

MAGNUM[®] 450WC & 650WC***Fast-Mate™ Water-Cooled Gun and Cable Assemblies*****Safety Depends on You**

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

**OPERATOR'S MANUAL**
LINCOLN[®]
ELECTRIC

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• World's Leader in Welding and Cutting Products •

• Sales and Service through Subsidiaries and Distributors Worldwide •

Cleveland, Ohio 44117-1199 U.S.A. TEL: 216.481.8100 FAX: 216.486.1751 WEB SITE: www.lincolnelectric.com

⚠ WARNING

⚠ CALIFORNIA PROPOSITION 65 WARNINGS ⚠

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

The Above For Diesel Engines

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

The Above For Gasoline Engines

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

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

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



FOR ENGINE powered equipment.

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



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



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

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

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



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

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



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



ELECTRIC AND MAGNETIC FIELDS may be dangerous

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

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

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

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

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

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

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

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

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

Mar '95



ELECTRIC SHOCK can kill.

- 3.a. The electrode and work (or ground) circuits are electrically "hot" when the welder is on. Do not touch these "hot" parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.
- 3.b. Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground.

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

- Semiautomatic DC Constant Voltage (Wire) Welder.
 - DC Manual (Stick) Welder.
 - AC Welder with Reduced Voltage Control.
- 3.c. In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically "hot".
- 3.d. Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.
- 3.e. Ground the work or metal to be welded to a good electrical (earth) ground.
- 3.f. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.
- 3.g. Never dip the electrode in water for cooling.
- 3.h. Never simultaneously touch electrically "hot" parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.
- 3.i. When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.
- 3.j. Also see Items 6.c. and 8.



ARC RAYS can burn.

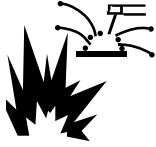
- 4.a. Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding. Headshield and filter lens should conform to ANSI Z87.1 standards.
- 4.b. Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.
- 4.c. Protect other nearby personnel with suitable, non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.



FUMES AND GASES can be dangerous.

- 5.a. Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. **When welding with electrodes which require special ventilation such as stainless or hard facing (see instructions on container or MSDS) or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and below Threshold Limit Values (TLV) using local exhaust or mechanical ventilation. In confined spaces or in some circumstances, outdoors, a respirator may be required. Additional precautions are also required when welding on galvanized steel.**
5. b. The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically thereafter to be certain it is within applicable OSHA PEL and ACGIH TLV limits.
- 5.c. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.
- 5.d. Shielding gases used for arc welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.
- 5.e. Read and understand the manufacturer's instructions for this equipment and the consumables to be used, including the material safety data sheet (MSDS) and follow your employer's safety practices. MSDS forms are available from your welding distributor or from the manufacturer.
- 5.f. Also see item 1.b.

AUG 06



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 02269-9101.
- 6.j. Do not use a welding power source for pipe thawing.



CYLINDER may explode if damaged.

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

- 7.b. Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.
- 7.c. Cylinders should be located:
 - Away from areas where they may be struck or subjected to physical damage.
 - A safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.
- 7.d. Never allow the electrode, electrode holder or any other electrically "hot" parts to touch a cylinder.
- 7.e. Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
- 7.f. Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.
- 7.g. Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders," available from the Compressed Gas Association 1235 Jefferson Davis Highway, Arlington, VA 22202.



FOR ELECTRICALLY powered equipment.

- 8.a. Turn off input power using the disconnect switch at the fuse box before working on the equipment.
- 8.b. Install equipment in accordance with the U.S. National Electrical Code, all local codes and the manufacturer's recommendations.
- 8.c. Ground the equipment in accordance with the U.S. National Electrical Code and the manufacturer's recommendations.

Jan, 07

PRÉCAUTIONS DE SÛRETÉ

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

Sûreté Pour Soudage A L'Arc

1. Protégez-vous contre la secousse électrique:
 - a. Les circuits à l'électrode et à la pièce sont sous tension quand la machine à souder est en marche. Eviter toujours tout contact entre les parties sous tension et la peau nue ou les vêtements mouillés. Porter des gants secs et sans trous pour isoler les mains.
 - b. Faire très attention de bien s'isoler de la masse quand on soude dans des endroits humides, ou sur un plancher métallique ou des grilles métalliques, principalement dans les positions assis ou couché pour lesquelles une grande partie du corps peut être en contact avec la masse.
 - c. Maintenir le porte-électrode, la pince de masse, le câble de soudage et la machine à souder en bon et sûr état de fonctionnement.
 - d. Ne jamais plonger le porte-électrode dans l'eau pour le refroidir.
 - e. Ne jamais toucher simultanément les parties sous tension des porte-électrodes connectés à deux machines à souder parce que la tension entre les deux pinces peut être le total de la tension à vide des deux machines.
 - f. Si on utilise la machine à souder comme une source de courant pour soudage semi-automatique, ces précautions pour le porte-électrode s'appliquent aussi au pistolet de soudage.
2. Dans le cas de travail au dessus du niveau du sol, se protéger contre les chutes dans le cas où on recoit un choc. Ne jamais enrouler le câble-électrode autour de n'importe quelle partie du corps.
3. Un coup d'arc peut être plus sévère qu'un coup de soleil, donc:
 - a. Utiliser un bon masque avec un verre filtrant approprié ainsi qu'un verre blanc afin de se protéger les yeux du rayonnement de l'arc et des projections quand on soude ou quand on regarde l'arc.
 - b. Porter des vêtements convenables afin de protéger la peau de soudeur et des aides contre le rayonnement de l'arc.
 - c. Protéger l'autre personnel travaillant à proximité au soudage à l'aide d'écrans appropriés et non-inflammables.
4. Des gouttes de laitier en fusion sont émises de l'arc de soudage. Se protéger avec des vêtements de protection libres de l'huile, tels que les gants en cuir, chemise épaisse, pantalons sans revers, et chaussures montantes.
5. Toujours porter des lunettes de sécurité dans la zone de soudage. Utiliser des lunettes avec écrans latéraux dans les zones où l'on pique le laitier.

6. Eloigner les matériaux inflammables ou les recouvrir afin de prévenir tout risque d'incendie dû aux étincelles.
7. Quand on ne soude pas, poser la pince à une endroit isolé de la masse. Un court-circuit accidentel peut provoquer un échauffement et un risque d'incendie.
8. S'assurer que la masse est connectée le plus près possible de la zone de travail qu'il est pratique de le faire. Si on place la masse sur la charpente de la construction ou d'autres endroits éloignés de la zone de travail, on augmente le risque de voir passer le courant de soudage par les chaînes de levage, câbles de grue, ou autres circuits. Cela peut provoquer des risques d'incendie ou d'échauffement des chaînes et des câbles jusqu'à ce qu'ils se rompent.
9. Assurer une ventilation suffisante dans la zone de soudage. Ceci est particulièrement important pour le soudage de tôles galvanisées plombées, ou cadmiées ou tout autre métal qui produit des fumées toxiques.
10. Ne pas souder en présence de vapeurs de chlore provenant d'opérations de dégraissage, nettoyage ou pistolage. La chaleur ou les rayons de l'arc peuvent réagir avec les vapeurs du solvant pour produire du phosgène (gas fortement toxique) ou autres produits irritants.
11. Pour obtenir de plus amples renseignements sur la sûreté, voir le code "Code for safety in welding and cutting" CSA Standard W 117.2-1974.

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

1. Relier à la terre le châssis du poste conformément au code de l'électricité et aux recommandations du fabricant. Le dispositif de montage ou la pièce à souder doit être branché à une bonne mise à la terre.
2. Autant que possible, l'installation et l'entretien du poste seront effectués par un électricien qualifié.
3. Avant de faire des travaux à l'intérieur de poste, la débrancher à l'interrupteur à la boîte de fusibles.
4. Garder tous les couvercles et dispositifs de sûreté à leur place.

Mar. '93

Thank You

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

CUSTOMER ASSISTANCE POLICY

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

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

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

Please Examine Carton and Equipment For Damage Immediately

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

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

Product _____

Model Number _____

Code Number or Date Code _____

Serial Number _____

Date Purchased _____

Where Purchased _____

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

On-Line Product Registration

- Register your machine with Lincoln Electric either via fax or over the Internet.
 - For faxing: Complete the form on the back of the warranty statement included in the literature packet accompanying this machine and fax the form per the instructions printed on it.
 - For On-Line Registration: Go to our **WEB SITE at www.lincolnelectric.com**. Choose "Quick Links" and then "Product Registration". Please complete the form and submit your registration.

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

⚠ WARNING

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

⚠ CAUTION

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

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GENERAL DESCRIPTION

The MAGNUM®™ 450WC Water Cooled Gun is rated at 450 amperes 100% duty cycle using carbon dioxide shielding gas and cooled with water at a flow rate of .58 gallons per minute (2.2 liters per minute). It is also rated 400 amperes 100% duty cycle with mixed argon shielding gases. There are several models of guns designed for gas metal arc welding (GMAW) with .035-1/16 (.9mm-1.6mm) solid electrodes and gas shielded flux cored arc welding (FCAW) with .045-5/64 (1.2 mm-2.0mm) cored electrodes. The gun tube angle is as shown in the table below and the gun has a Fast-Mate™ wire feeder end connector. Two 10 ft. (3.5 M) guns with a 45 degree gun tube angle are available for feeding .035-1/16 (.9mm-1.6mm) aluminum electrode. Optional liners are available for feeding aluminum electrode with the 60 degree guns. See ACCESSORIES section for details.

TABLE A.1 – MAGNUM®™ 450WC AT 100% DUTY CYCLE WITH CO₂ GAS

Description Product Number	Gun Cable Length (m)	Wire Size in. (mm)	Contact Tips	Gas Diffuser Assembly	Gas Nozzle	Cable Liner	Gun Tube Angle
K684-11	10 ft. (3.0)	.035 (0.9) .045 (1.2)	KP2067-1B2 KP2067-5B1	KP2059-1	KP1957-4	KP44-3545-15	60°
K684-12	15 ft. (4.5)	.035 (0.9) .045 (1.2)	KP2067-1B2 KP2067-5B1	KP2059-1	KP1957-4	KP44-3545-15	60°
K684-13	10 ft. (3.0)	.052 (1.3) 1/16 (1.6)	KP2067-6B1 KP2067-7B1	KP2059-1	KP1957-4	KP44-116-15	60°
K684-14	15 ft. (4.5)	.052 (1.3) 1/16 (1.6)	KP2067-6B1 KP2067-7B1	KP2059-1	KP1957-4	KP44-116-15	60°
K684-15	10 ft. (3.0)	1/16 (1.6) 5/64 (2.0)	KP2067-7B1 KP2067-10B1	KP2059-1	KP1957-4	KP44-564-15	60°
K684-16	15 ft. (4.5)	1/16 (1.6) 5/64 (2.0)	KP2067-7B1 KP2067-10B1	KP2059-1	KP1957-4	KP44-564-15	60°
K684-17	10 ft. (3.0)	.035A (0.9A) .045A (1.2A)	KP2067-1B2 KP2067-5B1	KP2059-1	KP1957-4	KP1958-5	45°
K684-18	10 ft. (3.0)	1/16A (1.6A)	KP2067-7B1	KP2059-1	KP1957-4	KP1958-3	45°

The MAGNUM®™ 650 WC Water Cooled Gun is rated at 650 amperes 100% duty cycle using carbon dioxide shielding gas and cooled with water at a flow rate of .58 gallons per minute (2.2 liters per minute). It is also rated 500 amperes 100% duty cycle with mixed argon shielding gases. The gun is designed for gas metal arc welding (GMAW) with 5/64 and 3/32 gas shielded flux cored arc welding (FCAW). The gun tube angle is 60 degrees and the gun has a Fast-Mate wire feeder end connector. Optional gas nozzles are available. See ACCESSORIES section for details.

TABLE A.2 – MAGNUM®™ 650WC AT 100% DUTY CYCLE WITH CO₂ GAS

Description Product Number	Gun Cable Length (m)	Wire Size in. (mm)	Contact Tips	Gas Diffuser	Gas Nozzle	Cable Liner	Gun Tube Angle
K1637-1	15 ft. (4.5)	5/64 (2.0)	KP2067-10B1	KP1959-2	M19127-2	M19365-1	60°

MAGNUM® 450WC & 650WC



INSTALLATION

⚠ WARNING



ELECTRICAL SHOCK can kill.

- Have an electrician install and service this equipment.
- Turn the input power off at the fuse box before working on equipment.
- Do not touch electrically hot parts.

The 450WC gun can only be connected to a wire feeder with a Lincoln Fast-Mate™ connector, a European style gun connector or a wire feeder equipped with an adapter. See Table B.1 for the various adapters that are available. Install the adapter per the Instructions sent with the adapter.

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.

Connection to a Power Wave power source equipped with a water cooler and K685 Synergic 7 wire feeder.

Connect the water hose quick connects to the receptacles on the front of the wire feeder. When connecting the hoses to the water supply, the **WATER IN** “BLUE HOSE” must be connected to the water out connector on the wire feeder.

The **WATER OUT** “RED HOSE” must be connected to the receptacle marked water in. The water cooler provided with the Powerwave will provide adequate flow to cool the gun and has a safety switch that will produce a “beeping” noise to warn the welder that there is no water flow. Do not weld until the flow problem is corrected and “beeping” stops.

Connection to other 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

⚠ CAUTION

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 K684 MAGNUM® Guns)

Description	
Product Number	Feeder Type
K489-1	Lincoln LN-7 Series, LN-8 or LN-9
K489-2	Lincoln LN-25
K489-3	Miller wire feeders
K489-4	Tweco - adapted wire feeders
K489-5	Hobart – Series 2000 wire feeders
K489-6	L-TEC wire feeders
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.

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®™ 450WC & 650WC 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® 450WC Compared to MAGNUM® 400	Welding Voltage Increase For MAGNUM® 650WC Compared to MAGNUM® 400
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
600 amperes	-----	1.4 volts
650 amperes	-----	1.6 volts

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

WARNING



process.

ELECTRIC SHOCK can kill.

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



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.

- Check that the welding power source is on and that the shielding gas supply is set for the proper flow rate.
- Position electrode over joint. The end of the electrode should be slightly off the work.
- 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.
- 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:

- 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.
- Do not kink or pull cable around sharp corners.
- Keep the electrode cable as straight as possible when welding or loading electrode through cable.
- Avoid wrapping excess cable around handle or front of wire feeder.
- Do not allow dolly wheels or trucks to run over cables.
- Keep cable clean by following maintenance instructions.
- Use only clean, rust-free electrode. The Lincoln electrodes have proper surface lubrication.
- Replace contact tip when the arc starts to become unstable or the contact tip end is fused or deformed.
- When using aluminum electrodes, 10 ft. Maximum cable length is recommended. If longer cable lengths are used, cable should be kept as straight as possible.

MAGNUM® 450WC & 650WC



EXPENDABLE REPLACEMENT PARTS FOR MAGNUM® 450WC GUN & CABLE ASSEMBLIES

Description	Part Number (Color Code)	English Size (In.)	Metric Size (mm)
CABLE LINER For Cables 15' (4.5 m) and less (Steel Wire)	KP44-3545-15 KP44-116-15 KP44-564-15	.035-.045" .052-1/16" 1/16-5/64	0.9-1.2 mm 1.3-1.6 mm 1.6-2.0 mm
For Cables 15' (4.5 m) and less (Aluminum Wire)	KP1958-2 (Black) KP1958-4 (Red) KP1958-6 (Blue)	.030-.035" 1/16" .035-.045	0.9-1.2 mm 1.6 mm 0.9-1.2 mm
For Cables 10' (3.0 m) and less (Aluminum Wire)	KP1958-1 (Black) KP1958-3 (Red) KP1958-5 (Blue)	.035-3/64" 1/16" .035-3/64"	0.9-1.2 mm 1.6 mm 0.9-1.2 mm
CONTACT TIPS	KP2067-1B2 KP2067-1B2 KP2067-3B1 KP2067-3B1 KP2067-5B1 KP2067-9B1 KP2067-6B1 KP2067-7B1 KP2067-7B1 KP2067-10B1	.035" .035A" .040" .040A" .045" 3/64A" .052" 1/16" 1/16A" 5/64"	0.9 mm 0.9A mm 1.0 mm 1.0A mm 1.2 mm 1.2A mm 1.3 mm 1.6 mm 1.6A mm 2.0 mm
GAS DIFFUSER	KP2059-1		
INSULATOR	KP2060-1		
GAS NOZZLE Flush Flush Flush .12" (3 mm) Recess .12" (3 mm) Recess Spot	KP1957-1 KP1957-2 KP1957-3 KP1957-4 KP1957-5 KP1957-6	0.39" 0.51" 0.59" 0.59" 0.76" 0.76"	10 mm 13 mm 15 mm 15 mm 19.2 mm 19.2 mm
GUN TUBE ASSEMBLY REPLACEABLE PARTS Gun Tube Insulation Disk Nozzle Holder Set Screw Ceramic Insulator Insulation Ring *Joint Compound	S22333-7A S24298-7B* S24298-7C S22333-7D* S24298-7G T12837		

EXPENDABLE REPLACEMENT PARTS FOR MAGNUM® 650WC GUN & CABLE ASSEMBLIES

Description	Part Number (Color Code)	English Size (In.)	Metric Size (mm)
CABLE LINER For Cables 15' (4.5 m) and less (Steel Wire)	M19265-1(yellow)	5/64-3/32"	2.0-2.4 mm
CONTACT TIP	KP2067-10B1	5/64"	2.0 mm
GAS DIFFUSER	KP2058-2		
INSULATOR	S22031-2		
GAS NOZZLE .12" (3 mm) Recess .12" (3 mm) Recess .12" (3 mm) Recess	M19127-1 M19127-2 M19127-3	0.59" 0.67" 0.87"	15 mm 17 mm 22.2 mm
GUN TUBE ASSEMBLY REPLACEABLE PARTS Gun Tube Insulation Disk Nozzle Holder Set Screw Ceramic Insulator Insulation Ring *Joint Compound	S24333-7A S24333-7B* S24298-7C S24333-7D* S24333-7G T12837		

* Joint compound is required for assembly of these parts.

Periodically remove and clean the nozzle, contact tip and gas diffuser. Replace the nozzle insulator 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.

Gun Tube Replaceable Parts

- The gun tube insulation disk should be periodically examined for wear. To replace the gun tube insulation disk, remove the diffuser and pull off the gun tube insulation disk. Although the gun tube insulation disk does not have a thread, it can be unscrewed from the gun tube. Refer to Figure E.1.
- The nozzle holder can be replaced if the threads are damaged. Remove the diffuser and gun tube insulation disk (refer to a. and Figure E.1). Remove the two (2) set screws that lock the nozzle holder in place. Unscrew the nozzle holder. (**Note: The nozzle holder has a Left hand thread.**) Pull the nozzle holder off the gun tube assembly. Be careful to not drop the ceramic that may come off with the nozzle holder. Coat the inside diameter and the outside diameter of the ceramic with DOW CORNING 340 joint compound (Lincoln part T12837). Check that the insulation ring is in place and place the ceramic on the gun tube. Place the new nozzle holder over the ceramic and tighten in place. Replace the two (2) set screws. Replace the gun tube insulation disk and the diffuser.

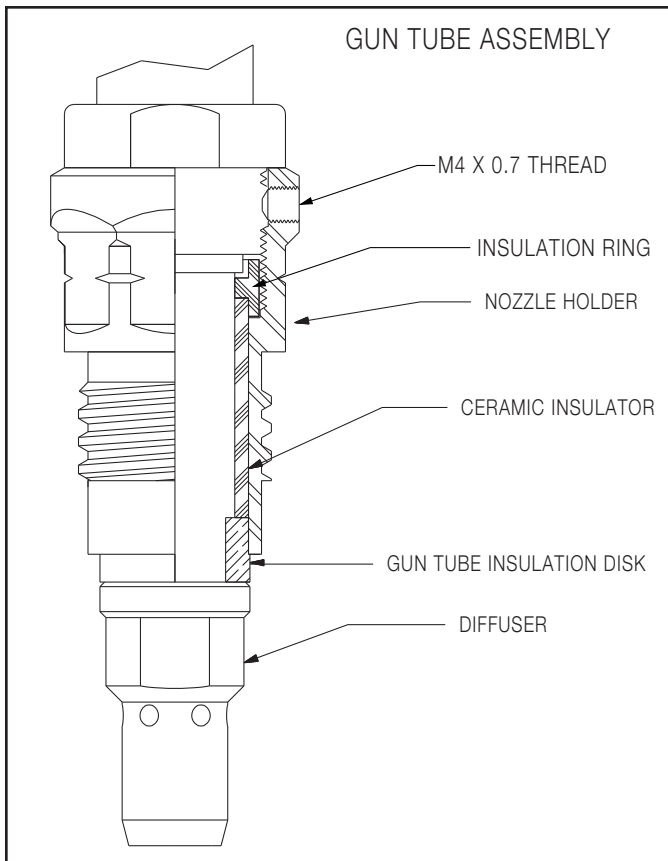


Figure E.1

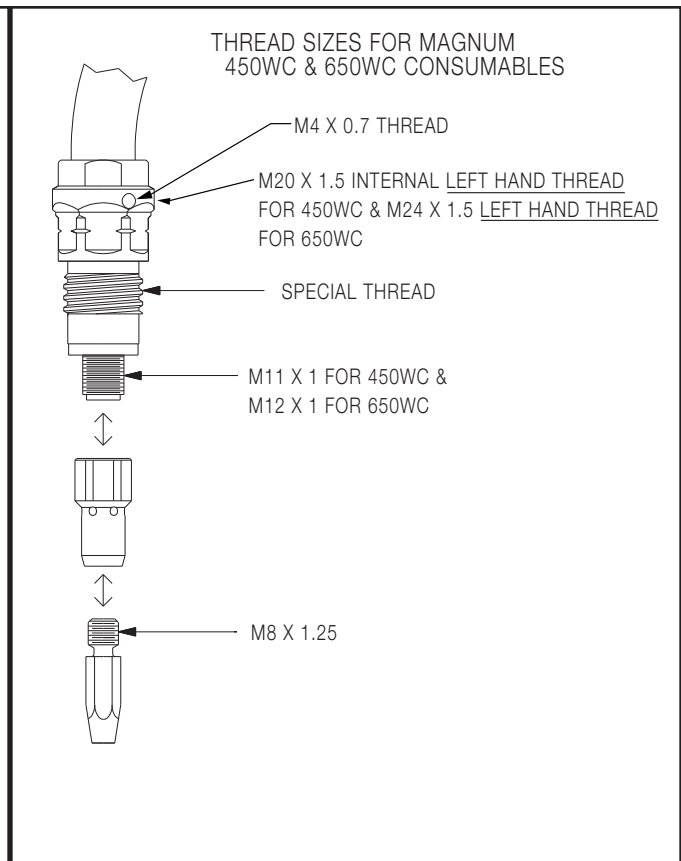





Figure E.2

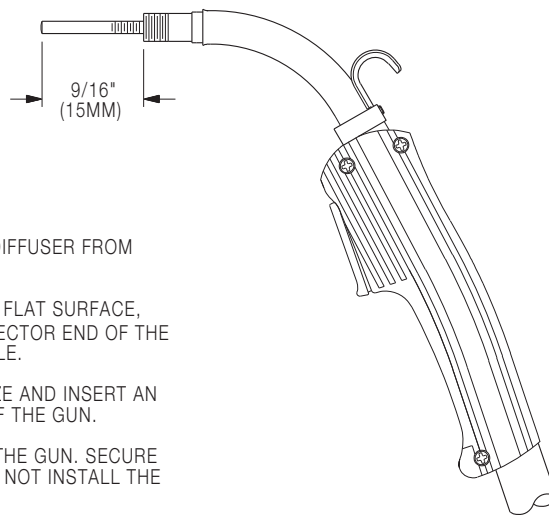
MAGNUM® 450WC & 650WC



REMOVAL, INSTALLATION AND TRIMMING INSTRUCTIONS FOR LINERS FITTING A HARD WIRE LINER FOR FEEDING SOLID AND CORED STEEL ELECTRODE

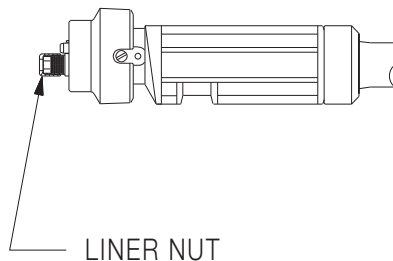
MAGNUM INSTALLATION INSTRUCTIONS FOR LINERS DESIGNED FOR FEEDING SOLID AND CORED STEEL WIRE

LINER	WIRE SIZE	STENCIL ON LINER BUSHING	COLOR	GUN
KP44-3545-15	.035-.045 (0.9-1.2mm)	KP44-3545-15 .045 (1.2MM)		450WC
KP-44-116-15	.052-1/16 (1.3-1.6mm)	KP-44-116-15 1/16 (1.6mm)		450WC
KP44-564-15	1/16-5/64 (1.6-2.0mm)	KP1933-3 5/64 (2.0mm)		450WC



1. REMOVE THE GAS NOZZLE AND THE GAS DIFFUSER FROM THE GUN TUBE.
2. LAY GUN AND CABLE OUT STRAIGHT ON A FLAT SURFACE, REMOVE THE LINER NUT FROM THE CONNECTOR END OF THE CABLE, AND PULL LINER OUT OF THE CABLE.
3. CHECK THE LINER FOR CORRECT WIRE SIZE AND INSERT AN UNTRIMMED LINER INTO THE BACK END OF THE GUN.
4. SEAT LINER BUSHING INTO THE BACK OF THE GUN. SECURE LINER BY TIGHTENING THE LINER NUT. DO NOT INSTALL THE GAS DIFFUSER AT THIS TIME.
5. LAY THE CABLE OUT STRAIGHT AND TRIM THE LINER TO THE CUT OFF DIMENSION SHOWN AND REMOVE ANY BURRS.
6. SECURE GAS DIFFUSER ONTO GUN TUBE AND REPLACE GAS NOZZLE.

THE VARIATION IN CABLE LENGTHS
MAY PREVENT USE OF THE LINER
IN OTHER GUNS.



MAGNUM® 450WC & 650WC



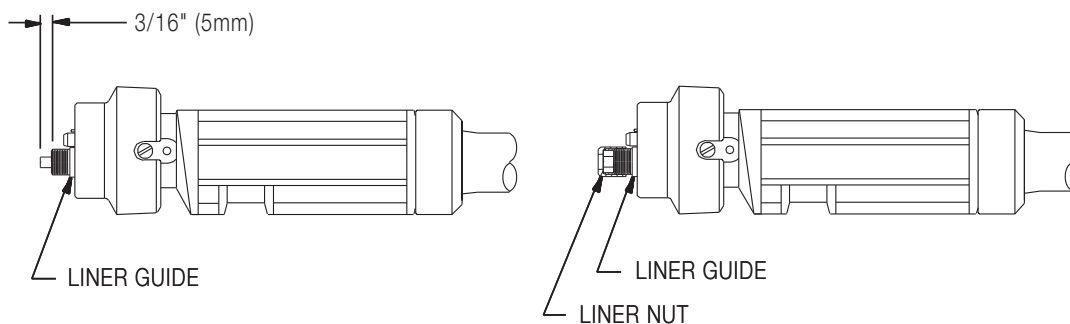
REMOVAL, INSTALLATION AND TRIMMING INSTRUCTIONS FOR LINERS FITTING A SOFT LINER FOR FEEDING ALUMINUM ELECTRODE

MAGNUM INSTALLATION INSTRUCTIONS FOR KP1958-ALL LINERS DESIGNED FOR FEEDING ALUMINUM WIRE

LINER	GUN LENGTH	WIRE SIZE	LINER COLOR
KP1958-1	10 FT. (3.0M)	.030-.035 (0.8-0.9mm)	BLACK
KP1958-2	15 FT. (4.5M)	.030-.035 (0.8-0.9mm)	BLACK
KP1958-3	10 FT. (3.0M)	1/16 (1.6mm)	RED
KP1958-4	15 FT. (4.5M)	1/16 (1.6mm)	RED
KP1958-5	10 FT. (3.0M)	.035-3/64 (.09-1.2mm)	BLUE
KP1958-6	15 FT. (4.5M)	.035-3/64 (.09-1.2mm)	BLUE

THE VARIATION IN CABLE LENGTHS
MAY PREVENT USE OF THE LINER
IN OTHER GUNS.

1. LAY GUN AND CABLE OUT STRAIGHT ON A FLAT SURFACE, REMOVE THE LINER NUT FROM THE CONNECTOR END OF THE CABLE AND PULL THE OLD LINER OUT OF THE CABLE. REMOVE THE GAS NOZZLE.
2. CHECK THE LINER FOR CORRECT WIRE SIZE AND LENGTH. INSERT THE STEEL END OF THE LINER INTO THE BACK END OF THE GUN UNTIL THE STEEL END OF THE LINER IS FULLY INSERTED INTO THE DIFFUSER. **CHECK THAT THE COILS OF THE LINER CAN BE SEEN THROUGH THE HOLES IN THE GAS DIFFUSER.**
3. MARK THE LINER 3/16" (5mm) FROM THE END OF THE LINER GUIDE. PULL THE LINER PARTIALLY OUT AND CUT OFF THE LINER AT THE MARK, USING A SHARP KNIFE.
4. SCREW THE BRASS LINER NIPPLE ONTO THE LINER AND INSERT THE NIPPLE INTO THE LINER GUIDE.
5. REPLACE THE LINER NUT AND THE GAS NOZZLE.



HOW TO USE TROUBLESHOOTING GUIDE

WARNING

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

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

Step 1. LOCATE PROBLEM (SYMPTOM).

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

Step 2. POSSIBLE CAUSE.

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

Step 3. RECOMMENDED COURSE OF ACTION

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

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

CAUTION

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

Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
FUNCTION PROBLEMS		
<p>1. Drive rolls turn, but wire will not feed or wire feeding is rough.</p>	<p>A. Gun cable kinked and/or twisted.</p> <p>B. Wire jammed in gun and cable.</p> <p>C. Incorrect drive rolls and guide tubes.</p> <p>D. Gun cable liner dirty.</p> <p>E. Worn drive rolls.</p> <p>F. Electrode rusty and/or dirty.</p> <p>G. Worn or improper size cable liner.</p> <p>H. Partially flashed, melted, or improper size contact tip.</p> <p>I. Incorrect diffuser</p>	<p>If all recommended possible areas of misadjustment have been checked and the problem persists, Contact your local Lincoln Authorized Field Service Facility.</p>
<p>2. Variable or "hunting" arc.</p>	<p>A. Contact tip worn or incorrect size.</p> <p>B. Worn or undersize ground cables or poor ground connections.</p> <p>C. Loose electrode connections.</p>	

⚠ CAUTION

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

Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
FUNCTION PROBLEMS		
<p>3. Poor arc striking with sticking or “blast-offs”, weld porosity, narrow and ropy looking bead, or electrode stubbing into plate while welding.</p>	<p>A. Improper procedures or techniques.</p> <p>B. Improper gas shielding.</p>	<p>If all recommended possible areas of misadjustment have been checked and the problem persists, Contact your local Lincoln Authorized Field Service Facility.</p>
<p>4. Tip seizes in diffuser.</p>	<p>A. Tip overheating due to prolonged or excessive high current and/or duty cycle welding.</p>	

 **CAUTION**

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

MAGNUM® 450WC & 650WC



NOTES

MAGNUM® 450WC & 650WC



			
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. ● Aislese 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"> ● Protégase 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 헝겍 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 بجلد الجسم أو بالمعالب 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で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"> ● ابعء 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"> ● اقطع 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.



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