

# GMAW Push-Pull Gun

# IM774

MK 091-0525  
September 2003  
Rev. D

## OPERATOR'S MANUAL

# CobraMAX™

Model numbers K2252-1 & K2252-2



### Safety Depends on You

Lincoln arc welding 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  
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## ⚠ 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.

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## 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. 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.c. 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.d. 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.e. Also see item 1.b.

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### WELDING 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.



### 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.

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## 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 reçoit un choc. Ne jamais enrouler le câble-électrode autour de n'importe quelle partie du corps.
3. Un coup d'arc peut être plus sévère qu'un coup de soliel, donc:
  - a. Utiliser un bon masque avec un verre filtrant approprié ainsi qu'un verre blanc afin de se protéger les yeux du rayonnement de l'arc et des projections quand on soude ou quand on regarde l'arc.
  - b. Porter des vêtements convenables afin de protéger la peau de soudeur et des aides contre le rayonnement de l'arc.
  - c. Protéger l'autre personnel travaillant à proximité au soudage à l'aide d'écrans appropriés et non-inflammables.
4. Des gouttes de laitier en fusion sont émises de l'arc de soudage. Se protéger avec des vêtements de protection libres de l'huile, tels que les gants en cuir, chemise épaisse, pantalons sans revers, et chaussures montantes.
5. Toujours porter des lunettes de sécurité dans la zone de

zones où l'on pique le laitier.

6. Eloigner les matériaux inflammables ou les prévenir tout risque d'incendie dû aux étincelles.
7. Quand on ne soude pas, poser la pince à une la masse. Un court-circuit accidentel peut entraîner 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 la masse sur la charpente de la construction, aux endroits éloignés de la zone de travail, on a de voir passer le courant de soudage par les escaliers, câbles de grue, ou autres circuits. Cela présente des risques d'incendie ou d'échauffement de câbles jusqu'à ce qu'ils se rompent.
9. Assurer une ventilation suffisante dans la zone de travail. Ceci est particulièrement important pour les zones où il y a des galvanisées plombées, ou cadmiées ou tout autre produit des fumées toxiques.
10. Ne pas souder en présence de vapeurs de solvants, d'opérations de dégraissage, nettoyage ou de chaleur ou les rayons de l'arc peuvent réagir avec le solvant pour produire du phosgène (gaz très toxique) ou autres produits irritants.
11. Pour obtenir de plus amples renseignements voir le code "Code for safety in welding and brazing" Standard W 117.2-1974.

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

1. Relier à la terre le châssis du poste conformément aux recommandations du fabricant. La mise à la terre de l'électricité et aux recommandations du fabricant de montage ou la pièce à souder doit être en bonne mise à la terre.
2. Autant que possible, l'installation et l'entretien doivent être effectués par un électricien qualifié.
3. Avant de faire des travaux à l'intérieur de la machine, couper l'interrupteur à la boîte de fusibles.
4. Garder tous les couvercles et dispositifs en place.

## INSTRUCTIONS FOR ELECTRO-MAGNETIC COMPATIBILITY

### Conformance

Products displaying the C-Tick mark are in conformity with Australian/New Zealand requirements for Electromagnetic Compatibility (EMC) according to standard (emission) AS/NZS 3652 "Electromagnetic Compatibility – Arc Welding Equipment".

Products displaying the CE mark are in conformity with European Community Council Directive 89/336/EEC requirements for EMC by implementing EN50199 "Electromagnetic Compatibility (EMC) – Product standard for arc welding equipment".

#### Products are:

- For use with other Lincoln Electric/LiquidArc equipment.
- Designed for industrial and professional use.

### Introduction

All electrical equipment generates small amounts of electromagnetic emission. Electrical emission may be transmitted through power lines or radiated through space, similar to a radio transmitter. When emissions are received by other equipment, electrical interference may result. Electrical emissions may affect many kinds of electrical equipment: other nearby welding equipment, radio and TV transmitters and receivers, numerical controlled machines, telephone systems, computers, etc. Be aware that interference may result and extra precautions may be required when a welding power source is used in a domestic establishment.

### Installation and Use

The purchaser/user is responsible for installing and using the welding equipment according to the manufacturer's instructions. If electromagnetic disturbances are detected then it shall be the responsibility of the purchaser/user of the welding equipment to resolve the situation with the technical assistance of the manufacturer. In some cases this remedial action may be as simple as earthing (grounding) the welding circuit (see note below). In other cases it could involve constructing an electromagnetic screen enclosing the power source and the work complete with associated input filters. In all cases electromagnetic disturbances must be reduced to the point where they are no longer troublesome.

**Note:** The welding circuit may or may not be earthed for safety reasons according to national codes. Changing the earthing arrangements should only be authorized by a person who is competent to assess whether the changes increase the risk of injury, eg. by allowing parallel welding current return paths which may damage the earth circuits of other equipment.

### Assessment of Area

Before installing welding equipment the purchaser/user shall make an assessment of potential problems in the surrounding area.

The following shall be taken into account:

- Other supply cables, control cables, signalling and telephone cables above, below and adjacent to the welding equipment;
- Radio and television transmitters and receivers;
- Computer and other control equipment;
- Safety critical safety equipment, eg. guarding of industrial equipment;
- The health of people around, eg. the use of pacemakers and hearing aids;
- Equipment used for calibration or measurement;
- The immunity of other equipment in the environment. The purchaser/user shall ensure that other equipment being used in the environment is compatible. This may require additional protection measures;
- The time of the day that welding or other activities are to be carried out.

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

### Methods of Reducing Emissions

#### Mains Supply

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

#### Maintenance of the Welding Equipment

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

#### Welding Cables

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

#### Equipotential Bonding

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

#### Earthing of the workpiece

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

#### Screening and Shielding

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

Portions of the preceding text are extracted from:

- Australian/New Zealand standard AS/NZS 3652. Permission to reproduce has been granted by Standards Australia and Standards New Zealand. For further explanation, readers should be referred to the standard itself.
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# Thank You

For selecting a quality product. We want you to take pride in operating this product...as much pride as we have in bringing the product to you!

## **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.

Model Name & Number \_\_\_\_\_

Code & Serial Number \_\_\_\_\_

Date of Purchase \_\_\_\_\_

Whenever you request replacements parts for, or information on this equipment always supply the information you have recorded above.

Read this Owner's 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.

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## SECTION A



## INSTALLATION

### TECHNICAL SPECIFICATIONS

#### Wire Capacity

.030" - .045" (0.6mm - 1.2mm) solid and hard wire  
.030" - 1/16" (0.8mm - 1.6mm) aluminum and cored wire

#### Wire Speed

800 IPM (20.3 mpm) Max at rated feeder input voltage (120VAC / 42VAC)

#### Duty Cycle

*All ratings are using Argon gas*

<b>150 Amps/25 Volts</b>	Air cooled - 100%
<b>200 Amps/25 Volts</b>	Air cooled - 50%
<b>225 Amps/25 Volts</b>	Water cooled - 100%

#### Shipping Weight (approximate)

##### Air Cooled

15ft. (4.5m).....	12.8 lbs. (5.81 Kg)
25ft. (7.6m).....	18.0 lbs. (8.16 Kg)
50ft. (15.2m).....	28.8 lbs. (13.06 Kg)

##### Water Cooled

15ft. (4.5m).....	13.3 lbs. (6.03 Kg)
25ft. (7.6m).....	19.4 lbs. (8.8 Kg)
50ft. (15.2m).....	34.5 lbs. (15.65 Kg)

**Torch weight (less leads)** ..... 2.21 lbs. (1.00 Kg)

### SUPPORT EQUIPMENT REQUIRED

- C.V. or C.C. power source of sufficient capacity for your needs.
- Regulated gas supply and hoses.
- Properly sized power leads from power source to wire feeder and ground.
- Water source and hose capable of providing a minimum of **1 quart (.95 liter) / min. at 45 psi** when using water cooled torches.

### COOLANT RECOMMENDATIONS

Use a name-brand additive, which does not contain reactive sulphur or chlorine and does not react with copper, brass or aluminum or create a custom mix using this formula:

- Use 3 Gallons (11.4 Liters) distilled water.
- Use 1 Gallon (3.8 Liters) ethylene glycol.
- Use 1 tsp (5 ml) liquid glycerin

The coolant rate should be 1 quart (.95 liter) / minute at 35 p.s.i.

### TORCH LEAD CONNECTIONS

#### POWER CABLE - AIR COOLED

A #2 AWG power cable is used on the CobraMAX™ air cooled torch. The torch end is threaded into the torch body. The power cable fitting connects to the power block in the Cobramatic® wire feed cabinet.

## SECTION B

### **POWER CABLE - WATER COOLED**

The CobraMAX™ water cooled torch utilizes a power/water cable with a #4 AWG cable inside a 5/8" (16MM) diameter hose.

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#### *IMPORTANT*

*Water cooled torches MUST be WATER cooled.*

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### **CONDUIT**

The CobraMAX™ torch comes standard with a poly-lined conduit, for feeding aluminum wire. The longer fitting with a shallow groove is used on the torch end. A set screw located on top of the torch handle secures the conduit in place.

### **GAS HOSE**

The gas hose is secured over the barbed gas fitting with a tie wrap. The cabinet end of the gas hose uses our standard gas fitting (1/8" - 27 nps).

### **WATER HOSE**

If so equipped, one end of the water hose is secured over the barbed water fitting with a tie wrap and the other end is connected to the center fitting on the power block.

### **ELECTRIC CABLE**

A seven conductor control cable is used on the CobraMAX™ torch. The torch end of the control cable is secured to the torch with a boot clamp and soldered to the pot assembly, trigger and water leads. Slack is left in the electric cable as it exits the back of the torch to prevent cable breakage. The cabinet end has a seven pin "W" clocked amphenol connector.

## **OPERATION**

### **GENERAL**

The CobraMAX™ torch maintains a constant, steady, uniform wire feed speed, regardless of curved or looped wire conduit. The constant push exerted by the slave motor in the cabinet, combined with the pull of the torch motor, causes the wire to literally float friction-free through the wire conduit. The 24VDC torch motor is controlled by a three and three-quarter (3 3/4) turn potentiometer in the torch handle.

### **CONTROLS AND SETTINGS**

#### **POTENTIOMETER**

The laterally-positioned potentiometer is located in the lower end of the handle, providing up to 800 ipm with 3 3/4 turns.

#### **MICRO SWITCH**

The micro switch assembly consists of the micro switch and leads.

### TRIGGER SENSITIVITY

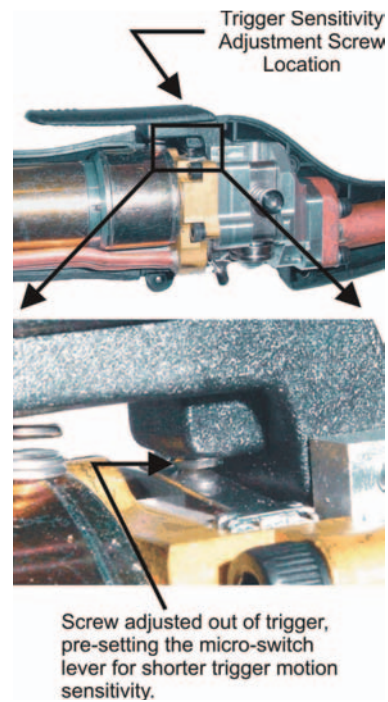
The amount of trigger level travel can be shortened for a "quicker" or "more responsive" action.

A more sensitive trigger lever is produced by reducing the gap between the trigger lever and the micro switch lever. By turning-in the trigger sensitivity adjustment screw, it closed the gap between the trigger lever and the micro switch lever.

This will enable the operator to increase the sensitivity of the trigger lever.

### SENSITIVITY ADJUSTMENT

With the wire feeder turned on (with or without welding wire loaded), turn the screw in until the micro-switch is activated. Once activated, the torch and wire feeder motors will begin feeding wire. Retract the screw accordingly until the system is deactivated and adjusted to the operators' liking.



## DRIVE ROLL AND IDLER ROLLS

### GENERAL

The CobraMAX™ torch comes standard with a knurled drive roll and a grooved idler roll, which will handle both steel and aluminum wire with diameters from .030-1/16 inch. Optional insulated V-groove drive rolls are also available for aluminum wire if desired (see optional kits).

Drive roll tension is accomplished with a unique spring-loaded pressure screw. The CobraMAX™ comes from the factory with the pressure adjustment screw preset. **NO ADJUSTMENT IS REQUIRED FOR ALL SIZES AND TYPES OF WIRES.**

### DRIVE ROLL INSTALLATION/REMOVAL

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*Note:*

*Neither of the handles needs to be removed to access the drive or idler rolls*

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1. Pull the cam lever away from the idler roll. This will relieve the pressure against the drive roll (as shown in Figure 1).
2. Align the drive roll removal tool (P/N 931-0100) over the flats of the drive roll (as shown in Figure 2). Hold the torch with one hand or on a table top, with the other hand give the removal tool a quick snap-turn in the **CLOCKWISE DIRECTION**.
3. Once the drive roll is loose, continue to spin drive roll in the clockwise direction to remove the drive roll from the torch.
4. Install a new drive roll on the left-hand threaded shaft. The drive roll will self-tighten when it is feeding wire.



Figure 1



Figure 2

### IDLER ROLL INSTALLATION AND REMOVAL

(Reference Figure 3)

1. Using a slot type screwdriver, loosen idler screw, taking care not to lose lock washer under idler roll.
2. Insert new idler roll and lock washer onto screw, insuring that idler groove is toward top and lock washer is beneath.

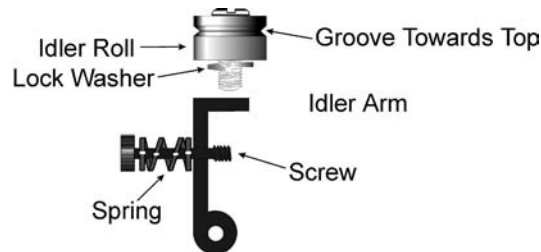


Figure 3

3. Tighten.

---

*NOTE: Lock washer must be under idler roll or it will not turn freely.*

---

## SECTION C

### ACCESSORIES

LE P/N    MK P/N

**Gas Purge/Trigger Latch Kit** ..... **K2227-1** ..... **005-0674**

This kit is required when using the CobraMAX™ on Cobramatic®, models 150-003 & 150-005 and the CobraMig® 260, model 186-002.

A gas flow control mechanism (i.e. solenoid or valve) is **required** so the CobraMAX™ can be used on Cobramatic® wire feeders. The following kits are available depending on the wire feeder used. The factory set times (in seconds) for normal and latched trigger functions is 0.25 pre-purge and 1.0 post-purge.

### OPTIONAL KITS

Insulated Drive Roll Kits are used to prevent preheating of the wire which may soften it and clog the liner. This picking up of current at the drive rolls rather than at the contact tip is usually not a problem unless using too large of a contact tip or excessively oxidized aluminum wire.

**Insulated Groove Drive Roll Kit**..... **KP1594-030** ..... **005-0640**

For **.030"** (0.8mm) dia. aluminum wire. Includes insulated drive roll P/N 511-0102 and idler roll assy. P/N 003-1870.

**Insulated Groove Drive Roll Kit**..... **KP1594-035** ..... **005-0641**

For **.035"** (0.9mm) dia. aluminum wire. Includes insulated drive roll P/N 511-0103 and idler roll assy. P/N 003-1870.

**Insulated Groove Drive Roll Kit**..... **N/A** ..... **005-0642**

For **.040"** (1.0mm) dia. aluminum wire. Includes insulated drive roll P/N 511-0104 and idler roll assy. P/N 003-1870.

**Insulated Groove Drive Roll Kit..... KP1594-3/64 ..... 005-0643**

For .045" (1.2mm) dia. aluminum wire. Includes insulated drive roll P/N 511-0105 and idler roll assy. P/N 003-1870.

**Insulated Groove Drive Roll Kit..... KP1594-1/16 ..... 005-0644**

For .062" (1.6mm) dia. aluminum wire. Includes insulated drive roll P/N 511-0106 and idler roll assy. P/N 003-1870.

**Handle Kit.....005-0700**

Includes left and right handles, screws and drive roll door.

**Trigger Kit.....005-0694**

Trigger adjustment kit includes a spring and sensitivity adjustment screw replacement for all Python®/CobraMAX™ torches.

**Micro Switch Kit.....005-0701**

Replacement micro switch assembly for all Python®/CobraMAX™ torches.

**Potentiometer Kit.....005-0695**

Replacement potentiometer assembly for all Python®/CobraMAX™ torches.

**CONDUITS**

Flat spiral steel conduit  
for steel & cored wire

Standard conduit  
with additional protective cover

**615-0208** ..... 15 ft./4.5m  
**615-0216** ..... 25 ft./7.6m  
**615-0218** ..... 50 ft./15.2m

**001-0774** ..... 15 ft./4.5m  
**001-0775** ..... 25 ft./7.6m  
**001-0777** ..... 50 ft./15.2m

**SNAKE SKINS**

Snake Skin protective covers are now standard on all torches. You may order spare replacement covers to protect the lead assy of the torch when the factory one becomes damaged or worn. It can easily be replaced in the field by means of Velcro®.

Snake Skin Cover 13ft (for 15ft leads) .....931-0110  
Snake Skin Cover 23ft (for 25ft leads) ..... 931-0122  
Snake Skin Cover 48ft (for 50ft leads) ..... 931-0123

**CONTACT TIPS**



**Contact Tip - 3/8" Diameter**

LE P/N	MK P/N	Wire Size	Tip ID	Arc	Tip Length
KP2217-1B1	621-0390	.030" (0.8mm)	.040"(1.0mm)	Spray	1-5/8"(41.3mm)
-	621-0396	.030" (0.8mm)	.040"(1.0mm)	Short	1-7/8"(47.6mm)
KP2217-2B1	621-0391	.035"(0.9mm)	.044"(1.1mm)	Spray	1-5/8"(41.3mm)
-	621-0397	.035"(0.9mm)	.044"(1.1mm)	Short	1-7/8"(47.6mm)
-	621-0392	.045"(1.2mm)	.053"(1.35mm)	Spray	1-5/8"(41.3mm)
-	621-0398	.045"(1.2mm)	.053"(1.35mm)	Short	1-7/8"(47.6mm)
KP2217-4B1	621-0393*	.045" or .052"	.060"(1.5mm)	Spray	1-5/8"(41.3mm)
-	621-0399	.045" or .052"	.060"(1.5mm)	Short	1-7/8"(47.6mm)
KP2217-5B1	621-0394	1/16"(1.6mm)	.075"(1.9mm)	Spray	1-5/8"(41.3mm)
-	621-0400	1/16"(1.6mm)	.075"(1.9mm)	Short	1-7/8"(47.6mm)
-	621-0395	1/16"(1.6mm)	.085"(2.16mm)	Spray	1-5/8"(41.3mm)

\*Standard - furnished with torch

## GAS CUPS



Gas Cups			
Cup Size	Cup I.D.	MK P/N	LE P/N
No. 6	3/8" (9.5mm)	621-0420	KP2249-1
No. 8*	1/2" (15.8mm)	621-0421	KP2250-1
No. 10	5/8" (15.8mm)	621-0422	KP2251-1

\*standard - furnished with torch

## BARREL LINERS

Torch Barrel Liners	
Part Number	Description
615-0341	Spiral Steel, .030 - .045" (0.8mm - 1.1mm)
LE KP2247-1 MK 621-0423	CobraMAX™ Tip Extender
615-0248	Spiral Steel Liner for Tip Extender
615-0177	Bulk Teflon liner material for .030 - .035"
LE KP2226-1 MK 931-0137	Teflon Liner Package, 5 pieces

## SECTION D

## MAINTENANCE

### PERIODIC MAINTENANCE

Your Cobramatic® System is designed to provide years of reliable service. Maintenance of the torch will normally consist of a general cleaning of the wire guide system, including barrel, drive rolls, and conduit at regular intervals.

Remove spatter build-up from inside of nozzles with a hardwood stick.

Maintenance Tools	
Tool	Part Number
Drive Roll Removal Tool	931-0100

The only parts on the Cobramatic® system that are subject to normal wear are the conduit, contact tips, gas cups, front body liners, wire guides, drive and idler rolls. A supply of these parts should be maintained on hand.

The number of units in operation and the importance of minimal "down time" will determine to what extent spare parts should be stocked on hand. See the "Recommended Spare Parts List" for the most commonly replaced parts.

If repairs do become necessary, qualified shop maintenance personnel can easily replace any part.

## Recommended Spare Parts List

Qty.	Part No.	Description
1	LE KP2072-30 MK 615-0007	Conduit - 15 ft
1	LE KP2072-28 MK 615-0008	Conduit - 25 ft
1	LE KP2072-29 MK 615-0068	Conduit - 50 ft
1	437-0253	Drive roll door
2	005-0694	Trigger assy kit
2	005-0695	Potentiometer assy kit
1	005-0700	Handle kit
2	005-0701	Micro switch assy kit
10	LE KP2219-1 MK 511-0101	Drive roll
5	LE KP2220-1 MK 005-0686	Idler roll kit



**Drive Roll Removal Tool  
931-0100**



**Idler Roll Kit  
LE P/N KP2220-1  
MK P/N 005-0686**



**Knurled Drive Roll  
LE P/N KP2219-1  
MK P/N 511-0101**



**MICRO SWITCH ASSY  
005-0701**



## SECTION E TROUBLESHOOTING

<b>Trouble</b>	<b>Cause</b>	<b>Remedy</b>
No wire feed at torch, feeder not operating, i.e. no slave motor or brake solenoid.	115/42 VAC Control fuse in feeder/Control box blown.	Replace fuse.
	Micro-switch defective/not being activated.	Replace switch. Check switch for operation.
	Broken electrical cable.	Check micro-switch wires for continuity.
No wire feed at torch, feeder operating properly	24 VAC Control fuse in feeder/Control box blown.	Check motor leads for shorts; then replace fuse.
	Bad Potentiometer.	Check potentiometer with meter
	Broken Electrical Cable.	Check motor and potentiometer wires for continuity.
	Bad Speed control/PCB.	See specific cabinet/control box owners manual for speed control operation.
Wire feeds, but welding wire is not energized.	Loose or no cable connections.	Check all power connections.
	Contactors control cable loose or in wrong position.	Check power supply owners manual for location and type of contactor signal required.
	Welding power source.	Check power source.
Wire feeds erratically.	Dirty or worn conduit.	Blow out or replace conduit.
	Wrong size contact tip.	See Contact tip table.
	Idler roll stuck.	Check for lock washer under idler roll, or replace if damaged.
Wire feeds one speed only.	Bad potentiometer.	Check with meter.
	Broken electrical cable.	Check potentiometer wires for continuity or short.
	Bad speed control.	See specific cabinet/control owners manual for speed control operation.
Wire walks out of drive rolls.	Idler roll upside-down.	Place groove in idler roll toward top.
	Rear wire guide missing.	Replace wire guide

## TROUBLESHOOTING GUIDE

Regardless of which torch or feeder used, all MK Products' push-pull guns operate on the same principle. The slave motor in the feeder runs at a fast, constant speed, but has very low torque. It is always trying to feed more wire than the torch motor wants, and when the motor gets all it wants, it slows the slave motor, preventing a bird's nest. Because of the low torque produced by the slave motor, a brake system is used to prevent wire overrun rather than tension. The drag adjustment in the feeder is used simply to keep the wire slightly taut, so it will not pull off the spool while feeding wire.

The high torque 24VDC torch motor is controlled by a solid state speed control located in the feeder, and a pot located in the torch. The torch motor, potentiometer, and micro switch are connected to the cabinet/control box via a control cable and amphenol connector. If this cable becomes damaged, a variety of symptoms can occur, depending on which wire(s) break. To test, check each wire for continuity and shorts.

Remember, the micro switch in the torch activates both the slave motor and torch motor circuits in the cabinet. Therefore, if the slave motor and brake solenoid operate, but the torch does not, look more toward the torch motor's 24V circuits, speed control, control cable, or the torch motor. If nothing operates, look more toward the slave motor's input, micro switch leads, or micro switch.

## TESTING THE TORCH

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*Reference the "W" clocked torch wiring diagram on the CobraMAX™ electrical diagram (in appendix) for information about pin-outs and locations.*

---

### MOTOR CHECK

Remove the torch connector from the cabinet.

Using the torch amphenol connector, check the resistance across pins "A" and "B" (motor leads). The resistance across the motor should be between **5 - 10 ohms** as the potentiometer is turned.

If an open circuit or short exist, check the motor leads and motor independently.

### TESTING THE POTENTIOMETER - "W" CLOCKED

Using the torch amphenol connector, check the resistance across pin "D" (wiper) and pin "C". The resistance should vary from **0 - 5K ohms** as the potentiometer is turned.

Check the resistance across pin "D" (wiper) and pin "G". The resistance should vary from **5K - 0 ohms** as the potentiometer is turned.

### TESTING THE MICRO SWITCH

Using the torch amphenol connector, check for continuity across pins "E" and "F" when the trigger is pressed.

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**SECTION F**

**APPENDICES**

**DIAGRAMS / PARTS LIST**

001-1420 CobraMAX™ Exploded View ..... 12

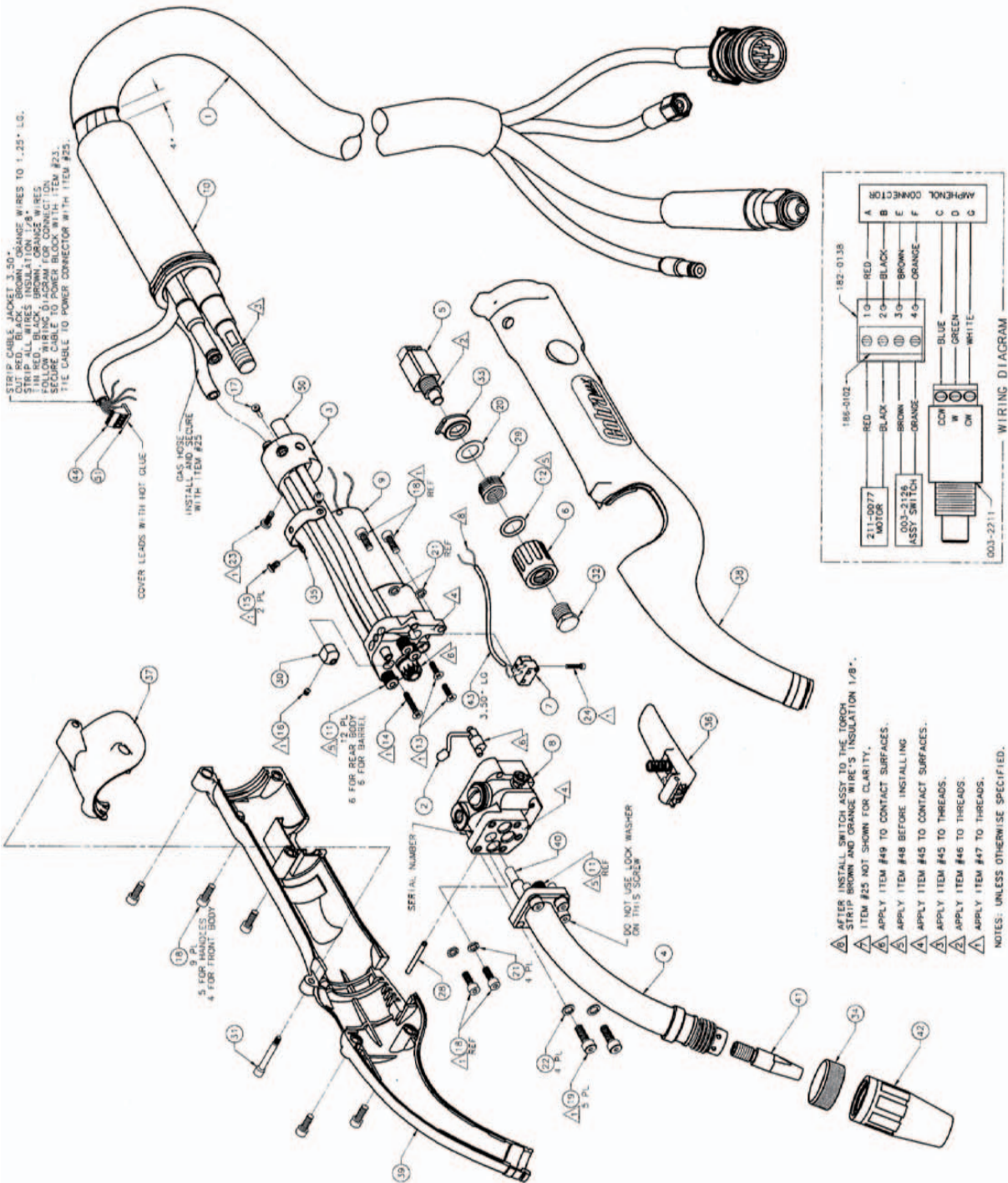
003-2141 Front Body Assembly ..... 14

Ultra-Flex Air Cooled Lead Assembly ..... 15

Water Cooled Lead Assembly ..... 16

Wiring Diagram ..... 17

# 001-1420A COBRAMAX™ EXPLODED VIEW



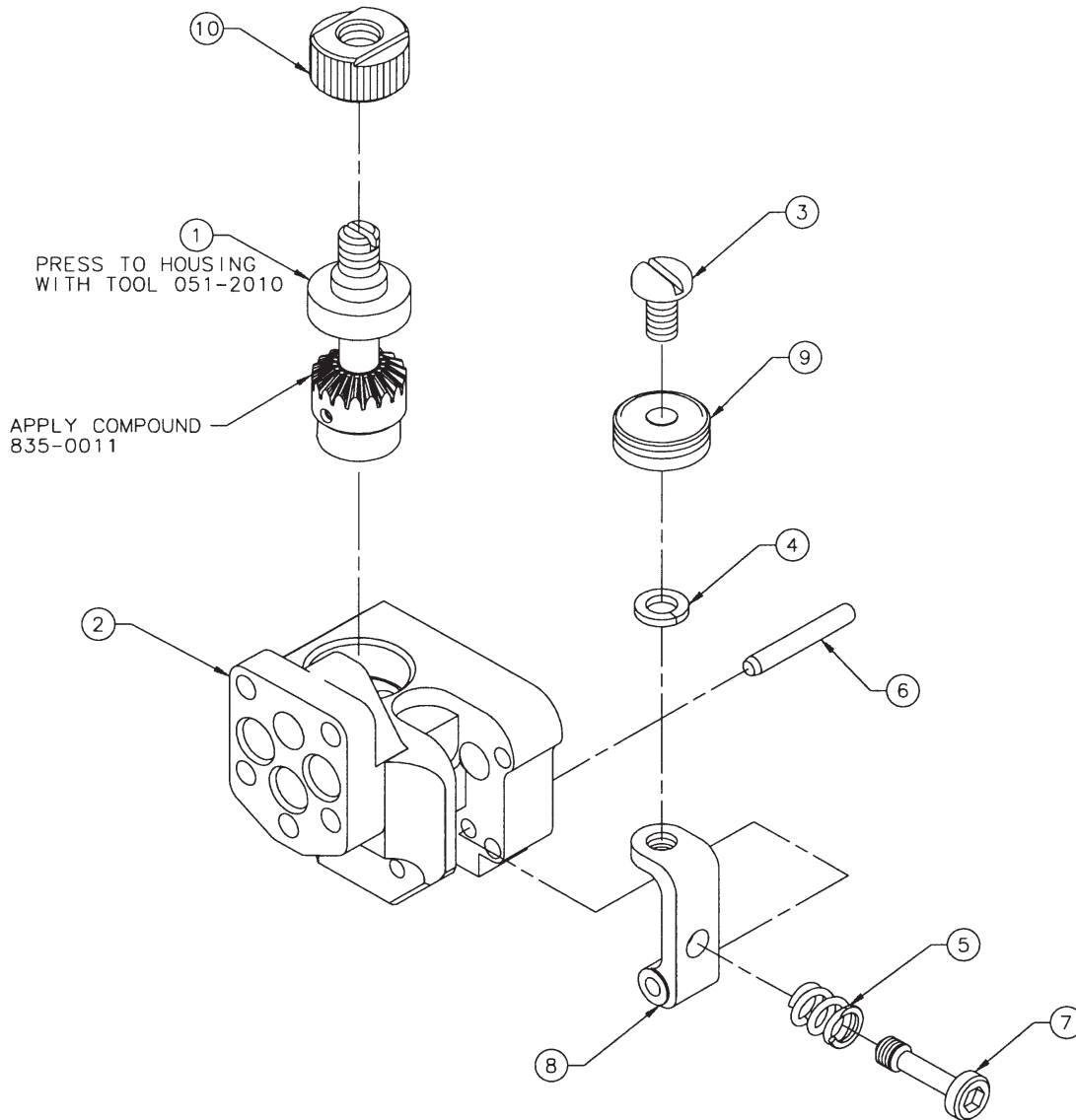
- ⚠ AFTER INSTALL SWITCH ASSY TO THE TORCH STRIP BROWN AND ORANGE WIRE'S INSULATION 1/8".
  - ⚠ ITEM #25 NOT SHOWN FOR CLARITY.
  - ⚠ APPLY ITEM #49 TO CONTACT SURFACES.
  - ⚠ APPLY ITEM #48 BEFORE INSTALLING.
  - ⚠ APPLY ITEM #45 TO CONTACT SURFACES.
  - ⚠ APPLY ITEM #45 TO THREADS.
  - ⚠ APPLY ITEM #46 TO THREADS.
  - ⚠ APPLY ITEM #47 TO THREADS.
- NOTES: UNLESS OTHERWISE SPECIFIED.

### CobraMAX™ Parts List

No.	Qty.	Part No.	Description	No.	Qty.	Part No.	Description
1	1	Ref. 227 Series	Ultra Flex Air Cooled Assembly	26	-	--	--
1	1	Ref. 228 Series	Ultra Flex Water Cooled Assembly	27	-	--	--
2	1	002-0629	Assy Cam Idler Arm	28	1	421-0018	Dowel Pin 3/32 x 7/8 SST
3	1	002-0631	Brazed Rear Body	29	1	431-1549	Nut Drag Pot
4	1	002-0635	Assy Brazed Barrel CobraMAX	30	1	431-1591	Wire Guide
5	1	005-0695	Pot Assy Kit*	31	1	431-1622	Shoulder Screw 1/8 x 4-40
6	1	003-2125	Pot Knob Assy	32	1	431-1637	Hex Screw 3/8-20 x 3/8
7	1	005-0701	Micro Swx Assy Kit	33	1	431-3263	Locator Pot
8	1	003-2141	Assy CobraMAX Front Body	34	1	431-4054	Front Nut Cobra Torch
9	1	211-0077	Pitman Motor	35	1	435-1585	Strap Motor Python
10	1	003-2153	Torch Boot	36	1	005-0694	Trigger Assy
11	12	303-0096	O-Ring 2-007 Buna N	37	1	437-0253	Door Molded Python
12	1	303-0540	O-Ring 2-013 Buna N	38	1	005-0700	Handle Kit: includes line items 18, 31, 34 and 37
13	2	319-0254	Screw FH Phil 82 4-40 x 3/8 SST	39			
14	1	319-0258	Screw FH Phil 82 4-40 x 5/8 SST	40	1	615-0339	Liner Teflon CobraMAX
15	2	320-0084	Screw Button 4-40 x 3/16 ST	41	1	621-0393	Tip HD Spray .060
16	1	321-0424	Set Screw 4-40 x .12 SST	42	1	621-0421	Assy Gas Cup #8 CobraMAX
17	1	321-1104	Set Screw Mod	43	0.30ft	737-0048	Tube Insulation 9AWG Clear
18	9	328-0012	Scr Shc 6-32 x 3/8	44	1	186-0102	Terminal block 2.5 mm, 4 pos
19	5	328-0025	Scr Shc 8-32 x 1/2 St.	45	A/R	823-0029	Naolox Compound
20	1	331-0311	Washer Flat 0.39 ID x 0.63 OD	46	A/R	823-0043	Thread Locking Cmpd Med Str
21	4	333-0005	Wshr Spr Lk #6	47	A/R	823-0050	Thread Locking Cmpd Low Str
22	4	333-0006	Wshr Spr Lk #8	48	A/R	835-0006	Silicon Lubricant
23	1	336-0020	Scr Ph Phil 4-40 x 5/16 SST	49	A/R	835-0011	Compound Grease
24	2	338-0153	Scr Shc 1-72 x 3/8	50	1	751-0020	Cap Plug
25	5	411-0045	Tie Wrap	51	1	182-0138	PCB Connector

\* Includes line items 12, 20, 29, and 33 assembled.

# 003-2141 FRONT BODY ASSEMBLY

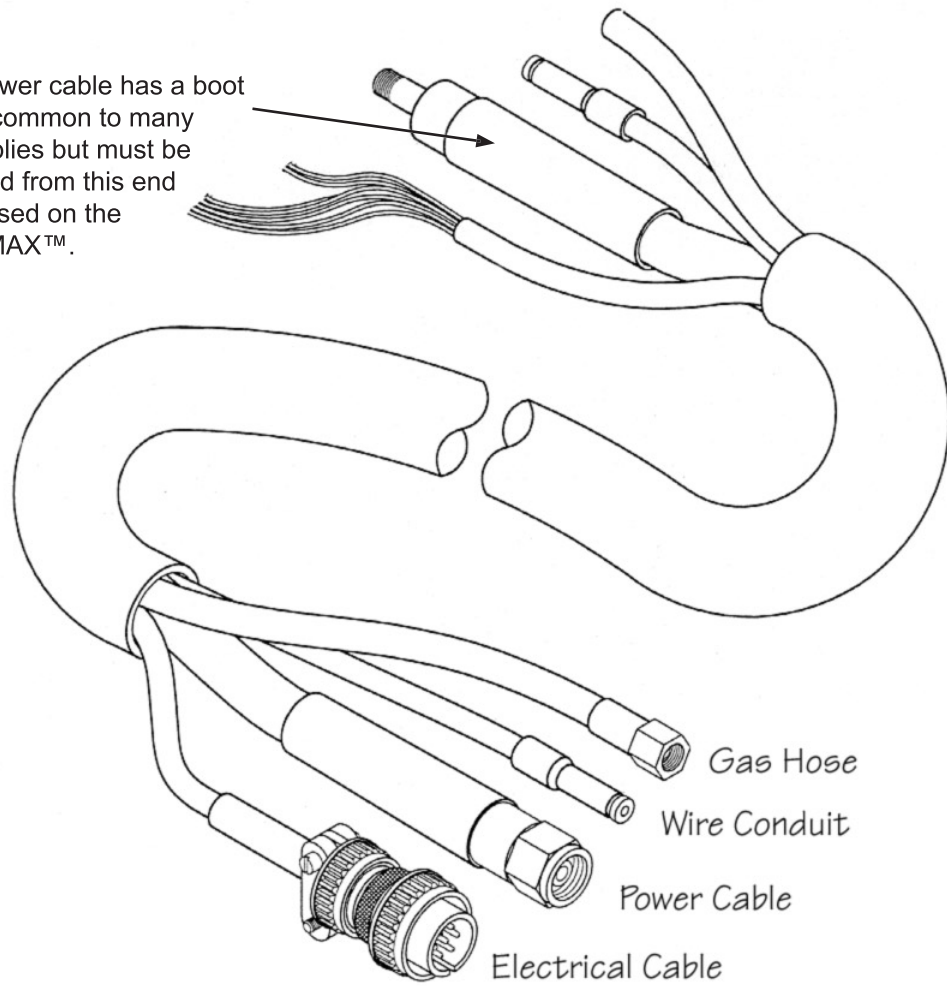


NOTE: Items #3, 4, and 9 can be ordered together in Kit LE P/N KP2220-1, MK P/N 005-0686.

Front Body Assembly 003-2141			
No.	Qty.	Part No.	Description
1	1	003-2083	Assy Output Shaft Python
2	1	003-2140	Assy CobraMAX Body
3	1	325-0206	SCR Ph 10-24-3/8
4	1	333-0082	Washer Lock 10
5	1	419-0092	Spring Comp 0.31 OD x 0.20 ID
6	1	421-0525	Pin Dowel 1/8 x 7/8 Sst
7	1	431-1663	Scr Adjust Idler
8	1	431-1598	Arm Idler
9	1	LE KP2220-1 MK 005-0686	Assy Idler Wire Feed
10	1	LE KP2219-1 MK 511-0101	Drive Roll
11	A/R	835-0011	Compound Grease

# ULTRA-FLEX AIR COOLED LEAD ASSEMBLY\*

This power cable has a boot that is common to many assemblies but must be removed from this end when used on the CobraMAX™.



\*Leads shown for reference only

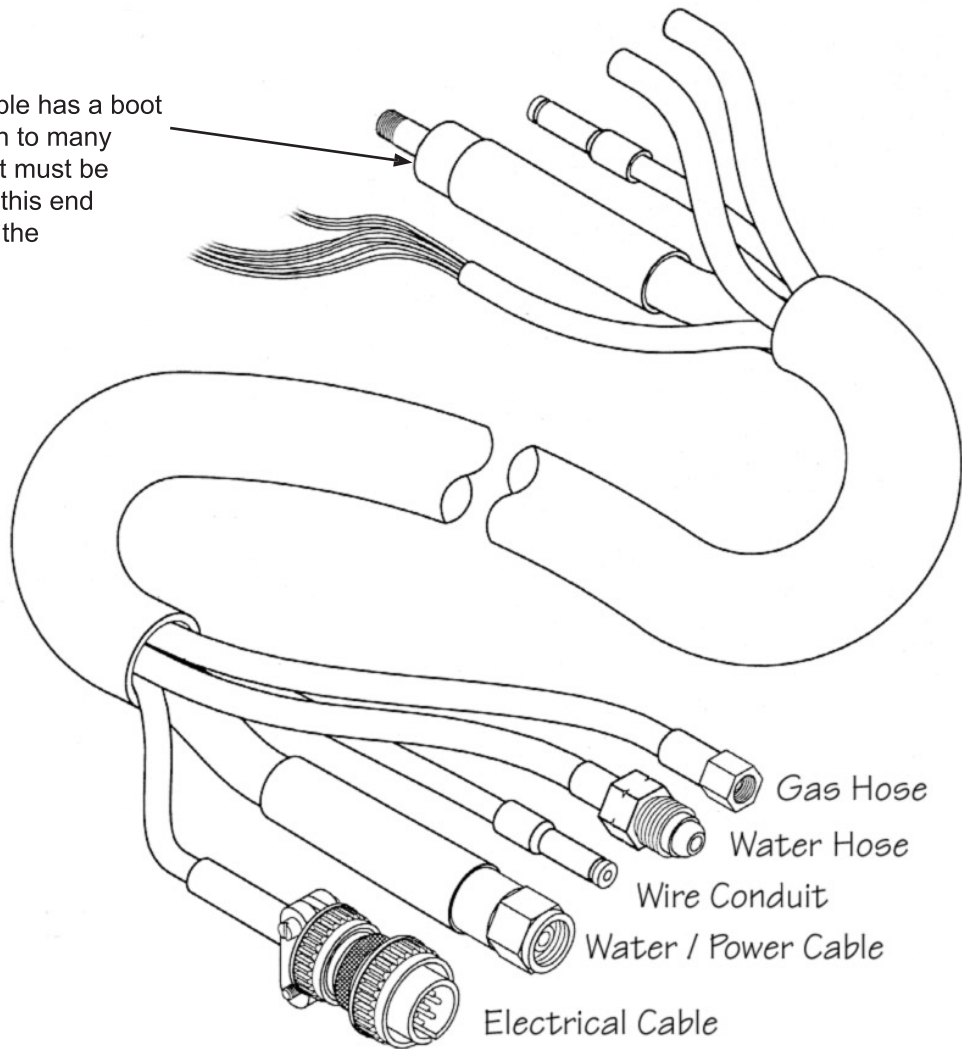
## 227 Series Ultra-Flex Cable Assemblies

Length	Conduit	Power Cable	Electrical Cable	Gas Hose	Snake Skin®
15"/4/5m	615-0007	001-2527	005-0690	001-0537	931-0110
25"/7.6m	615-0008	001-2528	005-0691	001-0538	931-0122
50'/15.2	615-0068	001-1042	005-0692	001-0665	931-0123



## WATER COOLED LEAD ASSEMBLY\*

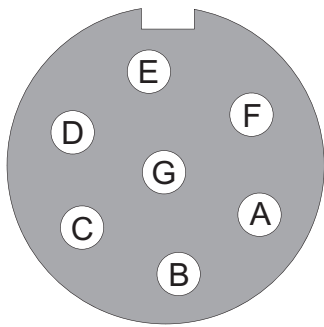
This power cable has a boot that is common to many assemblies but must be removed from this end when used on the CobraMAX™.



\*Leads shown for reference only

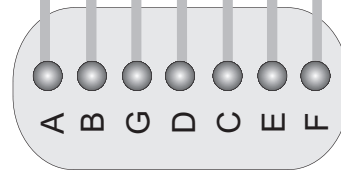
### 228 Series Ultra-Flex Cable Assemblies

Length	Conduit	#4 Power/Water Cable	Electrical Cable	Gas Hose	Water Hose	Snake Skin®
15'/4.5m	615-0007	001-2521	005-0690	001-0537	001-0529	931-0110
25'/7.6m	615-0008	001-2524	005-0691	001-0538	001-0530	931-0122
50'/15.2m	615-0068	843-0338	005-0692	001-0665	001-0667	931-0123



"W" Clocked  
Amphenol Connector  
Viewed from front of connector

Cabinet End  
Amphenol Connector

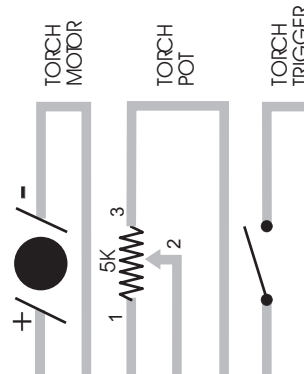


Red  
Black  
White  
Green  
Blue  
Brown  
Yellow

Torch Lead

Red  
Black  
White  
Green  
Blue  
Brown  
Yellow

Torch Functions



TORCH MOTOR

TORCH POT

TORCH TRIGGER

# MK WARRANTY REPAIR STATIONS

for MK Products as of 9/24/03  
for most up-to-date list, please visit [www.mkproducts.com](http://www.mkproducts.com)

## **ALABAMA**

AIRGAS - SOUTH, INC.

Birmingham, AL

205/251-6835

DIXIE WELDING SUPPLY

Attalla, AL

256/538-6157

INDUSTRIAL WELDING SERVICES

Quinton, AL

205/674-3258

KIBRO, INC.

Theodore, AL

251/653-4672

WELDING ENGINEERING SUPPLY CO.

Prichard, AL

334/457-8681

WELDING MACHINE HOSPITAL

Montgomery, AL

334/832-9353

## **ALASKA**

FAIRBANKS AERO SERVICES

Fairbanks, AK

907/479-6666

RNR, INC. dba

Rubey Engine & Electric

Anchorage, AK

907/336-5152

## **ARIZONA**

ALLSTATE ELECTRIC MOTOR CO.

Phoenix, AZ

602/233-0500

PRAXAIR DISTRIBUTION, INC.

Phoenix, AZ

602/269-2151

VERN LEWIS WLDG. SUPPLY

Phoenix, AZ

602/252-0341

## **ARKANSAS**

APPLIED SERVICES, INC.

Benton, AR

501/860-6464

ARKANSAS WELDING IND'L SUPPLY

Hot Springs, AR

501/321-9922

EL DORADO WELDING & INDUSTRIAL  
SUPPLY

El Dorado, AR

870/863-4088

WELSCO

Little Rock, AR

501/372-2252

## **CALIFORNIA**

ADVANCED WELDER REPAIR

Commerce, CA

323/263-7383

AIRGAS - WEST, INC.

Gardena, CA

310/523-9355

ALL PHASE WELDER REPAIR & CONSULTING

Sacramento, CA

916/331-0595

ARC PRODUCTS

San Diego, CA

619/628-1022

ARCO WELDER REPAIR

Santa Fe Springs, CA

562/921-5240

ARK WELDER REPAIR

Fresno, CA

559/292-4714

CAL-WELD SUPPLY

Fresno, CA

209/445-0131

DELTA-TECH

Sun Valley, CA

818/767-4234

EMCO-EAST WELD'R REPAIR

Concord, CA

925/798-4411

FRESNO OXYGEN

Fresno, CA

559/233-6684

INDUSTRIAL ELECTRICAL CO

Modesto, CA

209/527-2800

INDUSTRIAL WELDER REPAIR

LaPuente, CA

626/961-7643

NESCO WELDING SUPPLY

Fontana, CA

909/427-9670

PRAXAIR DISTRIBUTION

(ARC RENTS)

Signal Hill, CA

562/989-3212

# MK WARRANTY REPAIR STATIONS

for MK Products as of 9/24/03  
for most up-to-date list, please visit [www.mkproducts.com](http://www.mkproducts.com)

PRAXAIR DISTRIBUTION, INC.  
Bakersfield, CA  
661/321-9922

R. J. KATES  
San Diego, CA  
619/565-6960

RED-D-ARC, INC.  
Carson, CA  
310/233-3327

SIMS-ORANGE WELDING SUPPLY  
Santa Ana, CA  
714/549-9393

SOUTHWEST WELDER REPAIR  
Fontana, CA  
909/357-1661

SWEINHART ELECTRIC CO., INC.  
Long Beach, CA  
714/521-9100

VERNON ELECTRIC  
Covina, CA  
626-858-4750

## **COLORADO**

AIRGAS - INTERMOUNTAIN, INC.  
Colorado Springs, CO  
719/473-1947

WELDERS & EQUIP. SVC. & TESTING  
Littleton, CO  
303/932-8755

WESTERN SLOPE WELDER REPAIR  
Grand Junction, CO  
970/243-9616

## **CONNETICUT**

ABCO WELDING & INDUSTRIAL SUPPLY CO.  
Waterford, CT  
800/962-0285

TECH AIR  
Milford, CT  
203/783-1834

## **DELAWARE**

KEEN COMPRESSED GAS  
New Castle, DE  
302/594-4555

## **FLORIDA**

A & I SPECIALTIES  
Lehigh Acres, FL  
941/368-7435

AAA GENERATOR & PUMP  
Ft. Myers, FL  
941/332-1136

ACTION WELDING SUPPLY  
Jacksonville, FL  
904/786-2254

AMVEL CORPORATION  
Miami, FL  
305/592-5678

ELECTRICAL WELDERS SERVICE  
Orlando, FL  
407/999-5214

HAUN SYSTEMS REPAIR, INC.  
Winter Park, FL  
407/681-6064

HOLOX  
Ocala, FL  
352/351-4417

J.K. CIRCUIT TECHNOLOGY  
Boynton Beach, FL  
561/733-7859

ROPER ELECTRIC MOTOR SERVICE  
Panama City, FL  
850/769-6643

SMITTY'S WELDER SERVICE  
West Palm Beach, FL  
561/845-1224

TRI-GAS  
Miami, FL  
305/592-3180

TRI-STATE SALES & LEASING  
Lake City, FL  
904/397-3340

TRI-TECH  
Sarasota, FL  
941/758-3825

ELECTRICAL MOTORS CENTER, INC.  
Hialeah, FL  
305/825-3327

V.A. ELECTRICAL MOTORS CENTER, INC.  
Hialeah, FL  
305/825-3327

WELD DIRECT CORPORATION  
Jacksonville, FL  
904/387-5664

# MK WARRANTY REPAIR STATIONS

for MK Products as of 9/24/03  
for most up-to-date list, please visit [www.mkproducts.com](http://www.mkproducts.com)

## **GEORGIA**

B&W INDUSTRIAL SERVICES  
Augusta, GA  
706/738-8722

Mc CULLOUGH ELEC. MOTOR SVC.  
Atlanta, GA  
404/688-5251

## **HAWAII**

DC ELECTRIC, INC.  
Aiea, HI  
808/483-8900

## **IDAHO**

NORCO  
Boise, ID  
208/336-1643

ROSSITER ELECTRIC  
Idaho Falls, ID  
208/529-3665

## **ILLINOIS**

CMS ELECTROMECHANICAL SERVICES, INC.  
Galesburg, IL  
309/342-4125 – 888/964-3526

FRED ARMS ELECTRIC MOTOR REPAIR  
Stone Park, IL  
708/343-6262

INDUSTRIAL WELDER REBUILDERS  
Alsip, IL  
708/371-5688

RELIABLE EQUIPMENT REPAIR  
Hamel, IL  
618/633-5000

ROCKFORD INDUSTRIAL WELDING SUPPLY  
Rockford, IL  
815/226-1900

## **INDIANA**

AGA GAS, INC.  
Hammond, IN  
219/989-9030

AIRGAS - MID AMERICA, INC.  
Evansville, IN  
800/424-8905

B & H ELECTRIC  
Seymour, IN  
812/522-5607

COX EQUIPMENT COMPANY  
Indianapolis, IN  
317/241-8881

EVANSVILLE ARMATURE, INC.  
Evansville, IN  
812/428-9034

HARRISON ELECTRIC, INC.  
Michigan City, IN  
219/879-0444

MODERN SUPPLY CO., INC.  
Evansville, IN  
812/425-9353

PRAXAIR DISTRIBUTION, INC.  
Speedway, IN  
317/481-4550

SUTTON-GARTEN COMPANY  
Indianapolis, IN  
317/264-3236

## **IOWA**

AIRGAS NORTH CENTRAL  
Des Moines, IA  
515/266-1111

CEDAR RAPIDS WELDING SUPPLY  
Cedar Rapids, IA  
319/365-1466

ELECTRICAL ENGRG. & EQUIPMENT  
Des Moines, IA  
515/266-8890

SUPERIOR WELDING SUPPLY  
Waterloo, IA  
319/236-9660

WRIGHT WELDING SUPPLY  
Ft. Dodge, IA  
515/576-0640

## **KANSAS**

AEROFORM CORPORATION  
Coffeyville, KS  
620/251-1430

KANOX  
Hutchinson, KS  
316/665-5551

## **KENTUCKY**

GENERAL WELDING PRODUCTS  
Louisville, KY  
502/635-5218

RED-D-ARC  
Lexington, KY  
800/245-3660

WELDING EQUIPMENT  
Louisville, KY  
502/636-0545

# MK WARRANTY REPAIR STATIONS

for MK Products as of 9/24/03  
for most up-to-date list, please visit [www.mkproducts.com](http://www.mkproducts.com)

## **LOUISIANA**

GT SVCS OF MORGAN CITY  
Morgan City, LA  
985/385-4135

RED BALL OXYGEN CO.  
Shreveport, LA  
318/425-3211

WELDERS EQUIPMENT CO.  
Broussard, LA  
337/837-5701

WELDERS SUPPLY & EQUIP.  
Port Allen, LA  
225/346-4712

## **MARYLAND**

CCM MECH/ELEC REPAIR SERVICE  
Owings, MD  
301/855-7508

## **MASSACHUSETTS**

AIMTEK WELDING SUPPLY  
Auburn, MA  
508/832-5035

## **MICHIGAN**

ANN ARBOR WELDING SUPPLY CO.  
Ypsilanti, MI  
734/572-0444

APEX WELDING GASES & SUPPLY  
Muskegon Heights, MI  
616/722-3185

AUTOMATIC WELD  
Midland, MI  
517/496-9245

GREAT LAKES EQUIPMENT  
Clare, MI  
517/386-4630

HAMILTON ELECTRIC CO.  
Saginaw, MI  
517/799-6291

PLYMOUTH WAYNE, INC.  
Wixom, MI  
248/735-7700

SAGINAW WELDING SUPPLY CO.  
Saginaw, MI  
517/793-9696

SIMPKINS ELECTRICAL SVC.  
Michigan Center, MI  
517/764-7766

SOUTHPARK WELDING  
Marysville, MI  
810/364-6521

WELDING METALS, INC.  
Madison Heights, MI  
248/585-0480

WESAR COMPANY  
Three Rivers, MI  
616/483-9125

WILSON WELDING & MEDICAL GASES  
Warren, MI  
586/751-7400

## **MINNESOTA**

AIRGAS – NORTH CENTRAL  
Albert Lea, MN  
507/373-2411

CAPITOL CITY WELDING SUPPLY  
St. Paul, MN  
651/224-4843

CENTRAL McGOWAN  
St. Cloud, MN  
320/252-5292

MINNEAPOLIS OXYGEN CO.  
Minneapolis, MN  
612/588-8855

OXYGEN SERVICE CO.  
St. Paul, MN  
612/644-7273

## **MISSOURI**

CEE-KAY SUPPLY, INC.  
St. Louis, MO  
324/644-3500

P.G. WALKER  
Springfield, MO  
417/862-1745

ROD'S SERVICE, INC.  
St. Louis, MO  
314/721-6000

## **MISSISSIPPI**

KOMP IND'L & WELD'G SUPPLY  
Hattiesburg, MS  
601/649-5889

MID-SOUTH WELDING SUPPLY  
Meridian, MS 39301  
601-483-9331

NORDAN SMITH WELDING SUPPLY  
Hattiesburg, MS  
601/545-1800

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3D SUPPLIES, INC.  
Jackson, MS  
601/353-3330

## **MONTANA**

VALLEY WELDERS SUPPLY  
Billings, MT  
406/256-3330

## **NEVADA**

SIERRA WELDING SUPPLY CO.  
Sparks, NV  
775/359-0542

## **NEW HAMPSHIRE**

WELDING SYSTEMS SVC.  
Raymond, NH  
603/895-4700

## **NEW JERSEY**

INDUSTRIAL ELECTRIC SERVICE CO.  
Hawthorne, NJ  
973/423-1212

## **NEW YORK**

DELO WELDING SUPPLY  
Syracuse, NY  
315/478-2188

DYNAMIC WELD'G & REPAIR  
Bayshore, NY  
631/643-1308

HAUN WELDING SUPPLY  
Syracuse, NY  
315/463-5241

JACKSON WELDING SUPPLY  
Rochester, NY  
585/235-2920

## **NORTH CAROLINA**

ADAMS WELDER REPAIR & ELECTRICAL  
SERVICE, INC.  
Nashville, NC  
252/459-1960

HOLOX LTD.  
Colfax, NC  
336/996-1974

M & L WELDER REPAIR  
Asheville, NC  
828/250-9353

MACHINE & WELDING SUPPLY CO.  
Dunn, NC  
910/892-4016

MACHINE AND WELDING SUPPLY CO.  
Greenville, NC  
252/752-3089

MACHINE AND WELDING SUPPLY CO.  
Raleigh, NC  
919/772-9500

MACHINE AND WELDING SUPPLY CO.  
Winston-Salem, NC  
336/723-9651

NATIONAL WELDERS SUPPLY CO.  
High Point, NC  
910/882-1110

NATIONAL WELDERS SUPPLY CO.  
Charlotte, NC  
704/392-7317

## **OHIO**

AGA GASES, INC.  
Lima, OH  
419/228-2828

ALBRIGHT WELDING SUPPLY  
Wooster, OH  
330/264-2021

ALL ABOUT SERVICE  
Wickliffe, OH  
440/516-0303

ARC EQUIPMENT COMPANY  
Struthers, OH  
333/750-9353

ARC SERVICES, INC.  
Toledo, OH  
419/478-6204

BELAIR PRODUCTS, INC.  
Akron, OH  
330/253-3116

BIG RIVER ELECTRIC  
Gallipolis, OH  
740/446-4360

CnD MACHINE, INC.  
Canton, OH  
330/478-8811

ELECTRIC WELDER REPAIR  
Cuyahoga Heights, OH  
216/271-5600

MAINTENANCE UNLTD. & TOOL REPAIR  
Cincinnati, OH  
513/554-1313

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O.E. MEYER CO.  
Sandusky, OH  
419/621-4201

OHIO AIR PRODUCTS  
Canton, OH  
330/821-2771

RICK'S WELDER REPAIR SERVICE  
Eastlake, OH  
440/269-1204

S.D. NOLD, INC.  
Lisbon, OH  
330/424-3134

VALLEY NATIONAL GASES  
Cincinnati, OH  
513/241-5840

VALLEY NATIONAL GASES  
Lima, OH  
419/228-1008

VALLEY NATIONAL GASES  
Hilliard, OH  
614/771-1311

VALLEY NATIONAL GASES  
Toledo, OH  
419/241-9114

VOLLMER ELECTRIC CO.  
Columbus, OH  
614/476-8800

WEILER WELDING CO., INC.  
Dayton, OH  
937/222-8312

WELDINGHOUSE, INC.  
Cleveland, OH  
216/524-1955

**OKLAHOMA**  
AIRGAS MID-SOUTH  
Tulsa, OK  
918/582-0885

BILL'S WELDER REPAIR  
Oklahoma City, OK  
405/232-4799

MUNN SUPPLY  
Enid, OK  
580/234-4120

OKLAHOMA WELDERS SUPPLY  
Madill, OK  
580/795-5561

## **OREGON**

ARC SYSTEMS SERVICES  
Central Point, OR  
541/665-2676

E C COMPANY  
dba ELECTRICAL CONSTRUCTION COMPANY  
Portland, OR  
800/452-1511

INDUSTRIAL SOURCE  
Eugene, OR  
541/344-1438

WELDER SERVICE & REPAIR  
Redmond, OR  
541/548-8711

## **PENNSYLVANIA**

ALLWELD EQUIPMENT REPAIR  
Pittsburgh, PA  
412/821-8460

BY DESIGN  
Columbia, PA  
717/681-9494

GEOVIC WELDING SUPPLY  
Milton, PA  
717/742-9377

J.A. CUNNINGHAM EQUIPMENT, INC.  
Philadelphia, PA  
215/426-6650

JOSEPH PINTO, JR. EQUIPMENT CO.  
E. Lansdowne, PA  
610/259-4100

POWER SOURCE REPAIR CO., INC.  
Collingdale, PA  
610/532-6460

VALLEY NATIONAL GASES  
Pittsburgh, PA  
412/281-1835

## **SOUTH CAROLINA**

CAROLINA WELDER SVC.  
Lake City, SC  
843/687-0413

## **TENNESSEE**

ARC-ONE WELDER REPAIR, INC.  
East Ridge, TN 37412  
423-894-9353

INDUSTRIAL MACHINE REPAIRS  
Rogersville, TN  
423/272-8199



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NEXAIR  
Memphis, TN  
901/523-6821

NATIONAL RENTAL & REPAIR  
Knoxville, TN  
423/584-6390

QUALITY WELDING EQUIPMENT  
Nashville, TN  
615/726-5282

TRAMCO  
Bristol, TN  
423/968-4499

## **TEXAS**

AIRGAS-SOUTHWEST, INC.  
Austin, TX  
512/835-0202

AIRGAS-SOUTHWEST, INC.  
Houston, TX  
713/462-8027

DENISON OXYGEN  
Denison, TX  
903/465-3369

FT. WORTH WELDERS SUPPLY, INC.  
Ft. Worth, TX  
817/332-8696

GPC SERVICES, INC.  
San Angelo, TX  
915/655-4545

LEKTROTECH, INC.  
Greenville, TX  
903/454-7146

RITE-WELD SUPPLY, INC  
Fort Worth, TX  
817/626-8237

TexAir WELDING SUPPLY  
Longview, TX  
903/238-9353

WELDING MACHINE & TORCH REPAIR  
San Antonio, TX  
210/680-8390

## **UTAH**

ARC SERVICES, LLC  
West Valley City, UT  
801/975-1121

C.W. SILVER INDUSTRIAL SERVICE  
Salt Lake City, UT  
801/531-8888

## **VERMONT**

W.J. WELDING EQUIPMENT REPAIR, INC.  
N. Clarendon, VT  
802/775-7422

## **VIRGINIA**

AIR PRODUCTS & CHEMICALS, INC.  
Bristol, VA  
540/669-3161

ARC WELDERS, INC.  
Ashland, VA  
804/798-1818

ARCET EQUIPMENT CO.  
Hampton, VA  
757/728-9353

N.W. MARTIN CO.  
Springfield, VA  
703/644-0120

NORFOLK WELDERS SUPPLY  
Norfolk, VA  
804/622-6571

## **WASHINGTON**

AIRGAS - NORPAC, INC.  
Tacoma, WA  
253/473-2282

AIRGAS – NORPAC, INC.  
Vancouver, WA  
360/574-5311

A-L WELDING PRODUCTS  
Tukwila, WA  
425/228-2218

AMERICAN EQUIPMENT SERVICES  
Kent, WA  
253/395-9947

HARRIS ELECTRIC, INC.  
Seattle, WA  
206/782-6668

OXARC, INC.  
Spokane, WA  
509/535-7794

PACIFIC WELDING SUPPLIES  
Tacoma, WA  
253/572-5302

PRECISION WELDER & ENGINE REPAIR  
Seattle, WA  
206/382-6227

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## **WEST VIRGINIA**

CARDINAL SALES & SERVICE, INC.  
Clarksburg, WV  
304/622-7590

WILLARD C. STARCHER  
Spencer, WV  
304/927-2520

## **WISCONSIN**

INTERSTATE WELDING SALES CORP.  
Appleton, WI  
920/734-7173

MOSINEE MACHINE & ELECTRIC  
Mosinee, WI  
715/693-0858

PRAXAIR DISTRIBUTION, INC.  
Brookfield, WI  
414/938-6365

VALLEY NATIONAL GASES  
Milwaukee, WI  
414/281-9540

WELDER REPAIR & SERVICE  
Fredonia, WI  
262/692-3068

## **CANADA**

A&A WELDER SERVICES LTD.  
Saskatoon, Saskatchewan  
306/934-1601

ARC & GENERATOR REPAIR  
Garson, Ontario  
705/525-2141

B. HARRIS WELDING SVCS.  
Dartmouth, Nova Scotia  
902/468-6255

BARRY HAMEL EQUIPMENT LTD.  
Coquitlam, B.C.  
604/945-9313

BEAUCE TECHNOLOGIES, INC.  
St. Prosper, Quebec G0M 1Y0  
418-594-8852

D-TECH WELD SERVICES  
Regina, Saskatchewan  
306/586-9353

ELECTRO-MÉCANIK, INC.  
Sainte-Foy, Quebec  
418/683-1724

GPR INDUSTRIES 1994 LTD.  
Grande Prairie, Alberta  
780/532-5900

HYPERDYNAMICS TECHNOLOGIES LTD.  
Pickering, Ontario  
905/683-9938

INDUSTRIAL ELECTRONIC SERVICES  
Calgary, Alberta  
403/279-3432

LADEL LTD.  
Quebec  
819/376-6577

LeBLANC ELECTRO-TECH, INC.  
Boucherville, Quebec  
450/449-5244

Lincoln Electric Company of Canada (ASG)  
Mississauga, Ontario  
905-565-5600

M.R.T. REPAIR CENTER, INC.  
Montreal, Quebec  
514/648-0800

OZARK ELECTRICAL MARINE LTD.  
St. Johns, Newfoundland  
709/726-4554

PEEL ENGINES  
Mississauga, Ontario  
905/670-1535

PROMOTECH ÉLECTRIQUE, INC.  
Fleurimont, Quebec  
819/822-2111

WELDERS SUPPLY  
Winnipeg, Manitoba  
204/772-9476

WELDERTECH  
Calgary, Alberta  
403/279-3432

WELDTEC  
B.C.  
604/545-3886

## **CHINA**

PHT Group Company  
Beijing, China

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

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

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

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

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

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

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

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

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

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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# 3 YEAR LIMITED WARRANTY

**Effective February 1, 2003**

This warranty supersedes all previous MK Products warranties and is exclusive, with no other guarantees or warranties expressed or implied.

**LIMITED WARRANTY** - MK Products, Inc., Irvine, California warrants that all new and unused equipment furnished by MK Products is free from defects in workmanship and material as of the time and place of delivery by MK Products. No warranty is made by MK Products with respect to trade accessories or other items manufactured by others. Such trade accessories and other items are sold subject to the warranties of their respective manufacturers, if any.

MK Products' warranty does not apply to components having normal useful life of less than one (1) year, such as relay points, wire conduit, tungsten, and welding torch parts that come in contact with the welding wire, including gas cups, gas cup insulators, and contact tips where failure does not result from defect in workmanship or material.

**MK Products' shall, exclusively remedy the limited warranty or any duties with respect to the quality of goods, based upon the following options:**

- (1) repair
- (2) replacement
- (3) where authorized in writing by MK Products, the reasonable cost of repair or replacement at our Irvine, California plant; or
- (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer's risk and expense. Upon receipt of notice of apparent defect or failure, MK Products shall instruct the claimant on the warranty claim procedures to be followed.

As a matter of general policy only, MK Products may honor an original user's warranty claims on warranted equipment in the event of failure resulting from a defect within the following periods from the date of delivery of equipment to the original user:

- 1. Torches, Weldheads & Water Recirculators ..... 1 year**
- 2. All Other Equipment ..... 3 years**
- 3. Repairs ..... 90 days**

Classification of any item into the foregoing categories shall be at the sole discretion of MK Products. Notification of any failure must be made in writing within 30 days of such failure.

A copy of the invoice showing the date of sale must accompany products returned for warranty repair or replacement.

All equipment returned to MK Products for service must be properly packaged to guard against damage from shipping. MK Products will not be responsible for any damages resulting from shipping.

Normal surface transportation charges (both ways) for products returned for warranty repair or replacement will be borne by MK Products, except for products sold to foreign markets.

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USE OF OTHER THAN *GENUINE* MK PRODUCTS' CONSUMABLES, PARTS, AND ACCESSORIES MAY INVALIDATE YOUR PRODUCT WARRANTY.



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DATE :February 1, 2003



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