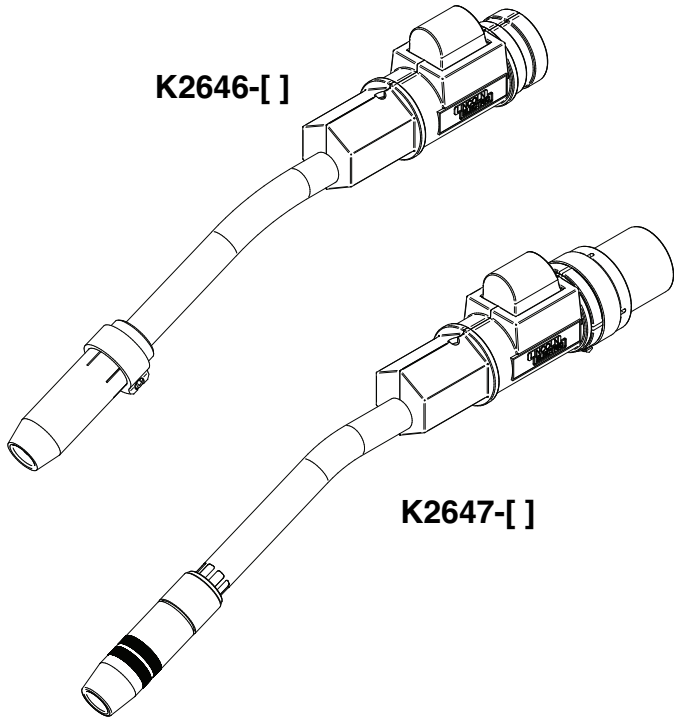


Operator's Manual

Magnum[®] PRO Robotic Torch



For use with machines having Code Numbers:

**K2646-4, K2646-4L, K2646-5L, K2646-8,
K2646-11**

**K2647-4, K2647-4L, K2647-5L, K2647-8,
K2647-11**



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)

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.P65warnings.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 Z87.1 standards.
- 4.b. Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.
- 4.c. Protect other nearby personnel with suitable, non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.



FUMES AND GASES CAN BE DANGEROUS.



- 5.a. Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. **When welding 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-1, "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.

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

INSTALLATION

GENERAL DESCRIPTION

The Magnum Pro Robotic GMA gun and cable assemblies have been designed to meet IEC 60974-7 specification for welding with steel electrode using the GMAW (gas metal arc welding) and the gas-shielded FCAW (flux-cored arc welding) processes. The Magnum Pro product line is designed for heavy duty applications possessing market leading ratings and simplicity in maintenance.

The Magnum PRO Robotic Torch is rated at 385 amps at 100% duty cycle with mixed gas.

RECOMMENDED PROCESSES

- GMAW, GMAW-P, GMAW-STT, FCAW, FCAW-SS

PROCESS LIMITATIONS

- This product is not recommended for submerged arc welding.

EQUIPMENT LIMITATIONS

Wire Size:

- Water -cooled robotic torches are designed for up to 1/16" wire
- Air-cooled robotic torches are designed for up to 5/64" wire

Wire Feeders:

- The water-cooled robotic torch is designed for a Lincoln or Tweco #5 power pin only.
- The air-cooled robotic torch can use any of the standard power pins.

COMMON EQUIPMENT PACKAGES

The external dress robotic torch is currently available in two models. K2646 (water-cooled) and K2647 (air-cooled). Both series are designed to be used for external dress robotic applications. They can also be applied to hard automation systems with the end user being responsible for mounting.

The available replacement parts for the Magnum Pro robotic torches are shown in Table A.1, A.2 and A.3.

TABLE A.1

MAGNUM PRO ROBOTIC TORCH MOUNTING KITS	
Product #	Description
KP2769-22	22° MOUNTING KIT (LINCOLN TCP)
KP2769-45	45° MOUNTING KIT (LINCOLN TCP)
KP2769-180	180° MOUNTING KIT (LINCOLN TCP)
KP3054-22	22° MOUNTING KIT (TREGASKISS TCP, FANUC CLUTCH MOUNT)
KP3055-22	22° MOUNTING KIT (TREGASKISS TCP, TREGASKISS CLUTCH MOUNT)
KP3499-22	22° MOUNTING KIT (LINCOLN TCP, ABB AND KUKA ARMS)
KP3499-45	45° MOUNTING KIT (LINCOLN TCP, ABB AND KUKA ARMS)
KP3499-180	180° MOUNTING KIT (LINCOLN TCP, ABB AND KUKA ARMS)

TABLE A.2

AIR-COOLED REPLACEMENT EQUIPMENT	
Product #	Description
KP3056-22	22° AC GOOSENECK (LINCOLN TCP)
KP3056-45	45° AC GOOSENECK (LINCOLN TCP)
KP3056-180	180° AC GOOSENECK (LINCOLN TCP)
KP3057-22	22° AC GOOSENECK (TREGASKISS TCP)

TABLE A.3

WATER-COOLED REPLACEMENT EQUIPMENT	
Product #	Description
KP2766-22	22° W/C GOOSENECK (LINCOLN TCP)
KP2766-180	180° W/C GOOSENECK (LINCOLN TCP)
KP2767-4	POWER CABLE & LINER ASSEMBLIES, ROBOTIC W/C, 4'
KP2767-4L	POWER CABLE & LINER ASSEMBLIES, ROBOTIC W/C, 4.5'
KP2767-5L	POWER CABLE & LINER ASSEMBLIES, ROBOTIC W/C, 5.5'
KP2767-8	POWER CABLE & LINER ASSEMBLIES, ROBOTIC W/C, 8'
KP2767-11	POWER CABLE & LINER ASSEMBLIES, ROBOTIC W/C, 11'
KP2768-116	ROBOTIC W/C CABLE LINER, UP TO 1/16"
KP3058-1	NOZZLE CLAMP

MAGNUM PRO AIR-COOLED ROBOTIC TORCH								
PRODUCT # / DESC.	TORCH CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN. (MM)	CONTACT TIPS STANDARD DUTY	GAS DIFFUSER ASSEMBLY	GAS NOZZLE	INSULATOR	CABLE LINER	GUN TUBE
K2647-4	4 ft. (1.3)	.035 (0.9)	KP2745-035R	KP2747-1	KP2743-1-62R	KP2773-1	KP1950-1 KP1950-1 KP1950-3 KP1950-3 KP44-564-15	KP3355-45
K2647-4L	4.5 ft. (1.4)		KP2745-045R					
K2647-5L	5.5 ft. (1.7)	.052 (1.3)	KP2745-052R					
K2647-8	8 ft. (2.6)	1/16 (1.6)	KP2745-116R					
K2647-11	11 ft. (3.4)	5/64 (2.0)	KP2745-564R					

MAGNUM PRO WATER-COOLED ROBOTIC TORCH									
PRODUCT # / DESC.	TORCH CABLE LENGTH FT. (M)	WIRE SIZE RANGE IN. (MM)	CONTACT TIPS STANDARD DUTY	TIP HOLDER	GAS DIFFUSER CAP	GAS NOZZLE	NOZZLE CLAMP	CABLE LINER	GUN TUBE
K2646-4	4 ft. (1.3)	.035 (0.9) .045 (1.2) .052 (1.3) 1/16 (1.6)	KP2764-035	KP2765-1	KP3049-1	KP3050-2-62R	KP3058-1	KP2768-116	KP2766-22
K2646-4L	4.5 ft. (1.4)		KP2764-045						
K2646-5L	5.5 ft. (1.7)		KP2764-052						
K2646-8	8 ft. (2.6)		KP2764-116						
K2646-11	11 ft. (3.4)								

	Robot Arm	Breakaway Disk	Torch Mount	Torch	Feeder Receptacle
FANUC	IB SERIES	KP3194-1	KP2769-22	K2647-*	K1500-3
	IC SERIES	KP3194-3	KP2769-22	K2647-*	K1500-3
	50IC	KP3194-2	KP2769-22	K2647-*	K1500-3
ABB	IRB1410-5/1.44	KP3194-1	KP2769-22	K2647-4L	K1500-3
	IRB1600-6/1.45	KP3194-1	KP2769-22	K2647-4	K1500-3
	IRB 2600-12/1.85	KP3194-4	KP3499-22	K2647-4	K1500-3
	IRB 4600-20/2.5	KP3194-4	KP3499-22	K2647-5L	K1500-3
KUKA	KR6-2	KP3194-1	KP2769-22	K2647-4	K1500-3
	KR10 R1420	KP3194-5	KP3499-22	K2647-4	K1500-3
	KR6 R1820	KP3194-5	KP3499-22	K2647-4L	K1500-3
	KR8 R1620	KP3194-5	KP3499-22	K2647-4	K1500-3

Other robot arms can be supported, provided the breakaway disk fits the robot face

SPECIFICATIONS: K2646-[], K2647-[]

**A/C MAGNUM PRO ROBOTIC TORCH - RATED
OUTPUT IEC 60974-7**

Duty Cycle	Amperes – Mixed Gas
60%	460
100%	385

**W/C MAGNUM PRO ROBOTIC TORCH - RATED
OUTPUT IEC 60974-7**

Duty Cycle	Amperes – Mixed Gas
60%	460
100%	385

WELDING PROCESSES

Process	Electrode Diameter Range	Output Range (Amperes)	Wire Feed Speed Range
GMAW-PULSED	.035" – 1/16" (0.8 – 1.6 MM)	385A @ 100% 460A @ 60%	(See wire feeder Instruction Manual)
GMAW-STT	.035" – 1/16" (0.8 – 1.6 MM)	385A @ 100% 460A @ 60%	
FCAW-GAS SHIELDED	.035" – 1/16" (0.8 – 1.6 MM)	385A @ 100% 460A @ 60%	

PHYSICAL DIMENSIONS – AIR-COOLED

Model	Cable Length	Weight
K2647-4	4 ft. (1.3)	7 lbs (3.2 kg)
K2647-4L	4.5 ft. (1.4)	7.4 lbs (3.4 kg)
K2647-5L	5.5 ft. (1.7)	7.75 lbs (3.5 kg)
K2647-8	8 ft. (2.6)	9 lbs (4.1 kg)
K2647-11	11 ft. (3.4)	10.5 lbs (4.8 kg)

PHYSICAL DIMENSIONS – WATER-COOLED

Model	Cable Length	Weight
K2646-4	4 ft. (1.3)	6 lbs (2.7 kg)
K2646-4L	4.5 ft. (1.4)	6.25 lbs (2.8 kg)
K2646-5L	5.5 ft. (1.7)	6.75 lbs (3.1 kg)
K2646-8	8 ft. (2.6)	8 lbs (3.6 kg)
K2646-11	11 ft. (3.4)	9.5 lbs (4.3 kg)

TEMPERATURE RANGES

Operating Temperature	-4°F to 104°F (-20°C to 40°C)
Storage Temperature	-40°F to 185°F (-40°C to 85°C)

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.



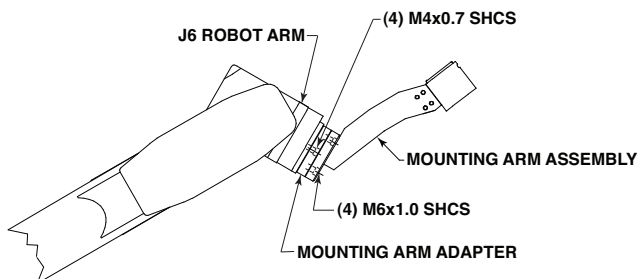
Only qualified personnel should install, use or service this equipment

CONNECTING MOUNTING ARM TO ROBOT

Make sure that the robot is in its Zero position.

Assemble mounting arm adapter to J6 of robot arm using 4 M4x0.7 SHCS. Assemble mounting arm assembly to adapter using 4 M6x1.0 SHCS. Make sure the hex bracket on the mounting arm is oriented down. (See Figure D.1)

FIGURE D.1



Gas Tube Kit is available to provide tool-less gas tube connection to Lincoln wire feeders. Install per the instructions sent with the kit.

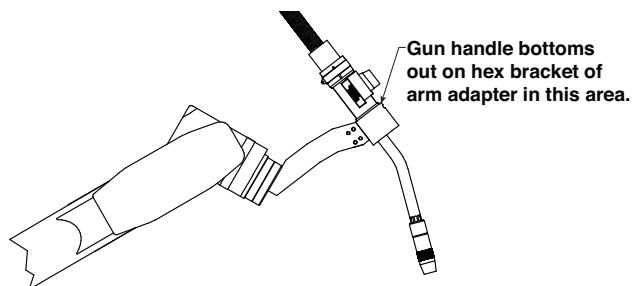
ASSEMBLY OF CABLE LINER TO GUN (FOR GUNS WITHOUT PREINSTALLED LINERS)

Lay gun flat and insert liner into back end of gun. Feed liner forward until liner bushing bottoms out and secure with set screw. For air-cooled torches, trim liner 5/8" from end of gooseneck. For water-cooled torches, trim liner flush to gooseneck, then remove liner and trim an additional 1" off of the liner. Insert back into gun and secure. Attach desired consumables to gooseneck.

CONNECTING GUN TO MOUNTING ARM

Insert front of gun thru rear of mounting arm hex, ensuring that gun is oriented with gooseneck down. Push gun forward until gun handle bottoms out on hex. Thru holes for set screw should be aligned. Secure with 2 attached SHCS. (See Figure D.2)

FIGURE D.2



CONNECTING CABLE ASSEMBLY TO WIRE FEEDER

Ensure that the appropriate bushing is installed on the wire feeder to match the connector on the gun. Insert feeder connector into wire feeder bushing and secure. Ensure that cable is not twisted when installed. Connect gas hose to gas fitting. (If Applicable)

ELECTRODES AND EQUIPMENT

The Magnum Pro Robotic torch has been designed for use with Lincoln GMAW wire electrodes. Refer to the appropriate Lincoln Process and Procedure Guidelines for the electrode used for information on recommended electrical and visible stickouts.

AVOIDING WIRE FEEDING PROBLEMS

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

1. Keep the electrode cable as straight as possible when welding or loading electrode through cable.
2. Keep cable clean by following maintenance instructions.
3. Use only clean, rust-free electrode. The Lincoln electrodes have proper surface lubrication.
4. Replace contact tip when the arc starts to become unstable or the contact tip end is fused or deformed.

ACCESSORIES

AIR-COOLED CONSUMABLES

LINER ASSEMBLY

Wire Diameter	Liner KP#
0.035	KP45-3545-15
0.045	KP45-3545-15
0.052	KP45-116-15
1/16	KP45-116-15

GUN TUBES

KP#	Bend Angle	Notes
KP3056-22	22.5°	LINCOLN® TCP
KP3056-45	45°	LINCOLN® TCP
KP3056-180	180°	LINCOLN® TCP
KP3057-22	22.5°	TREGASKISS®-STYLE TCP

CONTACT TIPS

Wire Diameter	KP# 10-piece pack	KP# 100-piece pack
0.035	KP2745-035R	KP2745-035R-B100
0.045	KP2745-045R	KP2745-045R-B100
0.052	KP2745-052R	KP2745-052R-B100
1/16	KP2745-116R	KP2745-116R-B100

DIFFUSERS

Style	KP# 1-piece pack	KP# 25-piece pack
SLIP-ON	KP2747-1	KP2747-1-B25
THREAD-ON	KP2747-2	KP2747-2-B25

INSULATOR

KP# 1-piece pack	KP# 25-piece pack
KP2747-1	KP2773-1-B25

NOZZLES

Style	Stickout	ID	KP# 1-piece pack	KP# 25-piece pack
THREAD-ON	1/8" RECESSED	1/2"	KP2743-1-50R	KP2743-1-50R-B25
THREAD-ON	1/8" RECESSED	3/4"	KP2743-1-75R	KP2743-1-75R-B25
THREAD-ON	1/8" RECESSED	5/8"	KP2743-1-62R	KP2743-1-62R-B25
THREAD-ON	FLUSH	1/2"	KP2743-1-50F	KP2743-1-50F-B25
THREAD-ON	FLUSH	3/4"	KP2743-1-75F	KP2743-1-75F-B25
THREAD-ON	FLUSH	5/8"	KP2743-1-62F	KP2743-1-62F-B25
THREAD-ON	1/8" STICKOUT	1/2"	KP2743-1-50S	KP2743-1-50S-B25
THREAD-ON	1/8" STICKOUT	3/4"	KP2743-1-75S	KP2743-1-75S-B25
THREAD-ON	1/8" STICKOUT	5/8"	KP2743-1-62S	KP2743-1-62S-B25
SLIP-ON	1/8" RECESSED	1/2"	KP2743-2-50R	KP2743-2-50R-B25
SLIP-ON	1/8" RECESSED	3/4"	KP2743-2-75R	KP2743-2-75R-B25
SLIP-ON	1/8" RECESSED	5/8"	KP2743-2-62R	KP2743-2-62R-B25
SLIP-ON	FLUSH	1/2"	KP2743-2-50F	KP2743-2-50F-B25
SLIP-ON	FLUSH	3/4"	KP2743-2-75F	KP2743-2-75F-B25
SLIP-ON	FLUSH	5/8"	KP2743-2-62F	KP2743-2-62F-B25
SLIP-ON	1/8" STICKOUT	1/2"	KP2743-2-50S	KP2743-2-50S-B25
SLIP-ON	1/8" STICKOUT	3/4"	KP2743-2-75S	KP2743-2-75S-B25
SLIP-ON	1/8" STICKOUT	5/8"	KP2743-2-62S	KP2743-2-62S-B25

WATER-COOLED CONSUMABLES**LINER ASSEMBLY**

Wire Diameter	Liner KP#
UP TO 1/16"	KP2768-116

GUN TUBES

KP#	Bend Angle	Notes
KP2766-22	22.5°	LINCOLN® TCP

CONTACT TIPS

Wire Diameter	KP# 10-piece pack	KP# 100-piece pack
0.035	KP2764-035	KP2764-035-B100
0.045	KP2764-045	KP2764-045-B100
0.052	KP2764-052	KP2764-052-B100
1/16	KP2764-116	KP2764-116-B100

TIP HOLDER

Style	KP# 5-piece pack	KP# 25-piece pack
UP TO 1/16	KP2765-1	KP2765-1-B25

DIFFUSER CAP

Style	KP# 5-piece pack	KP# 25-piece pack
STANDARD	KP3049-1	KP3049-1-B25

NOZZLES

Style	Stickout	ID	KP# 1-piece pack	KP# 25-piece pack
SLIP-ON	1/8" RECESSED	5/8"	KP3050-2-62R	KP3050-2-62R-B25
SLIP-ON	1/8" RECESSED	18MM	KP3050-2-72R	KP3050-2-72R-B25
SLIP-ON	1/8" RECESSED	3/4"	KP3050-2-75R	KP3050-2-75R-B25

NOZZLE CLAMP

KP# 1-piece pack
KP3058-1

MAINTENANCE

REMOVAL, INSTALLATION AND TRIMMING INSTRUCTIONS FOR MAGNUM® LINERS

NOTE: The variation in cable lengths prevents the interchangeability of liners. Once a liner has been cut for a particular gun, it should not be installed in another gun, unless it can meet the liner cut off length requirement. Liners are shipped with the jacket of the liner extended with the proper amount.

1. Loosen the hex bracket fasteners and the feeder connection. Remove cable from robot.
2. Lay gun and cable out straight on a flat surface.
3. Loosen set screw located in the brass feeder connector using 5/64 (2.0 mm) Allen wrench. Pull liner out of cable.
4. For installation and trimming instructions for Magnum liners see INSTALLATION section.

AIR COOLED GOOSENECKS AND NOZZLES

1. Replace worn contact tips as required.
2. Remove spatter from contact tip, diffuser, nozzle, insulator and gun tube after each 10 minutes of arc time or as required.
3. To remove gun tube from gun, loosen set screw in nose cone assembly with 3/16" (4.8 mm) Allen wrench.
4. Pull gun tube out from handle assembly. To reinstall, insert the gun tube, push in as far as possible, and retighten set screw.

WATER COOLED GOOSENECKS AND NOZZLES

1. Replace worn contact tips as required.
2. Remove spatter from contact tip, tip holder, insulator, nozzle and gun tube after each 10 minutes of arc time or as required.
3. Loosen the hex bracket fasteners and the feeder connection. Remove cable from robot and lay gun and cable out straight on a flat surface.
4. Remove nozzle, contact tip, and tip holder. Remove hose clamp and handle end cap and open handle halves.
5. Remove SHCS holding gooseneck assembly to power cable clamp and unplug power cable and liner assemblies from gooseneck.
6. Install new gooseneck assembly, reattach cable assemblies and clamp with SHCS. Assemble handle halves, snap handle end cap onto handle, and tighten hose clamp. Attach gun to robot and secure. Attach expendables.

CABLE CLEANING

Clean cable liner after using approximately 150 (68 kg) pounds of electrode. Remove the cable from the wire feeder. Remove the contact tip from the gun. Using an air hose and only partial pressure, gently blow out the cable liner from the 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.

TROUBLESHOOTING

WARNING

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

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

Step 1. LOCATE PROBLEM (SYMPTOM).

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

Step 2. POSSIBLE CAUSE.

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

Step 3. RECOMMENDED COURSE OF ACTION

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

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

WARNING

- Turn the input power OFF at the welding power source before installation or changing drive rolls and/or guides.
- Do not touch electrically live parts.
- Welding power source must be connected to system ground per the National Electrical Code or any applicable local codes.
- Only qualified personnel should perform maintenance work.



Observe all additional Safety Guidelines detailed throughout this manual.



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	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
No wire feed occurs.	1. Out of wire.	1. Install full spool of specified wire.
	2. Contact tip burnback.	2. Replace contact tip.
	3. Fully or partially blocked gun liner.	3. Remove and clean or replace gun liner.
	4. Bird nest.	4. Cut out bird nest, reload wire, and check for proper wire alignment.
	5. No motor voltage or current from machine.	5. See Troubleshooting section in welding machine's or wire feeder's Instruction Manual.
	6. Contact tip size too small for wire diameter used.	6. Replace contact tip with one that is the correct size.
Sluggish wire feed.	1. Drive roll is worn or galled.	1. Clean drive roll or replace drive roll.
	2. Machine's wire feed speed setting is too low.	2. Increase wire feed speed.
	3. Wire is obstructed somewhere along the wire feed path in the gun.	3. Check for obstructions: remove any wire shavings; remove kinked wire; remove and clean or replace gun liner.
	4. Low motor voltage.	4. See Troubleshooting section in welding machine's Instruction Manual.
	5. Gun cable is twisted.	5. Remove cable and reinstall per installation instructions.
	6. Mechanical resistance to wire feeding is too large.	6. Reposition robot so that cable is less twisted or bent.
Intermittent wire feed.	1. Drive roll has become galled.	1. Remove and then clean or replace drive roll.
	2. Wire has become kinked along its feed path. Wire shavings/lubricant is building up in the cable.	2. Manually pull wire slowly thru gun until unkinked wire emerges. Clean cable or replace cable liner.
Frequent birdnesting or kinking of wire in the gun cable.	1. Wire shavings/lubricant is building up in the cable.	1. Clean cable or replace cable liner.
	2. Cable liner is too large for wire size.	2. Install the smallest possible liner which is specified for the wire being used (i.e. use a .052-1/16 liner instead of a 1/16-5/64 liner when welding with 1/16" diameter wire.
	3. Mechanical resistance to wire feeding is too large.	3. Reposition robot so that cable is less twisted or bent.
Frequent occurrence of contact tip burnback.	1. Improper welding parameters or technique (example: ESO [Electrode Stick Out] is too short).	1. See welding wire literature for proper settings.
	2. Wire may be feeding intermittently.	2. See symptoms on intermittent or sluggish wire feed.
Poor weld bead appearance.	1. Improper electrode polarity.	1. Reconnect machine's welding output to proper electrode polarity.
	2. Improper welding parameters or technique.	2. See welding wire literature for proper settings.
Gun Overheating.	1. Gun maybe beyond recommended amperage.	1. See duty cycle chart for recommended amperage.
	2. Water may not be flowing properly.	2. Check that water cooler is turned on, check water lines for leaks.



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	<ul style="list-style-type: none"> Do not touch electrically live parts or electrode with skin or wet clothing. Insulate yourself from work and ground. 	<ul style="list-style-type: none"> Keep flammable materials away. 	<ul style="list-style-type: none"> Wear eye, ear and body protection.
Spanish AVISO DE PRECAUCION	<ul style="list-style-type: none"> No toque las partes o los electrodos bajo carga con la piel o ropa mojada. Aíslese del trabajo y de la tierra. 	<ul style="list-style-type: none"> Mantenga el material combustible fuera del área de trabajo. 	<ul style="list-style-type: none"> Protéjase los ojos, los oídos y el cuerpo.
French ATTENTION	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Gardez à l'écart de tout matériel inflammable. 	<ul style="list-style-type: none"> Protégez vos yeux, vos oreilles et votre corps.
German WARNUNG	<ul style="list-style-type: none"> Berühren Sie keine stromführenden Teile oder Elektroden mit Ihrem Körper oder feuchter Kleidung! Isolieren Sie sich von den Elektroden und dem Erdboden! 	<ul style="list-style-type: none"> Entfernen Sie brennbares Material! 	<ul style="list-style-type: none"> Tragen Sie Augen-, Ohren- und Körperschutz!
Portuguese ATENÇÃO	<ul style="list-style-type: none"> Não toque partes elétricas e electrodos com a pele ou roupa molhada. Isole-se da peça e terra. 	<ul style="list-style-type: none"> Mantenha inflamáveis bem guardados. 	<ul style="list-style-type: none"> Use proteção para a vista, ouvido e corpo.
Japanese 注意事項	<ul style="list-style-type: none"> 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。 	<ul style="list-style-type: none"> 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。 	<ul style="list-style-type: none"> 目、耳及び身体に保護具をして下さい。
Chinese 警告	<ul style="list-style-type: none"> 皮肤或湿衣物切勿接触带电部件及焊条。 使你自已与地面和工件绝缘。 	<ul style="list-style-type: none"> 把一切易燃物品移离工作场所。 	<ul style="list-style-type: none"> 佩戴眼、耳及身体劳动保护用具。
Korean 위험	<ul style="list-style-type: none"> 전도체나 용접봉을 젖은 형갑 또는 피부로 절대 접촉치 마십시오. 모재와 접지를 접촉치 마십시오. 	<ul style="list-style-type: none"> 인화성 물질을 접근시키지 마십시오. 	<ul style="list-style-type: none"> 눈, 귀와 몸에 보호장구를 착용하십시오.
Arabic تحذير	<ul style="list-style-type: none"> لا تلمس الاجزاء التي يسري فيها التيار الكهربائي أو الألكترود بجسدك أو بالملابس المبللة بالماء. ضع عازلا على جسمك خلال العمل. 	<ul style="list-style-type: none"> ضع المواد القابلة للاشتعال في مكان بعيد. 	<ul style="list-style-type: none"> 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.

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

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.



THE LINCOLN ELECTRIC COMPANY

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