



Product Description	Cobra® Gold
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MK Form Number	CT Gold
NWSA Form Number	550
Effective with Serial Number	01110100
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This manual applies to the following torch model numbers	210-XXX 211-XXX

Cobra *Welding Torch*

////// GOLD

OWNERS MANUAL



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.

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 replacement parts for r 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

.023inch - .045inch (0.8mm - 1.2mm) solid and hard wire

.030inch - 1/16inch (0.8mm - 1.6mm) aluminum and cored wire

Wire Speed

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

Duty Cycle

Air Cooled Torches (211 series)..... 200 amps @50%

Air Cooled Torches (Finned Copper Cup)..... 200 amps @100%

Air Cooled Torches (Heavy Duty Finned Copper Cup) 225 amps @100%

Water Cooled Torches (210 series)..... 250 amps @50%

Water Cooled Torches (Finned Copper Cup)..... 225 amps @100%

Water Cooled Torches

(Heavy Duty Finned Copper Cup) 250 amps @100%

Water Cooled Torches

with Optional Heavy Duty Finned Gas Cup..... 300 amps @50%

All ratings are at 25 volts max. using Argon Gas

Shipping Weight (approximate)

Air Cooled

15ft. (4.5m).....	13 lbs.	(5.9 Kg)
25ft. (7.6m).....	18 lbs.	(8.2 Kg)
50ft. (15.2m).....	33 lbs.	(14.96 Kg)

Water Cooled

15ft. (4.5m).....	14 lbs.	(6.35 Kg)
25ft. (7.6m).....	20 lbs.	(9.07 Kg)
50ft. (15.2m).....	35 lbs.	(15.88 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 35 p.s.i.** 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.

Use 3 Quarts (2.85 Liters) Distilled water.

Use 1 Quart (.95 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.

Section A (Cont.)

Torch Lead Connections

Power Cable

IMPORTANT - PLEASE NOTE

Water cooled torches use a #4 AWG power cable inside a flexible hose. Because of the size of cable used, these torches MUST be WATER COOLED.

The torch fitting is screwed into the back of the torch block using a conductive sealant. Air cooled torches, on the other hand, use a #2 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.

Conduit

The Cobra Gooseneck comes standard with a Teflon-lined conduit. The torch end is secured with a setscrew accessible through a hole in the handle. The other end is connected to the wire feeder. ***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, and then secured with a plastic cable tie. The gas inlet tube is located in the middle of the torch block, when viewed from the rear.

Water Hose

The water hose is pushed on to the inlet tube of the front body. The other end goes to the return side of the water recirculator. The Water tube is located in the upper right of the torch block, when viewed from the rear. Air cooled torches do not have a Water Hose.

Electric Cable

A seven conductor control cable is used on the Gooseneck Torch. The torch end of the control cable is secured to the back of the torch with a cable clamp and the wires are joined to the motor, pot, and micro switch through two connectors. The cabinet end has a 7 pin "W" clocked Amphenol connector. See the schematic in the appendix for wiring information.

Section B

Operation

General

The patented Cobra Gooseneck 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 (3)-turn potentiometer in the torch handle.

Section B (Cont.)

Controls and Settings

Potentiometer

The potentiometer is located on the left hand side of the torch and provides three (3) turns of adjustment. A special pot nut and O-Ring provides drag on the knob and also secures the pot to the handle.

Trigger, Gas Valve and Micro Switch

The torch trigger is designed so that when it is partially depressed, gas flow starts via the valve located in the torch body, prior to ignition of the arc. When the trigger is partially released after welding (extinguishing the arc), gas flow continues until the trigger is fully released; built-in pre and post gas flow.

The micro switch is wired "Normally Open" and secured to the torch block with two (2) screws. An insulator between the torch block and micro switch prevents accidental shorting of the switch leads. The trigger pin reaches through the handle and activates the micro switch just before the trigger bottoms out on the handle.

Drive Roll and Idler Rolls

General

The Gooseneck torch comes standard with knurled drive rolls, which will handle wire diameters from .023 through 1/16 inch. Optional insulated V-groove drive rolls are also available for improved feeding of aluminum wire (see Optional Kits).

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 if 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 setup properly, feeding wire out of the end of the torch and letting fall on the ground should form a large 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.*

**INCORRECT DRIVE ROLL TENSION IS THE NUMBER ONE
CAUSE OF POOR WIRE FEED PERFORMANCE**

Section B (Cont.)

Drive Roll Installation/Removal

Note

Neither of the handles needs to be removed to access the Drive or Idler Rolls.

1. Using a 5/32" hex wrench, loosen the Idler Roll tension screw. This will relieve the pressure against the drive roll.
2. Align the Drive Roll Removal Tool (P/N 931-0100) over the flats of the drive roll. 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**.



Figure 1

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.

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.

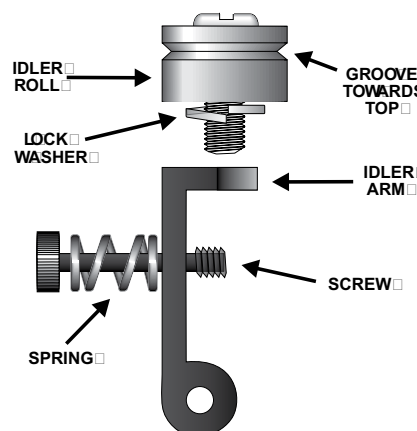


Figure 2

3. Tighten.
4. Using a 5/32" hex wrench, turn the Idler Roll tension screw into the gearbox housing to adjust the pressure against the drive roll.

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

Section C

Use genuine MK parts

Accessories

Spray Arc



Contact Tips

Short Arc



Contact Tip Selector Guide

Wire Size	Tip I.D. **	Arc	Tip Length	Part No.
.023" (0.6mm)	.030" (0.8mm)	Spray	1-1/2" (38mm)	621-0057
	.030" (0.8mm)	Short	1-3/4" (44mm)	621-0328
.030" (0.8mm)	.036" (0.9mm)	Spray	1-1/2" (38mm)	621-0325
	.036" (0.9mm)	Short	1-3/4" (44mm)	621-0326
.030" (0.8mm) or .035" (0.9mm)	.040" (1.0mm)	Spray	1-1/2" (38mm)	621-0076
	.040" (1.0mm)	Short	1-3/4" (44mm)	621-0077
.035" (0.9mm)	.044" (1.1mm)	Spray	1-1/2" (38mm)	621-0001
	.044" (1.1mm)	Short	1-3/4" (44mm)	621-0002
.045" (1.2mm)	.053" (1.3mm)	Spray	1-1/2" (38mm)	621-0327
.045" (1.2mm) or .052" (1.3mm)	.060" (1.5mm)	Spray	1-1/2" (38mm)	621-0003*
	.060" (1.5mm)	Short	1-3/4" (44mm)	621-0286
1/16" (1.6mm)	.075" (1.9mm)	Spray	1-1/2" (38mm)	621-0075
1/16" (1.6mm)	.085" (2.1mm)	Spray	1-1/2" (38mm)	621-0153
	.085" (2.1mm)	Short	1-3/4" (44mm)	621-0154

* Standard - Furnished with torch. ** All tips stamped with tip I.D.

NOTE: As a rule of thumb, use the smaller I.D. tip for steel, stainless steel and the 5000 series aluminum. Softer alloys such as the 1000 and 4000 series aluminum require more clearance and, therefore, use a larger I.D. tip.

Gas Cups

Standard Cup



Heavy Duty
Finned Cup



Standard Gas Cups			Heavy-Duty Gas Cups		
Size	I.D.	Part No.	Size	I.D.	Part No.
5	1/4" (6.4mm)	621-0079			
6	3/8" (9.5mm)	001-0137			
*8	1/2" (12.7mm)	001-0138	8	1/2" (12.7mm)	621-0366
10	5/8" (15.8mm)	001-0139	10	5/8" (15.8mm)	621-0367

*Standard - Furnished with torch

Section C (Cont.)

Torch Liners



Gooseneck Torch Liners			
Part No.	Liner Material	Length	Wire Type
615-0055*	Green Teflon	Standard	Aluminum
615-0284	Spiral Steel	Standard	Steel / Cored
615-0058	Green Teflon	Used with 621-0017 Tip Extender	Aluminum
615-0057	Spiral Steel	Used with 621-0017 Tip Extender	Steel / Cored
615-0054	Teflon - Standard	Bulk - by the foot	Aluminum
615-0331	Green Teflon	Used with 431-1630 Heavy Duty Cup Adapter and Finned Copper Cup	All wire types, .030 - .063" (0.8 - 2.6mm)

*Standard - Furnished with torch

Optional Kits

Insulated Drive Roll Kits

Insulated Groove Drive Roll Kits are used to prevent preheating of the aluminum 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 for .030" (0.8mm) dia. wire 005-0640
Includes insulated drive roll P/N 511-0150
and idler roll assembly P/N 003-1870.

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

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

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

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

Tip Extender



Tip Extender 621-0017
A tip extender is used if the torch cup or tip threads have been damaged or to prevent damage. Longer liners are required when using a tip extender.

Long Teflon Liner 615-0058
Long Spiral Steel Liner 615-0057

Note:

If more than one tip extender is used, the liner must be purchased in bulk and cut to size.

Section C (Cont.)

Accessories

Conduits

Flat Spiral Steel Conduit for steel & cored wire.

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

Standard Conduit with additional protective cover.

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

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

Snake Skins

Leather 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 a Velcro® closure.

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

Heavy Duty Contact Tip -3/8 " Diameter



One Heavy Duty Contact Tip, one Heavy Duty Gas Cup Adapter, one Finned Copper gas cup and one 615-0331 Torch Liner must be ordered and used together as an assembly.

Part #	Wire Size	Tip ID	Arc	Tip Length
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)
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)
621-0393	.052"(1.4mm)	.060"(1.5mm)	Spray	1-5/8"(41.3mm)
621-0399	.052"(1.4mm)	.060"(1.5mm)	Short	1-7/8"(47.6mm)
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)

Heavy Duty Gas Cup Adapter



Part #	Description
431-1630	Heavy Duty Cup Adapter

Finned Copper Gas Cups



Part #	Description
621-0249	#8, 1/2" ID (12.7mm) Gas Cup
621-0250	#10, 5/8" ID (15.8mm) Gas Cup
621-0251	#10, 5/8" ID (15.8mm) Heavy Duty Gas Cup
621-0252	#12, 3/4" ID (19.05mm) Heavy Duty Gas Cup

Section D

Maintenance

Periodic 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 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.

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

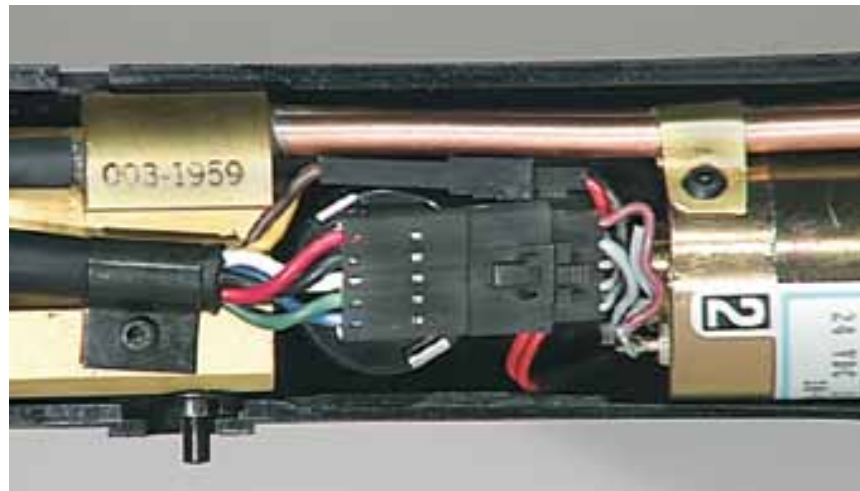
Your Cobramatic System is designed to provide years of reliable service. Normal wear and component failure may require occasional service.

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.

The front tube alignment is set at the factory for proper operation. If you feel you that your torch is not performing properly see the photo below to check alignment.



When replacing the Electrical Cable on a Cobra Gold make sure to properly place the connectors back into the handle opening above the potentiometer assembly. Use the picture below as a guide for proper placement.



Recommended Spare Parts List

Part Number	Description	Part Number	Description
615-0007	Conduit 15 ft	449-0542	Nut, Pot
615-0008	Conduit 25 ft	005-0255	Handle Kit
615-0068	Conduit 50 ft	511-0101	Drive Roll
117-0520	Potentiometer	511-0001	Idler Roll
161-0002	Micro Switch	333-0082	Lock Washer, Idler Roll
401-0521	Knob, Pot	931-0100	Drive Roll Removal Tool
303-0540	'O' Ring, Pot	931-0584	Gas Valve Tool



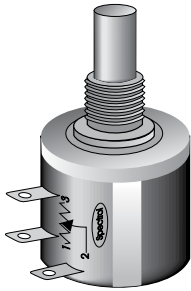
KNOB
401-0521



'O' RING
303-0540



NUT
449-0542



POTENTIOMETER
ASSEMBLY

POT
117-0520



DRIVE ROLL
REMOVAL TOOL
931-0100



DRIVE ROLL
511-0101



IDLER ROLL
511-0001



MICRO SWITCH
161-0002

Section E Troubleshooting

Trouble	Cause	Remedy
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.
Wire feeds, but welding wire is not energized.	Bad Speed control/PCB.	See specific cabinet/control box owners manual for speed control operation.
	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, i.e., closing or 115 VAC.
Wire feeds erratically.	Welding power source.	Check power source.
	Excessive spool drag pressure.	Decrease spool drag pressure.
	Incorrect pressure on drive rolls.	Adjust pressure at both feeder and torch.
	Dirty or worn conduit.	Blow out or replace conduit.
	Wrong size contact tip.	See Contact tip table.
Wire feeds one speed only.	Idler roll stuck.	Check for lock washer under idler roll, or replace if damaged.
	Bad potentiometer.	Check with meter.
	Broken electrical cable.	Check potentiometer wires for continuity or short.
Wire walks out of drive rolls.	Bad speed control.	See specific cabinet/control owners manual for speed control operation.
	Idler roll upside-down.	Place groove in idler roll toward top.
	Rear wire guide missing.	Replace wire guide

Section E (Cont.)

Troubleshooting Guide

Regardless of which torch or feeder used, all M.K. 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 24 V 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

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** as the potentiometer is turned.

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

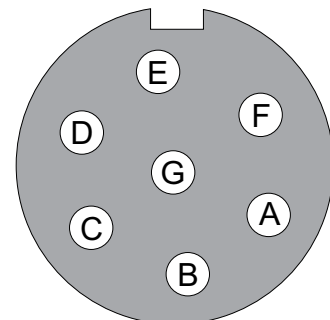
Testing the Potentiometer - "W" Clocked

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.



"W" Clocked
Amphenol Connector
Viewed from front of connector

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Section F

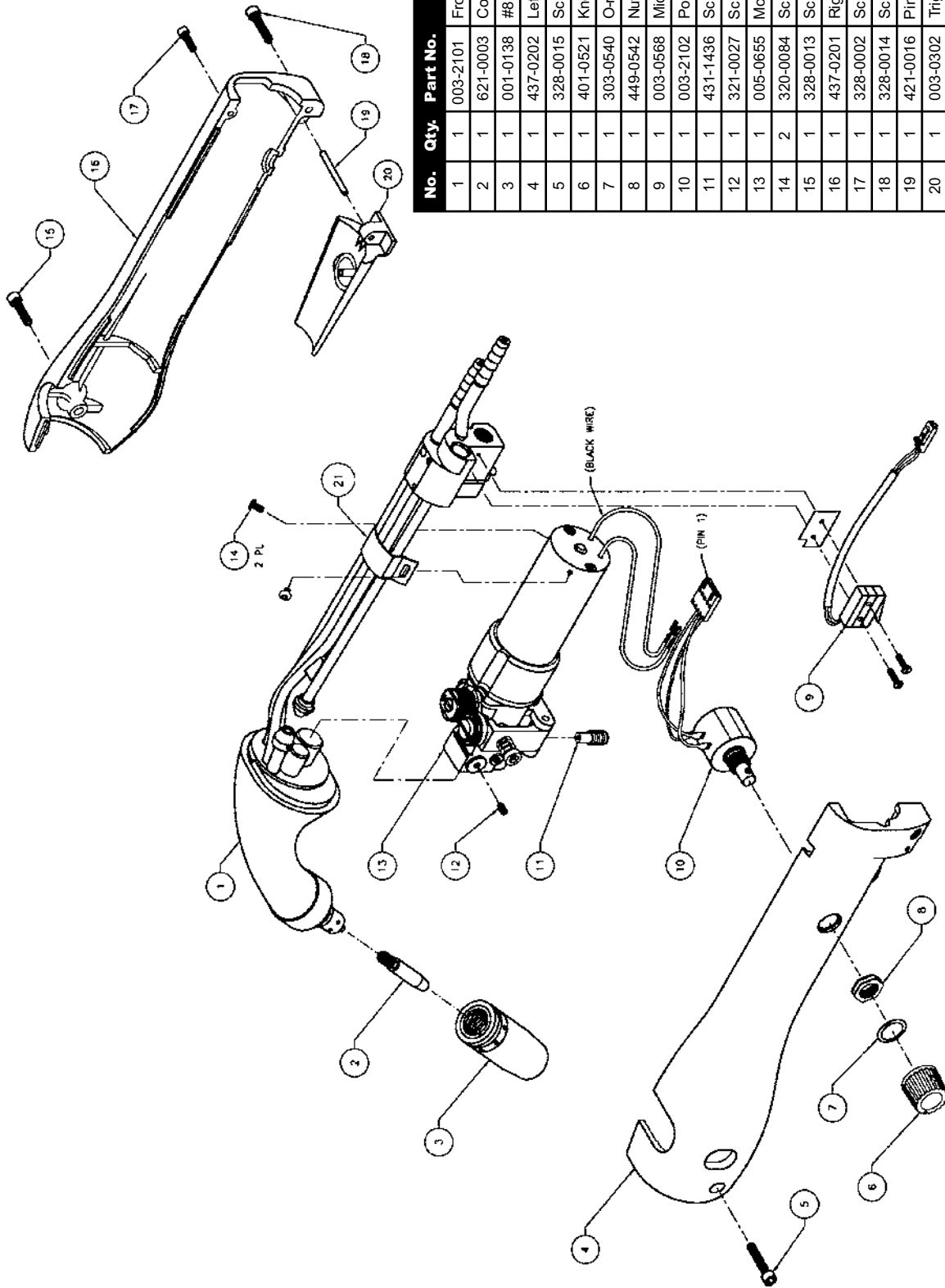
Appendices

Diagrams / Parts List

Cobra Gold Exploded View..... 17
Cobra Gold Front Body Assembly with Motor & Gear
Housing..... 18
Cobra Gold Gearbox Assembly 19
Ultra-Flex Air Cooled Lead Assy 20
Water Cooled Lead Assemblies..... 21
Electrical Control Cable 22
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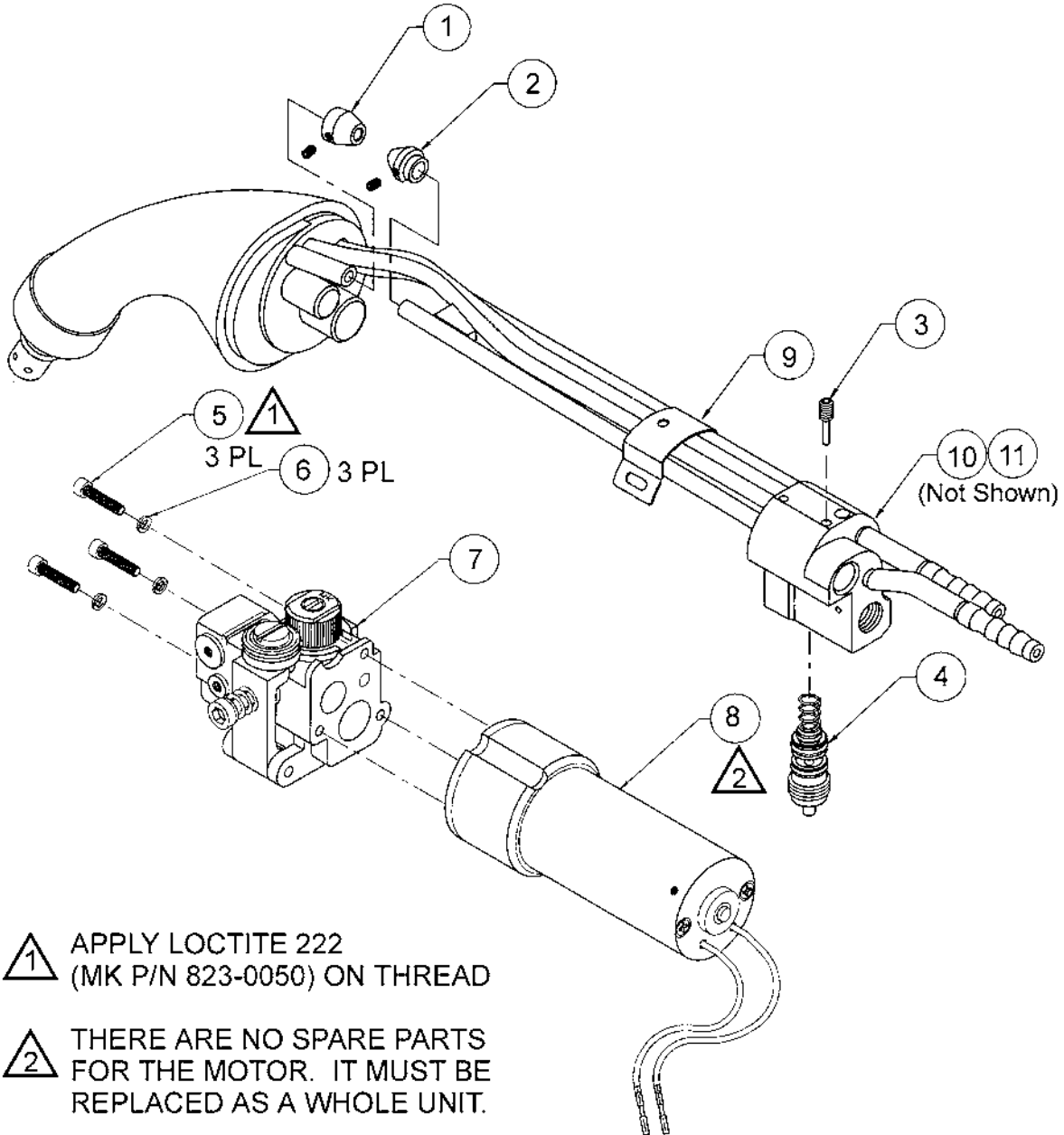
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Cobra Gold Exploded View P/N 003-1285



No.	Qty.	Part No.	Description
1	1	003-2101	Front Body Assy.
2	1	621-0003	Contact Tip, .0945 Wire, .060 ID
3	1	001-0138	#8 Gas Cup
4	1	437-0202	Left Side, Molded Handle
5	1	328-0015	Screw, Sch, Cap, 6-32 x3/4
6	1	401-0521	Knob, 1/4 shaft
7	1	303-0540	O-ring, .426 ID .070Thk
8	1	449-0542	Nut, Pot Inj Mold Handle
9	1	003-0568	Microswitch Assy.
10	1	003-2102	Potentiometer Assy.
11	1	431-1436	Screw, Set Mod. 1/4-20 x 5/8
12	1	321-0027	Screw, Cps, 6-32 x 3/16
13	1	005-0655	Motor & Gear Hsg Assy.
14	2	320-0084	Screw, Btn, Skt, Cap 4-40 x 3/16
15	1	328-0013	Screw, Sch, Cap 6-32 x 1/2
16	1	437-0201	Right Side, Molded Handle
17	1	328-0002	Screw, Sch, Cap, 4-40 x 3/8
18	1	328-0014	Screw, Sch, Cap, 6-32 x 5/8
19	1	421-0016	Pin, Dowel, 3/32 x 1.0 Long
20	1	003-0302	Trigger/Sleeve Assy.
21	1	435-1186	Motor Strap

**Cobra Gold Front Body Assembly with Motor & Gear Housing
P/N 003-2101 and P/N 005-0655**

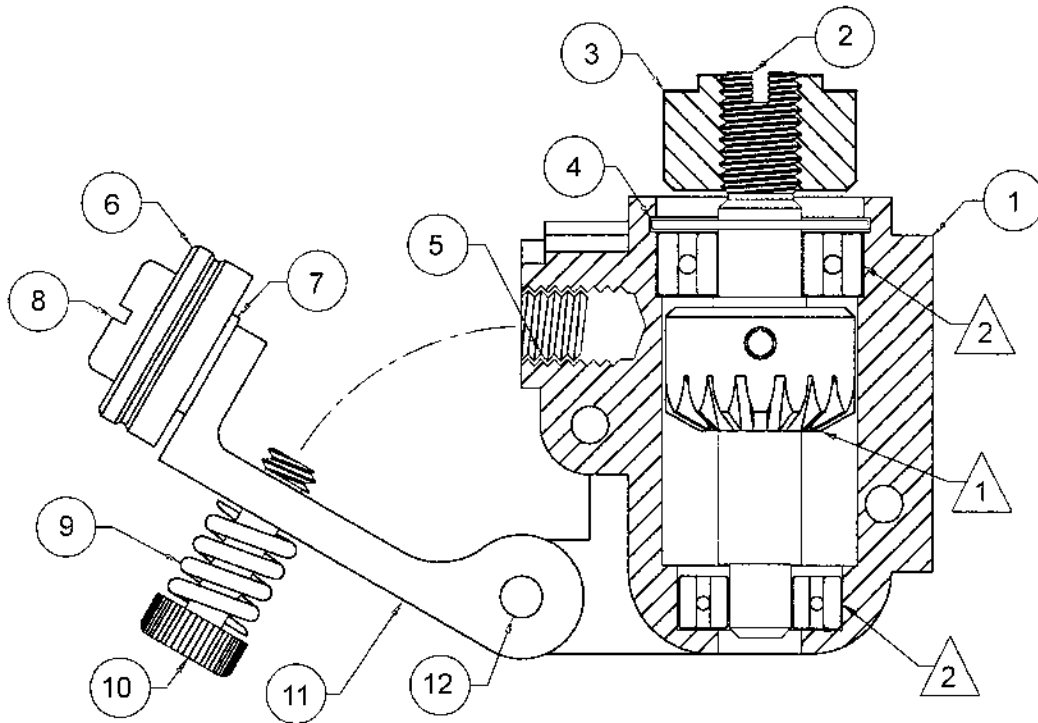


1 APPLY LOCTITE 222
(MK P/N 823-0050) ON THREAD

2 THERE ARE NO SPARE PARTS
FOR THE MOTOR. IT MUST BE
REPLACED AS A WHOLE UNIT.

No.	Qty.	Part No.	Description
1	1	431-1433	Guide, Wire, Front
2	1	431-1434	Guide, Wire, Rear
3	1	321-1074	Screw, Set, 6-32 x 1/2
4	1	001-0562	Valve, Gas
5	1	328-0003	Screw, Sch, Cap, 4-40 x 1/2
6	1	333-0084	Washer, Spr Lock, #4
7	1	003-1957	Assy, Gear Housing
8	1	005-0654	Motor Mod 19.5:1 W/Term
9	1	435-1186	Strap
10	1	411-0159	Strain Relief
11	1	328-0216	Screw, Sch, 3-48 x 3/16

Cobra Gold Gearbox Assembly P/N 003-1957



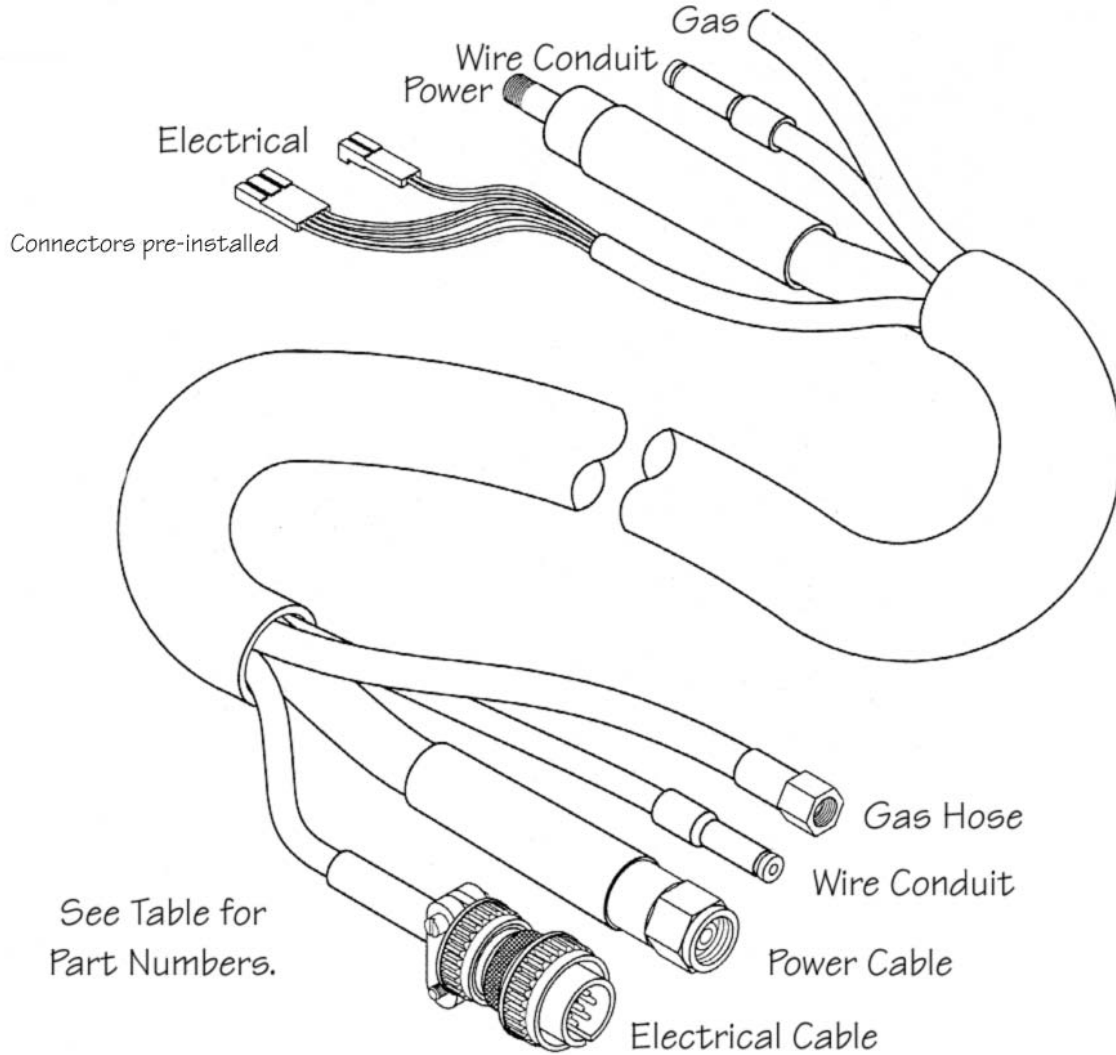
2 APPLY LOCTITE #620 (MK P/N 823-0038) TO OUTSIDE BEARING ONLY.

1 LUBE WITH 0.25 OZ OF 1:14 MIX MARVEL MYSTERY OIL & MOBILUX #2 GREASE MK #835-0001.

NOTES: UNLESS OTHERWISE SPECIFIED.

No.	Qty.	Part No.	Description
1	1	431-1435	90° Angle Head, Gear Housing
2	1	003-0787	Output Shaft Assy.
3	1	511-0101	Drive Roll, Cobra Gold
4	1	313-0198	Ring Retainer, Internal
5	1	351-0741	Helicoil, 10-24 x 0.190
6	1	511-0001	Idler Roll Assy
7	1	333-0082	Washer, Lock, #10
8	1	325-0206	Screw, PH, 10-24 x 3/8
9	1	419-0020	Spring, Compress
10	1	431-0015	Screw, Idler Arm, Adjust
11	1	413-0049	Idler Arm, Machine
12	1	421-3106	Pin, Dowel, 1/8 x 3/4

Ultra-Flex Air Cooled Lead Assy



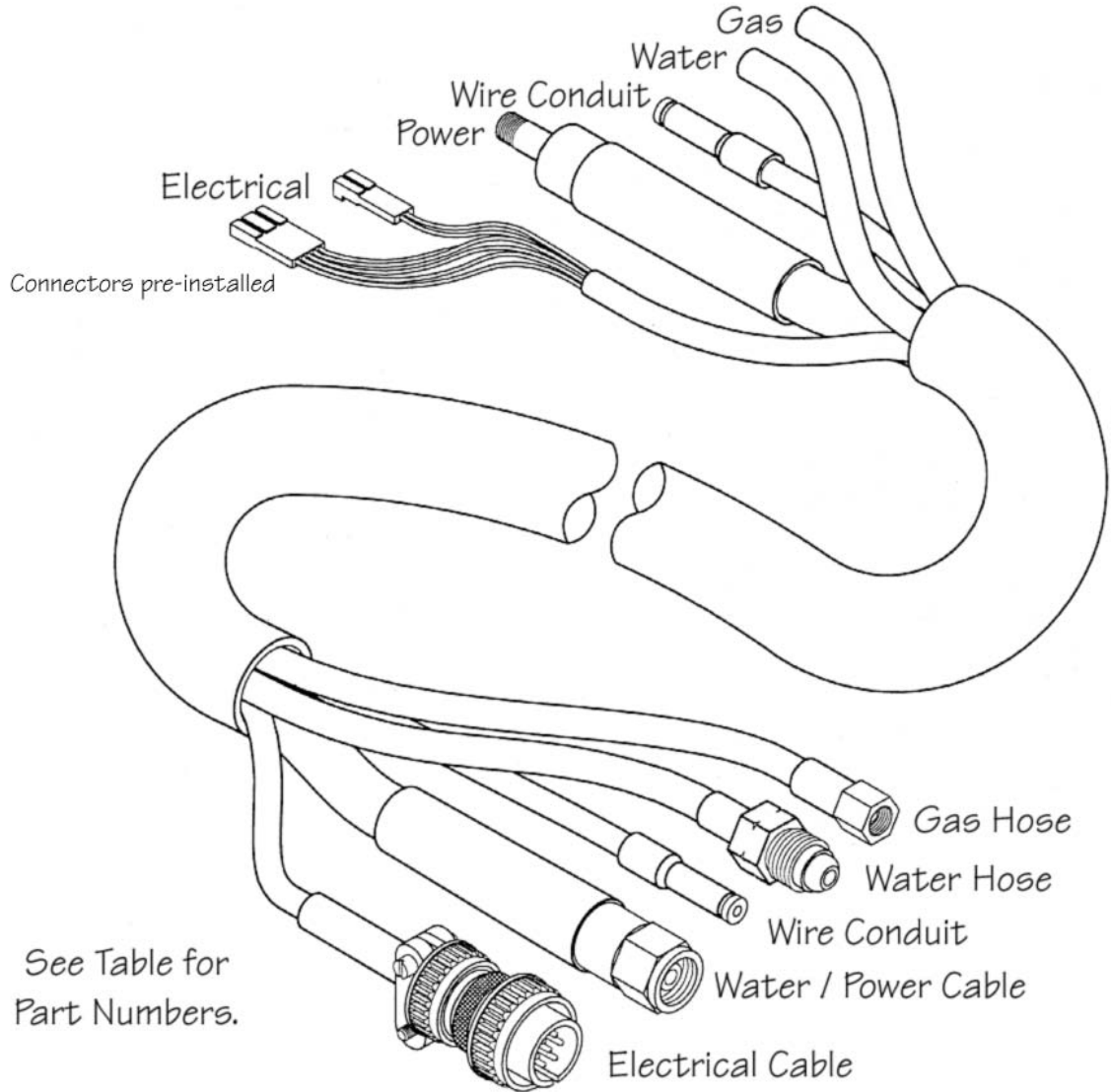
211 Series Ultra-Flex Cable Assemblies

Length	Conduit	Power Cable	Electrical Cable	Gas Hose	Snake Skin
15' / 4.5m	615-0007	001-2527	005-0268	001-0537	931-0110
25' / 7.6m	615-0008	001-2528	005-0269	001-0538	931-0122
50' / 15.2m	615-0068	001-1042	005-0272	001-0665	931-0123

Cable Fittings for Ultra-Flex (211 series)

Power Cable	Torch End Fitting	Cabinet End Lug Assy
Part No.→	431-1128	003-1328
Gas Hose	Nut & Insert	Ferrule
Part No.→	753-0464	469-0161

Water Cooled Lead Assy.



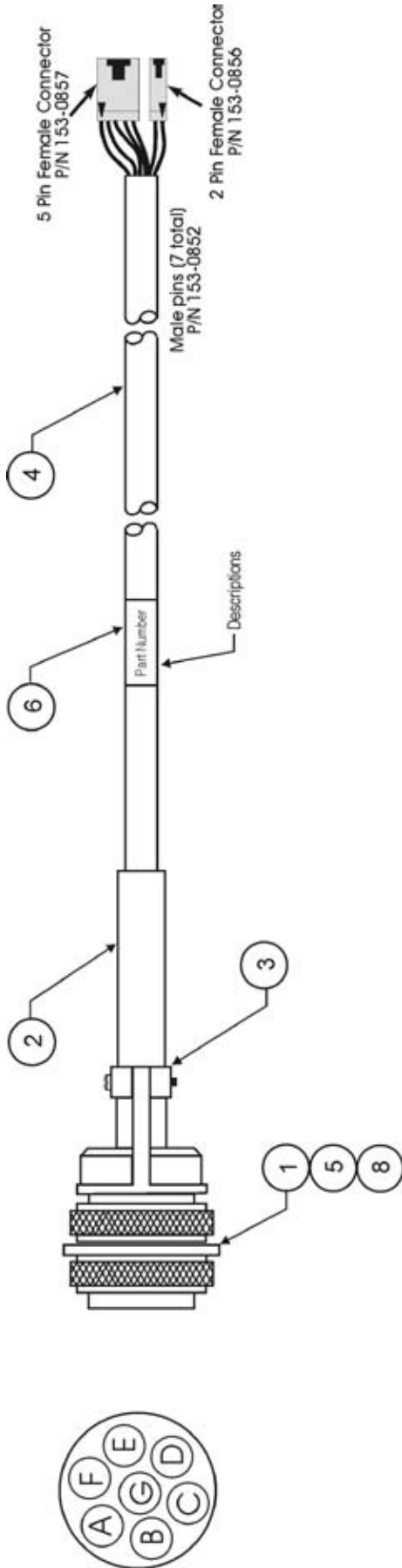
210 Series Water Cooled Cable Assemblies

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
50'/15.2m	615-0068	843-0338	005-0272	001-0665	001-0667	931-0123

Cable Fittings for Water-Cooled Torches (210 series)

Water / Power Cable	Torch End Fitting	Cabinet End Lug Assy	Ferrule #650 1ea
Part No.→	003-0590	003-1327	469-0002
Gas Hose	Nut & Insert	Ferrule	
Part No.→	753-0464	469-0161	
Water Hose	Nipple	Nut	Ferrule
Part No. →	753-0656	753-3379	469-0161

Electrical Control Cable



Control Cable "W" Torches

Part Numbers 001-3787, 001-3788, 001-3789 , 001-3790

No.	Qty.	Part No.	Description
1	1	153-0322	Connector, 7 Pin, "W"
2	1	301-0004	Boot
3	1	411-0025	Clamp
4	Table Q4	844-0070	Cable, 7 Cond, 22 Ga.
5	0.30ft	739-0004	Tubing, Shrink, Ø1/8
6	1	405-0762	Label, Self Laminated
7	1	411-0159	Clamp, Retaining
8	1	331-0087	Washer, Flat, Neoprene
9	1	411-0243	Tie Wire #4 Screw 3/4 Dia N

Wire List

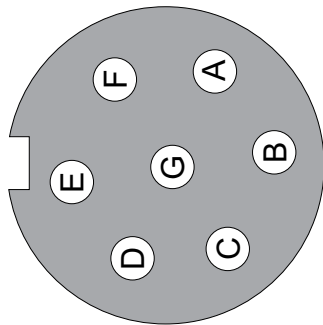
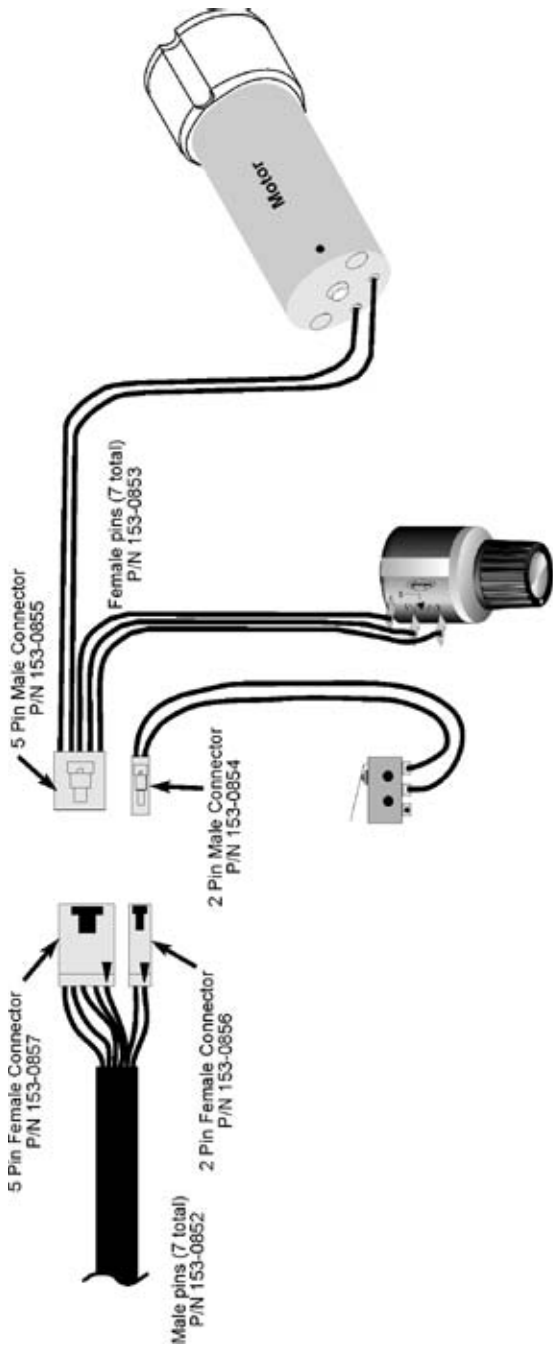
Pin	Wire Color	Signal Description
A	Red	Torch Motor
B	Black	Torch Motor
C	Blue	Pot
D	Green	Pot Wiper
E	Brown	Trigger
F	Orange	Trigger
G	White	Pot

Table Q4:

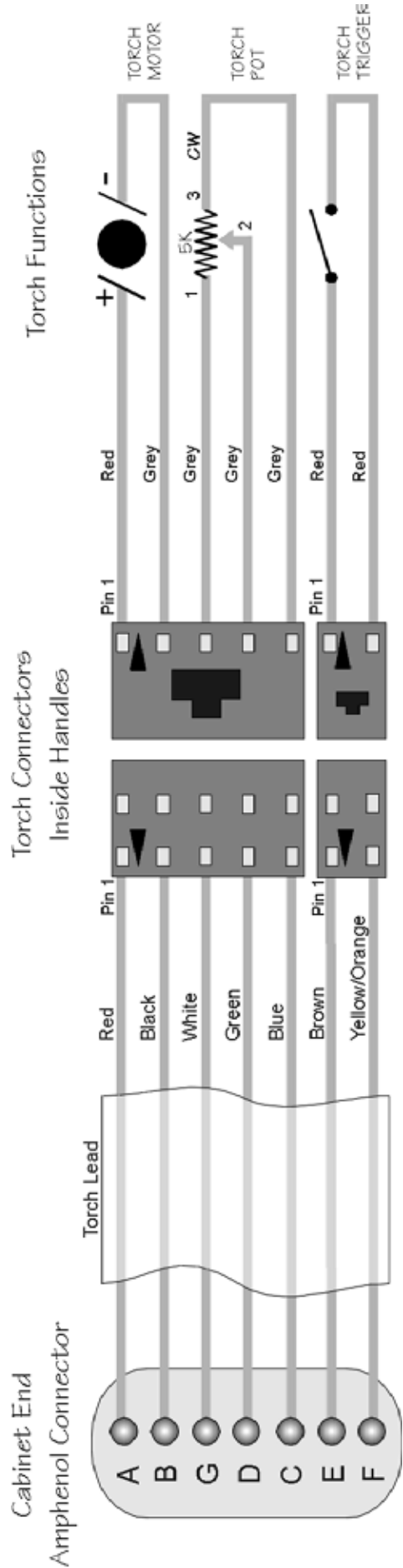
Quantity Required for Item #4

Part No.	Description	844-0070 Qty.
001-3787	15' Control Cable	15.50 Ft
001-3788	25' Control Cable	25.50 Ft
001-3789	30' Control Cable	30.50 Ft
001-3790	50' Control Cable	50.50 Ft

Cobra Gold Electrical



"W" Clocked
Amphenol Connector
Viewed from front of connector



MK Warranty Repair Centers as of 11/13/2001
Check www.mkprod.com for a current, accurate listing.

ALABAMA

AIRGAS – SOUTH, INC.
Birmingham, AL
205/251-6835

INDUSTRIAL WELDING SERVICES
Quinton, AL
205/674-3258

WELDING ENGINEERING SUPPLY CO.
Prichard, AL
334/457-8681

WELDING MACHINE HOSPITAL
Montgomery, AL
334/832-9353

ARIZONA

PRAXAIR DISTRIBUTION, INC.
Phoenix, AZ
602/269-2151

ALLSTATE ELECTRIC MOTOR CO.
Phoenix, AZ
602/233-0500

ARKANSAS

APPLIED SERVICES, INC.
Benton, AR
501/860-6464

ARKANSAS WELDING IND'L SUPPLY
Hot Springs, AR
501/321-9922

EL DORADO WELDING & IND'L SUPPLY
El Dorado, AR
870/863-4088

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
559/486-2251

CAL-WELD SUPPLY
Fresno, CA
209/445-0131

DELTA-TECH
Sun Valley, CA
818/767-4234

EMCO EAST
Concord, CA
925/798-4411

FRESNO OXYGEN
Fresno, CA
559/233-6684

INDUSTRIAL WELDER REPAIR
LaPuente, CA
626/961-7643

PRAXAIR DISTRIBUTION, INC.
Long Beach, CA
562/427-0099

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

SOUTHWEST WELDER REPAIR
Fontana, CA
909/357-1661

MK Warranty Repair Stations as of 11/13/2001 (Continued)

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

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

FLORIDA

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

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.
Orlando, 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
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

ILLINOIS

INDUSTRIAL WELDER REBUILDERS
Alsip, IL
708/371-5688

RELIABLE EQUIPMENT REPAIR
Hamel, IL
618/633-5000

SCHERER INDUSTRIAL GROUP, INC.
Galesburg, IL
309/342-4125 or 888/964-3526

INDIANA

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

MK Warranty Repair Stations as of 11/13/2001 (Continued)

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

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

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

KANSAS

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

LOUISIANA

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

Maryland

CCM Mech/Elec Repair Service, Inc.
Owings, MD
301/855-7508

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

SOUTHPARK WELDING
Marysville, MI
810/364-6521

MK Warranty Repair Stations as of 11/13/2001 (Continued)

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

WESAR COMPANY
Three Rivers, MI
616/483-9125

MINNESOTA

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

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 JERSEY

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

NEW YORK

DELO WELDING SUPPLY
Syracuse, NY
315/478-2188

HAUN WELDING SUPPLY
Syracuse, NY
315/463-5241

NORTH CAROLINA

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

ARC EQUIPMENT COMPANY
Struthers, OH
333/750-9353

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

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

MK Warranty Repair Stations as of 11/13/2001 (Continued)

BIG RIVER ELECTRIC
Gallipolis, OH
740/446-4360

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

OHIO AIR PRODUCTS
Canton, OH
330/821-2771

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

VALLEY NATIONAL GASES
Hilliard, OH
614/771-1311

VALLEY NATIONAL GASES
Lima, OH
419/228-1008

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

INDUSTRIAL SOURCE
Eugene, OR
541/344-1438

PENNSYLVANIA
ALLWELD EQUIPMENT REPAIR
Pittsburgh, PA
412/821-8460

GEOVIC WELDING SUPPLY
Milton, PA
717/742-9377

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

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

VALLEY NATIONAL GASES
Pittsburgh, PA
412/281-1835

SOUTH CAROLINA
CAROLINA WELDER SERVICE
Lake City, SC
843/687-0413

TENNESSEE
NEXAIR
Memphis, TN
901/523-6821

TRAMCO
Bristol, TN
423/968-4499

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

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

MK Warranty Repair Stations as of 11/13/2001 (Continued)

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

DENISON OXYGEN
Denison, TX
903/465-3369

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

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

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

UTAH

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

VIRGINIA

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

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

NORFOLK WELDERS SUPPLY
Norfolk, VA
804/622-6571

WASHINGTON

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

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

WEST VIRGINIA

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

WISCONSIN

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

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

WELDER REPAIR & SERVICE, INC.
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. LTD.
Dartmouth, Nova Scotia
902/468-6255

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

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

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

MK Warranty Repair Stations as of 11/13/2001 (Continued)

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

INDUSTRIAL ELECTRONIC SERVICES
Calgary, Alberta
403/279-3432

LADEL LTD.
Quebec
819/376-6577

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

WELDING WIDE SERVICES, INC.
Brampton, Ontario
905/874-9992

WELDTEC
B.C.
604/545-3886

CHINA

PHT Group Company
Beijing, China
86-10-6858 8395

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<p>WARNING</p>	<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.
<p>Spanish AVISO DE PRECAUCION</p>	<ul style="list-style-type: none"> No toque las partes o los electrodos bajo carga con la piel o ropa mojada. Aíslase 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.
<p>French ATTENTION</p>	<ul style="list-style-type: none"> Ne laissez ni la peau ni des vêtements mouillés entrer en contact avec des pièces sous tension. Isolerez-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.
<p>German WARNUNG</p>	<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!
<p>Portuguese ATENÇÃO</p>	<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, ouvidos e corpo.
<p>Japanese 注意事項</p>	<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。 高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"> 燃えやすいものの気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。
<p>Chinese 警告</p>	<ul style="list-style-type: none"> 皮肤或湿衣物切勿接触带电部件及焊炬。 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。
<p>Korean 위험</p>	<ul style="list-style-type: none"> 전도체나 용접봉을 젖은 환경 또는 피부로 절대 접촉치 마십시오. 도체와 접지를 접촉치 마십시오. 	<ul style="list-style-type: none"> 인화성 물질을 접근시키지 마십시오. 	<ul style="list-style-type: none"> 눈, 귀와 몸에 보호장구를 착용하십시오.
<p>Arabic تحذير</p>	<ul style="list-style-type: none"> لا تلمس الأجزاء التي يسري فيها التيار الكهربائي أو الأقطاب بجهد الجسم أو بالملابس المبللة بالتمام. ضع عزلاً 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"> ● Las 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"> ● ヒュームから顔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ください。 	<ul style="list-style-type: none"> ● パネルやカバーを取り外したまま機械操作をしないで下さい。 	Japanese 注意事項
<ul style="list-style-type: none"> ● 頭部遠離煙霧。 ● 在呼吸區使用通風或排風器除煙。 	<ul style="list-style-type: none"> ● 維修前切斷電源。 	<ul style="list-style-type: none"> ● 置裝板打開或沒有安全罩時不準作業。 	Chinese 警告
<ul style="list-style-type: none"> ● 얼굴로부터 용접가스를 멀리하십시오. ● 호흡지역으로부터 용접가스를 제거하기 위해 가스제거기나 통풍기를 사용하십시오. 	<ul style="list-style-type: none"> ● 보수전에 전원을 차단하십시오. 	<ul style="list-style-type: none"> ● 판넬이 열린 상태로 작동치 마십시오. 	Korean 위험
<ul style="list-style-type: none"> ● بعد رأسك بعيداً عن الدخان. ● استعمل التهوية أو جهاز ضبط 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 إذا كانت الاغطية الحديدية الوالدية 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鐵揮材料，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 gas cups, gas cup 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 and Water Recirculators..... 1 year**
2. **All Other Equipment..... 3 years**
3. **Repairs90 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.

ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY, OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE, OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY MK PRODUCTS, IS EXCLUDED AND DISCLAIMED BY MK PRODUCTS.

EXCEPT AS EXPRESSLY PROVIDED BY MK PRODUCTS IN WRITING, MK PRODUCTS ARE INTENDED FOR ULTIMATE PURCHASE BY COMMERCIAL/INDUSTRIAL USERS AND FOR OPERATION BY PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT AND NOT FOR CONSUMERS OR CONSUMER USE. MK PRODUCTS WARRANTIES DO NOT EXTEND TO, AND NO RE-SELLER IS AUTHORIZED TO EXTEND MK PRODUCTS' WARRANTIES TO ANY CONSUMER.



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Irvine, CA 92606
Tel (949)863-1234
Fax (949)474-1428
www.mkproducts.com

DATE : March 1, 2001



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