

# INSTRUCTIONS AND PARTS MANUAL

## CB-1PR PLASMA CIRCLE BURNER

### WITH REMOTE CONTROL AND A-80 POWER SOURCE

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

Model Number \_\_\_\_\_

Serial Number \_\_\_\_\_

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

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

LIT-CB-1PR-A80-IPM-0320

Bug-O Systems is committed to empowering our customers by providing operator controlled mechanized solutions for their welding, cutting and custom applications.



**B U G - O   S Y S T E M S**

A DIVISION OF WELD TOOLING CORPORATION



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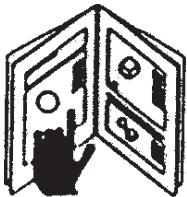
## SAFETY

**PROTECT YOURSELF AND OTHERS FROM SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. BE SURE THAT ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR PROCEDURES ARE PERFORMED ONLY BY QUALIFIED INDIVIDUALS.**



### **ELECTRIC SHOCK CAN KILL.**

- 1) The equipment is not waterproof. Using the unit in a wet environment may result in serious injury. Do not touch equipment when wet or standing in a wet location.
- 2) The unused connectors have power on them. Always keep the unused connectors covered with the supplied protective panels. Operation of the machine without the protective panels may result in injury.
- 3) Never open the equipment without first unplugging the power cord or serious injury may result.
- 4) Verify the customer supplied power connections are made in accordance with all applicable local and national electrical safety codes. If none exist, use International Electric Code (IEC) 950.
- 5) Never remove or bypass the equipment power cord ground. Verify the equipment is grounded in accordance with all applicable local and national electrical safety codes. If none exist, use International Electric Code (IEC) 950.



### **READ INSTRUCTIONS.**

Read the instruction manual before installing and using the equipment.



### **EQUIPMENT DAMAGE POSSIBLE.**

- 1) Do not plug in the power cord without first verifying the equipment is OFF and the cord input voltage is the same as required by the machine or serious damage may result.
- 2) Always verify both the pinion and wheels are fully engaged before applying power or equipment damage may occur.
- 3) Do not leave the equipment unattended.
- 4) Remove from the work site and store in a safe location when not in use.



### **FALLING EQUIPMENT can cause serious personal injury and equipment damage.**

Faulty or careless user installation is possible. As a result, never stand or walk underneath equipment.



### **MOVING PARTS can cause serious injury.**

- 1) Never try to stop the pinion from moving except by removing power or by using the STOP control.
- 2) Do not remove any protective panels, covers or guards and operate equipment.

## HIGH FREQUENCY WARNINGS

**SPECIAL PRECAUTIONS ARE REQUIRED WHEN USING PLASMA, TIG OR ANY WELDING PROCESS THAT USES HIGH FREQUENCY TO STRIKE AN ARC.**



**WARNING:** HIGH FREQUENCY CAN EFFECT MACHINE OPERATION AND THEREFORE, WELD QUALITY.

Read the precautions below before installing and using the equipment.

### PRECAUTIONS:

- 1) Some plasma or welding cables are strong sources of high frequency interference. NEVER lay a plasma or welding cable across the controls of the machine.
- 2) Always physically separate the plasma or welding cable leads from the machine cables. For example, the plasma or welding cable leads should NEVER be bundled with a pendant cable or the machine power cord. Maximize the separation between any machine cables and the plasma or welding cables.
- 3) Strictly follow the grounding procedures specified for the plasma or welding unit. NOTE: Some plasma and welding units produce exceptionally large amounts of high frequency noise. They may require a grounding rod be driven into the earth within six feet (2 meters) of the plasma or welding unit to become compatible with an automatic cutting or welding process.
- 4) If the high frequency is produced using a spark gap, adjust the points so the gap is as small as possible. The larger the gap, the higher the voltage and the higher the interference.
- 5) Some plasma or welding units will inject high frequency interference into the AC power line. Use separate power line branches whenever possible to power the plasma or welding source and the machine. Do not plug them into the same outlet box.
- 6) High frequency noise may enter the machine through the plasma or welding supply remote contactor leads. Some plasma and welding sources can produce noise spikes of up to several thousand volts. These sources are not compatible with automated cutting and welding equipment. It is recommended that the remote contactor leads on these plasma or welding sources not be connected to the machine. An alternate solution is to purchase a separate remote contactor isolation box.

# **CB-1PR CIRCLE BURNER WITH REMOTE CONTROL**

## **INSTRUCTIONS AND PARTS MANUAL**

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## **INTRODUCTION:**

The CB-1PR (CBP-2020) Plasma Circle Burner with Remote was designed for plasma bevel cutting of one to twelve inch diameter holes and will cut beveled holes in light wall pipe or vessels with wall thickness up to 5/16" (7 mm). An automatic rise and fall cam controls the torch position for saddle cut holes up to 2/3 of work diameter. The cables and air hoses supplying the unit pass through slip rings and O-rings enabling the machine to operate continuously in either direction without cable or hose wrap up. The CB-1PR (CBP-2020) Plasma Circle Burner is supplied with a Victor / Thermal Dynamics (CutMaster A80) plasma power supply, 180 degree plasma machine torch and 50' (15 m) control cable / torch lead. The CB-1PR (CBP-2020) Plasma Circle Burner requires 120/50-60/1 to operate, and see power source requirements on page 11. The unit must be mounted on a carriage or fixture.

## **FEATURES:**

- 1/12 HP P.M. motor and rotational speed control
- 180 degree plasma machine torch
- 50 ft. (15 m) control cable / torch lead
- Adjustable vertical and horizontal torch positioning system
- Rise and fall cam assembly with 5" (125 mm) of travel
- Brushes and collector rings for plasma current, rated at 200 AMPS
- Brushes and collector rings for all controls, eliminates cable and hose wrap
- Plasma cutting power supply, CutMaster A80 with duty cycles of 80% at 80 AMPS and 100% at 70 AMPS
- Rotation speed and directional controls
- Manual / Off / Automatic control switch
- Remote mounted control box

## SET-UP AND OPERATION:

**\*\*All page numbers referred to in this section are from this manual unless otherwise specified.\*\***

### POWER SUPPLY:

The CB-1PR Plasma Circle Burner is supplied with a Victor / Thermal Dynamics CutMaster A80 Plasma Cutting Power Supply and a CWO-1050 120V Power Enclosure. The CWO-1050 enclosure provides power to the CB-1PR Plasma Circle Burner for the operation of switches, speed control, and the rotational drive. Refer to the Victor / Thermal Dynamics CutMaster A80 Plasma Cutting Power Supply operating manual supplied with this machine for general operation and set-up information.

### PLASMA CUTTING TORCH:

The CB-1PR Plasma Circle Burner is equipped with a Victor / Thermal Dynamics Plasma Cutting Torch model SL100 machine torch. Refer to the Victor / Thermal Dynamics Plasma Cutting Torch instruction manual supplied with this machine for general operation and set-up information.

### FIXTURING:

All circle burners have to be fixtured in some manner from the top of the shaft. This may be achieved in one of the following: column & boom, manipulator, or carriage & monorail.

### CABLE CONNECTIONS:

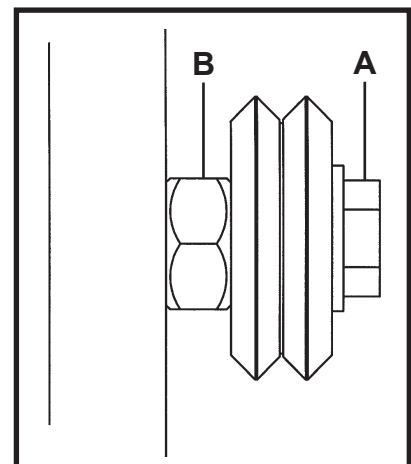
The CB-1PR Plasma Circle Burner is Equipped with a Junction Box Assembly (CWO-3035) page 17. The Junction Box Assembly is supplied with five leads that need to be connected as described below.

#### Connect:

- Cable Assembly Plasma Box Item (1) on page 17 to the Remote Pendant (CBP-2000)
- CBP-2005 Cable assembly from the Remote Pendant to the terminal connector in the main gear at the top of the machine
- Sensor Cable (CWE-1020) from the Remote Pendant to the top gear of the machine
- Air Hose Assembly item (2) on page 17 to the hose fitting in the top of the CB-1PR Shaft Assembly item (11) on page 13
- Low Frequency Power Cable item (4) on page 17 to the Low Frequency Power Cable item (2) on page 14
- High Frequency Power cable item (5) on page 17 to the High Frequency Power Cable item (3) on page 14
- The Power Supply Torch Lead as shown on page 17 (air, control cable, high frequency)
- Mount the Junction Box assembly to the top of the carriage or to the manipulator

### WHEEL ADJUSTMENT:

The CB-1PR Racking System (CWO-1670) and the Small Vertical Racker (CWO-1685) are equipped with adjustable wheels. Always check these components for proper wheel adjustment before using the machine. The wheels need adjustment if you can cock or wiggle the components out of alignment. The wheels should be snug, but not prohibit movement along the path of travel. The wheels with the hex stand off are adjustable. To adjust the wheels loosen the hex bolt (A) until the adjustable bushing (B) can be rotated. Correct the wheel alignment by rotating the adjustable bushing (B). Once adjusted, hold the adjustable bushing (B) while tightening the hex bolt (A). Recheck alignment.



### RISE AND FALL OF THE CAM:

All circle burners are equipped with a rise and fall cam assembly. The cam assembly must be aligned before any other settings can be made. To align the cam on the machine, align the horizontal rack parallel to the pipe, then adjust the gun holder so it is perpendicular to the horizontal rack. Loosen the set screws in the brass block on the cam, and rotate the cam to the vertical position as shown.

### SETTING THE CAM:

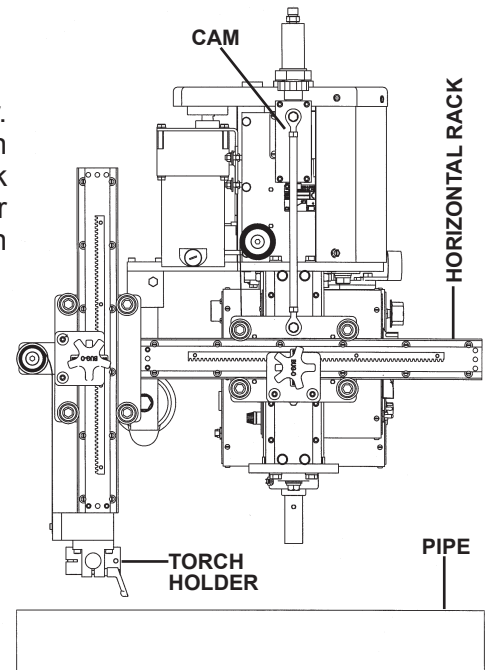
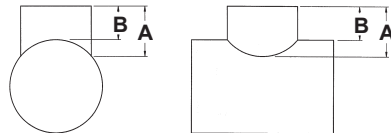
The cam setting is equal to the distance "B" subtracted from the distance "A".

#### EXAMPLE:

Let A=3 and B=2

$3-2=1$

The cam setting is 1.



### MACHINE CONTROLS:

Operational parameters can be set using the remote control box supplied with the machine as well as the controls located on the power supply. Please refer to the sections in this manual.

- CBP-2000 Device Controls, on page 8, for descriptions of the speed, directional, and plasma controls
- Power Supply Controls, on page 10, for descriptions of the power supply controls

### MAKING A CUT:

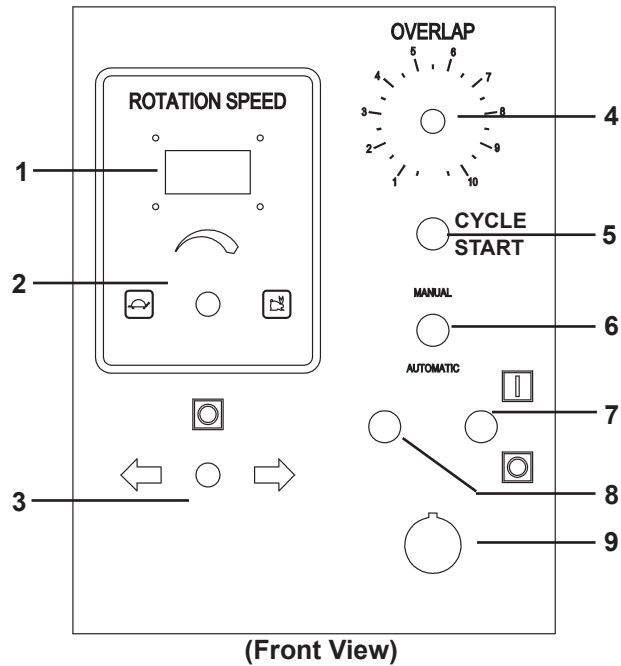
1. Position the torch to the starting location using the Racking System (CWO-1670). Ensure that the torch is at the appropriate position, standoff distance and angle.
2. Connect the ground cable to the work piece. The ground cable must make good electrical contact with the work.
3. With the "MANUAL/AUTO" switch in the "MANUAL" position, set the rotation direction and speed.
4. With the "MANUAL/AUTO" switch in the "AUTO" position, the cutting process and rotation are both started by pressing the "CYCLE START" button.
5. To stop the cutting processes and rotation, depress the large quick stop button.
6. The machine will automatically stop upon completion of one rotation, plus overlap.

**WARNING: THIS MACHINE PRODUCES PLASMA ARC RAYS, IT IS NECESSARY TO USE CORRECT EYE, HEAD, AND BODY PROTECTION.**

## CBP-2000 REMOTE PENDANT

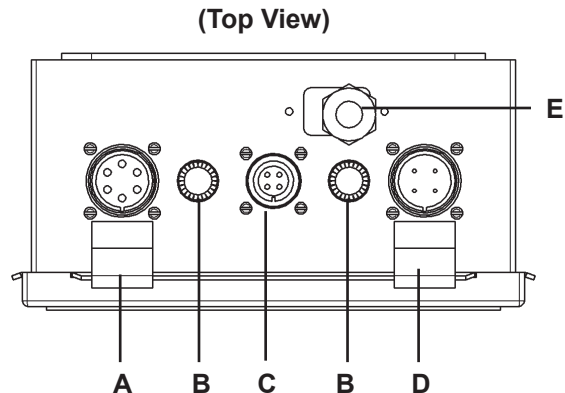
The CBP-2020 features remote pendant control. A summary of each control feature is provided below.

- 1. SPEED DISPLAY:**  
Displays a reference value for rotation speed.
- 2. SPEED CONTROL:**  
Controls the rotation speed of the machine.
- 3. TRAVEL DIRECTION:**  
Controls the machine's direction of rotation, when in "MANUAL". Select the left arrow for clockwise rotation, brake for stop, and the right arrow for counterclockwise rotation.
- 4. OVERLAP TIMER:**  
Controls the amount of time that the machine continues to rotate and cut beyond one revolution. Maximum overlap time is 2.5 seconds.
- 5. CYCLE START:**  
Initiates rotation and cutting when controls are in "AUTO".
- 6. MANUAL / AUTO SWITCH:**  
"MANUAL" allows the Operator to set rotation speed and direction without energizing the cutting torch. Machine must be in "AUTO" to energize the cutting torch.
- 7. ON / OFF SWITCH:**  
The On / Off switch enables/disables power to the control box.
- 8. PILOT LIGHT:**  
The Pilot Light indicates whether the machine is On / Off as dictated by the On / Off switch.
- 9. QUICK STOP:**  
Depressing the Quick Stop button instantly stops rotation and cutting.

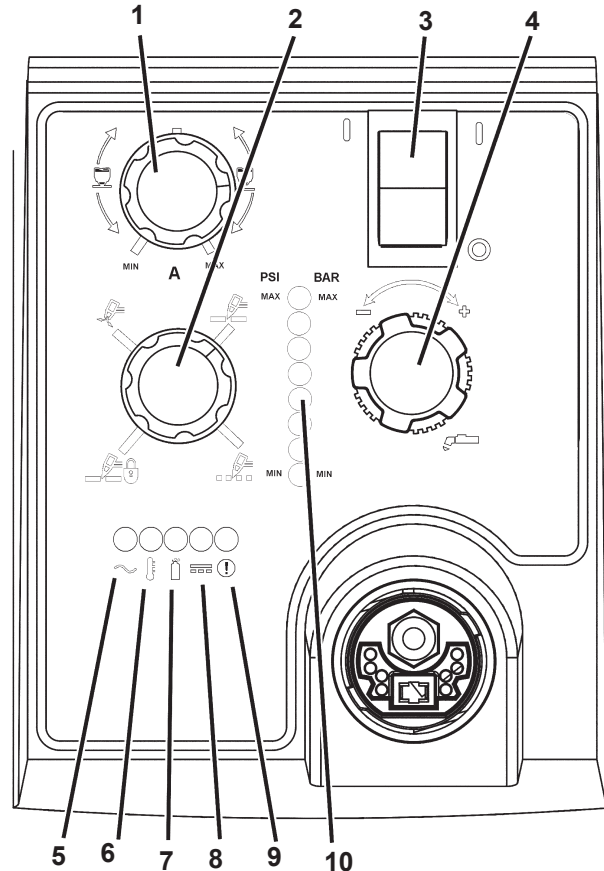


All of the control connections for the remote pendant are located on the top of the pendant.

- A. CN1:**  
Connects to the top of the machine via CBP-2005.
- B. FUSE HOLDER:**  
Each houses a 2A fast acting fuse.
- C. CN2:**  
Connects to the top of the machine via CWE-1020.
- D. CN3:**  
Connects to the Junction Box via CWO-3033.
- E. POWER CORD:**  
Delivers 120 VAC power to the Remote Pendant.



## PLASMA POWER SOURCE



Victor / Thermal Dynamics, Art# A-07886

### 1. OUTPUT CURRENT CONTROL

The Current Control is used to set the desired output current, the current can be adjusted from 15-60 amps. For drag cutting applications, the current should not exceed 60 amps.

### 2. FUNCTION CONTROL

The Function Control knob is used to select between four operating modes -- Set, Run, Rapid Auto Restart, and Latch. **SET** is used for setting gas pressure and purging lines. **RUN** is used for torch operation. **RAPID AUTO RESTART** allows for faster restarting of the Pilot Arc for uninterrupted cutting. The **LATCH** is used for specific applications, generally hand held cuts.

### 3. ON / OFF POWER SWITCH:

Controls input power to the power supply. Up is ON, down is OFF.

### 4. AIR / GAS PRESSURE CONTROL:

Used in the SET mode to adjust the air/gas pressure. Pull knob out to adjust, then push in to lock.

### 5. AC INDICATOR:

Steady light indicates power supply is ready for operation. Blinking light indicates interlock mode. Refer to power supply operation manual for more instructions.

### 6. TEMP INDICATOR:

Indicator will light power supply internal temperature is above the normal operational limits. Let unit cool before continuing operation.

### 7. GAS INDICATOR:

Indicator will light when minimum input gas pressure for power supply operation is present. This may not be enough pressure for torch operation.

### 8. DC INDICATOR:

Indicator will light while the torch switch is pressed.

### 9. FAULT ERROR INDICATOR:

Indicator is ON when fault circuit is active. Refer to power supply operation manual for more instructions.

### 10. PRESSURE INDICATORS:

Indicator will light according to pressure that was set using Pressure Control Knob.

## TECHNICAL DATA

**Amperage:** 30-80 AMPS, 100 AMP Max. Adjustable

**Input Voltage:** Power Source, see Page 11  
120 VAC 50/60 Hz single phase

**Rotation Speed:** 0.2-11 rpm

**Cam Range:** 5" (125 mm)

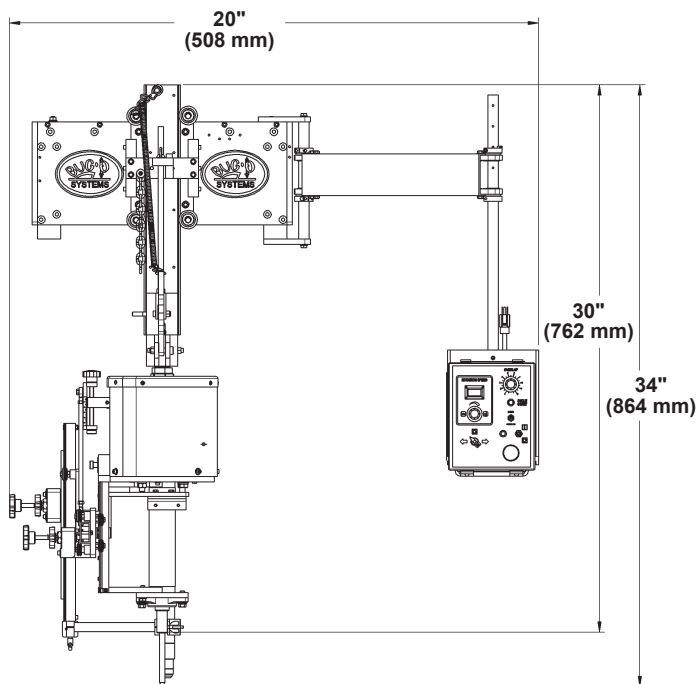
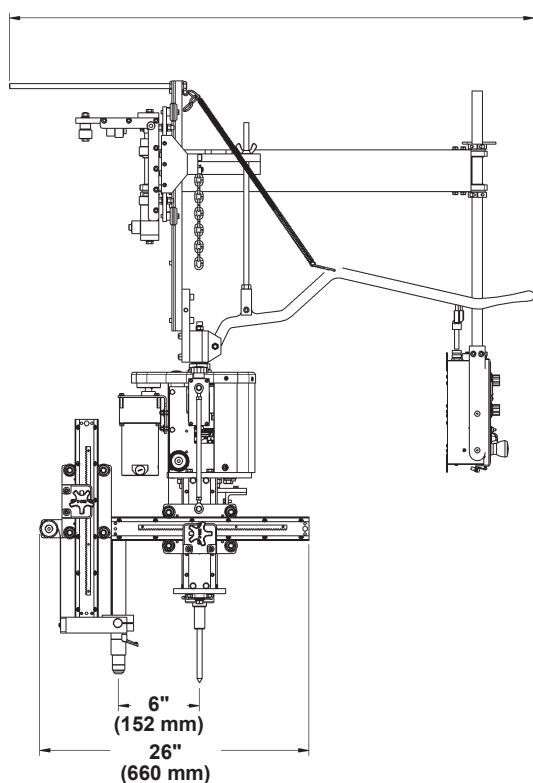
**Burning Diameter:** 1-12" (25-300 mm)

**Machine Weight:** 170 lbs. (77 kg)

**Power Source Weight:** 73.5 lbs. (33 kg)

**Shipping Weight:** 283.5 lbs. (129 kg)

## DIMENSIONS:



## POWER SUPPLY ELECTRICAL SPECIFICATIONS

|   |  |
|---|--|
| <b>Rated Output</b>                             | 80 Amps  |
| <b>Output Range</b>                             | 30 - 80 Amps, 100 Amps Max., Adjustable  |
| <b>Production Piercing and Cutting Capacity</b> | 1/2" (12mm)  |
| <b>Maximum Piercing and Cutting Capacity</b>    | 3/4" (20mm)  |
| <b>Maximum Edge Start</b>                       | 1 1/4" (30mm)  |
| <b>Input Volts</b>                              | 208-230/460V, 1/3 ph, 50/60 Hz,<br>380/400V, 3 ph, 50/60 Hz,<br>600V, 3 ph, 60 Hz  |
| <b>Input Amps @ Max Output</b>                  | 99 (208V, 1 ph)<br>49 (208V, 3 ph)<br>95 (230V, 1 ph)<br>45 (230V, 3 ph)<br>28 (380V, 3 ph)<br>27 (400V, 3 ph)<br>60 (460V, 1 ph)<br>29 (460V, 3 ph) |
| <b>Kilowatt Output</b>                          | 12 kW  |
| <b>Duty Cycle</b>                               | 80% @ 80 Amps<br>100% @ 70 Amps  |
| <b>MAX OCV</b>                                  | 260 VDC  |
| <b>Gas Type</b>                                 | Air @ 75 psi (5.2 bar) @ 6.7cfm (189 lpm)  |
| <b>Pilot</b>                                    | Start Cartridge  |
| <b>Weight</b>                                   | 63 lbs. (28.6kg) - Unit, Power Cable,<br>(Torch and Leads)   |
| <b>Dimensions</b>                               | H 13.5" (343mm) x W 9.75" (248mm) x<br>L 26.0" (660mm)   |
| <b>Work Cable</b>                               | 50' (6.1m)   |
| <b>Control</b>                                  | CNC rear panel connector, Start/Stop and<br>OK to Move   |
| <b>Input Power Cable</b>                        | 10' (3m) with plug (208/230V)<br>6' (2m) without plug (400V)   |
| <b>Warranty</b>                                 | 4 Years Power Supply & 1 Year Torch - Americas<br>3 Years Power Supply & 1 Year Torch - International  |
| <b>Certifications</b>                           | IP-23C, CSA, NTRL/C, CE, CCC   |
| <b>Torch Configuration</b>                      |  |
| <b>Torch</b>                                    | SL100®SV with ATC®, 180° Automation  |

## CBP-2020 CB-1PR PLASMA CIRCLE BURNER / PARTS LIST

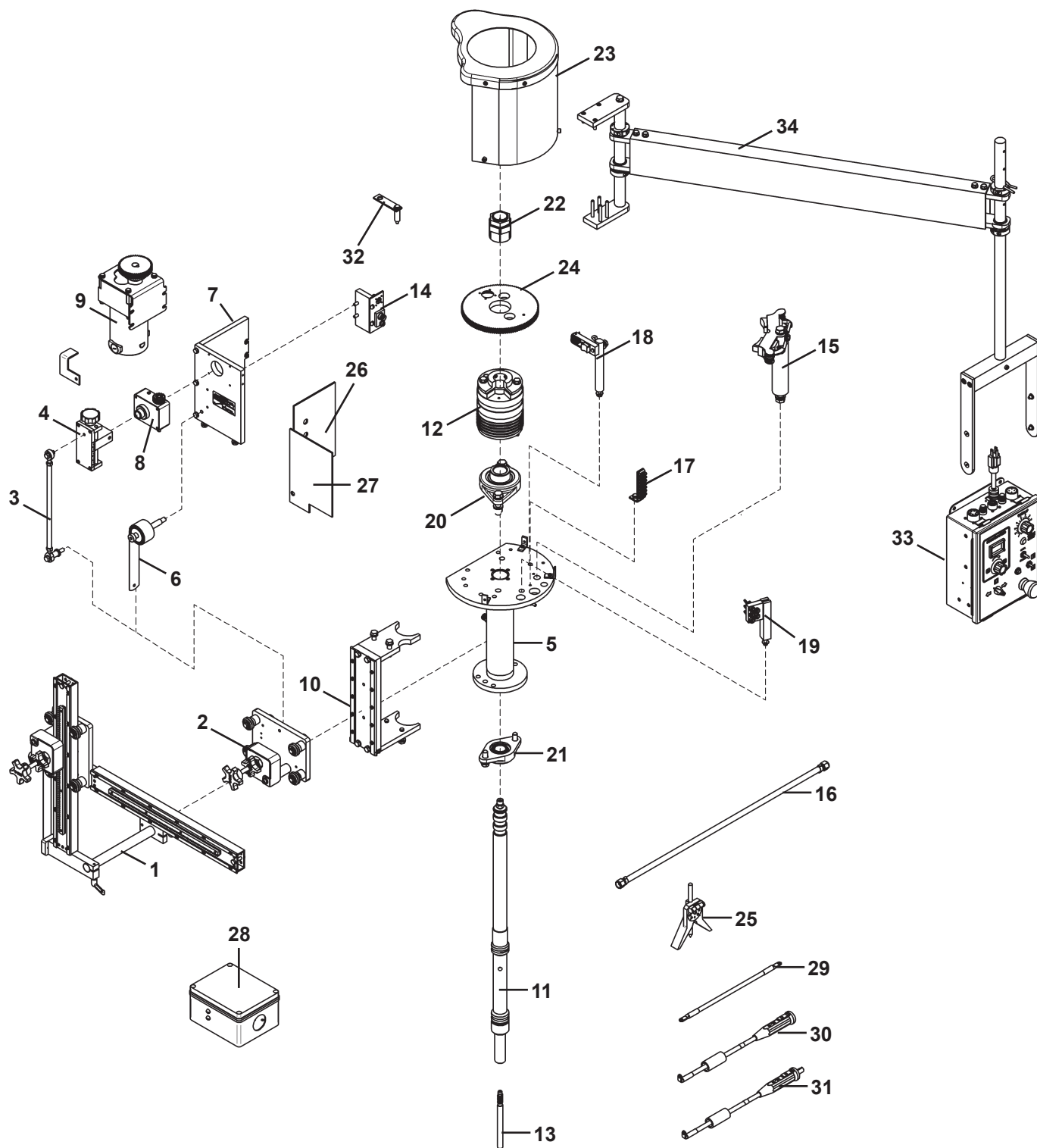
| <u>ITEM</u> | <u>QTY</u> | <u>PART NO.</u> | <u>DESCRIPTION</u>                  |
|-------------|------------|-----------------|-------------------------------------|
| 1           | 1          | CBO-1670        | Racking System                      |
| 2           | 1          | CWO-1685        | Small Horizontal Racker             |
| 3           | 1          | CWO-3004        | Cam Shaft & Spacer Assembly         |
| 4           | 1          | CWO-3005        | 5" Cam Assembly                     |
| 5           | 1          | CWO-3199        | Housing Assembly                    |
| 6           | 1          | CWO-3399        | Load Spring Assembly                |
| 7           | 1          | CWO-3417        | Motor & Transmission Plate Assembly |
| 8           | 1          | CWO-3418        | Transmission                        |
| 9           | 1          | CWO-3422        | P.M. Motor 157                      |
| 10          | 1          | CWO-3466        | Slide Bar Mounting Assembly         |
| 11          | 1          | CWO-3483        | Shaft Assembly CB-1PR               |
| 12          | 1          | CWO-3484        | CB-1PR Collector Ring Assembly      |
| 13          | 1          | CWO-3516        | CB-1PR Pointer Assembly             |
| 14          | 1          | CWO-3922        | Manifold & Retainer Assembly        |
| 15          | 1          | CWO-3923        | CB-1PR Large Brush Assembly         |
| 16          | 1          | CWO-3933        | 26" Air Hose Assembly               |
| 17          | 1          | CWO-3955        | Terminal Block Assembly             |
| 18          | 1          | CWO-3941        | High Frequency Brush Assembly       |
| 19          | 1          | CWO-3945        | CB-1PR Small Brush Holder           |
| 20          | 1          | CWO-4050        | 1" Bearing w/Fasteners              |
| 21          | 1          | CWO-4060        | 1-1/4" Bearing w/Fasteners          |
| 22          | 1          | CWO-5075        | 1-1/4" ID Trantorque                |
| 23          | 1          | CWO-5220        | Guard Assembly                      |
| 24          | 1          | CWO-9037        | CB-1PR 7-1/8" Diameter Gear         |
| 25          | 1          | CWO-9482        | Centering Head Tool                 |
| 26          | 1          | CWO-4849        | Motor Mt. Plt. Insulator            |
| 27          | 1          | CWO-4848        | Trans. Plate Insulator              |
| 28          | 1          | CWO-3035        | Junction Box Assy. Plasma           |
| 29          | 1          | CWO-3939        | Manifold Power Cable                |
| 30          | 1          | CWO-3957        | Low Frequency Power Cable           |
| 31          | 1          | CWO-3958        | High Frequency Power Cable          |
| 32          | 1          | CWE-1026        | Sensor Mount Bracket                |
| 33          | 1          | CBP-2000        | Control Box, Remote                 |
| 34          | 1          | CBP-2010        | Control Mount Arm                   |

Items not Shown

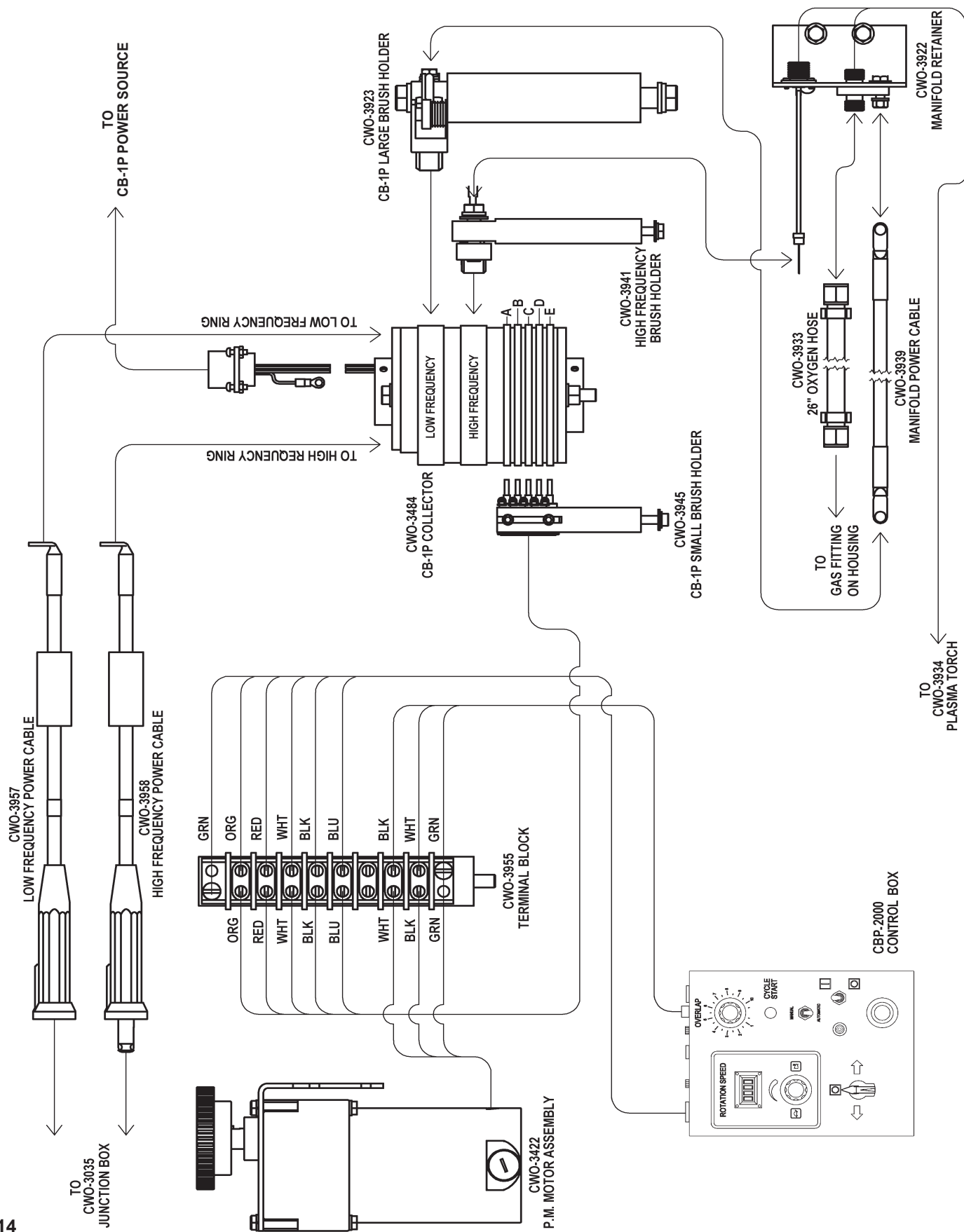
| <u>QTY</u> | <u>PART NO.</u> | <u>DESCRIPTION</u>    |
|------------|-----------------|-----------------------|
| 1          | CWE-1020        | Sensor Cable          |
| 1          | CBP-2005        | Control to Unit Cable |
| 1          | CWE-1028        | Sensor Target         |

**Note:** 1. See Page 14 for CBP-2020 wiring and cable information.  
 2. CWO-7658 is the plasma replacement torch. (Page 29)

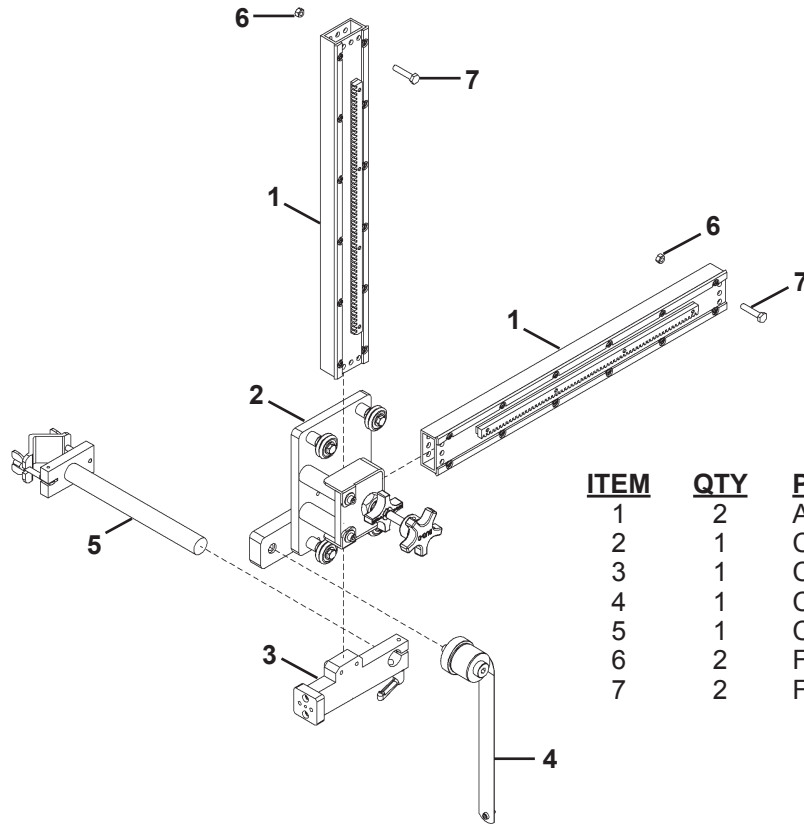
# CBP-2020 CB-1PR PLASMA CIRCLE BURNER / EXPLODED VIEW



## CBP-2020 CB-1PR PLASMA CIRCLE BURNER / WIRING DIAGRAM

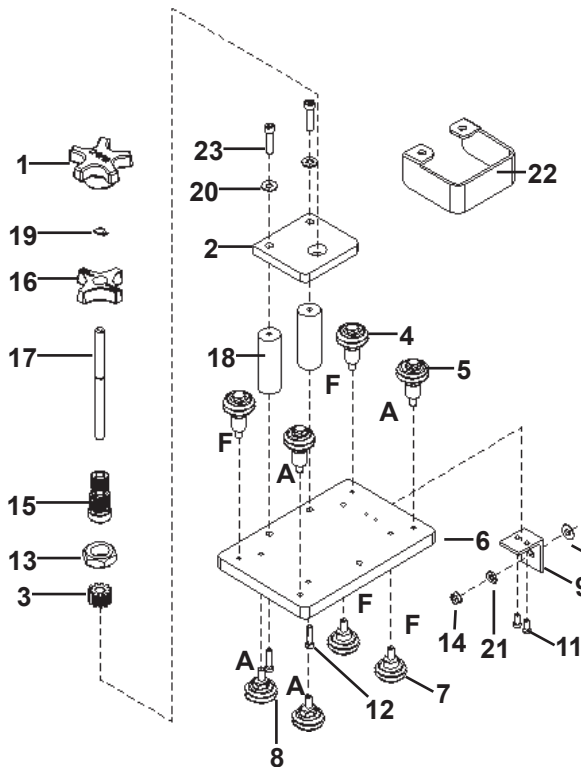


## CBO-1670 RACKING SYSTEM / EXPLODED VIEW / PARTS LIST



| ITEM | QTY | PART NO. | DESCRIPTION                    |
|------|-----|----------|--------------------------------|
| 1    | 2   | ABR-1070 | V-Guide Ways 19"               |
| 2    | 1   | CWO-1675 | Vertical Racker                |
| 3    | 1   | CWO-1695 | Attachment Block               |
| 4    | 1   | CWO-3450 | 10.6# Load Spring Assy.        |
| 5    | 1   | CBO-1675 | Torch Clamp Assy.              |
| 6    | 2   | FAS-1351 | Hex Nut 1/4-20                 |
| 7    | 2   | FAS-2351 | Hex Hd Cap Scr 1/4-20 x 1-1/4" |

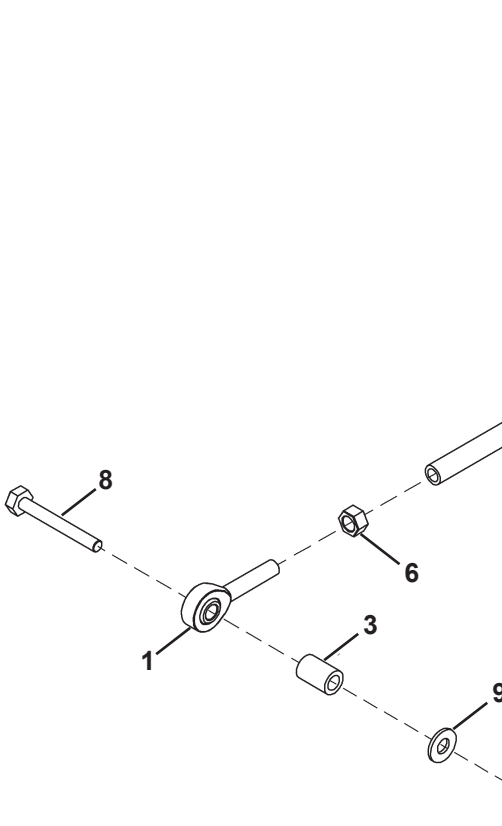
## CWO-1685 SMALL HORIZONTAL RACKER / EXPLODED VIEW / PARTS LIST



| ITEM | QTY | PART NO. | DESCRIPTION                  |
|------|-----|----------|------------------------------|
| 1    | 1   | BUG-2032 | Knob, Black                  |
| 2    | 1   | CWO-1678 | Racker Plate                 |
| 3    | 1   | CWO-1679 | Pinion 11T                   |
| 4    | 2   | CWO-1680 | W2 Fixed Leg & Wheel Assy.   |
| 5    | 2   | CWO-1681 | W2 Adj. Leg & Wheel Assy.    |
| 6    | 1   | CWO-1686 | Mount Plate (Small Racker)   |
| 7    | 2   | CWO-4020 | Fixed Leg & Wheel Assy.      |
| 8    | 2   | CWO-4021 | Adj. Leg & Wheel Assy.       |
| 9    | 1   | CWO-4112 | Bracket                      |
| 10   | 1   | FAS-0355 | Hex Hd Cap Scr 1/4-20 x 1/2" |
| 11   | 2   | FAS-0534 | Soc Hd Cap Scr #10-24 x 3/8" |
| 12   | 4   | FAS-0557 | Soc Hd Cap Scr 1/4-20 x 3/4" |
| 13   | 1   | FAS-1307 | Hex Jam Nut 3/4-16           |
| 14   | 1   | FAS-1351 | Hex Nut 1/4-20               |
| 15   | 1   | MUG-1141 | Bearing Collet               |
| 16   | 1   | MUG-1142 | Knob, Locking                |
| 17   | 1   | MUG-1144 | Shaft                        |
| 18   | 2   | MUG-1453 | Stand-Off                    |
| 19   | 1   | MUG-1579 | Retaining Ring               |
| 20   | 3   | WAS-0240 | 1/4" SAE Washer              |
| 21   | 1   | WAS-0243 | 1/4" Split Lock Washer       |
| 22   | 1   | CWO-1671 | Racker Shield                |
| 23   | 2   | FAS-0559 | Soc Hd Cap Scr 1/4-20 x 1"   |

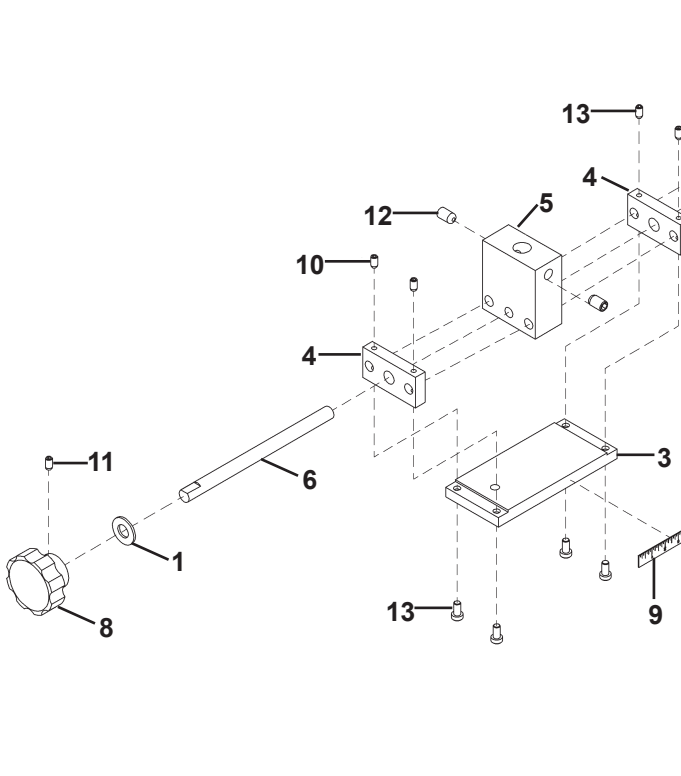
F = Fixed Wheel Placement  
A = Adjustable Wheel Placement

CWO-3004 CAM SHAFT & SPACER ASSEMBLY / EXPLODED VIEW / PARTS LIST



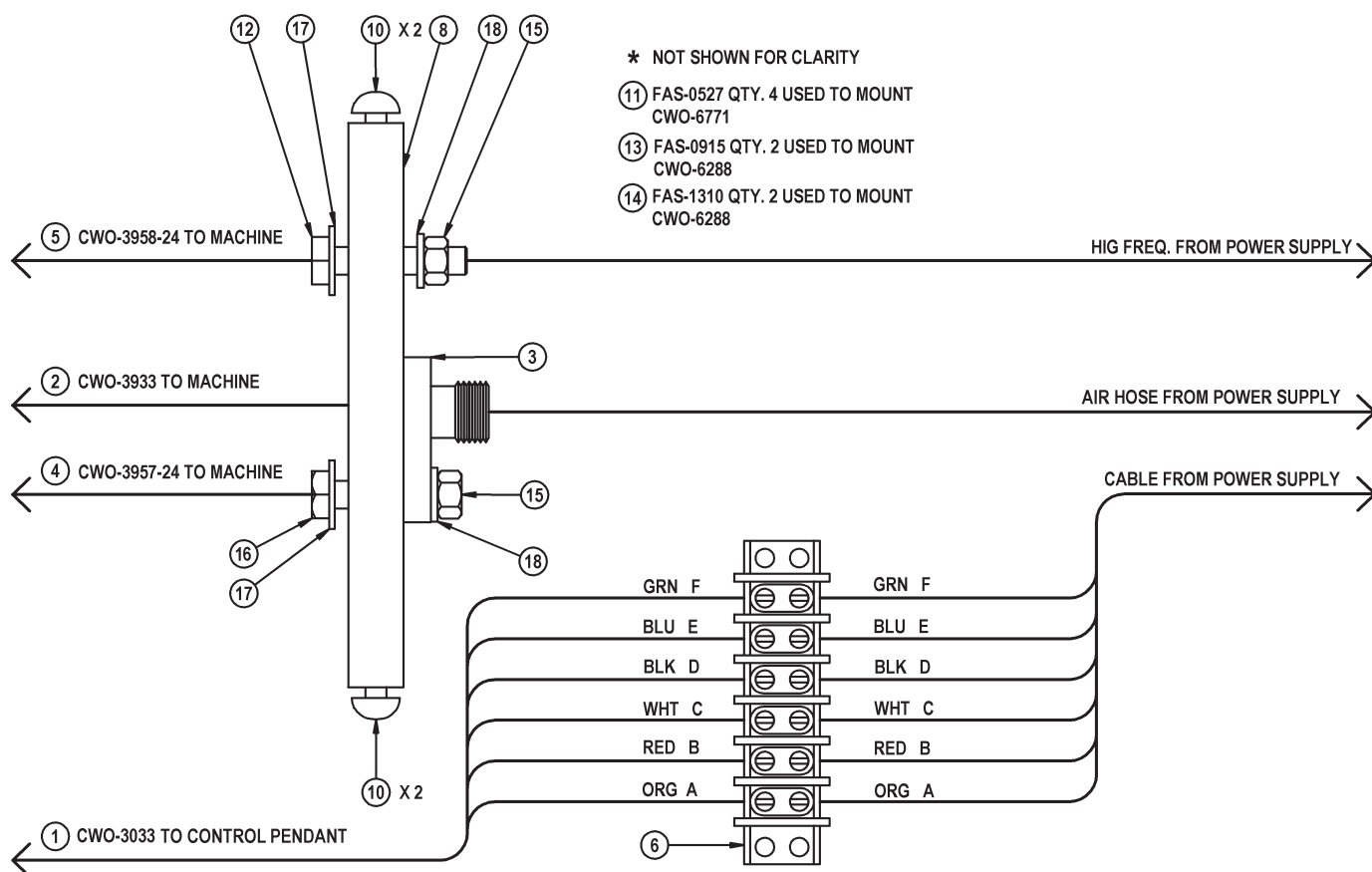
| ITEM | QTY | PART NO. | DESCRIPTION                         |
|------|-----|----------|-------------------------------------|
| 1    | 1   | CWO-4073 | Ball Joint Rod End 5/16-24 RH       |
| 2    | 1   | CWO-5019 | Ball Joint Rod End 5/16-24 LH       |
| 3    | 1   | CWO-9078 | Spacer 1/2" O.D. x 5/16 I.D. x 3/4" |
| 4    | 1   | CWO-9357 | Cam Shaft Tube                      |
| 5    | 1   | FAS-0377 | Hex Hd Cap Scr 5/16-18 x 3/4"       |
| 6    | 1   | FAS-1380 | Hex Nut 5/16-24                     |
| 7    | 1   | FAS-1381 | Hex Nut 5/16-24 LH                  |
| 8    | 1   | FAS-2375 | Hex Hd Cap Scr 5/16-18 x 2"         |
| 9    | 3   | WAS-0250 | 5/16 SAE Washer                     |

CWO-3005 5" CAM ASSEMBLY / EXPLODED VIEW / PARTS LIST



| ITEM | QTY | PART NO. | DESCRIPTION              |
|------|-----|----------|--------------------------|
| 1    | 2   | BUG-2098 | Delrin Washer 3/8" I.D.  |
| 2    | 1   | BUG-9012 | Locking Collar           |
| 3    | 1   | CWO-4026 | Base Plate 5" Cam        |
| 4    | 2   | CWO-4027 | End Plate 5" Cam         |
| 5    | 1   | CWO-4028 | Center Block 5" Cam      |
| 6    | 1   | CWO-4029 | Screw 5" Cam             |
| 7    | 2   | CWO-4031 | Rod 5" Cam               |
| 8    | 1   | CWO-4032 | Knob                     |
| 9    | 1   | CWO-5199 | Scale                    |
| 10   | 4   | FAS-0434 | Set Scr #10-24 x 3/8"    |
| 11   | 1   | FAS-0444 | Set Scr #10-32 x 3/8"    |
| 12   | 2   | FAS-0495 | Set Scr 3/8-16 x 1/2"    |
| 13   | 4   | FAS-0534 | Soc Hd Cap #10-24 x 3/8" |

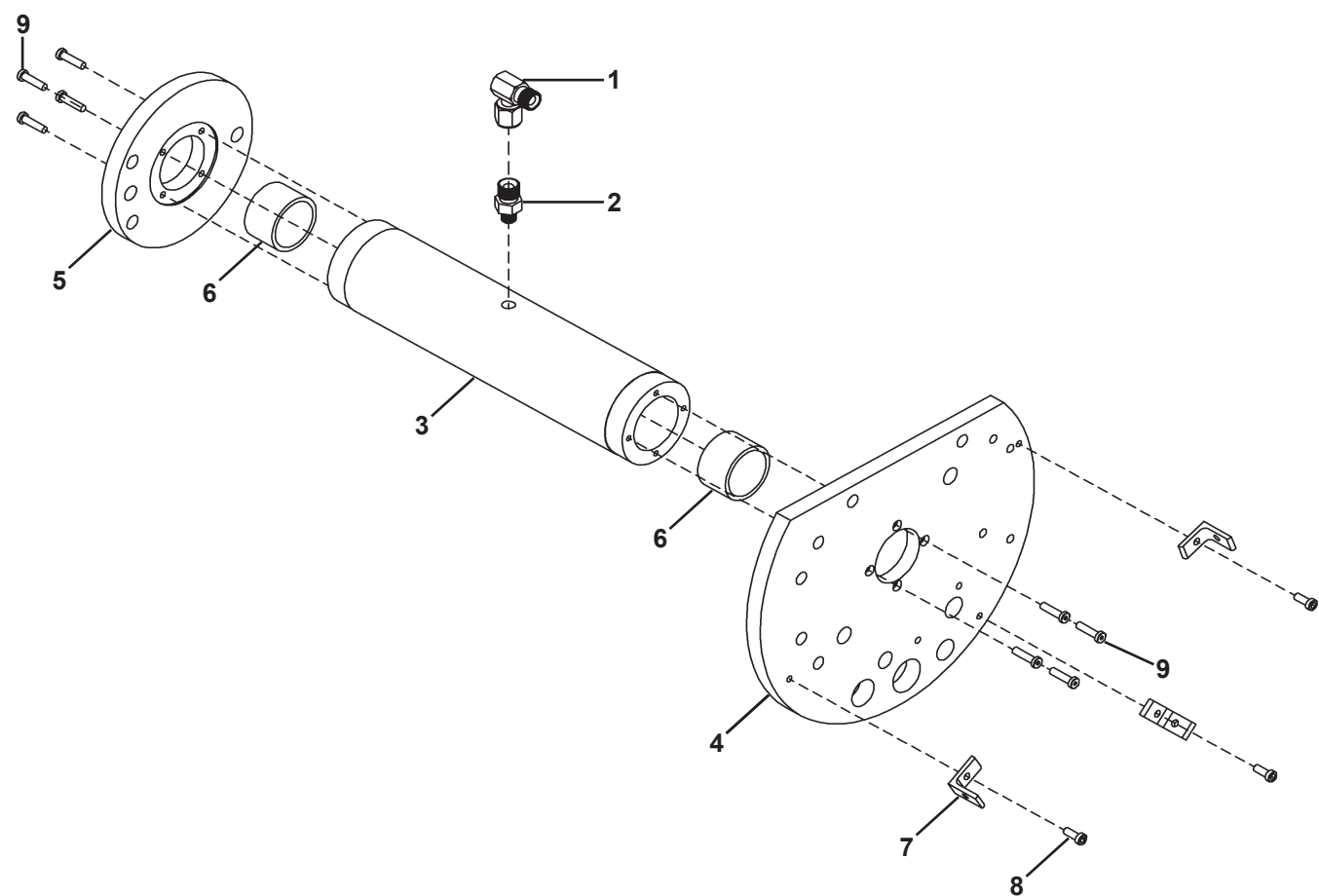
# CWO-3035 JUNCTION BOX ASSEMBLY / PARTS LIST / WIRING DIAGRAM



| ITEM | QTY | PART NO.    | DESCRIPTION                    |
|------|-----|-------------|--------------------------------|
| 1    | 1   | CWO-3033    | Cable Assy., Plasma Box        |
| 2    | 1   | CWO-3933    | 20" Oxygen Hose Assy.          |
| 3    | 1   | CWO-3938    | Hose Coupling Assy.            |
| 4    | 1   | CWO-3957-24 | 24" Low Frequency Power Cable  |
| 5    | 1   | CWO-3958-24 | 24" High Frequency Power Cable |
| 6    | 1   | CWO-6288    | Terminal Block (6)             |
| 7*   | 1   | CWO-6771    | Machined Enclosure & Cover     |
| 8    | 1   | CWO-6772    | JB Support Block               |
| 9*   | 2   | CWO-6767    | Cord Grip 1-1/4 Wire           |
| 10   | 4   | FAS-0235    | Rnd Hd Scr #10-24 x 1/2"       |
| 11*  | 4   | FAS-0527    | Soc Hd Cap Scr #8-32 x 3/4"    |
| 12   | 1   | FAS-0359    | Hex Hd Cap Scr 1/4-20 x 1"     |
| 13*  | 2   | FAS-0915    | Flt Hd Soc Scr #6-32 x 1/2"    |
| 14*  | 2   | FAS-1310    | Hex Nut #6-32                  |
| 15   | 2   | FAS-1351    | Hex Nut 1/4-20                 |
| 16   | 1   | FAS-2351    | Hex Hd Cap Scr 1/4-20 x 1-1/4" |
| 17   | 2   | WAS-0240    | 1/4" SAE Washer                |
| 18   | 2   | WAS-0243    | 1/4" Split Lock Washer         |

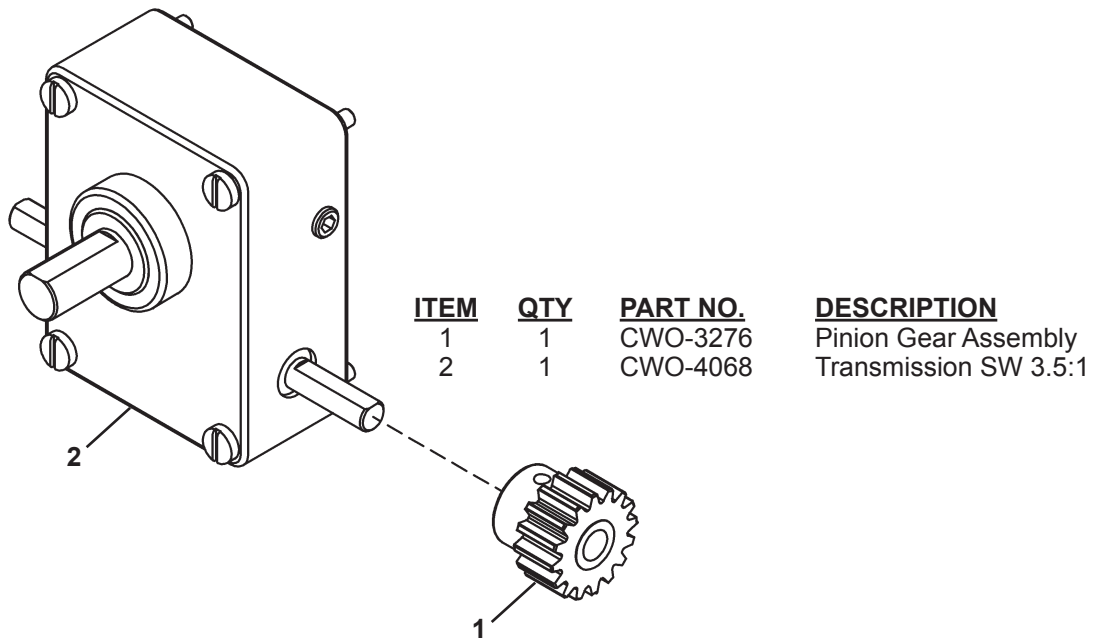
\* NOT SHOWN FOR CLARITY

CWO-3199 HOUSING ASSEMBLY / EXPLODED VIEW / PARTS LIST

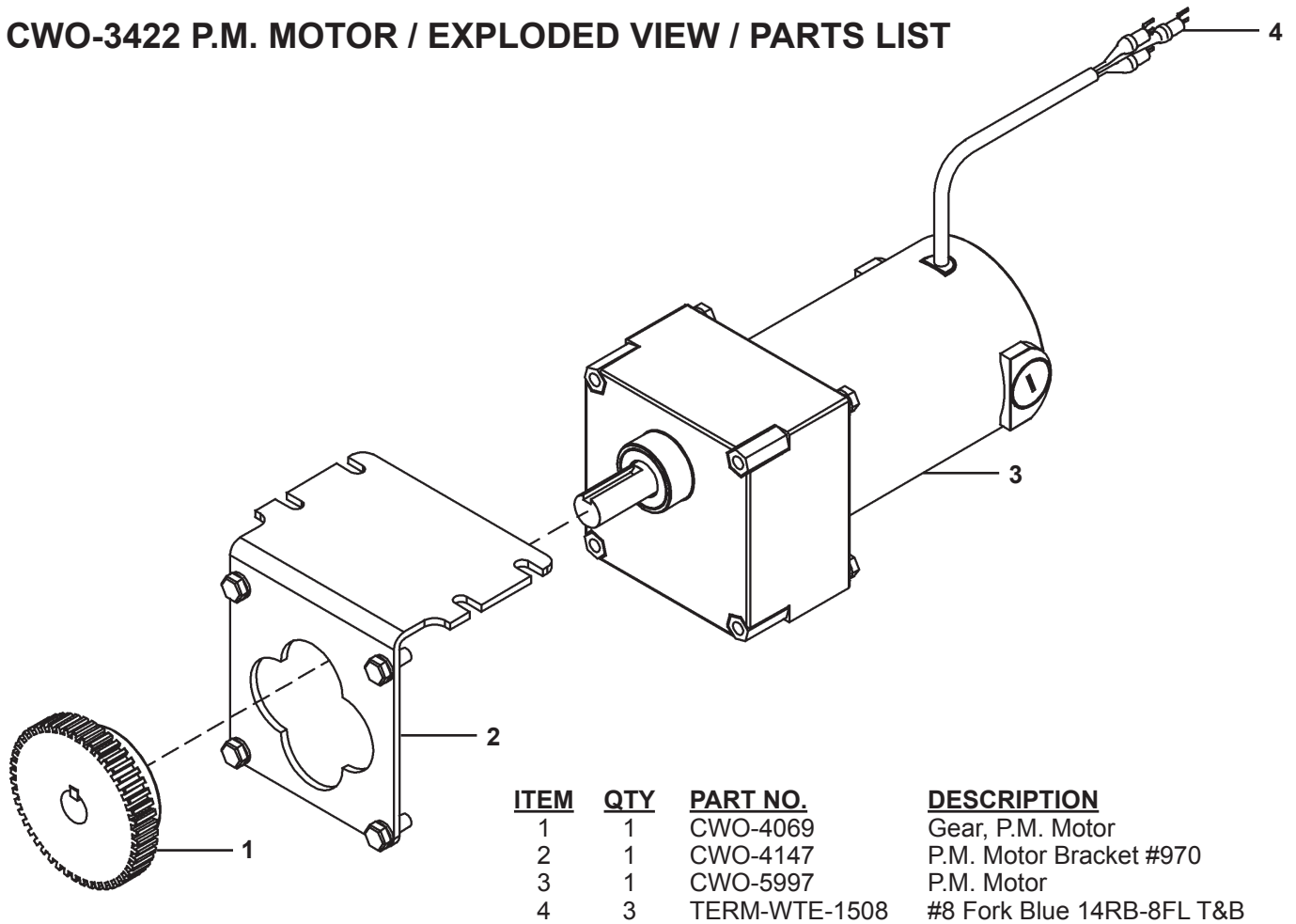


| ITEM | QTY | PART NO. | DESCRIPTION                           |
|------|-----|----------|---------------------------------------|
| 1    | 1   | BUG-1296 | 90 Degree Hose Adaptor                |
| 2    | 1   | CWO-4226 | Outlet Bushing                        |
| 3    | 1   | CWO-5837 | Center Tube Housing                   |
| 4    | 1   | CWO-5843 | Top Housing Plate CW-5                |
| 5    | 1   | CWO-5846 | Lower Housing Plate CW-5              |
| 6    | 2   | CWO-5975 | Insert 1-5/8" O.D. x 1.376" I.D. x 1" |
| 7    | 3   | CWO-9339 | Angle For Guard                       |
| 8    | 3   | FAS-0535 | Soc Hd Cap Scr #10-24 x 1/2"          |
| 9    | 8   | FAS-0548 | Soc Hd Cap Scr #10-32 x 3/8"          |

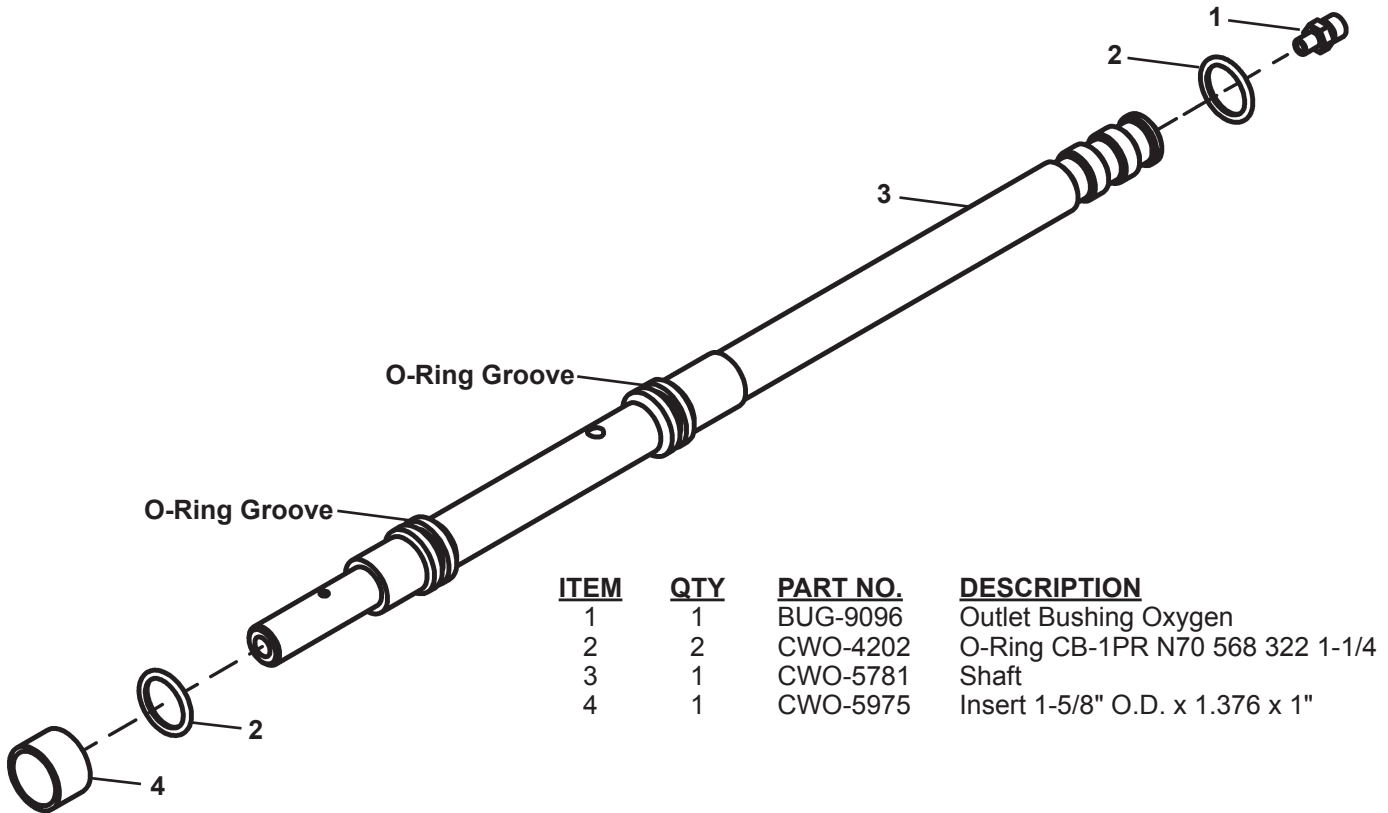
## CWO-3418 TRANSMISSION / EXPLODED VIEW / PARTS LIST



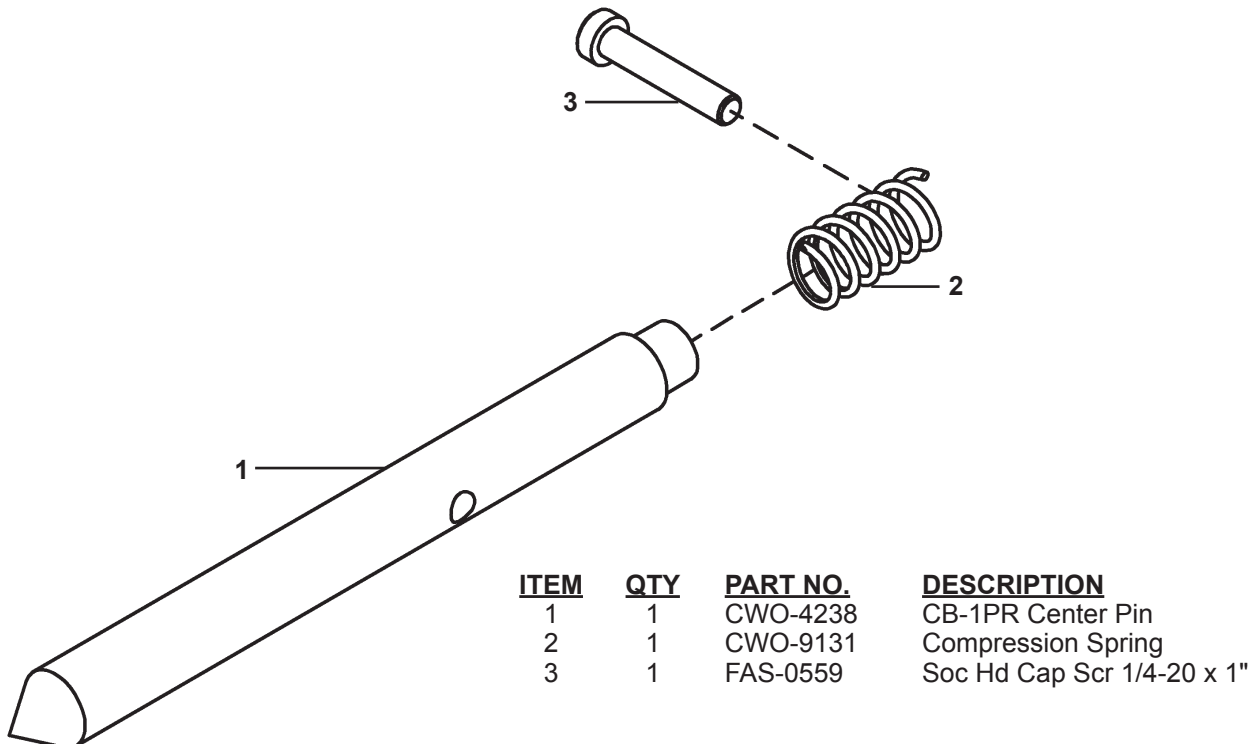
## CWO-3422 P.M. MOTOR / EXPLODED VIEW / PARTS LIST



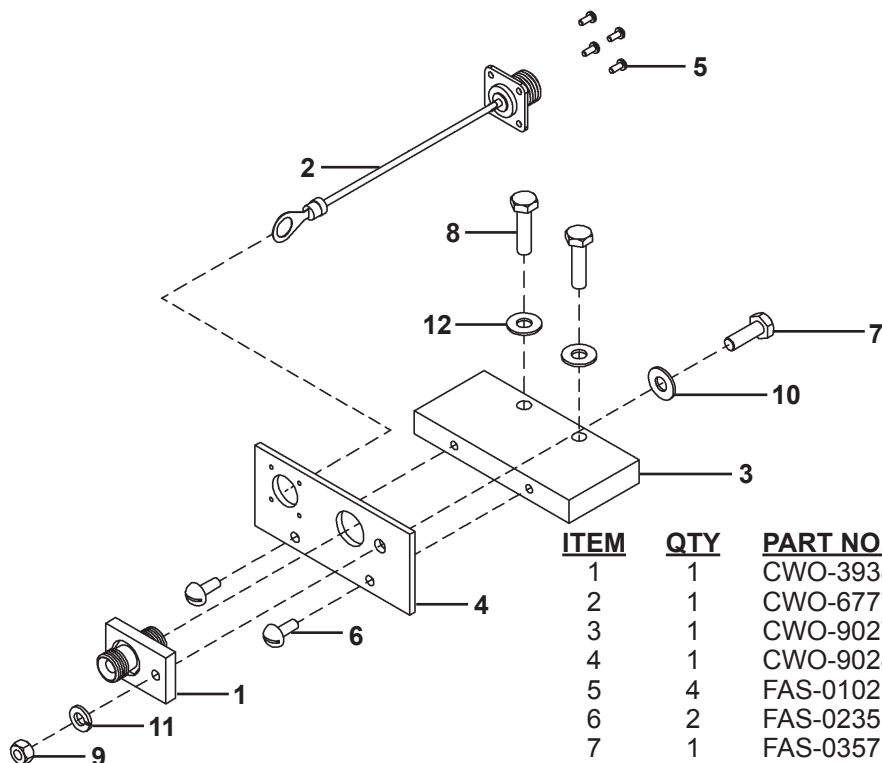
## CWO-3483 SHAFT ASSEMBLY CB-1PR / EXPLODED VIEW / PARTS LIST



## CWO-3516 CB-1PR POINTER ASSEMBLY / EXPLODED VIEW / PARTS LIST

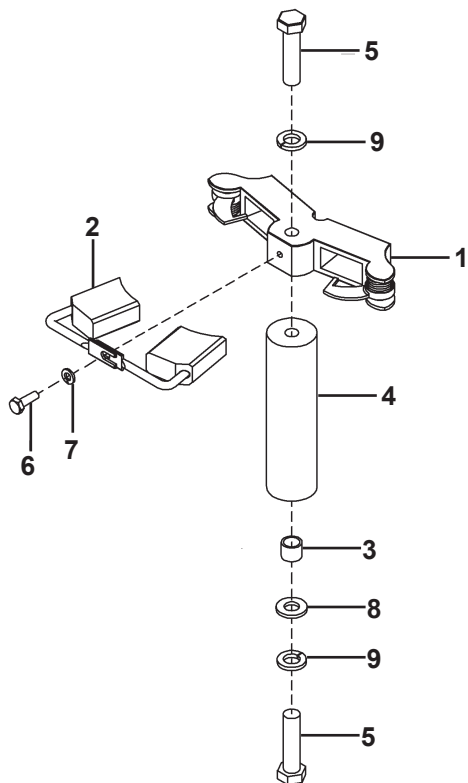


## CWO-3922 MANIFOLD AND RETAINER / EXPLODED VIEW / PARTS LIST



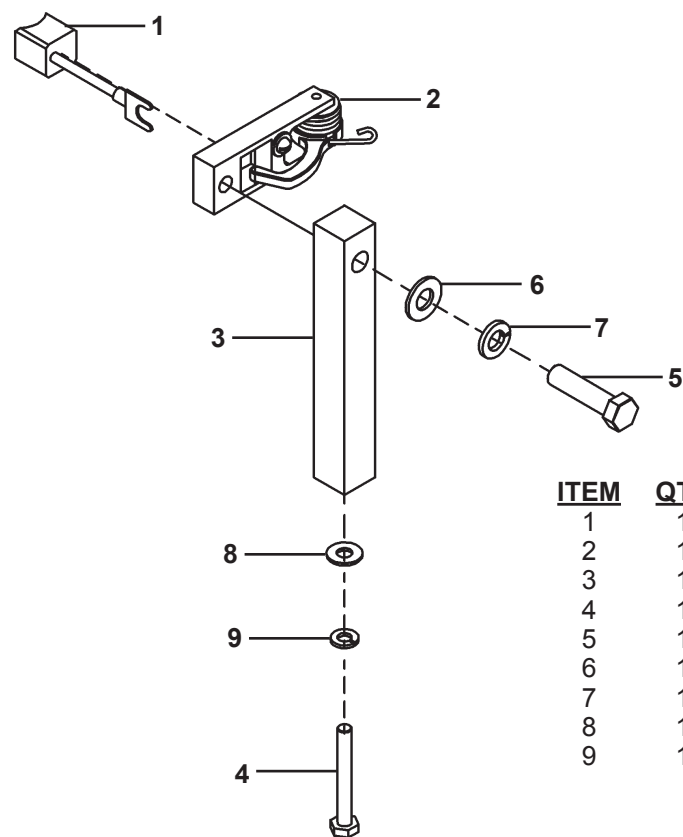
| ITEM | QTY | PART NO.   | DESCRIPTION                  |
|------|-----|------------|------------------------------|
| 1    | 1   | CWO-3938   | Hose Coupling Assembly       |
| 2    | 1   | CWO-6777   | Coaxial Panel Recp. Assembly |
| 3    | 1   | CWO-9027   | 1/2" Support Plate           |
| 4    | 1   | CWO-9028   | 1/8" Support Plate           |
| 5    | 4   | FAS-0102   | Pan Hd Scr 4-40 x 1/4"       |
| 6    | 2   | FAS-0235   | Rnd Hd Scr #10-24 x 1/2"     |
| 7    | 1   | FAS-0357   | Hex Hd Cap Scr 1/4-20 x 3/4" |
| 8    | 2   | FAS-0359-N | Hex Hd Cap Scr 1/4-20 x 1"   |
| 9    | 1   | FAS-1351   | 1/4-20 Hex Nut               |
| 10   | 1   | WAS-0240   | 1/4" SAE Washer              |
| 11   | 1   | WAS-0243   | 1/4" Split Lock Washer       |
| 12   | 2   | BUG-2063   | 1/4" Delrin Washer           |

## CWO-3923 CB-1PR LARGE BRUSH ASSEMBLY / EXPLODED VIEW / PARTS LIST



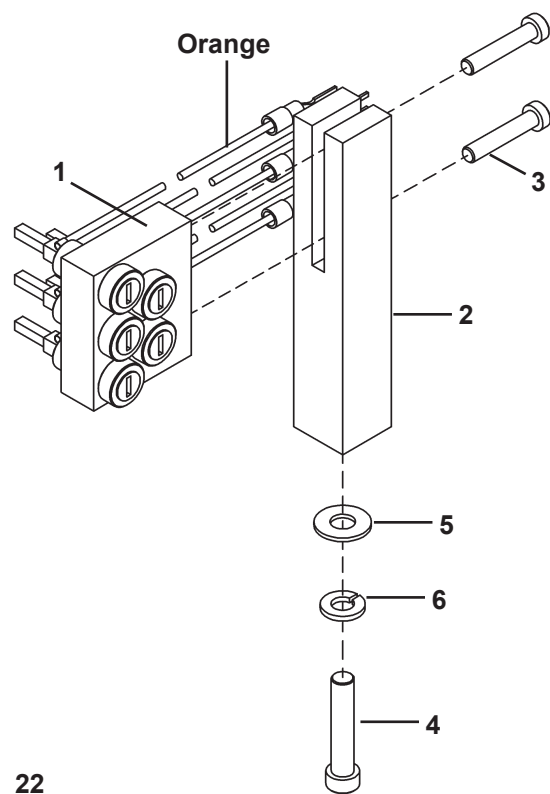
| ITEM | QTY | PART NO. | DESCRIPTION                  |
|------|-----|----------|------------------------------|
| 1    | 1   | CWO-4046 | Large Brush Holder           |
| 2    | 2   | CWO-4337 | Large Brush                  |
| 3    | 1   | CWO-5550 | Micarta Bushing              |
| 4    | 1   | CWO-7624 | CB-1PR Large Brush Support   |
| 5    | 2   | FAS-0305 | Hex Hd Cap Scr 1/2-13 x 2"   |
| 6    | 1   | FAS-0357 | Hex Hd Cap Scr 1/4-20 x 3/4" |
| 7    | 1   | WAS-0243 | 1/4" Split Lock Washer       |
| 8    | 1   | WAS-0280 | 1/2" Washer                  |
| 9    | 2   | WAS-0281 | 1/2" Lock Washer             |

CWO-3941 HIGH FREQUENCY BRUSH / EXPLODED VIEW / PARTS LIST

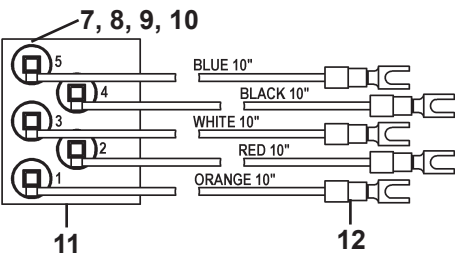


| ITEM | QTY | PART NO. | DESCRIPTION                    |
|------|-----|----------|--------------------------------|
| 1    | 1   | CWO-5833 | Brush 3/4" Sq. x 3/4" LG.      |
| 2    | 1   | CWO-5849 | Brush Holder, 3/4" Sq. Brush   |
| 3    | 1   | CWO-7625 | Hi-Freq. Brush Holder Support  |
| 4    | 1   | FAS-2355 | Hex Hd Cap Scr 1/4-20 UNC x 2" |
| 5    | 1   | FAS-2393 | Hex Hd Cap Scr 3/8-16 x 1-1/2" |
| 6    | 1   | WAS-0260 | 3/8" Washer                    |
| 7    | 1   | WAS-0262 | 3/8" Split Lock Washer         |
| 8    | 1   | WAS-0240 | 1/4" Washer                    |
| 9    | 1   | WAS-0243 | 1/4" Lockwasher                |

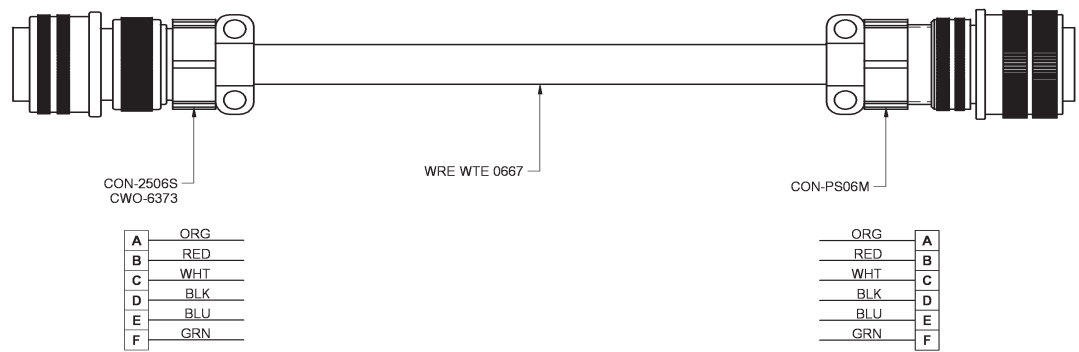
CWO-3945 CB-1PR SMALL BRUSH HOLDER / EXPLODED VIEW / PARTS LIST



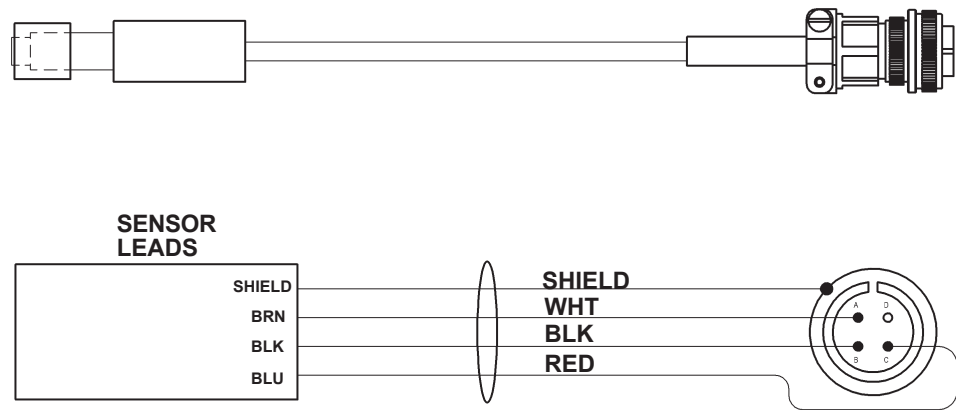
| ITEM | QTY | PART NO.      | DESCRIPTION                       |
|------|-----|---------------|-----------------------------------|
| 1    | 1   | CWO-3464      | Small CB-1PR Retainer Assembly    |
| 2    | 1   | CWO-9076      | Retainer Support (Small)          |
| 3    | 2   | FAS-0539      | Soc Hd Cap Scr #10-24 x 1" LG     |
| 4    | 1   | FAS-2551      | Soc Hd Cap Scr 1/4-20 x 1-1/4" LG |
| 5    | 1   | WAS-0240      | 1/4" SAE Washer                   |
| 6    | 1   | WAS-0243      | 1/4" Split Lock Washer            |
| 7    | 5   | CWO-5831      | 1/8" x 1/8" x 7/8" LG Brush       |
| 8    | 5   | CWO-5874      | 1/8" Brush Holder                 |
| 9    | 5   | CWO-5875      | Cap                               |
| 10   | 5   | CWO-5876      | Clip                              |
| 11   | 1   | CWO-7609      | CB-1PR Small Brush Retainer       |
| 12   | 5   | TERM WTE 0602 | #6 Fork Blue                      |



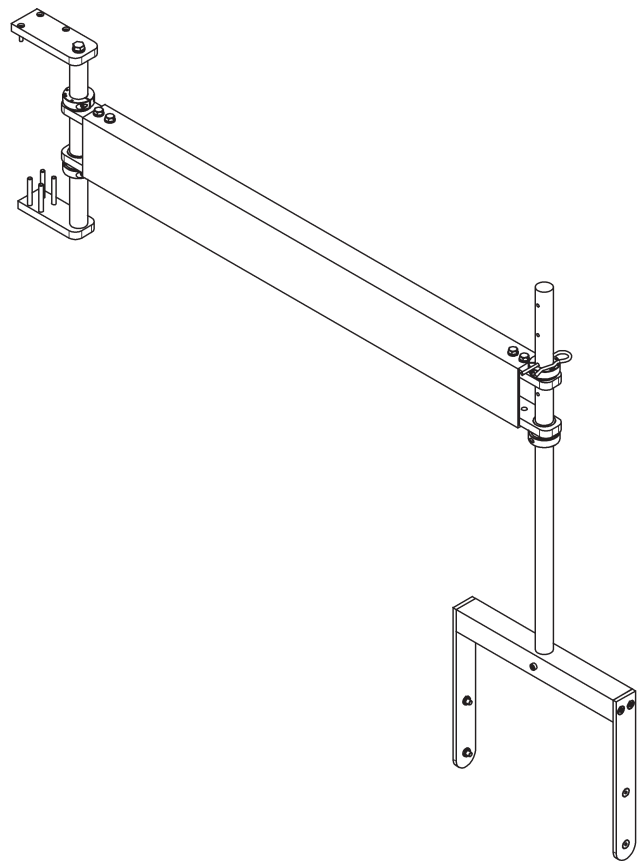
**CBP-2005 CONTROL TO UNIT CABLE**



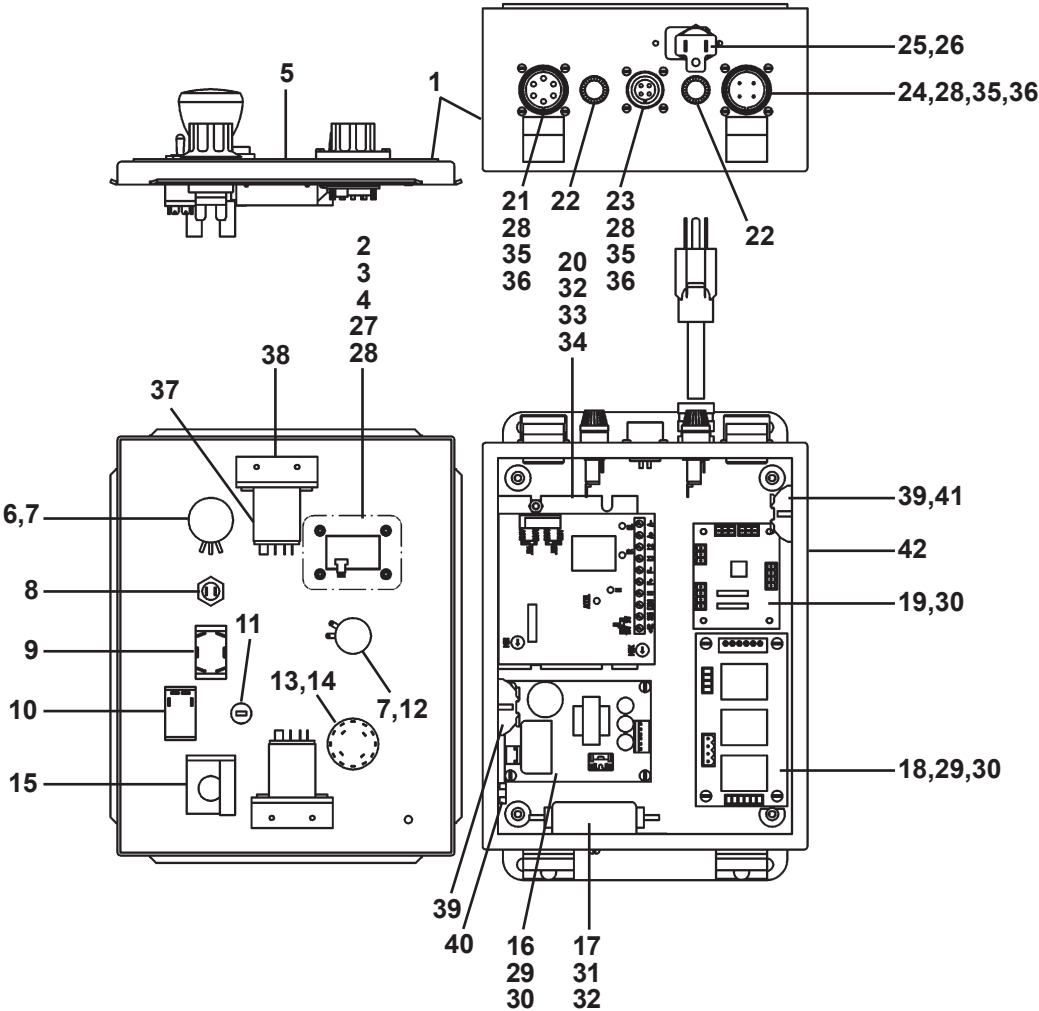
**CWE-1020 SENSOR CABLE**



**CBP-2010 CONTROL MOUNT ARM**

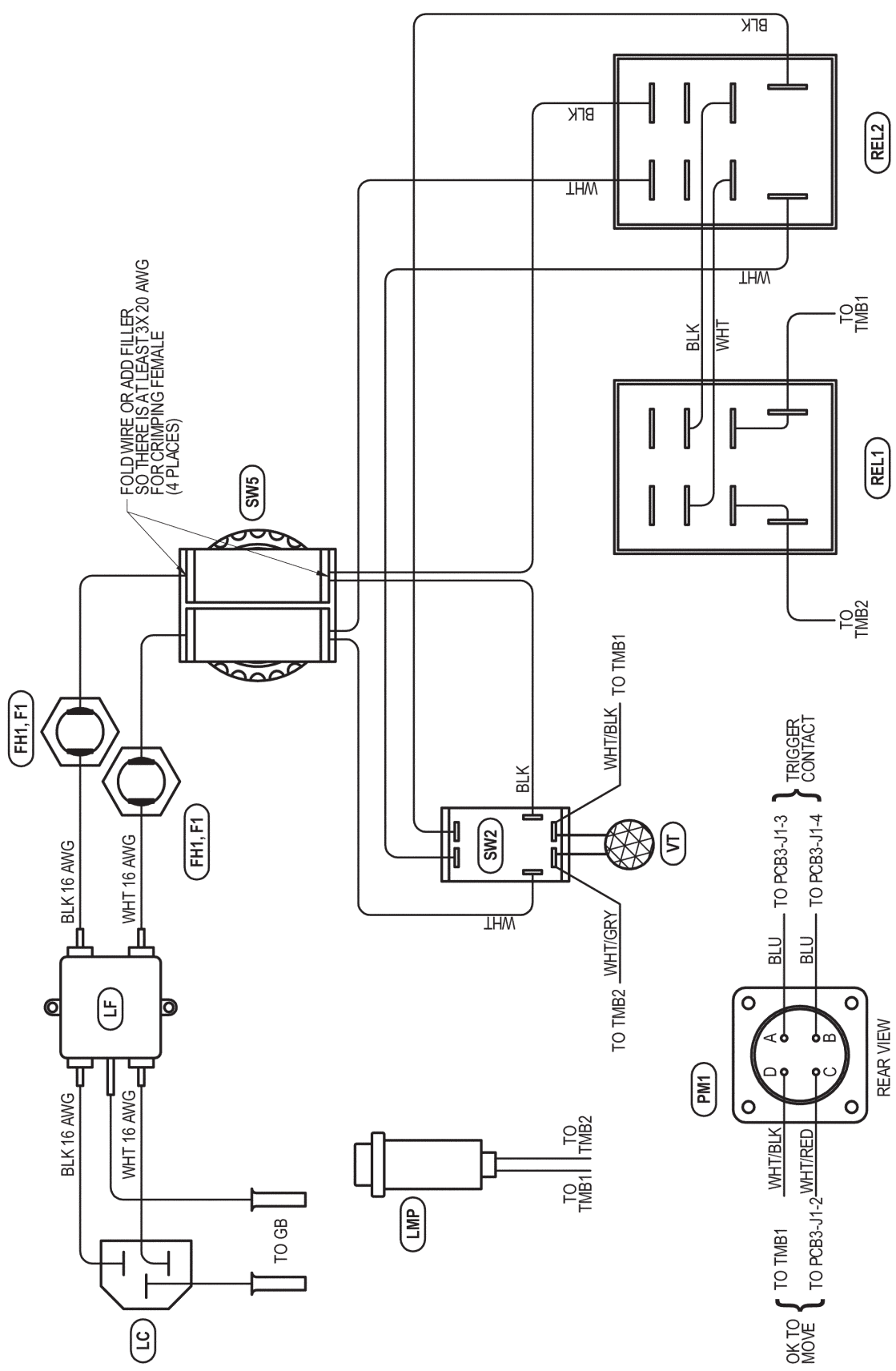


CBP-2000 CONTROL BOX, REMOTE CB-1P EXPLODED VIEW / PARTS LIST

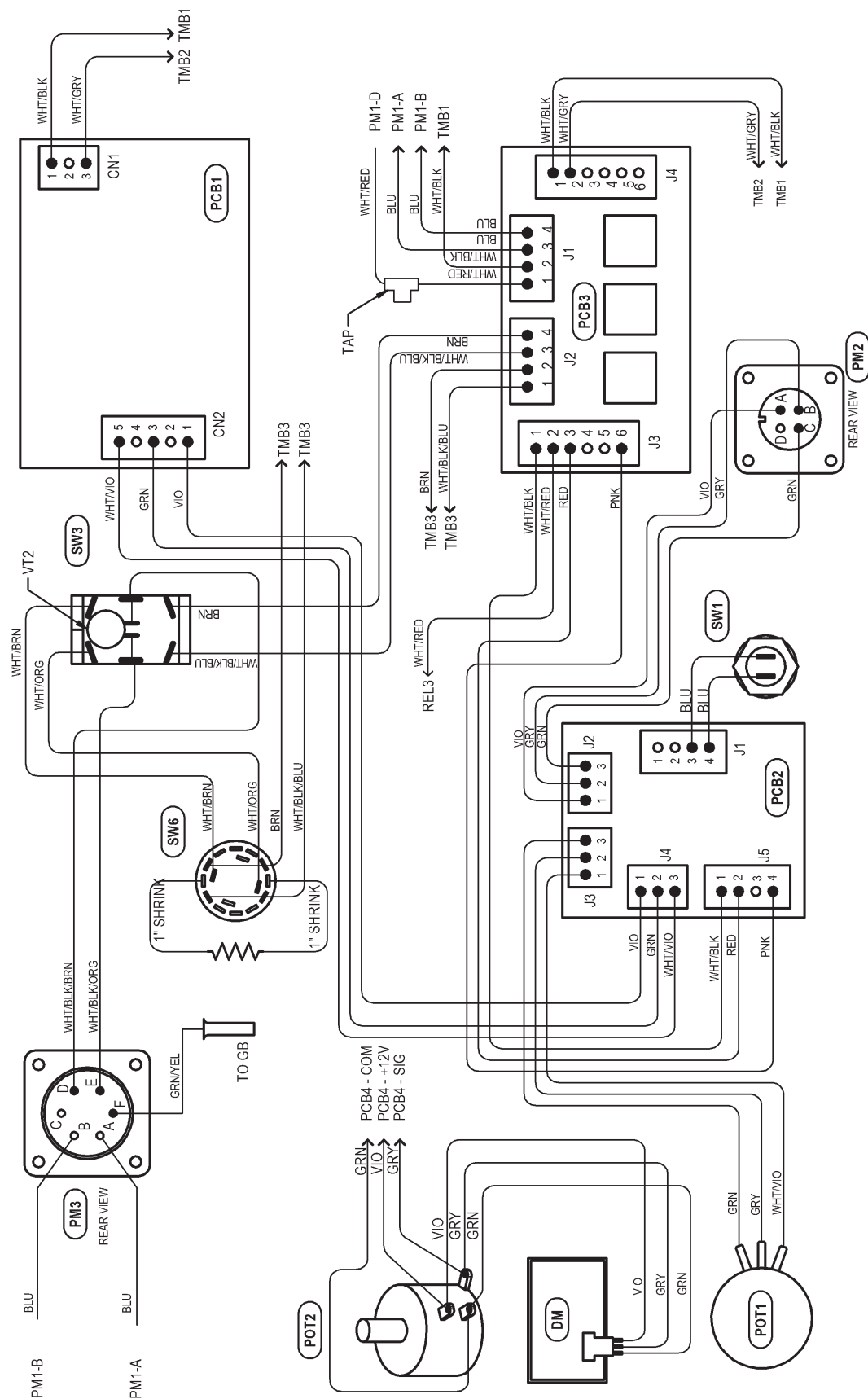


| ITEM | QTY | PART NO.    | DESCRIPTION                       | ITEM | QTY | PART NO.    | DESCRIPTION                 |
|------|-----|-------------|-----------------------------------|------|-----|-------------|-----------------------------|
| 1    | 1   | CBP-2002    | CBP-2000 Enclosure                | 22   | 2   | FHO-0188    | Fuse Holder, Panel Mount    |
| 2    | 1   | BUG-1764    | Meter Display Board Assembly      | 23   | 1   | MUG-1156    | Panel Connector, 4-T, F     |
| 3    | 1   | MDS-1011    | Display Bezel                     | 24   | 1   | CON-06RP04F | Conn, Box Mount 4 Pin F     |
| 4    | 1   | MDS-1013    | Display Filter                    | 25   | 1   | BUG-9446    | Cord Grip                   |
| 5    | 1   | CBP-2001    | CBP-2000 Legend Plate             | 26   | 1   | BUG-9445    | Power Cord, 18" x .410" Max |
| 6    | 1   | BUG-9677    | Potentiometer 10k Ohms            | 27   | 4   | SCF-1001    | #4-40 Seld Clinching Nut    |
| 7    | 2   | BUG-9687    | Knob, Fluted Phenolic w/Skirt     | 28   | 4   | FAS-0104    | 4-40 x 3/8 Pan Head         |
| 8    | 1   | SWT-1111    | Nor. Open Push Button, Black      | 29   | 8   | STOF-Q404   | Standoff Hex 6-32 Thk       |
| 9    | 1   | BUG-2255    | Toggle Switch DPDT, ON-OFF-ON     | 30   | 20  | FAS-0112    | Pan Hd Slit 6-32 x 1/4 Blk  |
| 10   | 1   | ARM-2279    | Toggle Switch DPST, ON-NONE-OFF   | 31   | 2   | FAS-0214    | #6-32 x 3/8 Rnd Hd, Zinc    |
| 11   | 1   | CWO-6206    | Red Neon Lamp, 125V, 6" Wire      | 32   | 4   | FAS-1310    | Hex Nut 6-32                |
| 12   | 1   | BUG-1562    | Multi Trn Potentiometer 10k 3 Trn | 33   | 2   | FAS-0115    | 6-32 x 1/2 Pan Hd, Zinc     |
| 13   | 1   | MUG-1258-1  | Rotary Switch Assembly            | 34   | 2   | WAS-0211    | #6 Internal Star Lockwasher |
| 14   | 1   | BUG-9694    | Knob                              | 35   | 12  | WAS-0201    | #4 Internal Star Lockwasher |
| 15   | 1   | SWT-FNC2    | E-Stop 2 N.C. Contacts            | 36   | 12  | FAS-1305    | Hex Nut 4-40                |
| 16   | 1   | PCB-5800    | Power Supply 12V +5V PCB          | 37   | 2   | CBP-2006    | Relay DPDT 10A 110/120 Vac  |
| 17   | 1   | CWO-6089    | RFI Filter, General Purpose       | 38   | 2   | CBP-2007    | Relay Bracket               |
| 18   | 1   | PCB-2231    | Relay Board                       | 39   | 3   | PWS-0147    | 2 Pos Terminal Block        |
| 19   | 1   | PCB-5801    | Micro PCB                         | 40   | 1   | PWS-0259    | Ground Bar Kit, 7 Terminal  |
| 20   | 1   | CWO-6527    | 0-90V Sdp Ctrl w/ Isolator        | 41   | 3   | FAS-0119    | Pan Hd 6-32 x 1             |
| 21   | 1   | CON-06RP06F | Conn, Panel, 6-T, F               | 42   | 4   | SCF-1023    | Self-Clinching Nut 1/4-20   |

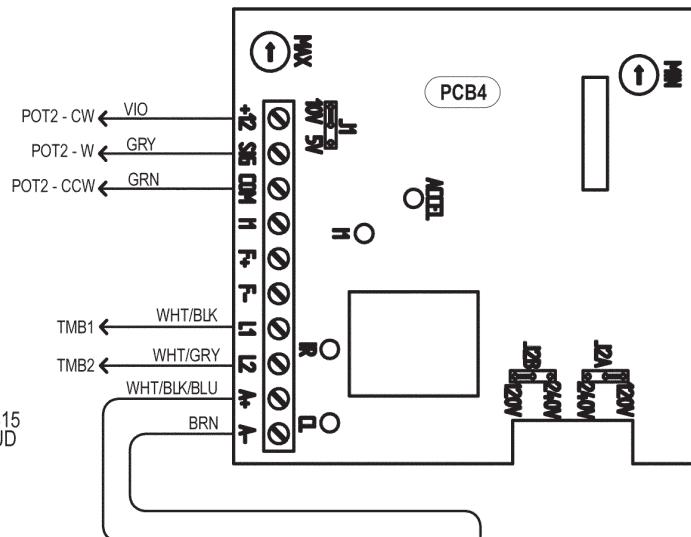
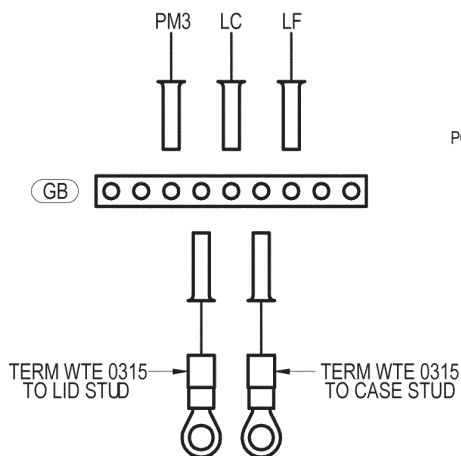
CBP-2000 CONTROL BOX / WIRING DIAGRAM (1 OF 3)



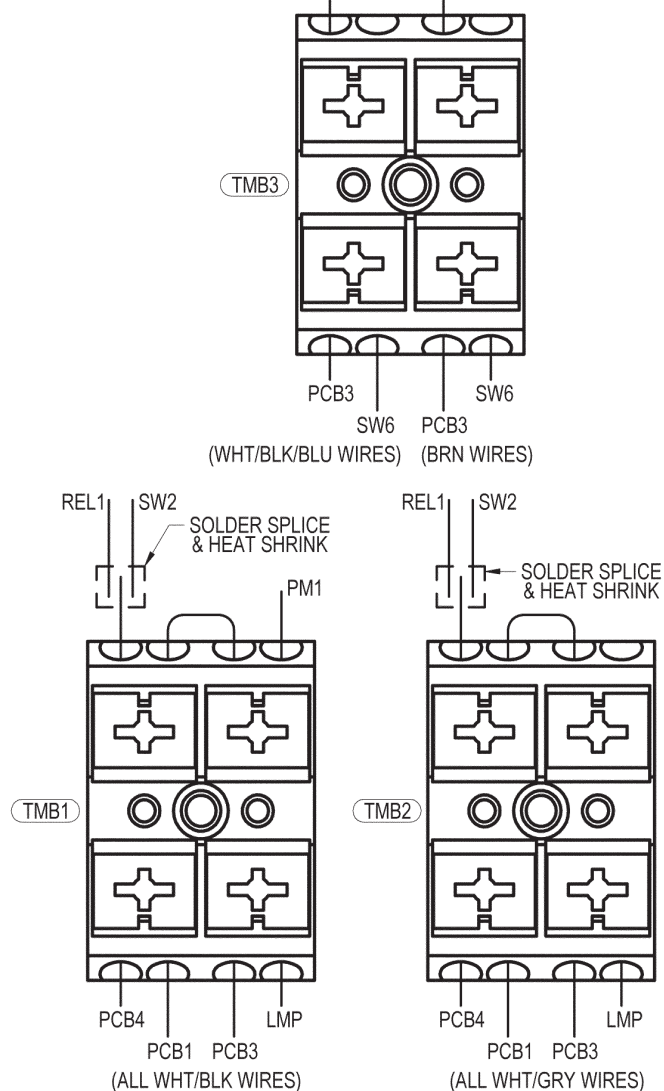
CBP-2000 CONTROL BOX / WIRING DIAGRAM (2 OF 3)



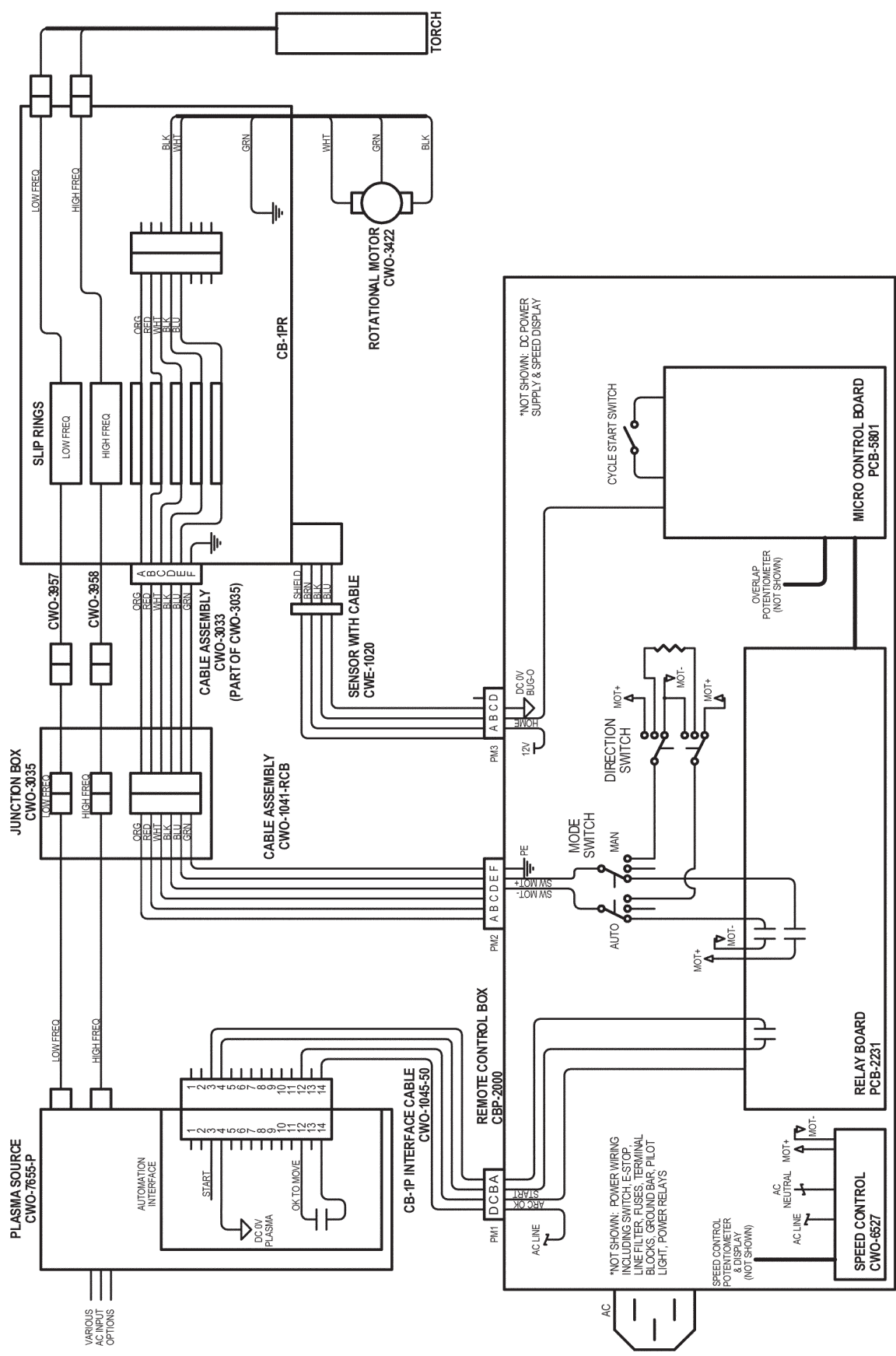
## CBP-2000 CONTROL BOX / WIRING DIAGRAM (3 OF 3)



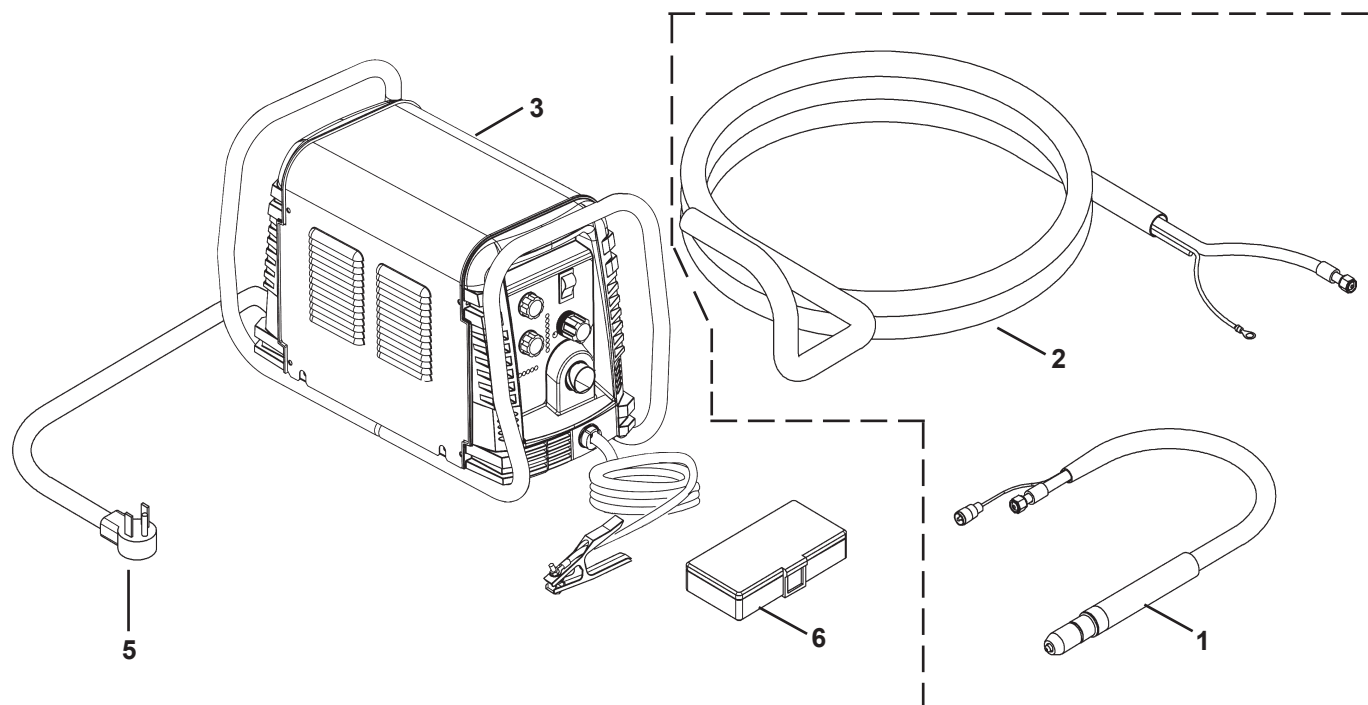
| ELECTRICAL COMPONENT CHART |                            |             |
|----------------------------|----------------------------|-------------|
| ITEM                       | DESCRIPTION                | PART NO.    |
| PCB1                       | Power Supply Pcb           | PCB-5800    |
| PCB2                       | Micro Control Pcb          | PCB-5801    |
| PCB3                       | Relay Board Pcb            | PCB-2231    |
| PCB4                       | 0-90V Spd Ctrl w/ Isolator | CWO-6527    |
| SW1                        | Push Button Switch         | SWT-1111    |
| SW2                        | Power Switch               | ARM-2279    |
| SW3                        | Toggle Switch              | BUG-2255    |
| SW5                        | E-Stop Switch              | SWT-EPFH    |
| SW6                        | Rotary Switch w/ Knob      | MUG-1258-1  |
| POT1                       | Potentiometer              | BUG-9677    |
| POT2                       | Multi-Turn Potentiometer   | BUG-1562    |
| DM                         | Digital Meter              | BUG-1764    |
| PM1                        | Lrg Panel Conn, 4-T, F     | CON-06RP04F |
| PM2                        | Panel Conn, 4-T, F         | MUG-1156    |
| PM3                        | Panel Conn, 6-T, F         | CON-06RP06F |
| LC                         | Line Cord                  | BUG-9445    |
| LF                         | Rfi Filter                 | CWO-6089    |
| LMP                        | Pilot Light                | CWO-6206    |
| FH1                        | Fuse Holder, Panel Mount   | FHO-0188    |
| F1                         | Fuse, Fast Acting 2A       | MPD-1028    |
| VT,VT2                     | Volt Trap, 120 VAC         | BUG-1393    |



CONSOLIDATED WIRING DIAGRAM



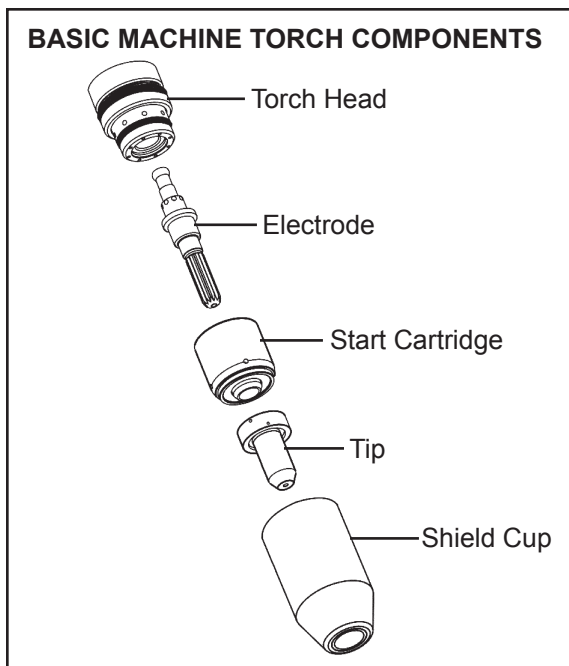
## CBP-2025 POWER SUPPLY REPLACEMENT COMPONENTS



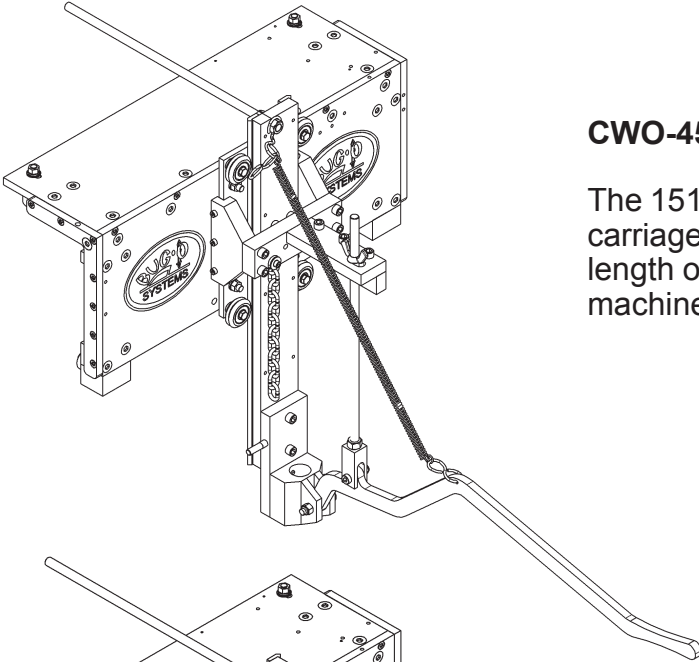
| ITEM | QTY | PART NO.     | DESCRIPTION                      |
|------|-----|--------------|----------------------------------|
| 1    | 1   | CWO-7658     | CB-1PR Torch Assy.               |
| 2    | 1   | CWO-7658-C1  | 50' Cable                        |
| 3    | 1   | CBP-2025     | CB-1PR CM82, Plasma Power Source |
| 4    | 1   | CBP-2026     | Precut & Term 50' Mach Torch     |
| 5    | 1   | CWO-1050     | 120V Power Box                   |
| *6   | 1   | SPK-CBP-2025 | Spare Parts Kit                  |

\* CWO-7655-SPK Spare Parts Kit Includes:

- 5 Electrode
- 10 Tip, Cutting, Air, 80 AMP
- 1 Start Cartridge

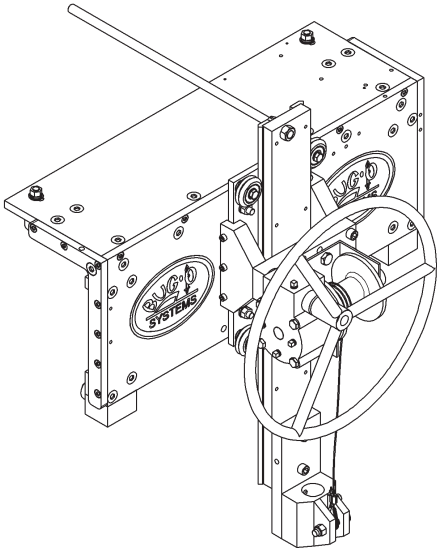


## CARRIAGES



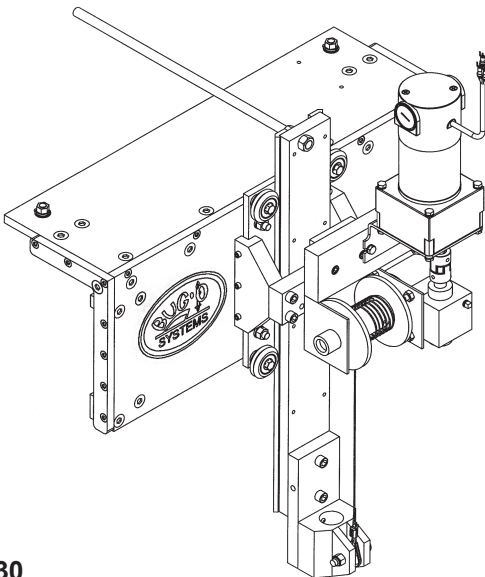
### **CWO-4530 151 Carriage**

The 151 Carriage mounts on a standard monorail. The carriage allows the operator to move the machine the length of the pipe, while utilizing a lever to position the machine vertically on the work piece.



### **CWO-4540 151P Carriage**

The 151P Carriage mounts on a standard monorail. The carriage allows the operator to move the machine the length of the pipe, while utilizing a winch to position the machine vertically on the work piece.



### **CWO-4550 151M Carriage**

The 151M Carriage mounts on a standard monorail, or “bridge crane” type setups. The carriage allows the operator to move the machine the length of the pipe, while utilizing an electric motor to mechanically position the machine vertically on the work piece.

# SET-UP INSTRUCTIONS FOR CW-5/CB-1PR USED IN SPRINKLER FABRICATION

## SUPPORTING FIXTURE AND PIPE STANDS

The first priority should be given to where the fixture is to be placed. The burning of the holes and welding of the couplings should be the last part of the operation performed on the pipe. It is important that a flow pattern or line be looked at, so that when the pipe is taken out of the fixture, it is finished and ready for shipment.

The monorail consists of a 4" x 8" x 1/4" wall rectangular tubing with a 3/8" x 3" flat bar welded to the tubing (See pg. 33). The flat bar has to project 1" above the top of the tubing. "C" clamps are to be used to hold the flat bar against the tubing with no gaps. The "C" clamp may be walked down the tubing as it is being tack welded. If the beam has a bow greater than 1/32" in a 30' span, take to following steps:

1. Determine exactly where the center of the bow is. This may be accomplished by putting a string along the front side of the monorail. Place 1/2" nuts between the string and the monorail and measure the gap between the string and the monorail. Always measure on the same side of the string.
2. After you have determined where center of the bow is, take a hand torch and heat the outside of the bow. The outside of the bow should be the side the flat bar is welded to. Take a piece of chalk and draw a triangle with a 2" base under the bottom of the flat bar with the top or point of the triangle pointing down. Do the same on the top of the monorail against the flat bar with the top or point pointing towards the face of the monorail. Heat these two areas so that they become cherry red in color. After the heat has been applied, take a large rag and a bucket of water and cool the heated area. After the area has been cooled, check the beam again. Repeat as necessary.

## PIPE STANDS

The pipe stands consist of 3" pipe in floor flanges with a 2-1/2" or 3" angle welded to the top of the pipe, and they should be spaced and aligned as shown (See pg. 33). The two stands should have some sort of clamping device to hold the pipe in place. The clamping device can be anything from a pipe vise to a chain and boom. The clamping device must be staggered.

After the pipe stands and supporting columns are in place, the monorail is to be placed on the supporting columns. The pipe stands and the supporting columns must be level and plumb. These items may have to be shimmed. With these items level, the monorail may be put in place on the supporting columns and held in place by two "C" clamps. Put a level on the face of the beam in the vertical position and on the bottom in the horizontal position. The beam should be level both ways, and if not, the beam will have to be shimmed. If the monorail has a twist, which may occur, level one end so that the other end needs to be pulled back.

Next, put a piece of 8" pipe in the pipe stands and clamp down. Take a centering head and find the center of the pipe on each end and in the middle. You can now use two methods to check to see if the monorail is aligned with the pipe below. They are as follows:

1. Use a plumb bob off the face of the monorail and measure from the center of the pipe to the plumb bob. The distance should be 5-11/16" in all three locations.
2. The second method is to put one carriage on the monorail and attach the CB-1PR to it. With the center pin in the burning machine, check all three locations. The burning machine must be plumb on the carriage if this method is used.

# SET-UP INSTRUCTIONS FOR CW-5/CB-1PR USED IN SPRINKLER FABRICATION

## INSTALLING CARRIAGES AND MACHINES ON THE MONORAIL

Assemble carriages and put them on the rail.

The CW-5 welder is put on the carriage that is nearest to the welding power source and the CB-1PR cutter nearest to the plasma power source.

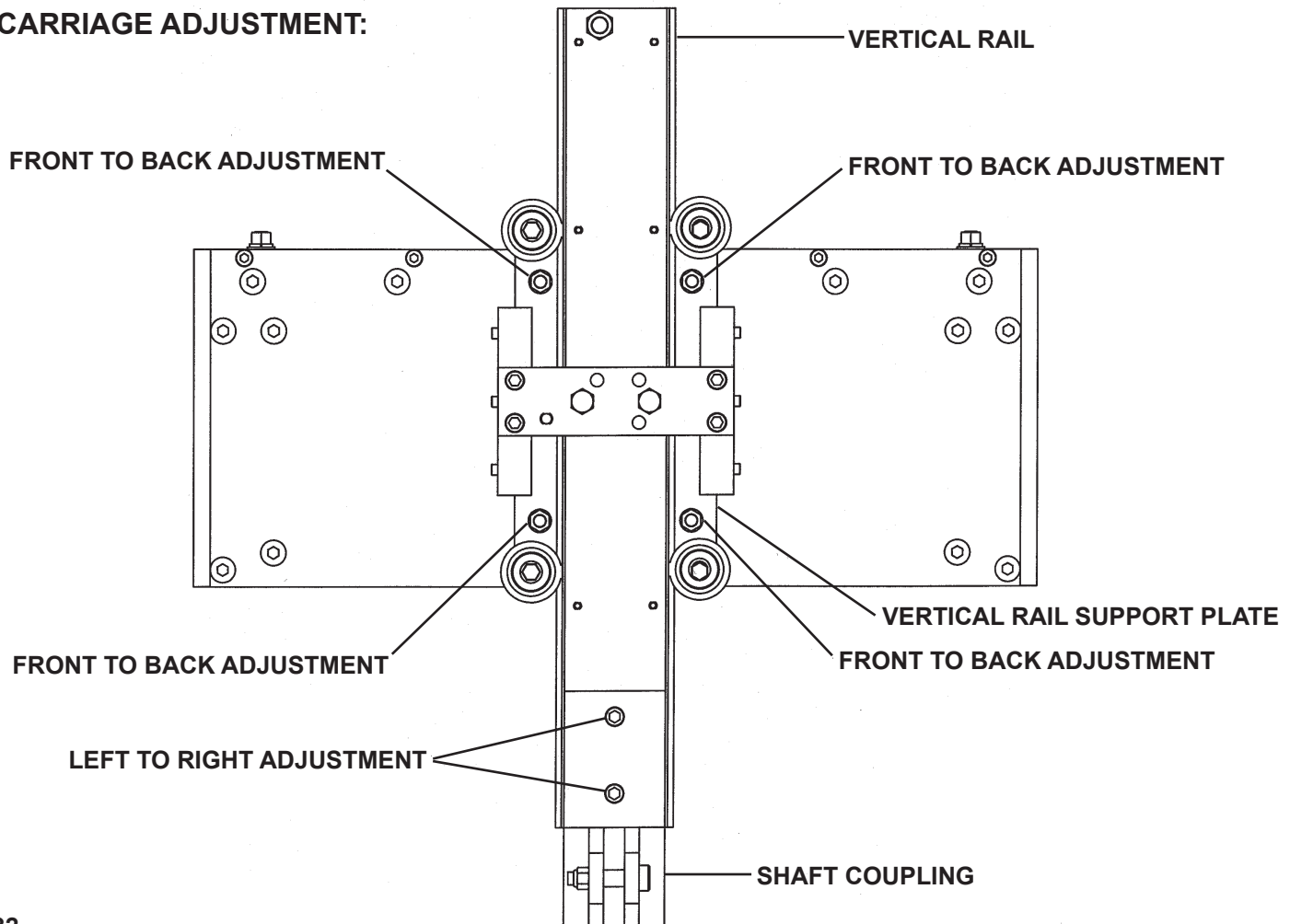
Put the CB-1PR cutter machine on the 8" pipe in the stands and bring the carriage to the machine. Lower the shaft coupling over the main shaft on the cutter. Ensure that shaft is fully inserted into the shaft coupling. Rotate the machine so that the plasma leads are in front and parallel to the carriage and tighten the set screws in the shaft coupling to secure the main shaft to the vertical slide assembly.

Next put the CW-5 welder on the 8" pipe and bring its carriage to it. Lower the shaft coupling down over the main shaft. Rotate the machine so that the welding lead on top of the machine will be on your left. This will put the electrical connector on the right. Tighten the set screws in the shaft coupling to secure the main shaft to the vertical slide assembly.

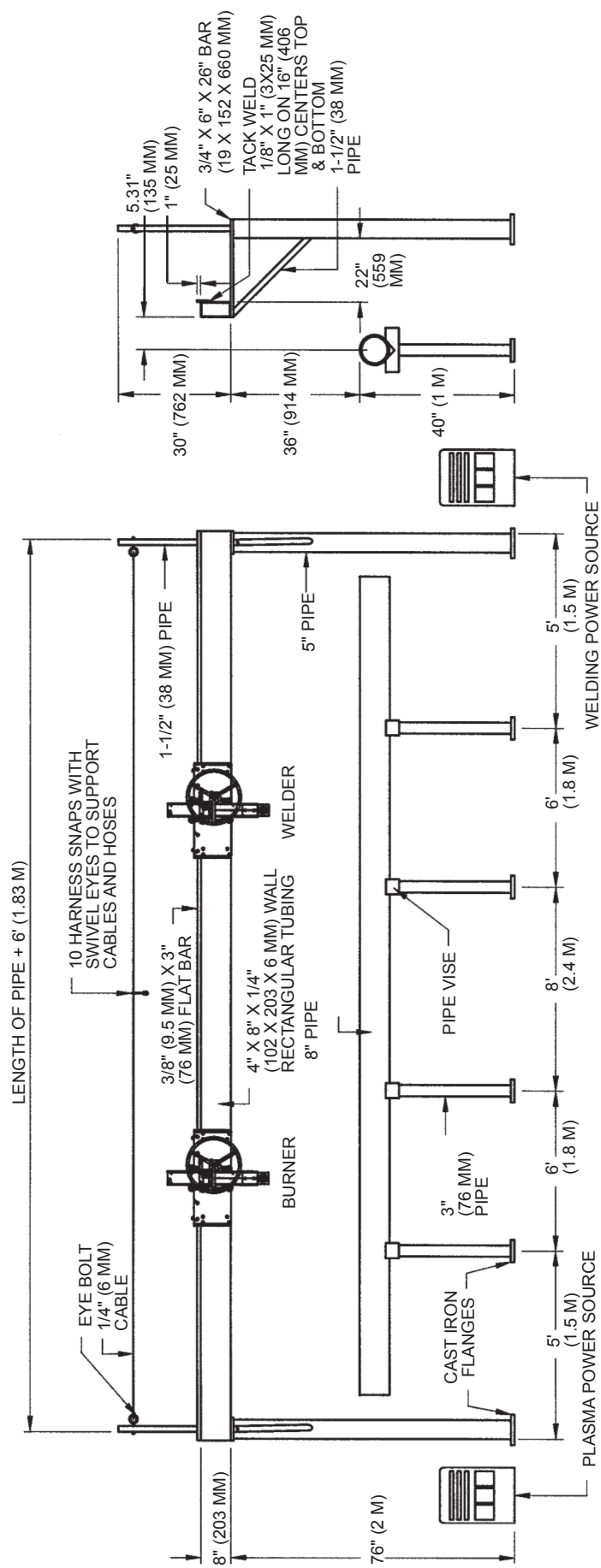
It is important for the machines to hang plumb. Left to right adjustments are made by loosening the two bolts that connect the shaft coupling to the vertical rail. Front to back adjustments are done by adjusting the position of the vertical rail support plate. Move the plate by adjusting the eight nuts on the four studs.

**Note:** Once machines are plumb verify that the machines are centered over the pipe stand.

### CARRIAGE ADJUSTMENT:



SET-UP DIAGRAM FOR CW-5 / CB-1PR USED IN SPRINKLER FABRICATION



## PREVENTIVE MAINTENANCE FOR CB-1PR PLASMA CIRCLE BURNER

**CAUTION:** Make sure the input power at the power source is turned off and the high and low frequency power cables, and the 50' control cable (Items # 2, 3,10, on the CB-1PR Electrical Wiring Diagram on page 14) are disconnected from the circle burner prior to working inside the machine.

**POWER SUPPLY:** Refer to the Victor / Thermal Dynamics CutMaster A80 Plasma Cutting Power Supply operating manual # 0-4979 supplied with this machine for general maintenance procedures and replacement parts.

**PLASMA TORCH:** Refer to the Victor / Thermal Dynamics Plasma Cutting Torch model SL100 machine torch instruction manual # 0-2962 supplied with this machine for general maintenance procedures and replacement parts.

### AFTER DAILY USE:

**Refer to CB-1PR Exploded View Parts List. (Page 12)**

**Racking System Item # 1:** Inspect gear rack; hardened ways and wheels (remove all dirt, grease, and rust). Check hardened ways for nicks and replace if necessary. Lubricate with a dry spray lubricant. Adjust wheels for snug fit and smooth operation. Lubricate racker pinion with a dry Teflon or graphite spray lubricant.

**Small Vertical Racker Item # 2:** Inspect wheels and remove all dirt, grease, and rust. Adjust wheels for snug fit and smooth operation. Lubricate racker pinion and wheels with a dry Teflon or graphite spray lubricant.

**Slide Bar Mounting Assembly Item # 10:** Inspect hardened ways (remove all dirt, grease, and rust). Check hardened ways for nicks and replace if necessary.

**Refer to CB-1PR Electrical Wiring Diagram. (Page 14)**

**Control Cable Item # 10:** Inspect cable connector to make sure threads are not stripped and that the connector is not cracked. Check the cable for cuts, missing insulation, and burn spots replace if necessary.

**CB-1PR Collector Ring Item # 9:** Inspect cable connector to make sure threads are not stripped and that the connector is not cracked. Ensure that the connector is fastened properly to the large aluminum gear (item # 30) on the CB-1PR Exploded View Parts List.

## EVERY SIX MONTHS:

**Refer to CB-1PR Exploded View Parts List. (Page 12)**

**Aluminum Gear Item # 30:** Do not grease this gear. Inspect gear teeth (remove all dirt and grease). Lubricate with a dry Teflon or graphite spray lubricant. Replace gear if excessively worn.

**P.M. Motor Assembly Item # 9:** Do not grease this pinion. Inspect the drive pinion (remove all dirt, grease, and rust). Lubricate with a dry Teflon or graphite spray lubricant. Replace pinion if excessively worn. Check set screw and tighten if necessary. Adjust motor assembly using the four adjustable mounting fasteners so that proper gear mesh is achieved between the aluminum gear (item # 30) and the motor drive pinion.

**5" Cam Assembly Item # 4:** Inspect the slide rails and the cam pinion (remove all dirt, grease, and rust). Do not grease slide rails or cam pinion. Lubricate with a dry Teflon or graphite spray lubricant. Replace cam pinion if excessively worn. Tighten all fasteners as needed.

**Refer to CB-1PR Electrical Component Chart. (Page 14)**

**Device Controls:** Open control box (use an air hose to blow out dust and dirt). Check all wires for breaks and replace if necessary. Check all electrical connectors and plugs if an electrical component fails refer to CBO-2000 Rotation Control electrical component chart for replacement parts or return for service.

**Large Brush Holder & Support:** Inspect brush holder. Make sure constant tension is being applied on the brushes. Brushes should move freely within the brush holder. Check brushes for arc build up. If brushes are pitted they will need replaced. Remove the brushes and sand them to ensure a smooth contact surface. Make sure all fasteners are tight.

**High Frequency Brush Holder:** Inspect brush holder. Make sure constant tension is being applied on the brush. The brush should move freely within the brush holder. Check the brush for arc build up. If the brush is pitted it will need replaced. Remove the brush and sand it to ensure a smooth contact surface. Make sure all fasteners are tight.

**Small Brush Retainer Assembly:** Inspect black brush holders for cracks and replace if needed. Check and make sure all wires are soldered properly to the holders. Replace the brushes when their length is less than ½ inch long. Remove the brushes and sand them to ensure a smooth contact surface. Make sure all fasteners are tight.

**Terminal Block:** Inspect the plastic terminal strip make sure it is not cracked, replace if necessary. Make sure all terminal connections are tight. Make sure all ground wires are connected to the mounting screws of the terminal strip.

## EVERY TWELVE MONTHS:

Refer to CB-1PR Exploded View Parts List. (Page 12)

**1" Bearing with Fasteners Item # 21:** Do not grease the bearing it is greased for life by the manufacturer. If the grease fitting has not been removed and plugged we suggest that you do so now. Earlier models may not have been plugged at time of assembly.

**1-1/4" Bearing with Fasteners Item # 22:** Do not grease the bearing it is greased for life by the manufacturer. If the grease fitting has not been removed and plugged we suggest that you do so now. Earlier models may not have been plugged at time of assembly.

**P.M. Motor Assembly Item # 9:** Bodine gear motor lubrication. Fill gear motor to oil level indicator with worm gear oil conforming to AGMA#5EP compounded (SAE#90) oil or Bodine lubricant #LO-23. Do not overfill.

**Transmission 3.5:1 Assembly Item # 8:** Inspect for excessive wear and tear. Keep the transmission assembly clean and lubricate with Lubriplate #630-AA.

Refer to CB-1PR Wiring Diagram. (Page 14)

**CB-1PR Collector:** The collector ring should be sanded once a year. If the collector ring is pitted too badly it should be replaced. Inspect all wires coming out of the collector ring for cut or missing insulation. All wires should be fastened to the center shaft with a nylon cable tie. Tighten four set screws if needed.

**Manifold Power Cable:** Ensure that the cable is fastened tightly to the large brush holder and the manifold retainer. Inspect the cable for cut or missing insulation. Replace the cable if necessary.

**Manifold Retainer Item:** Inspect for damage. Ensure that all cables and the oxygen hose are fastened tightly. Inspect the cables and oxygen hose for cuts or missing insulation. Replace if necessary.

**Junction Box Item:** Inspect the cables for cuts or missing insulation. Ensure that all terminal ends and connections are snug. Replace if necessary.

**Low Frequency Power Cable:** Inspect the cable for cut or missing insulation. Ensure that the micarta insulator is in good condition. Replace if necessary.

**High Frequency Power Cable:** Inspect the cable for cut or missing insulation. Ensure that the micarta insulator is in good condition. Replace if necessary.

## WARRANTY

### Limited 3-Year Warranty

MODEL \_\_\_\_\_  
SERIAL NO. \_\_\_\_\_  
DATE PURCHASED: \_\_\_\_\_  
WHERE PURCHASED: \_\_\_\_\_

For a period ending one (1) year from the date of invoice, Manufacturer warrants that any new machine or part is free from defects in materials and workmanship and Manufacturer agrees to repair or replace at its option, any defective part or machine. HOWEVER, if the invoiced customer registers the Product Warranty by returning the Warranty Registration Card supplied with the product within 90 days of the invoice date, or by registering on-line at [www.bugo.com](http://www.bugo.com), Manufacturer will extend the warranty period an additional two (2) years which will provide three (3) total years from the date of original invoice to customer. This warranty does not apply to machines which, after Manufacturer's inspection are determined by Manufacturer to have been damaged due to neglect, abuse, overloading, accident or improper usage. All shipping and handling charges will be paid by the customer.

The foregoing express warranty is exclusive and Manufacturer makes no representation or warranty (either express or implied) other than as set forth expressly in the preceding sentence. Specifically, Manufacturer makes no express or implied warranty of merchantability or fitness for any particular purpose with respect to any goods. Manufacturer shall not be subject to any other obligations or liabilities whatsoever with respect to machines or parts furnished by Manufacturer.

Manufacturer shall not in any event be liable to Distributor or any customer for any loss of profits, incidental or consequential damages or special damages of any kind. Distributor's or customer's sole and exclusive remedy against Manufacturer for any breach of warranty, negligence, strict liability or any other claim relating to goods delivered pursuant hereto shall be for repair or replacement (at Manufacturer's option) of the machines or parts affected by such breach.

#### **Distributor's Warranty:**

In no event shall Manufacturer be liable to Distributor or to any customer thereof for any warranties, representations or promises, express or implied, extended by Distributor without the advance written consent of Manufacturer, including but not limited to any and all warranties of merchantability or fitness for a particular purpose and all warranties, representations or promises which exceed or are different from the express limited warranty set forth above. Distributor agrees to indemnify and hold Manufacturer harmless from any claim by a customer based upon any express or implied warranty by Distributor which exceeds or differs from Manufacturer's express limited warranty set forth above.

#### **HOW TO OBTAIN SERVICE:**

**IF YOU THINK THIS MACHINE IS NOT OPERATING PROPERLY, RE-READ THE INSTRUCTION MANUAL CAREFULLY, THEN CALL YOUR AUTHORIZED BUG-O DEALER/DISTRIBUTOR. IF THEY CANNOT GIVE YOU THE NECESSARY SERVICE, WRITE OR PHONE US TO TELL US EXACTLY WHAT DIFFICULTY YOU HAVE EXPERIENCED. BE SURE TO MENTION THE MODEL AND SERIAL NUMBERS.**

**NOTES:**