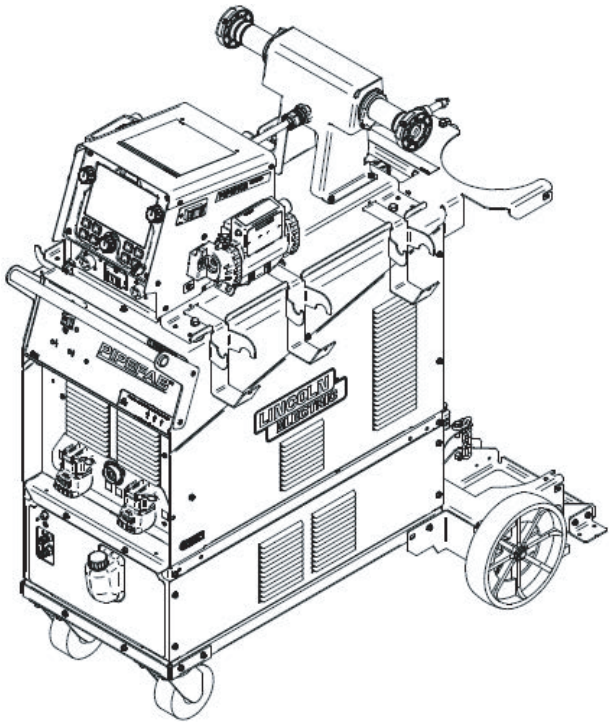
LINCOLN ELECTRIC

Operator's Manual

PIPEFAB™ WELDING SYSTEM



For use with machines having Code Numbers:

POWER SOURCE: 12858, 13010

FEEDER: 12929

REMOTE UI: 12938

GENUINE LINCOLN PARTS™

Register your machine:
www.lincolnelectric.com/registration

Authorized Service and Distributor Locator:
www.lincolnelectric.com/locator

Save for future reference

Date Purchased

Code: (ex: 10859)

Serial: (ex: U1060512345)

Need Help? Call 1.888.935.3877
to talk to a Service Representative

Hours of Operation:
8:00 AM to 6:00 PM (ET) Mon. thru Fri.

After hours?
Use "Ask the Experts" at lincolnelectric.com
A Lincoln Service Representative will contact you no later than the following business day.

For Service outside the USA:
Email: globalservice@lincolnelectric.com

* EAC

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THE LINCOLN ELECTRIC COMPANY
22801 St. Clair Avenue • Cleveland, OH • 44117-1199 • U.S.A.
Phone: +1.216.481.8100 • www.lincolnelectric.com

THANK YOU FOR SELECTING A QUALITY PRODUCT BY LINCOLN ELECTRIC.

PLEASE EXAMINE CARTON AND EQUIPMENT FOR DAMAGE IMMEDIATELY

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

SAFETY DEPENDS ON YOU

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

⚠ WARNING

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

⚠ CAUTION

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

KEEP YOUR HEAD OUT OF THE FUMES.

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

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

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

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

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

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

WEAR CORRECT EYE, EAR & BODY PROTECTION

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

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

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

IN SOME AREAS, protection from noise may be appropriate.

BE SURE protective equipment is in good condition.

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

SPECIAL SITUATIONS

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

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

Additional precautionary measures

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

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

REMOVE all potential fire hazards from welding area.

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

SECTION A: WARNINGS

CALIFORNIA PROPOSITION 65 WARNINGS

WARNING: Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects, or other reproductive harm.

- Always start and operate the engine in a well-ventilated area.
- If in an exposed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information go to www.P65 warnings.ca.gov/diesel

WARNING: This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code § 25249.5 *et seq.)*

WARNING: Cancer and Reproductive Harm www.P65warnings.ca.gov

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. 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.

1.i. Using a generator indoors CAN KILL YOU IN MINUTES.

1.j. Generator exhaust contains carbon monoxide. This is a poison you cannot see or smell.

1.k. NEVER use inside a home or garage, EVEN IF doors and windows are open.

1.l. Only use OUTSIDE and far away from windows, doors and vents.

1.m. Avoid other generator hazards. READ MANUAL BEFORE USE.

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. I standards.

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

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

FUMES AND GASES CAN BE DANGEROUS.

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

5. b. The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically thereafter to be certain it is within applicable OSHA PEL and ACGIH TLV limits.

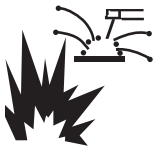
5.c. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.

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

5.e. Read and understand the manufacturer’s instructions for this equipment and the consumables to be used, including the Safety Data Sheet (SDS) and follow your employer’s safety practices. SDS forms are available from your welding distributor or from the manufacturer.

5.f. Also see item 1.b.

WELDING AND CUTTING SPARKS CAN CAUSE FIRE OR EXPLOSION.



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

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

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

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

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

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

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

6.h. Also see item 1.c.

6.I. Read and follow NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work", available from NFPA, 1 Batterymarch Park, PO box 9101, Quincy, MA 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-I, "Precautions for Safe Handling of Compressed Gases in Cylinders," available from the Compressed Gas Association, 14501 George Carter Way Chantilly, VA 20151.

FOR ELECTRICALLY POWERED EQUIPMENT.

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

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

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

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

PRÉCAUTIONS DE SÛRETÉ

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

Sûreté Pour Soudage A L'Arc

1. Protegez-vous contre la secousse électrique:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

ELECTROMAGNETIC COMPATIBILITY (EMC)

CONFORMANCE

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

INTRODUCTION

All electrical equipment generates small amounts of electromagnetic emission. Electrical emission may be transmitted through power lines or radiated through space, similar to a radio transmitter. When emissions are received by other equipment, electrical interference may result. Electrical emissions may affect many kinds of electrical equipment; other nearby welding equipment, radio and TV reception, numerical controlled machines, telephone systems, computers, etc.

Warning: This Class A equipment is not intended for use in residential locations where the electrical power is provided by the public low-voltage supply system. There may be potential difficulties in ensuring electro-magnetic compatibility in those locations, due to conducted as well as radiated disturbances.

INSTALLATION AND USE

The user is responsible for installing and using the welding equipment according to the manufacturer's instructions.

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

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

ASSESSMENT OF AREA

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

a) other supply cables, control cables, signaling and telephone cables; above, below and adjacent to the welding equipment;

b) radio and television transmitters and receivers;

c) computer and other control equipment;

d) safety critical equipment, e.g., guarding of industrial equipment;

e) the health of the people around, e.g., the use of pacemakers and hearing aids;

f) equipment used for calibration or measurement;

g) the immunity of other equipment in the environment. The user shall ensure that other equipment being used in the environment is compatible. This may require additional protection measures;

h) the time of day that welding or other activities are to be carried out.

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

METHODS OF REDUCING EMISSIONS

Public Supply System

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

Maintenance of the Welding Equipment

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

Welding Cables

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

Equipotential Bonding

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

Earthing of the Workpiece

Where the workpiece is not bonded to earth for electrical safety, nor connected to earth because of its size and position, e.g., ship's hull or building steelwork, a connection bonding the workpiece to earth may reduce emissions in some, but not all instances. Care should be taken to prevent the earthing of the workpiece increasing the risk of injury to users, or damage to other electrical equipment. Where necessary, the connection of the workpiece to earth should be made by a direct connection to the workpiece, but in some countries where direct connection is not permitted, the bonding should be achieved by suitable capacitance, selected according to national regulations.

Screening and Shielding

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

ECO design information

The equipment has been designed in order to be compliant with the Directive 2009/125/EC and the Regulation 2019/1784/EU.

Efficiency and idle power consumption:

Name	Efficiency when max power consumption / Idle power consumption	Equivalent model
Pipefab CE	85% / 30.3W	No equivalent model

Idle state, follow instructions to test idle mode:

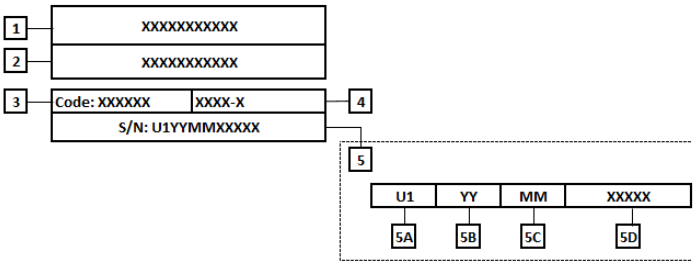
1. Connect an Ethernet cable from the port on the machine to a laptop and start up the machine.
2. Open the Power Wave Manager and configure the connection to the machine that is plugged in through the Ethernet.
3. Check the box for the 'System Hibernation Timer' to allow the machine to enter hibernation mode. Set the Hibernation Timer to 15 minutes (the lowest it can go). Wait 15 minutes and once the fans stop spinning the machine is in Hibernate Mode (Idle State).
4. The machine needs to be turned off and back on to come out of the hibernation mode

Efficiency:

The Efficiency procedure itself requires the use of a grid. Power Wave Manager can be downloaded from powerwavesoftware.com along with the Power Wave Manager instruction. The Power Wave Manager instructions explain how to test a machine using a resistive load. This is described in section 6 under calibration.

The value of efficiency and consumption in idle state have been measured by method and conditions defined in the product standard EN 60974-1

Manufacturer's name, product name, code number, product number, serial number and date of production can be read from rating plate and serial number label.



Where:

1- Manufacturer name and adress
2- Product name
3- Code number
4- Product number
5- Serial number
5A- country of production
5B- year of production
5C- month of production
5D- progressive number different for each machine

Typical gas usage for **MIG/MAG** equipment:

Material type	Wire diameter [mm]	DC electrode positive		Wire Feeding [m/min]	Shielding Gas	Gas flow [l/min]
		Current [A]	Voltage [V]			
Carbon, low alloy steel	0,9 - 1,1	95 - 200	18 - 22	3,5 – 6,5	Ar 75%, CO_2 25%	12
Aluminum	0,8 - 1,6	90 - 240	18 - 26	5,5 – 9,5	Argon	14 - 19
Austenitic stainless steel	0,8 - 1,6	85 - 300	21 - 28	3 - 7	Ar 98%, O_2 2% / He 90%, Ar 7,5% CO_2 2,5%	14 - 16
Copper alloy	0,9 - 1,6	175 - 385	23 - 26	6 - 11	Argon	12 - 16
Magnesium	1,6 - 2,4	70 - 335	16 - 26	4 - 15	Argon	24 - 28

Tig Process:

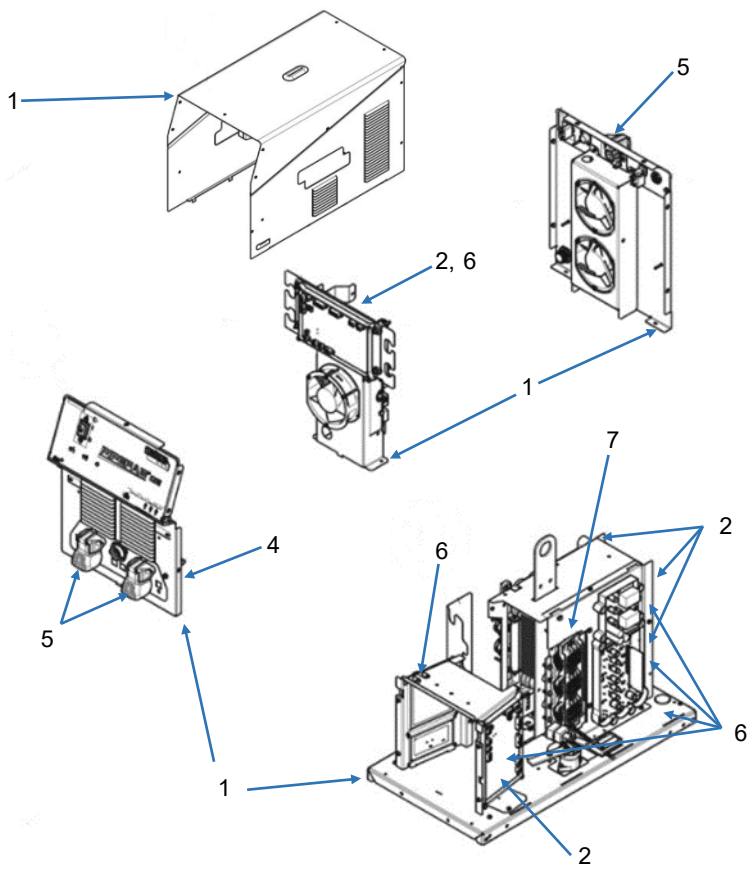
In TIG welding process, gas usage depends on cross-sectional area of the nozzle. For comonly used torches:
Helium: 14-24 l/min
Argon: 7-16 l/min
Notice: Excessive flow rates causes turbulence in the gas stream which may aspirate atmospheric contaminantion into the welding pool.

Notice: A cross wind or draft moving can disrupt the shielding gas coverage, in the interest of saving of protective gas use screen to block air flow.

End of life

At end of life of product, it has to be disposal for recycling in accordance with Directive 2012/19/EU (WEEE), information about the dismantling of product and Critical Raw Material (CRM) present in the product, can be found at: www.lincolnelectriceurope.com

Pipefab CE



Item	Component	Material for recovery	CRM	Selective treatment
1	Enclosure	Steel	-	-
2	Heat sink	Aluminum	Si, 52 g Mg, 87 g	-
3	External cables – not shown	Copper	-	Required
4	Transformer coil	Aluminum	-	-
5	Output terminal	Brass	-	-
6	PC board, 8 total	-	-	Required
7	Choke Internal cables, not shown	Copper	-	-

Reference: P-1484-A, code 13010

Content/details may be changed or updated without notice. For most current Instruction Manuals, go to parts.lincolnelectric.com.

PRODUCT DESCRIPTION

The PipeFab™ welding system consists of a portable advanced-process power source and feeder designed from the ground up to be the ideal system for welding steel, stainless, and nickel pipe. The PipeFab™ is ideal for applications where critical root, fill, and cap welds are needed to be performed at the highest level of quality. The new state of the art PipeFab™ Feeder features a robust 7" LCD display which offers a bright and easy to use interface to control all processes. With GMAW, GMAW-STT, GMAW-P, FCAW, GTAW (DC) and SMAW functionality, the dedicated process buttons and individual process memories make switching from one process to another simple and intuitive.

Superior arc performance, simplicity, and flexibility are at the core of the PipeFab™. Being an advanced software controlled system, the PipeFab™ is readily user updateable with free software from www.powerwavesoftware.com allowing it to take advantage of the latest and greatest innovations from Lincoln Electric's welding technologies.

PRODUCT LISTING

K NUMBER	PRODUCT NAME
K3731-1	PIPEFAB™ CSA
K3732-1	PIPEFAB™ CE
K3734-1	PIPEFAB™ READY PAK (INCLUDES POWER SOURCE K3731-1, FEEDER K3735-1, AND UNDERCARRIAGE K3736-1)
K3735-1	PIPEFAB™ FEEDER
K3738-1	PIPEFAB™ REMOTE UI

RECOMMENDED PROCESSES AND EQUIPMENT

RECOMMENDED PROCESSES

- GMAW, GMAW-P, GMAW-STT
- FCAW
- SMAW
- GTAW (DC)

RECOMMENDED EQUIPMENT

- The PipeFab™ Power Source and PipeFab™ Feeder make one cohesive unit that must be paired together.

PROCESS LIMITATIONS

- Processes must be within the duty cycle and rating of the power source and wire feeder. See the Technical Specifications section of this manual for more information.

EQUIPMENT LIMITATIONS

- The software based weld tables of the PipeFab™ Power Source limit the process capability within the output range and the safe limits of the machine. In general the processes will be limited to .030- .052 solid steel wire, .030 -.045 stainless wire, .035 -1/16 cored wire.
- The power source and UI may require software updates.
- The system does not include weld cables.
- Not compatible with K1500-1, K1500-2, K1500-3, K1500-4 K1500-5 and K489-7 gun adapter kits.
- PipeFab™ Feeder is only compatible with the PipeFab™ Power Source.
- PipeFab™ Power Source is only compatible with the PipeFab™ Feeder.

DESIGN FEATURES

POWER SOURCE

- Multiple process DC output range: 5 - 400 Amps.
- 200 – 600 VAC, 3 phase, 50-60Hz input power.
- New and Improved Line Voltage Compensation holds the output constant over wide input voltage fluctuations.
- Utilizes next generation microprocessor control, based on the ArcLink® platform.
- State of the art power electronics technology yields superior welding capability.
- Electronic over current protection.
- Input over voltage protection.
- F.A.N. (fan as needed). Cooling fan only runs when needed.
- Thermostatically protected for safety and reliability.
- Ethernet connectivity.
- Panel mounted Status and Thermal LED indicators facilitate quick and easy troubleshooting.
- Potted PC boards for enhanced ruggedness/reliability.
- Waveform Control Technology™ for good weld appearance and low spatter.
- STT® Capable.

FEEDER

- Standard bench can be converted to boom configuration and automatic oscillators.
- The feed plates can be rotated to accommodate different gun angles.
- Uses 5 pin K1543-xx or K2683-xx ArcLink cables. Cables may be joined together to make longer lengths.
- 4 roll wire drive.
- Changeable gun adapters.
- Ball bushing inlet guide.
- High resolution encoder on the motor.
- 7" digital user interface display.
- Displays voltage/trim, wire feed speed/amps, process settings, advanced settings, and more.
- Quick select buttons for switching processes.
- Center push-to-select encoder to navigate menus on screen.
- Total of 24 memories. 4 dedicated memories per process (TIG and STICK) and 4 dedicated memories per process and side (MIG/right, MIG/left, FCAW/right, FCAW/left).
- Digital communication between the feeder and power source.
- Standard USB port of ease of upgrading wire feeder.

TECHNICAL SPECIFICATIONS

PIPEFAB™ (K3731-1, K3732-1, K3734-1, K3735-1)

POWER SOURCE - INPUT VOLTAGE AND CURRENT					
MODEL	**DUTY CYCLE**	**INPUT VOLTAGE ±10%**	**INPUT AMPERES**	**IDLE POWER**	**POWER FACTOR @ RATED OUTPUT**
K3731-1 K3732-1	100% RATING	208/230/400*/460/575 50/60 HZ **(INCLUDED 380V TO 415V)**	53/46/26/24/19	550 WATTS MAX. (FAN ON)	0.94

WIRE FEEDER - INPUT VOLTAGE AND CURRENT			
MODEL	**COMPONENT**	**VOLTAGE**	**INPUT AMPERES**
K3735-1	WIRE DRIVE	40 VDC	9 A
	USER INTERFACE	40 VDC	1 A

POWER SOURCE - RATED OUTPUT			
INPUT VOLTAGE / PHASE / FREQUENCY	**GMAW / FCAW**	**SMAW**	**GTAW-DC**
	100%	**100%**	**100%**
380-415/3/50/60	400 AMPS 34 VOLTS	400 AMPS 36 VOLTS	400 AMPS 26 VOLTS
460/3/50/60			
575/3/50/60			

WIRE FEEDER - RATED OUTPUT				
DUTY CYCLE	**AMPERES**	**WIRE FEED SPEED**	**WIRE SIZES**	
			SOLID	**CORED**
60%	450 AMPS	50 - 800 IN/MIN 1.3 - 20.3 M/MIN	.023 - 1/16 IN 0.6 - 1.6 MM	.030 - 5/64 IN 0.8 - 2.0 MM

RECOMMENDED INPUT WIRE AND FUSE SIZES[1]			
INPUT VOLTAGE / PHASE / FREQUENCY	EFFECTIVE INPUT AMPERE RATING AND DUTY CYCLE	CORD SIZE[3]	TIME DELAY FUSE OR BREAKER[2]
		AWG SIZES (MM 2)	AMPERAGE
200-208/3/50/60	53A, 100%	4 (25)	100
230/3/50/60	46A, 100%	4 (25)	90
380-415/3/50/60	26A, 100%	8 (10)	60
460/3/50/60	24A, 100%	8 (10)	45
575/3/50/60	19A, 100%	10 (6)	35

1. Based on U.S. National electrical Code.
2. Also called “inverse time” or “thermal/magnetic” circuit breakers; circuit breakers that have a display in tripping action that decreases as the magnitude of the current increases.
3. Type SO cord or similar in 30° C ambient.

AGENCY MARKINGS			
MODEL	MARKET	CONFORMITY MARK	STANDARD
K3731-1	US AND CANADA	$_{C}CSA_{US}$	CAN/CSA E60974-1 ANSI/IEC 60974-1
K3732-1	US AND CANADA	$_{C}CSA_{US}$	CAN/CSA E60974-1 ANSI/IEC 60974-1
	EUROPE	CE	EN 60974-1
K3735-1	US AND CANADA	$_{C}CSA_{US}$	CAN/CSA E60974-5 ANSI/IEC 60974-5
	EUROPE	CE	EN 60974-5

MODEL	IP RATING
K3731-1	IP23
K3732-1	IP23
K3735-1	IP2X

WELDING PROCESS		
PROCESS	**OUTPUT RANGE (AMPERES)**	**MEAN OCV (UO)**
GMAW	40-400 A	73 V
GMAW-P		
FCAW		
GTAW-DC	5-400 A	36 V
SMAW	55-400 A	63 V

PHYSICAL DIMENSIONS				
MODEL	**HEIGHT**	**WIDTH**	**DEPTH**	**WEIGHT**
POWER SOURCE	30 IN (762 MM)	17.5 IN (444.5 MM)	34.8 IN (883.9 MM)	340 LBS. (154.2 KG)
PIPEFAB™ FEEDER	12.6 IN (320 MM)	19.7 IN (500 MM)	16.7 IN (424 MM)	54.5 LBS. (24.7 KG)
WIRE REEL STAND	13.8 IN (351 MM)	22.0 IN (559 MM)	28.2 IN (716 MM)	25.5 LBS. (11.6 KG)
PIPEFAB™ FEEDER AND WIRE REEL STAND	14.5 IN (368 MM)	22.0 IN (550 MM)	30.2 IN (767 MM)	80.0 LBS. (36.3 KG)
COMPLETE SYSTEM	53.2 IN (1351.3 MM)	30.9 IN (784.9 MM)	48.8 IN (1239.5 MM)	500 LBS. (226 KG)

TEMPERATURE RANGES		
MODEL	**OPERATING RANGE**	**STORAGE RANGE**
POWER SOURCE	-4°F TO 104°F (-20°C TO 40°C)	-40°F TO 185°F (-40°C TO 85°C)
PIPEFAB™ FEEDER	-40°F TO 104°F (-40C TO 40°C)	-40°F TO 185°F (-40C TO 85°C)

IP23 - Insulation Class(F) 155º(C)

- Weight does not include input cord

INSTALLATION

⚠ WARNING

ELECTRIC SHOCK can kill.

- **Turn the input power OFF at the disconnect switch or fuse box before attempting to connect or disconnect input power lines, output cables or control cables.**
- **Only qualified personnel should perform this installation.**
- **Do not touch the wire drive, drive rolls, wire coil or electrode when welding output is ON.**
- **Wire feeder may be connected to a piece of automatic equipment that may be remotely controlled.**
- **Do not operate with covers, panels or guards removed.**
- **Do not let the electrode or wire spool touch the wire feeder housing.**
- **Insulate yourself from the work and ground.**
- **Always wear dry insulating gloves.**
- **The lift bail is insulated from the wire feeder enclosure. If an alternate hanging device is used, it must be insulated from the wire feeder enclosure.**

⚠ WARNING

MOVING PARTS can injure.

- **Keep away from moving parts.**
- **Wear Eye Protection.**

SAFETY PRECAUTIONS

Read this entire installation section before operating machine.

SELECT SUITABLE LOCATION

The PipeFab™ will operate in harsh environments. Even so, it is important that simple preventative measures are followed in order to assure long life and reliable operation.

- The machine must be located where there is free circulation of clean air such that air movement in the front and back, out the sides and bottom will not be restricted.
- Dirt and dust that can be drawn into the machine should be kept to a minimum. The use of air filters on the air intake is not recommended because normal airflow may be restricted. Failure to observe these precautions can result in excessive operating temperatures and nuisance shutdown.
- Keep machine dry. Shelter from rain and snow. Do not place on wet ground or in puddles.
- Do not mount the PipeFab™ over combustible surfaces. Where there is a combustible surface directly under stationary or fixed electrical equipment, that surface shall be covered with a steel plate at least .060" (1.6mm) thick, which shall extend not less than 5.90" (150mm) beyond the equipment on all sides.
- The PipeFab™ feeder is rated IP2X and is suitable for indoor use. For best wire feeding performance, place the PipeFab™ Feeder on a stable and dry surface.
- Do not submerge the feeder.

This equipment is for industrial use only and it is not intended for use in residential locations where the electrical power is provided by the public low-voltage supply system. There can be potential difficulties in residential locations due to conducted as well as radiated radio-frequency disturbances. The EMC or RF classification of this equipment is Class A.

LIFTING

Lift the machine by the lift bail only. The lift bail is designed to lift the power source only. Do not attempt to lift the power source with feeder or accessories attached to it.

When suspending a wire feeder, insulate the hanging device from the wire feeder enclosure.

STACKING

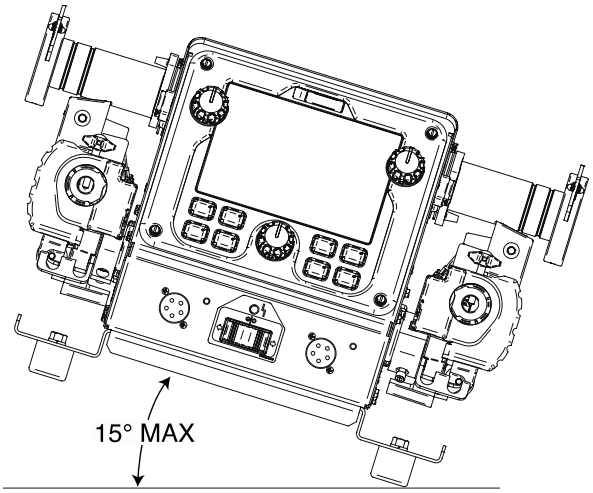
The PipeFab™ cannot be stacked.

TILTING

Place the machine directly on a secure, level surface or on a recommended undercarriage. The machine may topple over if this procedure is not followed.

For bench models, do not angle spindle for the wire spool or coil more than 15 degrees downward.

FIGURE A.1



MECHANICAL INSTALLATION

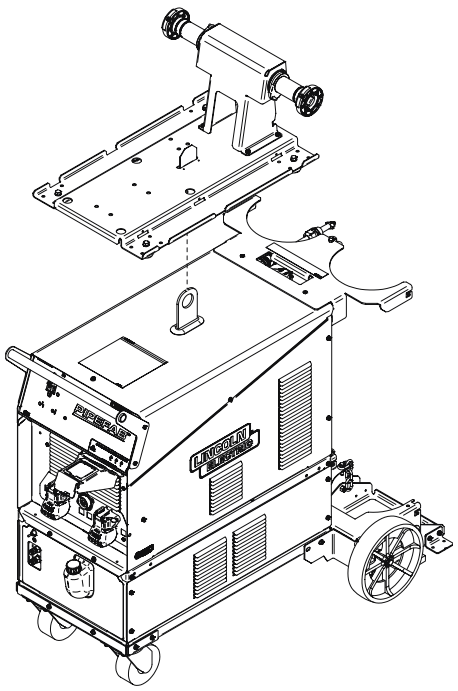
All accessory kits such as the PipeFab™ Undercarriage Kit and PipeFab™ Cooler come with installation instructions. Consult these installation instructions before assembly.

STANDARD (BENCH) CONFIGURATION

The PipeFab™ Feeder is installed on the PipeFab™ Power Source as shown in the steps below. The installation is the same whether or not the power source has the water cooler installed. In the below images, the water cooler is installed. Note that hardware in not necessary for the installation of the feeder. Hardware is included if desired.

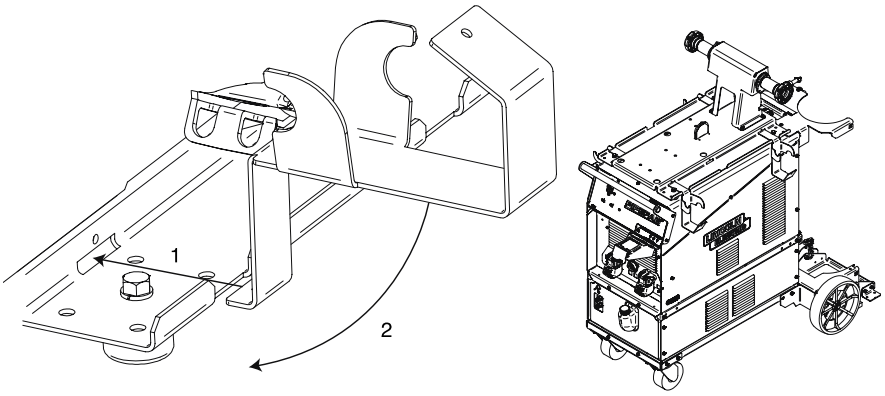
1. Position the Wire Reel Stand onto the Power Source. Ensure the lift bale is routed through the lift bale cutout and the Spindles are towards the rear of the machine.

FIGURE A.2



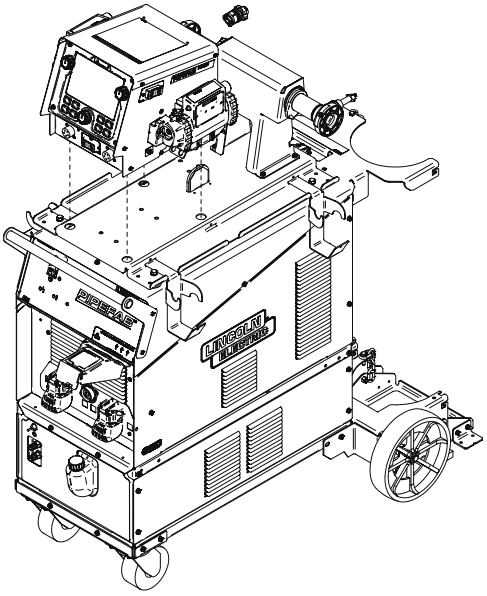
2. Install the Cable Management brackets. There are six slots, and four brackets, so place them in your most desired configuration. To install the brackets, (1) place the tab into the slot and (2) rotate the bracket 90° until it rests against the Power Source.

FIGURE A.3



3. Position the PipeFab™ Feeder onto the Wire Reel Stand. For secure mounting, ensure the feet of the feeder engage with the feet cutouts in the Wire Reel Stand.

FIGURE A.4



4. If desired, the PipeFab™ feeder and cable management brackets can be hard mounted to the wire reel stand using the provided hardware and L brackets as shown below. This is optional as these were designed to align securely without hardware.

FIGURE A.5 - L BRACKET INSTALLATION

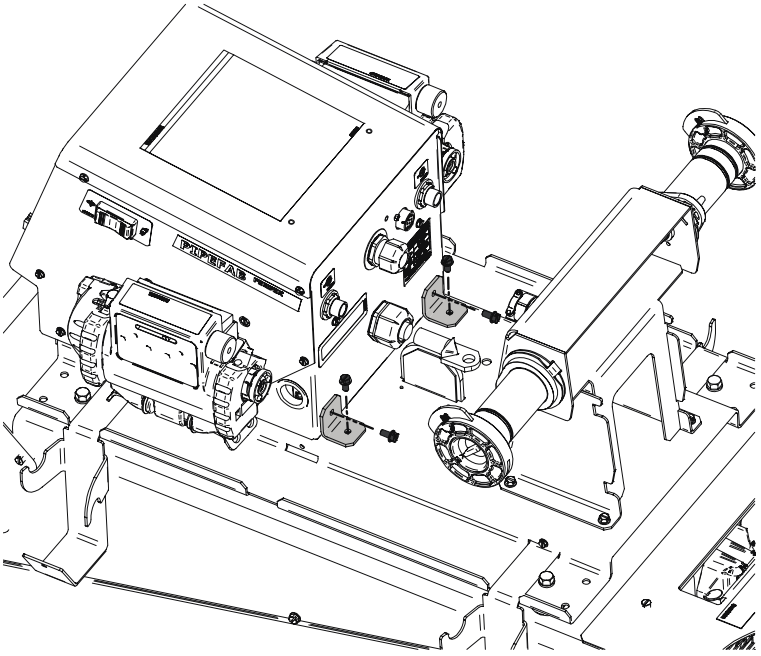
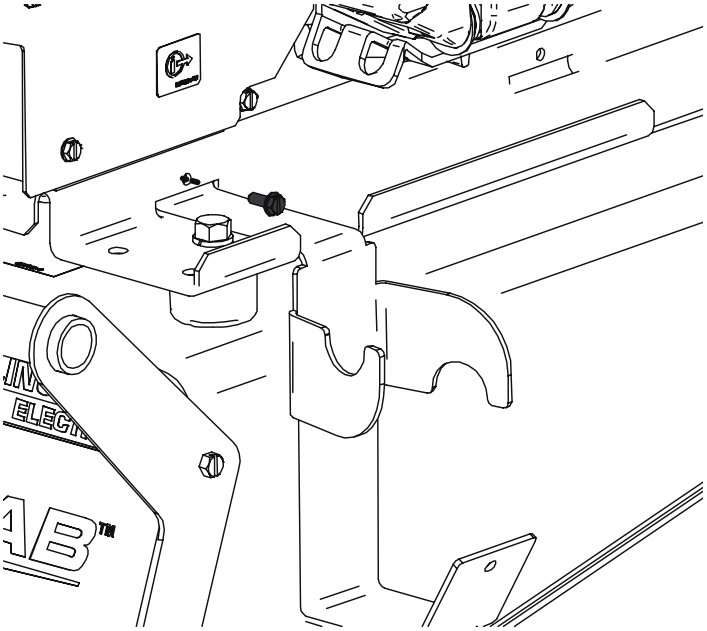
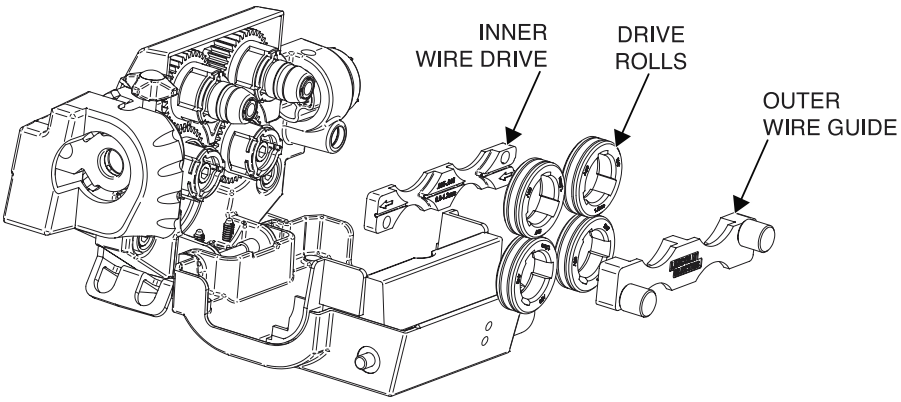


FIGURE A.6 - CABLE MANAGEMENT BRACKET MOUNTING



INSTALLING DRIVE ROLLS

FIGURE A.7



1. Turn power OFF at the welding power source.

2. Open the wire drive door by pulling on the top.

3. Remove the outer wire guide.

4. Remove drive rolls by pulling straight out. It may be necessary to wiggle the drive roll to free it from the snap ring.

5. Remove the inner wire guide.

6. Install the new inner wire guide, with the arrow pointing in the direction of wire travel.

7. Install the drive rolls and outer wire guide.

8. Close the wire drive door and adjust the pressure setting accordingly.

WIRE DRIVE PRESSURE SETTING

Most wires operate well with a pressure setting of “2”. The best drive roll pressure varies with wire type, wire surface, lubrication and hardness. Too much pressure may crush the wire or cause "birdnesting", but too little pressure could cause slippage.

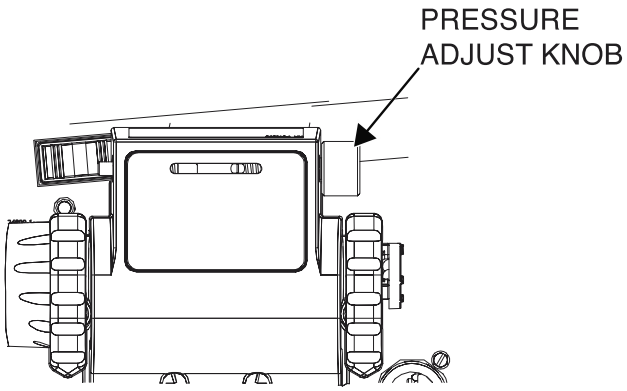
Setting the drive roll pressure

1. Press the end of the 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" or jams, the drive roll pressure is too high. Reduce the pressure by one turn of the knob, run new wire through the gun, and repeat step 1.

3. If the only result is slippage, disconnect the gun and pull the gun cable forward about 6" (150mm). There should be a slight waviness in the exposed wire. If there is no waviness, increase the pressure setting one turn, reconnect the gun and repeat the above steps.

FIGURE A.8

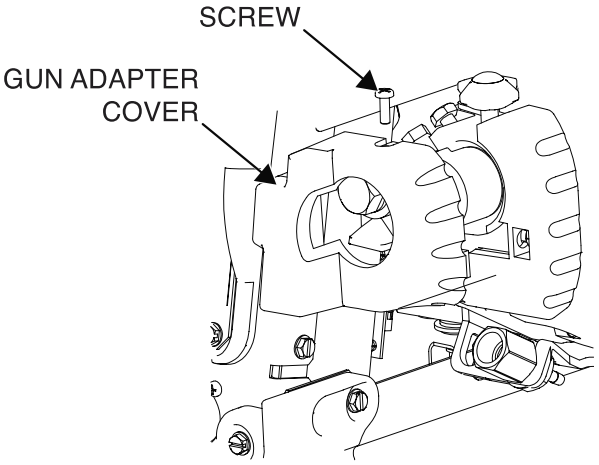


LINCOLN, STANDARD #2-#4, STANDARD #5, MILLER GUN ADAPTER INSTALLATION

1. Turn power OFF at the welding power source.

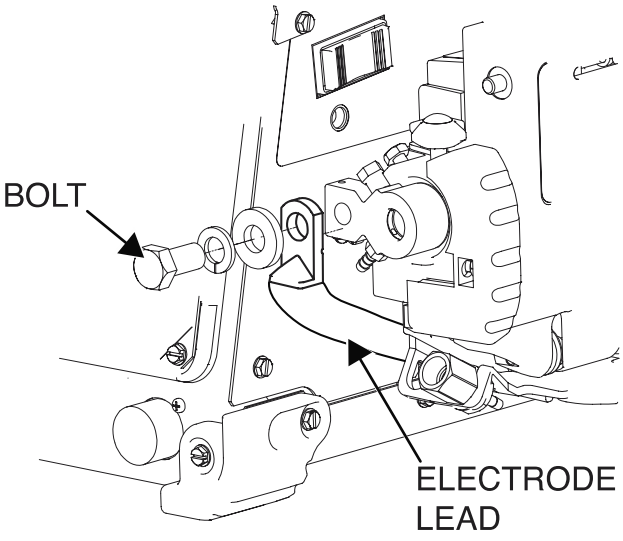
2. Using a Phillips screwdriver, remove the screw, lock washer and washer securing the gun adapter cover. Remove the gun adapter cover.

FIGURE A.9



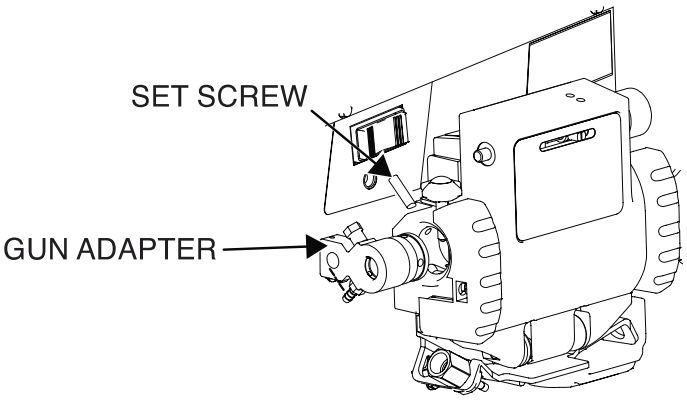
3. Using a ¾" wrench, remove the bolt securing the electrode lead to the gun adapter.

FIGURE A.10



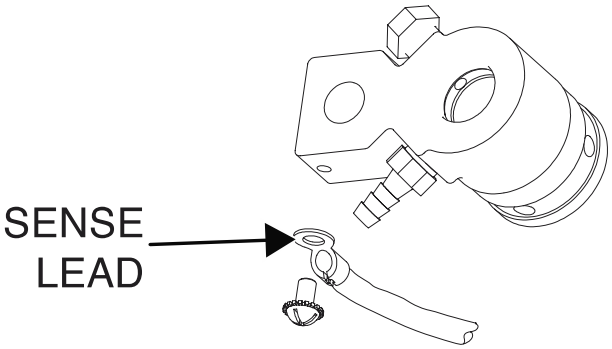
4. Use a 1/8” hex key, loosen the set screw securing the gun adapter.

FIGURE A.11



5. Using a Phillips screwdriver, remove the sense lead.

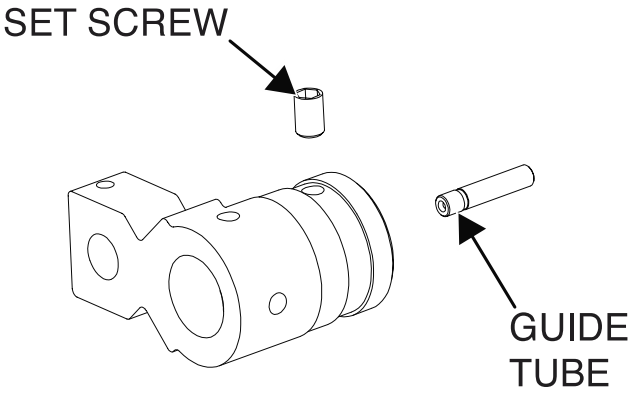
FIGURE A.12



6. If a gas hose is attached to the gun adapter, use pliers to remove the hose clamp and remove the gas hose.

7. If the gun adapter requires guide tubes, install the correct size guide tube and secure with the set screw.

FIGURE A.13



Wire size	Number of grooves in guide tube
.023 – .045" (0.6 – 1.2 mm)	1
.045 – 1/16" (1.2 – 1.6 mm)	2
1/16 – 5/64" (1.6 – 2.0 mm)	3
.068 – 7/64" (2.0 – 2.8 mm)	4

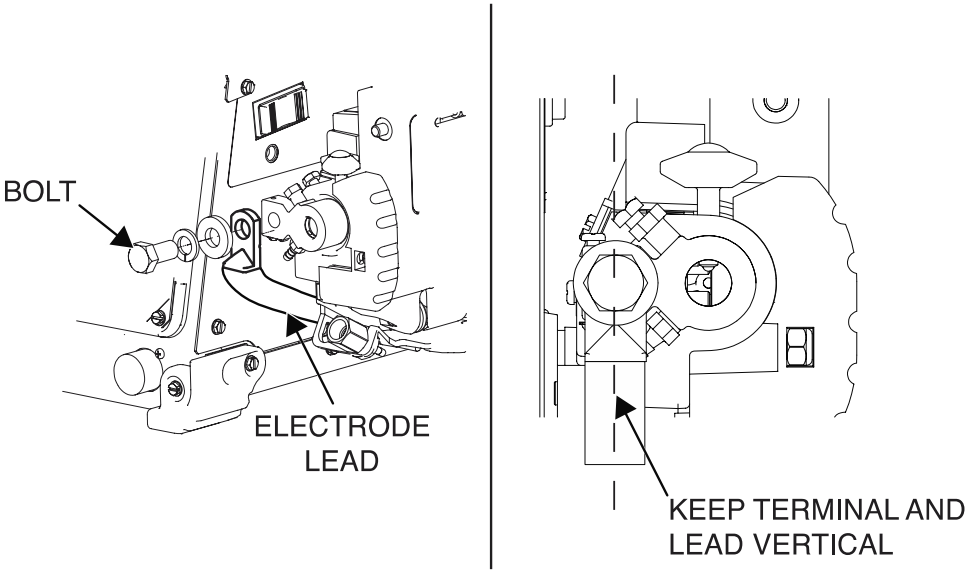
8. Assemble the sense lead to the new gun adapter. Orient the lead towards the rear of the gun adapter.

9. If required, assemble the gas hose to the gun adapter or the fitting on the feed plate and secure with a hose clamp.

10. Assemble the gun adapter to the wire drive. Tighten the set screw once the gun adapter is at a 90° angle.

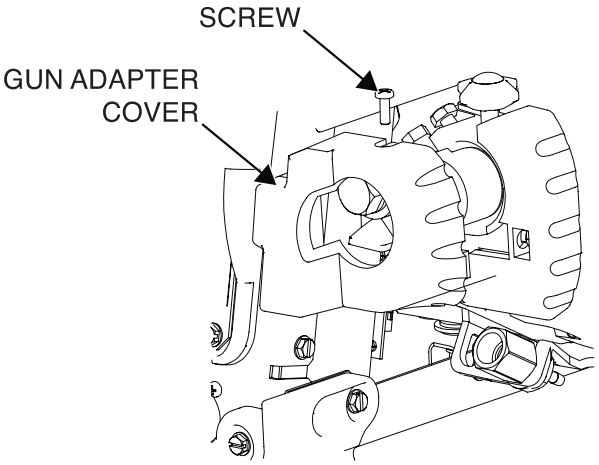
11. Bolt the electrode lead to the gun adapter, making sure to route the lead straight down.

FIGURE A.14



12. Assemble the gun adapter cover and secure with the screw, lock washer and washer.

FIGURE A.15



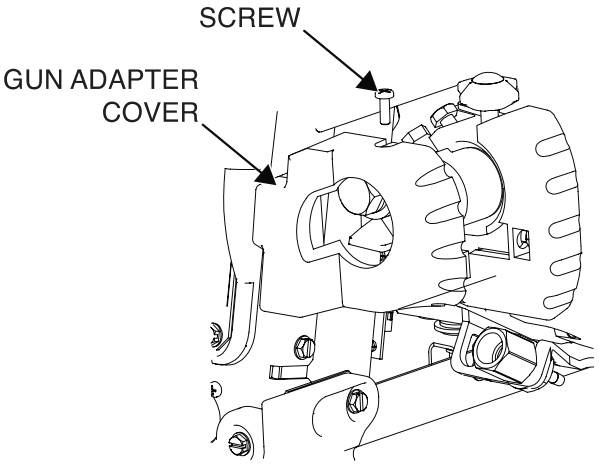
OXO AND FAST MATE GUN ADAPTER INSTALLATION

Using the Oxo or FastMate gun adapters requires a K3344-1 Standard #4 gun adapter to be installed in the wire drive.

1. Turn power OFF at the welding power source.

2. Using a Phillips screwdriver, loosen the screw securing the gun adapter cover. Remove the gun adapter cover.

FIGURE A.16

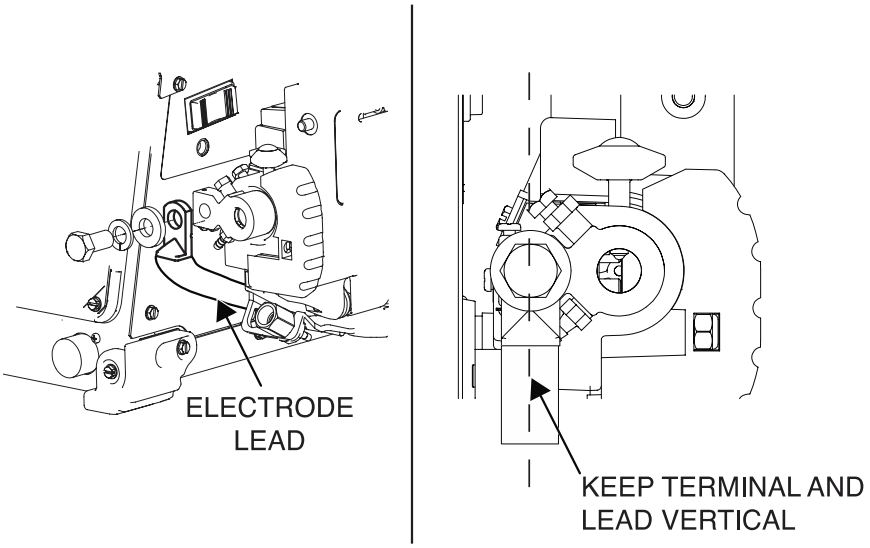


3. Using a ¾" wrench, remove the bolt securing the electrode lead to the gun adapter.

4. Using pliers, remove the hose clamp and hose from the gun adapter.

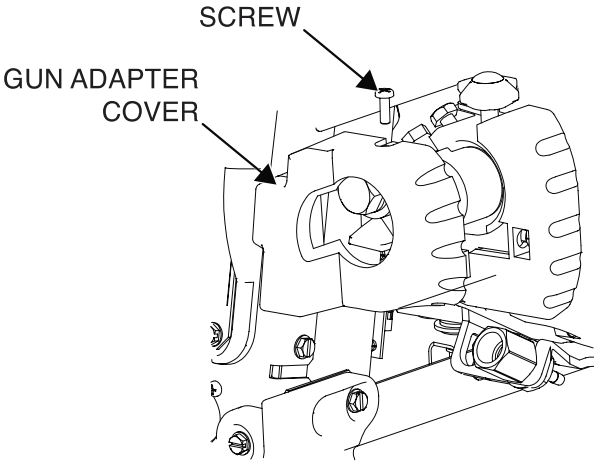
5. Bolt the electrode lead to the gun adapter, making sure to route the lead straight down.

FIGURE A.17



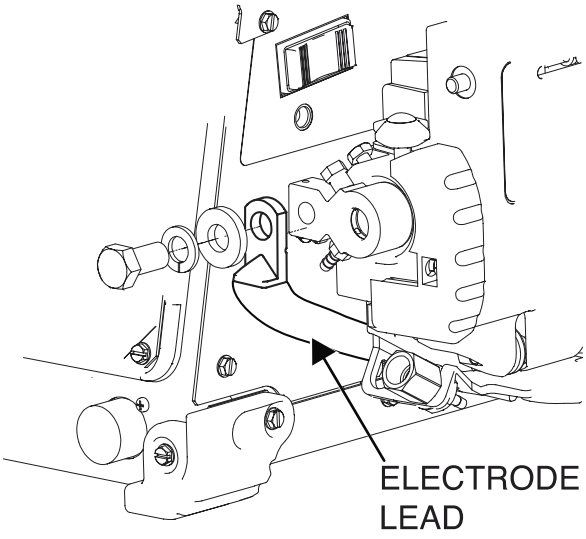
6. Assemble the gun adapter cover and secure with the screw.

FIGURE A.18



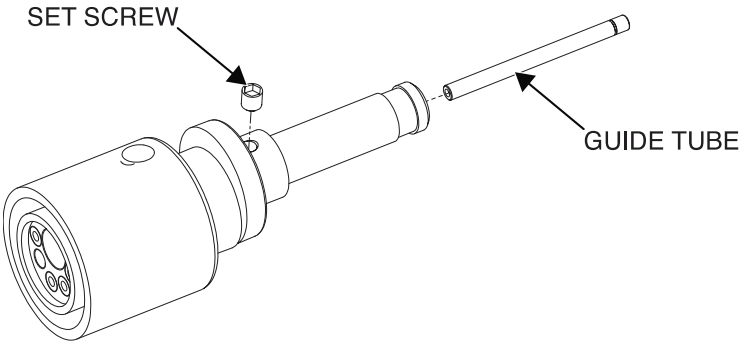
7. Assemble the gas hose to the Oxo or FastMate gun adapter.

FIGURE A.19



8. Select the appropriate guide tube and secure with the set screw.

FIGURE A.20



Wire size	Number of grooves in guide tube
.023 – .045” (0.6 – 1.2 mm)	1
.045 – 1/16” (1.2 – 1.6 mm)	2
1/16 – 5/64” (1.6 – 2.0 mm)	3
.068 – 7/64” (2.0 – 2.8 mm)	4

9. Slide the Oxo or FastMate gun adapter into the wire drive and secure with the thumb screw.

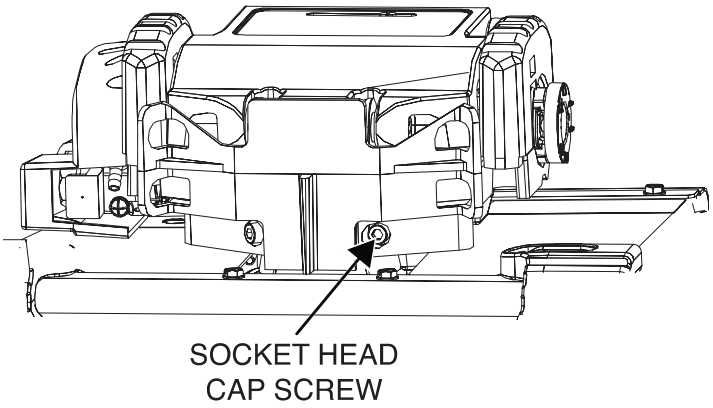
10. For FastMate gun adapters, connect the trigger pigtail to the connector on the front of the feeder.

ROTATING THE WIRE DRIVE

1. Turn power OFF at the welding power source.

2. Locate the socket head cap screw at the bottom of the wire drive. Loosen, but do not remove the screw.

FIGURE A.21



3. Rotate the wire drive to the desired position and tighten the screw.

SHIELDING GAS CONNECTION

⚠ WARNING

CYLINDER may explode if damaged.

BUILD-UP OF SHIELDING GAS may harm health or kill.

- **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.**
- **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.

Maximum inlet pressure is 100 psi. (6.9 bar.)
The inlet fitting is 5/8-18 CGA type connection.
Install the shielding gas supply as follows:

1. Secure the cylinder to prevent it from falling.
2. Remove the cylinder cap. Inspect the cylinder valves and regulator for damaged threads, dirt, dust, oil or grease. Remove dust and dirt with a clean cloth. **DO NOT ATTACH THE REGULATOR IF OIL, GREASE OR DAMAGE IS PRESENT!** Inform your gas supplier of this condition. Oil or grease in the presence of high pressure oxygen is explosive.
3. Stand to one side away from the outlet and open the cylinder valve for an instant. This blows away any dust or dirt, which may have accumulated in the valve outlet.
4. Attach the flow regulator to the cylinder valve and tighten the union nut(s) securely with a wrench. NOTE: If connecting to 100% CO_2 cylinder, insert regulator adapter between regulator and cylinder valve. If adapter is equipped with a plastic washer, be sure it is seated for connection to the CO_2 cylinder.
5. Attach one end of the inlet hose to the outlet fitting of the flow regulator. Attach the other end to the welding system shielding gas inlet. Using a wrench, tighten the union nuts.
6. Before opening the cylinder valve, turn the regulator adjusting knob counterclockwise until the adjusting spring pressure is released.
7. Standing to one side, open the cylinder valve slowly a fraction of a turn. When the cylinder pressure gage stops moving, open the valve fully.
8. The flow regulator is adjustable. Adjust it to the flow rate recommended for the procedure and process being used before making a weld.

WATER-COOLED GUN CONNECTIONS

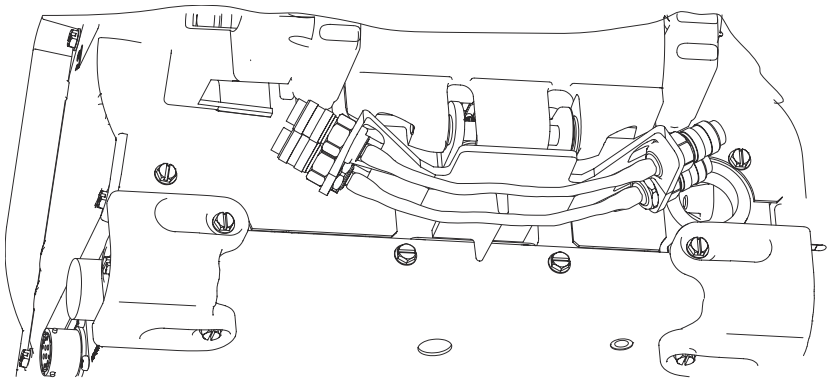
The K590-6 water connection kit installs underneath the wire drive.

1. Turn power OFF at the welding power source.

2. Install the quick disconnect fittings to the plastic bracket, by holding the rear nut stationary and spinning the fitting.

3. Cut the tubing to the desired length, and then install the tubing and hose clamps to the fittings.

FIGURE A.22



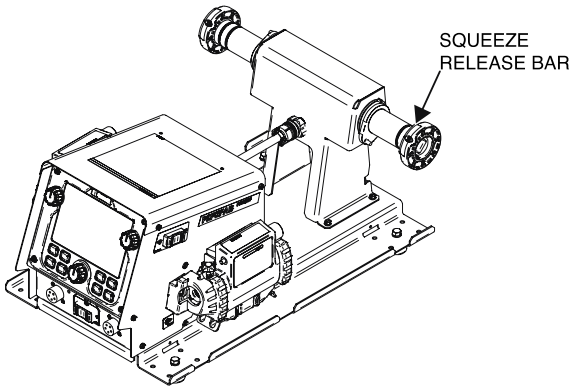
LOADING SPOOLS AND COILS

⚠ WARNING

- **Keep hands, hair, clothing and tools away from rotating equipment.**
- **Do not wear gloves when threading wire or changing wire spool.**
- **Only qualified personnel should install, use or service this equipment.**

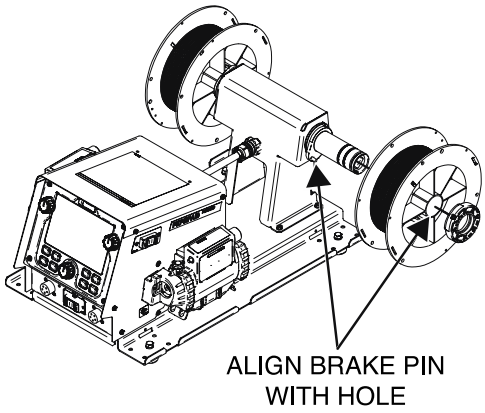
1. Turn power OFF at the welding power source.
2. Squeeze the release bar on the retaining collar and remove it from the spindle.

FIGURE A.23



3. Place the spool on the spindle, aligning the spindle brake pin with one of the holes in the back side of the spool. Be certain the wire feeds off of the spool in the proper direction.

FIGURE A.24



4. Re-install the retaining collar, with the metal bar engaging one of the grooves of the spindle. The release bar will spring out when engaged.

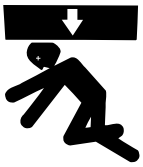
ELECTRICAL INSTALLATION

INPUT AND GROUND CONNECTION

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

⚠ WARNING

FALLING EQUIPMENT can cause injury.



- Lift only with equipment of adequate lifting capacity.
- Be sure machine is stable when lifting.
- Do not operate machine while suspended when lifting.

MACHINE GROUNDING

The frame of the welder must be grounded. A ground terminal marked with a ground symbol is located next to the input power connection block.

See your local and national electrical codes for proper grounding methods.

HIGH FREQUENCY PROTECTION

Locate the PipeFab™ away from radio controlled machinery. The normal operation of the PipeFab™ may adversely affect the operation of RF controlled equipment, which may result in bodily injury or damage to the equipment.

INPUT CONNECTION

Use a three-phrase supply line. A 1.40 inch diameter access hole with strain relief is located on the case back. Route input power cable through this hole and connect L1, L2, L3 and ground per connection diagrams and National Electric Code. To access the input power connection block, remove the left door of the machine (four screws). Be sure to reinstall the door before operation.

ALWAYS CONNECT THE POWER WAVE GROUNDING LUG (LOCATED AS SHOWN IN FIGURES A.26 AND A.27) TO A PROPER SAFETY (EARTH) GROUND.

FIGURE A.25 - CASE SIDE REMOVAL

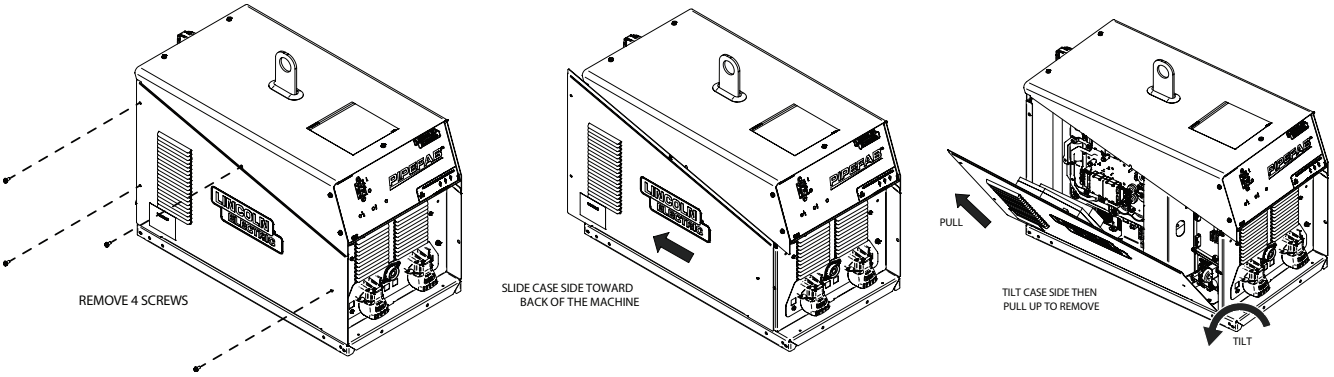


FIGURE A.26 - K3731-1 INPUT POWER CONNECTION

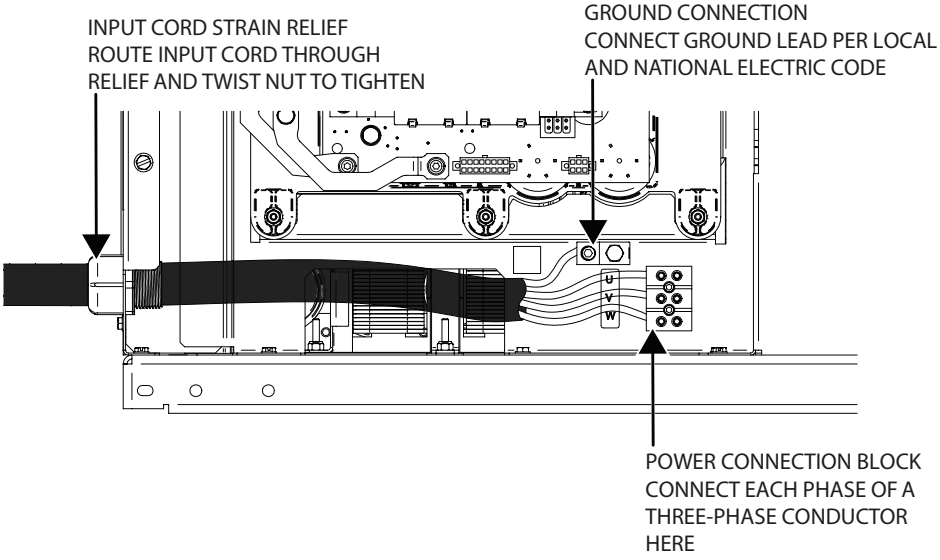
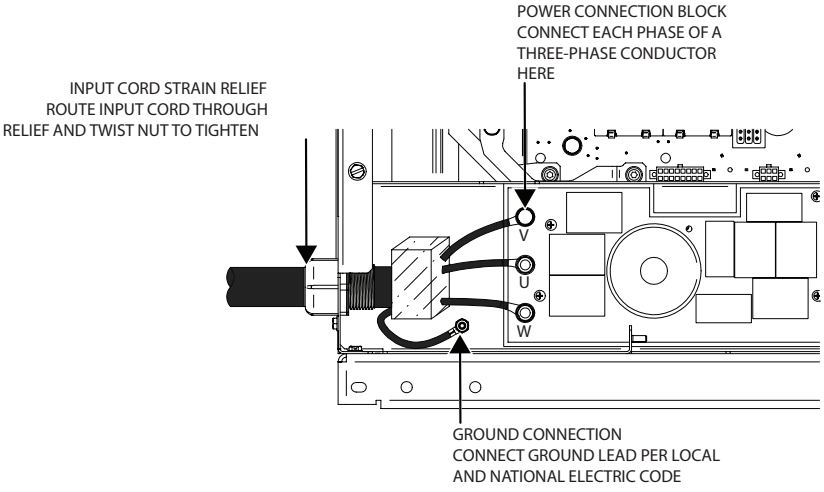


FIGURE A.27 - K3732-1 INPUT POWER CONNECTION



INPUT FUSE AND SUPPLY WIRE CONSIDERATIONS

Refer to Technical Specification Section for recommended fuse, wire sizes and type of the copper wires. Fuse the input circuit with the recommended super lag fuse or delay type breakers (also called "inverse time" or "thermal/magnetic" circuit breakers). Choose input and grounding wire size according to local or national electrical codes. Using input wire sizes, fuses or circuit breakers smaller than recommended may result in "nuisance" shut-offs from welder inrush currents, even if the machine is not being used at high currents.

INPUT VOLTAGE SELECTION

The PipeFab™ automatically adjusts to work with different input voltages. No reconnect switch settings are required.

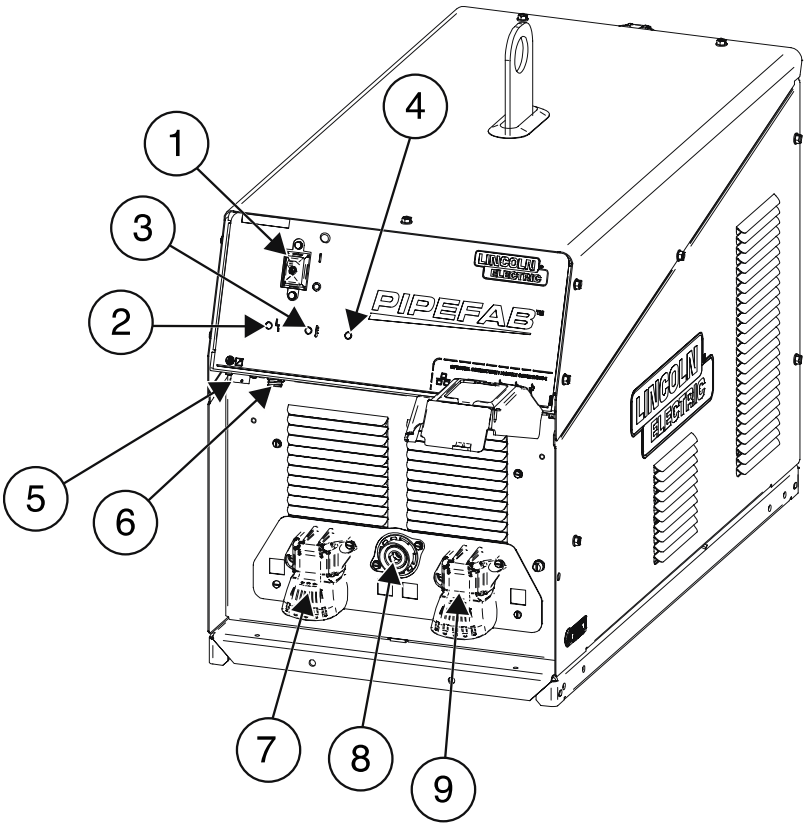
⚠ WARNING

The PipeFab™ ON/OFF switch is not intended as a service disconnect for this equipment. Only a qualified electrician should connect the input leads to the PipeFab™. Connections should be made in accordance with all local and national electrical codes and the connection diagram located on the inside of the reconnect access door of the machine. Failure to do so may result in bodily injury or death.

PIPEFAB™ POWER SOURCE CONNECTOR LOCATIONS

CASE FRONT LOCATIONS

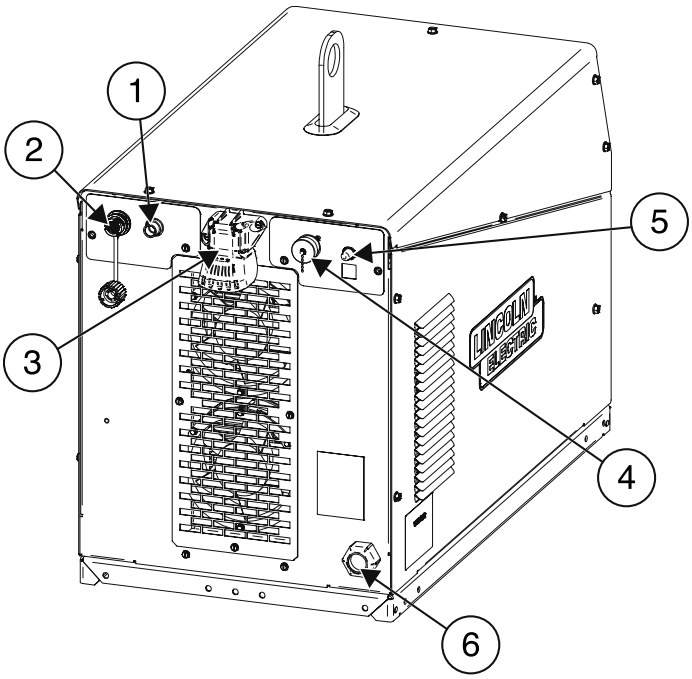
FIGURE A.27



1. **Power Switch**
2. **Status LED**
3. **Thermal LED**
4. **Status II LED**
5. **12 Pin Connector**
6. **Sense Lead Connector**
7. **Work Weld Output Terminal**
8. **TIG Weld Output Terminal**
9. **Stick Weld Output Terminal**

CASE BACK LOCATIONS

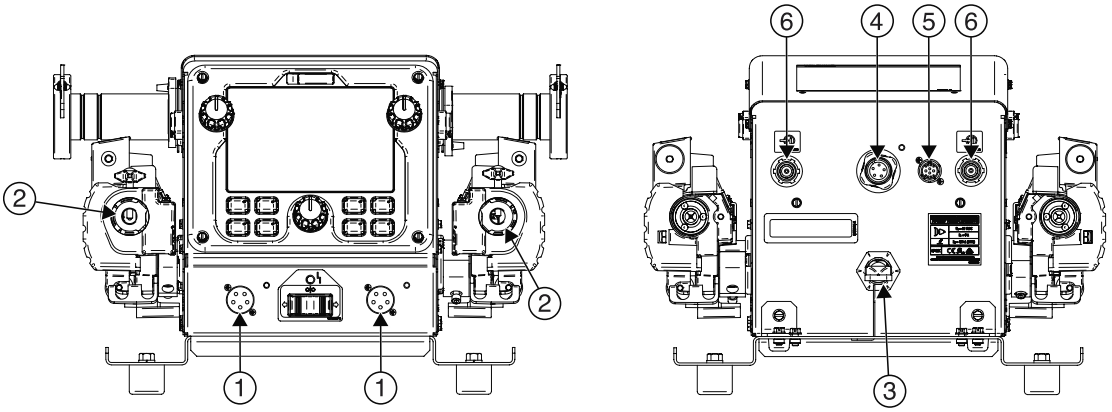
FIGURE A.28



1. **TIG Gas Input Solenoid**
2. **Ethernet**
3. **MIG Weld Output Stud**
4. **ArcLink Connector**
5. **40 Volt Circuit Breaker**
6. **Input Power Cord**

PIPEFAB™ FEEDER CONNECTOR LOCATIONS

FIGURE A.29

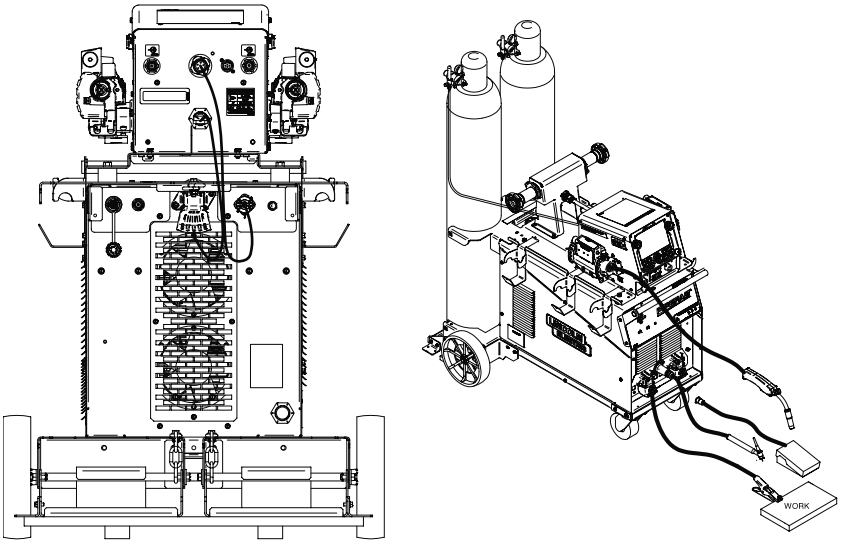


1. **5 Pin Trigger Connector**
2. **Gun Adapter**
3. **Input Weld Cable**
4. **5 Pin ArcLink Cable**
5. **12 Pin Remote UI Connector**
6. **MIG Input Gas Solenoid**

CONNECTION DIAGRAM

The PipeFab™ system was design such that all connections can be maintained when switching welding processes. There is no longer the need to changeover torches and welding cables between processes. The PipeFab™ Power Source will automatically change polarity and active output terminals based on the selected process. This selection is made on the user interface of the PipeFab™ Feeder.

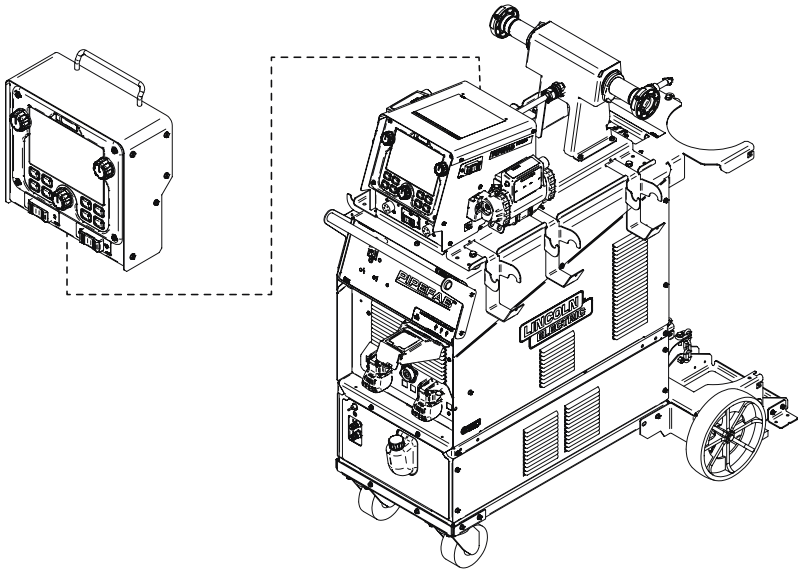
FIGURE A.30



REMOTE USER INTERFACE CONFIGURATION

A remote user interface (UI) can be added by simply plugging the PipeFab™ Remote UI into the PipeFab™ Feeder, 12 pin located on the back of the feeder. The remote UI is designed for hard automation setups with a manipulator.

FIGURE A.31

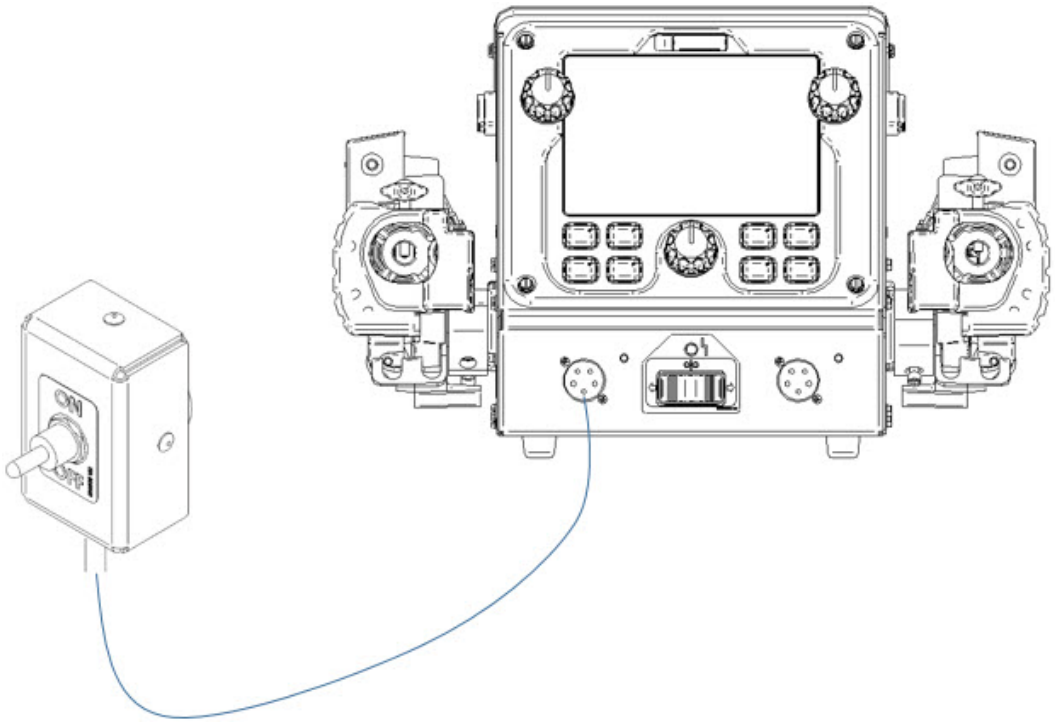


The Remote UI is to be connected to the system in addition to the UI mounted in the Wire Feeder. When a remote UI is connected, only one UI will be active at a time. In order to activate an inactive UI, press any button.

REMOTE TRIGGER SWITCH

A remote trigger switch is available for use in hard automation setups with or without a Remote UI. This is a toggle switch and lead assembly which connects to the appropriate gun trigger connection to start and stop the wire feeder. Turn the switch ON to start welding at the set parameters. Turn the switch OFF to stop welding.

FIGURE A.32: CONNECTION DIAGRAM OF REMOTE TRIGGER



RECOMMENDED WORK CABLE SIZES FOR ARC WELDING

GENERAL GUIDELINES

- **Select the appropriate size cables per the "Output Cable Guidelines" below.** Excessive voltage drops caused by undersized welding cables and poor connections often result in unsatisfactory welding performance. Always use the largest welding cables (electrode and work) that are practical, and be sure all connections are clean and tight.

  NOTE: Excessive heat in the weld circuit indicates undersized cables and/or bad connections.

- **Route all cables directly to the work and wire feeder, avoid excessive lengths and do not coil excess cable.** Route the electrode and work cables in close proximity to one another to minimize the loop area and therefore the inductance of the weld circuit.

- **Always weld in a direction away from the work (ground) connection.**

Table A.1 shows copper cable sizes recommended for different currents and duty cycles. Lengths stipulated are the distance from the welder to work and back to the welder again. Cable sizes are increased for greater lengths primarily for the purpose of minimizing cable drop.

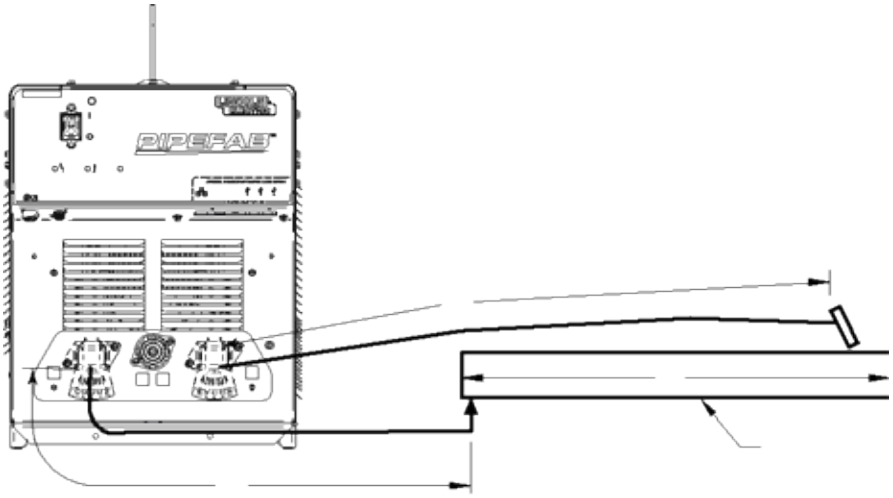
TABLE A.1 - RECOMMENDED CABLE SIZES - RUBBER COVERED COPPER - RATED 167°F (75°C)[1]

AMPERES	PERCENT DUTY CYCLE	CABLE SIZES FOR COMBINED LENGTHS OF ELECTRODE AND WORK CABLES				
		0 TO 50 FT.	50 TO 100 FT.	100 TO 150 FT.	150 TO 200 FT.	200 TO 250 FT.
200	100	2	2	2	1	1/0
250	100	1	1	1	1	1/0
300	100	2/0	2/0	2/0	2/0	3/0
400	100	3/0	3/0	3/0	3/0	4/0
450	100	3/0	3/0	4/0	4/0	2–3/0
500	60	2/0	2/0	3/0	3/0	4/0
550	40	2/0	2/0	3/0	3/0	4/0

CABLE INDUCTANCE AND ITS EFFECTS ON WELDING

Excessive cable inductance will cause the welding performance to degrade. There are several factors that contribute to the overall inductance of the cabling system including cable size, and loop area. The loop area is defined by the separation distance between the electrode and work cables, and the overall welding loop length. The welding loop length is defined as the total of length of the electrode cable (A) + work cable (B) + work path (C).

FIGURE A.33



To minimize inductance always use the appropriate size cables, and whenever possible, run the electrode and work cables in close proximity to one another to minimize the loop area. Since the most significant factor in cable inductance is the welding loop length, avoid excessive lengths and do not coil excess cable. For long work piece lengths, a sliding ground should be considered to keep the total welding loop length as short as possible.

REMOTE SENSE LEAD SPECIFICATIONS

VOLTAGE SENSING OVERVIEW

The best arc performance occurs when the PipeFab™ has accurate data about the arc conditions.

Depending upon the process, inductance within the electrode and work cables can influence the voltage apparent at the studs of the welder, and have a dramatic effect on performance. Remote voltage sense leads are used to improve the accuracy of the arc voltage information supplied to the control pc board. Sense Lead Kits (K940-xx) are available for this purpose.

The PipeFab™ has the ability to automatically sense when remote sense leads are connected. With this feature there are no requirements for setting-up the machine to use remote sense leads. This feature can be disabled through the Weld Manager Utility (available at www.powerwavesoftware.com) or through the set up menu on the PipeFab™ feeder.

⚠ CAUTION

If the auto sense lead feature is disabled and remote voltage sensing is enabled but the sense leads are missing or improperly connected extremely high welding outputs may occur.

GENERAL GUIDELINES FOR VOLTAGE SENSE LEADS

Sense leads should be attached as close to the weld as practical, and out of the weld current path when possible. In extremely sensitive applications it may be necessary to route cables that contain the sense leads away from the electrode and work welding cables.

Voltage sense leads requirements are based on the weld process (See Table A.2).

TABLE A.2

PROCESS	ELECTRODE VOLTAGE SENSING(1) 67 LEAD	WORK VOLTAGE SENSING(2) 21 LEAD
GMAW	67 LEAD REQUIRED	21 LEAD OPTIONAL (3)
GMAW-P	67 LEAD REQUIRED	21 LEAD OPTIONAL (3)
FCAW	67 LEAD REQUIRED	21 LEAD OPTIONAL (3)
STT [1]	67 LEAD REQUIRED	21 LEAD OPTIONAL (3) RECOMMENDED FOR CABLES LONGER THAN 75 FT.
GTAW	VOLTAGE SENSE AT STUDS	VOLTAGE SENSE AT STUDS
SMAW	VOLTAGE SENSE AT STUDS	VOLTAGE SENSE AT STUDS

(1) The electrode voltage sense lead (67) is automatically enabled by the weld process, and integral to the 5 pin ArcLink control cable (K1543-xx).
(2) When a work voltage sense lead (21) is connected the power source will automatically switch over to using this feedback (if the auto sense feature is enable).
(3) Negative polarity semi-automatic process operation WITHOUT use of a remote work sense lead (21) requires the Negative Electrode Polarity attribute to be set.

ELECTRODE VOLTAGE SENSING

The remote ELECTRODE sense lead (67) is built into the 5-pin ArcLink control cable and is always connected to the wire drive feed plate when a wire feeder is present. Enabling or disabling electrode voltage sensing is application specific, and automatically configured by the active weld mode.

⚠ CAUTION

If the auto sense lead feature is disabled and the weld polarity attribute is improperly configured extremely high welding outputs may occur.

WORK VOLTAGE SENSING

While most applications perform adequately by sensing the work voltage directly at the output stud, the use of a remote work voltage sense lead is recommended for optimal performance. The remote WORK sense lead (21) can be accessed through the four pin voltage sense connector located on the control panel by using the K940 Sense Lead Kit. It must be attached to the work as close to the weld as practical, but out of the weld current path. For more information regarding the placement of remote work voltage sense leads, see in this section entitled "Voltage Sensing Considerations for Multiple Arc Systems."

NEGATIVE ELECTRODE POLARITY

The PipeFab™ has the ability to automatically change the polarity of the power source. With this feature there are no setup requirements for welding with negative electrode polarity. Negative polarity is only available for TIG welding.

VOLTAGE SENSING CONSIDERATIONS FOR MULTIPLE ARC SYSTEMS

Special care must be taken when more than one arc is welding simultaneously on a single part. Multiple arc applications do not necessarily dictate the use of remote work voltage sense leads, but they are strongly recommended.

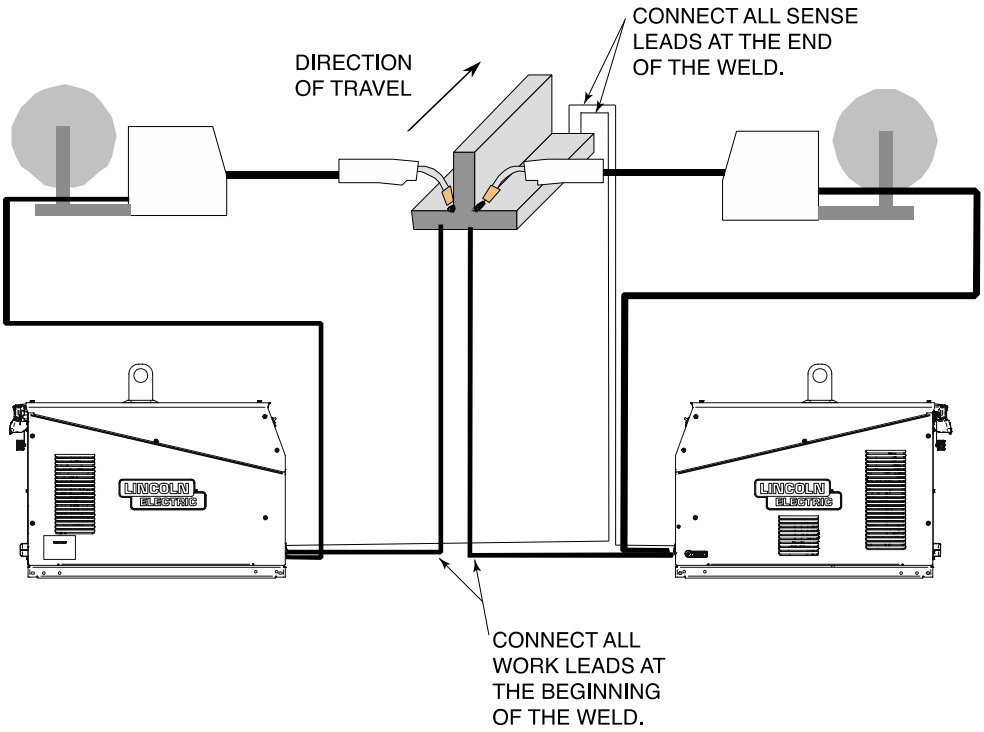
If Sense Leads ARE NOT Used:

- Avoid common current paths. Current from adjacent arcs can induce voltage into each others current paths that can be misinterpreted by the power sources, and result in arc interference.

If Sense Leads ARE Used:

- Position the sense leads out of the path of the weld current. Especially any current paths common to adjacent arcs. Current from adjacent arcs can induce voltage into each others current paths that can be misinterpreted by the power sources, and result in arc interference.
- **For longitudinal applications**, connect all work leads at one end of the weldment, and all of the work voltage sense leads at the opposite end of the weldment. Perform welding in the direction away from the work leads and toward the sense leads.
- **For circumferential applications**, connect all work leads on one side of the weld joint, and all of the work voltage sense leads on the opposite side, such that they are out of the current path.

FIGURE A.34



CONTROL CABLE CONNECTIONS

ArcLink Control Cables are available in two forms:

- K1543-xx series for most indoor or factory installations.
- K2683-xx series when the equipment is frequently moved.

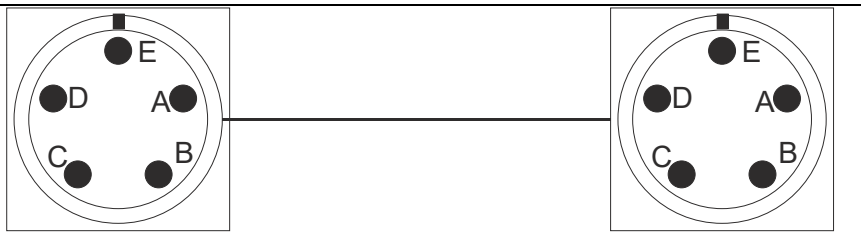
ArcLink/LincNet control cables are special high quality cables for digital communication. The cables are copper 5 conductor cable in a SO-type rubber jacket. There is one 20 gauge twisted pair for network communications. This pair has an impedance of approximately 120 ohms and a propagation delay per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

GENERAL GUIDELINES

Genuine Lincoln control cables should be used at all times (except where noted otherwise). Lincoln cables are specifically designed for the communication and power needs of the Power Wave® / Power Feed™ systems. Most are designed to be connected end to end for ease of extension. Generally, it is recommended that the total length not exceed 200 ft. (61 m). The use of nonstandard cables, especially in lengths greater than 25 feet, can lead to communication problems (system shutdowns), poor motor acceleration (poor arc starting), and low wire driving force (wire feeding problems). Always use the shortest length of control cable possible, and DO NOT coil excess cable.

Regarding cable placement, best results will be obtained when control cables are routed separate from the weld cables. This minimizes the possibility of interference between the high currents flowing through the weld cables, and the low level signals in the control cables. These recommendations apply to all communication cables including ArcLink® and Ethernet connections.

TABLE A.3



POWER SOURCE	
PIN	**FUNCTION**
A	ARCLINK
B	ARCLINK
C	67 VOLTAGE SENSE
D	40 VDC
E	COMMON

WIRE FEEDER	
PIN	**FUNCTION**
A	ARCLINK
B	ARCLINK
C	67 VOLTAGE SENSE
D	40 VDC
E	COMMON

CONNECTION BETWEEN POWER SOURCE AND ETHERNET NETWORKS

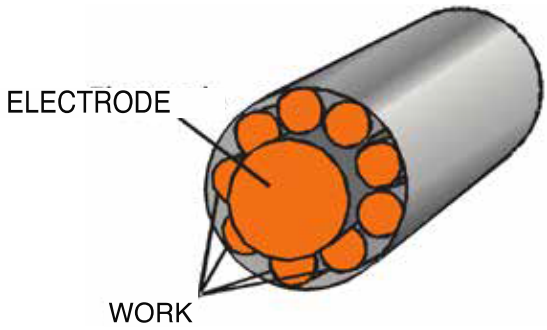
The PipeFab™ is equipped with a ODVA compliant RJ-45 Ethernet connector, which is located on the front panel. It is critical that all Ethernet cables external to either a conduit or an enclosure are solid conductor, shielded cat 5e cable, with a drain. The drain should be grounded at the source of transmission. For best results, route Ethernet cables away from weld cables, wire drive control cables, or any other current carrying device that can create a fluctuating magnetic field. For additional guidelines refer to ISO/IEC 11801. Failure to follow these recommendations can result in an Ethernet connection failure during welding.

USB PORTS

When equipped with the Optional Connectivity module K4720-1; the PipeFab™ will be able to connect remotely (wireless) via a USB WIFI adapter (customer must supply) or wired through an Ethernet cable.

WELD CABLES, COAXIAL

FIGURE A.35



Coaxial welding cables are specially designed welding cables for STT™ and pulse welding. Coaxial weld cables feature low inductance, allowing fast changes in the weld current. Regular cables have a higher inductance which may distort the STT™ waveshape. Inductance becomes more severe as the weld cables become longer.

Coaxial cables work best for high performance waveforms and when:

- long cables are present.

- the cables are housed in a metal tray.

A coaxial weld cable is constructed with multiple small leads wrapped around one large lead. The large inner lead connects to the electrode stud on the power source and the electrode connection on the wire feeder. The small leads combine together to form the work lead, one end attached to the power source and the other end to the work piece.

To install:

1. Turn the input power off at the welding power source.

2. Connect one end of the center lead to the power source electrode connection, and the other end to the wire feeder electrode connection.

3. Connect the outer lead bundle to the power source work connection, and the other end to the work piece. Minimize the length of any work lead extension for best results.

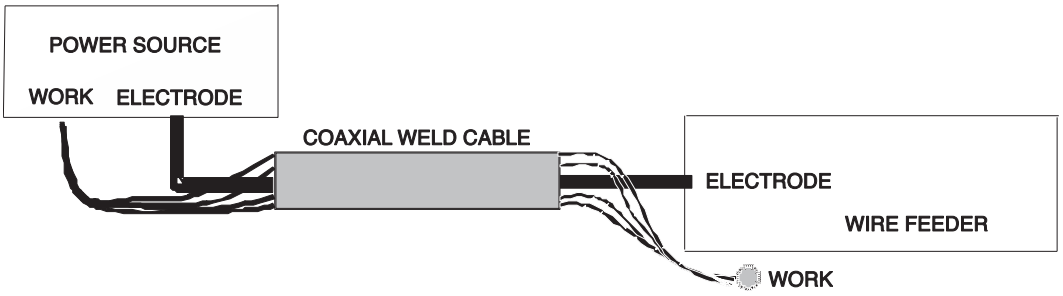
4. Insulate all connections.

TABLE A.4
RECOMMENDED CABLE SIZES (RUBBER COVERED COPPER - RATED 75°C)**

AMPERES	DUTY CYCLE	COAXIAL CABLE LENGTH			
		0 TO 25 FT.	25 TO 50 FT.	50 TO 75 FT.	75 TO 100 FT.
250	100%	1	1	1	1
300	60%	1	1	1	1/0
350	60%	1/0	1/0	--	--

** Tabled values are for operation at ambient temperatures of 40°C and below. Applications above 40°C may require cables larger than recommended or cables rated higher than 75°C.

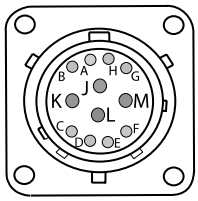
FIGURE A.36



FEEDER CONNECTORS

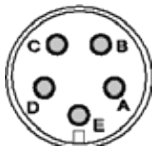
ADVANCED ACCESSORIES CONNECTOR (12 PIN)

TABLE A.5

PICTURE	FUNCTION	PIN	WIRING
	12 PIN CONNECTOR FOR PIPEFAB™ REMOTE UI.	A	CAN LOW
		B	CAN HIGH
		C	NOT USED
		D	NOT USED
		E	NOT USED
		F	NOT USED
		G	NOT USED
		H	NOT USED
		J	40 VDC COMMON
		K	40 VDC +
		L	NOT USED
		M	NOT USED

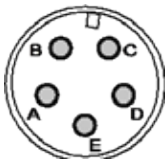
TRIGGER CONNECTOR (5 PIN)

TABLE A.6

PICTURE	FUNCTION	PIN	WIRING
	5 PIN TRIGGER CONNECTOR FOR PUSH-ONLY GUNS.	A	TRIGGER
		B	NOT USED
		C	TRIGGER
		D	N/A
		E	N/A

ARCLINK CONNECTOR (5 PIN)

TABLE A.7

PICTURE	FUNCTION	PIN	WIRING
	5 PIN CONNECTOR FOR COMMUNICATION AND POWER.	A	CAN
		B	CAN
		C	67 ELECTRODE VOLTAGE SENSE
		D	40 VDC
		E	COMMON

OPERATION

SAFETY PRECAUTIONS

READ AND UNDERSTAND ENTIRE SECTION BEFORE OPERATING MACHINE.

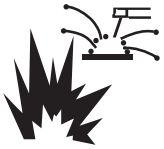
ELECTRIC SHOCK CAN KILL.

- Do not touch electrically live part or electrode with skin or wet clothing.
- Insulate yourself from work and ground.
- Always wear dry insulating gloves.
- Do not operate with covers, panels or guards removed or open.

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.

ARC RAYS can burn

- Wear eye, ear and body protection.

GRAPHIC SYMBOLS THAT APPEAR ON THIS MACHINE OR IN THIS MANUAL

TABLE B.1

	WARNING OR CAUTION	A	WELDING AMPERAGE		THERMAL
	INPUT POWER	V	WELDING VOLTAGE		SHIELDING GAS
I	ON		WIRE FEED SPEED		ARC START PARAMETERS
O	OFF		TRIM		ARC END PARAMETERS
+	POSITIVE OUTPUT		WORK		DANGEROUS VOLTAGE
-	NEGATIVE OUTPUT		COLD FEED		COOLER
	FRAME GROUND		GAS PURGE		STATUS
U_1	INPUT VOLTAGE		SHIELDING GAS INLET		OUTPUT
I_1	INPUT CURRENT		SHIELDING GAS OUTLET		PROTECTIVE GROUND

I_2	OUTPUT CURRENT		4-STEP TRIGGER		OPERATORS MANUAL
	CIRCUIT BREAKER		CV PROCESS		TIG PROCESS
	STICK PROCESS				

DEFINITIONS

BASIC DEFINITIONS

Arc Force – Arc Force adjusts the short circuit current for a soft arc, or for a forceful, driving arc. It helps to prevent sticking and shorting of organic coated electrodes, particularity globular transfer types such as stainless and low hydrogen. Arc Force is especially effective for root pass on pipe with stainless electrode and helps to minimize spatter for certain electrodes and procedures. Only displayed when set to a non-zero value.

Burnback Time – Adjustable time delay between turning off the wire feed and turning off the arc. Burnback helps to prevent wire sticking to the puddle. The burnback feature will allow current to flow for a specified time period at the end of a weld after wire feeding has stopped.

Cold Feed – Method for feeding wire without the contactor or gas valve being energized.

Crater Time – Controls the WFS and voltage for a specified time at the end of the weld after the trigger is released. During the Crater time, the machine will ramp from the Weld Procedure to the Crater Procedure.

FCAW – Weld process that uses gas shielded wire.

Gas Purge – Turns on the gas solenoid for as long as the gas purge switch is held.

Gas Type – Shielding gases that can be used: Argon, CO_2, 98 Ar / 2 CO_2, 90 Ar / 10 CO_2, 85 Ar / 15 CO_2, 80 Ar / 20 CO_2, 75 Ar / 25 CO_2.

HF – TIG starting method. HF turns on to help start the arc when output is enabled. HF start is used when a non-contact arc start method is required.

Hot Start – Increases output current during the start of welding, helps ignite the arc quickly and reliably. Only displayed when set to a non-zero value.

MIG – Weld process that has three different modes: CV, STT, and Pulse.

Pinch – Controls the arc characteristics when short-arc welding.

Postflow – Time that the shielding gas continues to flow after the arc has been terminated. Only displayed when set to a non-zero value.

Preflow Time – Adjusts the time that shielding gas flows before the welding output turns on.

Process – Selection of MIG, FCAW, TIG or Stick.

Run-In – Allows adjusting the wire feed speed prior to the arc being established. A low run-in speed permits smooth arc starts. After the arc is established the run-in value is inactive and the set wire feed speed is present. The run-in option is available in MIG and FCAW modes.

Start Time – Controls the WFS and voltage for a specified time at the end of the weld after the trigger is released. During the Crater time, the machine will ramp from the Weld Procedure to the Crater Procedure.

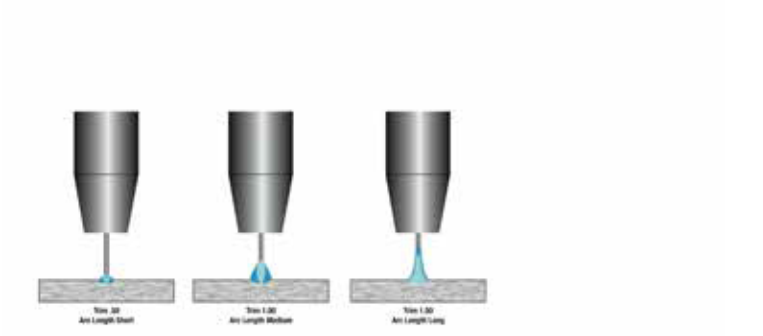
Stick – SMAW weld process, uses either a soft 7018 or crisp 6010 electrode.

Synergic – Use of pre-programmed parameters to determine the needed settings at a specific wire feed speed.

TIG – GTAW weld process, uses either HF or Touch Start weld mode to begin welding.

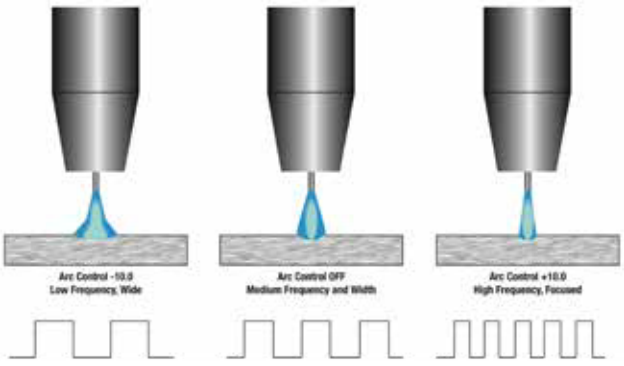
Trim – Adjusts the arc length.

FIGURE B.1



Ultimarc – Ultimarc regulate the focus or shape of the arc. Values greater than 0.0 increase the pulse frequency while decreasing the background current, resulting in a tight, stiff arc best for high speed sheet metal welding. Values less than 0.0 decrease the pulse frequency while increasing the background current, for a soft arc good for out-of-position welding. The MIG mode will determine if Ultimarc is used.

FIGURE B.2



Wire Diameter – Selection of wire size for MIG and FCAW processes.

Wire Type – Selection of wire materials for MIG processes.

POWER-UP SEQUENCE

When the PipeFab™ is powered up, it can take as long as 60 seconds for the machine to be ready to weld. During this time period the user interface will not be active.

DUTY CYCLE

The duty cycle is based on a ten-minute period. A 40% duty cycle represents 4 minutes of welding and 6 minutes of idling in a ten-minute period. Refer to the technical specification section for the PipeFab's duty cycle ratings.

MAKING A WELD

The serviceability of a product or structure utilizing the welding programs is and must be the sole responsibility of the builder/user. Many variables beyond the control of The Lincoln Electric Company affect the results obtained in applying these programs. These variables include, but are not limited to, welding procedure, plate chemistry and temperature, weldment design, fabrication methods and service requirements. The available range of a welding program may not be suitable for all applications, and the builder/user is and must be solely responsible for welding program selection.

Choose the electrode material, electrode size, shielding gas, and process (GMAW, GMAW-P etc.) appropriate for the material to be welded.

Select the weld mode that best matches the desired welding process. The standard weld set shipped with the PipeFab™ encompasses a wide range of common processes that will meet most needs.

All adjustments are made through the user interface of the wire feeder.

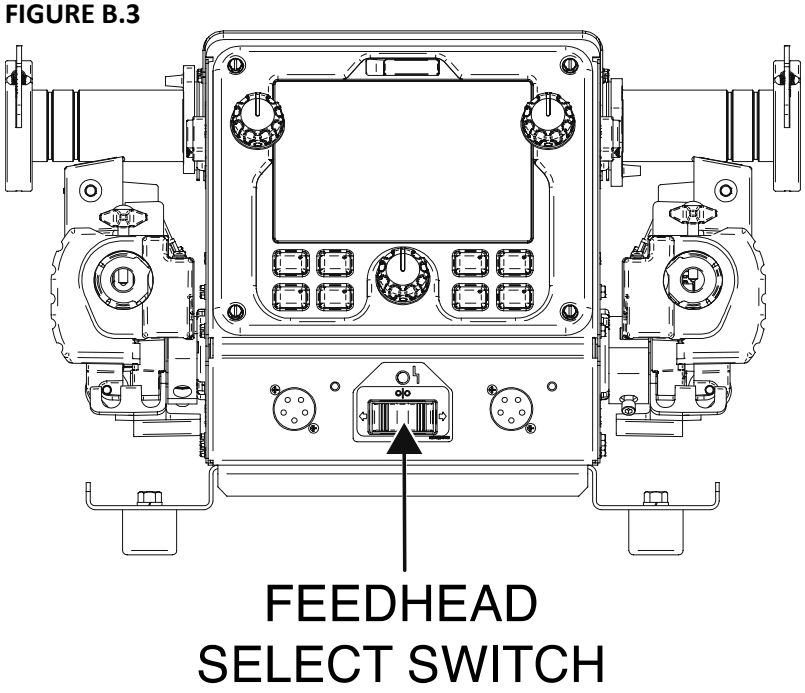
USER INTERACTIONS

WIRE DRIVE SELECTION

Pressing the Feedhead Select rocker towards the left side will activate the left wire drive while pressing the right side will activate the right wire drive. The active wire drive may also be selected by pulling the gun trigger on the left or right wire drive respectively. The green arrow on the top of either the left or right side of the user interface indicates the active wire drive.

When the active wire drive is switched, all parameters of the active drive from the last active procedure are loaded into the display.

FIGURE B.3



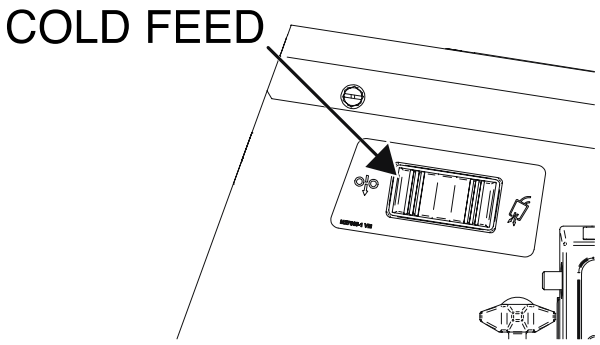
COLD FEED

Pressing the Cold Feed rocker switch feeds wire forward at the indicated speed for as long as the switch is held. When connected to the PipeFab™ Remote UI, Cold Feed may be active by the rocker switch on the side of the feeder or the rocker switch on the front of the Remote UI.

The power source output remains OFF during Cold Feeding.

To set cold feed speed, turn the left knob while holding the cold feed button.

FIGURE B.4

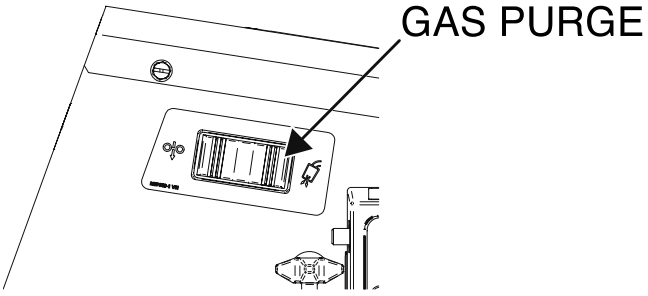


GAS PURGE

Pressing the Gas Purge rocker switch turns on the gas solenoid for as long as the gas purge switch is held. When connected to the PipeFab™ Remote UI, gas purge may be active by the rocker switch on the side of the feeder or the rocker switch on the front of the Remote UI.

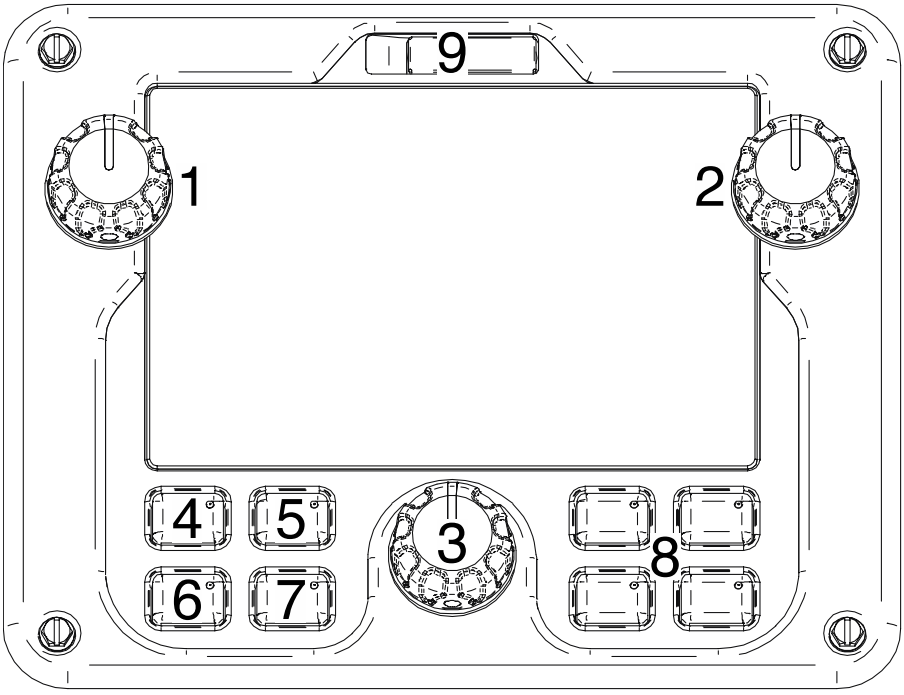
The power source output remains OFF during Gas Purge.

FIGURE B.5



USER INTERFACE LAYOUT

FIGURE B.6



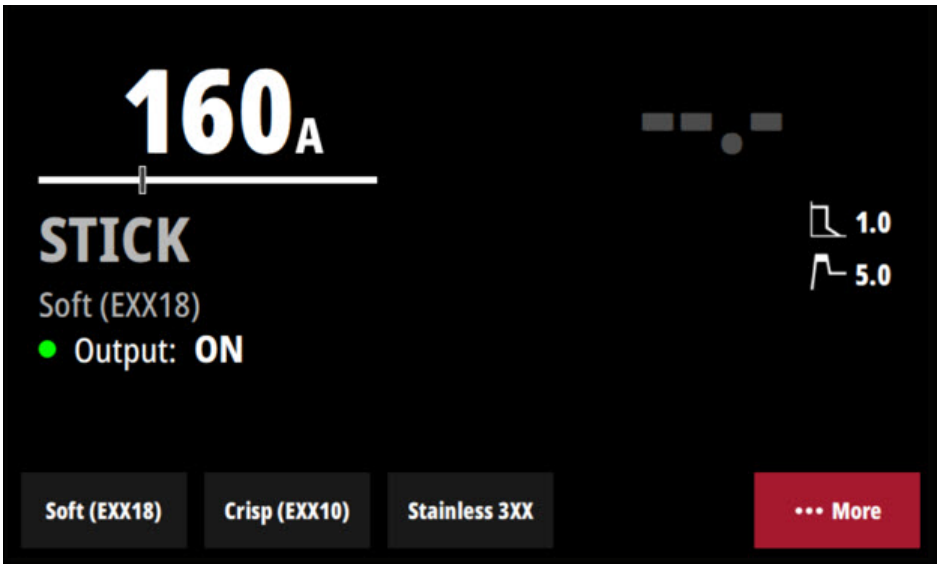
1. Process Adjustment Knob: Turn to adjust setpoint (dependent on the process).
2. Process Adjustment Knob: Turn to adjust setpoint (dependent on the process).
3. Menu Knob: Turn to scroll through the menu and press to select a highlighted option.
4. Stick Button: Press to set the system to Stick mode. This will deactivate all outputs besides the stick output.
5. TIG Button: Press to set the system to TIG mode. This will deactivate all outputs besides the TIG output.
6. MIG Button: Press to set the system to MIG mode. This will deactivate all outputs besides the MIG output.
7. FCAW Button: Press to set the system to FCAW mode. This will deactivate all outputs besides the FCAW output.
8. Memory Buttons: Memories can be saved for each welding mode. These can be accessed by touching the applicable memory button labeled one through four. To save a memory, hold the desired memory location down until the screen indicates the memory is saved.
9. USB Connector: A USB drive can be inserted to upload/download memories and update the user interface software.

USER INTERFACE NAVIGATION

NOTE: simplified home screens are used by default. To see the Home Screens as shown in the examples, set the HOME SCREEN LAYOUT to ADVANCED.

STICK HOME SCREEN

FIGURE B.7



1. Menu Bar - Use the Menu knob to scroll through the options along the bottom of the screen. Press the knob to select the highlighted option.
2. Current Setting-sets the desired current, use the left knob to adjust. Enter the More Settings to adjust the allowable ranges to be set by a remote.
3. Electrode Type Selection – XX10, XX18.
4. Arc Force – Enter the More Settings to adjust the value. Only displayed when set to a non-zero value.
5. Hot Start – Enter the More Settings to adjust the value. Only displayed when set to a non-zero value.
6. Output Indicator (Note: Output is “ON” at all times in Stick process).

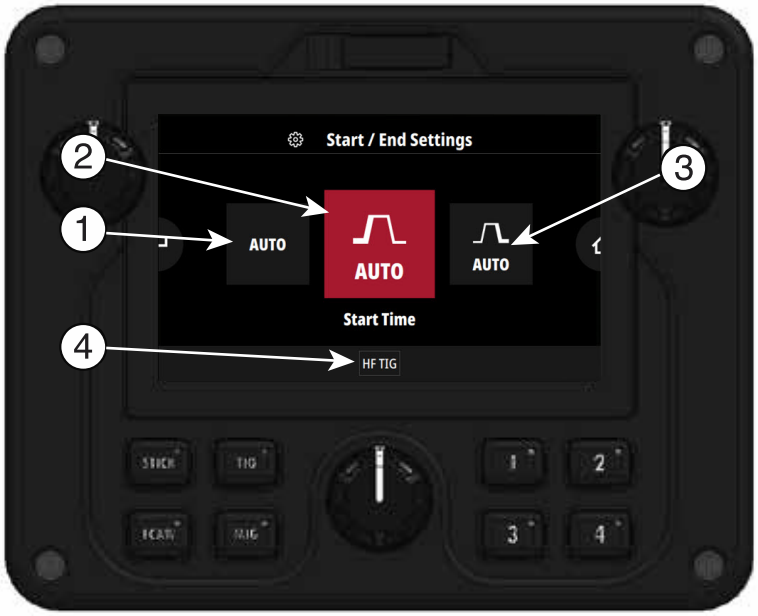
TIG HOME SCREEN

FIGURE B.8

1. Menu Bar - Use the Menu knob to scroll through the options along the bottom of the screen. Press the knob to select the highlighted option.
2. Current Setting - Sets the desired current, use left knob to adjust.
3. Start Type Selection – Touch Start, HF.
4. Post-Flow Time – Time that the shielding gas continues to flow after the arc has been terminated. Only displayed when set to a non-zero value.
5. Pre-Flow Time - Time that the shielding gas continues to flow before the arc has been started. Only displayed when set to a non-zero value.
6. Output Indicator – Output will be on in Touch Start mode without a remote. Output will be off until triggered when a remote is connected. NOTE: HF mode requires a remote to be connected.

TIG START/END SETTINGS

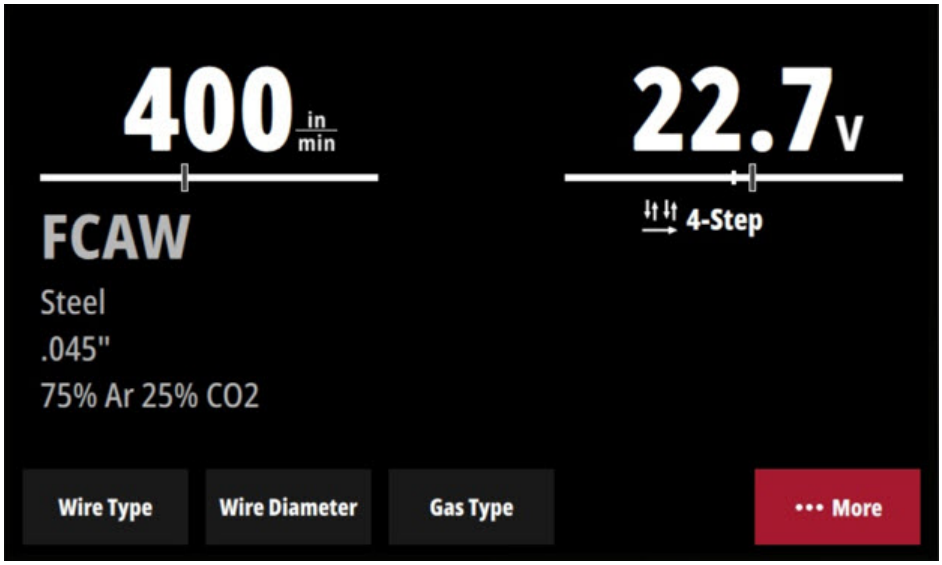
FIGURE B.9



1. Set all to Auto – Start/End settings are set to “auto” by default. These settings are programmed based on process and setpoint to provide ideal welding.
2. Start Time – Controls the voltage for a specified time at the beginning of the weld. During that time, the machine will ramp from the Start Procedure to the Welding Procedure.
3. Crater Time – Controls the voltage for a specified time at the end of the weld after the trigger is released. During the Crater time, the machine will ramp from the Weld Procedure to the Crater Procedure. .
4. Current Settings.

FCAW HOME SCREEN

FIGURE B.10

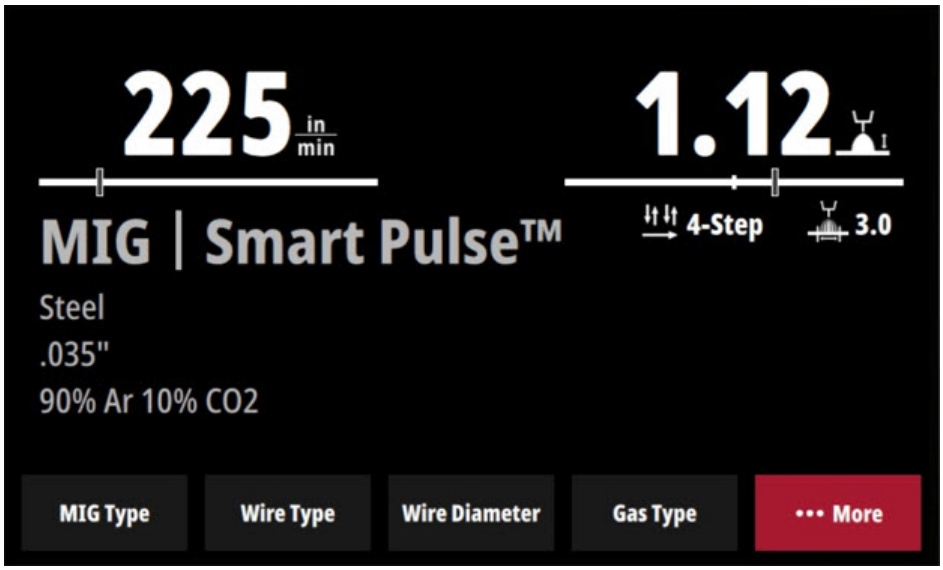


1. Feedhead Indicator – Shows which side of the wire feeder is selected and ready for setup. The active side can be selected by pressing the Feedhead Select Switch, Cold Feed Switch, or the gun trigger for the desired side.
2. Menu Bar - Use the Menu knob to scroll through the options along the bottom of the screen. Press the knob to select the highlighted option.
3. Wire Feed Speed Setting - Sets the desired wire feed speed, use left knob to adjust.
4. Voltage Setting - Sets the voltage, use right knob to adjust.
5. Wire Diameter Selection
6. Gas Type Selection
7. 2-Step/4-Step Trigger Interlock - Toggles between 2-Step and 4-Step Trigger Interlock. 2-Step provides weld power and feeds wire only when the trigger is depressed. 4-Step eliminates the need to hold the trigger while welding. It operates in 4 steps:
    1. Close trigger and establish welding arc.
    2. Release trigger and continue welding.
    3. Reclose trigger near end of weld.
    4. Release trigger again to stop welding.

    NOTE: No symbol will be shown if 2-Step mode is active.

MIG HOME SCREEN

FIGURE B.11

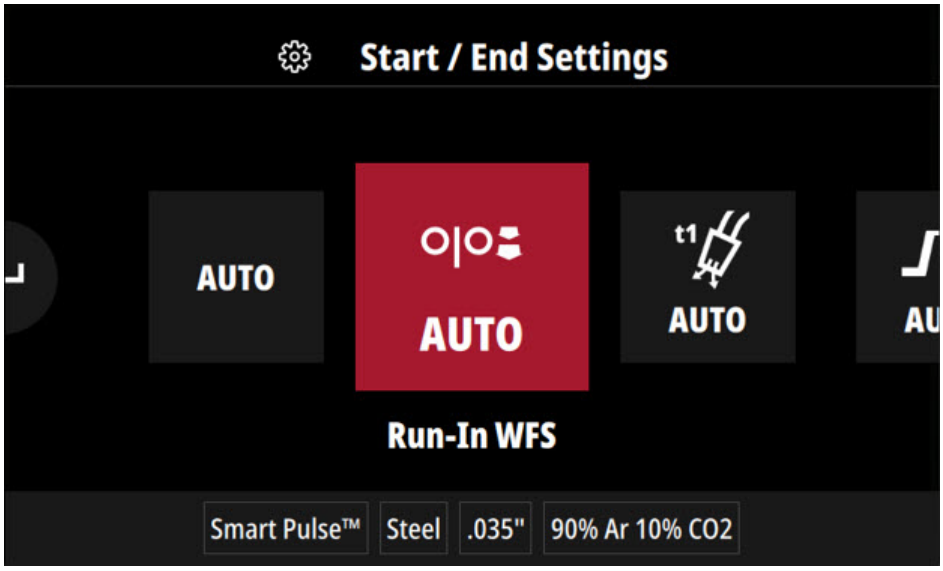


1. Feedhead Indicator – Shows which side of the wire feeder is selected and ready for setup. The active side can be selected by pressing the Feedhead Select Switch, Cold Feed Switch, or the gun trigger for the desired side.
2. Menu Bar - Use the Menu knob to scroll through the options along the bottom of the screen. Press the knob to select the highlighted option.
3. Wire Feed Speed Setting - Sets the desired wire feed speed, use left knob to adjust.
4. Voltage/Trim Setting - Sets the voltage or trim, use right knob to adjust.
5. MIG Mode Selection.
6. Wire Type Selection.
7. Wire Diameter Selection.
8. Gas Type Selection.
9. 2-Step/4-Step Trigger Interlock - Toggles between 2-Step and 4-Step Trigger Interlock. 2-Step provides weld power and feeds wire only when the trigger is depressed. 4-Step eliminates the need to hold the trigger while welding. It operates in 4 steps:
    1. Close trigger and establish welding arc.
    2. Release trigger and continue welding.
    3. Reclose trigger near end of weld.
    4. Release trigger again to stop welding.

    NOTE: No symbol will be shown if 2-Step mode is active.
10. Ultimarc/Pinch – Ultimarc and Pinch regulate the focus or shape of the arc. Values greater than 0.0 increase the pulse frequency while decreasing the background current, resulting in a tight, stiff arc best for high speed sheet metal welding. Values less than 0.0 decrease the pulse frequency while increasing the background current, for a soft arc good for out-of-position welding. The MIG mode will determine if Ultimarc is used or Pinch.
11. Synergic Voltage Indicator – Nominal voltage is shown. Lowering the voltage below nominal will move the bar to the left. Raising the voltage above nominal will move the bar to the right.

FCAW/MIG START/END SETTINGS

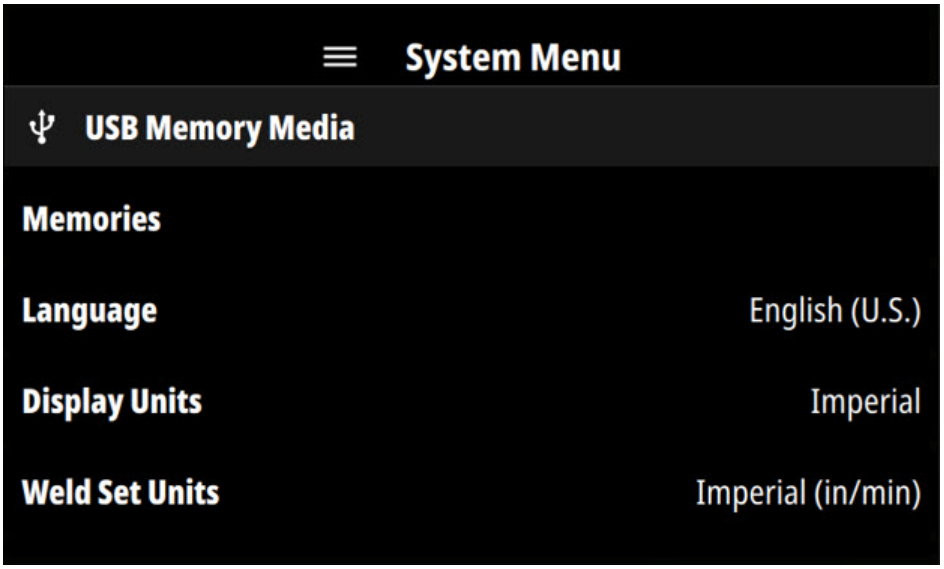
FIGURE B.12



1. Set all to Auto – Start/End settings are set to “auto” by default. These settings are programmed based on process and setpoint to provide ideal welding. The settings may be adjusted if desired.
2. Run-In – Allows adjusting the wire feed speed prior to the arc being established. A low run-in speed permits smooth arc starts. After the arc is speed will change from run-in to welding wire feed speed. The run-in option is available in MIG and FCAW modes.
3. Pre-Flow Time - Adjusts the time that shielding gas flows before the welding output turns on.
4. Start Time – Controls the WFS and Volts for a specified time at the beginning of the weld. During the start time, the machine will ramp from the Start Procedure to the preset Welding Procedure.
5. Crater Time – Controls the WFS and voltage for a specified time at the end of the weld after the trigger is released. During the Crater time, the machine will ramp from the Weld Procedure to the Crater Procedure.
6. Burnback Time – Adjustable time delay between turning off the wire feed and turning off the arc. Burnback helps to prevent wire sticking to the puddle. The burnback feature will allow current to flow for a specified time period at the end of a weld after wire feeding has stopped.
7. Post Flow Time - Adjusts the time that shielding gas flows after the welding output turns off.
8. Current Settings

SYSTEM MENU

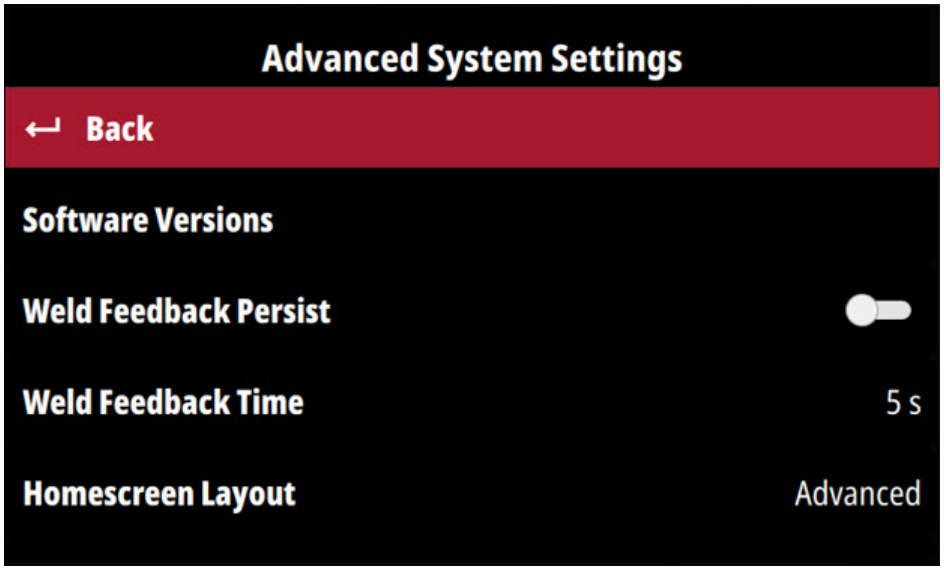
FIGURE B.13

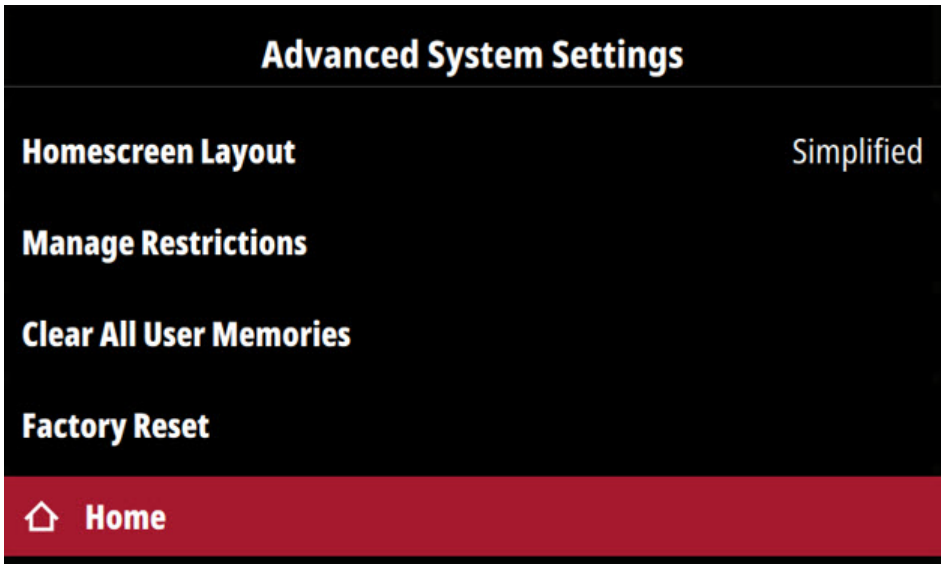


1. USB Memory Media Connected.
2. Memories – View the saved memories for each process.
3. Language – Language of the text present in the user interface.
4. Display Units – Selects the units to display wire feed speed, metric or imperial.
5. Water Cooler Operation – Determines when the optional K3737-1 PipeFab™ Cooler will run (not pictured).
6. Advanced System Settings (not pictured)
   NOTE: System Menu can only be accessed through the More Options menu.
7. Weld Set Units – Changes the weld set in use to be optimized for Imperial or metric units. Machine reset is required for this change to take effect. MIG and FCAW memories will be deleted when changing this setting.

ADVANCED SYSTEM SETTINGS

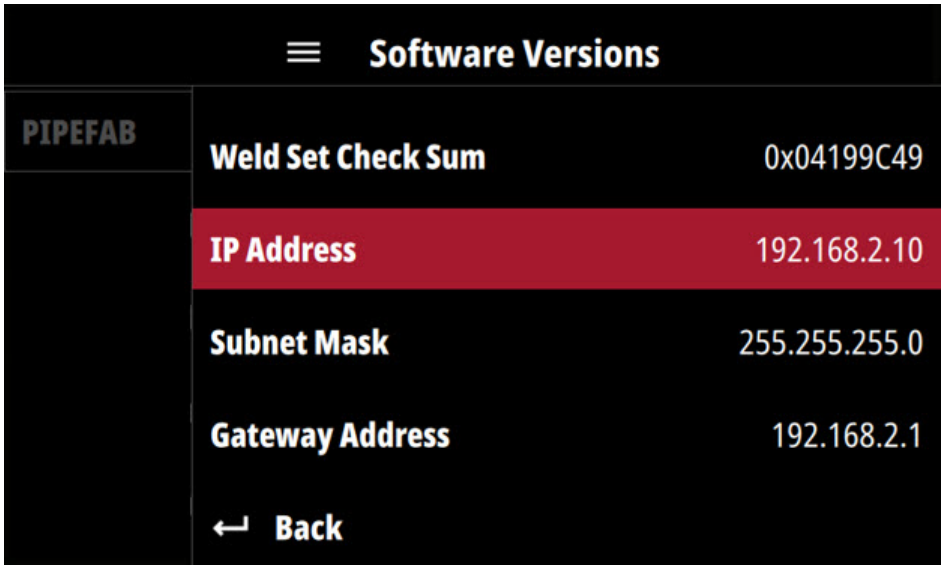
FIGURE B.14





1. Software Versions – Allows access to a list of software components grouped by system component. Also lists the IP address of the Ethernet port. See Figure B.15 on page B-18.

FIGURE B.15



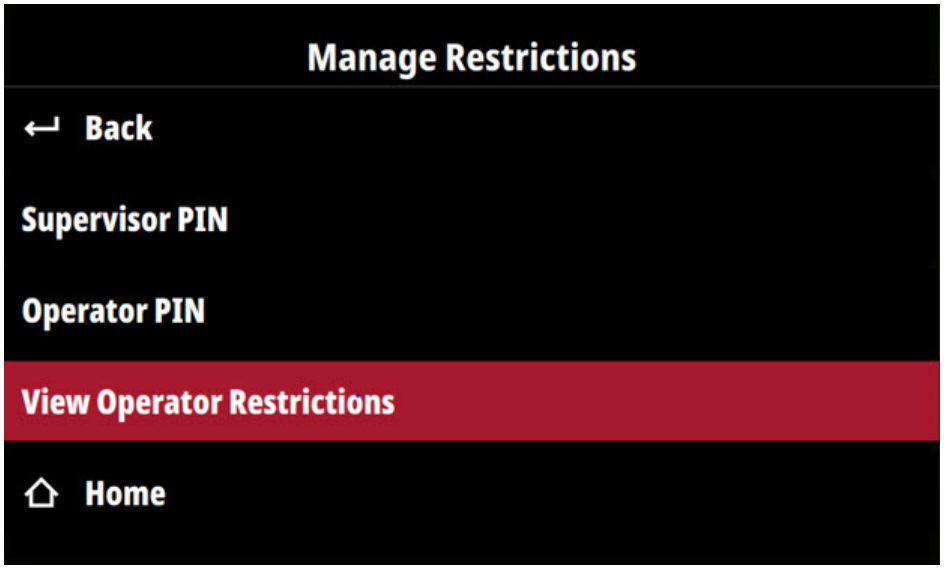
2. Weld Feedback Persist – When Weld Feedback Persist controls how long the actual welding voltage and current are displayed after completion of a weld. When Weld Feedback Persist is ON the actual welding voltage and current will remain on the display until the center knob on the display is turned or until the next weld starts. Weld Feedback Time is inactive when Weld Feedback Persist is ON.

When Weld Feedback Persist is OFF the actual welding voltage and current will be displayed for the time specified in Weld Feedback Time or until the next weld starts.

3. Home Screen – Choose between Simplified (default) or Advanced. The Advanced Home Screen shows more details of parameters set by the user.
4. Manage Restrictions – Allows the user to create, set, or enter a Supervisor PIN, Operator PIN, and to view and change the Operator Restrictions. Enter the correct Supervisor PIN to enter the Supervisor Menu where the user can “Edit Operator Restrictions”.

If a supervisor becomes locked out of a machine because of a forgotten PIN number, PowerWave Manager can be used to unlock the machine and generate a new Supervisor PIN.

FIGURE B.16



Operator Restrictions

System Menu – OFF/ON, restricts changes to the System Menu.
Wave Controls – OFF/ON, restricts changes to Wave Controls (i.e. Pinch, Arc Force, Ultimarc).
Start/End Settings – OFF/ON, restricts changes to Start/End Settings.
Remote Range – OFF/ON, restricts changes to the Remote Range.
Trigger Interlock – OFF/ON, restricts changes to 2-step/4-step settings.

Memory Only Mode – OFF/ON. Restricts the operator to only use processes and parameters stored in Memories. In Memory Only Mode, if no memory exists for a given process, that process button is disabled when using the associated side of the feeder. For example, if Memory Only Mode is ON and no memories are configured for a FCAW process on the left feeder, the machine cannot be put in FCAW mode when the left feeder is active.

Memory Modifications – Memory modifications can be ENABLED, so parameters can be resaved within the full range allowed by the machine. They can be DISABLED, so parameter cannot be resaved at all, or they can be resaved WITHIN LIMITS, to allow fine tuning within preset limits.

SIMPLIFIED HOME SCREEN

FIGURE B.17

1. Feedhead Indicator – Shows which side of the wire feeder is selected and ready for setup. The active side can be selected by pressing the Feedhead Select Switch, Cold Feed Switch, or the gun trigger for the desired side.
2. Menu Bar - Use the Menu knob to scroll through the options along the bottom of the screen. Press the knob to select the highlighted option.
3. Wire Feed Speed Setting - Sets the desired wire feed speed, use the left knob to adjust.
4. Voltage Setting - Sets the voltage, use the right knob to adjust.
5. Wire Type Selection.
6. Wire Diameter Selection.
7. Gas Type Selection.
8. Synergic Voltage Indicator – Nominal voltage is shown. Lowering the voltage below nominal will move the bar to the left. Raising the voltage above nominal will move the bar to the right.
   NOTE: In Simplified mode, advanced settings will not appear on the home screen even when set to a non-zero value.

MORE SETTINGS MENU (ALL PROCESSES)

FIGURE B.18

1. Advanced settings will appear here. Each weld process will have different settings. The most common advanced settings are: Pinch, Arc Force, Hot Start, Pre-Flow Time, Post-Flow Time, 2-Step/4-Step Trigger, and Ultimarc. Advanced settings will only be displayed when set to a non-zero value.

PREVIOUS SETTING INDICATOR

FIGURE B.19

1. Current Setting.
2. Previous Setting Indicator – The dotted line will indicate where on the bar the most recent setting was.
3. Current Setting Indicator – Increasing the value will move the bar to the right, decreasing the value will move the bar to the left.

WELDING SCREEN

FIGURE B.20

1. Output Active.
2. Feedhead Indicator – MIG and FCAW modes only.
3. Actual Current.
4. Actual Voltage.
5. Current Weld Settings.

BACK/HOME BUTTONS

FIGURE B.21

1. Back Button - Selecting the back button takes the system back one screen.
2. Home Button – Selecting the home button takes the system back to the home screen.

MEMORY OPERATION

FIGURE B.22

Memories can be saved for each welding process. These can be accessed by touching the applicable memory button labeled one through four.

To save a memory, hold the desired memory location down until the screen indicates the memory is saved.

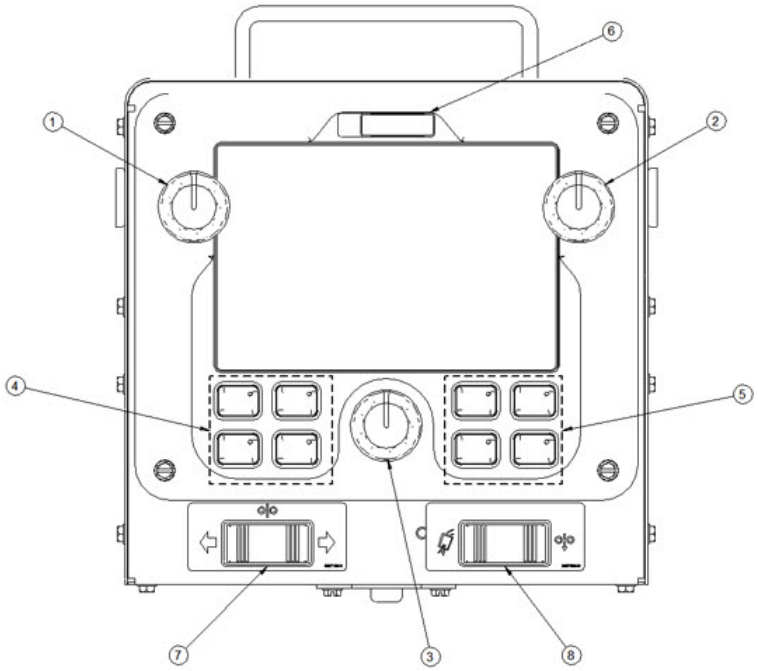
When one memory is selected the LED will be lit, if any settings are changed the LED will go out. If the memory button is pressed again, the settings will revert to the settings saved in the memory.

Four memories each can be saved in the Stick process, TIG process, MIG Left Feedhead, MIG Right Feedhead, FCAW Left Feedhead, and FCAW Right Feedhead.

Memory usage with remotes – If a TIG process is saved with a remote control connected, the remote control must be connected for the memory to be functional. If Memory Only Mode is not enabled, a warning will appear and can be bypassed.

FRONT PANEL CONTROLS OF REMOTE UI

FIGURE B.23



1. Process Adjustment Knob: Turn to adjust setpoint (dependent on the process).

2. Process Adjustment Knob: Turn to adjust setpoint (dependent on the process).

3. Menu Knob: Turn to scroll through the menu and press to select a highlighted option.

4. Process Buttons: Press to select the welding process type (Stick, TIG, MIG, FCAW)

5. Memory Buttons: Memories can be saved for each process type. These can be accessed by touching the applicable memory button labeled one through four. To save a memory, hold the desired memory location down until the screen indicates the memory is saved. The remote UI has its own set of memories. These are not shared with the memories stored in the wire feeder UI.

6. USB Connector: A USB drive can be inserted to upload/download memories and update the user interface software.

7. Feedhead Select Switch: Allows user to select left or right feedhead to be active. A feedhead can also be activated by closing a gun trigger.

8. Cold Feed/Gas Purge Switch: Cold feed will feed wire on the active feedhead when pressed. Gas purge will activate the gas solenoid on the active feedhead when pressed.

USER INTERFACE PROGRAMMING

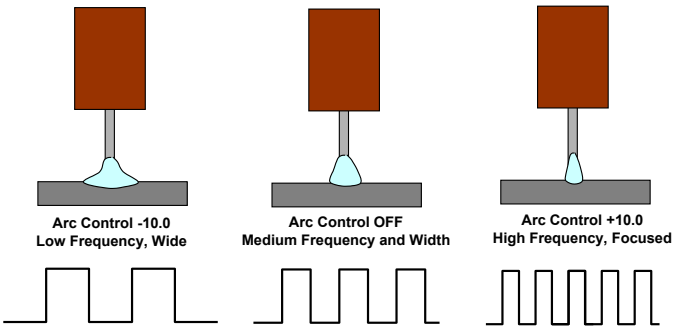
- Connect the 5-pin control cable from the wire feeder to the 5-pin connector on the PipeFab™ power source.
- Turn on the power to the wire feeder and wait for the initialization sequence to complete.
- Insert the USB stick into the USB port on the user interface.
- A message will appear asking if you want to perform a Display Software Update. Turn the center knob to highlight “Yes” in red. Press the center knob to start the update.
- Once a message appears stating display updated successfully, the unit will restart and return to a typical welding screen.
- Remove the USB stick from the USB port.

New user interface software can be found at powerwavesoftware.com.

WAVE CONTROL

TABLE B.2

PROCESS	WAVE CONTROL NAME	EFFECT / RANGE	DESCRIPTION
STICK	ARC FORCE	SOFT (-10.0) TO CRISP (10.0)	ARC FORCE ADJUSTS THE SHORT CIRCUIT CURRENT FOR A SOFT ARC, OR FOR A FORCEFUL, DRIVING ARC. IT HELPS TO PREVENT STICKING AND SHORTING OF ORGANIC COATED ELECTRODES, PARTICULARITY GLOBULAR TRANSFER TYPES SUCH AS STAINLESS AND LOW HYDROGEN. ARC FORCE IS ESPECIALLY EFFECTIVE FOR ROOT PASS ON PIPE WITH STAINLESS ELECTRODE AND HELPS TO MINIMIZE SPATTER FOR CERTAIN ELECTRODES AND PROCEDURE AS WITH LOW HYDROGEN, ETC.
MIG AND FCAW	PINCH	SOFT (-10.0) TO CRISP (10.0)	PINCH CONTROLS THE ARC CHARACTERISTICS WHEN SHORT-ARC WELDING.

PROCESS	WAVE CONTROL NAME	EFFECT / RANGE	DESCRIPTION
MIG	ULTIMARC	SOFT (-10.0) TO STIFF (10.0)	ULTIMARC REGULATES THE FOCUS OR SHAPE OF THE ARC. ULTIMARC VALUES GREATER THAN 0.0 INCREASE THE PULSE FREQUENCY WHILE DECREASING THE BACKGROUND CURRENT, RESULTING IN A TIGHT, STIFF ARC BEST FOR HIGH SPEED SHEET METAL WELDING. ULTIMARC VALUES LESS THAN 0.0 DECREASE THE PULSE FREQUENCY WHILE INCREASING THE BACKGROUND CURRENT, FOR A SOFT ARC GOOD FOR OUT-OF-POSITION WELDING. 
TIG	NO WAVE CONTROLS AVAILABLE .	---	---

TRIGGER SELECTION

2-STEP TRIGGER

2-Step Trigger controls the welding sequence in direct response to the trigger. When the gun trigger is pulled, the welding system (power source and wire feeder) cycles through the arc starting sequence and into the main welding parameters. The welding system will continue to weld as long as the gun trigger is activated. Once the trigger is released, the welding system cycles through the arc ending steps.

Example 1: 2-Step Trigger: Simple operation.

The simplest trigger operation occurs with a 2-Step trigger and Start and Crater set to OFF.

For this sequence,

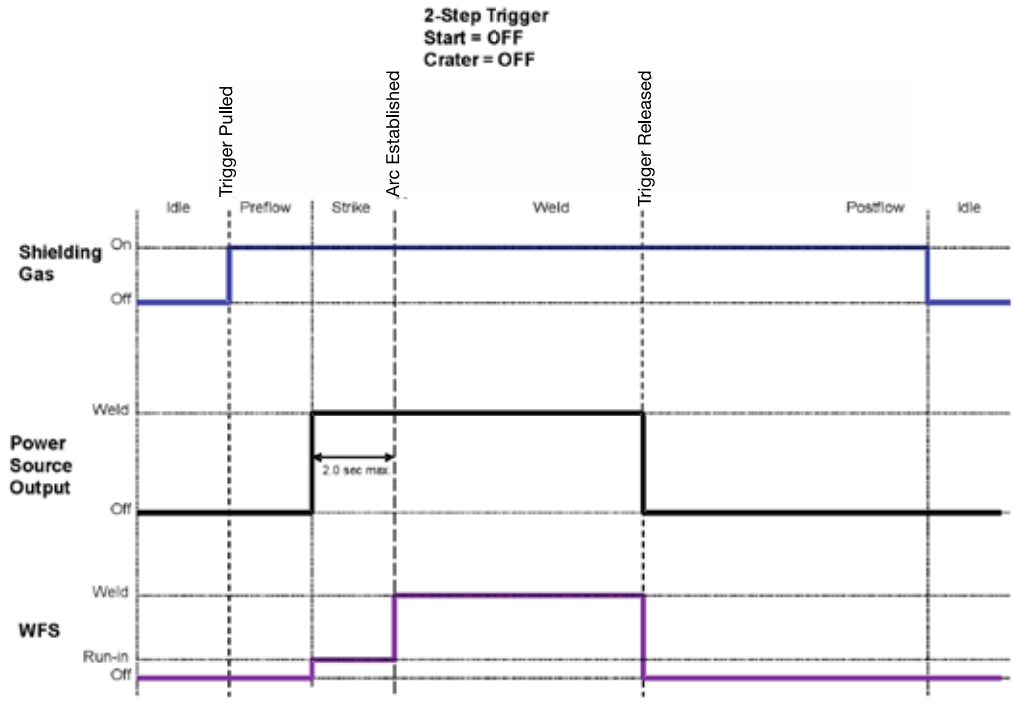
PREFLOW: Shielding gas begins to flow immediately when the gun trigger is pulled.

RUN-IN: After preflow time expires, the power source regulates to the welding output and wire is advanced towards the work piece at the Run-In WFS. If an arc is not established within 2.0 seconds, the wire feed speed will jump to the welding wire feed speed.

WELD: The power source output and the wire feed speed continue at the weld settings for as long as the trigger is pulled.

POSTFLOW: As soon as the trigger is released, the power source output and the wire feed speed are turned OFF. Shielding gas continues until the post flow timer expires.

FIGURE B.24



Example 2: 2-Step Trigger: Improved Arc Start and Arc End.

Tailoring the arc start and arc end is a common method for reducing spatter and improving weld quality. This can be accomplished with the Start and Burnback functions set to a desired values and Crater set to OFF.

For this sequence,

PREFLOW: Shielding gas begins to flow immediately when the gun trigger is pulled.

RUN-IN: After preflow time expires, the power source regulates to the start output and wire is advanced towards the work piece at the Run-In WFS. If an arc is not established within 2.0 seconds, the power source output and wire feed speed skips to the weld settings.

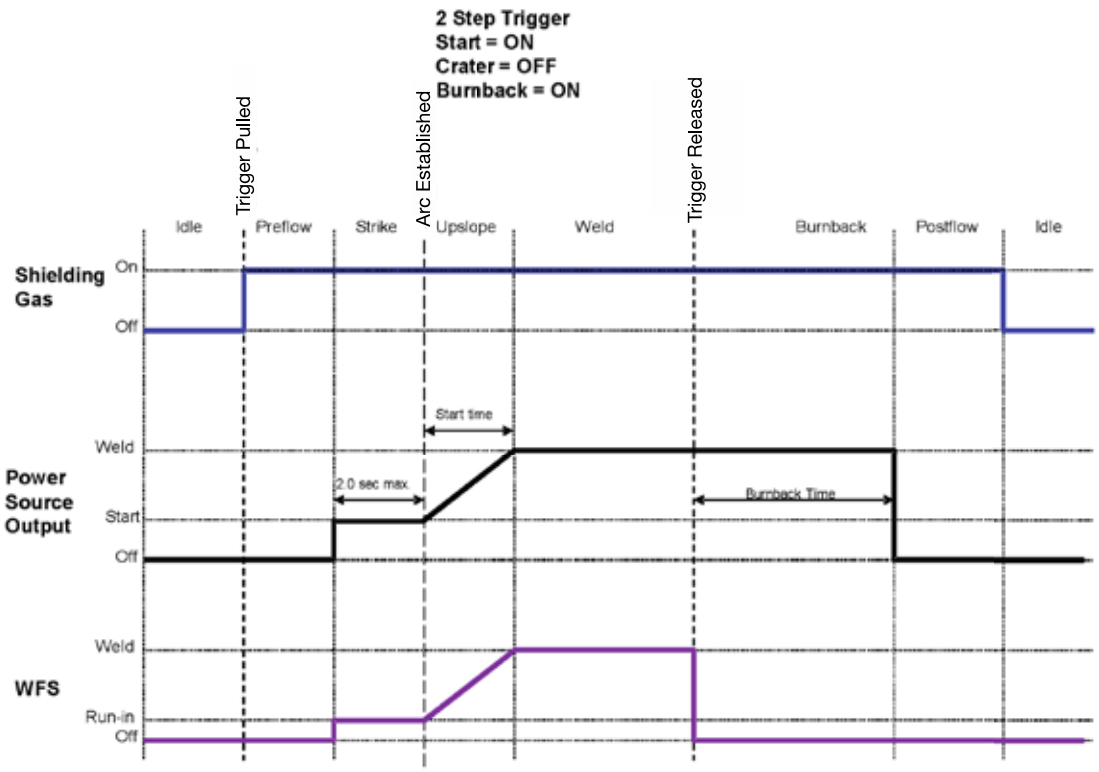
START: Once the wire touches the work and an arc is established, both the machine output and the wire feed speed ramp to the weld settings throughout the start time. The time period of ramping from the start settings to the weld settings is called UPSLOPE.

WELD: After upslope, the power source output and the wire feed speed continue at the weld settings.

BURNBACK: As soon as the trigger is released, the wire feed speed is turned OFF and the machine output continues for the burnback time.

POSTFLOW: Next, the machine output is turned OFF and shielding gas continues until the post flow timer expires.

FIGURE B.25



Example 3: 2-Step Trigger: Customized Arc Start, Crater and Arc End.

For this sequence,

PREFLOW: Shielding gas begins to flow immediately when the gun trigger is pulled.

RUN-IN: After preflow time expires, the power source regulates to the start output and wire is advanced towards the work piece at the Run-In WFS. If an arc is not established within 2.0 seconds, the power source output and wire feed speed skips to the weld settings.

START & UPSLOPE: Once the wire touches the work and an arc is established, both the machine output and the wire feed speed ramp to the weld settings throughout the start time. The time period of ramping from the start settings to the weld settings is called UPSLOPE.

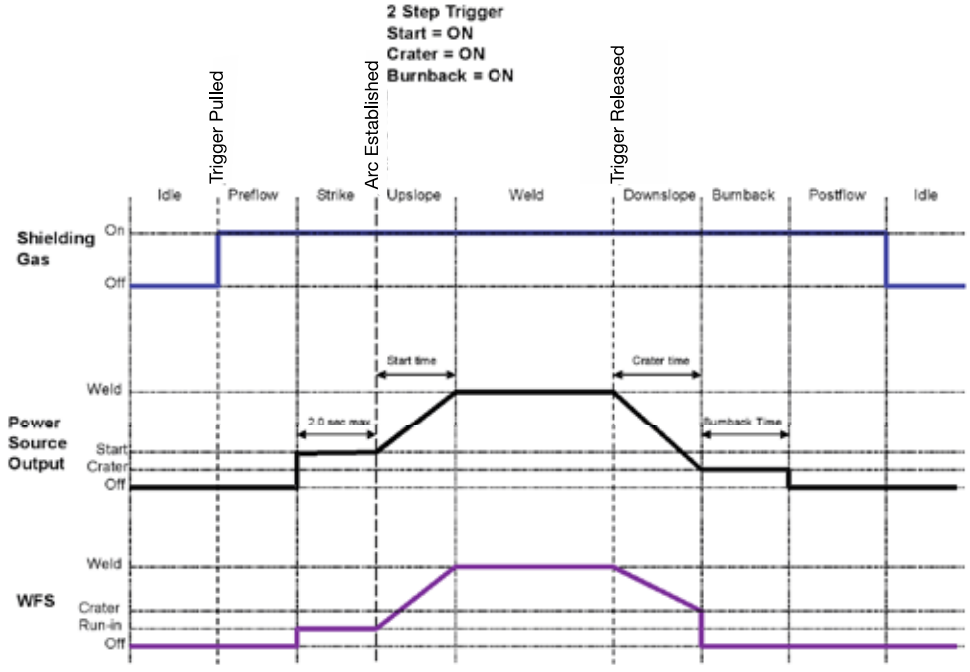
WELD: After upslope, the power source output and the wire feed speed continue at the weld settings.

CRATER & DOWNSLOPE: As soon as the trigger is released, the wire feed speed and power source output ramp to the crater settings throughout the crater time. The time period of ramping from the weld settings to the crater settings is called DOWNSLOPE.

BURNBACK: After the crater time expires, the wire feed speed is turned OFF and the machine output continues for the burnback time.

POSTFLOW: Next, the machine output is turned OFF and shielding gas continues until the post flow timer expires.

FIGURE B.26



2-STEP TRIGGER: SPECIAL CONSIDERATIONS

The weld sequence response depends upon when the trigger is pulled and released and whether or not START or CRATER are active.

An example sequence:

Pull the trigger to start feed of wire. When arc is established the sequencer will begin START/UPSLOPE. If trigger is released during UPSLOPE and CRATER/DOWNSLOPE is active, the machine will begin CRATER/DOWNSLOPE and sloping down over the CRATER time, regardless of when the trigger release occurred.

If the CRATER is disabled and the trigger is released during START/UPSLOPE, the sequencer will move to the BURNBACK state to end the weld.

4-STEP TRIGGER

4-step trigger allows the operator to release the trigger once an arc has been established. To end the weld, the trigger is pulled and then released again.

Two types of 4-Step Trigger are available. Use the set-up menu to select the desired type of operation.

With current interlock, if the arc goes out for more than 0.5 seconds while the trigger is released, the welding process stops and goes to the idle state.

Without the current interlock, if the arc goes out while the trigger is released, output to the power source remains on and the wire feeder will continue to feed wire.

Example 1: 4-Step Trigger: Trigger Interlock.

The 4-Step trigger can be configured as a trigger interlock. Trigger interlock adds to the welder's comfort when making long welds by allowing the trigger to be released after an initial trigger pull. Welding stops when the trigger is pulled a second time and then released, or if the arc is interrupted. For this sequence,

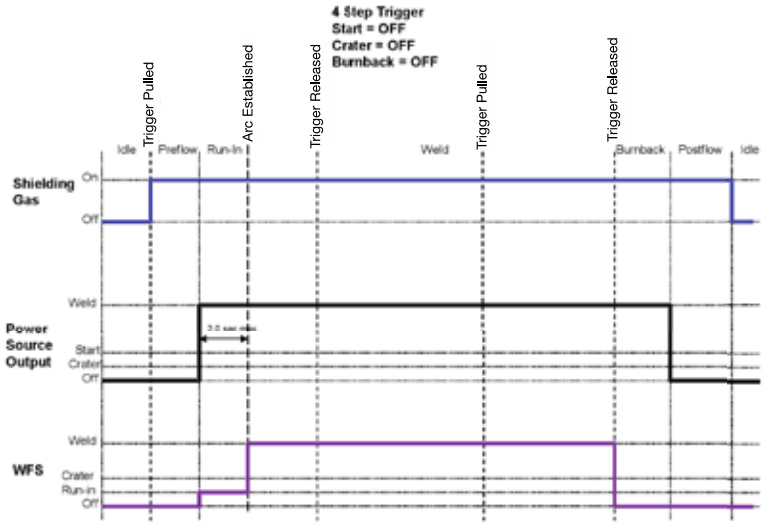
PREFLOW: Shielding gas begins to flow immediately when the gun trigger is pulled.

RUN-IN: After preflow time expires, the power source regulates to the welding output and wire is advanced towards the work piece at the Run-In WFS. If an arc is not established within 1.5 seconds, the wire feed speed will jump to the welding wire feed speed.

WELD: The power source output and the wire feed speed continue at the weld settings. The trigger is released and welding continues. Welding continues when the trigger is pulled a second time.

POSTFLOW: As soon as the trigger is released for the second time, the power source output and the wire feed speed are turned OFF. Shielding gas flows until the post flow timer expires.

FIGURE B.27



Example 2: 4-Step Trigger: Manual Control of Start and Crater times with Burnback ON.

The 4-Step trigger sequence gives the most flexibility when the Start, Crater and Burnback functions are active. With 4-Step trigger, the welder chooses the amount of time to weld at the Start, Weld and Crater settings by using the gun trigger. Burnback reduces the occurrence of wire to sticking into the weld pool at the end of a weld and conditions the end of the wire for the next arc start.

In this sequence,
PREFLOW: Shielding gas begins to flow immediately when the gun trigger is pulled.

RUN-IN: After preflow time expires, the power source regulates to the start output and wire is advanced towards the work piece at the run-in WFS. If an arc is not established within 2.0 seconds, the power source output and wire feed speed skips to the weld settings.

START: The power source welds at the start WFS and voltage until the trigger is released.

UPSLOPE: During upslope, the power source output and the wire feed speed ramp to the weld settings throughout the start time. The time period of ramping from the start settings to the weld settings is called UPSLOPE. If the trigger is pulled before upslope is complete, WELD is skipped and the sequence jumps to DOWNSLOPE.

WELD: After upslope, the power source output and the wire feed speed continue at the weld settings.

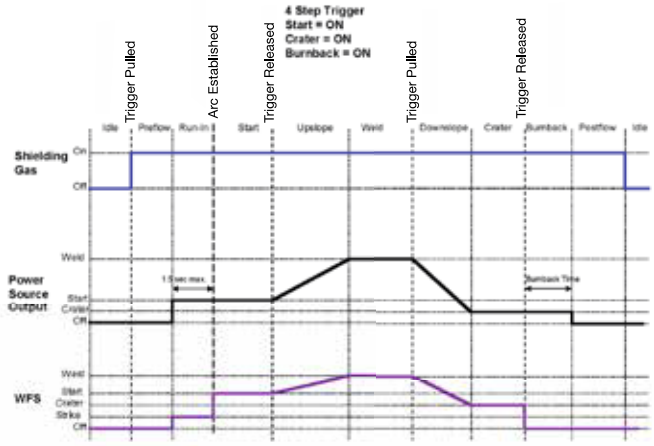
DOWNSLOPE: As soon as the trigger is pulled, the wire feed speed and power source output ramp to the crater settings throughout the crater time. The time period of ramping from the weld settings to the crater settings is called DOWNSLOPE.

CRATER: During CRATER, the power source continues to supply output at the crater WFS and voltage.

BURNBACK: When the trigger is released, the wire feed speed is turned OFF and the machine output continues for the burnback time.

POSTFLOW: Next, the machine output is turned OFF and shielding gas continues until the post flow timer expires.

FIGURE B.28



4-STEP TRIGGER: SPECIAL CONSIDERATIONS

The response to the trigger with 4-step trigger active is dependent upon when the trigger is pulled/released and the settings for START and CRATER.

Example 1:

Pull the trigger to start feed of wire. When arc is established the sequencer will remain in START until the trigger is released. When the trigger is released, UPSLOPE begins. If trigger is pulled again during UPSLOPE and CRATER/DOWNSLOPE is active, the feeder will begin the DOWNSLOPE, sloping down over the CRATER time, regardless of when the trigger pull occurred.

If the CRATER/DOWNSLOPE state is disabled and the trigger is pulled during UPSLOPE, the sequencer will remain in the UPSLOPE state and continue with the weld. If the fourth step (trigger release) occurs during UPSLOPE, the sequencer will jump to the BURNBACK to end the weld.

Example 2:

Pull the trigger to start feed of wire. When arc is established the sequencer will remain in START until the trigger is released. When the trigger is released, UPSLOPE begins and continues into WELD when the START timer is complete. When the trigger is pulled again (step 3) and CRATER/DOWNSLOPE is active, DOWNSLOPE begins and continues until the CRATER timer expires, at which time CRATER will be entered until the trigger is released.

While in DOWNSLOPE, if the trigger is released before the timer expires, the trigger will be ignored and the DOWNSLOPE state will continue until the timer expires, at which point CRATER state will be enabled, check for trigger, and jump to BURNBACK since the trigger has been released.

While in the DOWNSLOPE state and the trigger is released and then pulled again, it will be ignored. During 4-Step operation in DOWNSLOPE, the trigger will always be ignored.

START OPTIONS

The Start Options available depend upon the process and weld mode selected.

TABLE B.3

PROCESS	START OPTION	EFFECT / RANGE	DESCRIPTION
STICK	---	---	---
ALL MIG AND FCAW	PREFLOW TIME	0 – 60.0 SECONDS	
	RUN-IN WFS	AUTO, OFF, 50-150 IN/MIN TO WELD WFS	RUN-IN SETS THE WIRE FEED SPEED FROM THE TIME THE TRIGGER IS PULLED UNTIL AN ARC IS ESTABLISHED OR 2.5 SECONDS. USE RUN-IN FOR SOFTER ARC STARTS.
	START TIME, WFS AND VOLTS	0 – 10.0 SECONDS	THE START PROCEDURE CONTROLS THE WFS AND VOLTS FOR A SPECIFIED TIME AT THE BEGINNING OF THE WELD. DURING THE START TIME, THE MACHINE WILL RAMP UP OR DOWN FROM THE START PROCEDURE TO THE PRESET WELDING PROCEDURE.
TIG	PREFLOW TIME	0 – 60.0 SECONDS	---

END OPTIONS

The End Options available depend upon the process and weld mode selected.

TABLE B.4

PROCESS	START OPTION	EFFECT / RANGE	DESCRIPTION
STICK	---	---	---
ALL MIG AND FCAW	CRATER TIME, WFS AND VOLTS	0 – 10.0 SECONDS	CRATER PROCEDURE CONTROLS THE WFS AND VOLTS FOR A SPECIFIED TIME AT THE END OF THE WELD AFTER THE TRIGGER IS RELEASED. DURING THE CRATER TIME, THE MACHINE WILL RAMP UP OR DOWN FROM THE WELD PROCEDURE TO THE CRATER PROCEDURE. CRATER IS NOT COMMONLY USED WITH STT PROCESSES.
	BURNBACK TIME	AUTO, 0 – 0.25 SECONDS	THE BURNBACK TIME IS THE AMOUNT OF TIME THAT THE WELD OUTPUT CONTINUES AFTER THE WIRE FEEDING STOPS. IT PREVENTS THE WIRE FROM STICKING IN THE PUDDLE AND PREPARES THE END OF THE WIRE FOR THE NEXT ARC START.
	POSTFLOW TIME	0 – 60.0 SECONDS	ADJUSTS THE TIME THAT SHIELDING GAS FLOWS AFTER THE WELDING OUTPUT TURNS OFF.
TIG	POSTFLOW TIME	0 – 60.0 SECONDS	ADJUSTS THE TIME THAT SHIELDING GAS FLOWS AFTER THE WELDING OUTPUT TURNS OFF.

KITS, OPTIONS AND ACCESSORIES

All Kits Options and Accessories are found on the Web site: (www.lincolnelectric.com)

FIELD INSTALLED OPTIONS

PipeFab™ Kits

TABLE C.1

K NUMBER	DESCRIPTION
K3736-1	PIPEFAB™ UNDERCARRIAGE
K3737-1	PIPEFAB™ COOLER
K3738-1	PIPEFAB™ REMOTE UI

PROCESS SPECIFIC KITS

TABLE C.2

K NUMBER	DESCRIPTION	INCLUDED/PURPOSE
	STICK OPTIONS	
K875	ACCESSORY KIT – 150 AMP	INCLUDES 20 FT. (6.1 M) #6 ELECTRODE CABLE WITH LUG, 15 FT. (4.6 M) #6 WORK CABLE WITH LUGS, HEADSHIELD, FILTER PLATE, WORK CLAMP, ELECTRODE HOLDER AND SAMPLE PACK OF MILD STEEL ELECTRODE.
K704	ACCESSORY KIT – 400 AMP	INCLUDES 35 FT. (10.7 M) 2/0 ELECTRODE CABLE WITH LUG, 30 FT. (9.1 M) 2/0 WORK CABLE WITH LUGS, HEADSHIELD, FILTER PLATE, WORK CLAMP AND ELECTRODE HOLDER.
	TIG OPTIONS	
-	PRO-TORCH™ TIG TORCHES	A FULL LINE OF AIR-COOLED AND WATER-COOLED TORCHES AVAILABLE.
K963-4	HAND AMPTROL®	PROVIDES 25 FT. (7.6 M) OF REMOTE CURRENT CONTROL FOR TIG WELDING.
K870-2	FOOT AMPTROL®	PROVIDES 25 FT. (7.6 M) OF REMOTE CURRENT CONTROL FOR TIG WELDING.

WELDING FUME EXTRACTORS

Lincoln offers a wide range of fume extraction environmental system solutions, ranging from portable systems easily wheeled around a shop to shop-wide central systems servicing many dedicated welding stations.

DRIVE ROLL AND WIRE GUIDE KITS

TABLE C.3

DRIVE ROLL KITS, STEEL WIRES		
KP1505-030S	.023 - .030” (0.6 - 0.8 MM)	INCLUDES: 4 SMOOTH V GROOVE DRIVE ROLLS AND INNER WIRE GUIDE.
KP1505-035S	.035” (0.9 MM)	
KP1505-045S	.045” (1.2 MM)	
KP1505-052S	.052” (1.4 MM)	
KP1505-1/16S	1/16” (1.6 MM)	
KP1505-1	.035, .045” (0.9, 1.2 MM)	
KP1505-2	.040” (1.0 MM)	
DRIVE ROLL KITS, CORED WIRES		
KP1505-035C	.030 - .035" (0.8 - 0.9 MM)	INCLUDES: 4 KNURLED DRIVE ROLLS AND INNER WIRE GUIDE.
KP1505-045C	.040 - .045" (1.0 - 1.2 MM)	
KP1505-052C	.052" (1.4 MM)	
KP1505-1/16C	1/16" (1.6 MM)	
DRIVE ROLL KITS, STEEL OR CORED WIRES		
KP1505-068	.068 - .072" (1.8 MM)	INCLUDES: 4 KNURLED DRIVE ROLLS AND INNER WIRE GUIDE.
KP1505-5/64	5/64" (2.0 MM)	

GUN ADAPTER KITS

TABLE C.4

K NUMBER	DESCRIPTION
K3344-1	GUN ADAPTER KIT, LINCOLN BACK-END. INCLUDES A GUIDE TUBE KIT.
KP4069-1	GUIDE TUBE KIT FOR K3344-1 LINCOLN GUN ADAPTERS.
K3345-1	GUN ADAPTER KIT, STANDARD #2-#4 BACK-END.
K3346-1	GUN ADAPTER KIT, STANDARD #5 BACK-END.
K3347-1	GUN ADAPTER KIT, MILLER BACK-END.
K3348-1	GUN ADAPTER KIT, OXO BACK-END. INCLUDES A GUIDE TUBE KIT.
KP4069-2	GUIDE TUBE KIT FOR K3348-1 OXO GUN ADAPTERS.
K3349-1	GUN ADAPTER KIT, FAST-MATE (EURO). INCLUDES A GUIDE TUBE KIT.
KP4069-3	GUIDE TUBE KIT FOR K3349-1 FASTMATE GUN ADAPTERS.

CABLE AND LEAD KITS

TABLE C.5

K NUMBER	DESCRIPTION	PURPOSE
CONTROL CABLES		
K1543-XX	CONTROL CABLE: MALE 5 PIN TO FEMALE 5 PIN ARCLINK CABLE.	CONNECTS THE USER INTERFACE TO THE WIRE DRIVE FOR BOOM SYSTEMS. CONNECTS THE WIRE DRIVE TO THE POWER SOURCE ON BENCH SYSTEMS.
K2683-XX	HEAVY DUTY CONTROL CABLE: MALE 5 PIN TO FEMALE 5 PIN ARCLINK CABLE.	CONNECTS THE USER INTERFACE TO THE WIRE DRIVE FOR BOOM SYSTEMS. CONNECTS THE WIRE DRIVE TO THE POWER SOURCE ON BENCH SYSTEMS.
SENSE LEADS		
K940-XX	WORK VOLTAGE SENSE LEAD KIT	REQUIRED TO ACCURATELY MONITOR VOLTAGE AT THE ARC
K1811-XX		
ADAPTERS		
K2909-1	12 PIN TO 6 PIN ADAPTER	-
K2910-1	12 PIN TO 7 PIN ADAPTER	
COAXIAL WELDING CABLES		
K1796-XX	AWG 1/0 COAXIAL CABLE	OPTIMUM WELD CABLES FOR MINIMIZING CABLE INDUCTANCE AND OPTIMIZING WELDING PERFORMANCE.
K2593-XX	AWG #1 COAXIAL CABLE	

GENERAL ACCESSORIES

TABLE C.6

K NUMBER	DESCRIPTION	NOTES
K1546-1	INCOMING BUSHING FOR LINCOLN CONDUIT	USE WITH .025 – 1/16" WIRES.
K1546-2	INCOMING BUSHING FOR LINCOLN CONDUIT	USE WITH 1/16" TO 1/8" WIRES.
K1733-1	WIRE STRAIGHTENER	STRAIGHTEN WELDING WIRE TO IMPROVE FEEDING
K590-6	WATER CONNECTION KIT	PROVIDES WATER CONNECTIONS UNDER FEED PLATE
K1634-4	WIRE REEL ENCLOSURE	FOR USE WITH 30-40 LB SPOOLS
K4728-1	CASTER KIT	TO CONVERT WIRE REEL BASE TO A FEEDER UNDERCARRIAGE
K1555-1	INSULATED LIFT BALE	TO PROVIDE A LIFTING MECHANISM ON THE WIRE REEL STAND
K4719-1	REMOTE TRIGGER SWITCH	25 FOOT HAND HELD TRIGGER
K586-1	DELUXE ADJUSTABLE GAS REGULATOR & HOSE KIT	ACCOMMODATES CO2, ARGON, OR ARGON-BLEND GAS CYLINDERS. INCLUDES A CYLINDER PRESSURE GAUGE, DUAL SCALE FLOW GAUGE AND 4.3 FT. (1.3 M) GAS HOSE.

ACCESSORIES INCLUDED WITH THE PIPEFAB™ FEEDER:

- Wire drives include a Standard #2-#4 gun adapter.
- 30 tooth pinion gear installed.
- Inlet guides installed.
- Wire Reel Stand.
- Four cable management brackets.

MAINTENANCE

SAFETY PRECAUTIONS
READ AND UNDERSTAND ENTIRE SECTION BEFORE OPERATING MACHINE.

⚠ WARNING

ELECTRIC SHOCK can kill.

- Do not operate with covers removed.
- Turn off power source before installing or servicing.
- Do not touch electrically hot parts.
- Turn the input power to the welding power source off at the fuse box before working in the terminal strip.
- Only qualified personnel should install, use or service this equipment.

ROUTINE MAINTENANCE

Routine maintenance consists of periodically blowing out the machine, using a low-pressure air stream, to remove accumulated dust and dirt from the intake and outlet louvers, and the cooling channels in the machine.

Check weld cables, control cables and gas hoses for cuts.

Clean and tighten all weld terminals.

PERIODIC MAINTENANCE

Calibration of the PipeFab™ is critical to its operation. Generally speaking the calibration will not need adjustment. However, neglected or improperly calibrated machines may not yield satisfactory weld performance. To ensure optimal performance, the calibration of output Voltage and Current should be checked yearly.

Clean the drive rolls and inner wire guide and replace if worn.

Blow out or vacuum the inside of the feeder.

Inspect the motor brushes every 6 months. Replace if shorter than 0.5” (12.7mm).

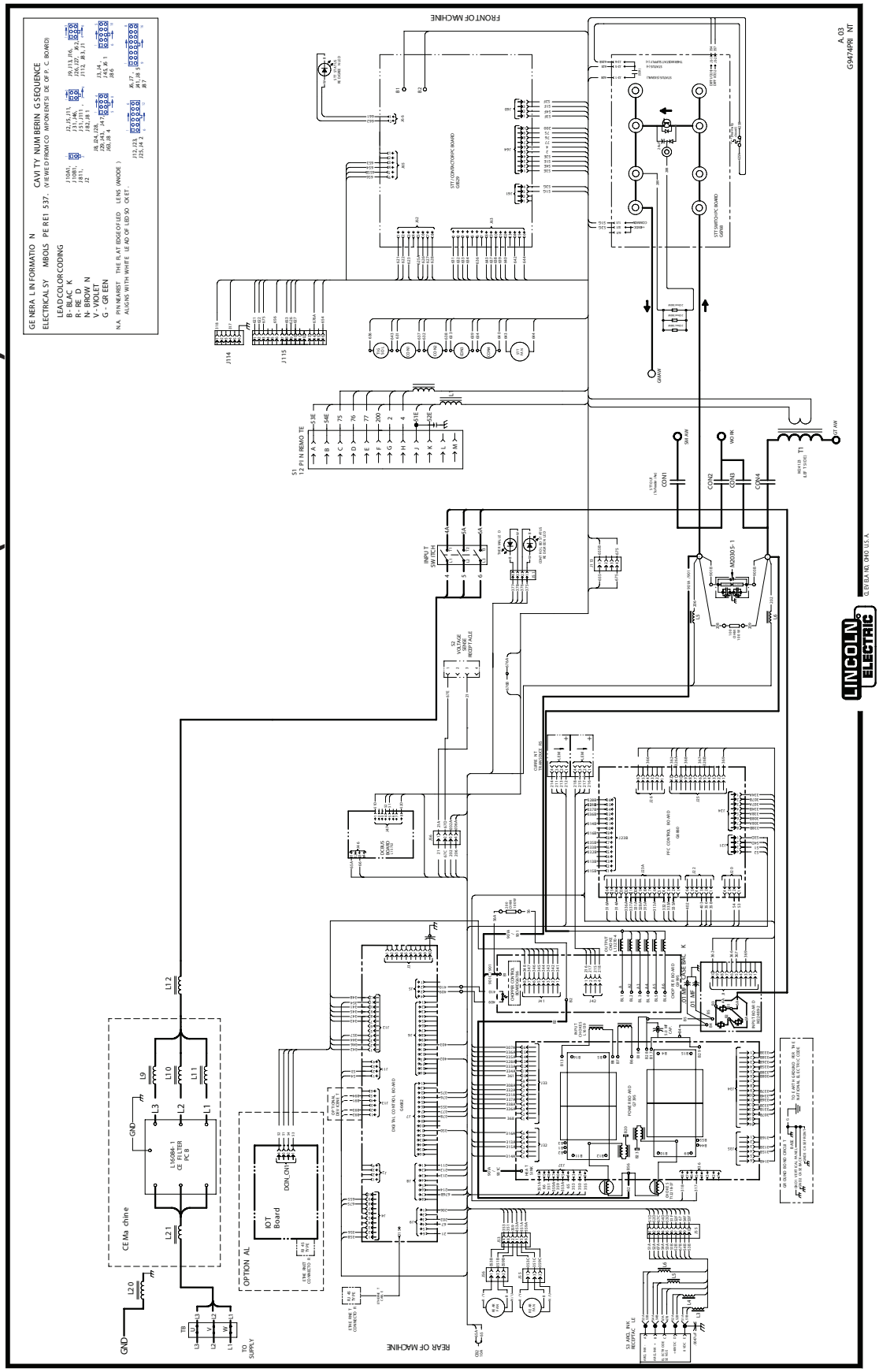
Every year inspect the gearbox and coat the gear teeth with a moly-disulfide filled grease. DO NOT use graphite grease.

CALIBRATION SPECIFICATION

Output Voltage and Current are calibrated at the factory. Generally the machine calibration will not need adjustment. However, if the weld performance changes, or the yearly calibration check reveals a problem, use the calibration section of the Diagnostics Utility to make the appropriate adjustments.

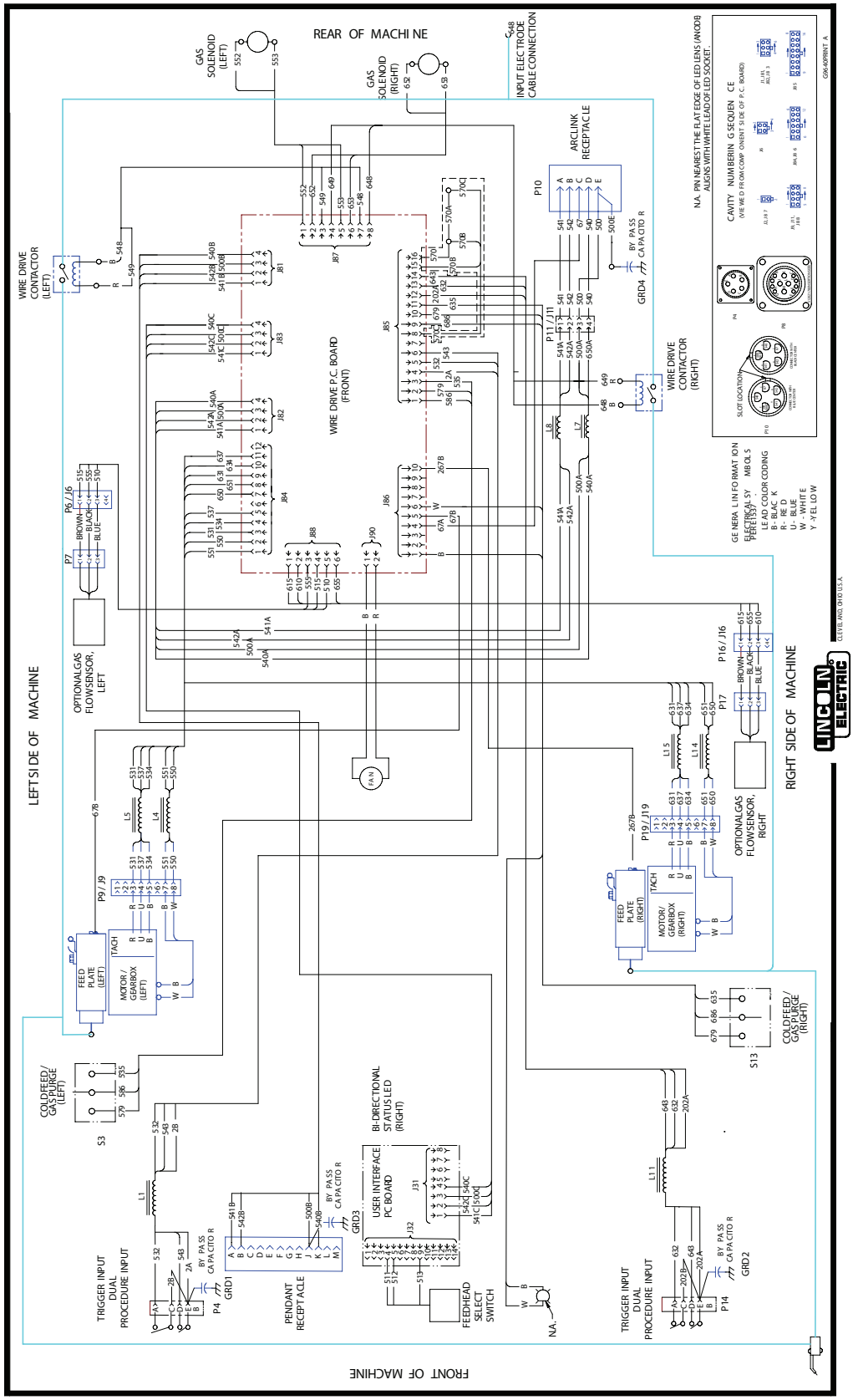
The calibration procedure itself requires the use of a grid, and certified actual meters for voltage and current. The accuracy of the calibration will be directly affected by the accuracy of the measuring equipment you use. The Diagnostics Utility includes detailed instructions and is available at www.powerwavesoftware.com.

PIPEFAB POWER SOURCE (Code 12858)



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.

PIPEFAB WIRE FEEDER (Code 12929)



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.

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

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

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

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

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

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

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

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

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

이 제품에 동봉된 작업지침서를 숙지하시고 귀사의 작업자 안전수칙을 준수하시기 바랍니다.

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

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