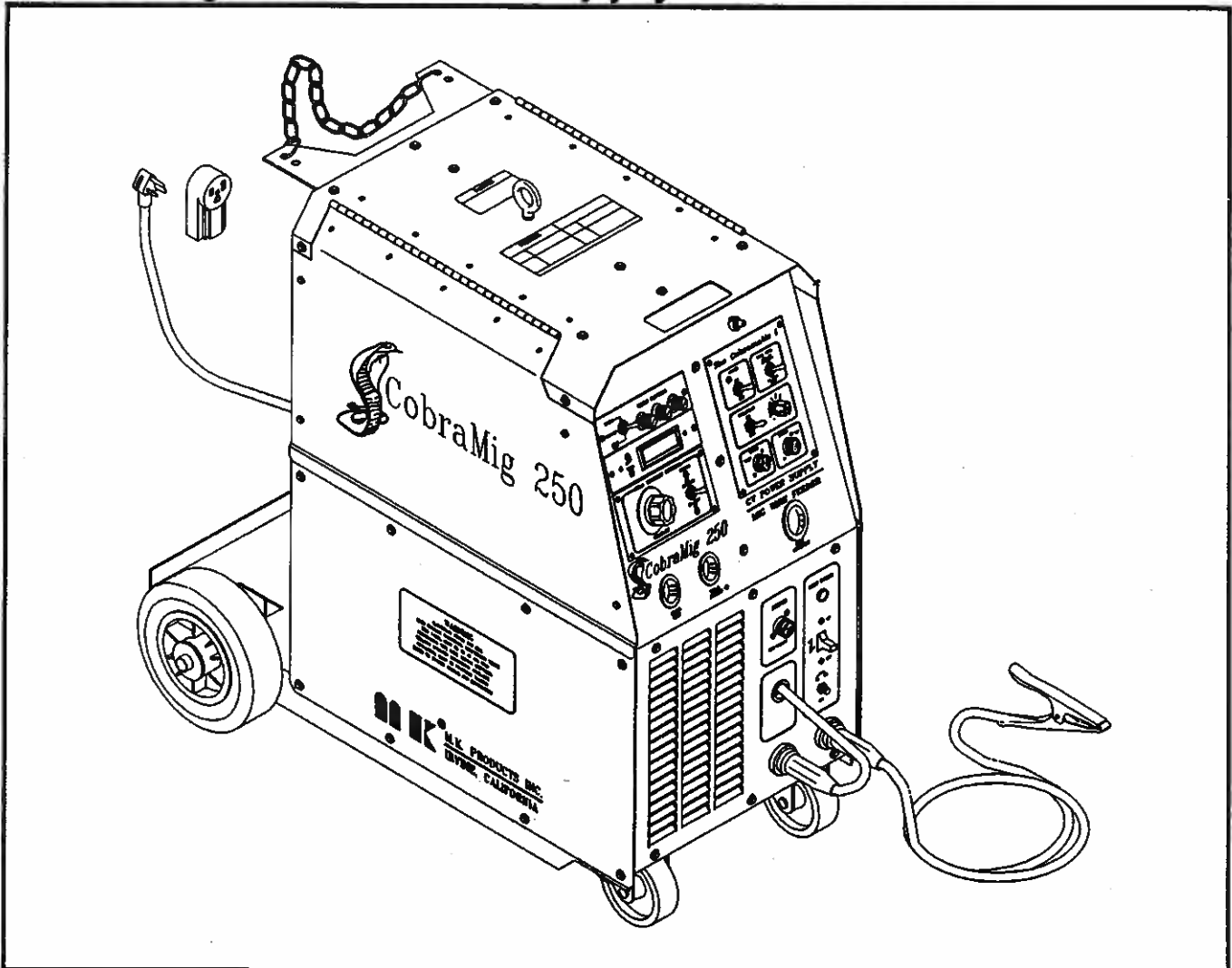




OWNERS MANUAL

Product Description	CobraMig 250 PS/WF
M.K. Manual Part Number	091-0275
M.K. Form Number	CM250/OM
NWSA Form Number	550
Effective with Serial Number	105
Voltage Ratings	208-230 VAC
Printing Date	Feb 1992
This manual applies to the following CobraMig Model Numbers	180-001

CobraMig 250 - Power Supply/Wire Feeder



M.K. PRODUCTS, INC.

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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 ULTRA-VIOLET 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

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 re-entering 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:

- a. appreciable combustibles (including building construction) are within 35 feet.
- b. appreciable combustibles are further than 35 feet, but can be ignited by sparks.
- c. openings (concealed or visible) in floors or walls within 35 feet may expose combustibles to sparks.
- d. 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 over-pressure; 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 re-tighten, 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 shutoff.

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, flame-proof 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, non-combustible screens or panels. Allow for free air circulation, particularly at floor level.

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

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

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

B. Toxic Fume Prevention

Comply with precautions in 1-2B.

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

C. Fire and Explosion Prevention

Comply with precautions in 1-2C.

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

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

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

D. Compressed Gas Equipment

Comply with precautions in 1-2D.

E. Shock Prevention

Exposed electrically hot conductors or other bare metal in the welding circuit, or in ungrounded, electrically-HOT equipment can fatally shock a person whose body becomes a conductor. **DO NOT STAND, SIT, LIE, LEAN ON, OR TOUCH** a wet surface when welding without suitable protection.

To protect against shock:

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

1. Grounding the Equipment

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

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

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

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

2. Connectors

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

3. Cables

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

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

4. Terminals and Other Exposed Parts

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

5. Electrode Wire

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

6. Safety Devices

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

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

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

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

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

THANK YOU

for purchasing what we believe is the best built wire feeder/power supply on the market. This manual details the installation of your CobraMig 250. Properly installed, adjusted, and maintained for your welding conditions, it will prove to be a reliable welding system producing consistently uniform welds.

The CobraMig 250 unit consists of a single-phase constant voltage (CV) power supply with a built-in *Cobramatic I* wire feeder and controls. This unit is compatible with any of M.K. Products 7-pin "W" clocked push-pull guns or Prince spool gun. ("S" clocked with connector kit)

In order to assure optimum performance of your CobraMig 250, familiarize yourself with the contents of this manual, and carefully follow all instructions.

This manual will not only guide you in installing your Cobramatic equipment, but will also be a handy reference for optional items, replacement parts, and consumables.

SPECIFICATIONS

Wire Diameter Capacity
 .030 - 1/16" ALL Types, .023 hard wires

Wire Capacity
 12" Standard (Insulated or Non-Insulated)

Power Input
 208 Vac 50/60 Hz, 50 amperes, single phase
 230 Vac 50/60 Hz, 45 amperes, single phase

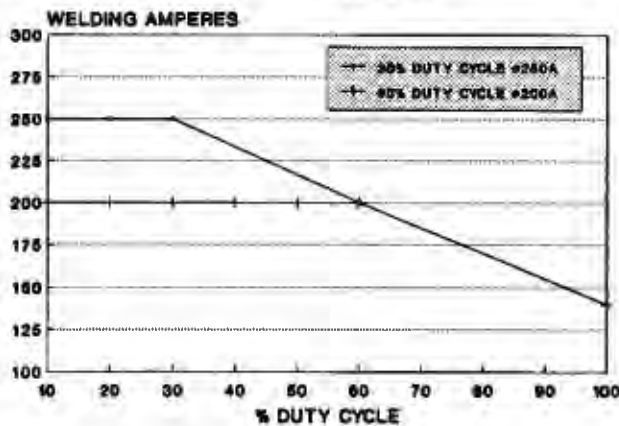
Rated Output @ 30% duty cycle
 250 amperes @ 26 Vdc - (8.7KW)
 2 ranges (12-22V) (22-32V) 40 Vdc max OCV

Weight
 230 pounds (dry), 260 pounds (shipping)

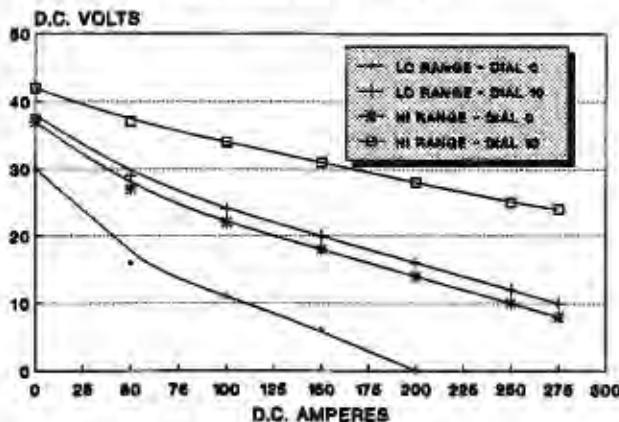
Size.....15"w x 32"h x 34"d

For Use with Torch Prefix Numbers
 145, 146, 147, 148, 149, 109, 156, 118, 133, 136,
 160, 161, 162, 163

DUTY CYCLE CURVES



VOLT-AMPERE CURVES



SUPPORT EQUIPMENT REQUIRED

Regulated Gas Supply and 6' GasHose.

Water Source and Hose Capable of Providing a Minimum of 1 qt/min. at 45 p.s.i. when using water cooled torches.

COOLANT RECOMMENDATIONS

1. Use a name-brand additive which does not contain reactive sulphur or chlorine and does not react with copper, brass, or aluminum.
2. Check coolant periodically to remain within limits of the following:

- A. Coolant Flow rate - 1 quart/minute at 45 p.s.i.
- B. Resistivity - 10K ohms/centimeter
- C. Ph Range - 5.5-8.5
- D. Particle Size - .005"

OPTIONAL ACCESSORIES

Plastic Guides for Slave Motor

Inlet Guide **753-0062**
 Outlet Guide with Knob **003-0428**

OPTIONAL KITS

Remote Voltage Kit **005-0584**
Enables the power supply to be controlled from 25' pendant.
Extend to 50' with 25' extension cable **843-0354**

LCD Meter Kit **005-0585**
Digital Volt and Amp meters with memory feature to hold and alternately display volts and amps for 1 minute after welding.

Timer Kit **005-0586**
Add on panel includes spot timer, and stitch weld option.

Remote wire feed Kit with digital readout knob **005-0166**
Relocates wire feed speed control from the torch to the CobraMig front panel.

Remote wire feed Kit **005-0167**
Relocates torch speed control to the CobraMig front panel.

S clocked Kit **005-3563**
*Adds *S* clocked connector compatibility to front panel.*

INSTALLATION

Location

The unit should be placed in a location where it can be protected from damage. For the longest unit life and best efficiency, avoid locations exposed to dust, corrosive fumes, high ambient temperatures or high humidity. Moisture and dirt on components can cause corrosion and/or shorting of circuits.

Adequate air circulation is needed at all times in order to prevent overheating and possible damage to internal parts. Maintain at least 12 inches of free air space on all sides of unit.

An eye bolt and mounting hole is provided for lifting/unpacking purposes. Do not have the gas cylinder or any other equipment mounted to this unit when using the lifting eye bolt. Do not suspend this unit overhead.

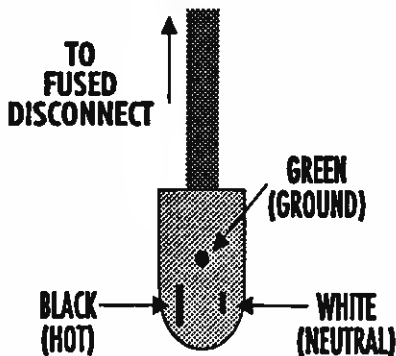
Input Power

This welding power supply is designed to be operated from single-phase 208 or 230VAC 60 Hz input power. Consult your local electrical utility if there are any questions about the type of electrical system at the installation site, or how proper connections to the welding machine have to be made.



WARNING

A fused line disconnect switch should be installed in the input circuit to the welding machine. This would ensure a complete removal of all electrical power when performing service.



The unit is equipped with a three-prong polarized plug and wall receptacle. The wall receptacle should be installed in a convenient location by a competent electrician. Install the wall receptacle with the ground terminal at the top.

Refer to *Table 1* for correct conductor and fuse size.

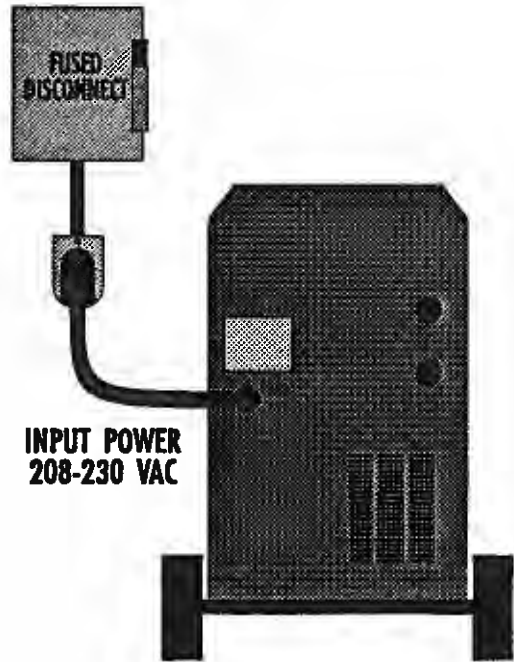


Table 1 - Conductor & fuse guide

Line Volts	Full Load Amps	Approx. Line Fuse Rating	Copper Line Wire Size*	Copper Grounding Conductor Min. Size
			Free Air	
208	50	60 AMP	No. 10	No. 10
230	45	60 AMP	No. 10	No. 10

*Based on 60% duty cycle

Connections for Different Line Voltages

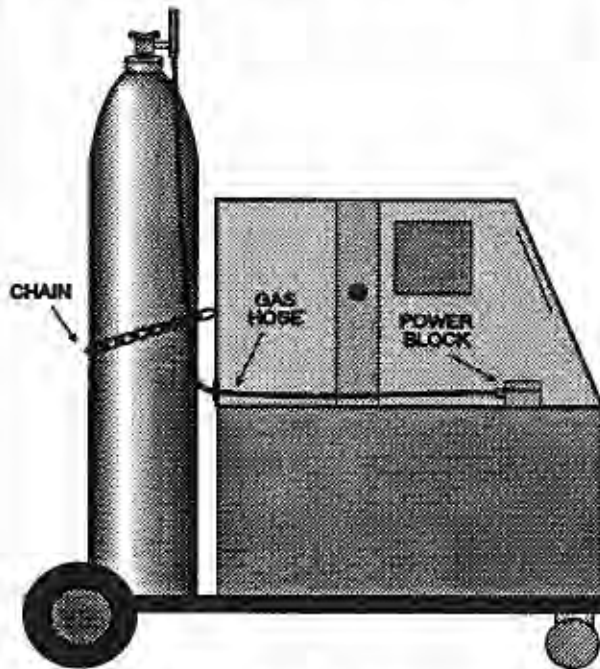
This unit was factory connected for the highest input voltage available for the machine, i.e. 230VAC. To check connections, or to change connections perform the following:

1. Turn off input power disconnect switch and unplug input cable.
2. Remove the right lower panel, as viewed from front, and locate terminal strip T1 and T2.

3. Reposition the jumper links on both the control transformer and main transformer as shown below. Units are shipped with jumpers in the 230 VAC mode.



4. Replace side panel with all hardware.



Shielding Gas Connection

1. Remove the screws from the left hinged door, as viewed from the front, and open door.
2. Route the gas hose from the regulator/flowmeter through the grommet on the back panel and into the 5/8-18 R.H. fitting on the power block.



DANGER

Welding gases can cause serious injury or death. Read manufacturer's instructions before installing, using, or servicing the regulator, gas hose, or gas cylinder.

Do not touch cylinder with electrode. Keep cylinder away from all electrical circuits. Keep gas cylinder secured so that it cannot move.

Water Connections

(Water Cooled Torches Only)

1. Connect the water return line from the recirculator through the grommet on the rear panel and into the 5/8" - 18 L.H. thread on the power block. The water "IN" hose connects directly to the torch water "IN" fitting; it does not pass through the power supply.

Torch Connections

1. Unpack torch and remove all shipping plugs.
2. Open the left door, as you face front of unit, and locate power block.
3. Route torch gas hose through front panel grommet and secure to fitting on power block with 1/2" wrench.
4. Route torch power cable through front panel grommet and secure to fitting on power block with a 3/4" wrench.
5. Open right door and connect conduit to slave motor outlet guide.

WIRE THREADING PROCEDURE

A. Wire Spool Installation

1. Release latches, and open right side door of cabinet.
2. Remove spool retainer from spindle hub.
3. Install wire spool onto spindle hub so that wire feeds from bottom of spool towards slave motor. Make sure that the hole in the spool aligns with pin

on spindle hub. The white dot on the end of the spindle hub will aid in this alignment.

4. Replace the spool retainer.
5. Blow out conduit, if dirty.

B. Threading Procedure

1. Place wire size selector switch on front panel to the correct position for the wire being used.

NOTE: For 3/64" and 1/16" aluminum wire use the "ALL OTHER WIRES" position.

2. Loosen end of wire from spool and cut off any kinked or bent portions.
3. Unreel and straighten out first 6" to 8" of wire.
4. Release tension from slave motor drive rolls.
5. Route wire into inlet guide, along drive roll groove, and into wire conduit.
6. Prevent the wire spool from turning with the palm of the right hand, and at the same time grasp the slave motor pressure adjusting knob.
7. Pull the torch trigger and slowly tighten the slave motor pressure adjusting knob until the slave motor stalls; then add an additional 1/4 turn more.

CAUTION:

EXCESSIVE DRIVE ROLL TENSION WILL REDUCE RATHER THAN IMPROVE WIRE FEED PERFORMANCE.

8. Tighten the torch pressure adjusting knob so the wire will be picked up and fed through the contact tip. 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.

C. Spindle Drag Adjustment

1. Loosen nut inside spindle until spring is not compressed.
2. When in the ".030-.035 Aluminum Only" position tighten nut until you feel spring start to compress then add 1 turn.

3. Press the trigger and make sure the wire comes level off of the spool. If you can see the wire cast when feeding, add a little more drag. (1/4 turn)

4. When in the "All Other Wires" position, start with 3 turns of drag and adjust.

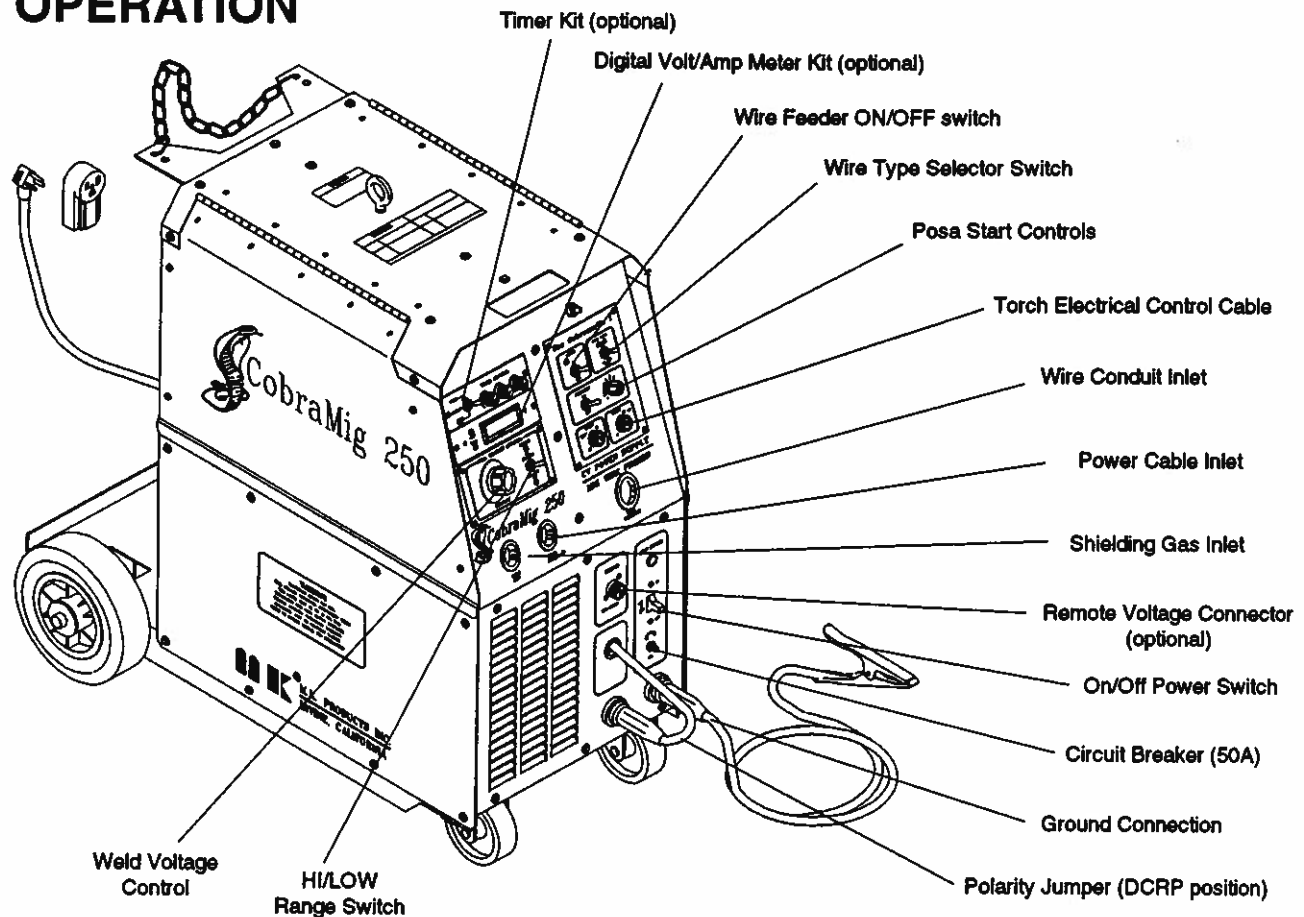
5. When in the ".023 hard wires" position, start with 1/2 turn and adjust.

D. Pre-Setting Slave Motor Tension

(NOTE: Read sections A & B before performing this operation.)

1. All Cobramatics have preset adjusting nuts which enables spools of the same wire diameter and type to be changed without further pressure adjustment after initial set-up.
2. To preset the slave motor tension, bottom out the pressure adjusting knob by turning it completely clockwise.
3. Prevent the wire spool from turning and using a 9/16" wrench adjust the preset nut until the slave motor stalls, then add an additional 1/4 turn.
4. Correct pressure will now be achieved by simply bottoming out the pressure adjusting knob.

OPERATION



I. GENERAL

The CobraMig 250 is a constant voltage (CV) DC welding power supply with a built-in Cobramatic I wire feeder which operates on the same basic principles as all other Cobramatics. The 115VAC slave motor in the feeder side 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 torch motor gets all it wants, it slows the slave motor to the speed that the torch is running. Because of the low torque produced by the slave motor, a brake system is used to prevent wire overrun rather than tension. The drag adjustment in the spindle is used to keep the wire slightly taut, so it will not unspool while feeding wire. The high torque 24VDC torch pull motor is controlled by a solid state speed control, located on the main board, and the potentiometer located on the torch.

The lower portion of the unit houses the power supply components. Power supply controls include a range switch and an infinitely variable voltage control.

II. COBRAMIG 250 CONTROLS

1. ON/OFF SWITCH

Placing the switch in the "ON" position energizes the power supply and places the unit in the ready-to-weld status. The power indicator light should be on at this time.

2. CONDUIT INLET

The conduit inlet provides access to the slave motor outlet guide.

3. POWER CABLE INLET

The power cable inlet provides access to the power block fitting inside the unit.

4. SHIELDING GAS INLET

Provides access to the gas fitting inside the cabinet.

5. WELD VOLTAGE

The weld voltage knob adjusts the power supply output voltage. It is infinitely variable between the ranges. The scale surrounding the WELD voltage control is a relative scale only; it does not represent actual voltage.

6. RANGE SWITCH

The "LO" range provides from 12 to 22 volts and the "HI" range provides from 22 to 32 volts.

7. REMOTE VOLTAGE (See Optional Kits)

This option enables the weld voltage control to be adjusted from a remote hand pendant.

8. TIMER KIT (See Optional Kits)

This option provides Spot Welding or Stitch Welding operation from the Cobramig 250. In the Spot Mode, timing can be adjusted for a welding time of .5 to 4 seconds and a Burnback time of 0 to .25 seconds. In the Stitch Mode, the unit can be commanded to "Turn On" from .5 to 4 seconds and "Turn Off" from .25 to 1 second.

9. DIGITAL VOLT/AMP METER (See Optional Kits)

The LCD meter provides an alternating display of Volts and Amps during and after welding for up to 1 minute using a built-in memory.

10. POLARITY JUMPER

The polarity jumper allows for easy reversal of the electrode polarity. For Reverse polarity (DCRP) plug jumper into the plus (+) connector below jumper plug. For Straight polarity (DCSP) plug jumper into minus (-) connector below jumper plug. The ground lug plugs into whichever connector is not used for the polarity jumper.

11. COBRAMATIC I CONTROLS

a. ON/OFF SWITCH

Placing the switch in the "ON" position energizes the feeder circuitry and the power indicator light.

b. WIRE SIZE SELECTOR SWITCH

The wire size selector switch changes the torque

of the slave motor for the wire you are using. When in the ".023 hard wires" position the slave motor produces 3/4 lb inches, in the ".030-.035" aluminum only position, the slave motor produces approximately 1-1/2 lbs. inches and approximately 4-1/2 lbs. inches when in the "all other wires" position.

(NOTE: Operating the cabinet with the switch in the wrong position will cause wire feed difficulties.)

c. POSA START CONTROLS

The Posa Start Control selects a Run-in Speed which is *slower* than the actual welding speed. After arc initiation, the *wire feed speed* control is transferred to the potentiometer in the torch handle. The scale surrounding the Run-in Speed Control is a relative scale only; it does not represent actual inches per minute, but a percentage of the speed dialed by the torch potentiometer.

d. TORCH AMPHENOL CONNECTORS

The Cobramatic I panel contains *as standard* a 7 pin "W" clocked amphenol connector and optionally a 7 pin "S" clocked connector may be added to accommodate both styles of 7 pin amphenol torches. See specifications for torch compatibility.

III. SEQUENCE OF OPERATION

1. Install and connect unit according to installation instructions.
2. Place the welding machine power ON/OFF switch to the "ON" position.
3. Install wire into feeder and set-up according to Wire Threading Procedure.
4. Open the gas cylinder valve to supply shielding gas to the gun.
5. Press gun trigger and adjust gas flow meter.
6. Connect the WORK (-)(DCRP) clamp to the workpiece.
7. Place the Weld Voltage control and Range switch at the desired position.
8. Set the gun wire speed potentiometer to the correct position.

WARNING: Be sure to put on proper protective clothing and eye safeguards (welding coat, apron, gloves, and welding helmet, with proper lenses installed). See Safety Instructions and Warnings chapter included in this manual. Neglect of these precautions may result in personal injury.

9. Place the gun near the workpiece and slightly crack the trigger and hold for 2 to 3 seconds before fully pressing the trigger. This provides a gas pre-flow which will improve arc starts.

For more information see Table 2 "Welding Guide" in this manual.

POSA START OPERATING PROCEDURE

A. GENERAL

The Posa Start Run-in Speed Control, located on the front panel, provides adjustment for slow wire run-in. Once the arc has been established, the wire feed speed is automatically changed from the slow run-in speed to the welding speed set on the torch potentiometer. This slow run in speed helps to reduce "burn-backs" and "push-back" during arc start.

B. CV POSA START OPERATION

1. Turn power supply main ON/OFF switch to the "ON" position.
2. Turn the Cobramatic I panel to the "ON" position and the Posa Start to the "OFF" position.
3. Adjust power source to desired voltage for your weld condition.
4. Depress gun trigger and adjust wire feed speed at gun to match voltage setting. If approximate wire feed is not known, it is better to start with excess wire feed rather than too little; in order to prevent a "burn-back".
5. Turn the Posa Start switch to the "ON" position. Press torch trigger and, using Run-in Speed Control, adjust wire feed rate to approximately 40 lpm (4" of wire in 6 seconds).
6. Strike an arc, and adjust wire feed rate at gun until correct condition is achieved.

MAINTENANCE

Torch

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.

Power Supply

1. Periodically inspect all cables and hoses for damage or breaks in the insulation jacket, particularly at the plugs or ends. Repair or replace cables or hoses as necessary.
2. Remove grease and dirt from components and remove moisture from electrical parts and cables.
3. Be sure that all connections are clean and tight.



WARNING: ELECTRIC SHOCK can kill. Shut-off disconnect and unplug unit before cleaning unit.

4. Every six months blow out or vacuum dust and dirt from the internal components of the power supply. Remove the side panels and use a clean, dry air stream or vacuum suction for the cleaning operation.

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

Your CobraMig 250 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.

PROCESS SETTINGS FOR THE COBRAMIG 250

The following table is provided as a guide to assist you in setting up for standard welding processes. Please be aware that there are many variables associated with welding and conditions can change from day to day due to any number of external influences.

M.K. Products has a **Technical Service Department** ready to assist you in setting up *our products*. But can not help with detailed questions regarding actual weld process data and troubleshooting an application. Please refer all weld process questions to a qualified welding technician.

M.K. Products reserves the right to change any settings associated with this welding guide, you may request the most up to date guide by calling our Customer Service department during normal working hours.

To use chart, locate material, thickness and wire diameter. Then read across for values to use, "REF" is the value dialed on the "Weld Voltage" knob on the front panel, this is only a reference value.

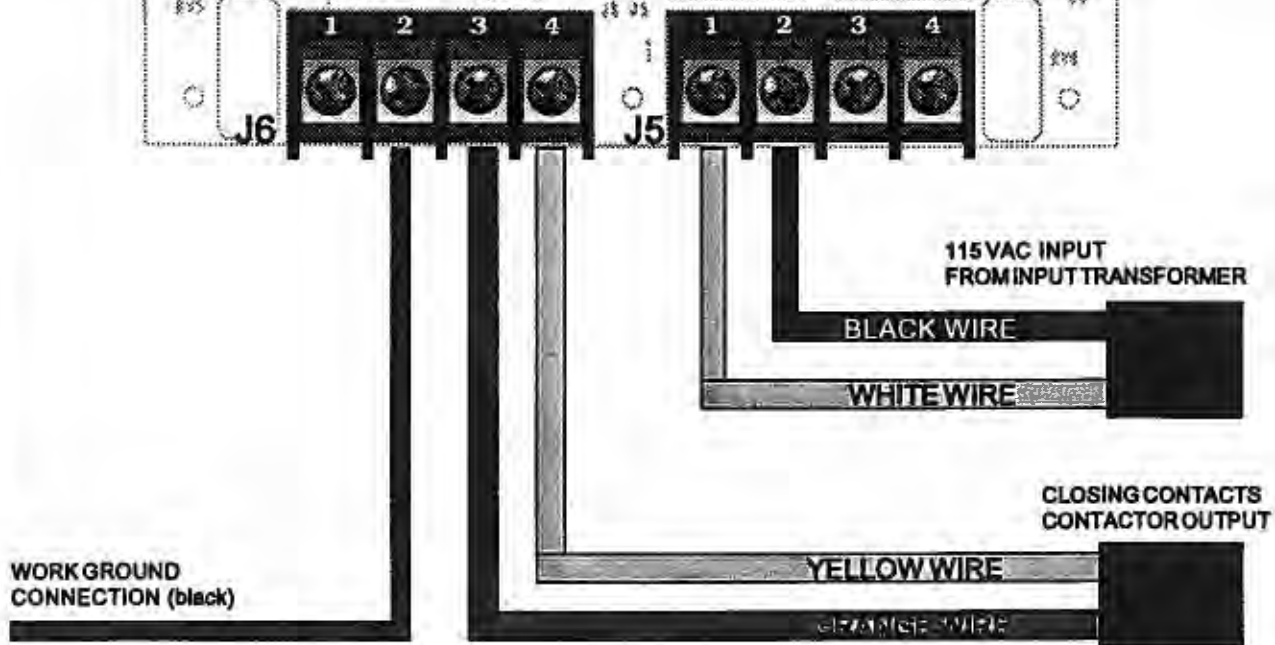
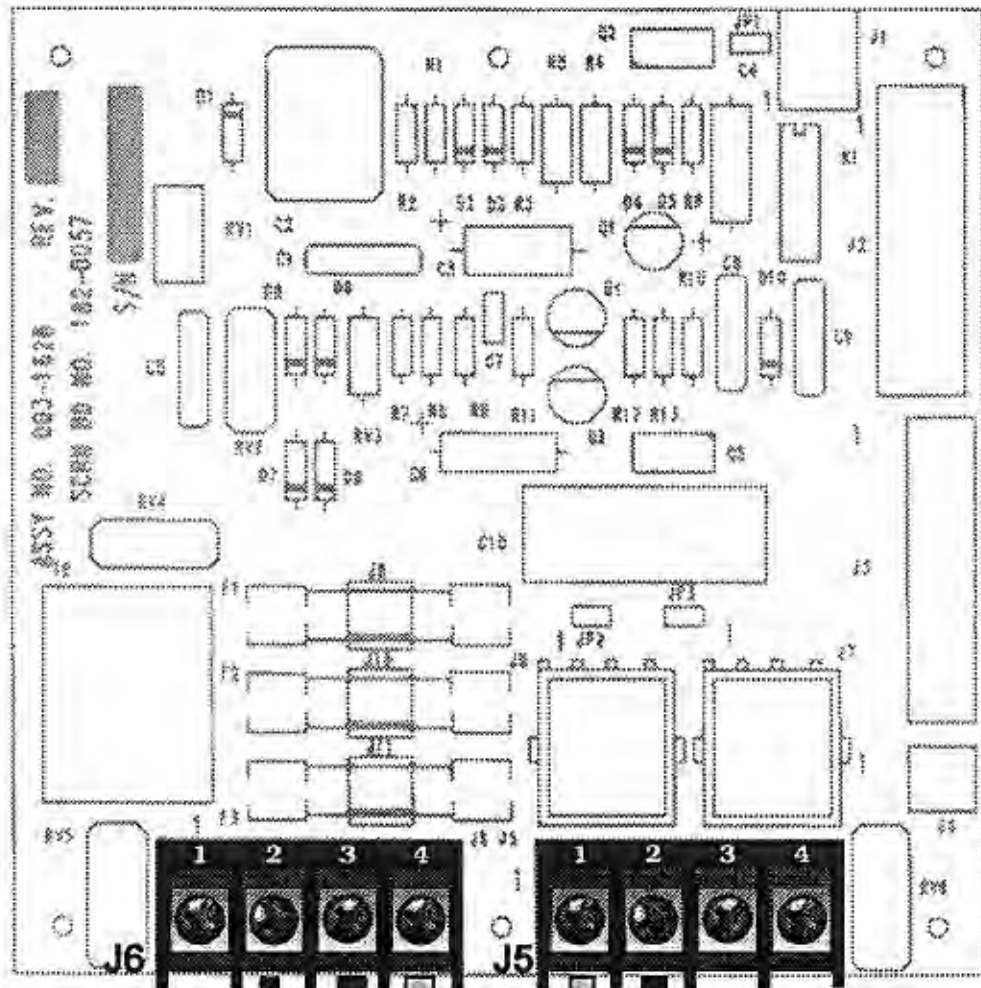
COBRAMIG 250 WELDING GUIDE											
	MATERIAL	IPM	DIA.	ALLOY	TIP ID/TYPE	CUP	GAS	FLOW	RANGE	XFER	REF
ALUMINUM	.040	295	.030	4043	.040 Spray	#6	Ar	20	Low	Short	2.5
	.060	370	.030	4043	.040 Spray	#6	Ar	20	Low	Short	3.2
	.090	360	.030	4043	.040 Spray	#6	Ar	20	Low	Spray	6.0
	.060	370	.035	4043	.044 Spray	#6	Ar	20	Low	Short	4.2
	.090	360	.035	4043	.044 Spray	#6	Ar	20	Low	Spray	7.0
	.125	390	.035	4043	.044 Spray	#6	Ar	20	Low	Spray	9.0
	.090	460	.035	5356	.044 Spray	#6	Ar	20	Low	Spray	6.2
	1/8	500	.035	5356	.044 Spray	#8	Ar	20	Low	Spray	9.2
	1/8	220	.045	4043	.060 Spray	#8	Ar	25	Low	Spray	7.6
	1/4	370	.045	4043	.060 Spray	#8	Ar	25	High	Spray	2.2
3/8	475	.045	4043	.060 Spray	#8	Ar	25	High	Spray	4.8	
STEEL	20 GA.	190	.023	E-70S-6	.031 Short	#6	C25	20	Low	Short	3.4
	1/16	270	.023	E-70S-6	.031 Short	#6	C25	20	Low	Short	4.6
	1/16	180	.030	E-70S-3	.036 Short	#6	C25	20	Low	Short	4.8
	.090	230	.030	E-70S-3	.036 Short	#6	C25	20	Low	Short	5.5
	1/16	140	.035	E-70S-6	.040 Short	#6	C25	20	Low	Short	5.2
	1/8	150	.035	E-70S-6	.040 Short	#6	C25	20	Low	Short	5.6
	1/4	210	.035	E-70S-6	.040 Short	#8	C25	25	Low	Short	7.2
STAINLESS	.060	120	.030	308LSI	.036 Short	#6	Tri-Mix	30	Low	Short	4.2
	1/8	230	.030	308LSI	.036 Short	#6	Tri-Mix	30	Low	Short	6.2
	1/16	100	.035	308LSI	.040 Short	#6	Tri-Mix	30	Low	Short	4.2
	1/8	180	.035	308LSI	.040 Short	#6	Tri-Mix	30	Low	Short	7.0
	1/4	240	.035	308LSI	.040 Short	#6	Tri-Mix	30	Low	Short	7.8

Ar = Argon

C25 = 75%Ar 25%CO₂

TriMix = 90%He 7 1/2% CO₂ 2 1/2 %Ar

COBRAMATIC / Main Board
003-1628



REVISIONS

REV.	DATE	DESCRIPTION	APPROVED

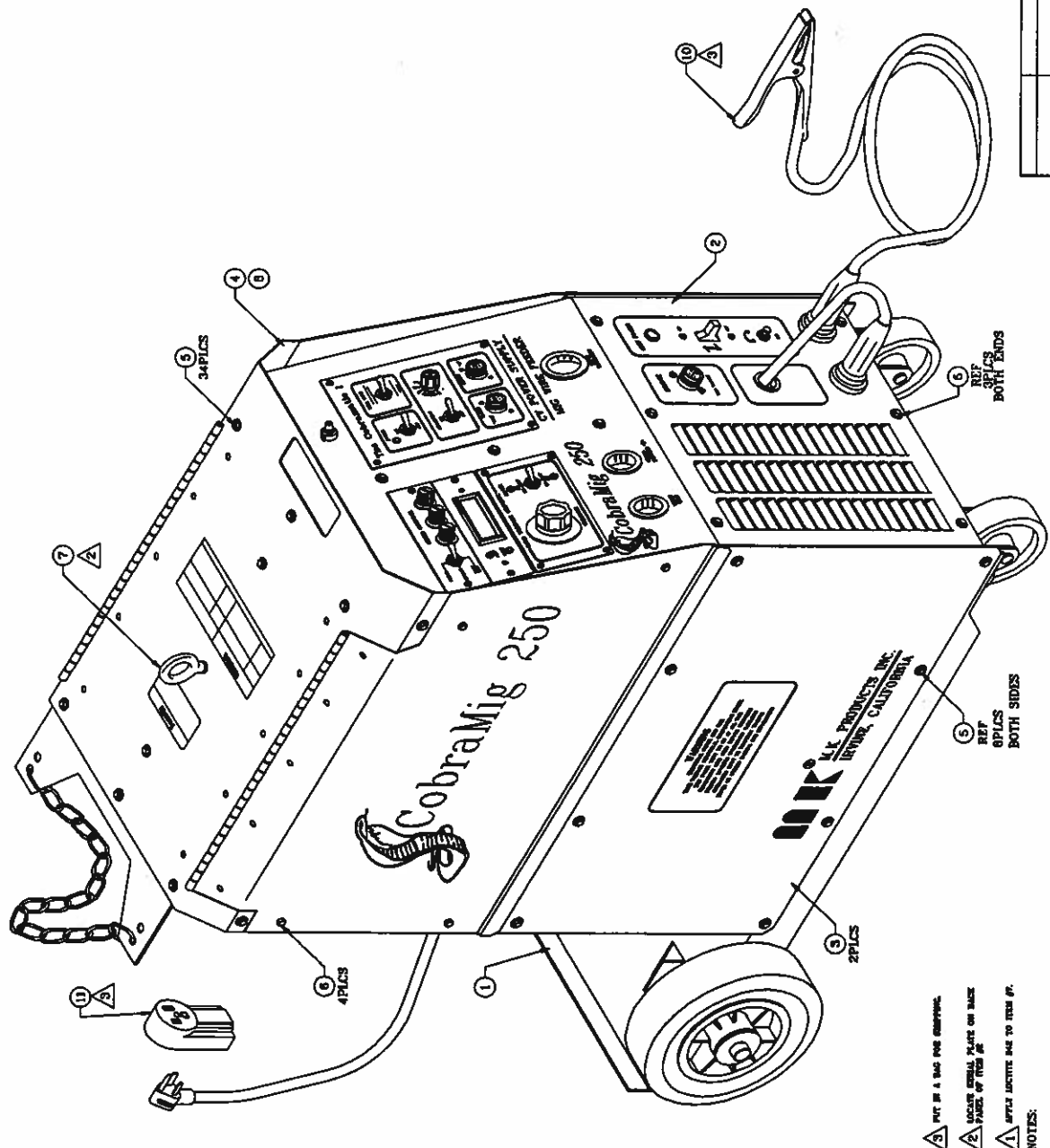
QTY.	DESCRIPTION	QTY.	DESCRIPTION
11	J-2	1	183-0416 RECEPTACLE 50A/250VAC
10	D-12	1	003-1752 CABLE, GROUND CLAMP
9	-	1	409-0777 SERIAL PLATE (NOTE #2)
8	H-8	1	091-0275 COBRAMIG OWNERS MANUAL
7	J-7	1	448-0013 LIFTING EYE BOLT
6	G-2	4	338-0039 SCR PH. FILE #10-32 X 3/8
5	I-9	34	327-0115 SCR SHT. MET. #14-12 T/B
4	H-9	1	003-1704 TOP COVER ASSY.
3	C-3	2	436-0044 SCREENED FIX DOOR
2	D-10	1	003-1751 WIRE FEEDER ASSY.
1	F-2	1	003-1750 POWER SUPPLY ASSY.

QTY.	DESCRIPTION	QTY.	DESCRIPTION
1	1750A	1	1750A

PARTS LIST

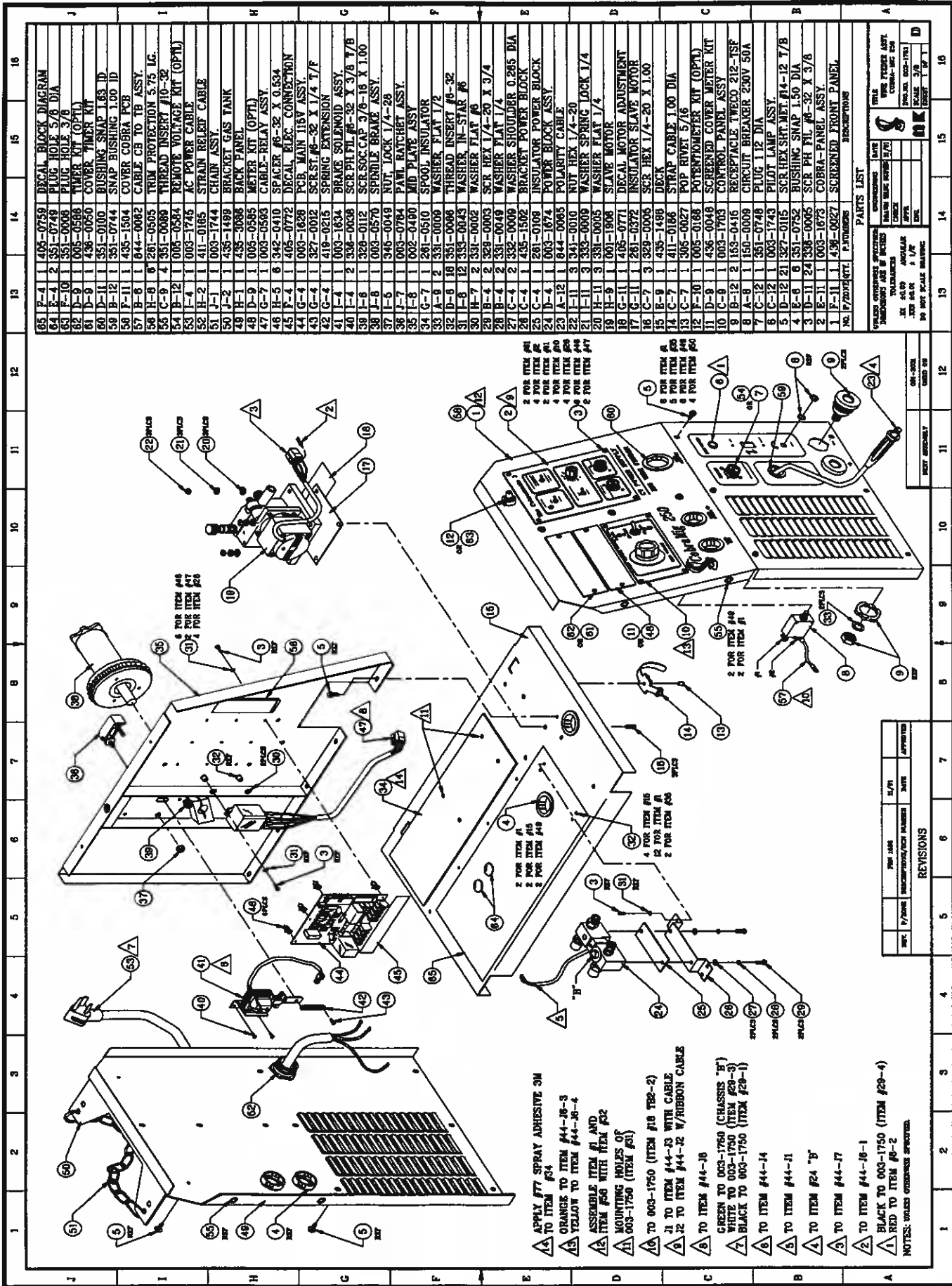
QTY.	DESCRIPTION	QTY.	DESCRIPTION
1	1750A	1	1750A

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES. TOLERANCES ARE AS SHOWN. SEE PARTS LIST FOR MATERIAL SPECIFICATIONS. DO NOT SCALE DRAWING.



- ▲ FIT IN A BAG FOR SHIPPING.
 - ▲ LOCATE SERIAL PLATE ON BACK PANEL OF THIS SET.
 - ▲ AFTER LOCATING BAG TO ITEM #1.
- NOTES:

QTY.	DESCRIPTION	QTY.	DESCRIPTION

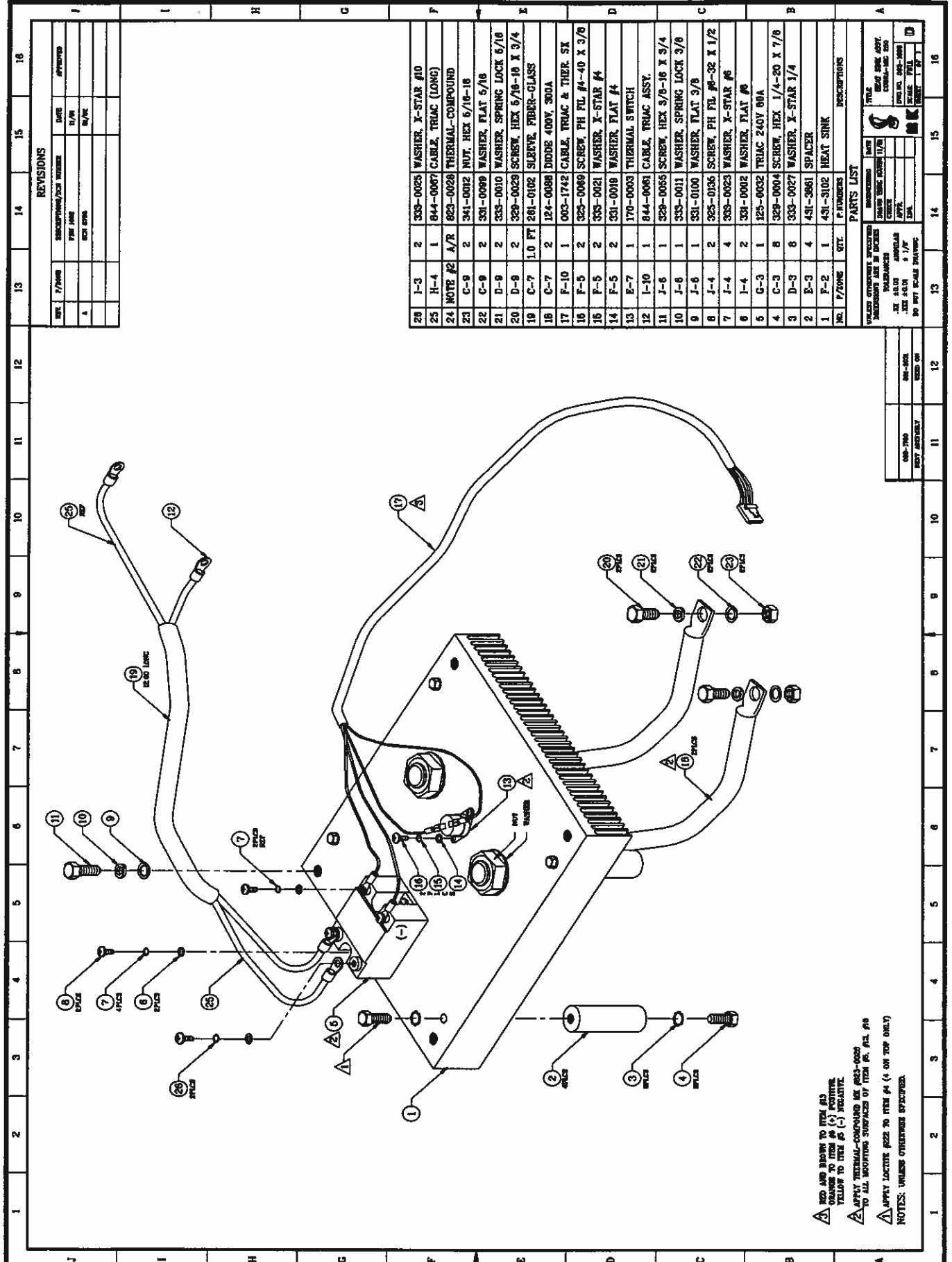


NO.	DESCRIPTION	QTY	UNIT	REVISIONS
65	F-4	1	408-0758	DECAL BLOCK DIAGRAM
64	E-4	2	351-0749	PLUG HOLE 5/8 DIA
63	F-10	1	351-0006	PLUG HOLE 3/8
62	F-9	1	005-0588	TIMER KIT (OPTL)
61	D-9	1	438-0050	COVER TIMER KIT
60	D-11	1	351-0100	BUSHING SNAP 1.63 ID
59	B-12	1	351-0744	SNAP BUSHING 1.00 ID
58	F-11	1	435-1504	COVER COBRA PCB
57	B-8	1	844-0082	CABLE CB TO TB ASSY
56	H-9	9	261-0505	TRIM PROTECTION 5.75 LG.
55	C-9	4	351-0069	THREAD INSERT #10-32
54	B-12	1	005-0584	REMOTE VOLTAGE KIT (OPTL)
53	I-4	1	003-1745	AC POWER CABLE
52	H-2	1	411-0165	STRAIN RELIEF CABLE
51	J-1	1	003-1744	CHAIN ASSY
50	J-2	1	435-1498	BRACKET GAS TANK
49	H-1	1	435-3088	BANK PANEL
48	D-9	1	005-0565	METER KIT (OPTL)
47	G-7	1	003-0563	CABLE-RELAY ASSY
46	H-5	8	342-0410	SPACER #8-32 X 0.634
45	F-4	1	408-0772	DECAL ELEC. CONNECTION
44	G-4	1	003-1628	PCB MAIN TB ASSY
43	G-4	1	327-0012	SCRLET #8-32 X 1/4 T/F
42	G-4	1	418-0215	SPRING EXTENSION
41	I-4	1	003-1634	BRACK SOLENOID ASSY
40	I-4	2	334-0036	SCR PH FIL #8-32 X 3/8 T/B
39	I-6	1	002-0112	SCR SOCCAP 3/8-16 X 1.00
38	I-8	1	003-0570	SPINDLE BRAKE ASSY
37	I-8	1	348-0049	NUT LOCK 1/4-28
36	J-7	1	003-0764	PAWL RATCHET ASSY
35	I-8	1	002-0490	MID PLATE ASSY
34	G-7	2	331-0009	WASHER FLAT 1/2
33	A-9	2	331-0006	THREAD INSERT #8-32
32	D-8	18	351-0008	WASHER IN-STAR #6
31	I-8	12	333-0043	WASHER FLAT #6
30	H-7	2	331-0002	SCR HEX 1/4-20 X 3/4
29	B-4	2	329-0093	SCR HEX 1/4-20 X 3/4
28	B-4	2	331-0048	WASHER FLAT 1/4
27	C-4	2	332-0009	WASHER SHOULDER 0.285 DIA
26	G-4	1	435-1502	BRACKET POWER BLOCK
25	C-4	1	281-0199	INSULATOR POWER BLOCK
24	D-4	1	003-1674	POWER BLOCK ASSY
23	A-12	1	844-0065	POLARITY CABLE
22	I-1	3	341-0010	NUT HEX 1/4-20
21	I-1	3	333-0009	WASHER SPRING LOCK 1/4
20	H-1	3	331-0005	WASHER FLAT 1/4
19	H-9	1	001-1904	SLAVE MOTOR
18	C-11	1	408-0771	DECAL MOTOR ADJUSTMENT
17	G-11	1	281-0372	INSULATOR SLAVE MOTOR
16	G-7	3	329-0005	SCR HEX 1/4-20 X 1.00
15	B-9	1	435-1498	DECK
14	C-7	1	411-0166	STRAP CABLE 1.00 DIA
13	C-7	1	305-0027	POP RIVET 5/16
12	F-10	1	005-0188	POTENTIOMETER KIT (OPTL)
11	D-9	1	438-0048	SCREENED COVER METER KIT
10	C-9	1	003-1703	CONTROL PANEL ASSY
9	B-12	2	163-0415	RECEPTACLE TWECO 212-TSF
8	A-9	1	150-0009	CIRCUIT BREAKER 200V 50A
7	C-12	1	351-0748	PLUG 1/2 DIA
6	C-12	1	003-1743	PILOT LAMP ASSY
5	D-12	21	327-0115	SCR HEX SHRT MET #14-12 T/B
4	E-6	6	351-0752	BUSHING SNAP 1.50 DIA
3	D-11	24	338-0005	SCR PH FIL #8-32 X 3/8
2	E-11	1	003-1673	COBRA-PANEL ASSY
1	F-11	1	438-0027	SCREENED FRONT PANEL

NO.	DESCRIPTION	QTY	UNIT	REVISIONS
65	F-4	1	408-0758	DECAL BLOCK DIAGRAM
64	E-4	2	351-0749	PLUG HOLE 5/8 DIA
63	F-10	1	351-0006	PLUG HOLE 3/8
62	F-9	1	005-0588	TIMER KIT (OPTL)
61	D-9	1	438-0050	COVER TIMER KIT
60	D-11	1	351-0100	BUSHING SNAP 1.63 ID
59	B-12	1	351-0744	SNAP BUSHING 1.00 ID
58	F-11	1	435-1504	COVER COBRA PCB
57	B-8	1	844-0082	CABLE CB TO TB ASSY
56	H-9	9	261-0505	TRIM PROTECTION 5.75 LG.
55	C-9	4	351-0069	THREAD INSERT #10-32
54	B-12	1	005-0584	REMOTE VOLTAGE KIT (OPTL)
53	I-4	1	003-1745	AC POWER CABLE
52	H-2	1	411-0165	STRAIN RELIEF CABLE
51	J-1	1	003-1744	CHAIN ASSY
50	J-2	1	435-1498	BRACKET GAS TANK
49	H-1	1	435-3088	BANK PANEL
48	D-9	1	005-0565	METER KIT (OPTL)
47	G-7	1	003-0563	CABLE-RELAY ASSY
46	H-5	8	342-0410	SPACER #8-32 X 0.634
45	F-4	1	408-0772	DECAL ELEC. CONNECTION
44	G-4	1	003-1628	PCB MAIN TB ASSY
43	G-4	1	327-0012	SCRLET #8-32 X 1/4 T/F
42	G-4	1	418-0215	SPRING EXTENSION
41	I-4	1	003-1634	BRACK SOLENOID ASSY
40	I-4	2	334-0036	SCR PH FIL #8-32 X 3/8 T/B
39	I-6	1	002-0112	SCR SOCCAP 3/8-16 X 1.00
38	I-8	1	003-0570	SPINDLE BRAKE ASSY
37	I-8	1	348-0049	NUT LOCK 1/4-28
36	J-7	1	003-0764	PAWL RATCHET ASSY
35	I-8	1	002-0490	MID PLATE ASSY
34	G-7	2	331-0009	WASHER FLAT 1/2
33	A-9	2	331-0006	THREAD INSERT #8-32
32	D-8	18	351-0008	WASHER IN-STAR #6
31	I-8	12	333-0043	WASHER FLAT #6
30	H-7	2	331-0002	SCR HEX 1/4-20 X 3/4
29	B-4	2	329-0093	SCR HEX 1/4-20 X 3/4
28	B-4	2	331-0048	WASHER FLAT 1/4
27	C-4	2	332-0009	WASHER SHOULDER 0.285 DIA
26	G-4	1	435-1502	BRACKET POWER BLOCK
25	C-4	1	281-0199	INSULATOR POWER BLOCK
24	D-4	1	003-1674	POWER BLOCK ASSY
23	A-12	1	844-0065	POLARITY CABLE
22	I-1	3	341-0010	NUT HEX 1/4-20
21	I-1	3	333-0009	WASHER SPRING LOCK 1/4
20	H-1	3	331-0005	WASHER FLAT 1/4
19	H-9	1	001-1904	SLAVE MOTOR
18	C-11	1	408-0771	DECAL MOTOR ADJUSTMENT
17	G-11	1	281-0372	INSULATOR SLAVE MOTOR
16	G-7	3	329-0005	SCR HEX 1/4-20 X 1.00
15	B-9	1	435-1498	DECK
14	C-7	1	411-0166	STRAP CABLE 1.00 DIA
13	C-7	1	305-0027	POP RIVET 5/16
12	F-10	1	005-0188	POTENTIOMETER KIT (OPTL)
11	D-9	1	438-0048	SCREENED COVER METER KIT
10	C-9	1	003-1703	CONTROL PANEL ASSY
9	B-12	2	163-0415	RECEPTACLE TWECO 212-TSF
8	A-9	1	150-0009	CIRCUIT BREAKER 200V 50A
7	C-12	1	351-0748	PLUG 1/2 DIA
6	C-12	1	003-1743	PILOT LAMP ASSY
5	D-12	21	327-0115	SCR HEX SHRT MET #14-12 T/B
4	E-6	6	351-0752	BUSHING SNAP 1.50 DIA
3	D-11	24	338-0005	SCR PH FIL #8-32 X 3/8
2	E-11	1	003-1673	COBRA-PANEL ASSY
1	F-11	1	438-0027	SCREENED FRONT PANEL

NO.	DESCRIPTION	QTY	UNIT	REVISIONS
65	F-4	1	408-0758	DECAL BLOCK DIAGRAM
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63	F-10	1	351-0006	PLUG HOLE 3/8
62	F-9	1	005-0588	TIMER KIT (OPTL)
61	D-9	1	438-0050	COVER TIMER KIT
60	D-11	1	351-0100	BUSHING SNAP 1.63 ID
59	B-12	1	351-0744	SNAP BUSHING 1.00 ID
58	F-11	1	435-1504	COVER COBRA PCB
57	B-8	1	844-0082	CABLE CB TO TB ASSY
56	H-9	9	261-0505	TRIM PROTECTION 5.75 LG.
55	C-9	4	351-0069	THREAD INSERT #10-32
54	B-12	1	005-0584	REMOTE VOLTAGE KIT (OPTL)
53	I-4	1	003-1745	AC POWER CABLE
52	H-2	1	411-0165	STRAIN RELIEF CABLE
51	J-1	1	003-1744	CHAIN ASSY
50	J-2	1	435-1498	BRACKET GAS TANK
49	H-1	1	435-3088	BANK PANEL
48	D-9	1	005-0565	METER KIT (OPTL)
47	G-7	1	003-0563	CABLE-RELAY ASSY
46	H-5	8	342-0410	SPACER #8-32 X 0.634
45	F-4	1	408-0772	DECAL ELEC. CONNECTION
44	G-4	1	003-1628	PCB MAIN TB ASSY
43	G-4	1	327-0012	SCRLET #8-32 X 1/4 T/F
42	G-4	1	418-0215	SPRING EXTENSION
41	I-4	1	003-1634	BRACK SOLENOID ASSY
40	I-4	2	334-0036	SCR PH FIL #8-32 X 3/8 T/B
39	I-6	1	002-0112	SCR SOCCAP 3/8-16 X 1.00
38	I-8	1	003-0570	SPINDLE BRAKE ASSY
37	I-8	1	348-0049	NUT LOCK 1/4-28
36	J-7	1	003-0764	PAWL RATCHET ASSY
35	I-8	1	002-0490	MID PLATE ASSY
34	G-7	2	331-0009	WASHER FLAT 1/2
33	A-9	2	331-0006	THREAD INSERT #8-32
32	D-8	18	351-0008	WASHER IN-STAR #6
31	I-8	12	333-0043	WASHER FLAT #6
30	H-7	2	331-0002	SCR HEX 1/4-20 X 3/4
29	B-4	2	329-0093	SCR HEX 1/4-20 X 3/4
28	B-4	2	331-0048	WASHER FLAT 1/4
27	C-4	2	332-0009	WASHER SHOULDER 0.285 DIA
26	G-4	1	435-1502	BRACKET POWER BLOCK
25	C-4	1	281-0199	INSULATOR POWER BLOCK
24	D-4	1	003-1674	POWER BLOCK ASSY
23	A-12	1	844-0065	POLARITY CABLE
22	I-1	3	341-0010	NUT HEX 1/4-20
21	I-1	3	333-0009	WASHER SPRING LOCK 1/4
20	H-1	3	331-0005	WASHER FLAT 1/4
19	H-9	1	001-1904	SLAVE MOTOR
18	C-11	1	408-0771	DECAL MOTOR ADJUSTMENT
17	G-11	1	281-0372	INSULATOR SLAVE MOTOR
16	G-7	3	329-0005	SCR HEX 1/4-20 X 1.00
15	B-9	1	435-1498	DECK
14	C-7	1	411-0166	STRAP CABLE 1.00 DIA
13	C-7	1	305-0027	POP RIVET 5/16
12	F-10	1	005-0188	POTENTIOMETER KIT (OPTL)
11	D-9	1	438-0048	SCREENED COVER METER KIT
10	C-9	1	003-1703	CONTROL PANEL ASSY
9	B-12	2	163-0415	RECEPTACLE TWECO 212-TSF
8	A-9	1	150-0009	CIRCUIT BREAKER 200V 50A
7	C-12	1	351-0748	PLUG 1/2 DIA
6	C-12	1	003-1743	PILOT LAMP ASSY
5	D-12	21	327-0115	SCR HEX SHRT MET #14-12 T/B
4	E-6	6	351-0752	BUSHING SNAP 1.50 DIA
3	D-11	24	338-0005	SCR PH FIL #8-32 X 3/8
2	E-11	1	003-1673	COBRA-PANEL ASSY
1	F-11	1	438-0027	SCREENED FRONT PANEL

NO.	DESCRIPTION	QTY	UNIT	REVISIONS
65	F-4	1	408-0758	DECAL BLOCK DIAGRAM
64	E-4	2	351-0749	PLUG HOLE 5/8 DIA
63	F-10	1	351-0006	PLUG HOLE 3/8
62	F-9	1	005-0588	TIMER KIT (OPTL)
61	D-9	1	438-0050	COVER TIMER KIT
60	D-11	1	351-0100	BUSHING SNAP 1.63 ID
59	B-12	1	351-0744	SNAP BUSHING 1.00 ID
58	F-11	1	435-1504	COVER COBRA PCB
57	B-8	1	844-0082	CABLE CB TO TB ASSY
56	H-9	9	261-0505	TRIM PROTECTION 5.75 LG.
55	C-9	4	351-0069	THREAD INSERT #10-32
54	B-12	1	005-0584	REMOTE VOLTAGE KIT (OPTL)
53	I-4	1	003-1745	AC POWER CABLE
52	H-2	1	411-0165	STRAIN RELIEF CABLE
51	J-1	1	003-1744	CHAIN ASSY
50	J-2	1	435-1498	BRACKET GAS TANK
49	H-1	1	435-3088	BANK PANEL
48	D-9	1	005-0565	METER KIT (OPTL)
47	G-7	1	003-0563	CABLE-RELAY ASSY
46	H-5	8	342-0410	SPACER #8-32 X 0.634
45	F-4	1	408-0772	DECAL ELEC. CONNECTION
44	G-4	1	003-1628	PCB MAIN TB ASSY
43	G-4	1	327-0012	SCRLET #8-32 X 1/4 T/F
42	G-4	1	418-0215	SPRING EXTENSION
41	I-4	1	003-1634	BRACK SOLENOID ASSY
40	I-4	2	334-0036	SCR PH FIL #8-32 X 3/8 T/B
39	I-6	1	002-0112	SCR SOCCAP 3/8-16 X 1.00
38	I-8	1	003-0570	SPINDLE BRAKE ASSY
37	I-8	1	348-0049	NUT LOCK 1/4-28
36	J-7	1	003-0764	PAWL RATCHET ASSY
35	I-8	1	002-0490	MID PLATE ASSY
34	G-7	2	331-0009	WASHER FLAT 1/2
33	A-9	2	331-0006	THREAD INSERT #8-32
32	D-8	18	351-0008	WASHER IN-STAR #6
31	I-8	12	333-0043	WASHER FLAT #6
30	H-7	2		



REVISIONS

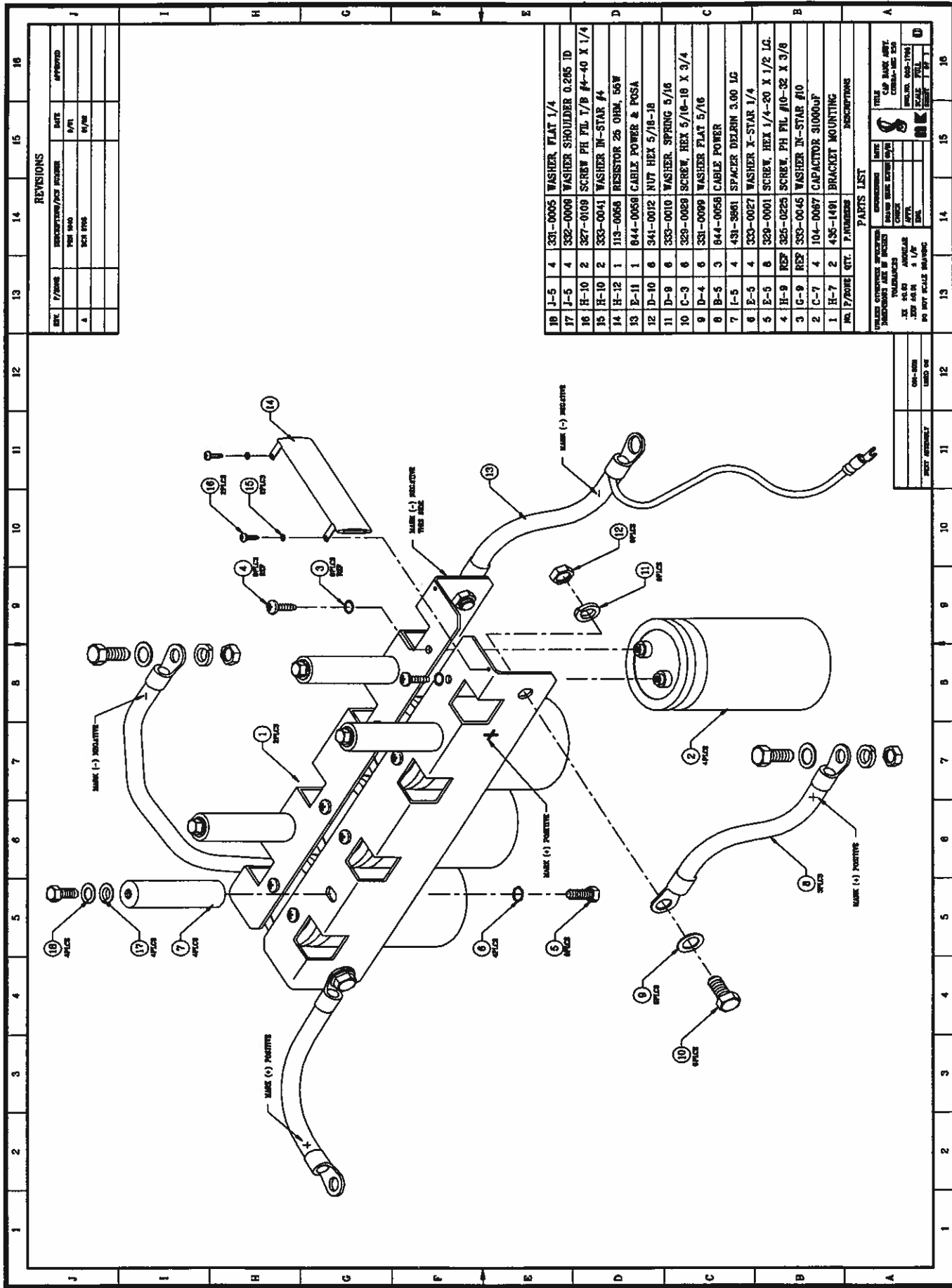
REV.	P/WORK	DESCRIPTION/REASON	DATE	APPROVED
1		FORM 1049	01/92	
2		REV. 0001	01/92	

28	J-3	2	333-0025	WASHER, X-STAR #10
25	H-4	1	844-0067	CABLE, TRIAC (LONG)
24	NOTE #2	A/R	823-0026	THERMAL-COMPOUND
23	C-9	2	341-0012	NUT, HEX 6/16-16
22	C-9	2	331-0099	WASHER, FLAT 5/16
21	D-9	2	333-0010	WASHER, SPRING LOCK 6/16
20	D-9	2	329-0028	SCREW, HEX 5/16-18 X 3/4
19	C-7	1.0 FT	261-0102	SLEEVE, FIBER-GLASS
18	C-7	2	124-0088	DODGE 400V, 300A
17	F-10	1	003-1742	CABLE, TRIAC & THER. SX
16	F-5	2	323-0069	SCREW, PH FL. #4-40 X 3/8
15	F-5	2	333-0021	WASHER, X-STAR #4
14	F-5	2	331-0016	WASHER, FLAT #4
13	E-7	1	170-0003	THERMAL SWITCH
12	J-10	1	844-0061	CABLE, TRIAC ASSY.
11	J-6	1	329-0055	SCREW, HEX 3/8-16 X 3/4
10	J-6	1	333-0011	WASHER, SPRING LOCK 3/8
9	J-6	1	331-0100	WASHER, FLAT 3/8
8	J-4	2	325-0136	SCREW, PH FL. #6-32 X 1/2
7	J-4	4	333-0023	WASHER, X-STAR #6
6	J-4	2	331-0002	WASHER, FLAT #6
5	C-3	1	125-0032	TRIAC 240V 80A
4	C-3	8	329-0004	SCREW, HEX 1/4-20 X 7/8
3	D-3	8	333-0027	WASHER, X-STAR 1/4
2	E-3	4	431-3861	SPACER
1	F-2	1	431-3102	HEAT SINK

PARTS LIST

REV.	DATE	DESCRIPTION	QTY.	UNIT
1	01/92	HEAT SINK ASSY.	1	EA
2	01/92	CONV. KIT 250	1	EA

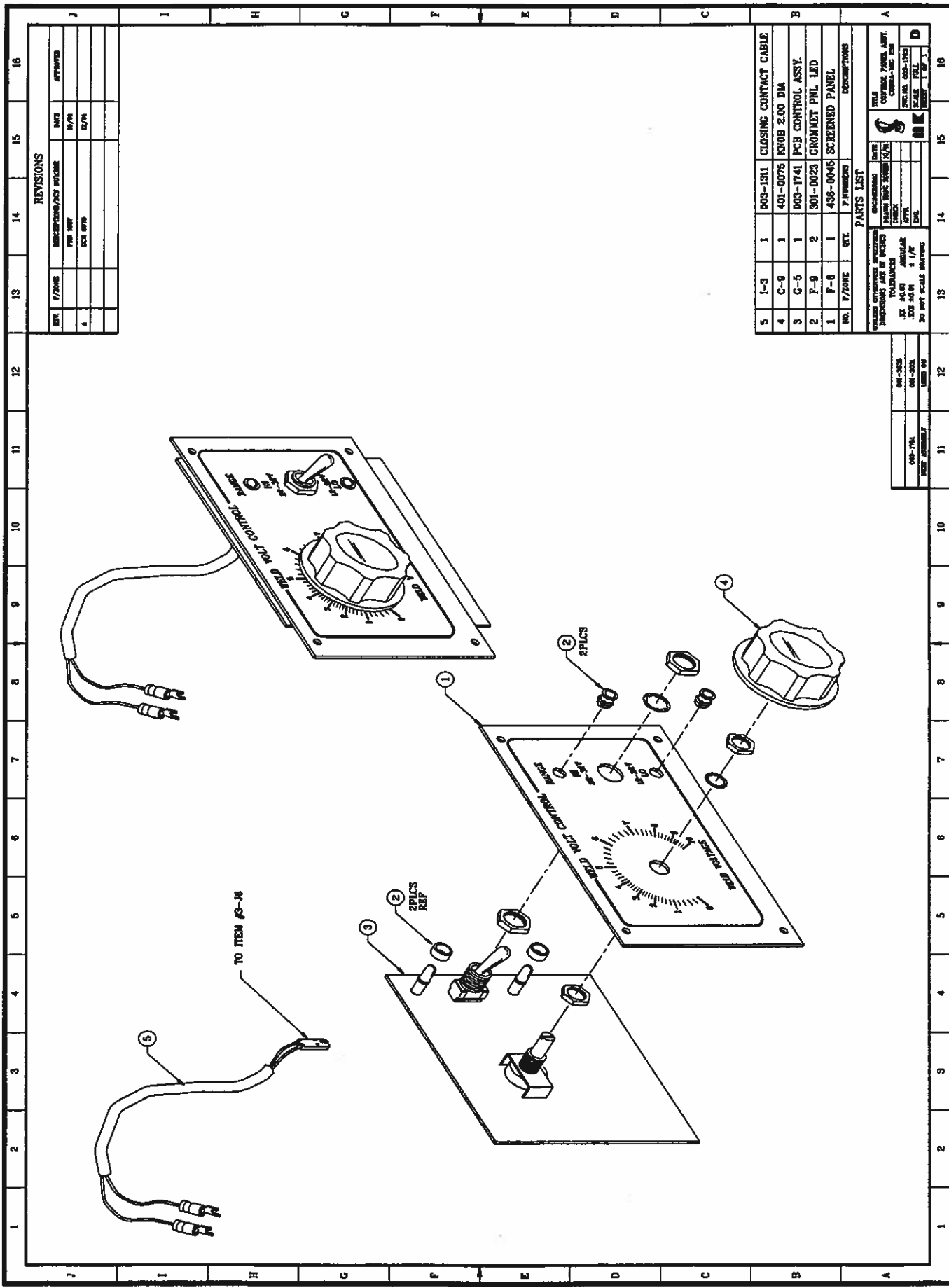
A END AND DOWN TO ITEM #13
 ORANGE TO ITEM #8 (+) POSITIVE
 YELLOW TO ITEM #8 (-) NEGATIVE.
 A APPLY THERMAL-COMPOUND AS 823-0026
 TO ALL MOUNTING SURFACES OF ITEM #5, #11, #18
 APPLY LOCITE #22 TO ITEM #4 (+ ON TOP ONLY)
 NOTES: UNLESS OTHERWISE SPECIFIED.



REVISIONS		
REV	DATE	DESCRIPTION
1	10/15/80	INITIAL DESIGN
2	11/15/80	REVISED FOR MANUFACTURE

NO.	QTY.	PARTS LIST	DESCRIPTIONS
16	J-5	4	331-0005 WASHER, FLAT 1/4
17	J-5	4	332-0008 WASHER, SHOULDER 0.285 ID
18	H-10	2	327-0109 SCREW, PH T/8 #4-40 X 1/4
19	H-10	2	333-0041 WASHER, IN-STAR #4
14	H-12	1	113-0058 RESISTOR 25 OHM, 56W
13	E-11	1	844-0058 CABLE POWER & POSA
12	D-10	6	341-0012 NUT, HEX 5/16-18
11	D-9	6	333-0010 WASHER, SPRING 5/16
10	C-3	6	329-0028 SCREW, HEX 5/16-18 X 3/4
9	D-4	6	331-0099 WASHER, FLAT 5/16
8	B-5	3	844-0059 CABLE POWER
7	I-5	4	431-3861 SPACER DELPHI 3.00 LG
6	E-5	4	333-0027 WASHER, X-STAR 1/4
5	E-5	6	329-0001 SCREW, HEX 1/4-20 X 1/2 LG.
4	H-9	REP	325-0028 SCREW, PH #10-32 X 3/8
3	G-9	REP	333-0045 WASHER, IN-STAR #10
2	C-7	4	104-0087 CAPACITOR, 5000UF
1	H-7	2	435-1491 BRACKET, MOUNTING

PARTS LIST	
NO.	DESCRIPTIONS
16	WASHER, FLAT 1/4
17	WASHER, SHOULDER 0.285 ID
18	SCREW, PH T/8 #4-40 X 1/4
19	WASHER, IN-STAR #4
14	RESISTOR 25 OHM, 56W
13	CABLE POWER & POSA
12	NUT, HEX 5/16-18
11	WASHER, SPRING 5/16
10	SCREW, HEX 5/16-18 X 3/4
9	WASHER, FLAT 5/16
8	CABLE POWER
7	SPACER DELPHI 3.00 LG
6	WASHER, X-STAR 1/4
5	SCREW, HEX 1/4-20 X 1/2 LG.
4	SCREW, PH #10-32 X 3/8
3	WASHER, IN-STAR #10
2	CAPACITOR, 5000UF
1	BRACKET, MOUNTING



REVISIONS

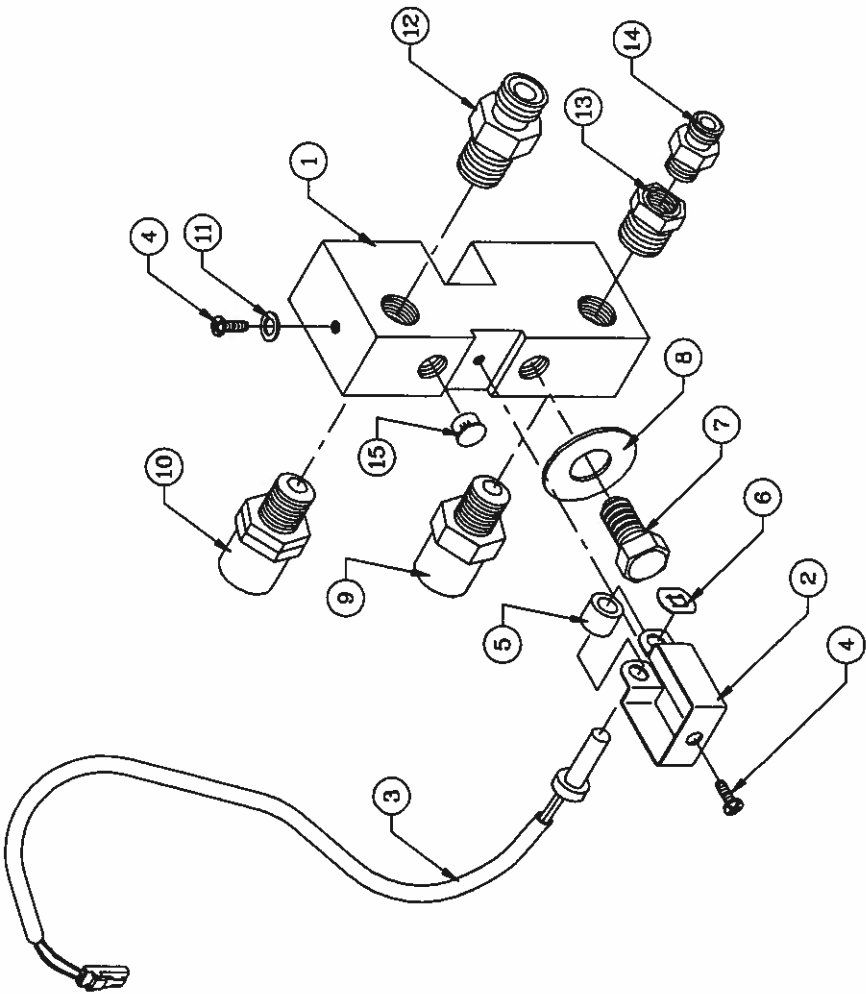
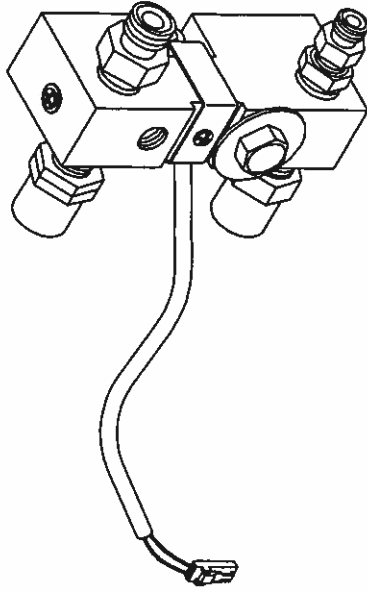
REV.	DATE	DESCRIPTION/ISSUE	BY	APPROVED
1	02/92	REVISED

NO.	QTY.	P. NUMBER	DESCRIPTION
1-3	1	003-1311	CLOSING CONTACT CABLE
4	C-8	401-0076	KNOB 2.00 DIA
5	G-5	003-1741	PCB CONTROL ASSY.
2	P-9	301-0023	GROMMET PNL LED
1	P-8	436-0045	SCREENED PANEL

PARTS LIST

NO.	QTY.	P. NUMBER	DESCRIPTION
1	1	003-1311	CLOSING CONTACT CABLE
2	1	401-0076	KNOB 2.00 DIA
3	1	003-1741	PCB CONTROL ASSY.
4	2	301-0023	GROMMET PNL LED
5	1	436-0045	SCREENED PANEL

REVISED	DATE	DESCRIPTION	DATE	BY
A		PRN 1543	5/90	
B		DCN 8634	11/90	
		DCN 8652	10/91	



QTY	P/N	DESCRIPTION	UNIT
1	351-0066	PLUG HOLE 5/16	
1	753-0114	FITTING 1/8	
1	753-0115	BUSHING 1/4 NPT. M. TO 1/8 NPT. F.	
1	753-0112	FITTING 1/4-18NPT TO 5/8-18	
1	331-0002	WASHER FLAT #6 ST	
1	753-0475	FITTING 1/4-18NPT TO 5/8-18 LH	
1	753-0486	FITTING 1/4-18M TO 5/8-18F	
1	331-0176	WASHER, FLAT 1/2 ID X 1.12 OD	
1	329-0054	SCREW, HEX 3/8-16 X 5/8	
1	313-0021	STUD RECEIVER PUSH-ON	
1	342-0396	SPACER	
2	336-0005	SCREW, PH. PHILL. #8-32 X 3/8	
1	003-1243	CURRENT SENSOR ASSY	
1	436-3038	BRACKET CURRENT SENSOR	
1	431-3505	POWER BLOCK CONNECTOR	
			INDICAL

QTY	P/N	DESCRIPTION
001-3080		
001-3076		
001-3070		
001-1134		
001-1183		
001-1182		
001-1072		

DATE	BY	DESCRIPTION
5/90		
11/90		
10/91		

UNLESS OTHERWISE SPECIFIED, DIMENSIONS WILL BE AS FOLLOWS:

XX 1/8" ANGLES 1/2"

XXX 1/8" FELLETS, 1/8" RADIUS

UNLESS OTHERWISE SPECIFIED, DIMENSIONS WILL BE AS FOLLOWS:

XX 1/8" ANGLES 1/2"

XXX 1/8" FELLETS, 1/8" RADIUS

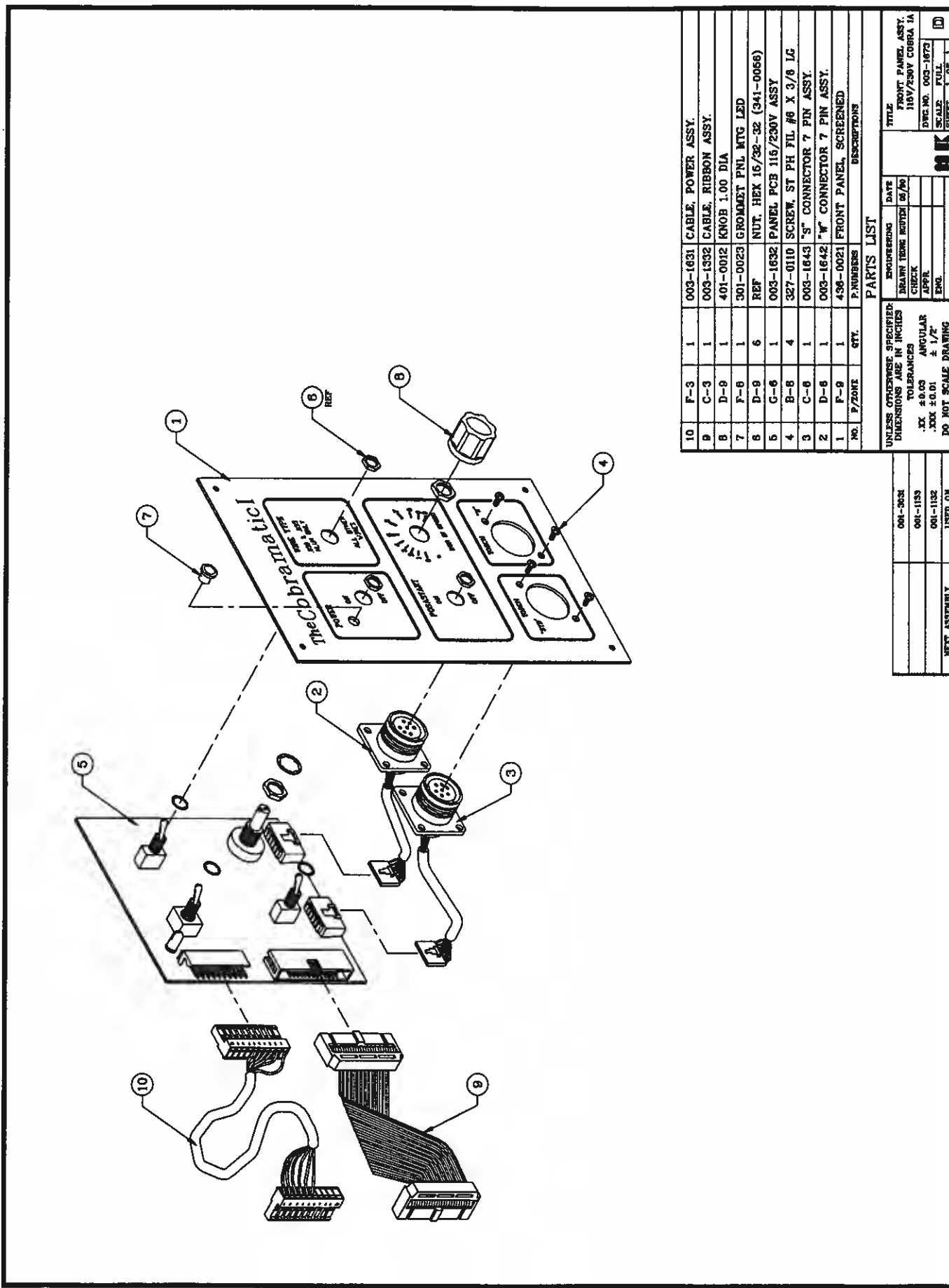
DATE: 5/90

BY: [Signature]

DESCRIPTION: POWER BLOCK ASSY COBRAMATIC I

SCALE: 1/1

REV: 1

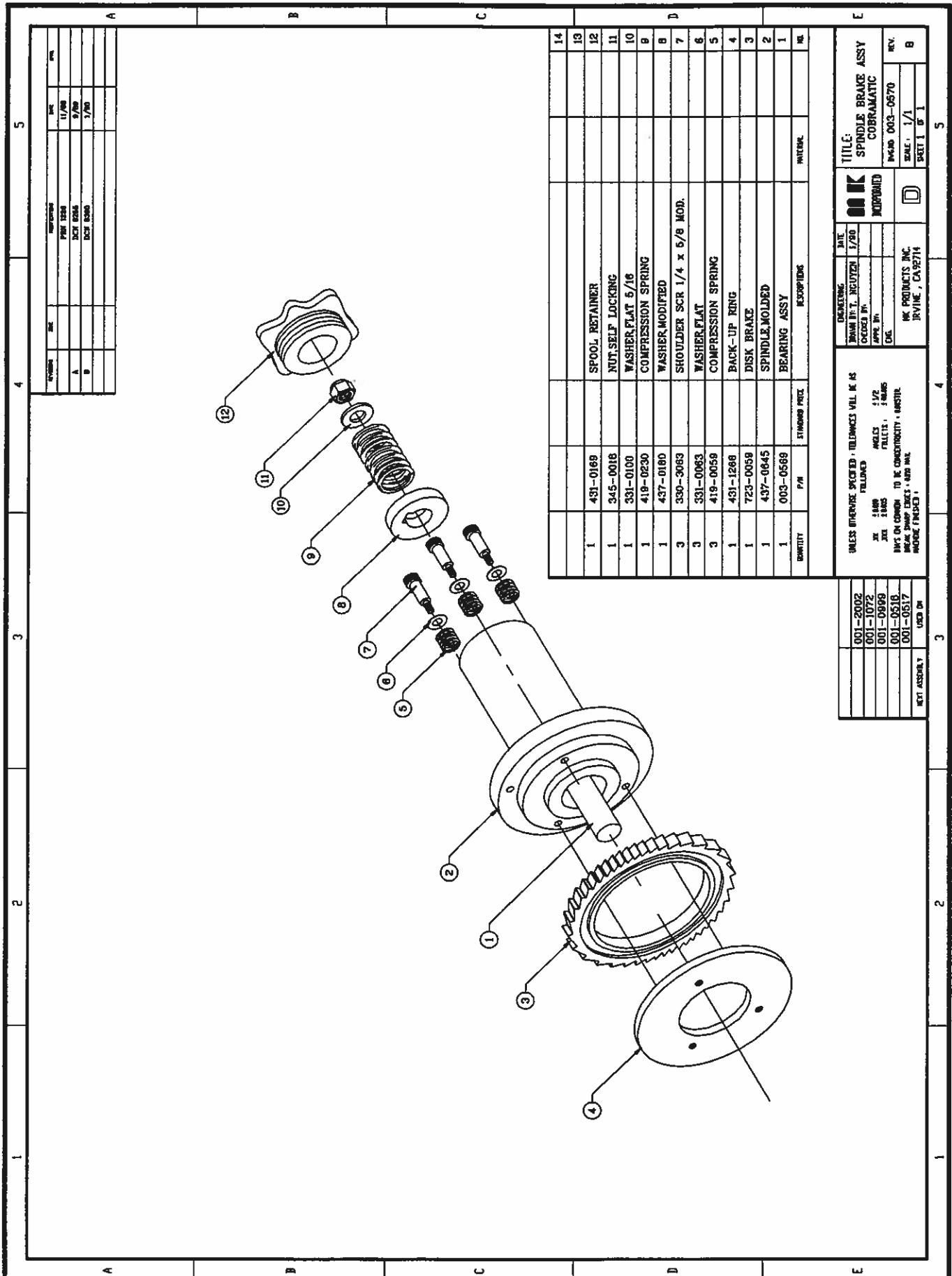


NO.	P/ZONE	QTY.	P. NUMBERS	DESCRIPTIONS
10	F-3	1	003-1631	CABLE, POWER ASSY.
9	C-3	1	003-1332	CABLE, RIBBON ASSY.
8	D-9	1	401-0012	KNOB 1.00 DIA
7	F-8	1	301-0023	GROMMET PNL MTG LED
6	D-9	6	REF	NUT, HEX 16/32-32 (341-0056)
5	G-6	1	003-1632	PANEL PCB 116/230V ASSY
4	B-8	4	327-0110	SCREW, ST PH FIL #6 X 3/8 LG
3	C-8	1	003-1643	"S" CONNECTOR 7 PIN ASSY.
2	D-8	1	003-1642	"W" CONNECTOR 7 PIN ASSY.
1	F-9	1	436-0021	FRONT PANEL, SCREENED

PARTS LIST

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES	DATE	ENGINEERS	DATE	TITLE
.XX ±0.03	DEBY/TDR 10/20/91		02/90	FRONT PANEL ASSY.
.XXX ±0.01	CHECK			116V/230V COBRA IA
± 1/2"	APPL			
DO NOT SCALE DRAWING	ENG.			

001-3024				
001-1153				
001-1152				
001-1151				

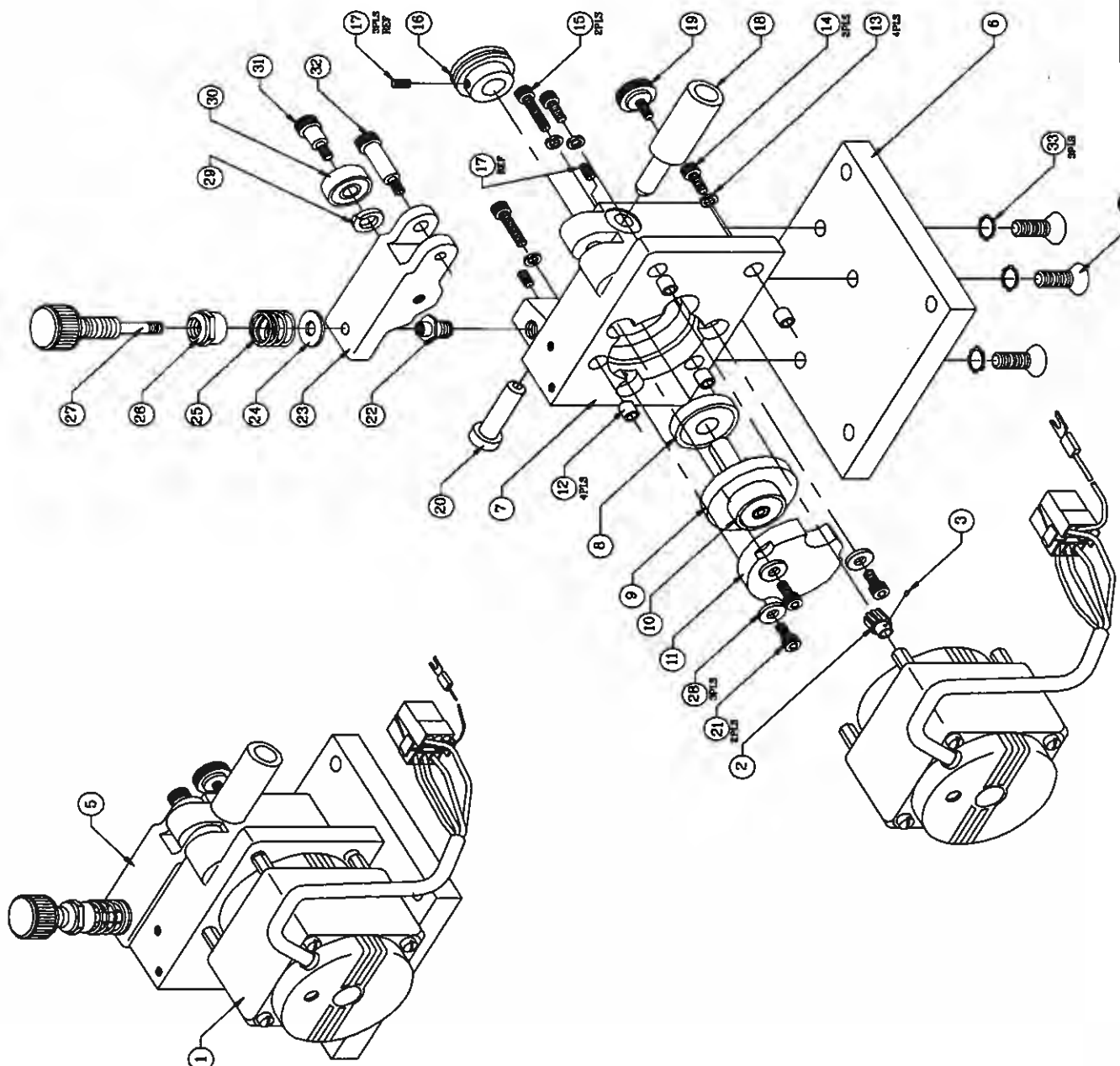


REV.	DATE	DESCRIPTION
A	11/80	REVISED
B	9/80	REVISED
C	3/80	REVISED

QTY	P/N	STANDARD PRICE	DESCRIPTION	UNIT
1	431-0168		SPOOL RETAINER	
1	345-0016		NUT, SELF LOCKING	
1	331-0100		WASHER, FLAT 5/16	
1	419-0230		COMPRESSION SPRING	
1	437-0180		WASHER, MODIFIED	
3	330-3083		SHOULDER SCR 1/4 x 5/8 MOD.	
3	331-0063		WASHER, FLAT	
3	419-0059		COMPRESSION SPRING	
1	431-1268		BACK-UP RING	
1	723-0058		DISK BRAKE	
1	437-0645		SPINDLE, MOLDED	
1	003-0568		BEARING ASSY	

UNLESS OTHERWISE SPECIFIED, DIMENSIONS WILL BE AS FOLLOWS: IN INCHES FRACTIONS DECIMALS DIMS ON CONTOUR TO BE CONSIDERED UNLESS OTHERWISE SPECIFIED HOLE FINISHES: H9/D9		OPERATING DATE DRAWN BY: T. NEUTZNER 1/80 CHECKED BY: J.P.P. 1/80 DATE: 1/80	TITLE: SPINDLE BRAKE ASSY COBRAMATIC
001-2002 001-1072 001-0969 001-0518 001-0517		MK PRODUCTS, INC. IRVINE, CA 92714	REV. 8 SCALE: 1/1 SHEET 1 OF 1

REVISED	DATE	DESCRIPTION	DATE	BY
		PREL		



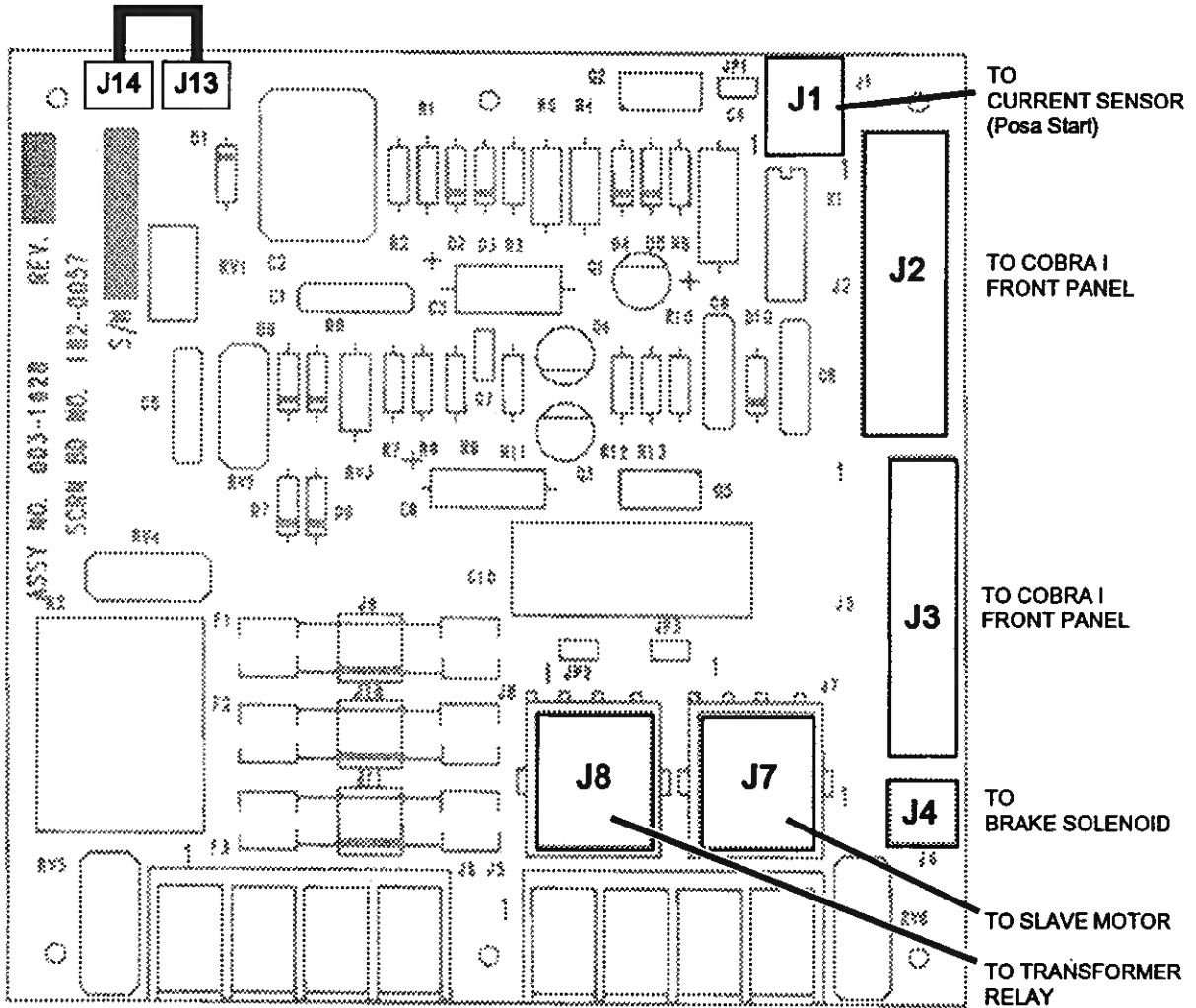
3	REF	32-L-0208	SCREW, FLAT HD 1/4-20 X 3/4
3	REF	333-0084	WASHER, C'SHOK INT STAR 1/4
1	REF	330-0004	SCREW, SHOULDER 1/4 X 3/4
1	REF	330-0001	SCREW, SHOULDER 1/4 X 5/8
1	REF	501-0207	ROLLER ROLL-SLAVE MOTOR
1	REF	333-0006	WASHER, LOCK SPRING 1/4
3	REF	331-0044	WASHER, FLAT #10
1	REF	603-0273	PRESSURE SHAFT, 3/16" Ø
1	REF	345-0847	PISTON, ADJUST
1	REF	419-0211	SPRING, COMP. 0.02 OD X 0.002
1	REF	331-0050	WASHER, 1/4" ID
1	REF	413-0208	ROLLER ROLL, ABS
1	REF	431-1082	PISTON, STOP SHAFT
3	REF	333-0024	SCREW, SOCKET HD #8-32 X 3/8
1	REF	333-0210	CUMUL. WIRE 1/2 DIA
1	REF	603-0118	KNUR. SURF-ASST
1	REF	733-0284	CUMUL. WIRE OUTLET 5/8 DIA
3	REF	321-0090	SET SCREW #10-24 X 1/4
1	REF	511-0208	DRIVE ROLL-SLAVE MOTOR
2	REF	329-0028	SCREW, SOCKET HD #8-32 X 1.00
2	REF	329-0028	SCREW, SOCKET HD #8-32 X 5/8
4	REF	333-0006	WASHER, LOCK SPRING #8
4	REF	342-0005	SPACER, 1/4 X 0.171 ID
1	REF	431-0204	CHP
1	REF	501-0108	CAP BEARING
1	REF	507-0138	GEAR SHAFT
1	REF	501-0118	BEARING REDUCTION SHAFT
1	REF	431-0347	GEAR REDUCTION CASTING
1	REF	261-0213	GEAR BOX INSULATION
1	REF	501-1807	GEAR BOX ASST-SLAVE MOTOR
1	REF	421-0126	SPRING PIN 1/8 X 1/4 LG
1	REF	507-0214	HEEL GEAR 24P-RT-G-3S
1	REF	003-1241	TORNADO MOTOR 3/4
1	REF		INSULATOR
1	REF		WHEEL

TITLE: MOTOR SLAVE ASST. COBRAMATIC
 DRAWN BY: []
 CHECKED BY: []
 DATE: 08-15-88
 SCALE: 1/1
 SHEET: 1/1

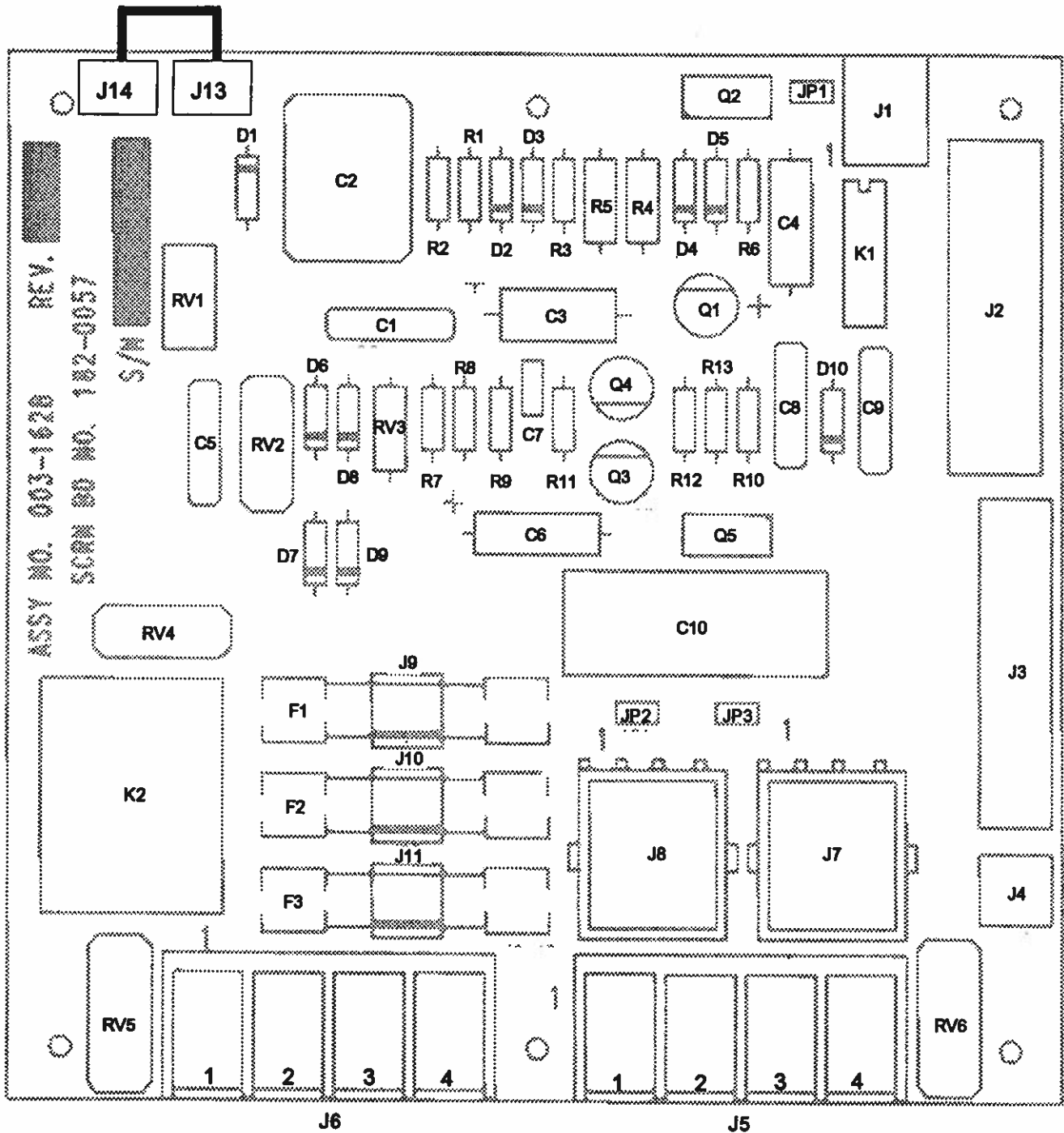
VALVE ENGINE DIVISION - BIRMINGHAM, AL, U.S.A.
 1000 1/2
 1000 1/2
 1000 1/2
 1000 1/2

1000 1/2
 1000 1/2
 1000 1/2
 1000 1/2

COBRAMATIC I - MAIN P.C. BOARD CONNECTIONS



COBRAMATIC I - MAIN P.C. BOARD PARTS PLACEMENT



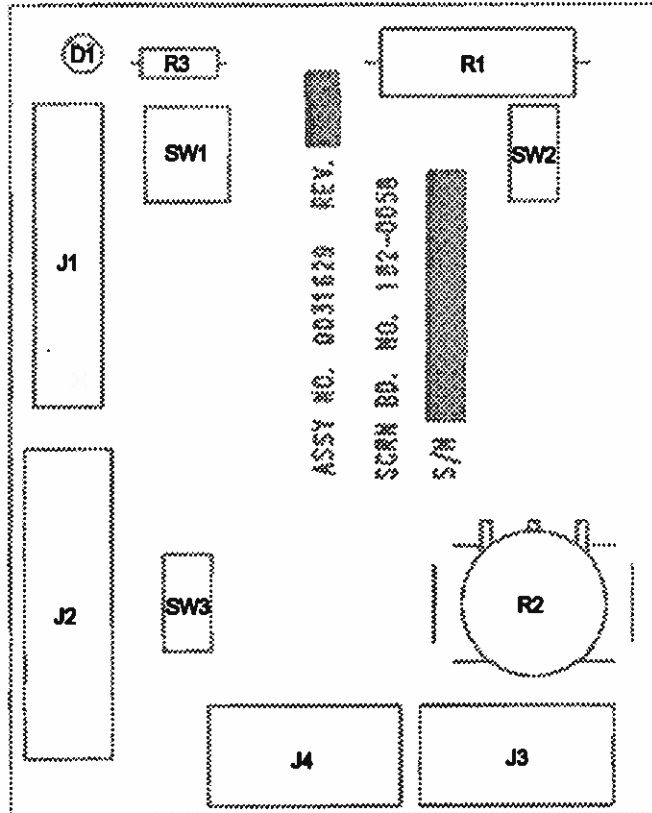
COMPONENTS TO BE REPLACED BY QUALIFIED SERVICE PERSONNEL ONLY.

003-1628
COBRAMATIC I - MAIN P.C. BOARD
PARTS LIST

<u>COMPONENT #</u>	<u>P/N</u>	<u>DESCRIPTION</u>
K1	157-0144	RELAY, 5V 5000HM 200MA
R2, R3	115-0154	RESISTOR, carbon .25 watt 6.8K ohm
R4, R5	115-0042	RESISTOR, carbon .50 watt 6.8K ohm
R12, R13	115-0120	RESISTOR, carbon .25 watt 100 ohm
R1	115-0274	RESISTOR, carbon .25 watt 4.3K ohm
R6	115-0122	RESISTOR, carbon .25 watt 150 ohm
R7	115-0144	RESISTOR, carbon .25 watt 10K ohm
R8	115-0138	RESISTOR, carbon .25 watt 3.3K ohm
R9	115-0129	RESISTOR, carbon .25 watt 560 ohm
R10.....	115-0136	RESISTOR, carbon .25 watt 2.2K ohm
R11.....	115-0141	RESISTOR, carbon .25 watt 5.6K ohm
D1, D3	124-0002	DIODE, 1 amp 800 volts (1N4006)
D6-D10	124-0003	DIODE, 2.5 amps 1KV (HEP170)
D2	124-0010	DIODE, zener 1 watt 4.3 volts (1N4731)
D4	124-0011	DIODE, zener 1 watt 10 volts (1N4740)
D5	124-0012	DIODE, zener 1 watt 6.8 volts (1N4736)
Q1	122-0005	TRANSISTOR, NPN 250MA 80 volts (2N4410)
Q2	122-0011	TRANSISTOR, NPN 500MA 250 volts (2N5655)
Q3	122-0004	TRANSISTOR, PNP 1 amp 50 volts (2N4249)
Q4	122-0013	TRANSISTOR, unijunction 30 volts (2N2646)
Q5	125-0028	THYRISTOR, 8 amps 400 volts (MCR218-6)
C1, C5, C8, C9	101-0016	CAPACITOR, ceramic .01uf 600VDC
C2	101-0013	CAPACITOR, Poly .047uf 200VDC
C3	104-0060	CAPACITOR, electrolytic 6.8uf 63 volts
C4, C6	104-0002	CAPACITOR, tantalum 10uf 20VDC
C7	101-0021	CAPACITOR, ceramic .047uf 50VDC
RV1, RV5, RV6.....	124-0026	VARISTOR, 130 volts 10 amps
RV2, RV4	124-0028	VARISTOR, 56 volts 8 amps
RV3	124-0029	VARISTOR, 47 volts 2 amps
C10.....	101-0116	CAPACITOR, poly 3.3uf 250VAC
J2	153-0876	TERMINAL, header 26 pin
J3	153-0842	TERMINAL, header 10 pin
J4	153-0844	TERMINAL, header 2 pin
J5, J6.....	186-0057	TERMINAL, strip 4 pin
J7, J8.....	153-0850	CONNECTOR, 6 pin
J13, J14.....	153-0867	TERMINAL, HEADER 3 PIN
Jumper	003-1307	JUMPER, J13 to J14
Fuse Holder	152-0008	FUSE HOLDER, PC mount
F1, F3	151-0001	FUSE, AGC 2A 250V
F2 220 VAC ONLY	151-0001	FUSE, AGC 2A 250V
K2	157-0022	RELAY, 24VAC 4PDT
K2 Socket	173-0026	SOCKET, relay 14 pin

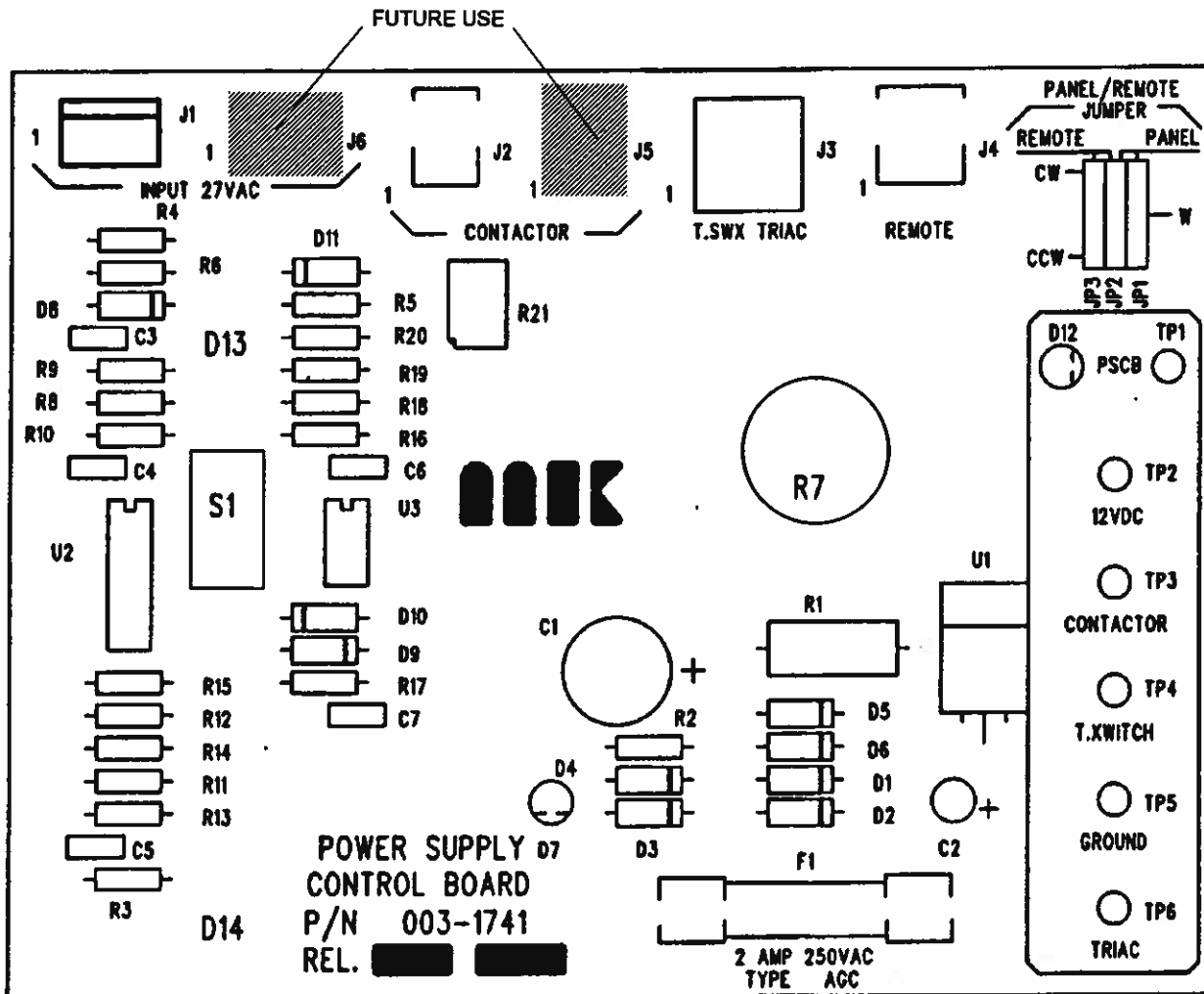
003-1632
COBRAMATIC I FRONT PANEL CIRCUIT BOARD

<u>COMPONENT #</u>	<u>P/N</u>	<u>DESCRIPTION</u>
R1	113-0593	RESISTOR, wire wound 400 ohm, 5 watt
R2	119-0020	POTENTIOMETER, 100K ohm
R3	115-0037	RESISTOR, carbon 2.7K ohm, 1/2 watt
D1	124-0045	LED, green
SW1	159-3587	SWITCH, DPDT, p.c. mount
SW2	159-3586	SWITCH, SPDT, p.c. mount
SW3	159-3586	SWITCH, SPDT p.c. mount
J1	153-0842	HEADER, 10pin, 90 degree
J2	153-0876	HEADER, 26pin, 90 degree
J3	153-0860	HEADER, 8pin, 90 degree
J4	153-0860	HEADER, 8pin, 90 degree



COMPONENTS TO BE REPLACED BY QUALIFIED SERVICE PERSONNEL ONLY.

POWER SUPPLY CONTROL BOARD P/N 003-1741



COMPONENTS TO BE REPLACED BY QUALIFIED SERVICE PERSONNEL ONLY.

P/N 003-1741
POWER SUPPLY CONTROL BOARD PARTS LIST

<u>COMPONENT #</u>	<u>P/N</u>	<u>DESCRIPTION</u>
C1	104-0057	CAPACITOR, electrolytic 222uf, 63VDC
C2	104-0024	CAPACITOR, electrolytic 10uf, 50V
C3,C4,C6	101-0075	CAPACITOR, monolithic 1uf, 50V
C5, C7	101-0054	CAPACITOR, poly .01uf, 63V
D1,D2,D3,D4,D5, D9,D10,D11	124-0002	DIODE, 1 amp 800V (1N4006)
D6	124-0067	DIODE, zener 1 watt, 22V (1N4748A)
D7,D13,D14	124-0042	DIODE, LED red
D8	124-0012	DIODE, zener 1 watt, 6.8V (1N4736)
D12	124-0045	DIODE, LED green
F1	151-0001	FUSE, MDA 2 amps, 250V AGC
J1	153-0793	TERMINAL, Leader 3 pin
J2	153-0866	TERMINAL, Leader 2 pin
J3	153-0901	TERMINAL, Leader 4 pin
J4	153-0867	TERMINAL, Leader 3 pin
R1	115-0428	RESISTOR, carbon 1 watt, 430 ohm
R6,R14,R16	115-0132	RESISTOR, carbon .25 watt, 1K ohm
R4	115-0108	RESISTOR, carbon .25 watt, 10 ohm
R3, R5	115-0134	RESISTOR, carbon .25 watt, 1.5K ohm
R2	115-0275	RESISTOR, carbon .25 watt, 5.1K ohm
R7	119-0021	POTENTIOMETER, 1K ohm, 1 turn
R8,R9,R10,R12		
R13,R17	115-0144	RESISTOR, carbon .25 watt, 10K ohm
R11	115-0154	RESISTOR, carbon .25 watt, 68K ohm
R15	115-0156	RESISTOR, carbon .25 watt, 100K ohm
R18	115-0164	RESISTOR, carbon .25 watt, 470K ohm
R19, R20	115-0128	RESISTOR, carbon .25 watt, 470 ohm
SW1	159-3586	SWITCH, tog SPDT 5 amps, 120VAC
TP1-TP5	185-0076	TEST POINT
U1	127-0007	VOLTAGE REGULATOR (LM340T-12)
U2	127-0016	OP-AMP, quad (LM342)
U3	129-0015	IC, (LM555) timer
Bracket	435-0901	BRACKET POT
Clip	152-0008	CLIP, fuse
PCB	182-0065	P.C. BOARD, unstuffed

TROUBLE SHOOTING SECTION



WARNING



Turn off input power switch, unplug primary power cord and wait 5 minutes before performing any service to this equipment. This will ensure that all storage capacitors have discharged to a relatively safe level.

The following pages detail the trouble shooting section of this manual, please read carefully and use caution when performing service on any electrical equipment. All service is to be performed by a qualified service technician.

Before calling for customer service, please go over the trouble shooting page to help solve your equipment problem. If the flow charts can not help you, please have the following information on hand before calling our service personnel:

1. Company name
2. Your name
3. Your phone number

4. Power supply Model No.
5. Primary power source

6. Symptoms of failure
7. Weld conditions

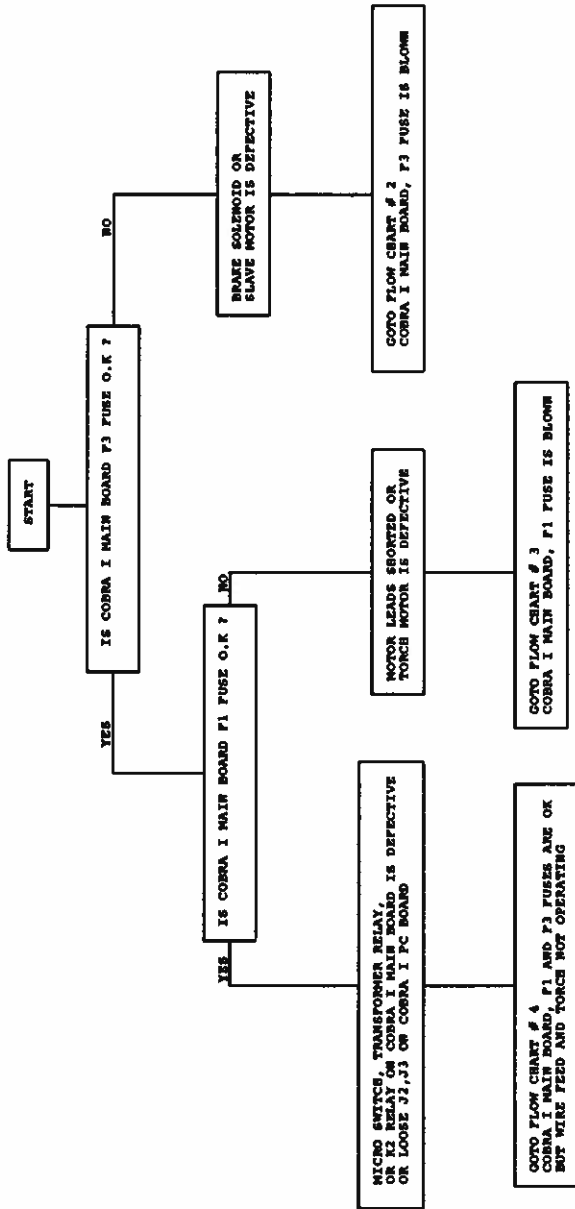
TROUBLESHOOTING GUIDE

TROUBLE	CAUSE	REMEDY	REFERENCE
No wire feed at torch, feeder not operating, i.e. no slave motor or brake solenoid.	Cobra I Main board F3 fuse blown. Cobra I Main board F1 fuse blown. Micro-switch defective/not being activated. Relay K2 on Cobra I Main Board is inoperative. Loose J2, J3, P.C. Board connectors on Cobra I Board. Broken electrical cable.	Check 115 VAC circuit, replace fuse. Check motor leads for shorts, replace fuse. Replace switch. Check switch for operation. Check / Replace K2 relay. Check J2, J3 connections. Check for continuity, replace cable if needed.	Flow chart #1
Brake solenoid / Slave motor inoperative.	Solenoid / Slave motor defective. Relay K2 inoperative.	Check for open circuit. Check for 115 VAC across J4-1,2. Check relay K2 if 115 VAC not present.	Brake solenoid : J4-1 to J4-2 is 80 ohms. Slave motor : J7-8 to J7-1, J7-4 to J7-2 is 150 ohms.
No wire feed at torch, feeder operating properly.	Bad torch Potentiometer. Bad torch motor. Broken Electrical Cable. Bad Speed control/PCB.	Check potentiometer with meter. Check / Replace motor. Check motor and potentiometer wires for continuity. Check / Replace P.C. Board.	Flow chart #5
Wire feeds at one speed only.	Torch pot is defective or torch cable is shorted. Cobra I main board is defective.	Check / Replace torch pot. Check / Replace Cobra I Main P.C. Board.	Flow chart #6
No weld output, wire feeds ok.	Loose or No cable connections. Power Supply control board is defective. Loose connection at thermostat terminals. Thermostat is defective. K2 relay on Cobra I main board is not sending closing contact signal. Triac is defective.	Check all power connections. Check / Replace Power Supply control board. Check connections to thermostat. Replace thermostat. Check / Replace relay K2 Check / Replace triac.	Flow chart #7 Triac resistance check : Pin 3 to Pin 4 : 1k ohm to 10k ohm. Pin 1 to Pin 2 : more than 100k ohms.
No weld output, fan motor does not run either.	No primary power input. Primary power connections are loose. Primary disconnect switch off or fuses open. CobraMig 250 main power switch defective.	Connect primary power! Check for secure connections on the primary power. Close switch or replace fuse. Replace power switch.	
Low weld voltage.	Low input voltage. Input voltage jumper link in wrong position. One of two diodes is defective or blown.	Check for proper input voltage (208-230 VAC) Place jumper link in position to match input voltage. Check / Replace power switch.	
Circuit breaker CB1 trips when torch trigger is depressed.	Rectifiers / Capacitors damaged or defective.	Check for short (J8-1,2 on Cobra I main board should read about 25 ohms.) Replace rectifiers / capacitors if necessary.	Flow chart #9
Posa Start not operating.	Posa Start pot or Posa Start switch is defective. Current sensor is defective or Posa Start circuit on Cobra I main board is defective.	Check / Replace if necessary. Check / Replace current sensor or Cobra I main board.	Flow chart #9
Erratic weld output.	Ground clamp loose at work connection. Capacitors defective. Voltage and wire feed settings are not correct. Excessive spool drag pressure. Dirty or worn conduit. Incorrect pressure on drive rolls. Idler roll stuck or sticking. Wrong size contact tip.	Check ground clamp for secure attachment. Replace capacitors if necessary. Readjust as necessary. Decrease spool drag pressure inside hub. Blow out or replace conduit. Adjust pressure at both feeder and torch. Check for lock washer under idler roll, or replace. See contact tip table for correct tip.	

FLOW CHART #1

SYMPTOM
NO WIRE FEED AT TORCH, FEEDER NOT OPERATING

PROBLEM AREA
COBRA I: MAIN BOARD, K2 RELAY
TORCH: MOTOR, CABLE, MICRO SWITCH
SLAVE MOTOR OR BRAKE SOLENOID



TROUBLE:
NO WIRE FEED AT TORCH, FEEDER NOT OPERATING,
I.E., NO SLAVE MOTOR OR BRAKE SOLENOID.

CAUSE:
(F3) 2 AMP FUSE IN FEEDER BLOWN
(F1) 2 AMP FUSE IN FEEDER BLOWN
MOTOR LEADS SHORTED AND NOT BEING ACTIVATED.
BROKEN ELECTRICAL CABLE.
TRANSFORMER RELAY, RELAY K2 INOPERATIVE
LOOSE J2, J3, COBRA I P.C. BOARD CONNECTORS

TITLE	NO WIRE FEED, FEEDER NOT OPERATING
FILE/DOCUMENT NUMBER	
B.	FLOW CHART #1
REV	
Date:	October 8, 1991 Sheet 1 of 1

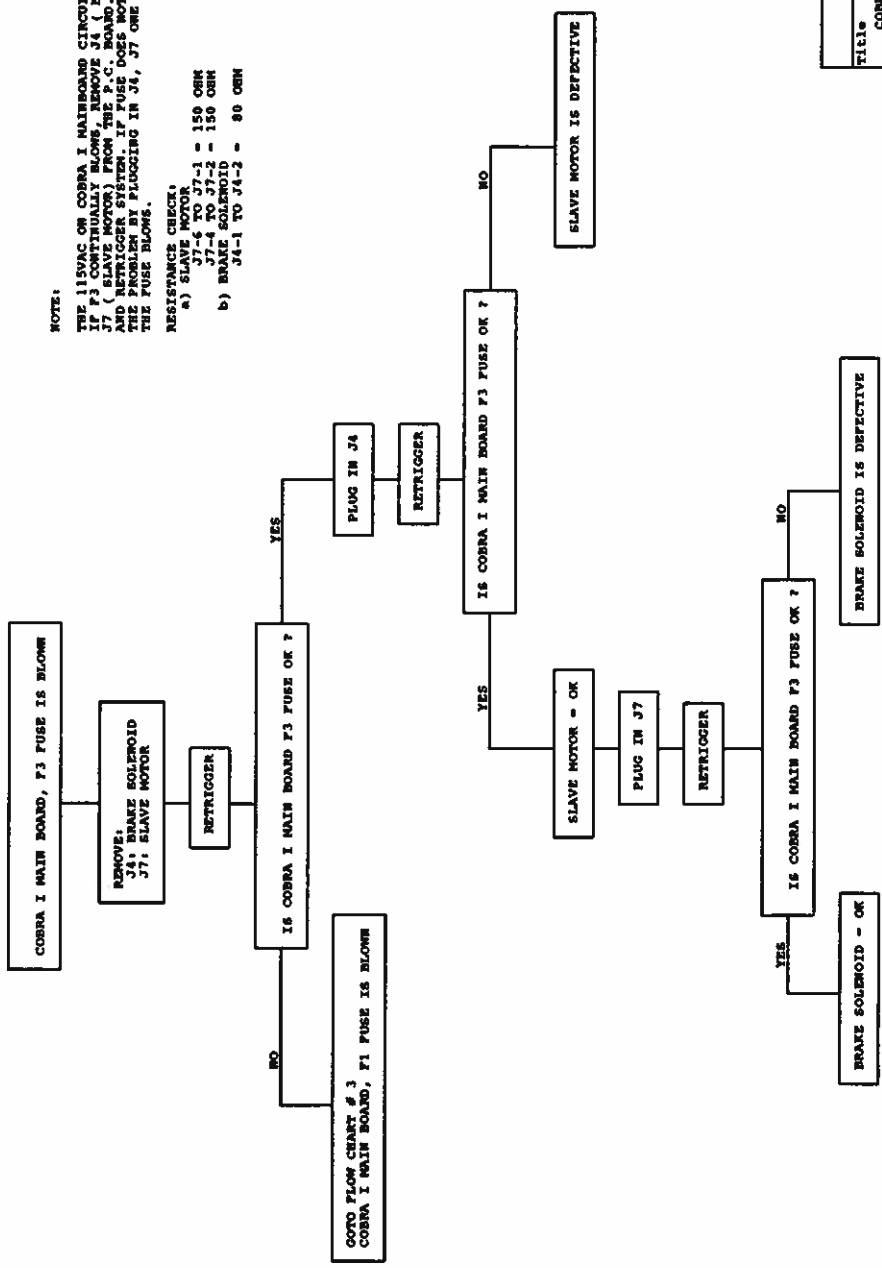
TRUBLE SHOOTING
FLOW CHART #1

FLOW CHART # 2

SYMPTOM	F3 FUSE ON COBRA I IS BLOWN WHEN TORCH IS TRIGGERED
PROBLEM AREA	COBRA I MAIN BOARD, SLAVE MOTOR OR BRAKE SOLENOID

NOTE:
 THE 115VAC ON COBRA I MAINBOARD CIRCUIT IS PROTECTED BY F3 FUSE.
 IF F3 CONTINUALLY BLOWS, REMOVE J4 (BRAKE SOLENOID),
 J7 (SLAVE MOTOR) FROM THE P. C. BOARD. REPLACE THE FUSE
 THE PROBLEM WILL BE SOLVED. IF FUSE DOES NOT BLOW, ISOLATE
 THE PROBLEM BY PLUGGING IN J4, J7 ONE AT A TIME UNTIL
 THE FUSE BLOWS.

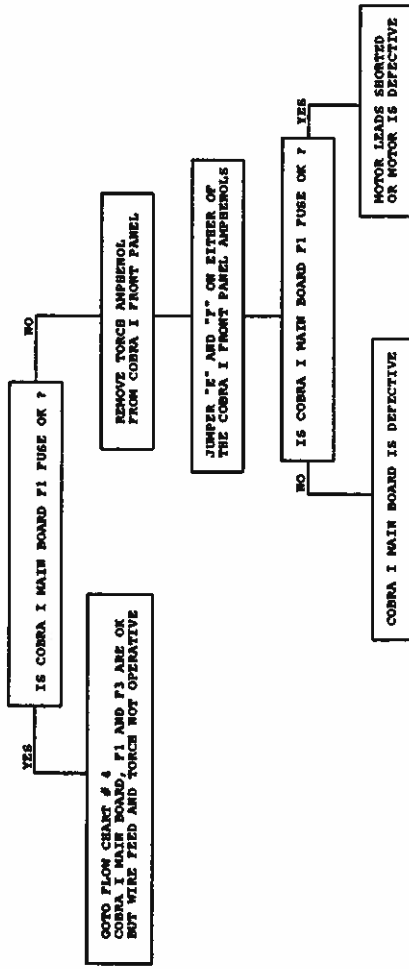
RESISTANCE CHECK
 a) SLAVE MOTOR
 J7-1 TO J7-2 = 150 OHM
 J7-4 TO J7-2 = 150 OHM
 b) BRAKE SOLENOID
 J4-1 TO J4-2 = 80 OHM



TITLE	COBRA I MAIN BOARD, F3 FUSE IS BLOWN
Size/Document Number	B
REV	FLOW CHART #2
DATE: OCTOBER 9, 1991	SHEET 2 OF

TROUBLE SHOOTING
FLOW CHART #2

FLOW CHART # 3	
SYMPTOM	COBRA I MAIN BOARD, F1 FUSE IS BLOWN
PROBLEM AREA	COBRA I MAIN BOARD OR TORCH MOTOR



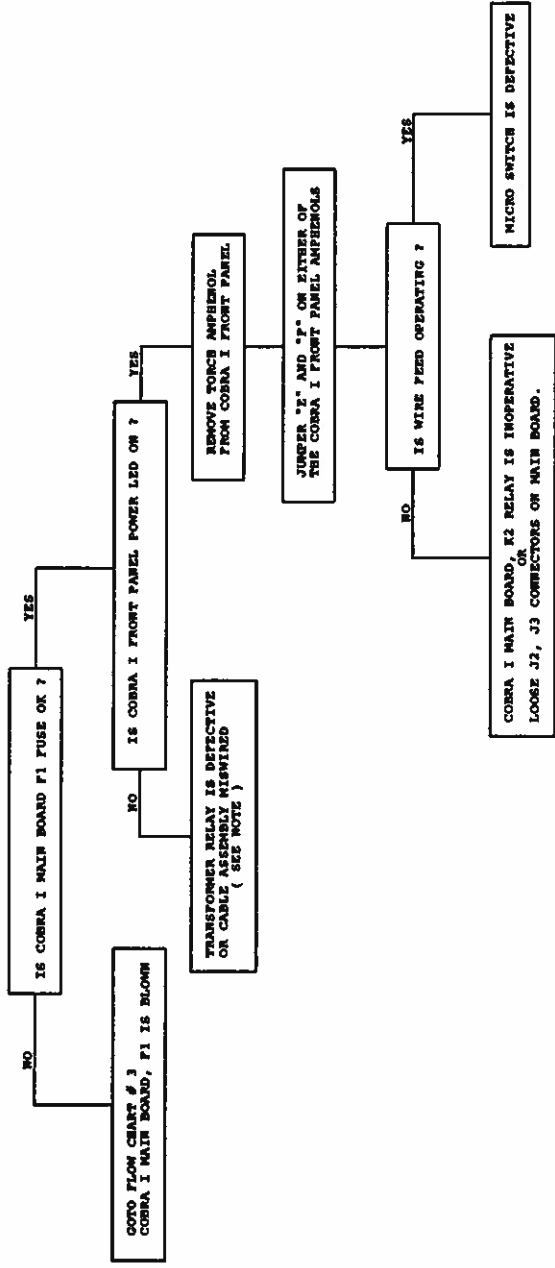
NOTE:
 MOTOR CHECK
 a. REMOVE THE AMPEROL CONNECTOR FROM THE CABINET.
 b. USING A OHM METER, CHECK THE RESISTANCE ACROSS THIS "A" AND "B" (MOTOR LEADS) ON TORCH AMPEROL. THE RESISTANCE SHOULD BE IN THE 100 TO 200 OHM RANGE.
 c. IF AN OPEN CIRCUIT OR SHORT EXISTS, CHECK THE MOTOR LEADS AND MOTOR INDEPENDENTLY.

Title	
COBRA I MAIN BOARD, F1 FUSE IS BLOWN	
Site/Document Number	
B	FLOW CHART # 3
Date	October 8, 1991
Sheet	3 of 3

TROUBLE SHOOTING
FLOW CHART #3

FLOW CHART # 4

SYMPTOM	COBRA I MAIN BOARD, F1 AND F3 FUSES ARE OK BUT NO WIRE FEED AT TORCH AND FEEDER NOT OPERATING
PROBLEM AREA	K2 RELAY ON COBRA I MAIN BOARD, TRANSFORMER RELAY, OR TORCH MOTOR MICRO SWITCH



NOTE:
 WHEN THE COBRA I FRONT PANEL POWER SWITCH IS ON, 115 VAC IS SENT TO THE COIL OF TRANSFORMER RELAY AND 27 VAC IS SENT TO COBAMATIC I MAIN BOARD.
 WHEN THE TORCH IS TRIGGERED, THEN K2 ON COBRA I MAIN BOARD IS ENERGIZED. THIS TRIGGER SIGNALS THE FACTORY MOTOR, BRAKE SOLENOID AND CONTROLLED VOLTAGE TO TORCH MOTOR.
 TRANSFORMER RELAY VOLTAGE:
 115VAC COM (WHITE), PIN 1 TO 115VAC BOT (RED), PIN 2 - 115VAC.
 27VAC COM (GREEN), PIN 3 TO 27VAC BOT (BLACK).
 27VAC COM (YELLOW), PIN 4 TO 27VAC BOT (BLUE), PIN 5 - 27VAC.
 WHEN THE TRIGGER IS PRESSED.

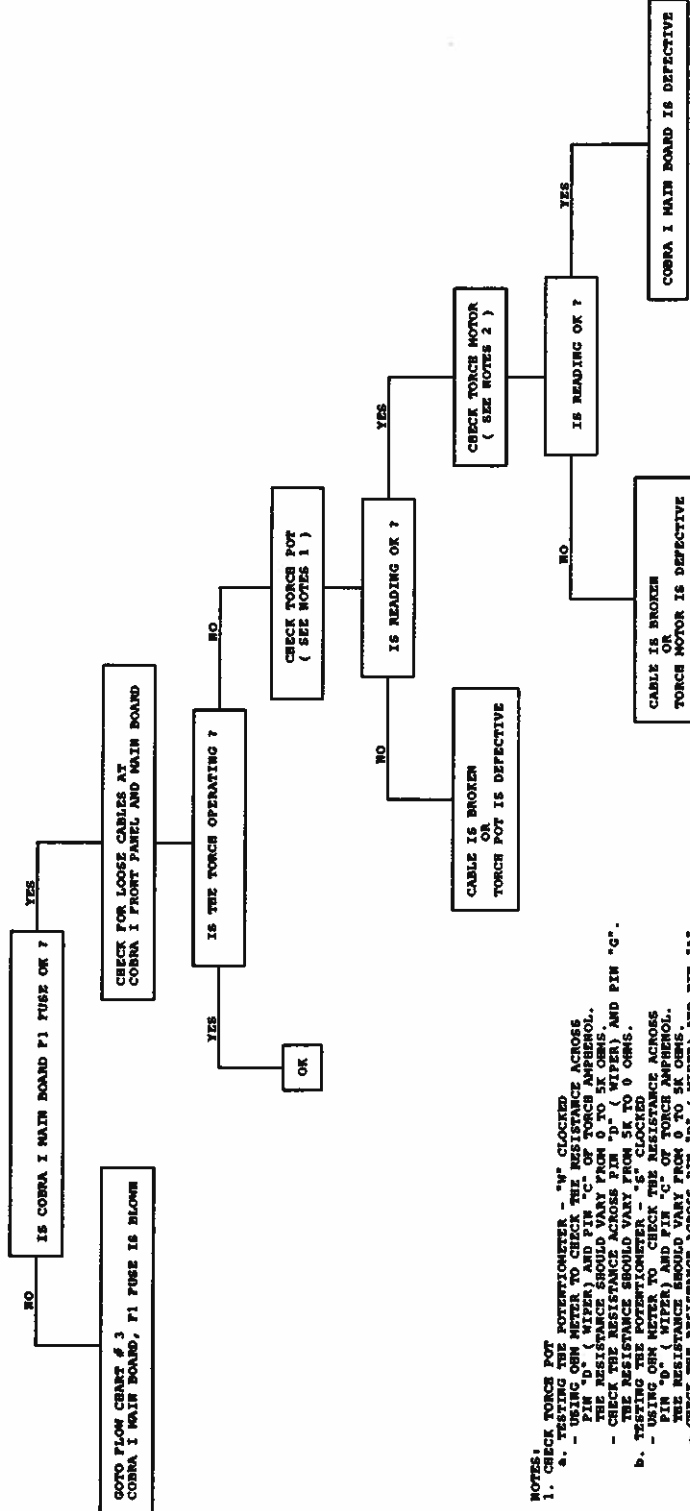
COBRA I MAIN BOARD, F1 AND F3 FUSES ARE OK BUT WIRE FEED AND TORCH NOT OPERATING	
Size	Document Number
B	FLOW CHART #4
Date	October 2, 1991 Sheet 1 of 1

TROUBLE SHOOTING
FLOW CHART #4

FLOW CHART # 5

SYMPTOM
NO WIRE AT TORCH, FEEDER OPERATING PROPERLY

PROBLEM AREA
COBRA I MAIN BOARD, TORCH POT OR TORCH MOTOR



- NOTES:**
1. CHECK TORCH POT
 - a. TESTING THE POTENTIOMETER - "W" CLOCKED
 - USING OHM METER TO CHECK THE RESISTANCE ACROSS PIN "D" (WIPER) AND PIN "C" (TORCH AMPHEROL).
 - THE RESISTANCE SHOULD VARY FROM 5K TO 0 OHMS.
 - CHECK THE RESISTANCE ACROSS PIN "D" (WIPER) AND PIN "G".
 - THE RESISTANCE SHOULD VARY FROM 5K TO 0 OHMS.
 2. CHECK TORCH MOTOR
 - a. REMOVE THE AMPHEROL CONNECTOR FROM COBRA I FRONT PANEL.
 - b. USING THE OHM METER TO CHECK THE RESISTANCE ACROSS PINS "A" AND PIN "B" (MOTOR LEADS) OF TORCH AMPHEROL.
 - THE RESISTANCE ACROSS THE MOTOR SHOULD BE BETWEEN 5K TO 0 OHMS.
 - c. IF AN OPEN CIRCUIT OR SHORT EXIST, CHECK THE MOTOR LEADS AND MOTOR INDEPENDENTLY.

Title _____

Doc# Document Number _____

P _____

Date: October 8, 1991 Sheet 5 of 5

TROUBLE SHOOTING
FLOW CHART #5

FLOW CHART # 6

SYMPTON

WIRE SPEED ONE SPEED ONLY

PROBLEM AREA

TORCH MOTOR POTENTIOMETER OR CABLE OR COBRA I MAIN BOARD

REMOVE THE AMPEROL CONNECTOR FROM THE COMMANDIC I FRONT PANEL

CHECK THE "W" CLOKED / "S" CLOKED POTENTIOMETER (SEE NOTE)

IS READING OK?

NO

YES

TORCH POT IS DEFECTIVE OR TORCH CABLE IS SHORTED

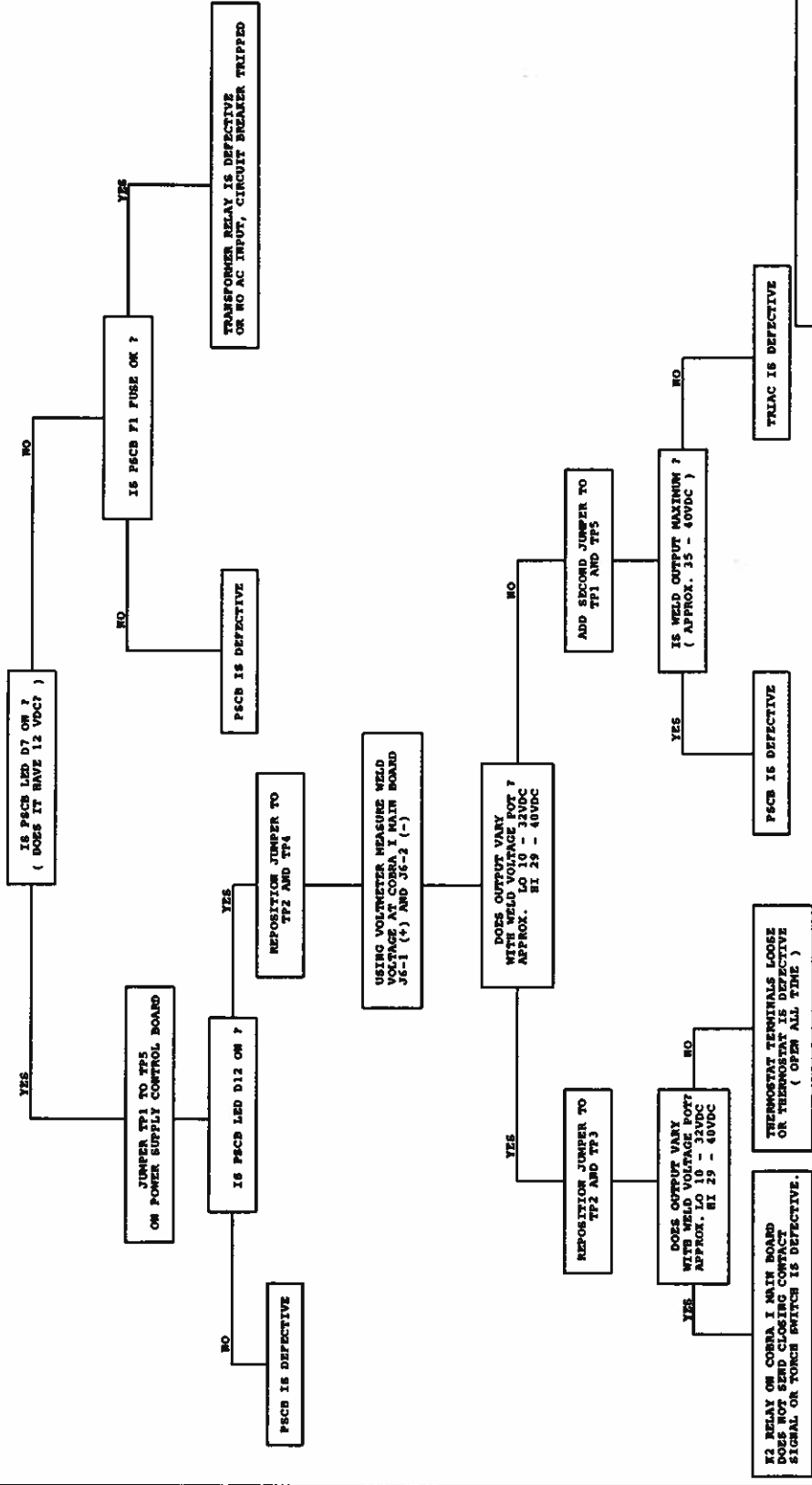
COBRA I MAIN BOARD IS DEFECTIVE

- NOTE:
- TESTING THE POTENTIOMETER - "W" CLOKED
 - USING THE OHM METER TO CHECK THE RESISTANCE ACROSS PINS "C" AND "D" OF TORCH AMPEROL CONNECTOR. THE RESISTANCE SHOULD VARY FROM 0 TO 5K OHMS.
 - CHECK THE RESISTANCE ACROSS PIN "D" (WIPER) AND PIN "G". THE RESISTANCE SHOULD VARY FROM 5K TO 0 OHM.
 - TESTING THE POTENTIOMETER - "S" CLOKED
 - USING THE OHM METER TO CHECK THE RESISTANCE ACROSS PINS "C" AND "D" OF TORCH AMPEROL CONNECTOR. THE RESISTANCE SHOULD VARY FROM 0 TO 5K OHMS.
 - CHECK THE RESISTANCE ACROSS PIN "D" (WIPER) AND PIN "G". THE RESISTANCE SHOULD VARY FROM 5K TO 0 OHM.

TITLE	WIRE FEED ONE SPEED ONLY
Size/Document Number	B
REV	FLOW CHART # 6
Date	November 12, 1991/Sheet 6 of 6

FLOW CHART # 7

SYMPTOM NO WELD OUTPUT
PROBLEM AREA POWER SUPPLY CONTROL BOARD (PSCB), THERMOSTAT, TRIAC, CLOSING CONTACT SIGNAL

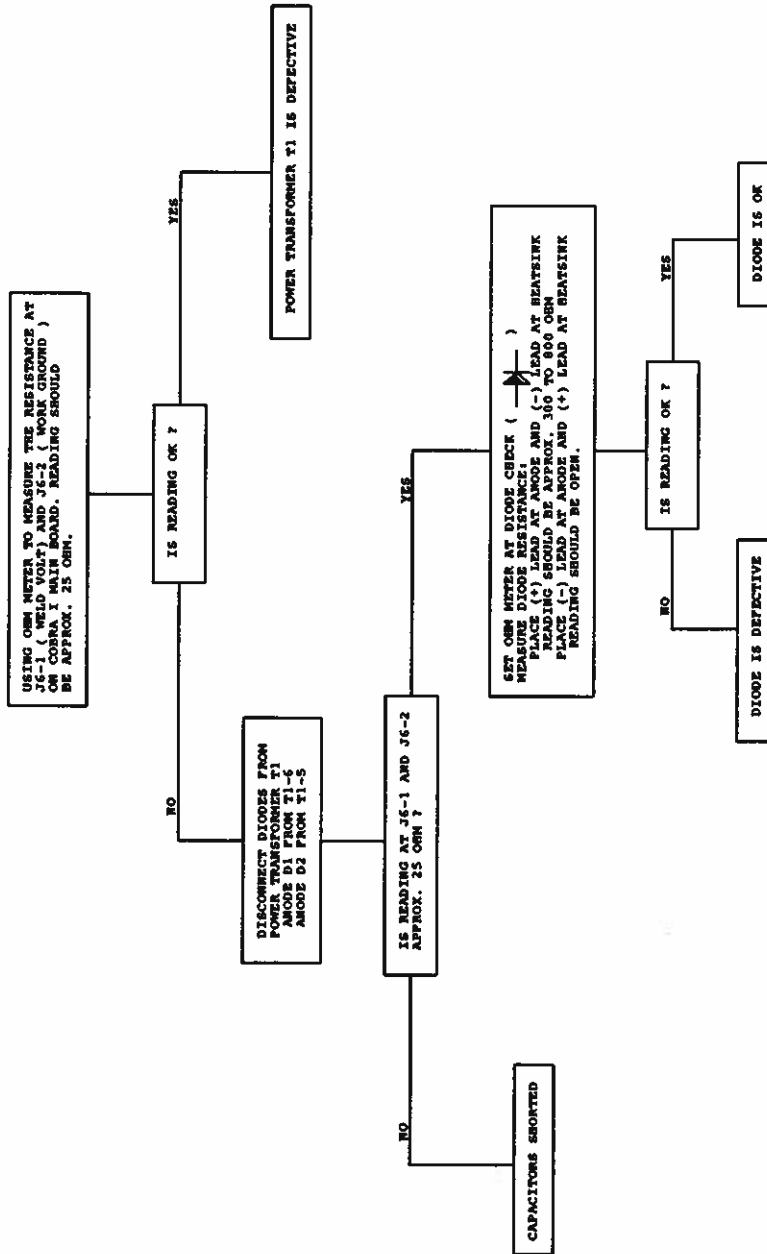


Title	NO WELD OUTPUT
Size/Document Number	FROM CHART # 7
REV	
Date	October 22, 1991/Sheet 7 of

TRUBLE SHOOTING
FLOW CHART #7

FLOW CHART # 8

SYMPTOM CIRCUIT BREAKER TRIPS WHEN TRIGGERED
PROBLEM AREA POWER TRANSFORMER T1, DIODES, CAPACITORS

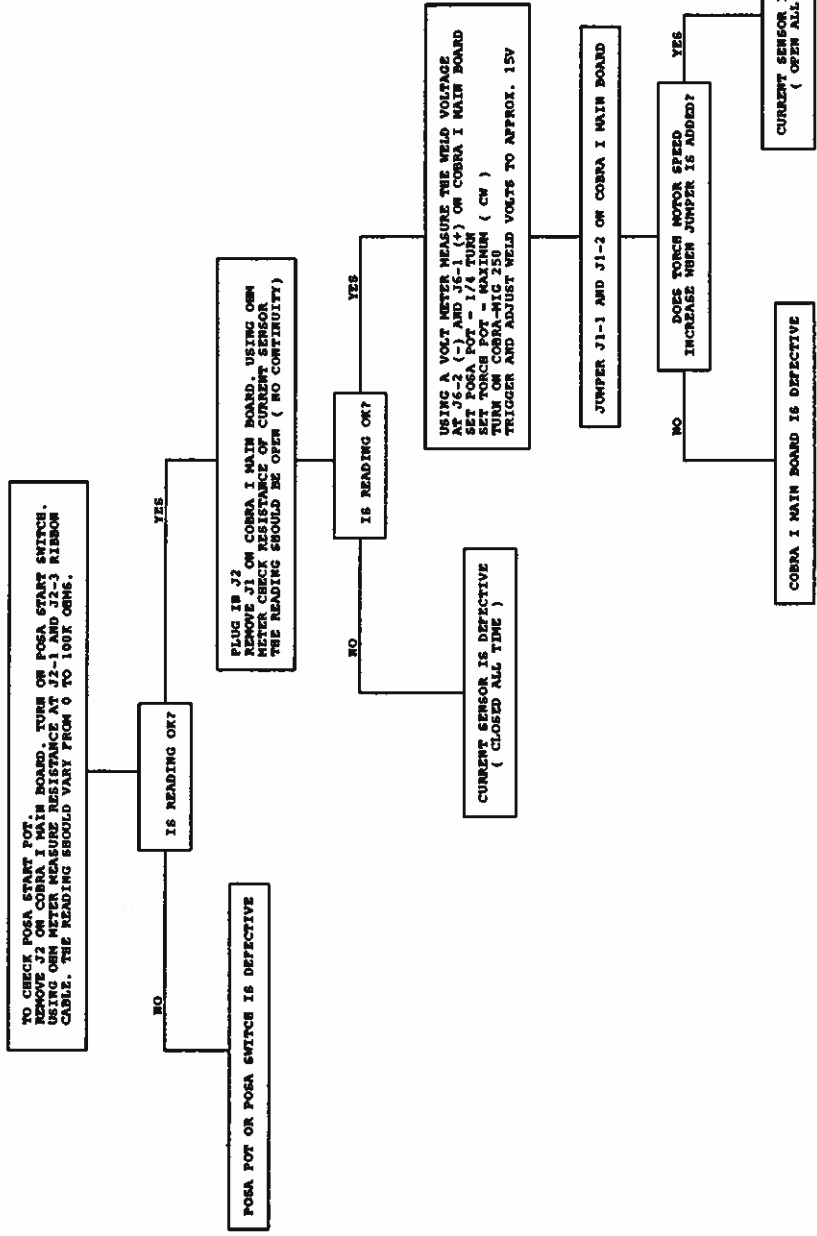


TITLE		CIRCUIT BREAKER TRIPS WHEN TRIGGER
Size/Document Number		PLM CHART #8
B	REV	
Date:		October 10, 1991
		Sheet 8 of 8

TRUBLE SHOOTING
FLOW CHART #8

FLOW CHART # 9

SYMPTOM	POSA START NOT OPERATING
PROBLEM AREA	CURRENT SENSOR, COBRA I MAIN BOARD



TITLE	POSA START NOT OPERATING
File/Document Number	FLOW CHART 9
REV	
Date:	November 7, 1991
Sheet	9 of 9

TRUBLE SHOOTING
FLOW CHART #9

I. TESTING THE TORCH

1. MOTOR CHECK

- a. Remove the amphenol connector from the cabinet.
- b. Using the torch amphenol, check the resistance across pins "A" and "B" (motor leads). The resistance across the motor should be between 5-10 ohms.
- c. If an open circuit or short exist, check the motor leads and motor independently.

2. TESTING THE POTENTIOMETER - "W" CLOCKED

- a. Using the torch amphenol, check the resistance across pin "D" (wiper) and pin "C". The resistance should vary from 0 - 5K ohms.
- b. Check the resistance across pin "D" (wiper) and pin "G". The resistance should vary from 5K - 0 ohms.

3. TESTING THE POTENTIOMETER - "S" CLOCKED

- a. Using the torch amphenol, check the resistance across pin "D" (wiper) and pin "C". The resistance should vary from 0 - 5K ohms.
- b. Check the resistance across pin "D" (wiper) and pin "A". The resistance should vary from 5K - 0 ohms.

4. TESTING THE MICRO SWITCH

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

II. RELAY K2 OPERATION

When the torch trigger is pressed, 24VAC is sent to the coil of relay K2. When K2 is energized, 115VAC is sent to the slave motor, spool brake, and the 115VAC contactor. Relay K2 is also responsible for sending 24VAC to the speed control circuit and shorting the torch motor leads together when the trigger is released for the

dynamic braking system. K2 also provides the closing contactor signal.

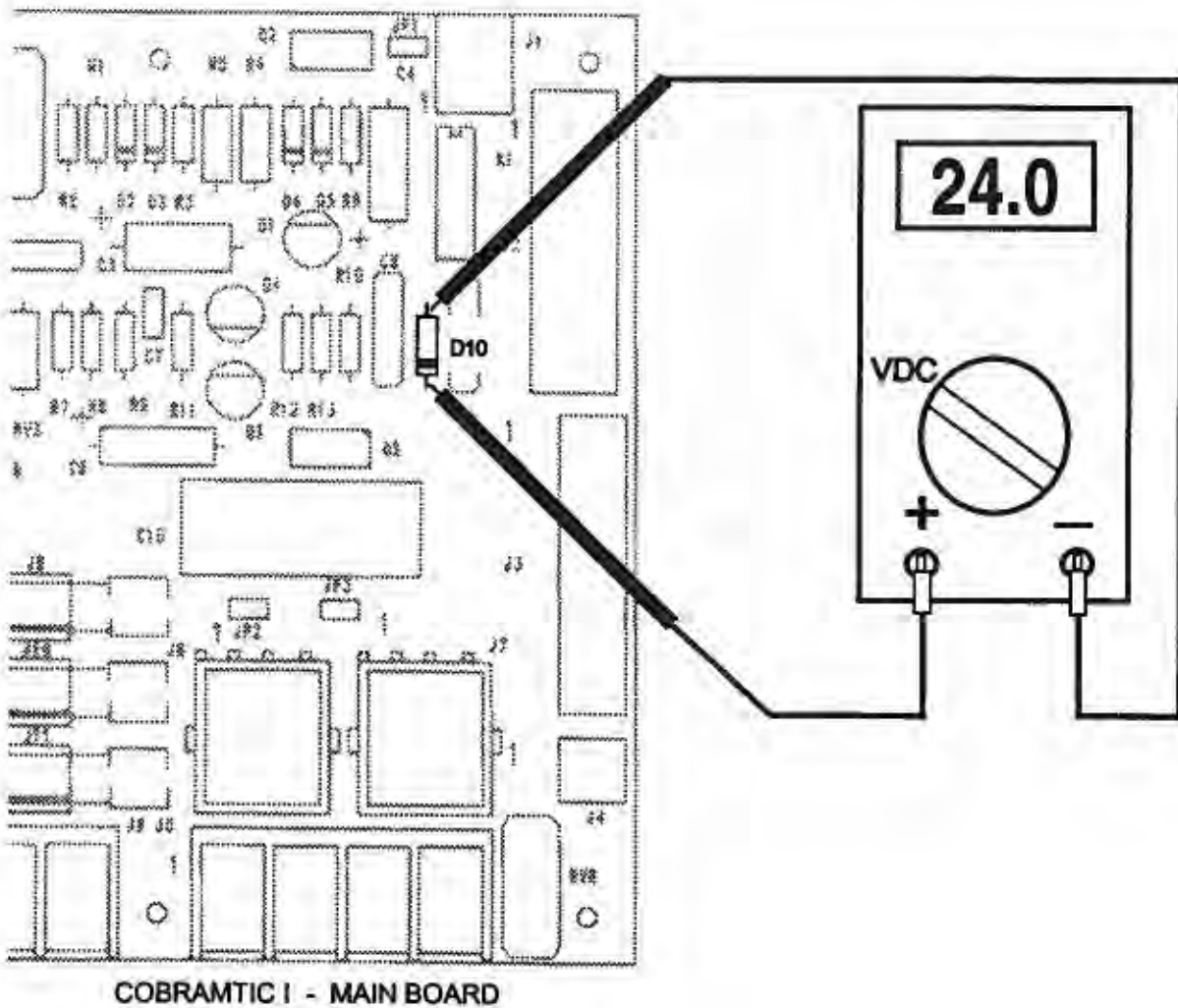
III. TESTING THE 115 VAC CIRCUITS

The 115 VAC circuit is protected by fuse F3. If F3 continually blows, remove J4 (Brake Solenoid), J7 (slave motor) and J5-3,4 (115 VAC Contactor) from the P.C. Board. Replace fuse, and retrigger system. If fuse does not blow; isolate the problem by plugging in J4, J7, and J5-3,4 one at a time until the fuse blows.

III. TESTING THE SPEED CONTROL

NOTE: The torch should be tested first and the amphenol must be connected to the Cobramatic I to perform this test.

Place a voltmeter across diode D10 and press torch trigger. A reading of 0 - 24VDC should be observed, as the potentiometer varied.

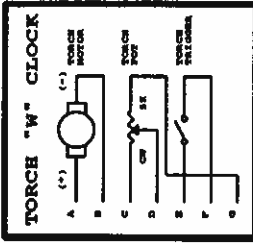


WIRING DIAGRAMS

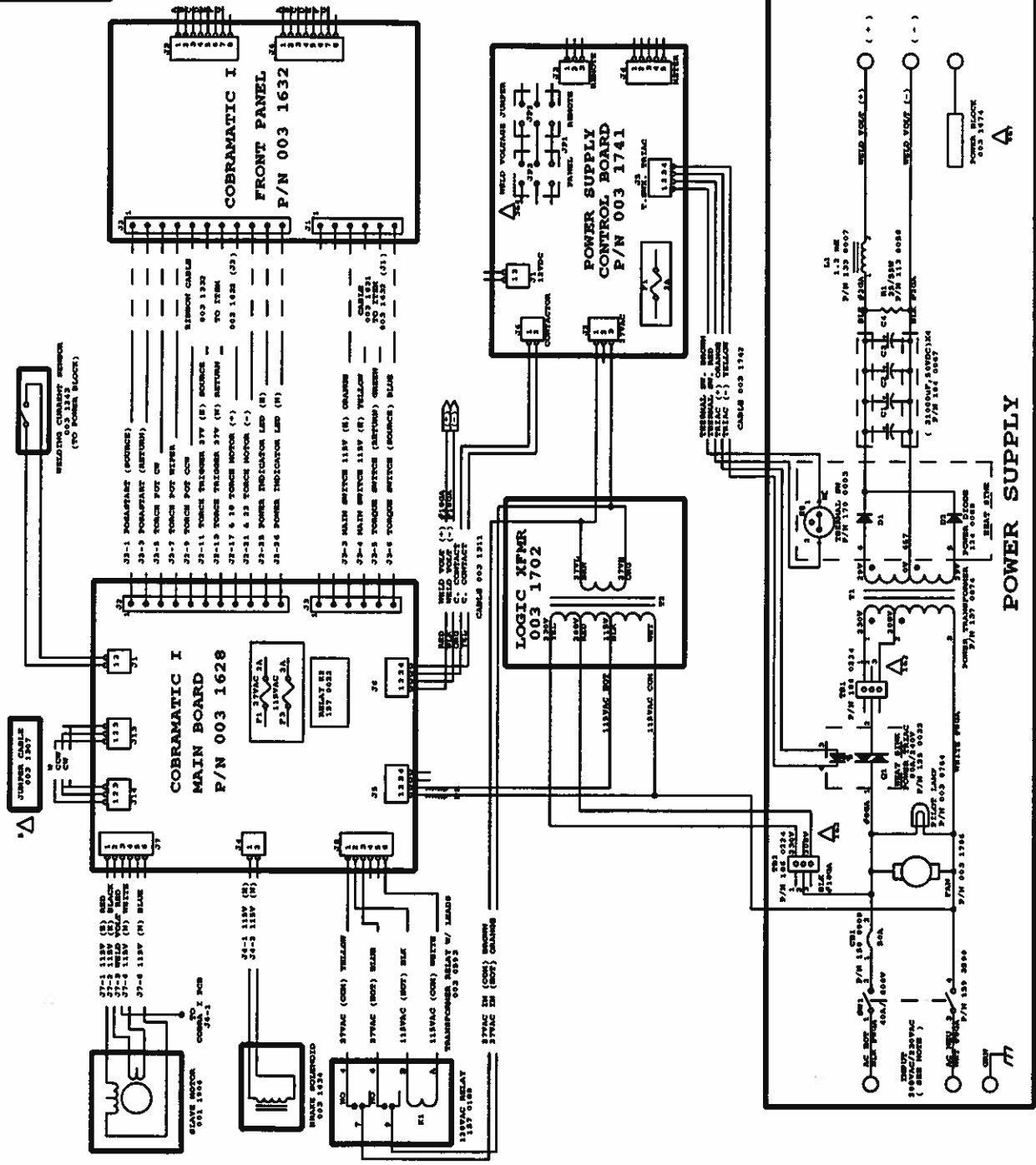
AND

ELECTRICAL SCHEMATICS

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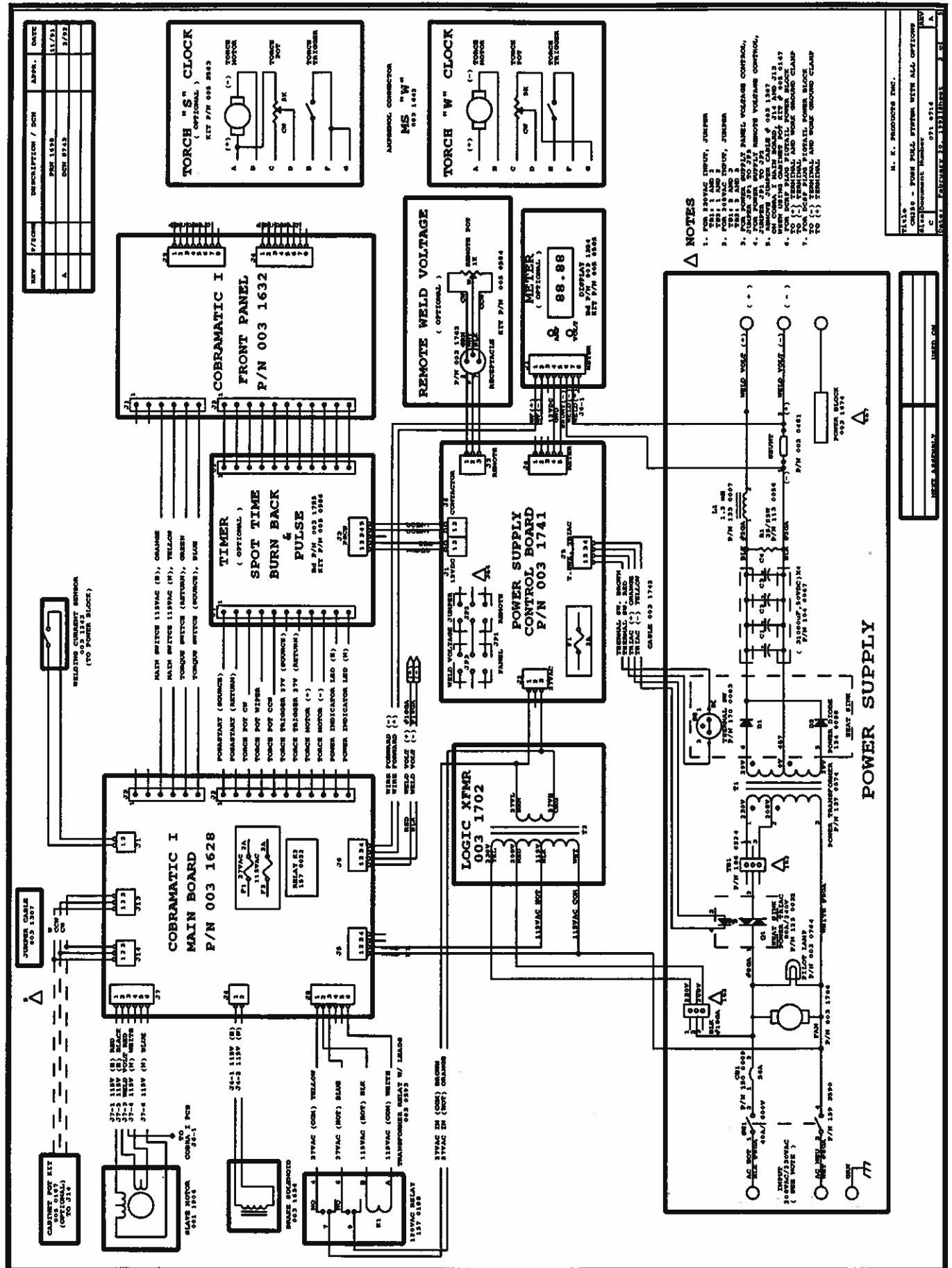


INTERNAL CONNECTION
MS "W" #
003 1643



- NOTES**
1. FOR WELDING POWER, JUNCTIONS ARE MADE AT THE POINTS INDICATED BY THE DOTTED LINES.
 2. FOR WELDING POWER, JUNCTIONS ARE MADE AT THE POINTS INDICATED BY THE DOTTED LINES.
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NOTES

1. TORCH "S" AND "W" TORCHES
2. TORCH "S" AND "W" TORCHES
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20. TORCH "S" AND "W" TORCHES

REV	P/COM	DESCRIPTION / COM	APPR.	DATE
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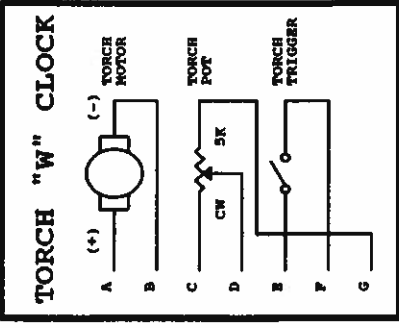
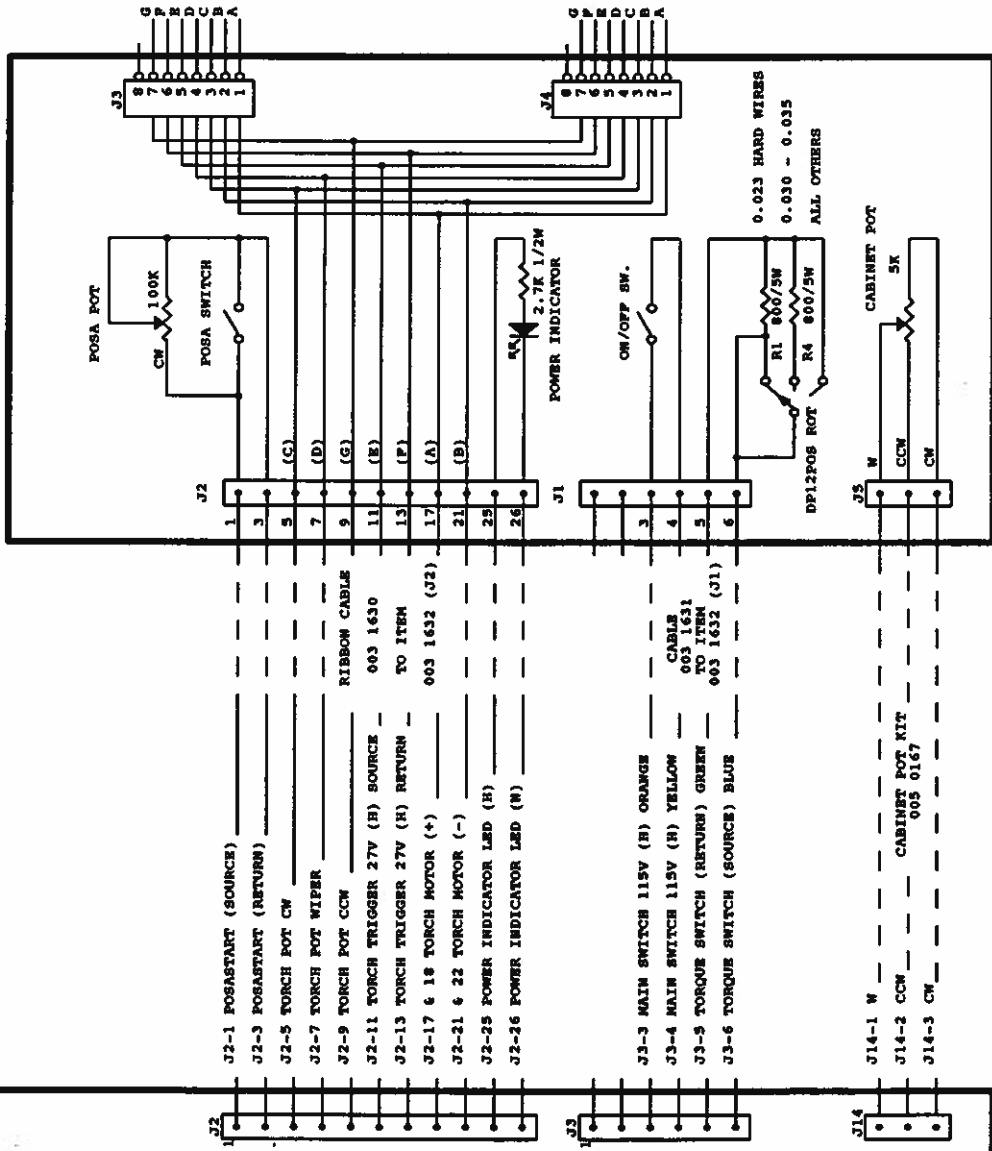
REV	P/COM	DESCRIPTION / COM	APPR.	DATE
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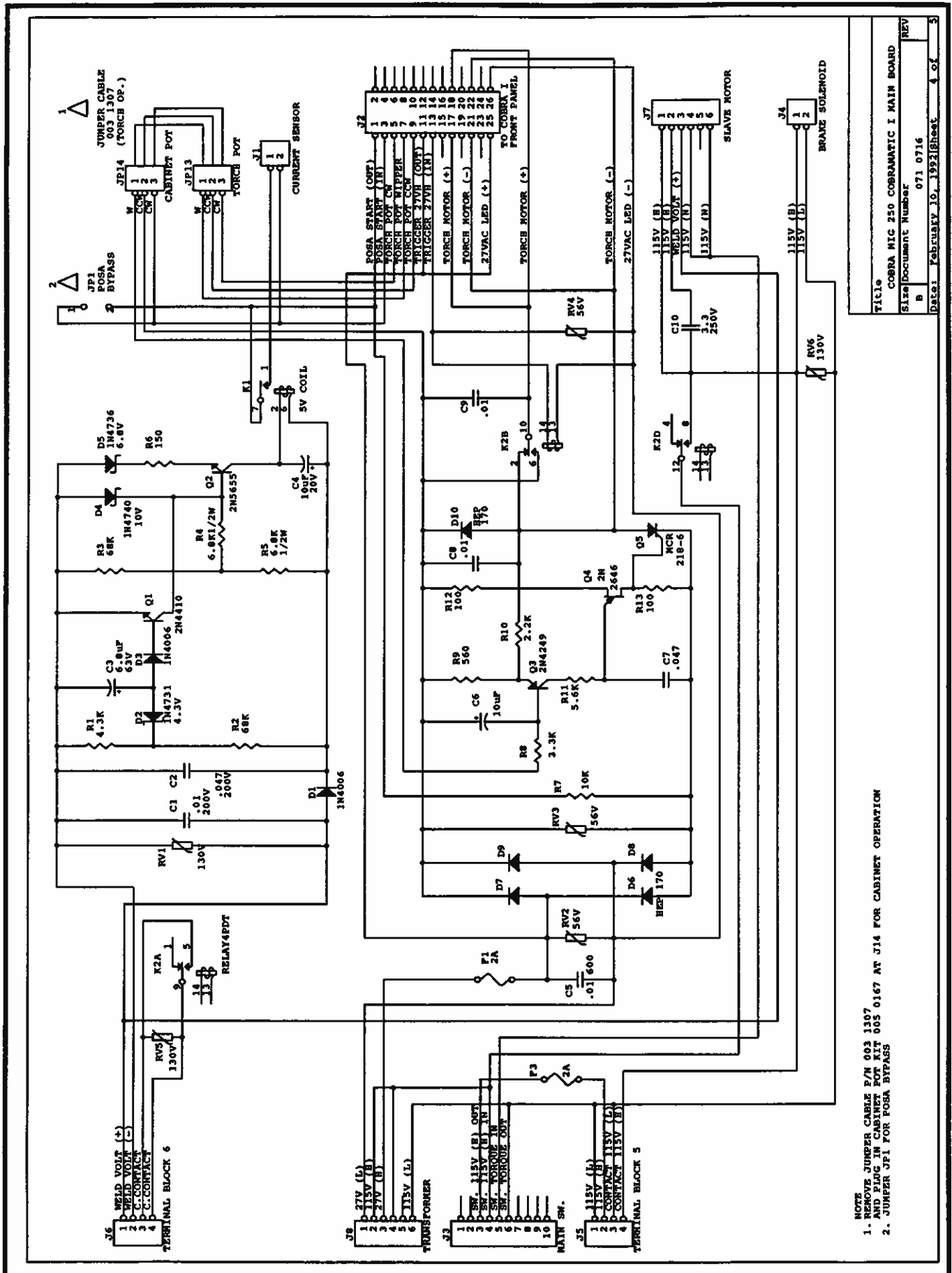
COBRAMATIC I MAIN BD.



AMPERHOL CONNECTOR
MS "W"
 003 1642

COBRA I FRONT PANEL BOARD

Title		COBRA MIG 250 FRONT PANEL
Size		Document Number
B		071 0716
Date		February 20, 1992 Sheet
		3 of 5



TITLE	COBRA MIC 250 COBRAMATIC I MAIN BOARD
SIZE	Document Number
REV	071 0716
Date:	February 10, 1992 Sheet 4 of 5

NOTE
 1. REMOVE JUMPER CABLE P/N 003 1307 AND PLUG IN CABINET POT KIT 005 0167 AT J14 FOR CABINET OPERATION
 2. JUMPER OF1 FOR POSA BYPASS

LIMITED WARRANTY

Effective July 1, 1991

This warranty supercedes all previous M. K. PRODUCTS warranties and is exclusive, with no other guarantees or warranties expressed or implied.

LIMITED WARRANTY - M. K. Products, Inc., Irvine, California warrants to its Authorized Distributor that all new and unused equipment furnished by M. K. Products is free from defect in workmanship and material as of the time and place of delivery by M. K. Products. No warranty is made by M. K. 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.

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

In the case of M. K. Products' breach of warranty or any other duty with respect to the quality of any goods, the exclusive remedies therefore shall be at M. K. Products' option: (1) repair; (2) replacement; (3) where authorized in writing by M. K. 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, M. K. Products shall instruct the claimant on the warranty claim procedures to be followed.

As a matter of general policy only, M. K. 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 1 year
2. Welding Torches 90 days
3. Mechanical and Electro-Mechanical Components 1 year
4. Electronic Assemblies and Sub-Assemblies 1 year

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

A copy of the distributor's invoice to the end user, showing the date of sale, must accompany products returned for warranty repair or replacement.

All equipment returned to M.K. Products for service must be properly packaged to guard against damage from shipping, M.K. 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 M. K. Products, except for products sold for 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 M. K. PRODUCTS, IS EXCLUDED AND DISCLAIMED BY M.K. PRODUCTS.

EXCEPT AS EXPRESSLY PROVIDED BY M. K. PRODUCTS IN WRITING, M. K. 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. M. K. PRODUCTS WARRANTIES DO NOT EXTEND TO, AND NO RESELLER IS AUTHORIZED TO EXTEND M. K. PRODUCTS' WARRANTIES TO, ANY CONSUMER.



M.K. PRODUCTS, INC.
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FAX (714) 474-1428

FORM : LW-3
DATE : July 1991



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