175 Ampere Push-Pull Welding Gun

Owner’s Manual

Product: Cobra® SX Millermatic
Manual: 091-0641
Serial: 10090001
Voltage Rating: 24 VDC
Revision: Sept 2010
Gun models: 326-8xx
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Safety Warnings

Warranty
Declaration of Conformity for European Community (CE) Products

Note This information is provided for units with CE certification (see rating label on unit).

Manufacturer’s Name: MK Products, Inc.
16882 Armstrong Ave.
Irvine, CA 92606

Declares that the product: Cobra® SX Millermatic Compatible
conforms to the following Directives and Standards:

Directives
Low Voltage Directive: 2006/95/EC

Standards
Torches And Guns For Arc Welding, EN 60974-7: 2005
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 DENSITY 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, and the 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. 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.

Vapors from chlorinated solvents can be decomposed by the heat of the arc (or flame) to form PHOSGENE, a highly toxic gas, 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 reentering it.

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 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.

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Cobra® SX Millematic Compatible™ Owner's Manual - Page 1
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 produced 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 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, disassemble, clean, and regularly thereafter. Brush with soap solution. 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 solution. Bubbles indicate leaks.

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.

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.

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.

4. Toxic Fume Prevention
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 pitted, or spattered.

5. Grounding the Equipment
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.

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

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Thank You

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

Please Examine Carton and Equipment For Damage Immediately

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

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

Model Name & Number _____________________
Code & Serial Number _____________________
Date of Purchase _____________________

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

Read this Owner’s Manual completely before attempting to use this equipment. Save this manual and keep it handy for quick reference. Pay particular attention to the safety instructions we have provided for your protection.
Section A

Installation

Technical Specifications

Wire Capacity

.030" - .035" (0.6mm - 0.9mm) Solid and hard wires
.030" - 3/64" (0.8mm - 1.6mm) Aluminum
.023" (0.6mm) capability using Optional Idler Roll, P/N 511-0113

Wire Speed

800 IPM (20.3 mpm) Max. at rated feeder Input Voltage (120VAC / 42VAC)

Duty Cycle

All ratings are using Argon Gas

175 Amps/25 Volts 60%

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.

Gun Lead Connections

Power Cable - Air Cooled

A #2 power cable is used on the Cobra® SX Millermatic Compatible™ gun. The gun and Power Pin ends of the cable are stripped to the copper strands and wrapped with a copper strip. A setscrew holds the cable securely in the gun body with torque requirements of 55-60 in-lb.

Conduit

The Cobra® SX Millermatic Compatible™ comes standard with a poly-lined conduit, for feeding aluminum wire. The longer fitting with a shallow groove is used on the gun end. A set screw located on top of the gun handle secures the conduit in place. The cabinet end of the conduit is secured into the Power Pin connector with a set screw.

Gas Hose

The gas hose is pushed over a barbed fitting on the end of the gun body and secured by twisting the hose retainer to the end of the hose (shown below). The hose retainer is re-usable and can be removed and re-installed as needed.

Control Cable

A multi-conductor control cable is used on the Cobra® SX Millermatic Compatible™. The gun end of the cable is secured with a cable clamp and the wires are connected to the potentiometer, the micro switch, the motor and the gun body mechanically. Slack is left in the electric cable as it exits the back of the gun to prevent cable and/or wire breakage. The cabinet end of the control cable uses a 10-Pin, "X" clocked Amphenol connector.
Section B  Operation

General
The Cobra® SX Millermatic Compatible™ gun 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 gun motor, causes the wire to literally float friction-free through the wire conduit. The 24VDC gun motor is controlled by a three and three-quarter (3 3/4) turn potentiometer in the gun handle.

Controls and Settings

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

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

Trigger Sensitivity
The amount of trigger lever travel can be shortened for a “quicker” or “more responsive” action. A more sensitive trigger lever is produced by reducing the gap between the trigger lever and the micro-switch lever. By turning-in the Trigger Sensitivity Adjustment Screw (Figure 1), it closes the gap between the trigger lever and the micro-switch lever. This will enable the operator to increase the sensitivity of the trigger lever.

Sensitivity Adjustment
With the wire feeder turned on (with or without welding wire loaded), turn the screw in until the micro-switch is activated (Figure 2). Once activated, the gun and wire feeder motors will begin feeding wire. Retract the screw accordingly until the system is deactivated and adjusted to the operators’ liking.

Drive Roll and Idler Rolls

General
The Cobra® SX Millermatic Compatible™ gun comes standard with a knurled drive roll and a grooved idler roll, ready for welding aluminum wire diameters from .030” up to 3/64”. An optional grooved idler roll, for wire diameter .023” is available as P/N 511-0113. Insulated V-Groove drive roll kits are also available for aluminum wire, (see Optional Kits).

Drive roll tension is accomplished with a unique spring-loaded pressure screw. The Cobra® SX Millermatic Compatible™ comes from the factory with the pressure adjustment screw preset.

NO ADJUSTMENT is required for all sizes and types of wires.

Drive Roll Installation/Removal

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

1. Push the idler lever, this will relieve the pressure against the drive roll (as shown in Figure 3).
2. Align the Drive Roll Removal Tool (P/N 931-0100) over the flats of the drive roll (as shown in Figure 4). Hold the gun with one hand or on a table top, with the other hand give the Removal Tool a quick snap-turn in the CLOCKWISE DIRECTION.
3. Once the drive roll is loose, continue to spin drive roll in the clockwise direction to remove the drive roll from the gun.

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
(Reference Figure 5)
1. Using a slot type screwdriver, loosen idler screw.
2. Insert new idler roll onto screw, insuring that idler groove is toward top.
3. Tighten.

Section C   Accessories

Optional Kits
The arcing of the wire at the knurled drive roll is typical of a contact tip which is too large for the wire or if the aluminum wire has excessive oxidation, reducing the contact between the wire and contact tip. Insulated Drive Roll Kits are used when the teeth on the knurled drive roll, arc to and soften the wire as it enters the barrel liner. The softened wire has a greater potential of being shaved and/or clogging in the barrel liner.

Insulated Groove Drive Roll Kit ......................................................005-0640
For .030" (0.8mm) dia. aluminum wire. Includes insulated drive roll and idler roll assy.

Insulated Groove Drive Roll Kit ......................................................005-0716
For .035" (0.9mm) dia. aluminum wire. Includes insulated drive roll and idler roll assy.

Insulated Groove Drive Roll Kit ......................................................005-0717
For .040" (1.0mm) dia. aluminum wire. Includes insulated drive roll and idler roll assy.

Insulated Groove Drive Roll Kit ......................................................005-0718
For 3/64" (1.2mm) dia. aluminum wire. Includes insulated drive roll and idler roll assy.

Snake Skins
Snake Skin protective covers are standard on the Cobra® SX Millermatic Compatible™. Replacement covers may be ordered and replaced in the field by means of hook and loop - also known as Velcro®.

Snake Skin Cover 15ft leads ......................................................931-0110
Snake Skin Cover 25ft leads ......................................................931-0122
Snake Skin Cover 35ft leads ......................................................931-0132
Snake Skin Cover 50ft leads ......................................................931-0123
Conduits
flat spiral steel conduit for steel & cored wire
615-0621-15 ................................................................. 15 ft./4.5m
615-0621-25 ................................................................. 25 ft./7.6m
615-0621-35 ................................................................. 35 ft./10.7m
615-0621-50 ................................................................. 50 ft./15.2m

Contact Tips

<table>
<thead>
<tr>
<th>Wire Size</th>
<th>Tip ID</th>
<th>Arc</th>
<th>Tip Length</th>
<th>Part No.</th>
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</thead>
<tbody>
<tr>
<td>.023&quot; (0.6 mm)</td>
<td>.031&quot; (0.8 mm)</td>
<td>Spray</td>
<td>1.50&quot; (38.1 mm)</td>
<td>621-0057-25</td>
</tr>
<tr>
<td>.023&quot; (0.6 mm)</td>
<td>.031&quot; (0.8 mm)</td>
<td>Short</td>
<td>1.75&quot; (44.5 mm)</td>
<td>621-0328-25</td>
</tr>
<tr>
<td>.030&quot; (0.8 mm)</td>
<td>.037&quot; (0.9 mm)</td>
<td>Spray</td>
<td>1.50&quot; (38.1 mm)</td>
<td>621-0325-25</td>
</tr>
<tr>
<td>.030&quot; (0.8 mm)</td>
<td>.037&quot; (0.9 mm)</td>
<td>Short</td>
<td>1.75&quot; (44.5 mm)</td>
<td>621-0326-25</td>
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<tr>
<td>.030&quot; (0.8 mm)</td>
<td>.040&quot; (1.0 mm)</td>
<td>Spray</td>
<td>1.50&quot; (38.1 mm)</td>
<td>621-0076-25</td>
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<tr>
<td>.035&quot; (0.9 mm)</td>
<td>.045&quot; (1.1 mm)</td>
<td>Spray</td>
<td>1.50&quot; (38.1 mm)</td>
<td>621-0001-25</td>
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<tr>
<td>.035&quot; (0.9 mm)</td>
<td>.040&quot; (1.0 mm)</td>
<td>Short</td>
<td>1.75&quot; (44.5 mm)</td>
<td>621-0077-25</td>
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<td>.035&quot; (0.9 mm)</td>
<td>.045&quot; (1.1 mm)</td>
<td>Short</td>
<td>1.75&quot; (44.5 mm)</td>
<td>621-0002-25</td>
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<tr>
<td>3/64&quot; (1.2 mm)</td>
<td>.054&quot; (1.37 mm)</td>
<td>Spray</td>
<td>1.50&quot; (38.1 mm)</td>
<td>621-0327-25</td>
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<tr>
<td>3/64&quot; (1.2 mm)</td>
<td>.060&quot; (1.5 mm)</td>
<td>Spray</td>
<td>1.50&quot; (38.1 mm)</td>
<td>621-0003-25</td>
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**This size tip furnished with gun
* All tips sold in quantities of 25
† Also sold in quantities of 250

Gas Cups

<table>
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<tr>
<th>Cup Size</th>
<th>Cup I.D.</th>
<th>Part No.</th>
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<tbody>
<tr>
<td>No. 5</td>
<td>1/4&quot; (6.4mm)</td>
<td>621-0079</td>
</tr>
<tr>
<td>No. 6</td>
<td>3/8&quot; (9.5mm)</td>
<td>001-0137†</td>
</tr>
<tr>
<td>No. 8</td>
<td>1/2&quot; (12.7mm)</td>
<td>001-0138‡</td>
</tr>
<tr>
<td>No. 10</td>
<td>5/8&quot; (15.8mm)</td>
<td>001-0139‡</td>
</tr>
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</table>

*standard - furnished with gun
†sold in packs of 4 each
‡sold in packs of 4 each

Gun Barrel Liners

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>931-0137</td>
<td>Teflon liner package, 5 pieces</td>
</tr>
<tr>
<td>615-0255</td>
<td>Spiral steel, .030-.045&quot; (0.8mm - 1.1mm)</td>
</tr>
<tr>
<td>621-0017</td>
<td>Tip Extender, Classic Cup, 1/4&quot; Tip (Stackable)</td>
</tr>
<tr>
<td>615-0256</td>
<td>Spiral liner for tip extender</td>
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Section D

Maintenance

Periodic Maintenance

Your Cobramatic System is designed to provide years of reliable service. Maintenance of the gun will normally consist of a general cleaning of the wire guide system, including barrel, drive rolls, and conduit at regular intervals. Remove spatter build-up from inside of nozzles with a hardwood stick. It is recommended that the conduit be blown out every time you add a new spool of wire.

The only parts on the Cobramatic system that are subject to normal wear are the conduit, contact tips, gas cups, front body liners, wire guides, drive and idler rolls. A supply of these parts should be maintained on hand. The number of units in operation and the importance of minimal “down time” will determine to what extent spare parts should be stocked on hand. See the “Recommended spare parts list” for the most commonly replaced parts.

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

<table>
<thead>
<tr>
<th>Maintenance Tools</th>
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<tbody>
<tr>
<td>Tool</td>
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<tr>
<td>Drive Roll Removal Tool</td>
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<table>
<thead>
<tr>
<th>Recommended Spare Parts List</th>
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</thead>
<tbody>
<tr>
<td>Qty.</td>
</tr>
<tr>
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</tr>
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<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>2</td>
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</table>

DRIVE ROLL REMOVAL TOOL
931-0100

KNURLED DRIVE ROLL
511-0101

IDLER ROLL
511-0001
(.030” - 3/64”)

IDLER ROLL
511-0113
(.023”)

MICRO SWITCH ASSY
003-2197
## Section E  Troubleshooting

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

Regardless of which gun or feeder used, all MK Products’ push-pull guns operate on the same principle. The slave motor in the feeder runs at a fast, constant torque, but has very low torque. It is always trying to feed more wire than the gun 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 gun motor is controlled by a solid state speed control located in the feeder, and a pot located in the gun. The gun 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 gun activates both the slave motor and gun motor circuits in the cabinet. Therefore, if the slave motor and brake solenoid operate, but the gun does not, look more toward the gun motor’s 24 V circuits, speed control, control cable, or the gun motor. If nothing operates, look more toward the slave motor’s input, micro switch leads, or micro switch.

Testing The Gun

Reference the "X" clocked Amphenol diagram on the Cobra® SX Millermatic Compatible™ electrical diagram for information about pin-outs and locations.

Motor Check
Remove the connector from the cabinet.
Using the Amphenol connector, check the resistance across pins “C” and “B” (motor leads).
If an open circuit (more than K ohms) or short (less than 2 ohms) exists, check the motor leads and motor independently.

Testing the Gun Potentiometer
Using the amphenol connector, check the resistance across pin “F” (wiper) and pin “E”. The resistance should vary from 0 - 5K ohms as the potentiometer is turned.
Check the resistance across pin “F” (wiper) and pin “H”. The resistance should vary from 5K - 0 ohms as the potentiometer is turned.

Testing the Micro Switch
Using the amphenol connector, check for continuity across pins “D” and “G” when the trigger is pressed.
## Appendixes And Diagrams / Parts List

<table>
<thead>
<tr>
<th>Section F</th>
<th>Exploded View</th>
<th>Front Body Assembly</th>
<th>Rear Body Assembly</th>
<th>Classic Cup Assembly</th>
<th>Lead Assembly</th>
<th>Power Pin Adapter Assembly</th>
<th>Power Manifold Assembly</th>
<th>Wiring Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
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<td>Qty.</td>
<td>Part No.</td>
<td>Description</td>
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<td>005-0694</td>
<td>Trigger Kit</td>
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<td>11</td>
<td>338-0014</td>
<td>SCR SHC 4-40 x 1/2 SST</td>
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<td>003-2190</td>
<td>Assy Potentiometer</td>
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<td>4</td>
<td>338-0034</td>
<td>SCR SHC 8-32 x 1/2 SST</td>
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<td>338-0153</td>
<td>SCR SHC 1-72 x 3/8</td>
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<td>003-2192</td>
<td>Assy Motor</td>
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<td>Pin Dowel 3/32 x 3/4 SST</td>
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<td>-</td>
<td>-</td>
<td>15</td>
<td>1</td>
<td>431-1760</td>
<td>SCR Shoulder 1/8 x 4-40</td>
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<tr>
<td>7</td>
<td>1</td>
<td>003-2244</td>
<td>Assy Rear Body</td>
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<td>005-0710</td>
<td>Handle Kit: Includes line items 10, 15, and 18</td>
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<tr>
<td>8</td>
<td>4</td>
<td>333-0003</td>
<td>Wshr Spr Lk #4</td>
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<td>9</td>
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<td>333-0006</td>
<td>Wshr Spr Lk #8</td>
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<td>437-0292</td>
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## Front Body Assembly

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<td>419-0120</td>
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<td>431-1728</td>
<td>SCR SH.093x4-40</td>
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<tr>
<td>4</td>
<td>-</td>
<td>-</td>
<td>Not Available Separately</td>
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<tr>
<td>5</td>
<td>1</td>
<td>431-1731</td>
<td>Idler Arm/Lever</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>511-0101</td>
<td>Drive Roll</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>511-0001</td>
<td>Idler Roll (.030&quot; - 3/64&quot;)</td>
</tr>
<tr>
<td>7</td>
<td>opt</td>
<td>511-0113</td>
<td>Idler Roll (.023&quot; - .035&quot;)</td>
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## Cobra® SX Millermatic Compatible™
### Rear Body Assembly
003-2244

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<tr>
<td>2</td>
<td>2</td>
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<td>0-Ring 2-005</td>
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<td>321-1104</td>
<td>Conduit SCR</td>
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</table>
Cobra® SX Millermatic Compatible™
Classic Cup Barrel Assembly
003-2340

⚠️ INSTALL ITEM 6 TO ITEM 2, THEN INSTALL ITEM 5
TRIM OFF LINER FROM NICKEL TUBE TO 0.06 INCH.
APPLY SILICONE LUBRICANT TO O-RINGS BEFORE INSTALLING.

<table>
<thead>
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<th>No.</th>
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<tbody>
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<td>1</td>
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<td>#8 Assy Gas Cup</td>
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<tr>
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<td>301-0101</td>
<td>Barrel Insulator</td>
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<td>4</td>
<td>2</td>
<td>303-0097</td>
<td>O-Ring 2-005</td>
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<tr>
<td>5</td>
<td>1 pkg.</td>
<td>931-0137</td>
<td>Barrel Liner PK, 5 pcs</td>
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<tr>
<td>6</td>
<td>1</td>
<td>621-0001</td>
<td>Tip, .045 x .25 OD</td>
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## Lead Assembly

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<th>25' Part No.</th>
<th>35' Part No.</th>
<th>50' Part No.</th>
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<tr>
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<td></td>
<td></td>
<td></td>
</tr>
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<td>3</td>
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<td>Assy Power Pin Adapter, Miller</td>
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<td></td>
<td></td>
<td></td>
</tr>
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<td>4</td>
<td>2</td>
<td>Wrap Spiral Cord</td>
<td></td>
<td></td>
<td></td>
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</tr>
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<td>5</td>
<td>4</td>
<td>Screw SHC 4-40 x 1/2 SST</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>Tie Wrap .75 x Dia N Blk</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>7*</td>
<td>1</td>
<td>Hose Retainer, 5/16</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>8</td>
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<td>Handle RH Lead Universal</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>9</td>
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<td>Handle LH Lead Universal</td>
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<td></td>
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<td>Snake Skin</td>
<td>931-0110</td>
<td>931-0122</td>
<td>931-0132</td>
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<td>552-0241-15</td>
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<td>552-0241-35</td>
<td>552-0241-50</td>
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<tr>
<td>12</td>
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<td>Conduit Tef Tube</td>
<td>615-0620-15</td>
<td>615-0620-25</td>
<td>615-0620-35</td>
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<td>843-0640-35</td>
<td>843-0640-50</td>
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</table>

*Hose Retainer is re-usable and can be removed and re-installed as needed*
Cobra® SX Millermatic Compatible™
Power Pin Adapter Assembly
P/N 003-2338

APPLY SILICONE LUBRICANT TO O-RINGS BEFORE INSTALLING

<table>
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<th>Part No.</th>
<th>Description</th>
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<tbody>
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<td>2</td>
<td>303-0010</td>
<td>O-Ring 2-014 .489 ID x .07 W</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>303-0102</td>
<td>O-Ring .487 ID x .103 W</td>
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</table>
Cobra® SX Millermatic Compatible™
Power Manifold Assembly
P/N 003-2337

<table>
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<td>1</td>
<td>321-1104</td>
<td>Set Screw Conduit</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>321-1082</td>
<td>Set Screw Flat 1/4 - 20 x 3/8 SST</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>431-1905</td>
<td>Fitting 1/8 ID x 1/16 - 27 NPT</td>
</tr>
<tr>
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<td>Power Manifold</td>
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</table>

TIGHTEN WITH 65-5 IN-LBS TORQUE

APPLY HIGH STRENGTH THREAD SEALANT
"X" Clocked Connector
Viewed from back of connector
<table>
<thead>
<tr>
<th>WARNING</th>
<th>AVISO DE PRECAUCION</th>
<th>ATTENTION</th>
<th>WARNUNG</th>
<th>ATENÇÃO</th>
<th>注意事項</th>
<th>警告</th>
<th>위험</th>
<th>تحذير</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Do not touch electrically live parts or electrode with skin or wet clothing.</td>
<td>• No toque las partes o los electrodos bajo carga con la piel o ropa mojada.</td>
<td>• Ne jamais laisser les parties molles entrer en contact avec des pièces sous tension.</td>
<td>• Berühren Sie keine strömfliehenden Teile oder Elektroden mit Ihrem Körper oder feuchter Kleidung!</td>
<td>• Não toque as partes elétricas e eletrodos com a pele ou roupa molhada.</td>
<td>• 注意電気回路を触らないでください。</td>
<td>• 保持绝缘物品及防护用品。</td>
<td>• 전동기 또는 전기기자재를 접촉하지 마십시오.</td>
<td>• ضع البدائل التي تأسفها النور.</td>
</tr>
<tr>
<td>• Insulate yourself from work and ground.</td>
<td>• Aísse de la tierra y de la tierra.</td>
<td>• Isoliez-vous du travail et de la terre.</td>
<td>• Isolieren Sie sich von dem Elektroden und dem Erdboden!</td>
<td>• Iso-se da peça e terra.</td>
<td>• 保持绝缘物品及防护用品。</td>
<td>• 保持绝缘物品及防护用品。</td>
<td>• 가리키는 물질을 절대 접촉하지 마십시오.</td>
<td>• ضع المواد الأصلية في مكان بعيد.</td>
</tr>
<tr>
<td>• Keep flammable materials away.</td>
<td>• Mantenga el material combustible fuera del área de trabajo.</td>
<td>• Gardez à l’écart de tout matériel inflammable.</td>
<td>• Entfernen Sie brennbare Materialien!</td>
<td>• Mantenha inflamáveis bem guardados.</td>
<td>• 保持绝缘物品及防护用品。</td>
<td>• 保持绝缘物品及防护用品。</td>
<td>• 가리키는 물질을 절대 접촉하지 마십시오.</td>
<td>• ضع المواد الأصلية في مكان بعيد.</td>
</tr>
<tr>
<td>• Wear eye, ear and body protection.</td>
<td>• Protejase los ojos, los oídos y el cuerpo.</td>
<td>• Protégez vos yeux, vos oreilles et votre corps.</td>
<td>• Tragen Sie Augen-,Ohren- und Körperschutz!</td>
<td>• Use protección para a vista, oído e corpo.</td>
<td>• 保持绝缘物品及防护用品。</td>
<td>• 保持绝缘物品及防护用品。</td>
<td>• 가리키는 물질을 절대 접촉하지 마십시오.</td>
<td>• ضع المواد الأصلية في مكان بعيد.</td>
</tr>
</tbody>
</table>

**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 EBNENFALLS ZU BEACHTEN.**
<table>
<thead>
<tr>
<th>Keep your head out of fumes.</th>
<th>Turn power off before servicing.</th>
<th>Do not operate with panel open or guards off.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use ventilation or exhaust to remove fumes from breathing zone.</td>
<td>Disconnect the cable of alimentación de poder de la máquina antes de iniciar cualquier servicio.</td>
<td>No operar con panel abierto o guardas quitadas.</td>
</tr>
</tbody>
</table>
| Los humos fuera de la zona de respiración. | Mantenga la cabeza fuera de los humos. Utilice ventilación o aspiración para gases. | Spanish:
| AVISO DE PRECAUCIÓN |
| Garder la tête à l'écart des fumées. | Utilizez un ventilateur ou un aspirateur pour dir les fumées des zones de travail. | French:
| ATTENTION |
| Vermeiden Sie das Einatmen von Schweißrauch! | Sorgen Sie für gute Be- und Entlüftung des Arbeitsplatzes! | German:
| WARNUNG |
| Mantenha seu rosto da fumaça. | Use ventilação e exaustão para remover fumaça da zona respiratória. | Portuguese:
| ATENÇÃO |

**WARNING**

- Si può arrotondare il naso così come da lavarsi. 
- Si può arrotondare il naso così come da lavarsi. 
- Si può arrotondare il naso così come da lavarsi.

|ヒュームから頭を離すようにして下さい。 | 呼吸に影響を十分注意してください。 |
|メンテナンス・サービスに携わる際には、まず電源スイッチを必ず切って下さい。 | パネルやカバーを外したままで機械操作をしないで下さい。

|韓国어 |
|위험 |

**警告**

- 不要靠近正在焊接的区域。
- 焊接前要切断电源。
- 未经允许不得使用或介入。

|警告 |
|---|---|---|
|日本語 |
|注意事項 |

- 电压、电压、电压。
- 电压、电压、电压。
- 电压、电压、电压。

|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.**

使用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商提供的說明以及應該使用的焊接材料，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。

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*تأتي هذه المعلومات لمعرفة منتج هذه المواد والمعدات قبل استخدامها واستيعاب العناية بأعمال العمل.*
LIMITED WARRANTY

Effective August 1, 2010

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

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

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

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

1. repair;
2. replacement;
3. where authorized in writing by MK Products, the reasonable cost of repair or replacement at our Irvine, California plant.

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. Power Supplies and Wire Feed Cabinets .................. 3 years
2. Weldheads, Coolers, Positioners, and Push Pull Guns .... 1 year
3. Spool Guns, and Spool Gun Modules .................... 180 days
4. Repairs/Exchanges/Parts .............................. 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 (one way) 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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