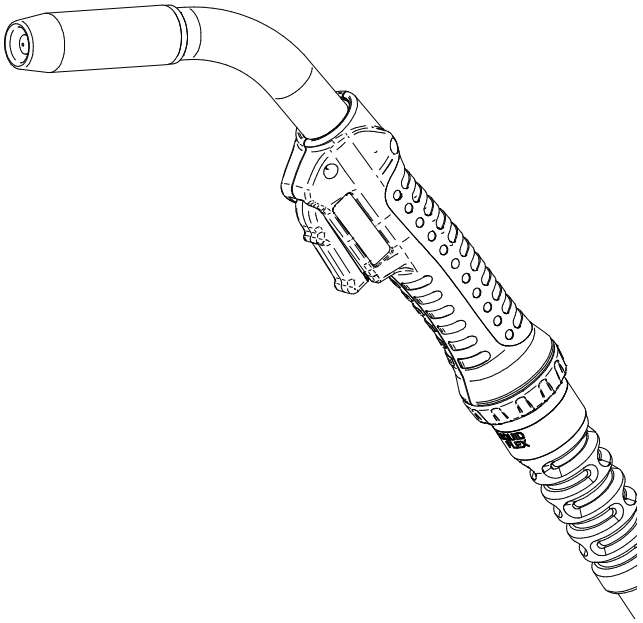
LINCOLN ELECTRIC

Operator's Manual

Magnum® PRO Water-Cooled 400A & 500A Guns



For use with Code Numbers:

K4521-2-FM-45
K4521-2-10-45
K4522-2-FM-45
K4522-2-10-45

GENUINE LINCOLN PARTS™

Register your machine:
www.lincolnelectric.com/register

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

Save for future reference

Date Purchased

Code: (ex: 10859)

Serial: (ex: U1060512345)

IM10520 | Issue Date Mar-19

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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 W117.2-1974. A Free copy of "Arc Welding Safety" booklet E205 is available from the Lincoln Electric Company, 22801 St. Clair Avenue, Cleveland, Ohio 44117-1199.

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

FOR ENGINE POWERED EQUIPMENT.

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

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

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

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

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

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

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

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

ELECTRIC AND MAGNETIC FIELDS MAY BE DANGEROUS

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

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

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

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

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

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

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

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

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

ELECTRIC SHOCK CAN KILL.

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

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

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

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

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

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

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

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

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

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

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

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

ARC RAYS CAN BURN.

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

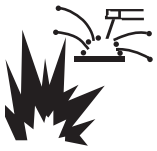
5.c. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.

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.

INSTALLATION .....SECTION A
GENERAL DESCRIPTION.....A-1
WHAT S INCLUDED.....A-2
FAST-MATE GUN INSTALLATION.....A-3
K466 GUN INSTALLATION.....A-3
LINER INSTALLATION AND TRIMMING INSTRUCTIONS.....A-4
CONTACT TIP AND GAS NOZZLE INSTALLATION.....A-4

OPERATION .....SECTION B
ELECTRODES AND EQUIPMENT.....B-1
MAKING A WELD.....B-1
AVOIDING WIRE FEEDING PROBLEMS B-1

ACCESSORIES .....SECTION C
PROCEDURE TO CHANGE THE GOOSENECK 400A AND 500A GUNS.....C-2

MAINTENANCE.....SECTION D

TROUBLESHOOTING.....SECTION E

PARTS LIST .....PARTS.LINCOLNELECTRIC.COM
CONTENT/DETAILS MAY BE CHANGED OR UPDATED WITHOUT NOTICE. FOR MOST CURRENT INSTRUCTION MANUALS, GO TO PARTS.LINCOLNELECTRIC.COM.

GENERAL DESCRIPTION

The Magnum PRO 400A Water Cooled Gun is rated at 400 amperes 100% duty cycle using mixed gas and cooled with water at a flow rate of .58 gallons per minute (2.2 liters per minute). The Magnum PRO 400A Water-Cooled Gun is equipped to run .035"-5/64" (.9mm-2.0mm) solid (GMAW) and cored (FCAW) wire diameters. Optional accessories are available in the ACCESSORIES section. Please see the table A.1 below for details.

TABLE A.1 MAGNUM PRO 400A WATER-COOLED GUN AT 100% DUTY CYCLE WITH MIXED 90 Ar/10 CO_2 GAS

Product Number	Gun Cable Length ft. (m)	Back End Connector	Contact Tip	Gas Diffuser Assembly	Gas Nozzle	Cable Liner	Gun Tube Angle
K4521-2-FM-45	15 ft. (4.5m)	Fast-Mate	KP2745-045	KP4380-1	KP4523-1-62R	KP44-3545-15	60°
K4521-2-10-45	15 ft. (4.5m)	K466-10	KP2745-045	KP4380-1	KP4523-1-62R	KP44-3545-15	60°

The Magnum PRO 500A Water Cooled Gun is rated at 500 amperes 100% duty cycle using mixed gas and cooled with water at a flow rate of .58 gallons per minute (2.2 liters per minute). The Magnum PRO 500A Water-Cooled Gun is equipped to run .035"-5/64" (.9mm-2.0mm) solid (GMAW) and cored (FCAW) wire diameters. Optional accessories are available in the ACCESSORIES section. Please see the table A.2 below for details.

TABLE A.2 MAGNUM PRO 500A WATER-COOLED GUN AT 100% DUTY CYCLE WITH MIXED 90 Ar/10 CO_2 GAS

Product Number	Gun Cable Length ft. (m)	Back End Connector	Contact Tip	Gas Diffuser Assembly	Gas Nozzle	Cable Liner	Gun Tube Angle
K4522-2-FM-45	15 ft. (4.5m)	Fast-Mate	KP2745-045	KP4380-1	KP4523-1-62R	KP44-3545-15	60°
K4522-2-10-45	15 ft. (4.5m)	K466-10	KP2745-045	KP4380-1	KP4523-1-62R	KP44-3545-15	60°

⚠ WARNING

Do not touch electrically live parts such as output terminals or internal wiring

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INSTALLATION

Read this entire installation section before you start installation.

SAFETY PRECAUTIONS

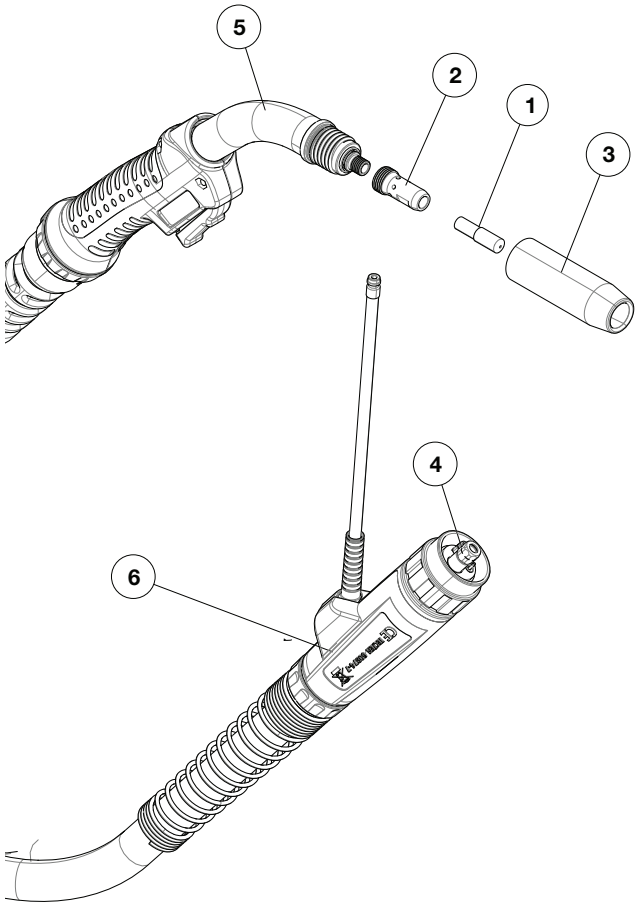
⚠ WARNING

ELECTRIC SHOCK can kill.

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

Only qualified personnel should install, use or service this equipment.

WHAT´S INCLUDED:



Magnum PRO 400A K4521-2-10-45

1 Contact tip .045 – KP2745-045
2 Gas Diffuser – KP4380-1
3 Nozzle 500A, Thread-On, 1/8R 5/8 ID – KP4523-1-62R
4 Liner .035-.045 – KP44-3545-15
5 Gun Tube 60° - KP4527-60
6 Gun Connector - K466-10

Magnum PRO 500A K4522-2-10-45

1 Contact tip .045 – KP2745-045
2 Gas Diffuser – KP4380-1
3 Nozzle 500A, Thread-On, 1/8R 5/8 ID – KP4523-1-62R
4 Liner .035-.045 – KP44-3545-15
5 Gun Tube 60° - KP4526-60
6 Gun Connector - K466-10

Magnum PRO 400A K4521-2-FM-45

1 Contact tip .045 – KP2745-045
2 Gas Diffuser – KP4380-1
3 Nozzle 500A, Thread-On, 1/8R 5/8 ID – KP4523-1-62R
4 Liner .035-.045 – KP44-3545-15
5 Gun Tube 60° - KP4527-60
6 Gun Connector - Fast-Mate

Magnum PRO 500A K4522-2-FM-45

1 Contact tip .045 – KP2745-045
2 Gas Diffuser – KP4380-1
3 Nozzle 500A, Thread-On, 1/8R 5/8 ID
4 Liner .035-.045 – KP44-3545-15
5 Gun Tube 60° - KP4526-60
6 Gun Connector - Fast-Mate

FAST-MATE GUN INSTALLATION

The Magnum PRO 400A & 500A Water-Cooled Guns come in two varieties, Fast-Mate™ back end connections and K466-10 back end connections. The Fast-Mate versions of the guns (K4521-2-FM-45 and K4522-2-FM-45) have fixed back ends that cannot be interchanged. These guns can be connected to wire feeders with a Lincoln Fast-Mate connection, a European style connection, or a wire feeder equipped with a Fast-Mate adapter kit. See table B.1 for the various Fast-Mate adapter kits available.

To install a Fast-Mate gun, check that the feeder outgoing guide, as well as the drive rolls are appropriate for the electrode being used. When using a Fast-Mate Adapter Kit, be certain that the adapter guide tube is also correct.

Align and fully engage the brass connector end of the gun into the mating connector on the outgoing side of the feeder wire drive. Secure the cable connection by tightening the Fast-Mate™ connector collar nut.

K466 GUN INSTALLATION

The K4521-2-10-45 and K4522-2-10-45 guns come with a K466-10 back end connection. The K466-10 connection can be removed and replaced by other K466 connections. Please refer to table B.2 for a list of feeders and their appropriate connectors.

TABLE B.2 - GUN CONNECTOR KITS FOR K4521-2-10-45 AND K4522-2-10-45 GUNS

Manufacturer	Wire Feeder Model	Part Number
Lincoln Electric®	LN-7 Series, LN-8, LN-9, LN-25 (Up to .052 in./1.4 mm wire, LN-23P	K466-1
	LN-8, LN-9 Series, LN-25 (1/16 in./1.6 mm and larger), LN-23P	K466-8
	LF-72, LF-74 Series, Flex Feed 74 HT, Flex Feed 84, LN-25 PRO, LN-25X, Activ8, Activ8x	K466-10
	Power Feed™ 10, 10M, 25M, and 84	K466-10
	POWER MIG® Series and Power Wave® C300	K466-6
Tweco® Adapted	No. 2, No. 3, No. 4 Guns	K466-2
Miller®	Intellimatic, Sidekick, D-51A, Porto-Mig Millermatic 130, 200, MM-35, S-42GL, S-52A, Swing Arc-Dual, Swing Arc-Single, S-32S, 52D, 54D, 54E, 60 Series	K466-3

K466-1& -8 Installation (For Lincoln Feeders)

a. Remove brass cable connector and insulation tube from the K466-1 kit. Slide the insulation tube onto the connector from the threaded end and screw it onto the feeder end of the gun cable. Tighten the connection with the wrench provided.

b. Remove the molded gas plug fitting on the side of the feeder end handle and replace it with the barbed brass fitting provided in the kit. The included wrench will fit both the gas plug and barbed fitting.

c. Attach the round connector of the gun control cable provided to the trigger connector on the front of the Lincoln feeder. (NOTE: Both the plug and socket are keyed and must be properly oriented.)

d. Place one tubing clamp onto each end of the flexible tubing provided, approximately 2” (51 mm) in from each end. Slide one end of the tubing onto the barbed connector on the feeder end cable handle (step b) and move the clamp down near the end of the tube to ensure a good gas seal.

NOTE: An optional K481 MAGNUM® Fast-Connect Gas Tube Kit is available to provide tool-less gas tube connection to Lincoln wire feeders. Install per the instructions sent with the kit.

K466-2 Installation (For Tweco Adapted Feeders)

a. Remove brass cable connector from the K466-2 kit and screw it onto the feeder end of the gun cable. Tighten the connection with the wrench provided.

b. Check that the molded gas plug fitting is sealing the gas fitting hole in the side of the feeder end handle.

K466-3 Installation (For Miller Feeders)

a. Remove brass cable connector from the K466-3 kit and screw it onto the feeder end of the gun cable. Tighten the connection with the wrench provided.

b. Check that the molded gas plug fitting is sealing the gas fitting hole in the side of the feeder end handle.

c. Attach the round connector of the gun control cable provided to the trigger connector on the front of the Miller feeder.

Connection to water coolers.

The water cooler should be rated for .58 gallons per minute (2.2 liters per minute) at 60 psi (4.08 atm) or greater. The connectors on the gun water hoses have a male quick connect fitting that will mate to a Rectus® Series 21 Coupler. (Note: A KP1529-1 adapter is available to connect the male quick connect to a CGA 033 left hand male connection). When connecting the hoses to the water cooler, the WATER IN "BLUE HOSE" must be connected to the water out connector on the water cooler. The WATER OUT "RED HOSE" must be connected to the water in connector on the water cooler.

Do not operate the gun without having water flowing through the gun. IRREPARABLE DAMAGE to the gun will occur if incorrectly connected or if operated even for a short time without an adequate supply of cooling water. A flow sensor is recommended to protect the gun. A K1536-1 flow sensor is available.

⚠ CAUTION

Do not operate the gun without having water flowing through the gun. IRREPARABLE DAMAGE to the gun will occur if incorrectly connected or if operated even for a short time without an adequate supply of cooling water. A flow sensor is recommended to protect the gun. A K1536-1 flow sensor is available.

TABLE B.1 – REQUIRED CABLE CONNECTOR KITS (FOR FAST-MATE GUNS)

Product Number	Feeder Type
K489-1	Lincoln LN-7 Series, LN-8 or LN-9
K489-2	Lincoln LN-25
K489-7	Lincoln -10 Series wire feeders

Adapter for quick connection to external CGA water fitting.

A KP1529-1 adapter was designed to connect the quick connecting fitting on the water cooled gun water hoses to a Compressed Gas Association (CGA) 033 left hand male connection. Two adapters are included in each kit.

LINER INSTALLATION AND TRIMMING INSTRUCTIONS

a. Lay the gun and cable straight on a flat surface.

b. Make sure that the set screw in the connector end is backed out so as not to damage liner or liner bushing. Remove and save the gas nozzle and gas diffuser from the end of the gun tube assembly.

c. Insert a new untrimmed liner into the connector end of the cable. Be sure the liner bushing is stenciled appropriately for the wire size being used.

d. Trim liner 1.25" from the end of the gun tube. When the diffuser is re-installed, the liner should meet flush with the diffuser.

CONTACT TIP AND GAS NOZZLE INSTALLATION

a. Choose the correct size contact tip for the electrode being used (wire size is stenciled on the side of the contact tip) and screw it snugly into the gas diffuser.

b. Install the appropriate gas nozzle into the diffuser. The proper nozzle should be selected based on the welding application.

c. Choose the gas nozzle as appropriate for the GMAW process to be used. Typically, the contact tip end should be flush to .12" (3.1 mm) extended for the short-circuiting transfer process and .12" (3.1 mm) recessed for spray transfer. For the Outershield (FCAW) process, 1/8" (3 mm) recess is recommended.

OPERATION

Do not attempt to use this equipment until you have thoroughly read all operating and maintenance manuals supplied with your machine. They include important safety precautions, detailed engine starting, operating and maintenance instructions and parts lists.

⚠ WARNING

ELECTRIC SHOCK can kill.

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

FUMES AND GASES can be dangerous.

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

WELDING SPARKS can cause fire or explosion.

- **Keep flammable material away.**

ARC RAYS can burn.

- **Wear eye, ear and body protection.**

Only qualified personnel should operate this equipment.

The wire feeder drive roll pressure should be set to a minimum to prevent wire from coming thru the cable when a wire feed stop occurs. The ideal drive roll pressure is set so the drive rolls will slip when the electrode is slightly wavy after a wire feed stop.

ELECTRODES AND EQUIPMENT

The Magnum PRO 400A & 500A Water-Cooled guns and cables have been designed for use with Lincoln L-50 and Super Arc L-56, solid steel wire electrodes for the GMAW process and Lincoln Outershield® cored electrodes for the gas-shielded FCAW process. Refer to the appropriate Lincoln Process and Procedure Guidelines for the electrode used for information on recommended electrical and visible stickouts.

MAKING A WELD

Note: Water cooled guns will have a higher voltage drop along the length of the cable than air cooled guns. To compensate for the higher voltage drop, the following table is a guide line to determine how much the welding voltage should be increased.

Welding Current	Welding Voltage Increase For Magnum PRO 400A Water-Cooled Gun Compared to MAGNUM® 400	Welding Voltage Increase For Magnum PRO 500A Water-Cooled Gun Compared to MAGNUM® 550
200 amperes	0.5 volts	0.5 volts
300 amperes	1.0 volts	0.7 volts
400 amperes	1.5 volts	0.9 volts
500 amperes	—-	1.2 volts

The final voltage setting must be determined by the arc characteristics that are required for the welding process.

a) Check that the welding power source is on and that the shielding gas supply is set for the proper flow rate.

b) Position electrode over joint. The end of the electrode should be slightly off the work.

c) Lower your welding helmet, close the gun trigger, and begin welding. Hold the gun so the contact tip to work distance gives the correct electrical stickout as required for the procedure being used.

d) To stop welding, release the gun trigger and then pull the gun away from the work after the arc goes out.

AVOIDING WIRE FEEDING PROBLEMS

Wire feeding problems can be avoided by observing the following gun handling procedures:

a) If a 'burn back' or wire feed stop occurs, release the trigger immediately. Remove the contact tip, free the wire and clean or replace the tip as necessary. If the wire has been scored by the feed rolls, discard the damaged section of the wire. This is necessary because the damaged wire could jam in the contact tip and cause another burn back.

b) Do not kink or pull cable around sharp corners.

c) Keep the electrode cable as straight as possible when welding or loading electrode through cable.

d) Avoid wrapping excess cable around handle or front of wire feeder.

e) Do not allow dolly wheels or trucks to run over cables.

f) Keep cable clean by following maintenance instructions.

g) Use only clean, rust-free electrode. The Lincoln electrodes have proper surface lubrication.

h) Replace contact tip when the arc starts to become unstable or the contact tip end is fused or deformed.

i) When using aluminum electrodes, 10 ft. Maximum cable length is recommenced. If longer cable lengths are used, cable should be kept as straight as possible.

ACCESSORIES

EXPENDABLE REPLACEMENT PARTS

Description	Part Number	Wire Diameter (In.)	Wire Diameter (mm)
CABLE LINER			
For Cables 15' (4.5 m) and less (Steel Wire)	KP44-3545-15	.035-.045"	0.9-1.2 mm
	KP44-116-15	.052-1/16"	1.3-1.6 mm
	KP44-564-15	1/16-5/64	1.6-2.0 mm
CONTACT TIPS - Pkg. Qty. - 10			
	KP2745-035	0.035"	.09 mm
	KP2745-040	0.040"	1.0 mm
	KP2745-045	0.045"	1.2 mm
	KP2745-052	0.052"	1.3 mm
	KP2745-116	1/16"	1.6 mm
	KP2745-072	0.068-0.072"	1.7-1.8 mm
	KP2745-564	5/64"	2.0 mm
GAS DIFFUSER	KP4380-1		
GAS NOZZLE - Thread-On			
1/8 Recessed, 1/2 ID	KP4523-1-50R		
1/8 Recessed, 3/4 ID	KP4523-1-75R		
1/8 Recessed, 5/8 ID	KP4523-1-62R		
Flush, 1/2 ID	KP4523-1-50F		
Flush, 3/4 ID	KP4523-1-75F		
Flush, 5/8 ID	KP4523-1-62F		
1/8 Stick Out, 1/2 ID	KP4523-1-50S		
1/8 Stick Out, 3/4 ID	KP4523-1-75S		
1/8 Stick Out, 5/8 ID	KP4523-1-62S		
GUN TUBE			
45 DEG. GUN TUBE - 500A	KP4526-45		
60 DEG. GUN TUBE - 500A	KP4526-60		
45 DEG. GUN TUBE - 400A	KP4527-45		
60 DEG. GUN TUBE - 400A	KP4527-60		

PROCEDURE TO CHANGE THE GOOSENECK 400A AND 500A GUNS

⚠ WARNING

ELECTRIC SHOCK can kill.

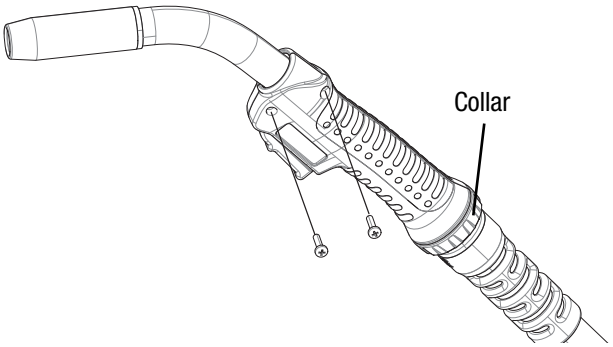
- **Disconnect the gun from feeder**
- **Do not stand in water puddles**

Tools Needed:

- Philips head screwdriver
- Crimping Clamps
- 10mm wrench

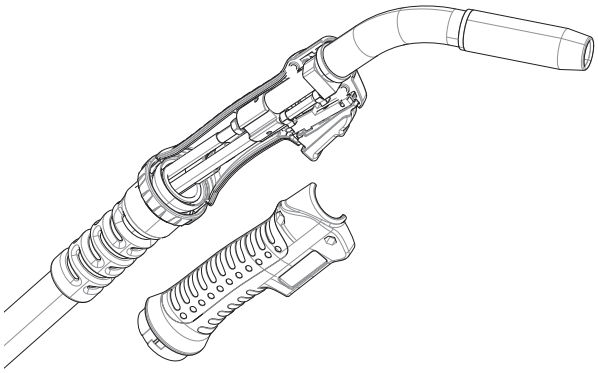
1. Unplug the gun from the feeder, and remove the gun liner. Completely drain the water hoses.
2. Take out the two Phillips head screws and remove the collar from handles.

FIGURE C.1



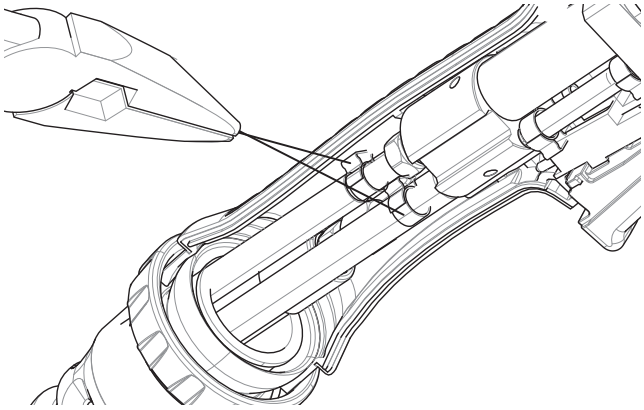
3. Remove just one side of the handle to leave the connector uncovered.

FIGURE C.2



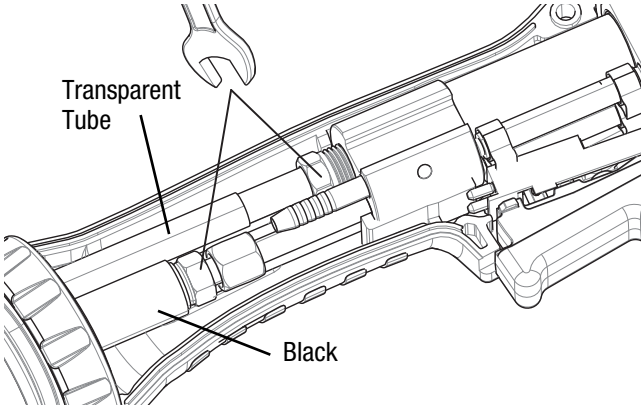
4. Cut hose clamps from hoses, use cutting pliers and disconnect them from the connector block. The blue and black hoses carry water through the torch.

FIGURE C.3



5. With a 10 mm wrench, unscrew the large black threaded connection from the copper tubing attached to the connector block.

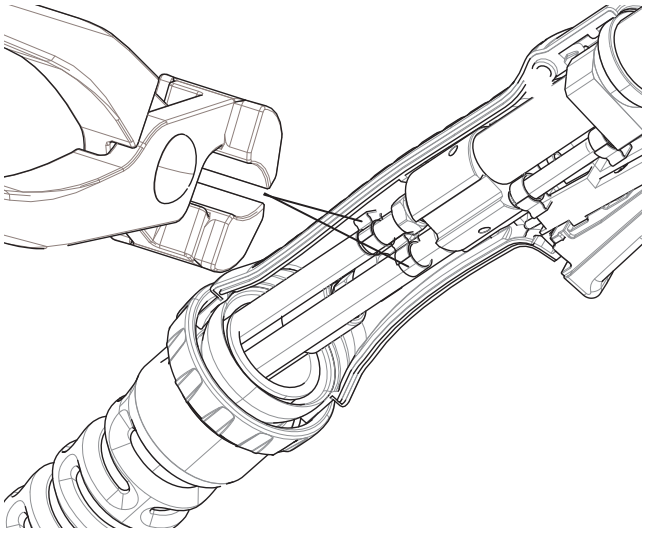
FIGURE C.4



6. Unscrew the brass Hex tubing (which is connected to the transparent tube) with a 10 mm wrench from the connector block.
7. Slide on unclamped hose clamps to the blue and black hoses. The clamps are included with the gooseneck.
8. Screw in the brass hex fitting attached to the transparent tube into the new gooseneck and connector block.
9. Screw the large black threaded connection to the copper tubing of the new gooseneck and connector block.

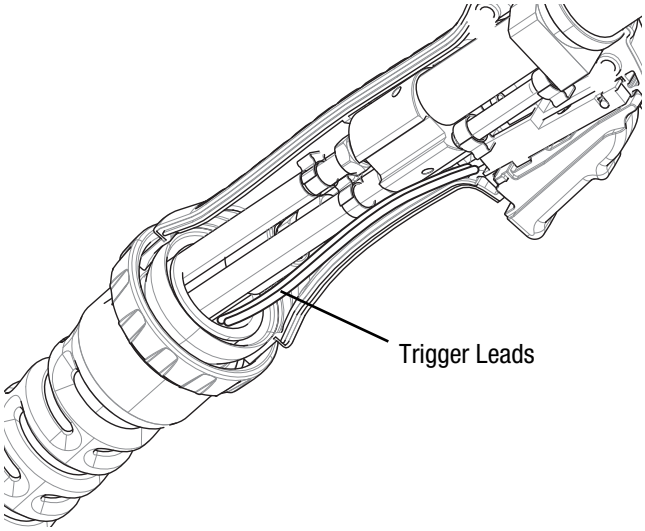
10. Connect the blue water hose to the copper tubing with the four o-rings on it and crimp it using crimp clamps.

FIGURE C.5



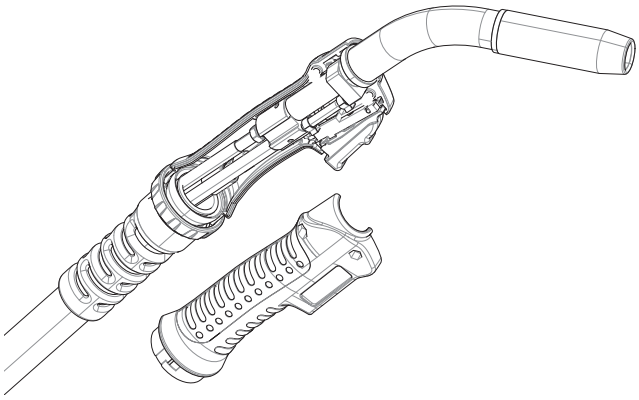
11. Connect the black water hose to the copper tubing and crimp it using crimp clamps.
12. Before reattaching the handle halves, ensure trigger leads are correctly routed and trigger assembly is correctly placed.

FIGURE C.6



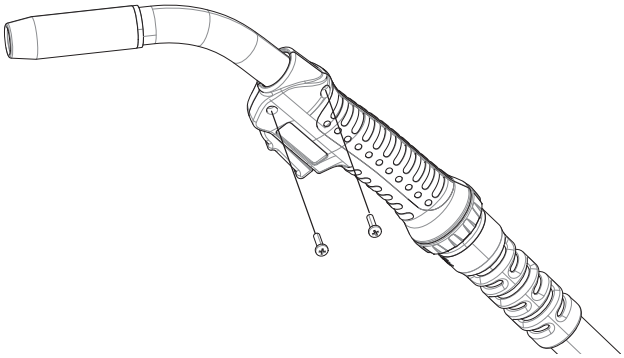
13. Place the other half of the handle, being careful to not pinch the trigger leads, and ensure that it fits well in the other handle half.

FIGURE C.7



14. Place screws and lock the collar to close the handles.

FIGURE C.8



MAINTENANCE

Periodically remove and clean the nozzle, contact tip and gas diffuser. Replace the nozzle if damaged. Regular use of an anti-spatter compound will reduce the adherence of spatter and ease its removal.

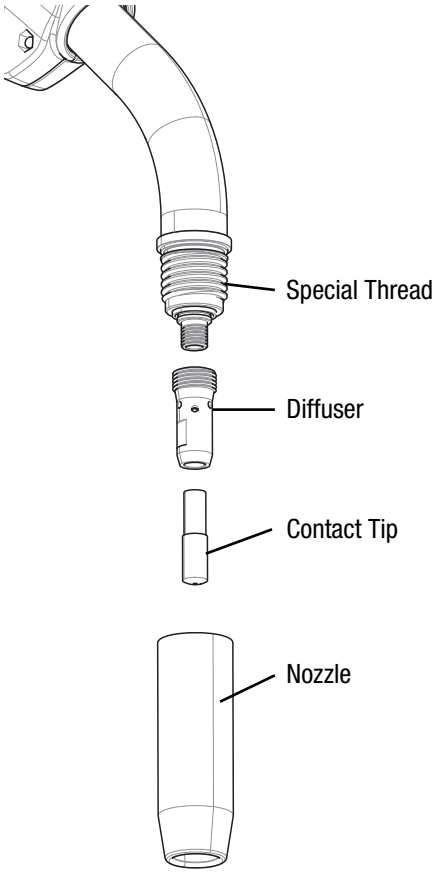
Clean cable liner after using approximately 300 pounds (136 kg) of electrode. Remove the cable from the wire feeder and lay it out straight on the floor. Remove the contact tip from the gun. Using an air hose and only partial pressure, gently blow out the cable liner from the gas diffuser end.

⚠ CAUTION

Excessive pressure at the start may cause the dirt to form a plug.

Flex the cable over its entire length and again blow out the cable. Repeat this procedure until no further dirt comes out.

FIGURE D.1



Observe all Safety Guidelines detailed throughout this manual

TROUBLESHOOTING

HOW TO USE TROUBLESHOOTING GUIDE

⚠ WARNING

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

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

Step 1. LOCATE PROBLEM (SYMPTOM).

Look under the column labeled "PROBLEM (SYMPTOMS)." This column describes possible symptoms that the machine may exhibit. Find the listing that best describes the symptom that the machine is exhibiting.

Step 2. POSSIBLE CAUSE.

The second column labeled "POSSIBLE CAUSE" lists the obvious external possibilities that may contribute to the machine symptom.

Step 3. RECOMMENDED COURSE OF ACTION

This column provides a course of action for the Possible Cause, generally it states to contact you local Lincoln Authorized Field Service Facility.

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

⚠ WARNING

ELECTRIC SHOCK can kill.

- **Turn off machine at the disconnect switch on the rear of the machine and remove main power supply connections before doing any troubleshooting.**

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

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Observe all Safety Guidelines detailed throughout this manual

PROBLEM (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
Drive rolls turn, but wire will not feed or wire feeding is rough.	Gun cable kinked and/or twisted.	Keep as straight as possible. Inspect cable and replace if necessary.
	Wire jammed in gun and cable.	Remove wire from gun and cable - feed in new wire. Note any obstruction. Replace liner if necessary.
	Incorrect drive rolls and guide tubes.	Be sure the wire diameter being used is stamped on drive rolls and guide tubes. Replace if necessary.
	Gun cable liner dirty.	Clean liner or replace.
	Worn drive rolls.	Replace or reverse split drive roll type.
	Electrode rusty and/or dirty.	Replace the electrode if it is rusty.
	Worn or improper size cable liner.	Replace cable liner.
	Partially flashed, melted, or improper size contact tip.	Replace the contact tip.
	Incorrect diffuser.	Be sure diffuser size is correct for the electrode being used.
Variable or "hunting" arc.	Contact tip worn or incorrect size.	Replace contact tip.
	Worn or undersize ground cables or poor ground connections.	Inspect - repair or replace as necessary.
	Loose electrode connections.	Be sure the following connections are tight: electrode cable to power source, work cable to power source and work, gun cable to power source contact block, gun nozzle to body, and contact tip to nozzle.
Poor arc striking with sticking or "Blast-offs", weld porosity, narrow and ropy looking bead, or electrode stubbing into plate while welding.	Improper procedures or techniques.	See "Gas Metal Arc Welding Guide" (GS-100).
	Improper gas shielding.	Clean gas nozzle. Make certain that gas diffuser is not restricted. Make certain that gas cylinder is not empty or turned off. Make certain gas solenoid valve is operating and gas flow rate is proper. Remove gun liner and check rubber seal for any sign of deterioration or damage. Be sure set screw in brass connector is in place and tightened against the liner bushing.
Tip seizes in diffuser.	Tip overheating due to prolonged or excessive high current and/or duty cycle welding.	Do not exceed current and duty cycle rating of gun.

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

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

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

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

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

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

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

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

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

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

이 제품에 동봉된 작업지침서를 숙지하시고 귀사의 작업자 안전수칙을 준수하시기 바랍니다.

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

CUSTOMER ASSISTANCE POLICY

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

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

Subject to Change – This information is accurate to the best of our knowledge at the time of printing. Please refer to www.lincolnelectric.com for any updated information.

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