of the feed plate with a 3/16" Allen wrench.
4. Remove the screw on the left face of the feed plate. If changing from high speed (larger gear) to low speed (smaller gear), line the lower hole on the left face of the feed plate with the threads on the clamping collar. Line the upper hole with the threads to install larger gear for high speed feeder. If feed plate does not rotate to allow holes to line up, further loosen the screw on right face of feed plate.

5. Remove the small gear from the output shaft. Lightly cover the output shaft with engine oil or equivalent. Install gear onto output shaft and secure with flat washer, lock washer, and Phillips head screw which were previously removed.
6. Tighten the screw on lower right face of feed plate.
7. Re-attach feed plate to wire feeder if removed in Step 2.
8. Feed plate will be rotated out-of-position due to the gear change. Adjust the angle of the feed plate per the instructions above.
9. Set the wire drive gear ratio switch on Wire Drive PC board as follows:

### GEAR RATIO RECOGNITION:

1. Remove the rear access door from the wire feeder case.
2. Locate the dip switch bank on the P.C. board (refer to table A.3)
3. Locate dip switch # 8 and move it to the appropriate gear ratio setting as described below:

FIGURE A.2



4. Replace the rear access door of the wire feeder case.

**Note:** The system recognizes dip switch settings only during system power-up.

TABLE A.3

	PF-10M Feeder location (Facing rear of unit)	PF-10M P.C. board location (Facing rear of unit)
Feeder 1	Right	On inside divider panel
Feeder 2	Left	On rear access door



## WIRE FEED DRIVE ROLL KITS

NOTE: The maximum rated solid and cored wire sizes and selected drive ratios are shown on the SPECIFICATIONS in the front of this section.

The electrode sizes that can be fed with each roll and guide tube are stenciled on each part. Check the kit for proper components. Kit specifications can be found in the ACCESSORIES section.

## PROCEDURE TO INSTALL DRIVE ROLLS AND WIRE GUIDES

### WARNING



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

- Do not touch electrically live parts such as output terminals or internal wiring.
- When feeding without Power Feed® 10 Dual “Cold Feed” feature, electrode and drive mechanism are “hot” to work and ground and could remain energized several seconds after the gun trigger is released.
- Turn OFF input power at welding power source before installation or changing drive roll and/or guide tubes.
- Welding power source must be connected to system ground per the National Electrical Code or any applicable local codes.
- Only qualified personnel should perform this installation.

### Drive Roll Kit Installation (KP1505-[ ])

- Turn OFF Welding Power Source.
- Pull open Pressure Door to expose rolls and wire guides.
- Remove Outer Wire Guide by turning knurled thumb screws counter-clock-wise to unscrew them from Feedplate.

**Observe all additional Safety Guidelines detailed throughout this manual.**

- Remove drive rolls, if any are installed, by pulling straight off shaft. Remove inner guide.

- Insert inner Wire Guide, groove side out, over the two locating pins in the feedplate.
- Install each drive roll by pushing over shaft until it butts up against locating shoulder on the drive roll shaft. (Do Not exceed maximum wire size rating of the wire drive).
- Install Outer Wire Guide by sliding over locating pins and tightening in place.
- Engage upper drive rolls if they are in the “open” position and close Pressure Door.

TO SET DRIVE ROLL PRESSURE, see “Drive Roll Pressure Setting” in OPERATION.

## GUN AND CABLE ASSEMBLIES WITH STANDARD CONNECTION

The Power Feed® 10 Dual Wire Feeder is equipped with a factory installed K1500-2 gun connection Kit. This kit is for guns having a Tweco™ #2-#4 connector. The Power Feed® 10 Dual Wire Feeder has been designed to make connecting a variety of guns easy and inexpensive with the K1500 series of gun connection kits. Gun trigger and dual procedure lead connections connect to the single 5 pin receptacle on the front of the feed head box. See “Gun Adapters” in ACCESSORIES section.

## GUN AND CABLE ASSEMBLIES WITH FAST-MATE™ CONNECTION (including the Magnum 450 Water Cooled gun)

A K489-9 adapter will install directly into the wire drive feedplate, to provide for use of guns with Fast-Mate™ or European style gun connections. This K489-9 will handle both standard Fast-Mate™ and Dual Schedule Fast-Mate™ guns.

Another way to connect a gun with a Fast-Mate™ or European style gun connector to the Power Feed® 10 Dual Wire Feeder, is to use the K489-10 Fast-Mate™ adapter kit. Installation of this adapter also requires a K1500-1 gun connector. See “Gun Adapters” in ACCESSORIES section.

## Magnum 200 / 300 / 400 Guns

The easiest and least expensive way to use Magnum 200/300/400 guns with the Power Feed® 10 Dual Wire Feeder is to order them with the K466-10 connector kit, or to buy a completely assembled Magnum gun having the K466-10 connector (such as the K497-21 dedicated Magnum 400).



## Magnum 550 Guns

The easiest and least expensive way to use the Magnum 550 guns with Power Feed® 10 Dual wire feeders is to order the gun with the K613-7 connector kit, and install a K1500-3 gun connection kit to the wire feeder.

## Lincoln Innershield and Sub Arc Guns

All of these guns can be connected to the Power Feed® 10 Dual Wire Feeder by using the K1500-1 Adapter Kit.

## Lincoln Fume Extraction Guns

The K556 (250XA) and K566 (400XA) guns require that a K489-10 Fast-Mate™ adapter kit be installed. Installation of this adapter also requires a K1500-1 gun connector kit.

The K206, K289, and K309 require only the installation of a K1500-1 connector in the Power Feed® wire feeder.

## Non-Lincoln Guns

Most competitive guns can be connected to the Power Feed® 10 Dual Wire Feeder by using one of the K1500 series adapter kits, See "Gun Adapters" in ACCESSORIES section.

## GENERAL GUN CONNECTION GUIDELINES

The instructions supplied with the gun and K1500 series gun adapter should be followed when installing and configuring a gun. What follows are some general guidelines that are not intended to cover all guns.

- Check that the drive rolls and guide tubes are proper for the electrode size and type being used. If not, change them.
- Lay the cable out straight. Insert the connector on the welding conductor cable into the brass conductor block on the front of the wire drive head. Make sure it is all the way in and tighten the hand clamp. Keep this connection clean and bright. Connect the trigger control cable polarized plug into the mating 5 cavity receptacle on the front of the wire drive unit.

**Note:** for Fast-Mate and European connector style guns, connect gun to gun connector making sure all pins and gas tube line up with appropriate holes in connector. Tighten gun by turning large nut on gun clockwise.

- For GMA Gun Cables with separate gas fittings, connect the 3/16" I.D. gas hose from the wire drive unit to the gun cable barbed fitting.
- For water cooled guns see WATER CONNECTIONS in this section.

## GMAW SHIELDING GAS

### WARNING



#### **CYLINDER may explode if damaged.**

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



#### **BUILDUP OF SHIELDING GAS may harm health or kill.**

- Shut off shielding gas supply when not in use.

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

**NOTE:** Gas supply pressure must be regulated to a maximum of 80 psi(5.5 bar).

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 wire drive unit.

Connect a supply hose from the gas cylinder flow valve outlet to the 5/8-18 female inert gas fitting on the back panel of the wire drive or, if used, on the inlet of the Gas Guard regulator. (See Below).

**Gas Guard Regulator** - The Gas Guard Regulator is an optional accessory (K659-1) on these models.

Install the 5/8-18 male outlet of the regulator to the 5/8-18 female gas inlet on the back panel of the wire drive. Secure fitting with flow adjuster key at top. Attach gas supply to 5/8-18 female inlet of regulator per instructions above.

## WIRE SPINDLE PLACEMENT

The reel stand provides two mounting locations for the 2 inch diameter wire reel spindle to accommodate various reel sizes. Each mounting location consists of a tube in the center of the reel stand, and locating slots on the outside of the reel stand. The bolt, used with a plain washer and lock washer, slides through the tube from the side of the reel stand. The bolt should be threaded into the wire spindle such that the tabs on the brake mechanism align with the locating slots, then tighten.

The upper location must be used for 50-60 lb. Readi-Reels, Spools and Coils.

For smaller coils (44lb, 30lb, 10lb, etc.), the spindle can be placed in either the upper or lower location. The goal is to make the wire path from the coil to the wire drive an entry into the incoming guide tube that is as straight as possible. This will optimize wire feeding performance.

## WATER CONNECTIONS (FOR WATER COOLED GUNS)

If a water cooled gun is to be installed for use with the Power Feed® 10 Dual, a K590-6 Water connection kit can be installed for each gun requiring water cooling. Contained in the kit are the water lines and quick connect water line fittings that install in the wire feed head. Follow the installation instructions included in the kit. Water cooled guns can be damaged very quickly if they are used even momentarily without water flowing. To protect the gun, we recommended that a water flow sense kit be installed. This will prevent wire feeding if no water flow is present.

## WIRE FEED SHUT DOWN CIRCUIT (OPTIONAL)

This option is intended as a means of disabling welding in the event that the water flow (for a water cooled gun) is not present. Water cooled guns can be quickly damaged if they are momentarily used without water flow. This matter can be avoided when a Lincoln Flow Sensor Kit (K1536-1) is applied to the wire feeder shutdown circuit.

The Flow Sensor Kit has two control leads that become electrically common when the water is flowing. When integrated with the wire feeder shut down circuit, it forms a closed (common) circuit and enables welding. In the event that water is not flowing, the Flow Sensor circuit (shut down circuit) is electrically opened which disables any further operation.

Flow Sensor Kit installation is as follows:

1. Remove rear access door of the wire feeder case.
2. Locate the shutdown circuit leads inside feeder case cavity (refer to table A.4).  
Note: The leads will be connected together with insulated (pink) quick disconnects.
3. Disconnect pink quick-connect tabs (.25 inch tab terminals).
4. Locate and remove plastic plug on rear of wire feeder case.
5. Insert Flow Sensor leads through hole.
6. Connect Flow Sensor leads with shutdown circuit leads.
7. Replace rear access door.

TABLE A.4

	PF-10M Shutdown Leads	Feeder Cavity Location (Facing rear of unit)
Feeder 1 Shutdown	570 570 A/B	Upper Right Corner
Feeder 2 Shutdown	670 670 A	Upper Left Corner

## EXAMPLES OF CONNECTING AN ARCLINK POWER WAVE SYSTEM

ArcLink Power Wave® products may be configured in many different ways. The flexible system allows multiple wire feeders to be connected to the same power source. The diagrams represent some of the common methods for connecting ArcLink Products.

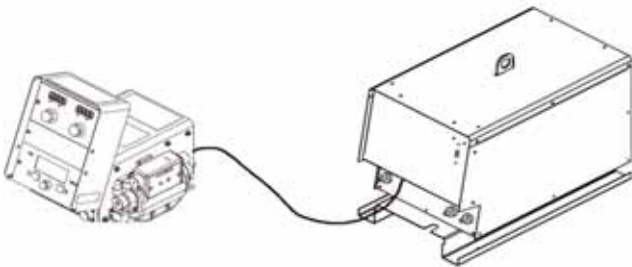
Important: Bench model wire feeders cannot be separated into a separate control box and wire drive for a boom system.

### Common ArcLink Systems

The following Power Wave® systems may all be assembled without any changes to the equipment DIP switches

#### Basic Semi-Automatic System

- Great for general fabrication.

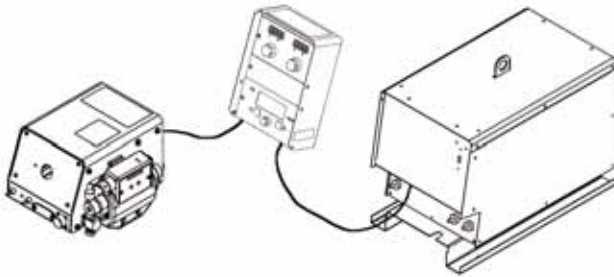


Shown with

- K2230-2 Power Feed® 10M Single Wire Feeder
- K2203-1 Power Wave® 455M/STT

#### Boom Semi-Automatic System

- Often used when making large weldments.

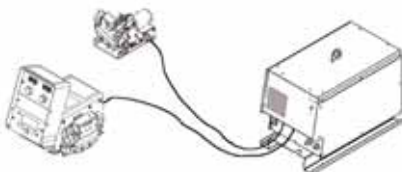


Shown with

- K2314-1 Power Feed® 10M Single Wire Feeder Boom (includes wire drive and control box)
- K2203-1 Power Wave® 455M/STT

#### Robotic/Semi-Automatic System

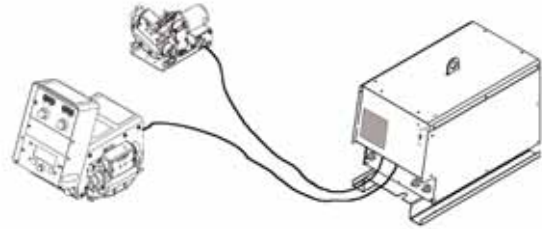
- Use the bench feeder for offline welding.



Shown with

- K2230-2 Power Feed® 10M Single Wire Feeder
- K1780-2 PF-10/R
- K2203-1 Power Wave® 455M/STT
- K2205-1 Wire Drive Module

#### Hard Automation System

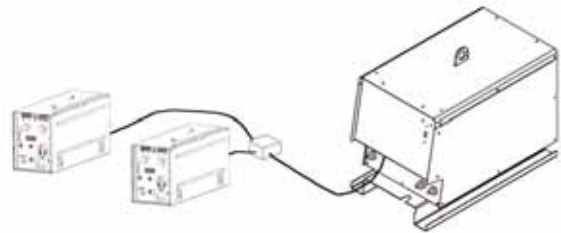


Shown with

- Control Box (not available at the time of this writing)
- K1780-2 PF-10/R
- K2203-1 Power Wave® 455M/STT
- K2205-1 Wire Drive Module

#### Multiple Wire Feeder System

- Load one feeder with solid wire, the other with flux cored.



- Great for pipeline work.

Shown with

- K2429-1 ArcLink T Cable Connector
- K2196-3 Power Feed® 15M
- K2203-1 Power Wave® 455M/STT

#### ArcLink Systems

Many other ArcLink systems may be assembled besides those shown in this manual. The majority will self configure. If an assembled system flashes the status light green rapidly on all components, contact the Lincoln Electric Company for further assistance.

Current Power Feed® 10M models that will not self configure...

- K2316-1 Power Feed® 10M Dual Boom

These configurations will require Dip Switches to be set. See the power source instruction manual on how to disable self configuration.

POWER FEED® 10M DUAL WIRE FEEDER



## SAFETY PRECAUTIONS

Read entire Operation section before operating the Power Feed® 10M Dual Wire Feeder.

### WARNING



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

- Do not touch electrically live parts or electrode with skin or wet clothing. Insulate yourself from work and ground.
- Always wear dry insulating gloves.



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

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



#### **WELDING SPARKS can cause fire or explosion.**

- Keep flammable material away.
- Do not weld on closed containers.



#### **ARC RAYS can burn eyes and skin.**

- Wear eye, ear and body protection.

Observe all safety information throughout this manual.

## DEFINITIONS OF WELDING MODES

### NON-SYNERGIC WELDING MODES

- A **Non-synergic** welding mode requires all welding process variables to be set by the operator.

### SYNERGIC WELDING MODES

- A **Synergic** welding mode offers the simplicity of single knob control. The machine will select the correct voltage and amperage based on the wire feed speed (WFS) set by the operator.

## COMMON WELDING ABBREVIATIONS

### WFS

- Wire Feed Speed

### CC

- Constant Current

### CV

- Constant Voltage

### GMAW (MIG)

- Gas Metal Arc welding

### GMAW-P (MIG)

- Gas Metal Arc welding-(Pulse)

### GMAW-PP (MIG)

- Gas Metal Arc welding-(Pulse-on-Pulse)

### GTAW (TIG)

- Gas Tungsten Arc welding

### SMAW (STICK)

- Shielded Metal Arc welding

### FCAW

- Flux Core Arc Welding

## PRODUCT DESCRIPTION

The Power Feed® 10M Dual Wire Feeder unit consists of a user interface and two wire drives. This unit will be available as a bench model or a boom model.

The Power Feed® 10M Dual Wire Feeder is a high performance, digitally controlled, modular wire feeder. Properly equipped, it can support the GMAW, GMAW-P, FCAW, SMAW, GTAW, and STT processes. The Power Feed® 10M Dual Wire Feeder is designed to be a part of a modular, multi process welding system. The Power Feed® 10M Dual Wire Feeder is a Semi-Automatic unit that is designed to interface with the Power Wave M family of welding machines. It consists of a user interface (UI) and wire drive (WD) that operate on 40VDC input power. The user interface is designed to act as a means to access the functionality (weld mode, run-in, volts, current etc.) of the welding system. The wire drive unit is a 4 driven roll feeder that can "push" various types of welding wire.

Each component in the system has special circuitry to "talk with" the other system components, so each component (power source, wire feeder, electrical accessories) knows what the other is doing at all times. This shared information lays the groundwork for a system with superior welding performance.

## DUAL HEAD UNIT

Two Control PC boards: one board supports user interface and wire drive functions and second board supports second wire drive functions.

## RECOMMENDED PROCESSES AND EQUIPMENT

### RECOMMENDED PROCESSES

The Power Feed® 10M Dual Wire Feeder can be set up in a number of configurations. They are designed to be used for GMAW, GMAW-P, FCAW and STT processes for a variety of materials, including mild steel, stainless steel, and cored wires. Other processes such as STT, SMAW and GTAW can be controlled using the user interface portion of the unit. (See Accessories Section for Part numbers and connections.

### RECOMMENDED EQUIPMENT

The Power Feed® 10M Dual Wire Feeder must be used with communication compatible welding equipment. That is, the communication protocol that is used in the welding system must be capable of communicating with the wire feeder. This would be any power source that has the **Arclink** receptacle available and is operating with **LincNet** or **Arclink** software.



## OPERATIONAL FEATURES AND CONTROLS

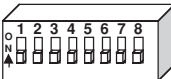
### Power Feed®-10M SERIES SYSTEM CONFIGURATION

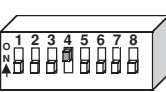
The specific system component function of the pc board will be configurable by dip switch or by software configuration tool. Dip switch configuration is as follows: Refer to DIP switch settings of figures below.

#### Notes:

1. Basic Power Feed®-10M systems consist of one User Interface (UI), and up to two wire drives (a dual head wire drive counts as two).

### POWER FEED-10M DUAL BENCH DIP SWITCH SETTINGS

UI/WD PCB - S25629 \_\_\_\_\_  (located on Wire Drive divider panel)

WD only PCB - S25616 \_\_\_\_\_  (located on Wire Drive rear access door)

### CONTROLS (Refer to Figure B.2)

#### 1. WIRE FEED SPEED (WFS) / AMP METER

This meter displays either the WFS or current value depending on the status of the machine. Located below the display are the text "WFS" and "Amps." An LED light is illuminated next to one of these in order to indicate the units of the value displayed in the meter.

- Prior to CV operation, the meter displays the desired pre-set WFS value.
- Prior to CC-Stick and CC-GTAW operation, the meter displays the preset current value.
- During Welding, the meter displays actual average amps, but may be configured to display actual WFS.
- After welding, the meter holds the actual current or WFS value for 5 seconds. During this time, the display is blinking to indicate that the machine is in the "Hold" period. Output adjustment while in the "Hold" period results in the "prior to operation" characteristics stated above.
- After the 5 second "Hold" period, the meter displays the set WFS (CV modes) or Amp (CC modes) value.

#### 2. VOLT / TRIM METER

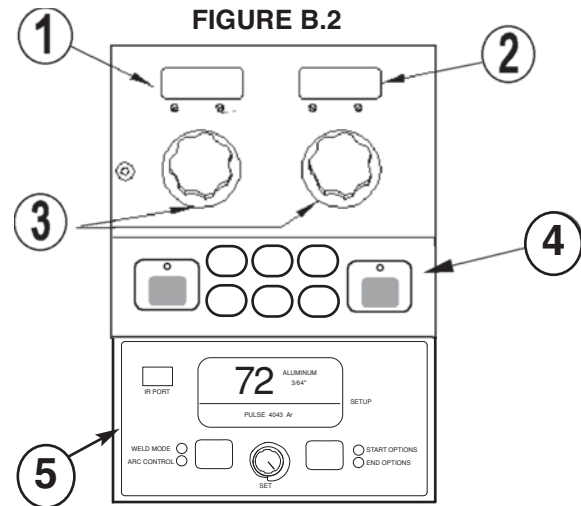
This meter displays either the voltage or trim value depending on the status of the machine. Located below the display are the text "Volts" and "Trim." An LED light is illuminated next to one of these in order to indicate the units of the value displayed in the meter.

### CV Processes

- Prior to CV-GMAW and CV-FCAW operation, the meter displays the desired preset Voltage value.
- Prior to CV-GMAW-P operation, the meter displays the desired preset Trim value.
- During Welding, the meter displays actual average volts.
- After welding, the meter holds the actual voltage value for 5 seconds. During this time, the display is blinking to indicate that the machine is in the "Hold" period. Output adjustment while in the "Hold" period results in the "prior to operation" characteristics stated above.
- After the 5 second "Hold" period, the meter displays the set Voltage (GMAW, FCAW) or Trim (GMAW-P) value.

### CC Processes

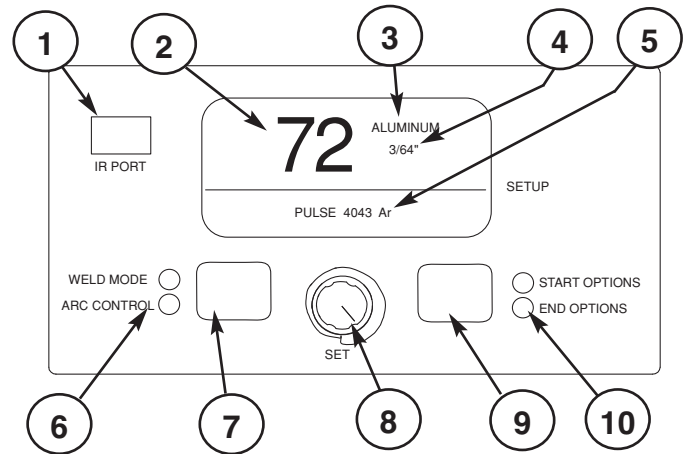
- The meter displays the status of the output.
- When output is enabled, the meter will display "ON."
- When there is no output, the meter will display "OFF."



3. OUTPUT CONTROLS

- The Power Feed® 10M Dual Wire Feeder has 2 encoder knobs to adjust weld parameters.
- Each encoder changes the displayed value of the meter located directly above that encoder.
- In CC-GTAW modes when equipped with a foot or hand amptrol, the left encoder sets the maximum welding current. Full depression of a foot or hand amptrol results in the preset level of current.
- In CC-Stick and CC-GTAW, the right encoder activates and de-activates the output. Turning the encoder clockwise enables the output. To de-energize the output, turn the encoder counter-clockwise. The display above will indicate the "ON" or "OFF" status of the output.

FIGURE B.3



4. DUAL PROCEDURE / DUAL HEAD SELECT W/MEMORY PANEL

(See Mode Select Panel Section for a Functional Description and detailed explanation)

This panel is intended for dual head applications, and is essentially the same as the Dual Procedure with Memory panel except for the addition of a second procedure select push button. It contains two procedure select buttons, one for each head, and six memory (storage) buttons.

In general terms, dual procedure and memory are essentially independent storage locations for information.

5. MODE SELECT PANEL 4 (MSP4)

OVERVIEW:

The MSP4 is the standard mode select panel for the Power Feed® 10M Dual Wire Feeder wire feeders. The MSP4 is capable of:

- Weld mode selection.
- Arc Control adjustment.
- Weld sequence control (Preflow Time, Run-in WFS, etc.)

ITEM	DESCRIPTION
1	IR (Infrared) Port. (Codes 11378 and below)
2	Weld Mode Number.
3	Weld Wire Type.
4	Wire Size.
5	Weld Mode Description.
6	Status LED Lights-Weld Mode/Arc Control.
7	Selection Pushbutton Weld Mode or Arc Control.
8	"Set" (Adjustment) Dial / Knob
9	Selection Pushbutton Start and End Options.
10	Status LED Lights-Start/End Options.

Through the use of alphanumeric displays, the MSP4 provides standard text messages designed to enhance the user's understanding of the machine's operation as well as provide advanced capabilities. The panel provides:

- Clear identification of the selected weld mode.
- Identification of weld modes not listed on the preprinted weld mode list label.
- Control of up to four wave controls (arc controls.)
- Weld mode specific wave control name display (Peak, Background, Pinch, etc.).
- Unit values are displayed (Amps, in/min, etc.).
- User-friendly machine setup and configuration.
- Limit setting for restricting the operators range of control.
- Lockout to prevent unauthorized changes to machine configuration.

(For Codes 11378 and below)

Additionally, the MSP4 includes an infrared (IR) port for wireless communication and configuration using a Palm OS based hand held computer and a simplified control layout.



## LAYOUT-CONTROLS (SEE FIGURE B.3)

The MSP4 panel controls (Items 7 and 9) set consist of an encoder knob Item 8 and two push buttons. The encoder is primarily used to change the value of the selected attribute.

The left pushbutton (Item 7) is used to toggle between Weld Mode selection and any active Arc Controls (a.k.a. wave controls). The choices of wave controls varies by weld mode. For example, weld mode 31 has one wave control, "Pinch". Weld mode 110 has three wave controls, "Peak Current", "Background Current" and "Tailout". If the selected weld mode has no wave controls, pressing the left pushbutton will have no effect. If the selected weld mode uses one or more wave controls, pressing the left pushbutton will sequence the selection from weld mode -> wave control 1 (if active) -> wave control 2 (if active) -> wave control 3 (if active) -> wave control 4 (if active) then back to weld mode.

The right pushbutton (Item 9) is used to select attributes that affect the available weld parameters such as preflow time, burnback time, etc. Since most users will require infrequent access to these attributes, they are separate from weld mode selection and wave control adjustment.

## LAYOUT-DIGITAL DISPLAY

The MSP4 display consists of a large 4-digit, 7-segment LED display, two 8-character alphanumeric LED displays and one 16-character alphanumeric LED display. The information shown on the various displays depends on the state of the user interface as described below.

When the MSP4 is being used to select a weld mode, the 4-digit display (Item 2) indicates the selected weld mode number. The upper 8-character alphanumeric display (Item 3) indicates the electrode type (steel, aluminum, etc.) The lower 8-character alphanumeric display (Item 4) indicates the electrode size (.035", 1/16", etc.).

The 16-character alphanumeric display (Item 5) indicates the process type and other information, the exact content of which depends on the selected weld mode. This additional information may include specific electrode type (e.g. 4043) and/or a description of the recommended gas (e.g. HeArCO<sub>2</sub>).

When the MSP4 is being used to change the value of an attribute, the 7-segment displays show the selected attribute's value. The upper 8-character alphanumeric display is typically not used while changing an attribute's value. The lower 8-character alphanumeric display is used to indicate the units of the selected attribute (e.g. seconds, in/min, etc.). The 16-character alphanumeric display is used to display the name of the selected attribute.

The content of the displays while the user interface is being used for advance machine configuration (e.g. limit setting, pass code entering, machine setup, etc.) is described in later sections.

## POWER-UP SEQUENCE

When power is first applied to the machine, a lamp test is performed. All discrete LED's are turned on, all 7-segment displays will show a pattern of "8." and all alphanumeric displays will show a hatch pattern where every-other pixel is illuminated. The lamp test will last for two seconds, after which all displays are turned back off. The 16-character alphanumeric display will show "Initializing..." while waiting for the Weld Sequencer to announce bus available. The MSP4 alphanumeric displays will then display the name of the weld table loaded in the power source while the user interface prepares the machine for operation. After all initialization is complete, the MSP4 will display the weld mode information for the mode number that was selected when the machine was last powered down.

## CHANGING WELD MODES

To select a weld mode, press the left MSP4 pushbutton until the WELD MODE LED is illuminated. Turn the MSP4 encoder until the desired weld mode number is displayed. As the MSP4 encoder knob is rotated, only the weld mode number is displayed. After 1 second of encoder idle time, the user interface will change to the selected weld mode and the new mode's electrode type, electrode size and process information will appear.

## WELD MODE SEARCHING

The Weld Mode Search feature allows the selection of a welding mode based on certain criteria (wire size, process type, etc.).

## SEARCHING FOR A WELD MODE

To search for a mode, turn the control knob until "Weld Mode Search" is displayed. This will appear in between the highest and the lowest weld mode numbers.

Once “Weld Mode Search” is displayed, pressing the right pushbutton labeled “Begin” will start the search process.

During the search process, pressing the right pushbutton typically acts as a “next” button and the left pushbutton typically acts as a “back” button.

Rotate the control knob then press the right pushbutton to select relevant welding details such as welding process, wire type, wire size, etc.

When the final selection is made, the PF-10M will automatically change to the weld mode found by the Weld Mode Search process.

Earlier products may not have this feature. To activate this feature, a software update may be needed from [www.powerwavesoftware.com](http://www.powerwavesoftware.com)

### CHANGING ARC WAVE CONTROL

If the selected weld mode uses any of the four available wave controls, users can press the left MSP4 pushbutton until the ARC CONTROL LED is illuminated. The value, name and units (if applicable) of the available wave controls will appear. Note that the name of the control is derived from the weld table and may not necessarily appear as "Wave Control". Repeated pressing of the left MSP4 pushbutton will cycle through all active wave controls and then the weld mode. Turning the MSP4 encoder will change the value of the displayed wave control.

### CHANGING WELD SEQUENCE BEHAVIOR

Weld sequencing attributes are grouped into two categories, START OPTIONS and END OPTIONS. START OPTIONS may include Preflow Time, Run-in Wire Feed Speed, and Start Time. END OPTIONS may include Spot Timer, Crater Time, Burnback Time and Postflow Time. The attributes that appear in the START and END OPTIONS are weld mode dependent. For example, if a TIG weld mode is selected, Run-in WFS will not appear since it is not relevant to the selected process. Repeated pressing of the right MSP4 pushbutton will cycle through all relevant START and END OPTIONS. Turning the MSP4 encoder will change the value of the selected option.

When the Start Time attribute is set to a value other than OFF, the START OPTIONS LED will blink synchronous with the WFS and VOLTS/TRIM LED's on the dual-display panel. This blinking is used to indicate that start wire feed speed and voltage/trim can now be set to values different from those used while welding.

Similarly, if the Crater Time attribute is set to a value other than OFF, the END OPTIONS LED will blink synchronously with the dual-display LED's, indicating that crater wire feed speed and voltage/trim now can be set to values different from those used while welding.

### INFRARED (IR) CONTROL

(For Codes 11378 and below)

The MSP4 interface includes an infrared transceiver. This allows wireless machine configuration using a Palm OS based hand held computer. A proprietary Palm OS application, ALPalm, was developed for this purpose. (Contact Lincoln Electric for more information on this feature.)

### LOCKOUT/SECURITY

The MSP4 can be optionally configured to prevent the welder from changing selected MSP4 options. By default, the welder will be able to change the weld mode, all relevant wave controls and all relevant start and end options.

### LIMIT SETTING

The MSP4 can be optionally configured to limit the operator's range of control of any weld parameter (weld WFS, arc control, etc.). Limits are only available with the Dual Procedure/Memory Panel.

### MACHINE SETUP/USER PREFERENCES

The MSP4 can be used to configure and troubleshoot the machine.

### ACCESSING THE MACHINE SETUP MENU

To access the Machine Setup menu, press both MSP4 push buttons simultaneously. The MSP4 7-segment display will display the first user preference, "P.0", and the SETUP LED will illuminate.

- Pressing the left MSP4 pushbutton will exit the entire Machine Setup menu while in the P.0 user preference.
- Turning the MSP4 encoder knob will select other available User Preferences.
- To exit the User Preference Menu, either rotate the MSP4 encoder until P.0 is displayed and press the left MSP4 pushbutton or press both MSP4 push buttons simultaneously at any time.

## SET-UP FEATURES MENU

The Setup Menu gives access to the Setup Configuration. Stored in the setup configuration are user parameters that generally only need to be set at installation. The parameters are grouped as shown in the following table.

PARAMETER	DEFINITION
P.1 through P.99 P.100 through P.107	Unsecured Parameters (always adjustable) Diagnostic Parameters (always read only)

### SET-UP FEATURES MENU

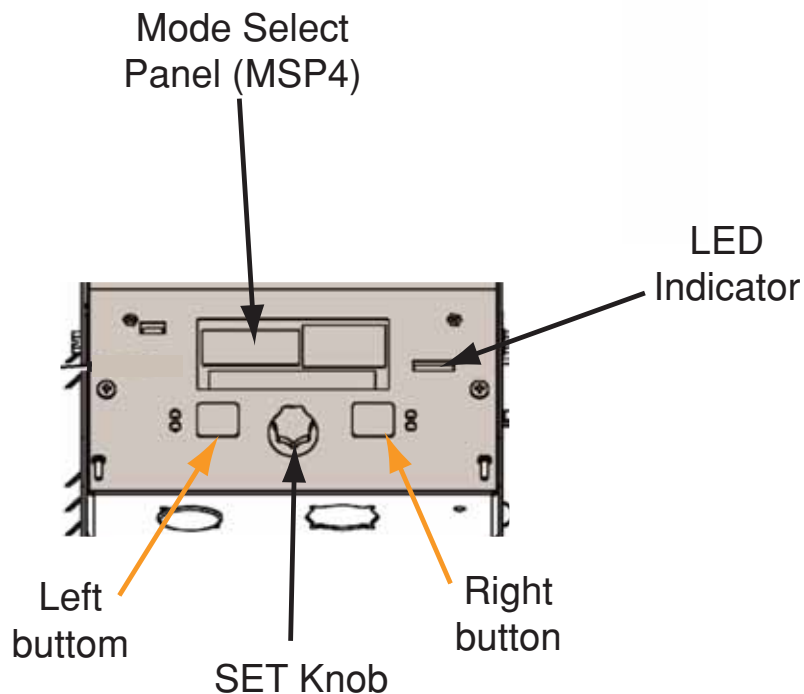
(See Figure B.3a)

1. To access the set-up menu, press the **Right** and **Left** buttons of the **MSP4** panel simultaneously. **Note** that the set-up menu cannot be accessed if the system is welding, or if there is a fault (The status **LED** is not solid green).

Change the value of the blinking parameter by rotating the **SET** knob.

2. After changing a parameter it is necessary to press the **Right** hand button to save the new setting. Pressing the **Left** button will cancel the change.
3. To exit the set-up menu at any time, press the **Right** and **Left** buttons of the MSP4 panel simultaneously. Alternately, 1 minute of inactivity will also exit the set-up menu.

FIGURE B.3a - SETUP MENU



## USER DEFINED PARAMETERS

Parameter	Definition
<b>P.0</b>	<p><b>Exit Setup Menu</b></p> <p>This setup menu parameter can be used to exit the setup menu. When <b>P.0</b> is displayed, press the left Mode Select button to exit the setup menu.</p>
<b>P.1</b>	<p><b>Wire Feed Speed Units</b></p> <p>This option selects which units to use for displaying wire feed speed.            English = inches/minute wire feed speed units (default).            Metric = meters/minute wire feed speed units.</p>
<b>P.2</b>	<p><b>Arc Display Mode</b></p> <p>This option selects what value will be shown on the upper left display while welding.            Amps = The left display shows Amperage while welding (default).            WFS = The left display shows Wire Feed Speed while welding.</p>
<b>P.3</b>	<p><b>Display Options</b></p> <p>This setup parameter was previously named "Display Energy"</p> <p>If the previous software revision had this parameter set to display energy, that selection will remain.</p> <p>This option selects the information displayed on the alphanumeric displays while welding. Not all P.3 selections will be available on all machines. In order for each selection to be included in the list, the power source must support that feature. A software update of the power source may be needed to include the features.</p> <p>Standard Display = The lower displays will continue to show preset information during and after a weld (default).            Show Energy = Energy is displayed, along with time in HH:MM:SS format.            Show Weld Score = The accumulative weld score result is shown.</p>
<b>P.4</b>	<p><b>Recall Memory with Trigger</b></p> <p>This option allows a memory to be recalled by quickly pulling and releasing the gun trigger. To recall a memory, quickly pull and release the trigger the number of times that correspond to the memory number. For example, to recall memory 3, quickly pull and release the trigger 3 times. To recall memory 1, quickly pull and release the trigger the number of user memories plus 1. Memories cannot be recalled while the system is welding.</p> <p>Disabled = The gun trigger cannot be used to recall user memories (default).            Enabled = The gun trigger can be used to recall user memories.</p>

## USER DEFINED PARAMETERS

Parameter	Definition
<p><b>P.5</b></p>	<p><b>Procedure Change Method</b></p> <p>This option selects how remote procedure selection (A/B) will be made. The selected procedure can be changed locally at the user interface by pressing the 'A-Gun-B' button. The following methods can be used to remotely change the selected procedure:</p> <ul style="list-style-type: none"> <li>• Use an external switch wired to the procedure select input.</li> <li>• Quickly releasing and re-pulling the gun trigger.</li> <li>• Using a dual-schedule gun which incorporates a procedure select switch in the trigger mechanism (pulling the trigger more than half way changes the procedure from A to B)</li> </ul> <p>The possible values for this parameter are:</p> <ul style="list-style-type: none"> <li>• External Switch = Procedure selection may only be performed at the memory panel or an external switch (e.g. K683).</li> <li>• Quick Trigger = The selected procedure can be changed remotely by releasing and re-pulling the trigger quickly while welding. This feature is disabled in 4-Step trigger mode. The external procedure switch is disabled. To operate: <ul style="list-style-type: none"> <li>- Select "GUN" on the memory panel.</li> <li>- Start the weld by pulling the gun trigger. The system will weld with procedure A settings.</li> <li>- While welding, quickly release then pull the gun trigger once. The system will switch to procedure B settings. Repeat to switch back to procedure A settings. The procedure can be changed as many times as needed during the weld.</li> <li>- Release the trigger to stop welding. The system will automatically return to procedure A settings.</li> </ul> </li> <li>• Integral TrigProc = When using a Magnum DS dual-schedule gun (or similar) that incorporates a procedure switch in the gun trigger mechanism. While welding in 2-step, machine operation is identical to the "External Switch" selection. When welding in 4-step, additional logic prevents procedure A from being re-selected when the trigger is released at step 2 of the 4-step weld sequence. The machine will always operate in 2-step if a weld is made exclusively in procedure A, regardless of the 2/4 step switch position (this is intended to simplify tack welding when using a dual-schedule gun in 4-step).</li> </ul>
<p><b>P.6</b></p>	<p><b>Stall Factor Adjustment</b></p> <p>This option allows the adjustment of the stall factor in Push/Pull operation. The stall factor controls the stall torque of the push motor when using a push-pull gun. The wire feeder is factory-set to not stall unless there is a large resistance to feeding wire. The stall factor can be reduced to stall more easily and possibly prevent bird nesting. However, low stall factors can cause motor stalling during normal welding conditions, which results in the wire burning back to the tip or rapid tack welds. If you are experiencing bird nests, check for other feeding problems before adjusting the stall factor. The default value for the stall factor is 75, with a range of 5 to 100.</p>

## USER DEFINED PARAMETERS

Parameter	Definition
P.7	<p><b>Gun Offset Adjustment</b></p> <p>This option adjusts the wire feed speed calibration of the pull motor of a push-pull gun. This should only be performed when other possible corrections do not solve any push-pull feeding problems. An rpm meter is required to perform the pull gun motor offset calibration. To perform the calibration procedure do the following:</p> <ol style="list-style-type: none"> <li>1. Release the pressure arm on both the pull and push wire drives.</li> <li>2. Set the wire feed speed to 200 ipm.</li> <li>3. Remove wire from the pull wire drive.</li> <li>4. Hold an rpm meter to the drive roll in the pull gun.</li> <li>5. Pull the trigger on the push-pull gun.</li> <li>6. Measure the rpm of the pull motor. The rpm should be between 115 and 125 rpm. If necessary, decrease the calibration setting to slow the pull motor, or increase the calibration setting to speed up the motor. The calibration range is -30 to +30, with 0 as the default value.</li> </ol>
P.8	<p><b>TIG Gas Control</b></p> <p>This option allows control over which gas solenoid actuates while TIG welding.</p> <p>"Valve (manual)" = No MIG solenoid will actuate while TIG welding, gas flow is manually controlled by an external valve.</p> <p>"Solenoid (auto)" = This selection only applicable to PWC300. The MIG solenoid will turn on and off automatically while TIG welding.</p> <p>"Feeder Solenoid" = No applicable to PWC300. The internal (feeder) MIG solenoid will turn on and off automatically while TIG welding.</p> <p>"Pwr Src Solenoid" = Not applicable to PWC300. Any gas solenoid connected to the power source will turn on and off automatically while TIG welding. This selection will not appear in the list if the power source does not support a gas solenoid.</p> <p><b>Notes:</b> Preflow is not available while TIG welding. Postflow is available - the same postflow time will be used in MIG and TIG. When machine output on/off is controlled via the upper right knob, gas flow will not start until the tungsten touches the work. Gas flow will continue when the arc is broken until the Postflow time expires. When machine output on/off is controlled via an arc start switch or foot Amptrol, gas will begin flowing when the output is turned on and will continue flowing until the output is turned off and the Postflow time expires.</p>
P.9	<p><b>Crater Delay</b></p> <p>This option is used to skip the Crater sequence when making short tack welds. If the trigger is released before the timer expires, Crater will be bypassed and the weld will end. If the trigger is released after the timer expires, the Crater sequence will function normally (if enabled).</p>
P.14	<p><b>Reset Consumable Weight</b></p> <p>Use this option to reset the initial weight of the consumable package. Press the Right Button to reset the consumable weight. This option will only appear with systems using Production Monitoring.</p>



## USER DEFINED PARAMETERS

Parameter	Definition
P.16	<p><b>Push-Pull Gun Knob Behavior</b></p> <p>This option determines how the potentiometer on the Push/Pull torch will behave.</p> <p>Gun Pot Enabled = The welding wire feed speed is always controlled by the potentiometer on the push-pull gun (default). The left front panel knob is only used to adjust Start and Crater wire feed speed.</p> <p>Gun Pot Disabled = The wire feed speed is always controlled by the left front panel knob. This setting is useful when the operator wishes to have wire feed speed settings recalled from memories and not have the potentiometer "overwrite" the setting.</p> <p>Gun Pot Proc A = When in procedure A, the welding wire feed speed is controlled by the potentiometer on the push-pull gun. When in procedure B, the welding wire feed speed is controlled by the left front panel knob. This setting allows a fixed wire feed speed to be selected in procedure changes.</p>
P.20	<p><b>Display Trim as Volts Option</b></p> <p>This option determines how trim is displayed.</p> <p>False = The trim is displayed in the format defined in the weld set (default).</p> <p>True = All trim values are displayed as a voltage.</p>
P.22	<p><b>Arc Start/Loss Error Time</b></p> <p>This option can be used to optionally shut off output if an arc is not established, or is lost for a specified amount of time. Error 269 will be displayed if the machine times out. If the value is set to OFF, machine output will not be turned off if an arc is not established nor will output be turned off if an arc is lost. The trigger can be used to hot feed the wire (default). If a value is set, the machine output will shut off if an arc is not established within the specified amount of time after the trigger is pulled or if the trigger remains pulled after an arc is lost. This is disabled while welding in Stick, TIG or Gouge. To prevent nuisance errors, set Arc Start/Loss Error Time to an appropriate value after considering all welding parameters (run-in wire feed speed, weld wire feed speed, electrical stick out, etc). To prevent subsequent changes to Arc Start/Loss Error Time, the setup menu should be locked out by setting Preference Lock = Yes using the Power Wave Manager software.</p>
P.80	<p><b>Sense From Studs</b></p> <p>Use this option for diagnostic purposes only. When power is cycled, this option is automatically reset to False.</p> <p>False = Voltage sensing is automatically determined by the selected weld mode and other machine settings (default).</p> <p>True = Voltage sensing is forced to "studs".</p>
P.81	<p><b>Sense Leads Selection</b></p> <p>Used in place of DIP switches for configuration of the work and electrode sense leads. This option will only appear in the list if the power source has a hardware selection option.</p> <p>67 pos polarity = An electrode sense lead is connected using positive polarity. This is used by most GMAW welding procedures.</p> <p>67 neg polarity = An electrode sense lead is connected using negative polarity. This is used by most GTAW welding procedures and some Innershield procedures.</p> <p>67 &amp; 21 = An electrode sense lead and work sense lead are connected.</p> <p>Hardware Config = The hardware determines the best remote sensing configuration. This is applicable to MIG welding procedures only.</p>
P.82	<p><b>Voltage Sense Display</b></p> <p>Allows viewing of Voltage Sense Lead Selection to aid in troubleshooting. The configuration is displayed as a text string on the lower display whenever the output is enabled. This parameter is not saved on a power cycle, but will be reset to False.</p>



## USER DEFINED PARAMETERS

Parameter	Definition
P.99	<p><b>Show Test Modes</b></p> <p>Most power sources contain weld modes used for calibration and test purposes. By default, the machine does not include test weld modes in the list of weld modes that are available to the operator. To manually select a test weld mode, set this option to "Yes". When the power source is turned off and back on again, the test modes will no longer appear in the mode list. Test weld modes typically require the machine output to be connected to a grid load and cannot be used for welding.</p>
P.100	<p><b>View Diagnostics</b></p> <p>Diagnostics are only used for servicing or troubleshooting the Power Wave system. Select "Yes" to access the diagnostic options in the menu. Additional parameters will now appear in the setup menu (P.101, P.102, etc).</p>
P.101	<p><b>View Event Logs</b></p> <p>Used for viewing all the system event logs. Press the Right Button to enter the option. Rotate Control Knob to select the desired event log to read. Press the Right Button again to enter the selected log. Rotating the Control Knob will scroll through the event log, displaying the log index number, event code and some other data. Press the Left Button to back out to select another log. Press the Left Button again to exit this option.</p>
P.102	<p><b>View Fatal Logs</b></p> <p>Used for viewing all the system fatal logs. Press the Right Button to enter the option. Rotate Control Knob to select the desired fatal log to read. Press the Right Button again to enter that log. Rotating the Control Knob will scroll through the log, displaying the log index number and fatal code. Press the Left Button to back out to select another log. Press the Left Button again to exit this option.</p>
P.103	<p><b>View Software Version Information</b></p> <p>Used for viewing the software versions for each board in the system. Press the Right Button to enter the option. Rotate Control Knob to select the desired board to read. Press the Right Button again to read the firmware version. Press the Left Button to back out to select another board. Rotate the Control Knob to select another board, or press the Left Button to exit this option.</p>
P.104	<p><b>View Hardware Version Information</b></p> <p>Used for viewing the hardware version for each board in the system. Press the right MSP Button to enter the option. Rotate Set knob to select the desired board to read. Press the right button again to read the hardware version. Press the left button to back out to select another board. Press the left button again to exit this option.</p>
P.105	<p><b>View Welding Software Information</b></p> <p>Used for viewing the Weld Set in the Power Source. Press the Right Button to read the Weld Set version. Press the Left Button to back out and exit this option.</p>
P.106	<p><b>View Ethernet IP Address</b></p> <p>Used for viewing the IP address of Ethernet compatible equipment. Press the Right Button to read the IP Address. Press the Left Button to back out and exit this option. The IP address cannot be changed using this option.</p>
P.107	<p><b>View Power Source Protocol</b></p> <p>Used for viewing the type of power source the feeder is connected to. Press the Right Button to identify the power source as either LincNet or ArcLink. Press the Left Button to back out and exit this option.</p>

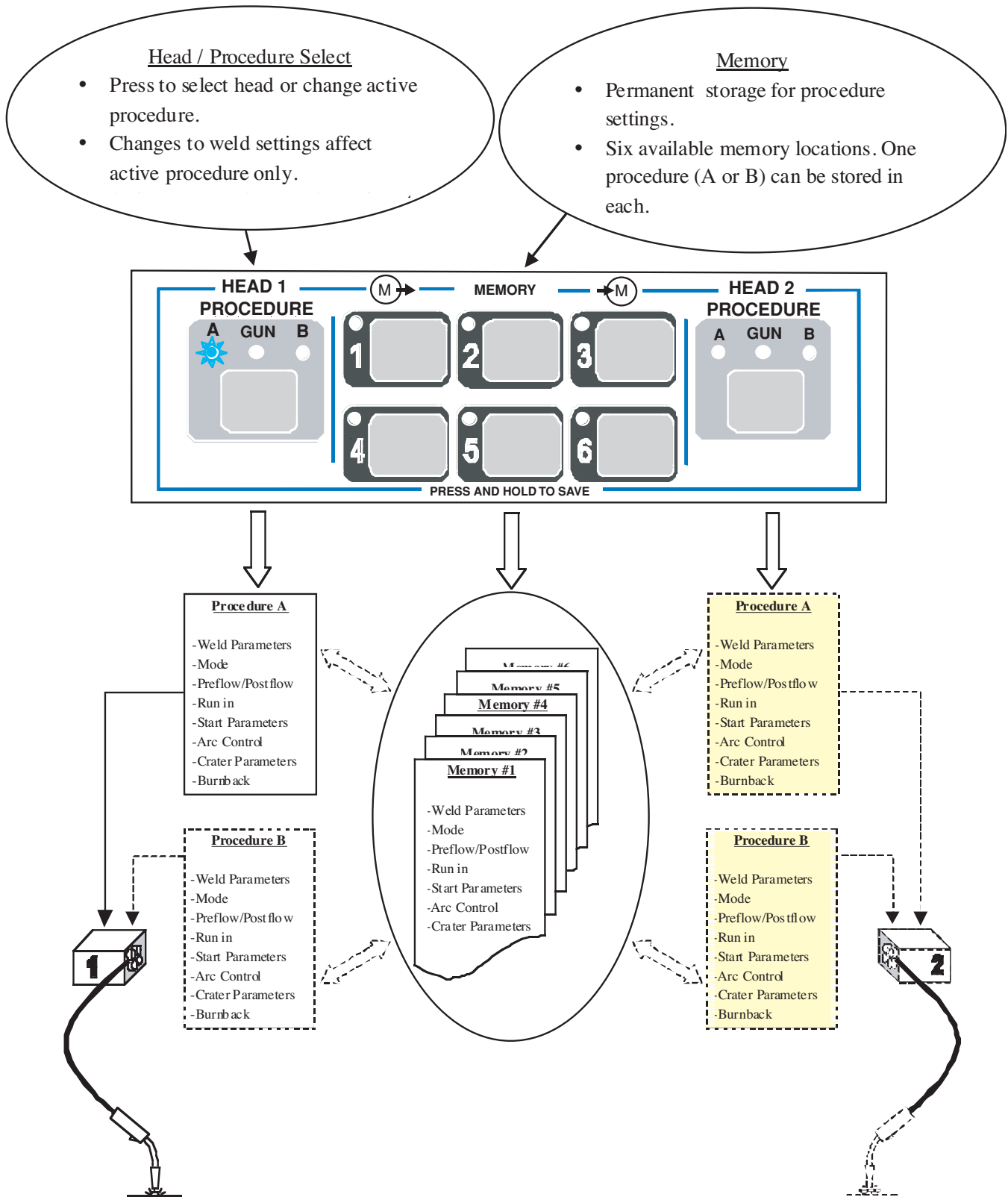
## USER DEFINED PARAMETERS

Parameter	Definition
P.501	<p><b>Encoder Lockout</b></p> <p>Locks one or both of the upper knobs (encoders), preventing the operator from changing wire feed speed, amps, volts or trim. The function of each upper knob depends on the selected weld mode. When a constant current weld mode is selected (e.g. Stick, TIG, Gouge), the upper right knob will always function as an on/off switch. This parameter can only be accessed using Power Wave Manager software.</p>
P.502	<p><b>Memory Change Lockout</b></p> <p>Determines if the memories can be overwritten with new contents.            No = Memories can be saved and limits can be configured (default).            Yes = Memories cannot be changed - saving is prohibited and limits cannot be re-configured.            This parameter can only be accessed using Power Wave Manager software.</p>
P.503	<p><b>Memory Button Disable</b></p> <p>Disables the specified memory button(s). When a memory is disabled, welding procedures cannot be restored from or saved to that memory. If an attempt is made to save or restore a disabled memory, a message will be displayed on the lower display indicating the memory number is disabled. In multi-head systems, this parameter disables the same memory buttons on both feed heads. This parameter can only be accessed using Power Wave Manager software.</p>
P.504	<p><b>Mode Select Panel Lock</b></p> <p>Selects between several Mode Select Panel lockout preferences. When a Mode Select Panel selection is locked and an attempt is made to change that parameter, a message will be displayed on the lower display indicating the parameter is locked.</p> <p>All MSP Options Unlocked = All adjustable parameters on the Mode Select Panel are unlocked.            All MSP Options Locked = All knobs and buttons on the Mode Select Panel are locked.            Start &amp; End Options Locked = The Start and End parameters on the Mode Select Panel are locked, all others are unlocked.            Weld Mode Option Locked = The weld mode cannot be changed from the Mode Select Panel, all others Mode Select Panel settings are unlocked.            Wave Control Options Locked = The Wave Control parameters on the Mode Select Panel are locked, all others are unlocked.            Start, End, Wave Options Locked = The Start, End and Wave Control parameters on the Mode Select Panel are locked, all others are unlocked.            Start, End, Mode Options Locked = The Start, End and Weld Mode Select parameters on the Mode Select Panel are locked, all others are unlocked.            This parameter can only be accessed using Power Wave Manager software.</p>
P.505	<p><b>Setup Menu Lock</b></p> <p>Determines if the setup parameters can be modified by the operator without entering a passcode.</p> <p>No = The operator can change any set menu parameter without first entering the passcode even if the passcode is non-zero (default).            Yes = The operator must enter the passcode (if the passcode is non-zero) in order to change any setup menu parameters.            This parameter can only be accessed using Power Wave Manager software.</p>

## USER DEFINED PARAMETERS

Parameter	Definition
<b>P.506</b>	<b>Set User Interface Passcode</b> Prevents unauthorized changes to the equipment. The default passcode is zero which allows full access. A nonzero passcode will prevent unauthorized: changes to memory limits, saving to memory (if P.502 = Yes), changes to setup parameters (if P.505 = Yes). This parameter can only be accessed using Power Wave Manager software.
<b>P.509</b>	<b>UI Master Lockout</b> Locks all user interface controls, preventing the operator from making any changes. This parameter can only be accessed using Power Wave Manager software.

FIGURE B.4



Each procedure contains/stores the following information:

- Basic weld parameters as applicable - WFS, Volts, Trim, Amps
- Weld Mode - Mode Number
- Preflow/Postflow - Time in Seconds
- Run in - WFS Only (work point determined by next active sequence state)
- Start Parameters - Status, Slope Time, WFS, Volts, Trim, Amps
- Arc Control - Setpoint
- Crater Parameters - Status, Slope Time, WFS, Volts, Trim, Amps
- Burnback - Time in Seconds
- Limits - All applicable limits.

## DUAL HEAD / DUAL PROCEDURE WITH MEMORY

In general terms, dual procedure and memory are essentially independent storage locations for information. Procedures can be thought of as temporary or working storage locations because they contain the weld settings readily available for use, and when active, are easily modified. The dual procedure feature allows the operator to switch between procedures (A and B) "on the fly" while welding. In addition to their procedure set-up functions, the procedure select push buttons serve as a means to manually select the active feed head (wire drive). Memory is more of a permanent storage location that cannot be accessed while welding. It contains one complete set of procedure information which can be recalled into the active procedure (A or B). Conversely, the active procedure can be saved into memory for safe keeping.

### Dual Procedure / Head Select

This feature allows the user to select Procedure A, Gun (Remote Select), or Procedure B, as well as selecting the active feed head (wire drive). The active feed head is indicated by the procedure group (A, Gun, B) with the illuminated LED(s), and only one procedure group / feed head can be active at a time. Changing the active feed head can be done in one of two ways. Either remotely, by pulling the trigger of the inactive feed head, or locally by momentarily depressing the procedure select push-button of the inactive head.

When a procedure group / feed head is active, momentarily depressing the procedure select pushbutton will change from A to Gun, from Gun to B, or from B to A. The corresponding LED will be lit to let the user know which procedure is active. When the Gun position is selected, the Gun LED will be solid red, and the active procedure LED (A or B) will be flashing.

The active procedure is determined by the dual procedure (Gun) input located in the gun receptacle, or through the "Procedure Change with Trigger" feature if properly configured.

Note:

When in the Gun position, if no dual procedure (Gun) switch is plugged in, the Procedure defaults to A.

There are a total of four independent procedures available on this panel. Two for each feed head.

Both the contents of the active procedure, and the active procedure itself (A to B, or B to A) can be changed "on the fly" during welding. Changing the active status of the feed head can only be done when the system is in the idle state. Procedure settings for each feed head, and active procedure information are saved at power down.

### Memory

This feature allows the user to save and recall up to six individual procedures to/from a secured storage location. Each of the six memory locations is capable of storing a complete copy of the information associated with a single procedure (A or B) including its individual limits. See the complete list above.

Memories can be accessed at anytime, except when welding. For wire fed processes this means anytime a trigger is NOT activated. For CC processes it means anytime current is NOT flowing.

### Saving to Memory

To save an individual procedure (A or B) to memory, first be sure the desired procedure of the desired feed head is active (its LED is on). Press and hold the button of the memory location you wish to store the procedure into. After 2 seconds, the LED above the memory button will begin to flash indicating that the procedure has been saved. The LED will continue to flash as long as the memory button is depressed. When released the memory LED will stay on steady, and remain lit as long as the contents of the memory remain equal to the contents of the associated procedure.

If the memory button is released before the light begins to flash ( $t < 2s$ ), a memory recall function will occur instead of a save function (i.e. the contents of the selected memory will copied to the active procedure).

Note:

It is not required to load all 6 memories at once, nor is it necessary to load them in order.

## Recalling from Memory

To recall the contents of a memory into the active procedure, momentarily push the desired memory button (for less than 2 seconds). The saved parameters will be copied into the active procedure, and the LED of the memory button will light indicating the source of the information. As with saving to memory, this light will remain lit as long as the contents of the source memory remain equal to the contents of the associated procedure.

If a constant current mode is saved to memory with the power source in the "on" state, the "on" status will be changed to "off" when the procedure is recalled. This prevents a potential safety hazard if a memory button is pushed and the power source unexpectedly turns on.

## 2 STEP / 4 STEP OPERATION

The Wire Drive has a 2 Step / 4 Step switch located near the gun connector. 2-Step Trigger Mode operation requires the operator hold the gun trigger closed in order to weld. 4-Step Trigger Mode eliminates the need to hold the gun trigger closed while welding. User-selectable 4-step modes with or without current interlock. The switch in the down position will enable 2-Step operation and in the up position enables 4 - Step operation. This switch has no effect in CC modes of operation, such as stick welding. Both 2 and 4 - Step can be operated in Synergic and Non-Synergic modes. In a Synergic mode, machine output tracks Wire Feed Speed (WFS) during welding. In Non-Synergic modes, machine output is independent of WFS.

### 2 Step Synergic Operation:

Without Start/Crater/Burnback functions active

#### Waveform Sequence:

1. Trigger is pulled; Prewflow sequence begins and runs until preflow timer expires.
2. Run-In sequence initiates until Arc is established.
3. Arc established; Weld sequence begins.
4. Trigger released (Arc extinguished); Postflow sequence begins and runs until postflow timer expires.
5. End of sequence.



#### WFS vs. Work point Waveform

—= solid line represents WFS  
 ---= dashed line represents Work point or Machine Output

### 2 Step Synergic Operation: With Burnback function active.

#### Waveform Sequence:

1. Trigger is pulled; Prewflow sequence begins and runs until preflow timer expires.
2. Run-In sequence initiates until Arc is established.
3. Arc established; Weld sequence begins.
4. Trigger released (Arc extinguished); Burnback sequence begins and runs until burnback timer expires.
5. Postflow sequence begins and runs until postflow timer expires.
6. End of sequence.



#### WFS vs. Work point (Output) Waveform

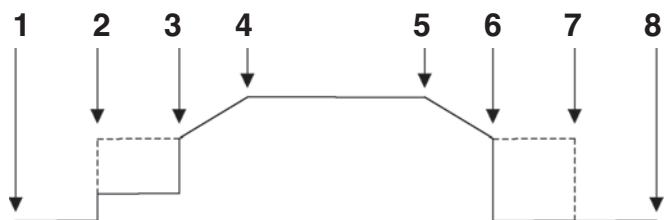
—= solid line represents WFS  
 ---= dashed line represents Work point or Machine Output

### 2 Step Synergic Operation:

With Start/Crater/Burnback functions active.

#### Waveform Sequence:

1. Trigger is pulled; Prewflow sequence begins and runs until preflow timer expires.
2. Run-In sequence initiates until Arc is established.
3. Arc established; Start sequence begins and runs for the amount of time set.
4. Weld sequence begins.
5. Trigger released; Crater sequence begins and runs until crater timer expires.
6. Arc Extinguished; Burnback sequence begins and runs until burnback timer expires.
7. Postflow sequence begins and runs until postflow timer expires.
8. End of process.



#### WFS vs. Work point (Output) Waveform

—= solid line represents WFS  
 ---= dashed line represents Work point or Machine Output



#### 4 Step Synergic Operation: Without Start/Crater/Burnback functions active

##### Waveform Functionality:

1. Trigger is pulled and released; Preflow sequence begins and runs until Preflow timer expires.
2. Run-In sequence begins and runs until Arc is established
3. Arc established; Weld sequence begins.
4. Trigger pulled; Weld sequence continues.  
Note: This can be done anytime between Step 3 and 5.
5. Trigger released; Postflow sequence begins and runs until Postflow timer expires.
6. End of sequence.



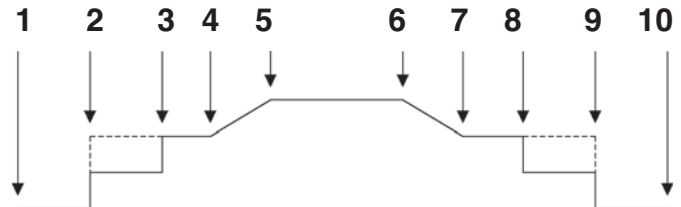
##### WFS vs. Work point Waveform

— = solid line represents WFS  
 --- = dashed line represents **Work point** or **Machine Output**

#### 4 Step Synergic Operation: With Start/Crater/Burnback functions active

##### Waveform Functionality:

1. Trigger is pulled and released; Preflow sequence begins and runs until Preflow timer expires.
2. Run-In sequence begins and runs until Arc is established.
3. **Arc established**; Work point moves to set value in Start sequence.
4. **Trigger released**; Step 4 to 5 is start time set in Start sequence to get to Weld sequence.
5. Weld sequence begins and runs until trigger is pulled.
6. **Trigger pulled and held**; Crater sequence begins. Work point, WFS move to set value in Crater sequence in the amount of time set within Crater sequence.
7. Work point, WFS Crater values held until trigger is released.
8. **Trigger released**; Burnback sequence begins and runs until Burnback timer expires.
9. Postflow sequence begins and runs until Postflow timer expires.
10. End of sequence.



##### WFS vs. Work point (Output) Waveform

— = solid line represents WFS  
 --- = dashed line represents work point or machine output

##### Additional Comments:

- To achieve a Hot Start routine, the values in step 2 (Run-In and Strike) can be set such that work point (output) is set to a desired level, while the Weld work point level will be set to a normal or nominal level for the particular process.

Example Strike Value: 350A

Strike Time: 0.1 sec.

Weld Value: 170A

When the process is initiated, the work point will jump to Strike work point of 350A with the set Run-In WFS. When the trigger is released, the work point will jump to 170A in the 0.1 seconds and the Weld sequence will begin, traversing through the rest of the sequence using the functions set forth.

## COLD FEED/GAS PURGE SWITCH

The Wire Drive has a Cold Feed/Gas Purge Switch located near the gun connector. This is an up/down center-off momentary toggle switch.

When held in the up position, the Wire Drive will feed wire, but neither the power source nor the gas solenoid will be energized. When cold feeding, the feed speed can be adjusted by rotating the WFS encoder knob on the Control Box. Adjusting the cold feed will not affect the run in or welding wire feed speed. When the cold feed switch is released, the cold feed value is saved.

When this switch is held in the down position, the gas solenoid valve is energized, but neither the power source nor the drive motor will be energized.



## HOT INCH

Hot inch occurs when the trigger is pulled and an arc is not established. After a 2.5 second period, the Sequencer will jump to the Weld state and the wire feeder will run at the preset wire feed speed on the display. The wire is hot (output is on) at this point. Start, Upslope, Downslope, Crater, Burnback, Postflow, etc are all skipped when Hot Inch is activated.

## FOOT AMPCTRL

A Foot Ampctrl Kit can be installed in order to operate the output of the machine using a pedal. Located on the Control Box, the Right encoder turns output on/off if desired. The left encoder sets the max work point limit. When the pedal is pressed OCV will be present and gas will not flow. As soon as the tungsten touches the work and there is current flow, the gas solenoid will turn on. If the arc breaks the machine will enter the postflow state. When the postflow timer expires, the machine will return to OCV mode and no gas will flow until the arc is established. If the pedal is released it turns the machine off, postflow will be entered until time out. When the postflow timer expires the machine will return to idle state and wait for trigger. Preflow will be presettable for external triggers if desired. Triggering machine with encoder will skip preflow.

## WIRE DRIVE -- PC BOARD ADJUSTMENTS

### ELECTRODE POLARITY:

The system needs to be aware of the electrode polarity. A DIP switch setting on the Wire Drive PC boards is used for this purpose. See INSTALLATION Section "Setting DIP Switches in the Wire Drive".

### GEAR BOX RATIO:

The systems needs to know which gear has been installed on the Wire Drive, low or high speed. A DIP switch setting on the Wire Drive PC boards is used for this purpose. See INSTALLATION section "Wire Drive Ratio" for information on how to set the DIP Switch.

## WIRE REEL LOADING - READI-REELS, SPOOLS OR COILS

### To Mount a 30 Lb. (14 kg) Readi-Reel Package (Using the Molded Plastic K363-P Readi-Reel Adapter:)

The Spindle should be located in the **LOWER** mounting hole.

- 1) Depress the Release Bar on the Retaining Collar and remove it from the spindle. **See Figure B.1.**
- 2) Place the Adapter on the spindle.
- 3) Re-install the Retaining Collar. Make sure that the Release Bar "pops up" and that the collar retainers fully engage the retaining groove on the spindle.
- 4) Rotate the spindle and adapter so the retaining spring is at the 12 o'clock position.
- 5) Position the Readi-Reel so that it will rotate in a direction when feeding so as to be de-reeled from bottom of the coil.
- 6) Set one of the Readi-Reel inside cage wires on the slot in the retaining spring tab.
- 7) Lower the Readi-Reel to depress the retaining spring and align the other inside cage wires with the grooves in the molded adapter.
- 8) Slide cage all the way onto the adapter until the retaining spring "pops up" fully.

### CAUTION

Check to be sure the Retaining Spring has 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.

- 9) To remove Readi-Reel from Adapter, depress retaining spring tab with thumb while pulling the Readi-Reel cage from the molded adapter with both hands. Do not remove adapter from spindle.

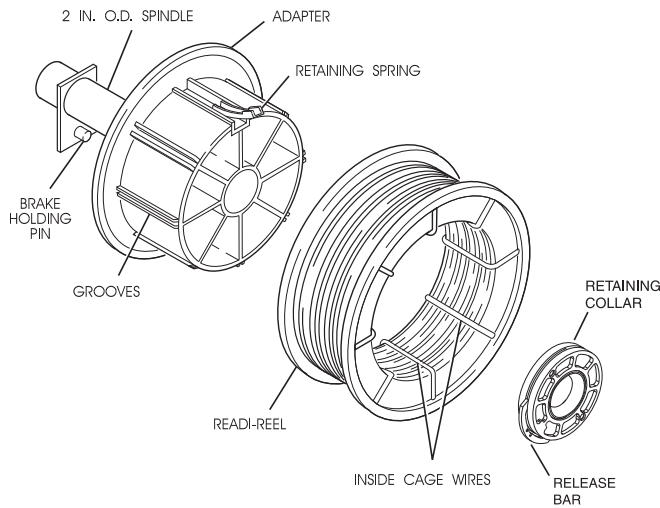


FIGURE B.1

### To Mount 10 to 44 Lb. (4.5-20 kg) Spools (12"/300 mm Diameter) or 14Lb.(6 Kg) Innershield Coils:

The Spindle should be located in the **LOWER** mounting hole.

(For 8" (200 mm) spools, a K468 spindle adapter must first be slipped onto spindle.)

(For 13-14 lb. (6 Kg) Innershield coils, a K435 Coil Adapter must be used).

- 1) Depress the Release Bar on the Retaining Collar and remove it from the spindle.
- 2) Place the spool on the spindle making certain the spindle brake pin enters one of the holes in the back side of the spool. Be certain the wire comes off the reel in a direction so as to de-reel from the bottom of the coil.
- 3) Re-install the Retaining Collar. Make sure that the Release Bar "pops up" and that the collar retainers fully engage the retaining groove on the spindle.

### To Mount a 50-60 Lb. (22.7-27.2 kg) Coil: (Using K1504-1 Coil Reel) (For 50-60 lb Readi-Reels a K438 Readi-Reel Adapter must be used).

The Spindle must be located in the **UPPER** mounting hole.

- 1) With the K1504-1 Coil Reel mounted on to the 2" (51 mm) spindle (or with reel laying flat on the floor) loosen the spinner nut and remove the reel cover. See Figure B.2.
- 2) Before cutting the tie wires, place the coil of electrode on the reel so it unwinds from the bottom as the reel rotates.

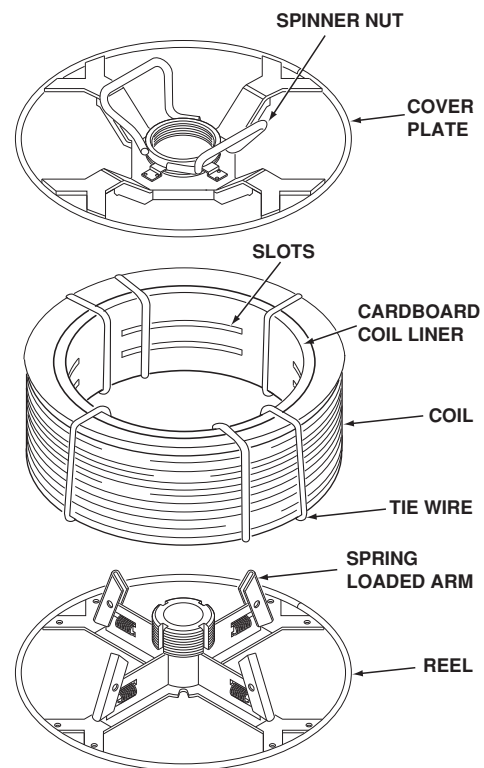
- 3) Tighten the spinner nut against the reel cover as much as possible by hand using the reel cover spokes for leverage. **DO NOT** hammer on the spinner nut arms.
- 4) Cut and remove only the tie wire holding the free end of the coil. Hook the free end around the rim of the reel cover and secure it by wrapping it around. Cut and remove the remaining tie wires.

## ⚠ 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 "backlashing" of the coil, which may tangle the wire. A tangled coil will not feed so it must either be untangled or discarded.**

- 5) Be sure the coil reel is engaged with the spindle brake pin and the Release Bar on the Retaining Collar "pops up" and that the collar retainers fully engage the retaining groove on the spindle.

FIGURE B.2



## FEEDING ELECTRODE AND BRAKE ADJUSTMENT

- 1) Turn the 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 6" (150 mm). Cut off the first 1" (25 mm). (If the electrode is not properly straightened, it may not feed or may jam causing a "birdnest".)
- 3) Insert the free end through the incoming guide tube.
- 4) Press the Cold Inch key or the Cold Feed Mode gun trigger and push the electrode into the drive roll.
- 1) Press end of gun against a solid object that is electrically isolated from the welder output and press the gun trigger for several seconds.
- 2) If the wire "birdnests", jams, or breaks at the drive roll, the drive roll pressure is too great. Back the pressure setting out one turn, run new wire through gun, and repeat above steps.
- 3) If the only result is drive roll slippage, disengage the gun, pull the gun cable forward about 6" (150 mm). There should be a slight waviness in the exposed wire. If there is no waviness, the pressure is too low. Increase the pressure setting one turn, reconnect the gun, tighten locking clamp and repeat the above steps.

### WARNING

**When feeding with the gun trigger, unless "COLD FEED" trigger mode is selected, the electrode and drive mechanism are always "HOT" to work and ground and could remain "HOT" several seconds after the gun trigger is released.**

- 5) Feed 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.

## DRIVE ROLL PRESSURE SETTING

The Power Feed® 10 Dual Wire Feeder pressure is factory pre-set to about position "2" as shown on the pressure indicator on the front of the feedplate door. This is an approximate setting.

The optimum drive roll pressure varies with type of wire, surface condition, lubrication, and hardness. Too much pressure could cause "birdnesting", but too little pressure could cause wire feed slippage with load and/or acceleration. The optimum drive roll setting can be determined as follows:

## PROCEDURE FOR SETTING ANGLE OF FEEDPLATE

- 1) Loosen the clamping collar screw using a 3/16" Allen wrench. The clamping collar screw is accessed from the bottom of the feedplate. It is the screw which is perpendicular to the feeding direction.
- 2) Rotate feedplate to the desired angle and tighten clamping collar screw.

## GAS GUARD REGULATOR SETTING

- 1) With the gas supply shut off, the Gas Guard regulator flow adjusting Key should be set to maximum (full clockwise) which is rated to be 60 SCFH (28 l/min).
- 2) Adjust gas supply flow rate for a level higher than will be required, then adjust Gas Guard flow adjusting Key counterclockwise to the desired gas flow rate.

## MAKING A WELD

- 1) Use only a network compatible power source.
- 2) Properly connect the electrode and work leads for the correct electrode polarity.
- 3) Set all desired parameters such as trigger logic, Run-in Speed, Acceleration, Electrode polarity, etc. per "DIP SWITCH SETUP" in the INSTALLATION section.
- 4) Set 2-step, 4-step switch on wire drive to desired mode of operation. (Refer to "2-step/4-step switch operation" in this section.)
- 5) Select Weld Mode. (Refer to Control Box Operation in this section).
- 6) Use Control Select switches, increment/decrement switches, and encoder knobs to set desired parameters for weld depending on what options are installed. (Refer to Control Box Operation in this section).
- 7) Feed the electrode through the gun and cable and then cut the electrode within approximately .38" (9.5 mm) of the end of the contact tip for solid wire and within approximately .75" (19mm) of the extension guide for cored wire.
- 8) Connect work cable to metal to be welded. Work cable must make good electrical contact to the work. The work must also be grounded as stated in "Arc Welding Safety Precautions".

### WARNING



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

- 9) If used, be sure shielding gas valve is turned on.
- 10) Position electrode over joint. End of electrode may be lightly touching the work.
- 11) Lower welding helmet, close gun trigger, and start welding. Hold the gun so the contact tip to work distance gives the correct electrical stickout as required for the procedure being used.
- 12) To stop welding, release the gun trigger and then pull the gun away from the work after the arc goes out and Postflow time, if used, is over.

- 13) If required, starting can be optimized by adjusting the acceleration and/or run-in speed. (Refer to Control Box Operation in this section).

## WIRE REEL CHANGING

At the end of a coil, remove the last of the old electrode coil from the conductor cable by either pulling it out at the nozzle end of the gun or by using the following procedure:

- 1) Cut the end of the electrode off at the gun end. Do not break it off by hand because this puts a slight bend in the wire making it difficult to pull it back through the nozzle.
- 2) Disconnect the gun cable from the gun connector on the Power Feed® 10 Dual wire drive unit and lay the gun and cable out straight.
- 3) Using pliers to grip the wire, pull it out of the cable from the connector end.
- 4) After the electrode has been removed, reconnect the gun cable to the drive. Load a new reel of electrode per the instructions in "Wire Reel Loading" in this section.

## WIRE FEED OVERLOAD PROTECTION

The wire drive provides overload protection of the wire drive motor. If the wire drive motor becomes overloaded for an extended period of time the wire drive will issue a shutdown command to the Control Box and force it's status light to blink between green and red. The Control Box turns off the power source, wire feed and gas solenoid. The status light on the wire drive will continue to blink between green and red for about 30 seconds before the wire drive will automatically reset. At that time, the wire drive will issue a shutdown over command to the Control Box that will return the system to normal operation. The wire drive will force it's status light to solid green.

Overloads can result from improper tip size, liner, drive rolls, or guide tubes, obstructions or bends in the gun cable, feeding wire that is larger than the rated capacity of the feeder or any other factors that would impede normal wire feeding. (See "Avoiding Wire Feeding Problems" in the MAINTENANCE section).

## COMPONENT STATUS LIGHTS

Each network component has a single status light. The light is a bicolor, Green/Red, LED. The purpose of the status light is to allow the operator to quickly identify that the system is working properly or, if not,

which component is causing the problem. By using the status lights the operator can quickly pinpoint the system problem to a particular component. See the following table for a complete listing and description of all status light conditions.

**NOTE:** The green light **ON and steady** indicates a normal functioning system.

STATUS LIGHT STATES		
LED State	Power Source LED	LED on any other nodes (components); Wire Feeder, Control Box Etc.
Off	Power Source is not turned ON or is not functioning correctly.	The system component is not receiving input power or is faulty.
Green LED blinking at a "normal" rate	It should only blink for a few seconds while the system is mapping (identifying components). If blinking continues every group may have a mapping error. (DIP switches may be set incorrectly).	It should only blink for a few seconds until the system component (node) has been recognized. If the blinking continues at least one node in the group has a mapping error (DIP switches may be set incorrectly). The node or nodes with mapping errors will be blinking red. <ul style="list-style-type: none"> <li>• There may be too many components in the group. All components in the group will be blinking green.</li> <li>• The power source bus may not be available. The bus may be being used to program another component.</li> <li>• The LED's of the power source and the component being programmed will be solid green.</li> </ul>
Red LED blinking at a "normal" rate	Indicates a recoverable communication fault. The power source should automatically recover: If it cannot recover the LED will be solid red.	Indicates a recoverable communication fault most likely caused by one of the following. <ul style="list-style-type: none"> <li>• More than one control box (UI) in the group. All control boxes in the group will be blinking red.</li> <li>• No control box (UI) in the group. All nodes in the group will be blinking red.</li> <li>• More than one node, of the same equipment type, has the same group and feed head (FH) numbers. All these nodes will be blinking red.</li> <li>• The feed head DIP switches may be set to zero. The nodes with DIP switches set to zero will be blinking red.</li> <li>• The node bus may be off.</li> </ul>
Red/Green LED blinking at a "normal" rate	Indicates a recoverable hardware fault such as over temperature, overload shutdown etc.	Indicates a recoverable hardware fault such as over temperature, overload shutdown etc. Could also be an open shutdown circuit at the feed head (leads 570, 572 with tab terminals) typically used for water flow shutdown switches.

<b>STATUS LIGHT STATES (CON'T)</b>		
<b>LED State</b>	<b>Power Source LED</b>	<b>LED on any other nodes (components); Wire Feeder, Control Box Etc.</b>
Red LED blinking at a fast rate	Power source needs to be reprogrammed. Contact your Local Authorized Lincoln Field Service Facility.	System component (node) needs to be reprogrammed. Contact your Local Authorized Lincoln Field Service Facility.
Red LED ON and steady	Power source has a non-recoverable hardware fault. Contact your Local Authorized Lincoln Field Service Facility.	System component (node) has a non-recoverable hardware fault. Contact your Local Authorized Lincoln Field Service Facility.
Green LED ON and steady	System normal and functional.	System normal and functional.

**Normal Blinking LED** - Each illumination should exist for 0.5 seconds.

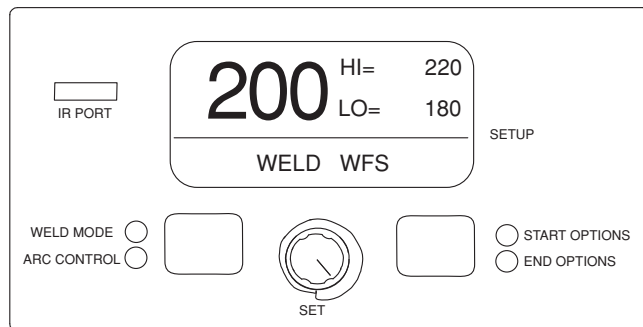
**Fast Blinking LED** - Each illumination should exist for 0.1 seconds.



## LIMIT SETTING

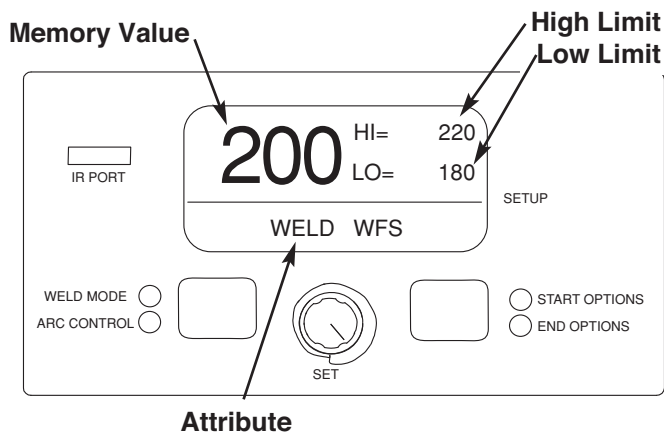
Each user memory can be optionally configured to limit the user's range of control over some user interface settings. By default, user limits are not enabled. To set limits for a selected memory, first select a weld mode and perform a memory save. Next, press and hold the memory button for five seconds. Release the memory button when the memory LED begins to blink rapidly and the Mode Select Panel displays indicate "Set Limits".

If the passcode has been set to a value other than zero, the user will be prompted to enter it. If the passcode is zero, the Mode Select Panel will immediately display the Limit Setup menu and the SETUP LED will illuminate:



The above example shows a wire mode, constant current weld modes would show "Weld Amps" rather than "Weld WFS".

There are four items displayed on each Limit Setup screen. The long alphanumeric display shows the selected attribute (e.g. Weld WFS, Volts, etc.). The short alphanumeric displays show the selected attribute's high and low user limits. The 7-segment displays show the value that is copied to procedure memory when a memory recall is performed.



One of these four items will blink to indicate which item will change when the Mode Select Panel Knob is rotated. Initially, the selected item will be the attribute. To select the high limit, press either Mode Select Panel button and the high limit value will begin to blink. Pressing either Mode Select Panel button again will cause the memory value to blink, pressing a third time will cause the low limit to blink.

Weld modes cannot be selected from the Limits Setup menu; the mode must be selected and saved to memory prior to entering the Limits Setup menu.

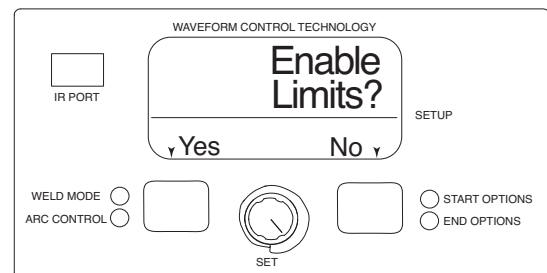
The memory value, high and low limit values are bound by the limits of the machine. For example, weld mode 49 may allow the wire feed speed to be adjusted between 10 and 200 in/min. These are referred to as "machine limits". Machine limits can vary between power sources and are also weld mode dependent.

The memory value must always be less than or equal to the high limit and greater than or equal to the low limit. The high limit must always be greater than or equal to the low limit and the low limit must always be less than or equal to the high limit. The rules are enforced automatically. If the low limit is increased above the memory value, the memory value will automatically increase.

To lock an attribute to a specific value, set the high and low limits to the desired value. The user will not be able to change it.

After setting limits, press the memory button that is flashing. The Mode Select Panel displays will prompt the user to save or discard the limit changes just made.

By pressing the Mode Select Panel button labeled YES, changes to limits are saved and user limits are automatically enabled. By pressing NO, any changes made to limits are discarded and the limit enable/disable state is not changed.



To enable or disable limits that have been established for any memory, press and hold the respective memory button in for more than 10 seconds until the Mode Select Panel displays "Enable Limits?". Pressing "Yes" will use the established limits, while pressing "No" will ignore the established limits. The limits that have been set for any memory location will not be erased if they are disabled.

TABLE C.1 – DRIVE ROLL AND GUIDE TUBE KITS

Wire Size	4-Roll DH Drive (4-Driven)
<b><u>Solid Steel Electrode</u></b>	
0.023" - 0.025" (0.6 mm)	KP1505 - 030S
0.030" (0.8 mm)	KP1505 - 030S
0.035" (0.9 mm)	KP1505 - 035S
0.040" (1.0 mm)	KP1505 - 040S
0.040" (1.0 mm)	KP1505 - 045S
0.045" (1.2 mm)	KP1505 - 045S
0.052" (1.4 mm)	KP1505 - 052S
1/16" (1.6 mm)	KP1505 - 1/16S
5/64" (2.0 mm)	KP1505-5/64
3/32" (2.4 mm)	KP1505-3/32
<b><u>Cored Electrode</u></b>	
0.030 (0.8 mm)	KP1505 - 035C
0.035" (0.9 mm)	KP1505 - 035C
0.040" (1.0 mm)	KP1505 - 045C
0.045" (1.2 mm)	KP1505 - 045C
0.052" (1.4 mm)	KP1505 - 052C
1/16" (1.6 mm)	KP1505 - 1/16C
0.068" (1.7 mm)	KP1505 - 068
5/64" (2.0 mm)	KP1505 - 5/64
3/32" (2.4 mm)	KP1505 - 3/32
7/64" <small>Lincore Hard Facing</small> (2.8mm)	KP1505 - 7/64H
7/64" (2.8mm)	KP1505 - 7/64
.120" (3.0mm)	KP1505 - 120
<b><u>Aluminum Electrode</u></b>	
0.035" (0.9 mm)	KP1507 - 035A
0.040" (1.0 mm)	KP1507 - 040A
3/64" (1.2 mm)	KP1507 - 3/64A
1/16" (1.6 mm)	KP1507 - 1/16A
3/32" (2.2 mm)	KP1507 - 3/32A

POWER FEED® 10M DUAL WIRE FEEDER



## FIELD INSTALLED OPTIONS/ACCESSORIES

### • OPTIONAL CONTROL PANEL KITS

- Arclink Cables
  - Without Weld Cable
 

Cable Lengths: 8 ft	K1543-8
16 ft	K1543-16
25 ft	K1543-25
50 ft	K1543-50
100 ft	K1543-100
- Co-Axial Power Cable
 

Cable Length: 25 ft. (350 amps)	K1796-25
50 ft. (350 amps)	K1796-50
75 ft. (325 amps)	K1796-75
100 ft. (325 amps)	K1796-100
- Weld Power Cables
  - Lug to Lug - 3/0, 600A, 60% Duty Cycle, 10 ft  
K1842-1
  - Lug to Lug - 3/0, 600A, 60% Duty Cycle, 35 ft  
K1842-35
  - Lug to Lug - 3/0, 600A, 60% Duty Cycle, 60 ft  
K1842-60
  - Lug to Lug - 3/0, 600A, 60% Duty Cycle, 110 ft  
K1842-110
- Feed Plate Gun Receiver Bushings. For use with:
  - Lincoln Gun Connector (K466-1)
  - Innershield/SubArc Guns K1500-1
  - Tweco® 4 Gun Connector (K466-2, K466-10)
  - Magnum 200/300/400 Guns K1500-2
  - Tweco® 5 Gun Connector (K1637-7)
  - Magnum 550 Guns K1500-3
  - Miller® Adapted Gun (K466-3) K1500-4
  - OXO® Gun K1500-5
  - Fast Mate Guns K489-9
  - Magnum 200/300/400 to K1500-2 Adapter K466-2
  - K613-7 Magnum 550 to K1500-3 Adapter K613-7
- Incoming Bushings
 

- Lincoln Conduit .025-1/16"	K1546-1
- Lincoln Conduit 1/16-1/8"	K1546-2
- Wire Straightener
 

- For 10-Series Feed Heads or Separate Mounting	K1733-1
----------------------------------------------------	---------
- Spindle Adapters
  - For Mounting Readi-Reels and  
2" I.D. Spools up to 60 lbs. K162-1
  - For Mounting Readi-Reels and  
2" I.D. Spools up to 60 lbs. K162-1H
  - For 14 lb. Innershield Coils to be  
mounted on 2" O.D. Spools K435
  - For 8" O.D. Small spools (10-12.5 lbs.)  
to be mounted on 2" O.D. spindles K468

- Readi-Reel Adapters
  - Adapts 22-30 lb. Readi-Reels  
to a 2" Spindle K363P
  - Adapts 50-60 lb. Readi-Reels  
to a 2" Spindle K438
- Coil Adapter
  - Adapts 50-60 lb. Lincoln coils  
to a 2" Spindle K1504-1
- Plastic Wire Cover for  
30-44 lb. Wire Packages K1634-3
- Plastic Wire Cover for up  
to 60 lb. Wire Packages K1634-2
- Water Connection Kit K590-6
- Water Connection Adapter KP1529-1
- Magnum Flow Sensor K1536-1
- Gas Guard Regulator K659-1
- Dual Procedure Switch (5 pin)  
with Trigger Leads K683-3
- Large Panel Security Door K1574-1
- Swivel Platform K1557-1
- Light Duty Caster Kit K1556-1
- Insulated Lift Bail K1555-1

## K162-1 - WIRE SPINDLE ADAPTER

Spindle for boom mounting Readi-Reels and 2" (51 mm) I.D. spools with up to 60 lb. (27.2 kg) capacity. User mounted to appropriately prepared boom framework. Includes an easily adjustable friction brake for control of overrun (a 2" spindle is standard on Power Feed 10 Dual Bench model).

When a 2" (51 mm) spindle is used with Readi-Reels, or coils not on 12" (305 mm) or 8" (203 mm) O.D. spools, an adapter is required:

## K1504-1 - COIL ADAPTER

Permits 50 lb to 60 lb (22.7-27.2 Kg.) coils to be mounted on 2" (51 mm) O.D. spindles.

## K435 - COIL ADAPTER

Permits 14 lb. (6 kg) Innershield coils to be mounted on 2" (51 mm) O.D. spindles.

## K363P - READI-REEL ADAPTER

Adapts Lincoln Read-Reel coils of electrode 30 lb. (14 kg) and 22 lb. (10 kg) to a 2" (51 mm) spindle. Durable molded plastic one piece construction. Designed for easy loading; adapter remains on spindle for quick changeover.

## K438 - READI-REEL ADAPTER

Adapts Lincoln Read-Reel coils of electrode 50-60 lb. (22.7-27.2 kg) to a 2" (51 mm) spindle

## GUNS AND GUN ADAPTERS

The Power Feed 10 Dual wire feeder is equipped with a factory installed K1500-2 gun connection Kit. This kit is for guns having a Tweco™ #2-#4 connector. The Power Feed 10 Dual has been designed to make connecting a variety of guns easy and inexpensive with the K1500 series of gun connection kits. Gun trigger and dual procedure lead connections connect to the single 5 pin receptacle on the front of the wire drive box.

### MAGNUM 200/300/400 GUNS

The easiest and least expensive way to use Magnum 200/300/400 guns with the Power Feed 10 Dual wire feeder is to order them with the K466-10 connector kit, or to buy a completely assembled Magnum gun having the K466-10 connector (such as the K471-21, -22, and -23 dedicated Magnum 400 guns and the K497-20 and -21 dedicated Magnum 200 guns).

### MAGNUM 550 GUNS

The easiest and least expensive way to use the Magnum 550 guns with Power Feed 10 Dual wire feeders is to order the gun with the K613-2 connector kit, and install a K1500-3 gun connection kit to the wire feeder.

## LINCOLN INNERSHIELD AND SUB ARC GUNS

All of these guns can be connected to the Power Feed by using the K1500-1 Adapter Kit.

## LINCOLN FUME EXTRACTION GUNS

The K556 (250XA) and K566 (400XA) guns require that a K489-9 Fast-Mate™ adapter kit be installed.

The K206, K289, and K309 require only the installation of a K1500-1 connector in the Power Feed wire feeder.

## NON-LINCOLN GUNS

Most competitive guns can be connected to the Power Feed by using one of the K1500 series adapter kits.

## GUN RECEIVER BUSHINGS AND ADAPTERS

### K489-9 (DUAL SCHEDULE FAST-MATE ADAPTER)

This adapter installs directly into the wire drive feed-plate, to provide for use of guns with Fast-Mate or European style gun connections. This K489-9 will handle both standard Fast-Mate and Dual Schedule Fast-Mate guns.

### K1500-1 (LINCOLN INNERSHIELD GUN STANDARD CONNECTION)

Use this kit to connect the following guns: Guns having a Lincoln standard innershield gun connector, Magnum 200/300/400 with K466-1 connector kit, and Magnum 550 guns with the K613-1 gun connection kit.

### K1500-2 (TWECO #2-#4 TYPE CONNECTION)

The K1500-2 gun adapter comes factory installed on the Power Feed 10 Dual wire feeder. Use this adapter for guns that have a Tweco #2-#4 connector. Such guns include Magnum 200/300/400 guns with K466-2 connector kit, and completely factory assembled Magnum guns that are factory equipped with the K466-2 connector (such as the K471-21, -22, and -23 dedicated Magnum 400 guns and the K497-20 and -21 Magnum 200 guns).

### K1500-3 (TWECO #5 CONNECTION)

For Magnum 550 gun with K613-2 Connection Kit, and any other gun having a Tweco #5 connector .

**K1500-4 (MILLER CONNECTION)**

For any gun having a newer style Miller connector. Install gun adapters per the instructions shipped with it.

**K1500-5 (OXO CONNECTION)**

For any gun having an OXO style connector. Install gun adapters per the instructions shipped with it.

**CONDUIT ADAPTERS****K1546-2 ADAPTER**

for use with Lincoln Magnum conduit and E-Beam conduit (wire sizes 1/16 - .120)

For Magnum conduit:

Install the K1546-2 gun adapter at the incoming end of the feed plate, secure with the set screw located at the back of the feed plate. If a brass fitting is supplied with the conduit, remove it from the feeder end of the conduit by unscrewing it. Insert the conduit into the K1546-2, secure the conduit by fastening it the the adapter with the supplied knob screw.

For E-Beam Conduit:

Install the K1546-2 gun adapter at the incoming end of the feed plate, secure with the set screw located at the back of the feed plate. Insert the conduit into the K1546-2, secure the conduit by fastening it the the adapter with the supplied knob screw.

**DUAL PROCEDURE SWITCH OPTIONS****K683-3 DUAL PROCEDURE SWITCH**

Kit includes gun switch, and mountings for Lincoln Innershield and Magnum guns, with 15 ft. (4.5m) control cable and 5-pin plug with two leads to connect to gun trigger.

Connect the 5-pin plug of the K683-3 Dual procedure Switch to the Power Feed 10 Dual Wire Feeder Trigger/Dual Procedure 5-socket receptacle.

The two lead plug cord extending out of the 5-pin plug of the Dual Procedure switch is to be connected to the two trigger leads of the welding gun per instructions shipped with the kit.

**K683-1 DUAL PROCEDURE SWITCH**

The K683-3 Dual Procedure Switch is the recommended method of obtaining dual procedure for non-Fast-Mate guns; but a K683-1 can be used. For using a K683-1 with a fast mate gun, see USING DUAL PROCEDURE WITH FAST-MATE GUNS. A K683-1 Dual Procedure Switch can be used on the Power Feed 10 Dual if a K686-2 adapter is used. The K686-2 kit includes the gun switch and mountings for Lincoln Innershield and Magnum guns, with 15 ft. (4.5 m) control cable and 3-pin plug. K686-2 Adapter permits the 3-pin plug from the K683-1 and 5-pin gun trigger plug to be connected to the 5-pin trigger/dual procedure receptacle on the wire feeder.

**USING DUAL SCHEDULE WITH FAST-MATE GUNS ON -10 SERIES FEEDERS**

Configuration 1

K489-9 Dual Schedule Fast-Mate adapter

K575-[ ] Magnum 400 DS/FM gun (or competitive DS/FM gun)

Configuration 2\*

K489-9 Dual Schedule Fast-Mate adapter

K683-1 Dual Procedure Switch (3 pin)

K686-2 "Y" adapter (3pin + 5 pin to 5 pin)

\* Non-DS Fast-Mate gun (Magnum 450WC, Magnum 200, Magnum 300, Magnum 400, and others)

**K590-6 WATER CONNECTION KIT**

Install per the instructions shipped with the kit.

**K1536-1 WATER FLOW SENSOR KIT**

Install per the instructions shipped with the kit



## K659-1 GAS GUARD REGULATOR

Adjustable flow regulator with removable adjuster key for CO<sub>2</sub> and Argon blend gases. Mounts onto feeder inlet, and reduces gas waste and arc start “blow” by reducing surge caused by excess pressure in supply hose.

Install the 5/8-18 male outlet of the regulator to the 5/8-18 female gas inlet on the back panel of the wire drive. Secure fitting with flow adjuster key at top. Attach gas supply to 5/8-18 female inlet of regulator per INSTALLATION section.

## K1556-1 LIGHT DUTY CASTER KIT

This option provides 4 casters and all required hardware to mount it to the Power Feed Wire Feeder.

## K1555-2 INSULATED LIFT HOOK

For applications where an insulated lift hook is required. This kit provides an easily installed, heavy duty insulated lift eye that mounts to the wire reel stand mast. See the instructions provided with the kit for installation.

## K1546-1 CONDUIT ADAPTER

Install per the Instructions shipped with the Kit.

## K1551-2 INCOMING BUSHING (4 Ball Roller) (Standard on codes 10600 and up)

This ball bearing equipped incoming bushing can be used in place of the standard incoming wire bushing, when feeding solid steel or cored wire electrodes. It significantly reduces any abrasion to the electrode wire where it enters the feed head. This results in even smoother, more trouble free operation.

## K1733-1 WIRE STRAIGHTENER

Install per the Instructions shipped with the Kit.

## K2339-1 PUSH-PULL KIT AND K2320-1 FOOT AMPPTROL AMPHENOL

The push-pull kit provides direct connection of a Cobra Gold or Prince XL torch to the Power Feed® 10M Dual Wire Feeder wire feeder.

The kit is intended for use with the following Cobra Max, Python or Prince XL torches:

<u>Cobra Max</u>	
K2252-1	Air Cooled 15ft.(4.5m)
K2252-2	Air Cooled 25ft.(7.6m)
<u>Python</u>	
	K2212-1 Water Cooled 15ft.(4.5m)
K2211-2	Air Cooled 25ft.(7.6m)
	K2212-2 Water Cooled 25ft.(7.6m)
K2211-3	Air Cooled 50ft.(15.6m)
	K2212-3 Water Cooled 50ft.(15m)
<u>Prince XL</u>	
	K1592-1 Water Cooled 15ft.(4.5)
K2296-2	Air Cooled 25ft.(7.6)
	K1592-2 Water Cooled 25ft.(7.6)
	K1592-3 Water Cooled 50ft.(15.6)

### CAUTION

Remove all input power to the Power Feed® 10M Dual Wire Feeder before installing the Connection Adapter Kit.

### WARNING

Refer to the Owner's Manual of the Torch for Amperage and Duty Cycle rating information. The torch rating may not match the rating of the power source.

## MAKING A WELD WITH THE PRINCE XL OR COBRA GOLD TORCH INSTALLED

- Set the idle roll pressure on the wire drive between an indicator reading of 0-2. A recommended start point is 1.5.
- Depending on the weld mode, set the Voltage or Trim at the Power Feed® 10M Dual Wire Feeder using the right control knob located on the upper case front panel.
- The Wire Feed Speed (WFS) is set using the control knob on the Torch. The left control knob on the Power Feed® 10M Dual Wire Feeder is inactive. The actual WFS being set at the torch is displayed on the Power Feed® 10M Dual Wire Feeder.
- All weld parameters normally available for the active weld mode are available during push-pull operation. Refer to the Operation Section of this manual.



## MAINTENANCE

### Safety Precautions

#### ⚠ WARNING



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

- Do not touch electrically live parts such as output terminals or internal wiring.
- When inching with gun trigger, electrode and drive mechanism are “hot” to work and ground and could remain energized several seconds after the gun trigger is released.
- Turn OFF input power at welding power source before installation or changing drive roll and/or guide tubes.
- Welding power source must be connected to system ground per the National Electrical Code or any applicable local codes.
- Only qualified personnel should perform maintenance work.

Observe all additional Safety Guidelines detailed throughout this manual.

### ROUTINE MAINTENANCE

Gun and Cable connection: After feeding every coil of wire; check tightness of gun connection to wire feed brass bushing.

#### Drive Rolls and Guide Tubes

After feeding every coil of wire, inspect the drive roll section. Clean it as necessary. The driver rolls and Inner Wire Guides are stamped with the wire sizes they will feed. If a wire size other than that stamped on the roll(s) is to be used, the roll(s) and Inner Wire Guides must be changed.

All drive rolls have two identical grooves. The rolls may be flipped over to use the other groove.

See “Procedure to Install Drive Rolls and Wire Guides” in the INSTALLATION section for roll changing instructions.

#### Wire Reel Mounting - Readi-Reels and 10 through 30lb (4.5-14kg) Spools

No routine maintenance required.

### Avoiding Wire Feeding Problems

Wire feeding problems can be avoided by observing the following gun handling and feeder set up procedures:

- a) Do not kink or pull cable around sharp corners.
- b) Keep the electrode cable as straight as possible when welding or loading electrode through cable.
- c) Do not allow dolly wheels or trucks to run over cables.
- d) Keep cable clean by following maintenance instructions.
- e) Use only clean, rust-free electrode. The Lincoln electrodes have proper surface lubrication.
- f) Replace contact tip when the arc starts to become unstable or the contact tip end is fused or deformed.
- g) Do not use excessive wire spindle brake settings.
- h) Use proper drive rolls, wire guides and drive roll pressure settings.

### PERIODIC MAINTENANCE

- Every year inspect the gearbox and coat the teeth with a Moly-disulfide grease. **Do Not** use graphite grease.
- Every six months check the motor brushes. Replace them if they are less than 1/4" long.
- Replace the drive rolls and inner wire guide when they are worn.
- Replace the pig tail if the insulation is cut, abraded or damaged.

#### Gun and Cable Maintenance

See appropriate Operator’s Manual.

#### Procedure for Removing Feedplate from Wire Feeder

- 1) Loosen the clamping collar screw using a 3/16" Allen wrench. The clamping collar screw is accessed from the bottom of the feedplate. It is the screw which is perpendicular to the feeding direction.
- 2) Loosen the retaining screw, which is also accessed from bottom of feeder, using a 3/16" Allen wrench. Continue to loosen the screw until the feedplate can be easily pulled off of the wire feeder.

## 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.

### WARNING



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

- Do not touch electrically live parts such as output terminals or internal wiring.
- When inching with gun trigger, electrode and drive mechanism are “hot” to work and ground and could remain energized several seconds after the gun trigger is released.
- Turn OFF input power at welding power source before installation or changing drive roll and/or guide tubes.
- Welding power source must be connected to system ground per the National Electrical Code or any applicable local codes.
- Only qualified personnel should perform these trouble shooting procedures.

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**Observe all additional Safety Guidelines detailed throughout this manual.**  
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### 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 CAUSE	RECOMMENDED COURSE OF ACTION
Rough wire feeding or wire not feeding but drive rolls are turning.	<ol style="list-style-type: none"> <li>1. Gun cable kinked and/or twisted.</li> <li>2. Wire jammed in gun and cable. Check for mechanical restrictions in feeding path.</li> <li>3. Check for current position of drive rolls Relative to split wire guide groove.</li> <li>4. Drive rolls may not be seated properly.</li> <li>5. Gun cable dirty. - Clean if necessary.</li> <li>6. Worn drive roll.</li> <li>7. Electrode rusty and/or dirty. Cable frayed, or poor solder joint at work or electrode lug.</li> <li>8. Worn nozzle or cable liner. - Replace if necessary.</li> <li>9. Partially flashed or melted contact tip. - Replace if necessary.</li> <li>10. Incorrect drive roll pressure. - Readjust if necessary.</li> <li>11. Improper liner, tip or inner/outer guides. - Replace if necessary.</li> </ol>	<p>If all recommended possible areas of misadjustment have been checked and the problem persists, <b>Contact your local Lincoln Authorized Field Service Facility.</b></p>

 **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.

**POWER FEED® 10M DUAL WIRE FEEDER**



Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
Variable or "hunting" arc.	<ol style="list-style-type: none"> <li>1. Wrong size, worn and/or melted contact tip. - Replace if necessary.</li> <li>2. Improper Drive Tension.</li> <li>3. Worn work cable or poor work connection. - Replace if necessary.</li> <li>4. Loose electrode or work cable connections.</li> <li>5. Wrong polarity. - Make sure electrode polarity is correct for process being used.</li> <li>6. Gas nozzle extended beyond gun tip or wire stickout too long while welding.</li> <li>7. Poor gas shielding on processes requiring gas. - Check gas flow and mixture.</li> </ol>	<p>If all recommended possible areas of misadjustment have been checked and the problem persists, <b>Contact your local Lincoln Authorized Field Service Facility.</b></p>
Poor arc striking with sticking or "blast-offs", weld porosity, narrow and ropy looking bead, or electrode stubbing into plate while welding.	<ol style="list-style-type: none"> <li>1. Improper procedures or techniques. - See "Gas Metal Arc Welding Guide" (GS-100).</li> <li>2. Improper gas shielding - Clean gas nozzle. Make certain that gas diffuser is not empty or turned off. Make certain gas flow rate is proper.</li> <li>3. Remove gun liner and check rubber seal for any sign of deterioration or damage. Be sure set screw in connector block is in place and tightened against the liner bushing.</li> <li>4. Improper gear box ratio configuration.</li> <li>5. Power Source calibration issues.</li> </ol>	

 **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.

**POWER FEED® 10M DUAL WIRE FEEDER**



Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
Tip seizes in diffuser.	1. Tip overheating due to prolonged or excessive high current and/or duty cycle welding.  Note: A light application of high temperature antiseize lubricant (such as Lincoln E2067 Graphite Grease) may be applied to tip of threads.	If all recommended possible areas of misadjustment have been checked and the problem persists, <b>Contact your local Lincoln Authorized Field Service Facility.</b>
Unit shuts off while welding or attempting to weld, status light is red/green alternating between colors every second. Unit tries to recover after 30 seconds and may repeat again.	1. Wire feed shut down circuit maybe electrically open. (Leads 570 and 572 in wire feed head.  2. The wire drive motor may be overloaded. Check for mechanical restrictions in the wire feeding path.	
Drive roll does not turn although arc voltage is present, and solenoid is on. Feed head and Control Box status LEDs are both solid green.	1. Check for loose or broken leads at the wire drive motor.  2. Defective wire feed motor or feed head Printed Circuit (PC) board. Note: With WFS set to max control board should supply 24 VDC to motor (leads #550, #551).	
No wire feed, solenoid, or arc voltage. Status LEDs are solid green.	1. Faulty gun trigger switch. The gun trigger switch or circuit may be faulty. Check or Replace.	
No control of wire feed. All status lights are solid green. Preset WFS is adjustable on Control Box	1. Defective motor tach or control PC board, or harness. Check for loose or faulty connections on motor tach. See Wiring Diagram.	
Wire feed motor turns and solenoid operates, but no arc voltage is present. Status light is solid green on Control Box.	1. Power source may be defective. See Power Source LED Status Light Chart.  2. Check for broken/Hi impedance connection in weld circuit.	

 **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.

POWER FEED® 10M DUAL WIRE FEEDER



Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
Speed does not change when weld current flows. Status lights are solid green.	<ol style="list-style-type: none"> <li>1. Run-in and weld speeds are set to the same value.</li> <li>2. Possible problem with current sensor electronics in power source. Check power source manual to trouble shoot current sensor electronics.</li> </ol>	<p>If all recommended possible areas of misadjustment have been checked and the problem persists, <b>Contact your local Lincoln Authorized Field Service Facility.</b></p>
Voltmeter and/or ammeter do not function properly even though status lights are solid green. Welding may vary from normal procedure.	<ol style="list-style-type: none"> <li>1. 67 and/or 21 voltage sense leads may have intermittent or poor connections. Check.</li> <li>2. Possible problem with power source electronics.</li> </ol>	
Purge switch on feed head does not activate solenoid but trigger closure in MIG or pulse modes does.	<ol style="list-style-type: none"> <li>1. Defective gas purge switch or feed head board. Check continuity with gas purge switch held down across J1 pins 3 and 5. Release purge switch and note there should be no continuity now. If either of these fail, the problem is either in the gas purge switch or harnessing. If no failure, replace feed head board.</li> </ol>	
Cold feed switch does not activate the motor but trigger does in MIG or Pulse modes. LEDs are solid green on both control board and feed head boards.	<ol style="list-style-type: none"> <li>1. Defective cold feed switch or feed head PC board. Check continuity with cold feed switch held up across plug pins 3 and 4 of J1. Release the cold inch switch and note that there should be no continuity now. If either of these fail, the problem is either in the purge switch or harnessing. If continuity O.K., replace feed head 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 your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

POWER FEED® 10M DUAL WIRE FEEDER





Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
Displays and/or indicator lights do not change when their corresponding switches and or knobs are activated to request a change.	<ol style="list-style-type: none"> <li>1. The encoders or switches may be faulty.</li> <li>2. Check for broken harness wire(s) or harness disconnected from intended location.</li> </ol>	<p>If all recommended possible areas of misadjustment have been checked and the problem persists, <b>Contact your local Lincoln Authorized Field Service Facility.</b></p>
Display(s) and status lights are blank.	<ol style="list-style-type: none"> <li>1. Power source is OFF.</li> <li>2. Feeder supply or fuse circuit at power source is blown or tripped, or defective harness or cabling.</li> <li>3. Display or Control Board (CB) boards may be faulty.</li> </ol>	
Dual Procedure is not functioning when using remote dual procedure switch. Status lights are solid green on CB and head boards.	<ol style="list-style-type: none"> <li>1. Gun has not been selected at the control box. Set dual procedure switch on CB to gun. Refer to operating instructions.</li> <li>2. Faulty remote dual procedure switch. Remove switch. Check continuity between switch pins with switch open and closed. If it fails the continuity test, repair or replace switch.</li> <li>3. Faulty Local Dual procedure switch.</li> </ol>	
Wire feed speed is consistent and adjustable, but operates at the wrong speed.	<ol style="list-style-type: none"> <li>1. Dip switch on feed head board does not match gear ratio used at gear box. If using a high speed gear, the feed head PC board dip switch 8 must be set to 1 or "ON".</li> <li>2. Feed head board is not properly reading DIP switch. Replace feed head PC board.</li> </ol>	
Status LED not solid green	<ol style="list-style-type: none"> <li>1. see LED Status Light Chart.</li> </ol>	
Gas solenoid not operating properly or intermittent.	<ol style="list-style-type: none"> <li>1. Inlet gas pressure exceeding 80 psi(5.5 bar). Verify that gas pressure regulator is operating properly.</li> </ol>	

 **CAUTION**

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POWER FEED® 10M DUAL WIRE FEEDER



Observe all Safety Guidelines detailed throughout this manual

Error Codes for the Power Wave 455: Code 10555 and below

**Note:** For any Err # listed below write down the error number for reference and try cycling power to see if the error clears itself. If not, refer to the What to Do column for the given Err.

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
Display shows any of the following:		
Err 001	More than 1 CB with the same group number.	Make sure the group dip switch setting is unique for each CB.
Err 003	Too many objects in group.	A given group can only support up to 7 objects. Remove any objects over 7 from the group either by changing the group dip switch settings or physically disconnecting any objects over 7 in the group.
Err 004	More than 1 object of the same equipment type with the same group # and feed head #.	Adjust the dip switch setting to make either the group # or feed head # unique for all objects of the same equipment type.
Err 005	A feed head has its feed head dip switches set to zero in a group with more than one object.	The appropriate feed head # is 1 through 7. Check the dip switch setting chart in INSTALLATION section and set the switches to make the Feed head ID non-zero.
Err 006	Did not receive a recognition command from the power source.	Check to see if the status light is <u>not</u> solid green on the power source (refer to status light states in OPERATION section if not). Also, check continuity in the communication lines from CB to Power Source (refer to wiring diagram). Refer to Power source trouble shooting section for additional information. If all these avenues fail, replace CB mother PC board.

 **CAUTION**

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POWER FEED® 10M DUAL WIRE FEEDER



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Error Codes for the Power Wave 455: Code 10555 and below

**Note:** For any Err # listed below write down the error number for reference and try cycling power to see if the error clears itself. If not, refer to the What to Do column for the given Err.

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
Display shows any of the following:		
Err 020	An attempt was made to reprogram a CB or feed head but the program did not verify.	Check for potential electrical HF noise generators in the area. Try removing the noise source and programming again. If the Err 020 still occurs, either replace the EEPROM chip(s) in the board being reprogrammed or replace the whole PC board being reprogrammed.
Err 100	The Power Source issued a shut down command for some reason.	See what to Do on Err 006.
Err 200	No Heart beat response from the PS.	See what to Do on Err 006.
Err 201	No heart beat response from an object.	If this occurs while welding, the status LED should be flashing red on the object that lost heart beat. Otherwise, look for any nodes that are flashing green. This indicates they have not been recognized and there is a power source problem (see power source trouble shooting section). If the status LED is either flashing or solid red, there may be a problem with continuity in the communication lines. Check the lines for continuity, in the cable and harnessing (refer to wiring diagram).
Err 210	EEPROM error.	Parameter recalled at power up was out of range. Rotate Encoder Knob to reset. Check all settings before proceeding to weld. If this condition persists then replace the CB mother PC board.

**⚠ CAUTION**

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**POWER FEED® 10M DUAL WIRE FEEDER**



Observe all Safety Guidelines detailed throughout this manual

Error Codes for the Power Wave 455: Code 10555 and below

**Note:** For any Err # listed below write down the error number for reference and try cycling power to see if the error clears itself. If not, refer to the What to Do column for the given Err.

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
Display shows any of the following:		
Err 211	Microprocessor RAM error in Control Box.	Turn Power off at power source. Wait 5 seconds. Turn power back on. If Err 211 is displayed again, then replace CB mother PC board.
Err 212	Microprocessor RAM Error in object board other than Control Box (Such as feed head)	Cycle power as in Err 211. If Err 212 is still displayed, then replace the PC board in the object with the fault. The object with the fault should be solid red on its status LED.
- - - (three dashes)	Appears on right display of CB module that contains the status LED	This is an indication that a constant current such as stick or gauge mode has been selected. Turning the right encoder clockwise when in this state will activate output to Power Source. Turning the right encoder counter-clockwise will deactivate output.

 **CAUTION**

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POWER FEED® 10M DUAL WIRE FEEDER



Observe all Safety Guidelines detailed throughout this manual

Error Codes for the Power Wave 455: Code 10675 and above.

### ERROR CODES FOR THE POWER WAVE 455

The following is a list of possible error codes that the Power Feed® 10M Dual Wire Feeder can output via the display on this user interface.

**Note:** For any Err # listed below write down the error number for reference and try cycling power to see if the error clears itself. If not, refer to the What to Do column for the given Err.

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
Display shows any of the following:		
Err 11	CAN communication bus off.	Probably due to excessive number of communication errors.
Err 12	User Interface time out error.	User Interface is no longer responding to the Power Source. The most likely cause is a fault/bad connection in the communication leads or control cable.
Err 21	Unprogrammed Weld Mode.	Contact the Service Department for instructions on reloading the Welding Software.
Err 22	Empty Weld Table.	Contact the Service Department for instructions on reloading the Welding Software.
Err 23	Weld Table checksum error.	Contact the Service Department for instructions on reloading the Welding Software.
Err 31	Primary overcurrent error.	Excessive Primary current present. May be related to a switch board or output rectifier failure.
Err 32	Capacitor "A" under voltage (Left side facing machine)	Low voltage on the main capacitors. May be caused by improper input configuration.
Err 33	Capacitor "B" under voltage (Right side facing machine)	When accompanied by an overvoltage error on the same side, it indicates no capacitor voltage present on that side, and is usually the result of an open or short in the primary side of the machine.

### CAUTION

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POWER FEED® 10M DUAL WIRE FEEDER



Observe all Safety Guidelines detailed throughout this manual

Error Codes for the Power Wave 455: Code 10675 and above.

### ERROR CODES FOR THE POWER WAVE 455

The following is a list of possible error codes that the Power Feed® 10M Dual Wire Feeder can output via the display on this user interface.

**Note:** For any Err # listed below write down the error number for reference and try cycling power to see if the error clears itself. If not, refer to the What to Do column for the given Err.

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
Display shows any of the following:		
Err 34  Err 35	Capacitor "A" under voltage (Left side facing machine)  Capacitor "B" under voltage (Right side facing machine)	Excess voltage on the main capacitors. May be caused by improper input configuration. When accompanied by an undervoltage error on the same side, it indicates no capacitor voltage present on that side, and is usually the result of an open or short in the primary side of the machine.
Err 36	Thermal error	Indicates over temperature. Usually accompanied by Thermal LED. Check fan operation. Be sure process does not exceed duty cycle limit of the machine.
Err 37	Softstart error	Capacitor precharge failed. Usually accompanied by codes 32-35.
Err 41	Secondary overcurrent error	The secondary (weld) current limit has been exceeded. When this occurs the machine output will phase back to 100 amps, typically resulting in a condition referred to as "noodle welding" NOTE: For the Power Wave 455/R the secondary limit is 570 amps for the standard stud, and 325 amps for the STT stud and all single phase operation.
Err 43	Capacitor delta error	The maximum voltage difference between the main capacitors has been exceeded. May be accompanied by errors 32-35.

## CAUTION

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POWER FEED® 10M DUAL WIRE FEEDER





Observe all Safety Guidelines detailed throughout this manual

Error Codes for the Power Wave 455: Code 10675 and above.

### ERROR CODES FOR THE POWER WAVE 455

The following is a list of possible error codes that the Power Feed® 10M Dual Wire Feeder can output via the display on this user interface.

**Note:** For any Err # listed below write down the error number for reference and try cycling power to see if the error clears itself. If not, refer to the What to Do column for the given Err.

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
Display shows any of the following:		
Err 49	Single phase error	Indicates machine is running on single phase input power. Usually caused by the loss of the middle leg (L2).
Other		Error codes that contain three or four digits are defined as fatal errors. These codes generally indicate internal errors on the Power Source Control Board. If cycling the input power on the machine does not clear the error, try reloading the operating system. If this fails, replace the control board.

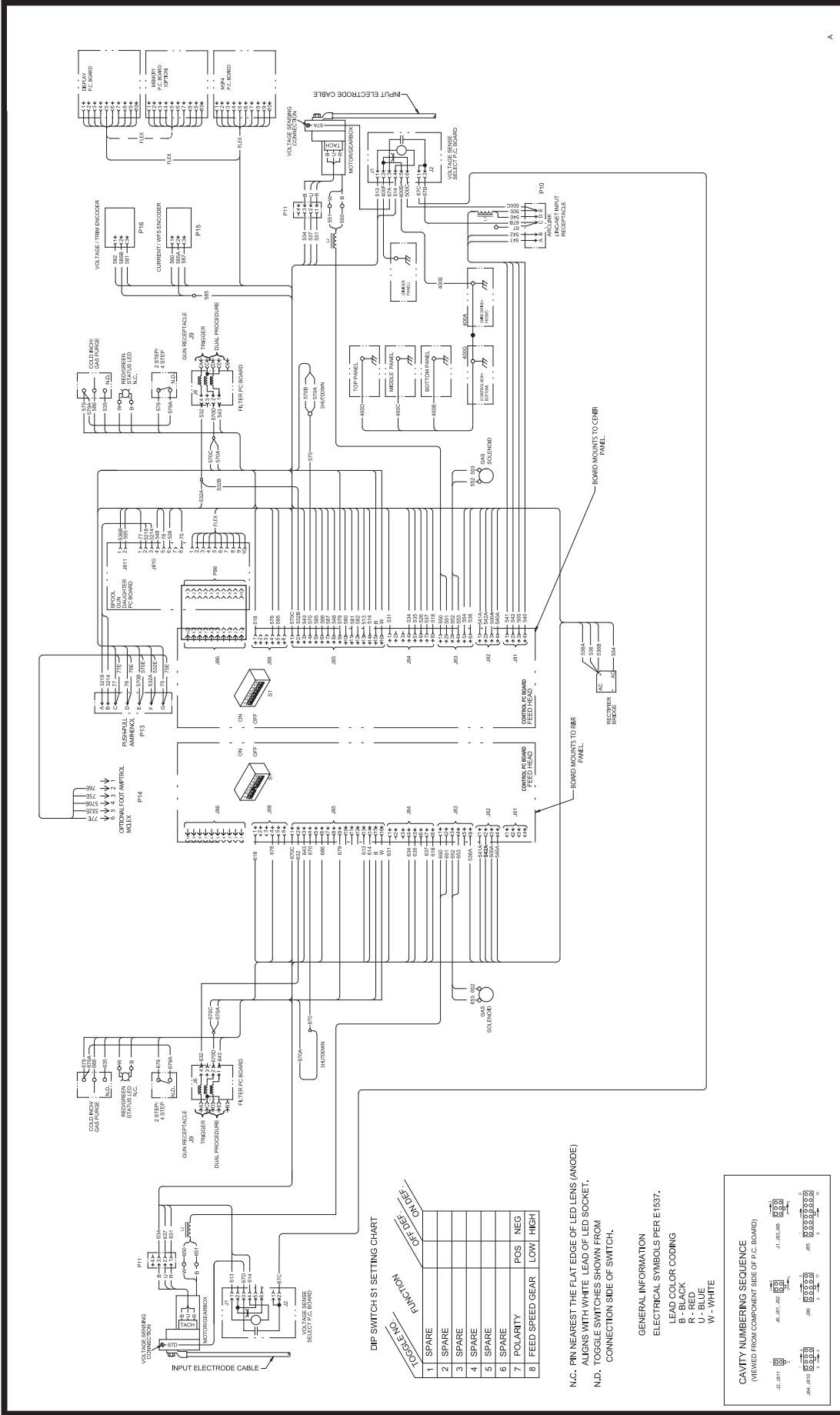
### CAUTION

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.

POWER FEED® 10M DUAL WIRE FEEDER



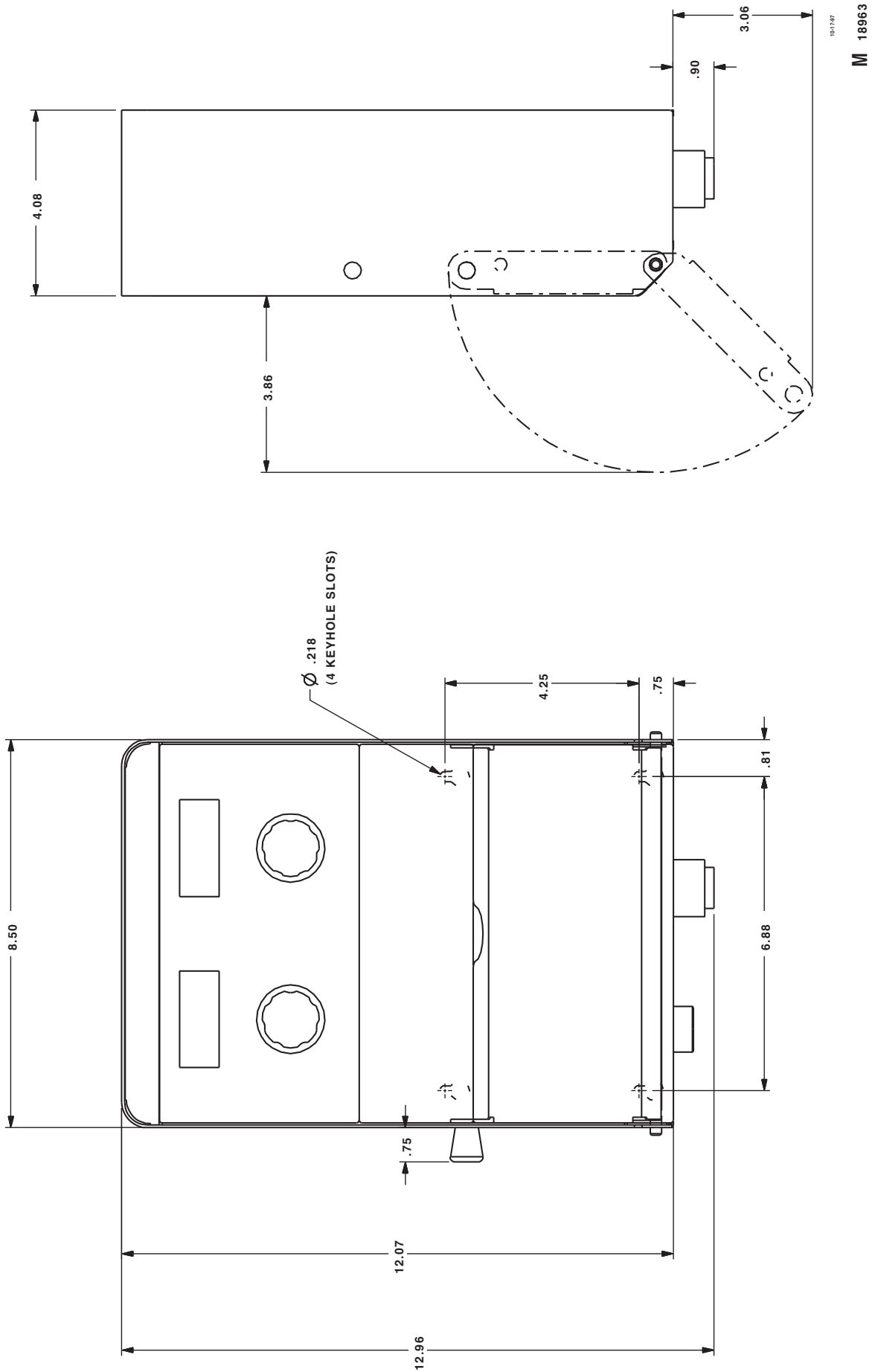
WIRING DIAGRAM - POWER FEED® 10M DUAL WIRE FEEDER FOR CODES 11378, 11899



G4319-1

**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.

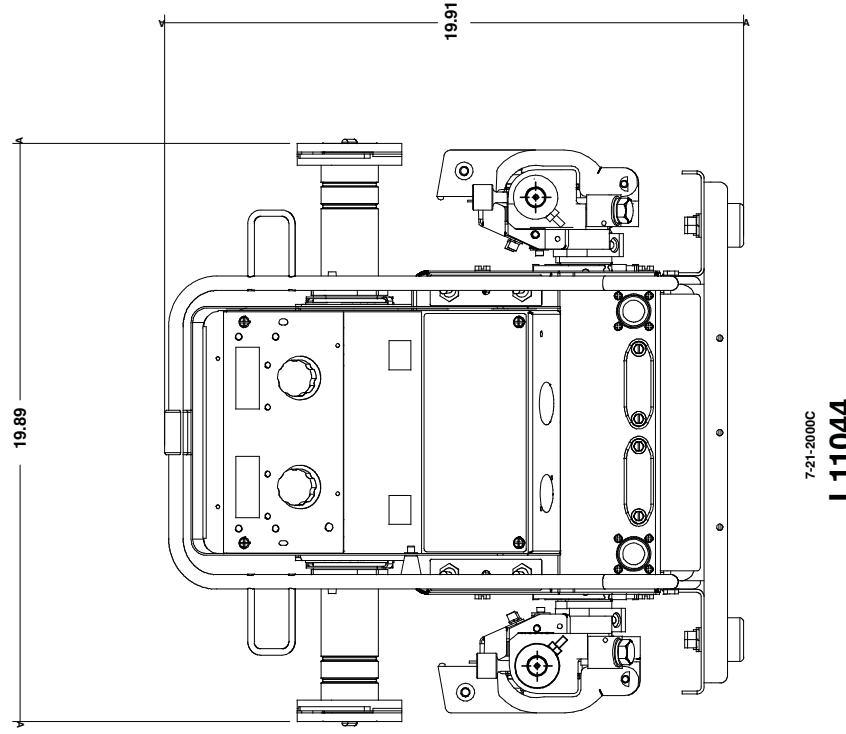
CONTROL BOX DIMENSION PRINT



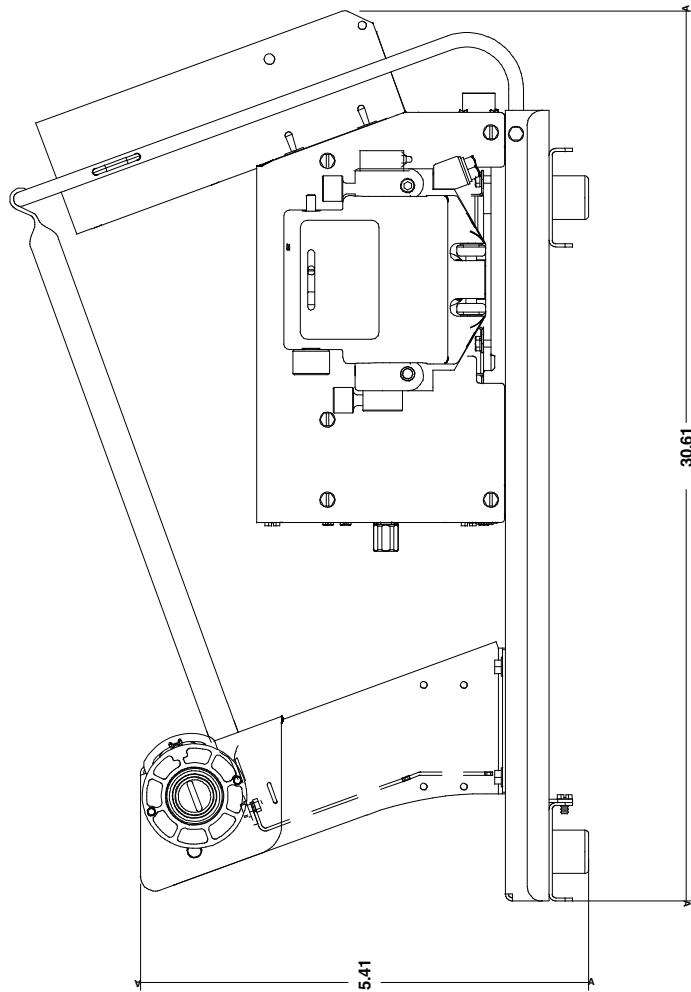
POWER FEED® 10M DUAL WIRE FEEDER



WIRE FEEDER (BENCH MODEL) DIMENSION PRINT



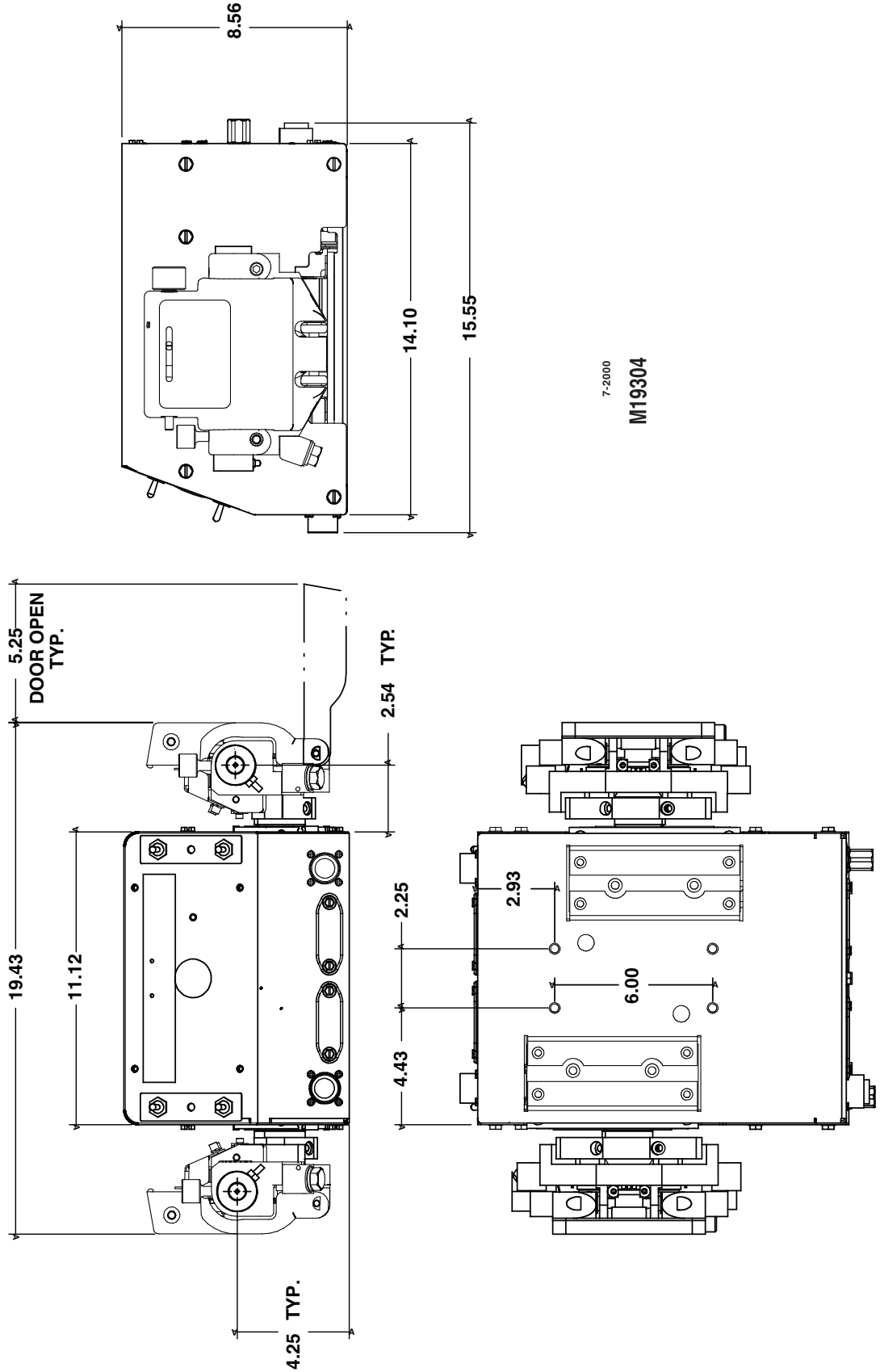
7-21-2000C  
L11044



POWER FEED® 10M DUAL WIRE FEEDER



WIRE DRIVE DIMENSION PRINT



POWER FEED® 10M DUAL WIRE FEEDER



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

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

**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.**



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

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

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

請詳細閱讀並理解製造廠提供的說明以及應該使用的銀焊材料，並請遵守貴方的有閣勞動保護規定。

이 제품에 동봉된 작업지침서를 숙지하시고 귀사의 작업자 안전수칙을 준수하시기 바랍니다.

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