



Product Description	RoboKing®
MK Part Number	091-0389
MK Form Number	OM-RK
NWSA Form Number	550
Effective with Serial Number	41500
Voltage Rating	24VDC
Printing/Revision Date	November 2002 E
This manual applies to the following torch model numbers	218-XXX

RoboKing®



SAFETY CONSIDERATIONS

ELECTRIC ARC WELDING EQUIPMENT

CAUTION : READ BEFORE ATTEMPTING INSTALLATION, OPERATION OR MAINTENANCE OF THIS EQUIPMENT

1-1 INTRODUCTION

This equipment is intended for ultimate application by commercial/industrial users and for operation by persons trained and experienced in the use and maintenance of welding equipment. Operation should not be undertaken without adequate training in the use of such equipment. Training is available from many public and private schools or similar facilities.

Safe practices in the installation, operation and maintenance of this equipment requires proper training in the art, a careful study of the information provided with the equipment, and the use of common sense. Rules for safe use are generally provided by suppliers of welding power sources, compressed gas suppliers, and electrode suppliers. Careful compliance with these rules will promote safe use of this equipment.

The following Safety Rules cover some of the more generally found situations. READ THEM CAREFULLY. In case of any doubt, obtain qualified help before proceeding.

1-2 GENERAL PRECAUTIONS

A. Burn Prevention

ELECTRIC ARC WELDING PRODUCES HIGH INTENSITY HEAT AND ULTRAVIOLET RADIANT ENERGY WHICH MAY CAUSE SERIOUS AND PERMANENT EYE DAMAGE AND WHICH MAY DAMAGE ANY EXPOSED SKIN AREAS.

Wear helmet with safety goggles or glasses with side shields underneath, appropriate filter lenses or plates (protected by clear cover glass). This is a must for welding or cutting (and chipping) to protect the eyes from radiant energy and flying metal. Replace cover glass when broken, pitted, or spattered.

Medical first aid and eye treatment. First aid facilities and a qualified first aid person should be available for each shift unless medical facilities are close by for immediate treatment of flash burns of the eyes and skin burns.

Wear protective clothing - leather (or asbestos) gauntlet gloves, hat, and high safety-toe shoes. Button shirt collar and pocket flaps, and wear cuffless trousers to avoid entry of sparks and slag.

Avoid oily or greasy clothing. A spark may ignite them.

Flammable hair preparations should not be used by persons intending to weld or cut.

Hot metal such as electrode stubs and work pieces should never be handled without gloves.

Ear plugs should be worn when working on overhead or in a confined space. A hard hat should be worn when others work overhead.

B. Toxic Fume Prevention

WARNING: The use of this product may result in exposure to chemicals known to the State of California to cause cancer and birth defects or

other reproductive harm.

Adequate ventilation. Severe discomfort, illness or death can result from fumes, vapors, heat, or oxygen enrichment or depletion that welding (or cutting) may produce. Prevent them with adequate ventilation. NEVER ventilate with oxygen.

Lead-, cadmium-, zinc-, mercury-, beryllium-bearing and similar materials, when welded or cut, may produce harmful concentrations of toxic fumes. Adequate local exhaust ventilation must be used, or each person in the area, as well as the operator, must wear an air-supplied respirator. For beryllium, both must be used.

Metals coated with or containing materials that emit toxic fumes should not be heated unless coating is removed from the work surface, the area is well ventilated, or the operator wears an air-supplied respirator.

Work in a confined space only while it is being ventilated and, if necessary, while wearing an air-supplied respirator.

Gas leaks in a confined space should be avoided. Leaked gas in large quantities can change oxygen concentration dangerously. Do not bring gas cylinders into a confined space.

Leaving confined space, shut OFF gas supply at source to prevent possible accumulation of gases in the space if downstream valves have been accidentally opened or left open. Check to be sure that the space is safe before reentering it.

Vapors from chlorinated solvents can be decomposed by the heat of the arc (or flame) to form PHOSGENE, a highly toxic gas, and other lung and eye irritating products. The ultraviolet (radiant) energy of the arc can also decompose trichloroethylene and perchloroethylene vapors to form phosgene. DO NOT WELD or cut where solvent vapors can be drawn into the welding or cutting atmosphere or where the radiant energy can penetrate to atmospheres containing even minute amounts of trichloroethylene or perchloroethylene.

C. Fire and Explosion Prevention

Causes of fire and explosion are: combustibles reached by the arc, flame, flying sparks, hot slag, or heated material, misuse of compressed gases and cylinders, and short circuits.

BE AWARE THAT flying sparks or falling slag can pass through cracks, along pipes, through windows or doors, and through wall or floor openings, out of sight of the goggled operator. Sparks can fly many feet.

To prevent fires and explosion:

Keep equipment clean and operable, free of oil, grease, and (in electrical parts) of metallic particles that can cause short circuits.

If combustibles are in area, do NOT weld or cut. Move the work if practicable, to an area free of combustibles. Avoid paint spray rooms, dip tanks, storage areas, ventilators. If the work cannot be moved, move combustibles at least 35 feet away,

out of reach of sparks and heat; or protect against ignition with suitable and snug-fitting, fire-resistant covers or shields.

Walls touching combustibles on opposite sides should not be welded on (or cut). Walls, ceilings, and floor near work should be protected by heat-resistant covers or shields.

Fire watcher must be standing by with suitable fire extinguishing equipment during and for some time after welding or cutting if:

1. Appreciable combustibles (including building construction) are within 35 feet.
2. Appreciable combustibles are further than 35 feet, but can be ignited by sparks.
3. Openings (concealed or visible) in floors or walls within 35 feet may expose combustibles to sparks.
4. Combustibles adjacent to walls, ceilings, roofs, or metal partitions can be ignited by radiant or conducted heat.

Hot work permit should be obtained before operation to ensure supervisor's approval that adequate precautions have been taken.

After work is done, check that area is free of sparks, glowing embers, and flames.

An empty container that held combustibles, or that can produce flammable or toxic vapors when heated, must never be welded on or cut, unless container has first been cleaned in accordance with industry standards.

This includes: a thorough steam or caustic cleaning (or a solvent of water washing, depending on the combustible's solubility), followed by purging and inerting with nitrogen or carbon dioxide, and using protective equipment.

Water-filling just below working level may substitute for inerting.

A container with unknown contents should be cleaned (see paragraph above). Do NOT depend on sense of smell or sight to determine if it is safe to weld or cut.

Hollow castings or containers must be vented before welding or cutting. They can explode.

Explosive atmospheres. NEVER weld or cut where the air may contain flammable dust, gas, or liquid vapors (such as gasoline).

D. Compressed Gas Equipment

The safe handling of compressed gas equipment is detailed in numerous industry publications. The following general rules cover many of the most common situations.

1. Pressure Regulators

Regulator relief valve is designed to protect only the regulator from overpressure; it is not intended to protect any downstream equipment. Provide such protection with one or more relief devices.

Never connect a regulator to a cylinder containing gas other than that for which the regulator

was designed.

Remove faulty regulator from service immediately for repair (first close cylinder valve). The following symptoms indicate a faulty regulator:

Leaks - if gas leaks externally.

Excessive Creep - if delivery pressure continues to rise with downstream valve closed.

Faulty Gauge - if gauge pointer does not move off stop pin when pressurized, nor returns to stop pin after pressure release.

Repair. Do NOT attempt repair. Send faulty regulators for repair to manufacturer's designated repair center, where special techniques and tools are used by trained personnel.

2. Cylinders

Cylinders must be handled carefully to prevent leaks and damage to their walls, valves, or safety devices:

Avoid electrical circuit contact with cylinders including third rails, electrical wires, or welding circuits. They can produce short circuit arcs that may lead to a serious accident. (See 1-3C)

ICC or DOT marking must be on each cylinder. It is an assurance of safety when the cylinder is properly handled.

Identifying gas content. Use only cylinders with name of gas marked on them; do not rely on color to identify gas content. Notify supplier if unmarked. NEVER DEFACE or alter name, number, or other markings on a cylinder. It is illegal and hazardous.

Empties: Keep valves closed, replace caps securely; mark MT; keep them separate from FULLS, and return promptly.

Prohibited use. Never use a cylinder or its contents for other than its intended use, NEVER as a support or roller.

Locate or secure cylinders so they cannot be knocked over.

Passageways and work areas. Keep cylinders clear of areas where they may be stuck.

Transporting cylinders. With a crane, use a secure support such as a platform or cradle. Do NOT lift cylinders off the ground by their valves or caps, or by chains, slings, or magnets.

Do NOT expose cylinders to excessive heat, sparks, slag, and flame, etc. that may cause rupture. Do not allow contents to exceed 55 degrees C (130 degrees F.) Cool with water spray where such exposure exists.

Protect cylinders, particularly valves from bumps, falls, falling objects, and weather. Replace caps securely when moving cylinders.

Stuck valve. Do NOT use a hammer or wrench to open a cylinder valve that cannot be opened by hand. Notify your supplier.

Mixing gases. NEVER try to mix any gases in a cylinder.

NEVER refill any cylinder.

Cylinder fittings should never be modified or exchanged.

3. Hose

Prohibited use. Never use hose other than that designed for the specified gas. A general hose identification rule is: red for fuel gas, green for oxygen, and black for inert gases.

Use ferrules or clamps designed for the hose (not ordinary wire or other substitute) as a binding to connect hoses to fittings.

No copper tubing splices. Use only standard brass fittings to splice hose.

Avoid long runs to prevent kinks and abuse. Suspend hose off ground to keep it from being run over, stepped on, or otherwise damaged.

Coil excess hose to prevent kinks and tangles.

Protect hose from damage by sharp edges, and by sparks, slag, and open flame.

Examine hose regularly for leaks, wear, and loose connections. Immerse pressured hose in water; bubbles indicate leaks

Repair leaky or worn hose by cutting area out and splicing. Do NOT use tape.

4. Proper Connections

Clean cylinder valve outlet of impurities that may clog orifices and damage seats before connecting regulator. Except for hydrogen, crack valve momentarily, pointing outlet away from people and sources of ignition. Wipe with a clean, lintless cloth.

Match regulator to cylinder. Before connecting, check that the regulator label and cylinder marking agree, and that the regulator inlet and cylinder outlet match. NEVER Connect a regulator designed for a particular gas or gases to a cylinder containing any other gas.

Tighten connections. When assembling threaded connections, clean and smooth seats where necessary. Tighten. If connection leaks, disassemble, clean, and retighten, using properly fitting wrench.

Adapters. Use a CGA adapter (available from your supplier) between cylinder and regulator, if one is required. Use two wrenches to tighten adapter marked RIGHT and LEFT HAND threads.

Regulator outlet (or hose) connections may be identified by right hand threads for oxygen and left hand threads (with grooved hex on nut or shank) for fuel gas.

5. Pressurizing Steps:

Drain regulator of residual gas through suitable vent before opening cylinder (or manifold valve) by turning adjusting screw in (clockwise). Draining prevents excessive compression heat at high pressure seat by allowing seat to open on pressurization. Leave adjusting screw engaged slightly on single-stage regulators.

Stand to side of regulator while opening cylinder valve.

Open cylinder valve slowly so that regulator pressure increases slowly. When gauge is pressurized (gauge reaches regulator maximum) leave cylinder valve in following position: for oxygen and inert gases, open fully to seal stem against possible leak; for fuel gas, open to less than one turn to permit quick emergency shut-off.

Use pressure charts (available from your supplier) for safe and efficient recommended pressure settings on regulators.

Check for leaks on first pressurization and regularly thereafter. Brush with soap solution. Bubbles indicate leaks. Clean off soapy water after test; dried soap is combustible.

E. User Responsibilities

Follow all Safety Rules.

Remove leaky or defective equipment from service immediately for repair. Read and follow user manual instructions.

F. Leaving Equipment Unattended

Close gas supply at source and drain gas.

G. Rope Staging-Support

Rope staging-support should not be used for welding or cutting operation; rope may burn.

1-3 ARC WELDING

Comply with precautions in 1-1, 1-2, and this section. Arc Welding, properly done, is a safe process, but a careless operator invites trouble. The equipment carries high currents at significant voltages. The arc is very bright and hot. Sparks fly, fumes rise, ultraviolet and infrared energy radiates, weldments are hot, and compressed gases may be used. The wise operator avoids unnecessary risks and protects himself and others from accidents.

A. Burn Protection

Comply with precautions in 1-2.

The welding arc is intense and visibly bright. Its radiation can damage eyes, penetrate lightweight clothing, reflect from light-colored surfaces, and burn the skin and eyes. Skin burns resemble acute sunburn; those from gas-shielded arcs are more severe and painful. DON'T GET BURNED; COMPLY WITH PRECAUTIONS.

1. Protective Clothing

Wear long-sleeve clothing in addition to gloves, hat, and shoes. As necessary, use additional protective clothing such as leather jacket or sleeves, flameproof apron, and fire-resistant leggings. Avoid outer garments of untreated cotton.

Bare skin protection. Wear dark, substantial clothing. Button collar to protect chest and neck, and button pockets to prevent entry of sparks.

2. Eye and Head Protection

Protect eyes from exposure to arc. Eyes may be damaged by radiant energy when exposed to the electric arc, even when not looking in the direction of the arc. Never look at an electric arc without protection.

Welding helmet or shield containing a filter plate shade no. 12 or denser must be used when welding. Place over face before striking arc.

Protect filter plate with a clear cover plate.

Cracked or broken helmet or shield should NOT be worn; radiation can be passed through to cause burns.

Cracked, broken, or loose filter plates must be replaced IMMEDIATELY. Replace clear cover plate when broken, pitted, or spattered.

Flash goggles with side shields MUST be worn under the helmet to give some protection to the eyes should the helmet not be lowered over the face before an arc is struck. Looking at an arc momentarily with unprotected eyes (particularly a high intensity gas-shielded arc) can cause a retinal burn that may leave a permanent dark area in the field of vision.

3. Protection of Nearby Personnel

Enclose the welding area. For production welding, a separate room or enclosed bay is best. In open areas, surround the operation with low-

reflective, noncombustible screens or panels. Allow for free air circulation, particularly at floor level.

Viewing the weld. Provide face shields for all persons who will be looking directly at the weld.

Others working in area. See that all persons are wearing flash goggles.

Before starting to weld, make sure that screen flaps or bay doors are closed.

B. Toxic Fume Prevention

Comply with precautions in 1-2B.

Generator engine exhaust must be vented to the outside air. Carbon monoxide can kill.

C. Fire and Explosion Prevention

Comply with precautions in 1-2C.

Equipment's rated capacity. Do not overload arc welding equipment. It may overheat cables and cause a fire.

Loose cable connections may overheat or flash and cause a fire.

Never strike an arc on a cylinder or other pressure vessel. It creates a brittle area that can cause a violent rupture or lead to such a rupture later under rough handling.

D. Compressed Gas Equipment

Comply with precautions in 1-2D.

E. Shock Prevention

Exposed electrically hot conductors or other bare metal in the welding circuit, or in ungrounded, electrically-HOT

equipment can fatally shock a person whose body becomes a conductor. DO NOT STAND, SIT, LIE, LEAN ON, OR TOUCH a wet surface when welding without suitable protection.

To protect against shock:

Keep body and clothing dry. Never work in damp area without adequate insulation against electrical shock. Stay on a dry duckboard, or rubber mat when dampness or sweat cannot be avoided. Sweat, sea water, or moisture between body and an electrically HOT part - or grounded metal - reduces the body surface electrical resistance, enabling dangerous and possibly lethal currents to flow through the body.

1. Grounding the Equipment

When installing, connect the frames of each unit such as welding power source, control, work table, and water circulator to the building ground. Conductors must be adequate to carry ground currents safely. Equipment made electrically HOT by stray currents may shock, possibly fatally. Do NOT GROUND to electrical conduit, or to a pipe carrying ANY gas or a flammable liquid such as oil or fuel.

Three-phase connection. Check phase requirement of equipment before installing. If only three-phase power is available, connect single-phase equipment to only two wires of the three-phase line. Do NOT connect the equipment ground lead to the third (live) wire, or the equipment will become electrically HOT - a dangerous condition that can shock, possibly fatally.

Before welding, check ground for continuity. Be sure conductors are touching bare metal of equipment frames at connections.

If a line cord with a ground lead is provided with the equipment for connection to a switch box,

connect the ground lead to the grounded switch box. If a three-prong plug is added for connection to a grounded mating receptacle, the ground lead must be connected to the ground prong only. If the line cord comes with a three-prong plug, connect to a grounded mating receptacle. Never remove the ground prong from a plug, or use a plug with a broken ground prong.

2. Connectors

Fully insulated lock-type connectors should be used to join welding cable lengths.

3. Cables

Frequently inspect cables for wear, cracks, and damage. IMMEDIATELY REPLACE those with excessively worn or damaged insulation to avoid possibly lethal shock from bared cable. Cables with damaged areas may be taped to give resistance equivalent to original cable.

Keep cable dry, free of oil and grease, and protected from hot metal and sparks.

4. Terminals and Other Exposed Parts

Terminals and other exposed parts of electrical units should have insulating covers secured before operation.

5. Electrode Wire

Electrode wire becomes electrically HOT when the power switch of gas metal-arc welding equipment is ON and welding gun trigger is pressed. Keep hands and body clear of wire and other HOT parts.

6. Safety Devices

Safety devices such as interlocks and circuit breakers should not be disconnected or shunted out.

Before installation, inspection, or service of equipment, shut OFF all power, and remove line fuses (or lock or red-tag switches) to prevent accidental turning ON of power. Disconnect all cables from welding power source, and pull all 115 volts line-cord plugs.

Do not open power circuit or change polarity while welding. If, in an emergency, it must be disconnected, guard against shock burns or flash from switch arcing.

Leaving equipment unattended. Always shut OFF, and disconnect all power to equipment.

Power disconnect switch must be available near the welding power source.

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.

Table of Contents

SAFETY CONSIDERATIONS	I-IV
------------------------------------	-------------

INSTALLATION	SECTION A
---------------------------	------------------

TECHNICAL SPECIFICATIONS	1
SUPPORT EQUIPMENT REQUIRED	1
COOLANT RECOMMENDATIONS	1
TORCH LEAD CONNECTIONS	1

OPERATION	SECTION B
------------------------	------------------

GENERAL	2
MOTOR GEAR BOX	2
DRIVE AND IDLER ROLLS	2

ACCESSORIES	SECTION C
--------------------------	------------------

DRIVE ROLL KITS	4
OPTIONAL ACCESSORIES	4
CONTACT TIPS	5
GAS CUPS	5
TORCH LINERS	5

MAINTENANCE	SECTION D
--------------------------	------------------

RECOMMENDED SPARE PARTS LIST	6
------------------------------------	---

TROUBLESHOOTING	SECTION E
------------------------------	------------------

TESTING THE TORCH	7
TROUBLESHOOTING GUIDE	7

APPENDICES	SECTION F
-------------------------	------------------

MK REPAIR STATIONS

SAFETY WARNINGS

LIMITED WARRANTY

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SECTION A



INSTALLATION

TECHNICAL SPECIFICATIONS

Wire Capacity

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

Wire Speed

800 IPM (20mpm) Max. at rated feeder Input Voltage (120VAC / 42VAC)

Duty Cycle

Water Cooled (model 218 series) - 400 amps @ 100%
500 amp rating when used with #2 optional Power Cable

All ratings are at 25 volts max. using Argon Gas

Shipping Weight

15' (4.5m)	15 lbs. (6.8 Kg)
25' (7.6m)	19 lbs. (8.6 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 qt(liter) / min. at 45 p.s.i.** when using water cooled torches.

COOLANT RECOMMENDATION

Use a name-brand additive which does not contain reactive sulphur or chlorine and does not react with copper, brass, or aluminum. Here's also mixture that works well :

Use 3 Gallons (11.4 Liters) deionized water. (NOT DISTILLED)

Use 1 Gallon (3.8 Liters) ethylene glycol.

Use 1 tsp (5 ml) liquid glycerin per gallon (3.8 Liters) of mixture

The Coolant rate should be 1 qt (liter) / minute at 35 p.s.i.

TORCH LEAD CONNECTIONS

Power Cable

The torch fitting is screwed into the back of the torch block using a conductive sealant. RoboKing torches use a #4 AWG power cable which is secured to the torch in the same manner. The power cable fitting on the other end connects to the power block inside the Cobramatic feeder.

ALL ROBOKING TORCHES MUST BE WATER COOLED

Conduit

The RoboKing comes standard with a teflon lined conduit. The torch end is secured with a set screw accessible through a hole in the handle under

SECTION B

the rear Handle nut. Spiral steel conduits are available when using hard and cored wires.

Gas Hose

The gas hose is pushed on to the inlet tube of the front body. The gas inlet tube is located in the top center of the torch when viewed from the rear.

Water Hose

The water hose is pushed on to the inlet tube of the front body. The Water tube is located in the lower left of the torch when viewed from the rear.

Electric Cable

A seven conductor control cable is used on RoboKing Torch, although only 2 conductors are used. The torch end of the control cable is secured to the back of the torch with a cable clamp and the wires are connected to the motor through a connector. The cabinet end has a 7 pin "W" clocked Amphenol connector. See schematic for wiring information.

OPERATION

GENERAL DESCRIPTION

The RoboKing is designed to be used in automation processes and is unique in its design from other torches made by MK Products. The RoboKing Torch maintains a constant, steady, uniform 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 24 volt DC torch motor is controlled by the speed control in the Cobramatic II cabinet.

There is no trigger in the torch to start the arc, this is controlled by means of an outboard control.

MOTOR GEAR BOX

A 19.5:1 24VDC motor gear box is used on this version of the RoboKing Torch. The motor gear box attaches to the angle head with three (3) Allen screws. The torch serial number is stamped on the angle head. There are no spare parts for the motor gear box; it must be replaced as a whole unit.

DRIVE AND IDLER ROLLS

General

The RoboKing comes setup from the factory with the drive roll & idler roll requested at the time of order. Other sizes of grooved drive rolls for aluminum wire are also available (see Optional Kits). Use Knurled drive rolls for all steel applications. One set will feed all wire diameters from .030 (0.8mm) to 1/6"(1.6mm)

Drive roll tension is accomplished by means of a pressure-adjusting screw located on the left hand side of the torch. Proper tension is achieved when wire does not slip when a small amount of pressure is added to the wire as it exits the tip.

----- IMPORTANT -----

NOTE:

*Over-tightening of the drive rolls will cause excessive knurling and/or deformation of the wire. When the complete system is set-up properly, wire will feed out of the end of the torch and fall on the ground forming a uniform circle. If it forms a spiral or spring then there is too much tension in the system. Please refer to the Cabinet Owners Manual for adjustment to the tension setting detailed there.
THIS IS THE NUMBER ONE CAUSE OF POOR WIRE FEED PERFORMANCE*

Drive Roll Installation/Removal

Please Note : Drive rolls have a LEFT HAND thread.

Remove the drive roll with small nose pliers by turning the drive roll clockwise.

Install new drive roll on motor shaft using left hand thread. Drive roll will self-tighten when feeding wire.

Idler Roll Installation and Removal

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.
3. Tighten.

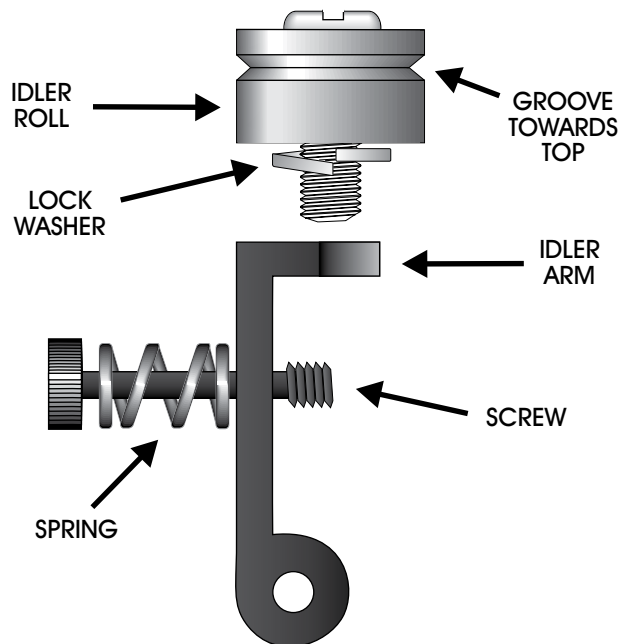


Figure 2

NOTE:

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

SECTION C

ACCESSORIES

DRIVE ROLLS 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 **005-0640**
For .030" (0.8mm) dia. aluminum wire.
Includes insulated drive roll P/N 511-0150 and idler roll assy. P/N 003-1870.

Insulated Groove Drive Roll Kit **005-0641**
For .035" (0.9mm) dia. aluminum wire.
Includes insulated drive roll P/N 511-0151 and idler roll assy. P/N 003-1870.

Insulated Groove Drive Roll Kit **005-0642**
For .040" (1.0mm) dia. aluminum wire.
Includes insulated drive roll P/N 511-0152 and idler roll assy. P/N 003-1870.

Insulated Groove Drive Roll Kit **005-0643**
For .045" (1.2mm) dia. aluminum wire.
Includes insulated drive roll P/N 511-0153 and idler roll assy. P/N 003-1870.

Insulated Groove Drive Roll Kit **005-0644**
For .062" (1.6mm) dia. aluminum wire.
Includes insulated drive roll P/N 511-0154 and idler roll assy. P/N 003-1870.

Knurled Drive Roll **511-0101**

Idler Roll Kit **005-0686**

OPTIONAL ACCESSORIES

Flat Spiral Steel Conduit
for steel & cored wire.
615-0208 15 ft./4.5m
615-0216 25 ft./7.6m

Standard Conduit
with additional protective cover.
001-0774 15 ft./4.5m
001-0775 25 ft./7.6m

NOTE:

The protective cover is used to help protect the conduit from burns.

Snake Skin protective boot 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 a side zipper.

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

CONTACT TIPS

Standard Contact Tips				
Wire Size	Tip I.D.	Arc	Tip Length	Part No.
.030"/0.8mm	.040"/1.0mm	Spray	1 5/8"/41.3mm	621-0158
		Short	1 7/8"/47.6mm	621-0165
.035"/0.9mm	.044"/1.0mm	Spray	1 5/8"/41.3mm	621-0157
		Short	1 7/8"/47.6mm	621-0166
.045"/1.2mm	.053"/1.35mm	Spray	1 5/8"/41.3mm	621-0161
		Short	1 7/8"/47.6mm	621-0167
.045" or .052"	.060"/1.5mm	Spray	1 5/8"/41.3mm	621-0162
		Short	1 7/8"/47.6mm	621-0168
.063"/1.6mm	.075"/1.9mm	Spray	1 5/8"/41.3mm	621-0163
		Short	1 7/8"/47.6mm	621-0169
.063"/1.6mm	.075"/1.9mm	Spray	1 5/8"/41.3mm	621-0163
		Short	1 7/8"/47.6mm	621-0169
.063"/1.6mm	.085"/2.16mm	Spray	1 5/8"/41.3mm	621-0164

GAS CUPS

Standard Water Cooled Cup			
Cup Size	Cup I.D.	Cup Length	Part No.
No. 10	5/8"/15.9mm	3"/76.2mm	621-0065
Optional Air Cooled Cups*			
Cup Size	Cup I.D.	Cup Length	Part No.
No. 6	3/8"/9.5mm	1.43"/36.5mm	621-0170
No. 8	1/2"/12.7mm	1.43"/36.5mm	621-0159
No. 10	5/8"/15.9mm	1.43"/36.5mm	621-0160

*Requires Cup Adapter P/N 621-0101 & Cup Nut P/N 449-0193

TORCH LINERS

Liners for Barrels			
Wire Size	Liner Material	Application	Part No.
.030-.035"/0.8-0.9mm	White Teflon	Aluminum	615-0542
.045-.062"/1.2-1.6mm	White Teflon	Aluminum	615-0538
.030-.045"/0.8-1.2mm	Steel Spiral	Steel/Hard wire	615-0543

SECTION D

MAINTENANCE

Maintenance of the torch will normally consist of a general cleaning of the wire guide system, including tubes, drive rolls, and conduits at regular intervals.

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

The only parts on the RoboKing 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.

If repairs do become necessary, any part can easily be replaced by a qualified shop maintenance personnel.

Your RoboKing System is designed to provide years of reliable service. Normal wear and component failure may require occasional service.

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.

RECOMMENDED SPARE PARTS

Qty.	Part Number	Description
1	615-0007	Conduit 15'
1	615-0008	Conduit 25'
2	511-0101	Knurled Drive Roll
2	005-0686	Idler Roll for steel



GOLD
DRIVE ROLL
511-0101



IDLER ROLL KIT
005-0686

SECTION E

TROUBLESHOOTING

Regardless of which torch or feeder used, all MK Products' push-pull guns operate on the same principle. The 115 (42) VAC 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 spindle is used simply to keep the wire slightly taut, so it will not pull off the spool while feeding wire.

The high torque 24 VDC torch motor is controlled by a solid state speed control. The torch motor is connected to the cabinet/control box via a control

cable and Amphenol. 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.

TESTING THE TORCH

See "W" clocked torch wiring diagram 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**.

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

TROUBLESHOOTING GUIDE

Trouble	Cause	Remedy
No wire feed at torch, feeder not operating, i.e. no slave motor or brake solenoid.	Control fuse in feeder/Control box blown.	Replace fuse.
	Broken electrical cable.	Check motor leads for continuity.
No wire feed at torch, feeder operating properly.	24VAC control fuse in feeder/Control box blown.	Check motor leads for shorts; then replace fuse.
	Broken electrical cable.	Check motor leads for continuity.
	Bad speed control/PCB.	See specific cabinet/control box owner's 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 owner's manual for locations and type of contactor signal required, i.e., closing or 115VAC
	Welding power source	Check power source.
Wire feeds erratically.	Excessive spool drag pressure.	Decrease spool drag pressure.
	Dirty or worn conduit.	Blow out or replace conduit.
	Incorrect pressure on drive rolls.	Adjust pressure at both feeder & torch.
	Idler roll stuck.	Adjust pressure at both feeder & torch.
	Idler roll stuck.	Check for lock washer under idler roll, or replace if damaged.
	Wrong size contact tip.	See contact tip table.
Wire feeds one speed only.	Bad speed control.	See specific cabinet/control box owner's 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.

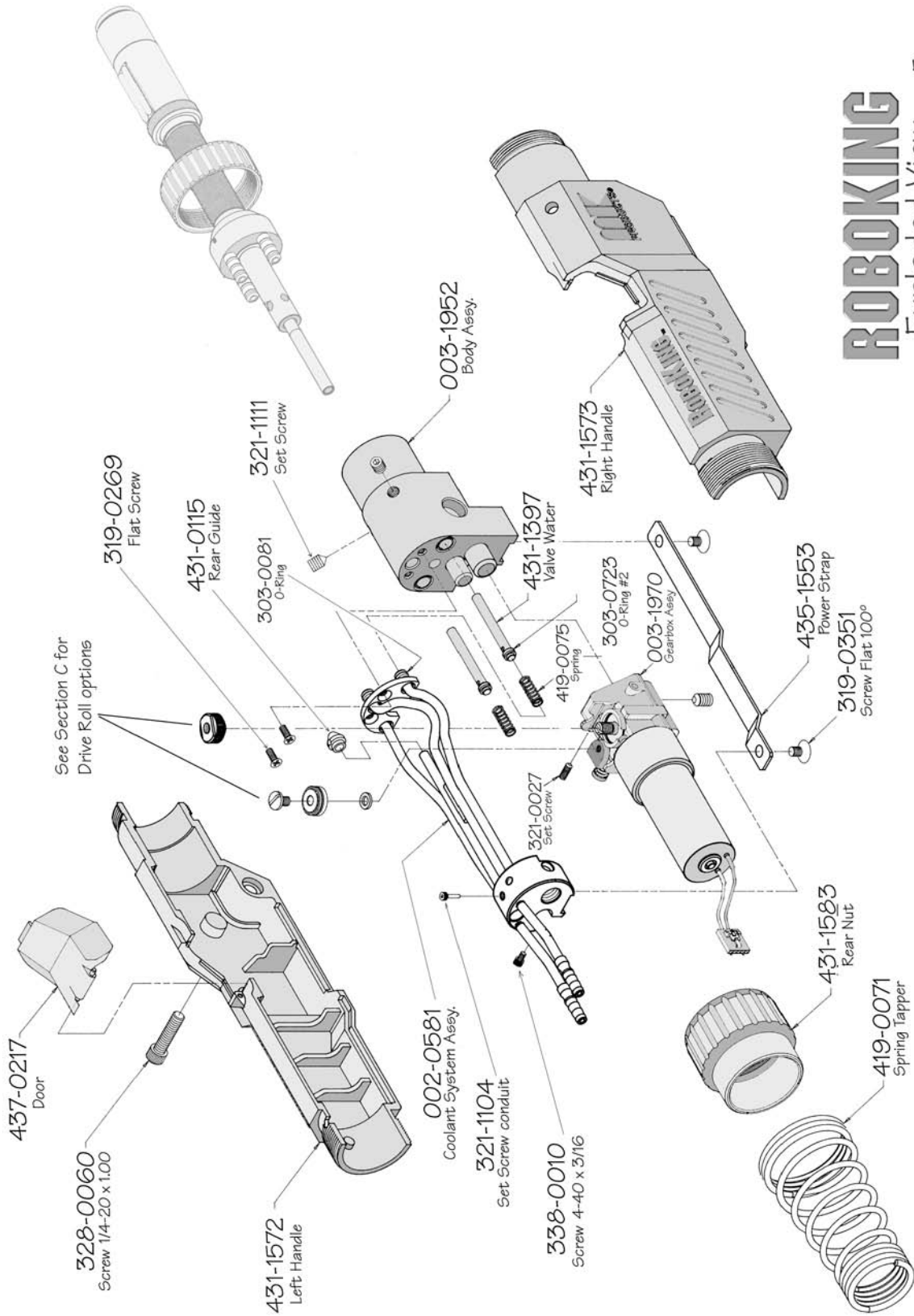
SECTION F

APPENDICES

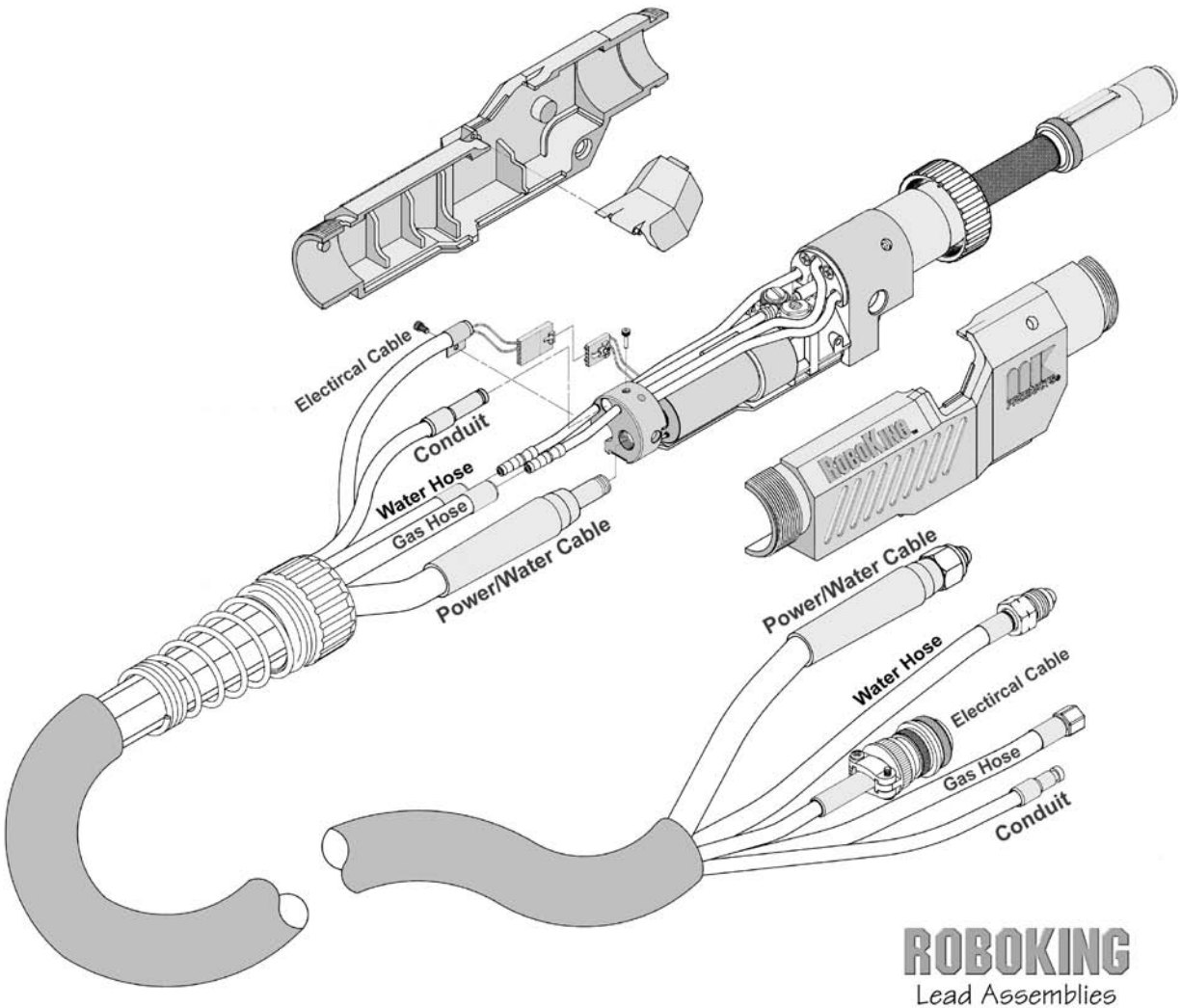
DIAGRAMS AND PARTS LISTS

EXPLODED VIEW	9
CABLE ASSEMBLIES	10
BARREL ASSEMBLIES	11
ELECTRICAL	12
GEAR BOX ASSEMBLY	13

EXPLODED VIEW



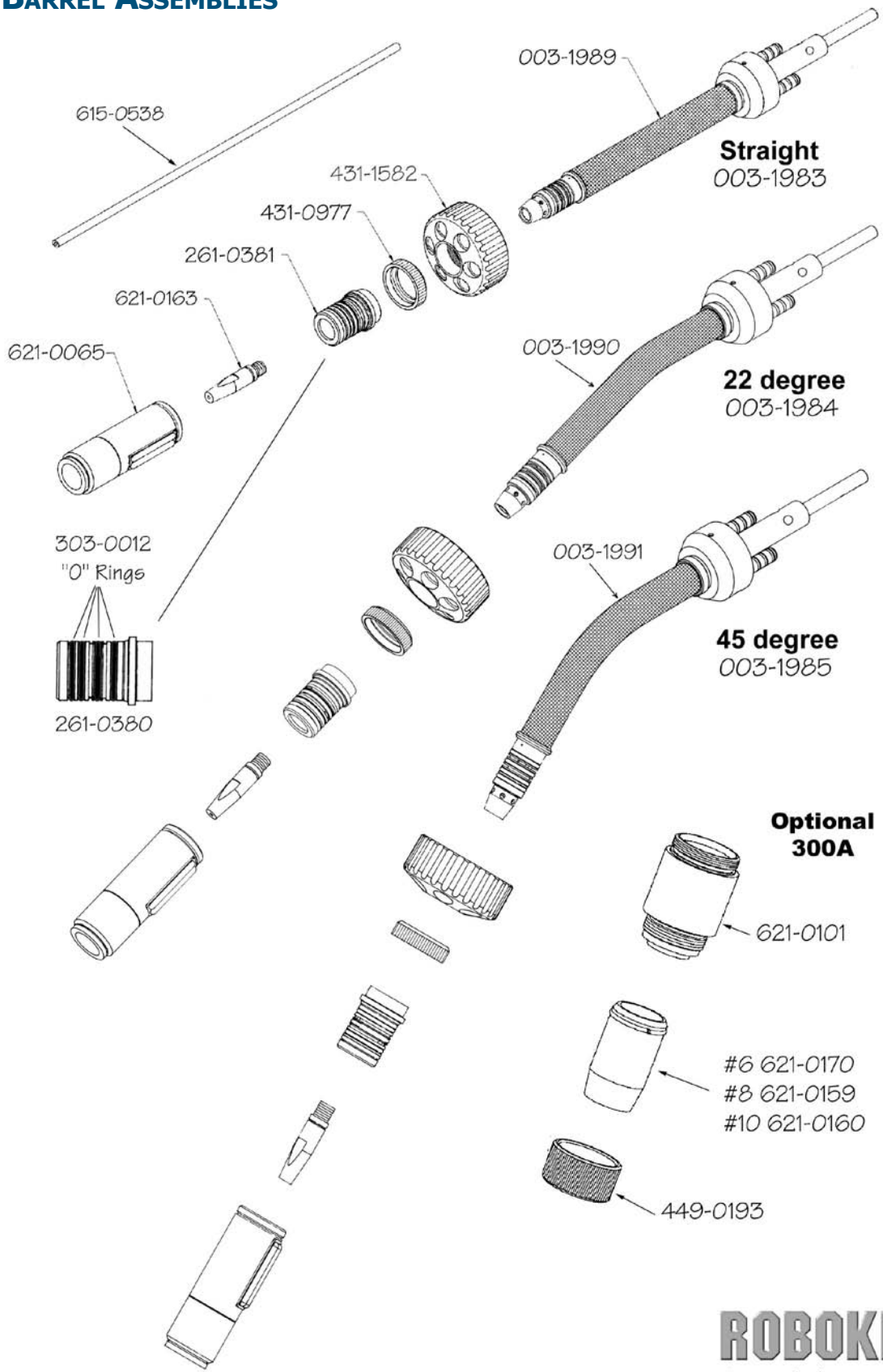
CABLE ASSEMBLIES



ROBOKING
Lead Assemblies

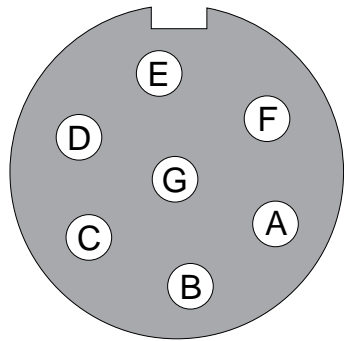
Water Cooled Cable Assemblies						
Length	Conduit	#4 Water/ Power Cable	Electrical Cable	Gas Hose	Water Hose	Snake Skin
15"/4.5m	615-0007	001-2521	005-0268	001-0537	001-0529	931-0110
25"/7.6m	615-0008	001-2524	005-0269	001-0538	001-0530	931-0122

BARREL ASSEMBLIES

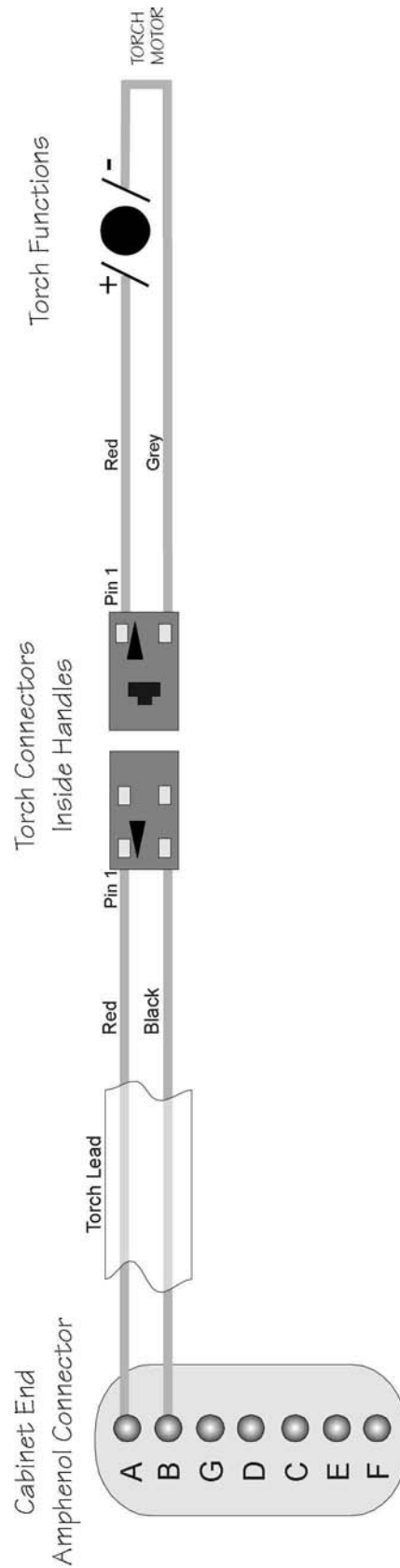


ROBOKING
Barrel Assemblies

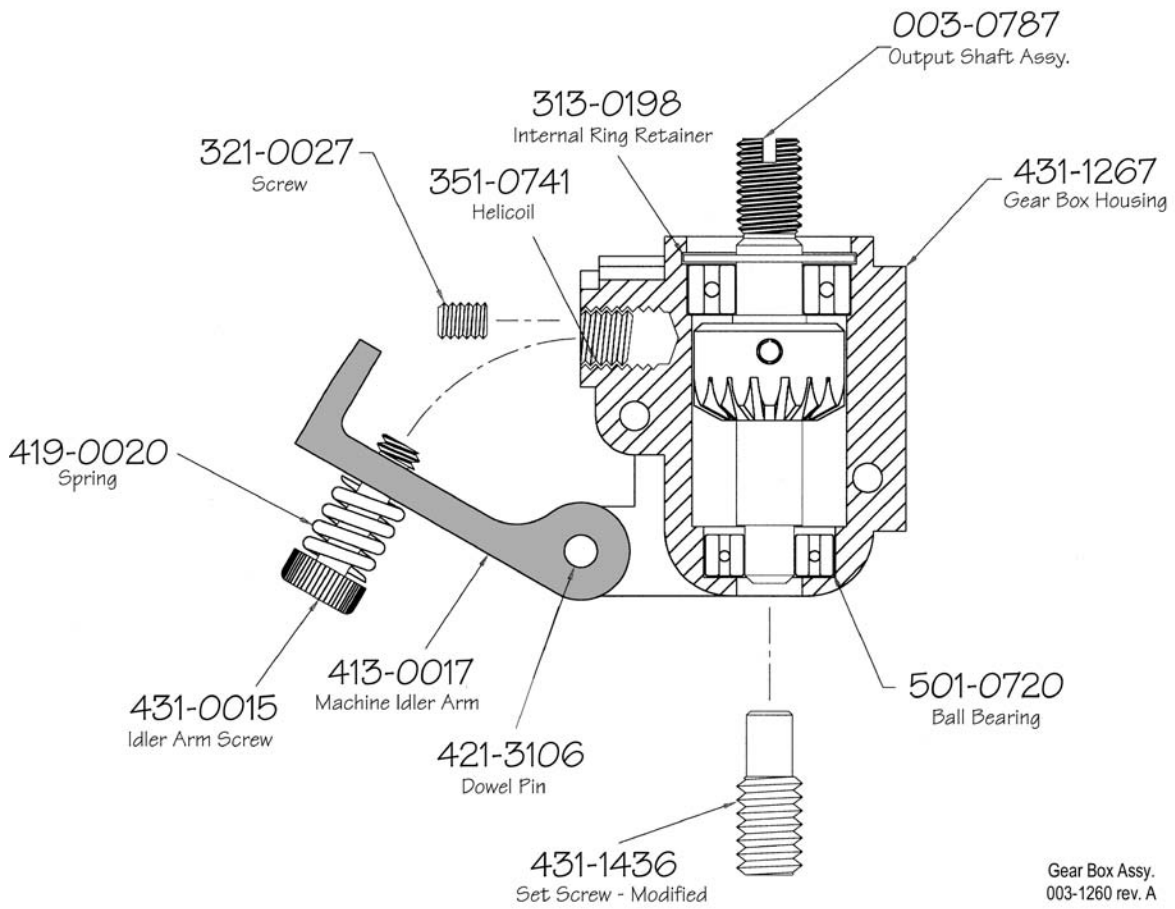
ELECTRICAL



"W" Clocked
Amphenol Connector
Viewed from front of connector



GEAR BOX ASSEMBLY



MK Warranty Repair Stations

for MK Products

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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 ENGRNG SUPPLY CO. Prichard, AL 334/457-8681	WELDING MACHINE HOSPITAL Montgomery, AL 334/832-9353

ALASKA

RNR, INC. dba Rubey Engine & Electric Anchorage, AK 907/336-5152	FAIRBANKS AERO SERVICES Fairbanks, AK 907/479-6666	
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ARIZONA

PRAXAIR DISTRIBUTION, INC. Phoenix, AZ 602/269-2151	ALLSTATE ELECTRIC MOTOR CO. Phoenix, AZ 602/233-0500	
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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
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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 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	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 ELEC. CO., INC. Long Beach, CA 714/521-9100		

MK Warranty Repair Stations

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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

CONNECTICUT

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

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

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

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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	
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KENTUCKY

GENERAL WELDING PRODUCTS Louisville, KY 502/635-5218	RED-D-ARC Lexington, KY 800/245-3660	WELDING EQUIPMENT Louisville, KY 502/636-0545
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LOUISIANA

RED BALL OXYGEN CO. Shreveport, LA 318/425-3211	WELDERS EQUIPMENT CO. Broussard, LA 337/837-5701	
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MARYLAND

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

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

MINNESOTA

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

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

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

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

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

NEVADA

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

NEW HAMPSHIRE

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

NEW JERSEY

INDUSTRIAL ELEC. SERV. CO.
Hawthorne, NJ
973/423-1212

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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	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

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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

INDUSTRIAL MACHINE
REPAIRS
Rogersville, TN
423/272-8199

NEXAIR
Memphis, TN
901/523-6821

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

QUALITY WELD'G 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

MK Warranty Repair Stations

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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	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	M.R.T. REPAIR CENTER, INC. Montreal, Quebec 514/648-0800
OZARK ELEC. 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 86-10-6858 8395		
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MK Warranty Repair Stations

for MK Products

Current as of 10/11/02

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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	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	M.R.T. REPAIR CENTER, INC. Montreal, Quebec 514/648-0800
OZARK ELEC. 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
86-10-6858 8395

			
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. ● Aíslense del trabajo y de la tierra. 	<ul style="list-style-type: none"> ● Mantenga el material combustible fuera del área de trabajo. 	<ul style="list-style-type: none"> ● Protéjase los ojos, los oídos y el cuerpo.
French ATTENTION	<ul style="list-style-type: none"> ● Ne laissez ni la peau ni des vêtements mouillés entrer en contact avec des pièces sous tension. ● Isolez-vous du travail et de la terre. 	<ul style="list-style-type: none"> ● Gardez à l'écart de tout matériel inflammable. 	<ul style="list-style-type: none"> ● Protégez vos yeux, vos oreilles et votre corps.
German WARNUNG	<ul style="list-style-type: none"> ● Berühren Sie keine stromführenden Teile oder Elektroden mit Ihrem Körper oder feuchter Kleidung! ● Isolieren Sie sich von den Elektroden und dem Erdboden! 	<ul style="list-style-type: none"> ● Entfernen Sie brennbares Material! 	<ul style="list-style-type: none"> ● Tragen Sie Augen-, Ohren- und Körperschutz!
Portuguese ATENÇÃO	<ul style="list-style-type: none"> ● Não toque partes elétricas e electrodos com a pele ou roupa molhada. ● Isole-se da peça e terra. 	<ul style="list-style-type: none"> ● Mantenha inflamáveis bem guardados. 	<ul style="list-style-type: none"> ● Use proteção para a vista, ouvido e corpo.
Japanese 注意事項	<ul style="list-style-type: none"> ● 通電中の電気部品、又は溶材にヒフやぬれた布で触れないこと。 ● 施工物やアースから身体が絶縁されている様にして下さい。 	<ul style="list-style-type: none"> ● 燃えやすいものの側での溶接作業は絶対にしてはなりません。 	<ul style="list-style-type: none"> ● 目、耳及び身体に保護具をして下さい。
Chinese 警告	<ul style="list-style-type: none"> ● 皮肤或湿衣物切勿接觸帶電部件及綽條。 ● 使你自已與地面和工件絕緣。 	<ul style="list-style-type: none"> ● 把一切易燃物品移離工作場所。 	<ul style="list-style-type: none"> ● 佩戴眼、耳及身體勞動保護用具。
Korean 위험	<ul style="list-style-type: none"> ● 전도체나 용접봉을 젖은 헝겊 또는 피부로 절대 접촉치 마십시오. ● 모재와 접지를 절촉치 마십시오. 	<ul style="list-style-type: none"> ● 인화성 물질을 접근 시키지 마십시오. 	<ul style="list-style-type: none"> ● 눈, 귀와 몸에 보호장구를 착용하십시오.
Arabic تحذير	<ul style="list-style-type: none"> ● لا تلمس الأجزاء التي يسري فيها التيار الكهربائي أو الأقطاب بجهد الجسم أو بالملابس المبللة بالماء. ● ضع عازلاً 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って下さい。 	<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"> ● 업골로부터 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 작동하지 마십시오. 	Korean 위험
<ul style="list-style-type: none"> ● بعد 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"> ● قطع 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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LIMITED WARRANTY

Effective March 1, 2001

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 defect 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 nozzles, nozzle insulators, and contact tips where failure does not result from defect in workmanship or material.

In the case of MK Products' breach of warranty or any other duty with respect to the quality of any goods, the exclusive remedies therefore shall be at MK Products' option: (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..... 2 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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