# INSTRUCTIONS AND PARTS MANUAL

# SE-2PTD
## PROGRAMMABLE PASS THROUGH

LIT-SE2PTD-IPM-1206

# 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 al applicable local and national electrical safety codes. In none exist, use International Electric Code (IEC) 950.
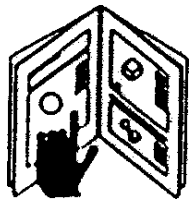
## READ INSTRUCTIONS.

Read the instruction manual before installing and using the equipment.

## EQUIPMENT DAMAGE POSSIBLE.

1) Do not plug in the power cord with out 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 worksite 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.

# SE-2PTD
# PROGRAMMABLE PASS THROUGH
## INSTRUCTIONS AND PARTS MANUAL

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Patents Pending

# INTRODUCTION:

The SE-2PTD Programmable Pass Through machine provides dual programming capabilities enabling the user to make saddle cuts, offset cuts, laterals, miters, holes, and shapes in pipes. The Programmable Pass Through machine is capable passing pipes from 1" to 4" (25-100mm) through the spindle. Pipes from 4" to 14" (100-355mm) can be externally chucked by clamping the I.D. of the pipe. The Programmable Pass Through machine is available for plasma and oxy-fuel cutting and eliminates the need to make templates or layout complex cuts.

# SET-UP:

The machine is designed to be fixed to a worktable. The machine needs to be bolted to the table through the mounting holes located in the legs of the machine. The machine is to be operated from a separate power line; it can be supplied for voltage ratings of 120 or 240 VAC. Verify which model you have prior to applying power. The torch arm should already be inserted into the linear drive located on the top of the machine. If it is not, throw the power switch to the "on" position, and carefully insert the torch arm into the v-wheels located inside of the linear drive from the chuck end. Slide the torch arm in until the teeth touch the drive gear. Then, using the manual jog switch, drive the arm back into the machine. Push the reset button so the machine holds its position. Insert the cutting torch into the torch holder and position the torch so that is centered in line with the chuck axis.

The machine can be used with oxy-fuel or plasma torches. If the machine is set-up for oxy-fuel cutting, use a three-hose cutting torch and run the hoses to the quick action manifold with solenoid. The solenoid controls the cutting oxygen. If the machine is set-up for plasma cutting, it will be equipped with a rotary ground, contact relay, and holding clamp for a plasma torch. Plug the contact relay into the contact output located on the control panel. Wire the trigger leads for the plasma machine to the supplied connector and plug into the contact relay box.

Loop the gas hose or plasma cable over the cable hanger located on the top of the machine for support. Plug the programming pendant cable into the pendant control connection located on the control panel. Place the programming pendant in the pendant holster located to the right of the control panel.

The adjustable pipe support (A) is attached to the rear of the machine, is used with long pipes, to help keep the pipe (B) aligned. Make sure to adjust the height of the rollers (C) so that the pipe runs true when rotating. The machine is now ready to be programmed for operation.
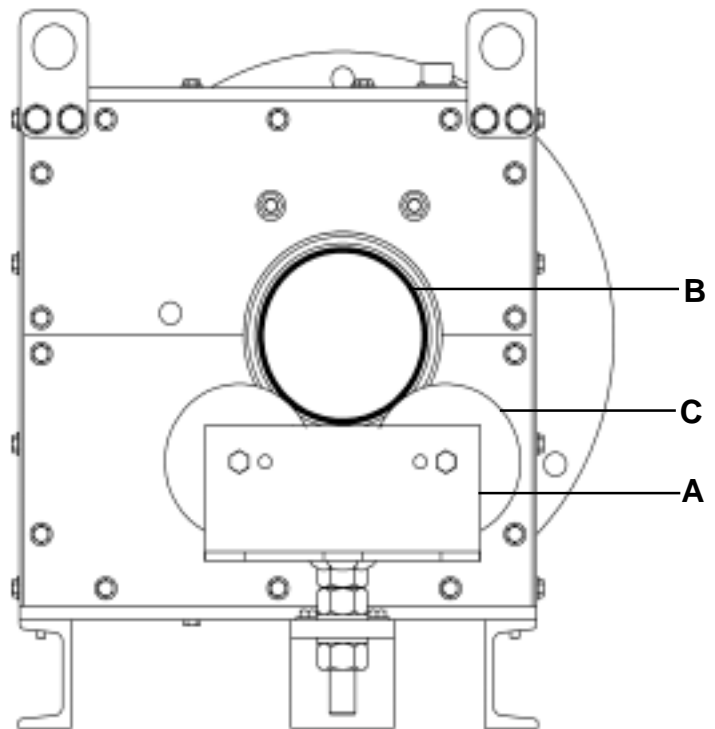


Pipe Support Rear View.

# MACHINE CONTROLS:

**START / RESUME:** Push to start cutting or resume cutting after a pause. If the torch has been manually positioned off the cut path, the machine will move the torch towards the cut and swing it into the cut line when reached.

**STOP / PAUSE:** Computer control is interrupted when pushed until the START / RESUME button is pushed. If pushed while running, the torch is shut off and the machine stops. Pushing the START / RESUME button again will resume the cut. When the STOP / PAUSE button is pushed, the machine can be manually positioned by the MANUAL JOG switch; this does not change the home reference position unless the RESET button is pushed.

**RESET:** Resets the computer when pushed and makes whatever position the machine is in the home position. If the torch or pipe is moved by the MANUAL JOG switch, upon releasing it, the machine will return to the home position.

**SPEED KNOB:** Controls the tangential speed of the torch along the cut, from zero to maximum. The speed will depend on the diameter of the pipe. When the torch arm is moving in or out, the rotational speed will slow down to keep the resultant speed constant.

**MANUAL JOG:** When pushed up or down the pipe will jog in the corresponding direction. When pushed left or right the torch arm will move in the corresponding direction.

**CONTACT OUTPUT:** When the machine is set-up for plasma cutting the contact relay box connection is made here. When the machine is set up for oxy-fuel cutting, the manifold solenoid connection is made here.

**PENDANT CONTROL CONNECTION:** The programming pendant connection is made here.

**POWER CORD:** Connect the appropriate voltage 120 or 240 VAC to the machine. Verify which model you have before applying power.

**POWER INDICATOR LIGHT:** Indicates that power is being supplied to the machine.

**POWER ON / OFF:** Switches power "ON" or "OFF".

**CIRCUIT BREAKER:** Protects the machine against overload or electrical faults.

**MIRROR IMAGE SWITCH:** Enables the user to cut mirror image cuts of various cut types. Simply program the cut with the switch on the standard cut position "S", then toggle the switch to the mirror image position "M" to cut a mirror image of the programmed cut.

# MACHINE CONTROLS CONTINUED

**(MAIN CONTROL PANEL)**

START / RESUME

STOP / PAUSE

MANUAL
JOG

CONTACT
OUTPUT

PENDANT
CONTROL
CONNECTION

RESET

SPEED
CONTROL

POWER
CORD

CIRCUIT
BREAKER

POWER INDICATOR
LIGHT

POWER
"ON / OFF"

MIRROR IMAGE
SWITCH

S  M

**(LINEAR DRIVE SIDE VIEW)**
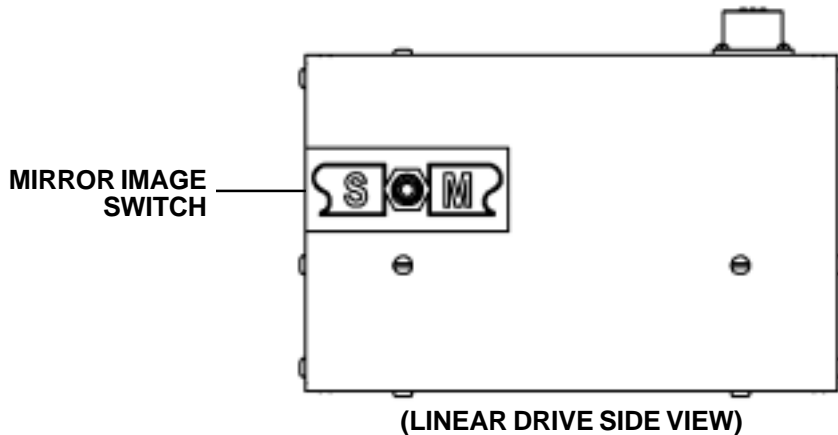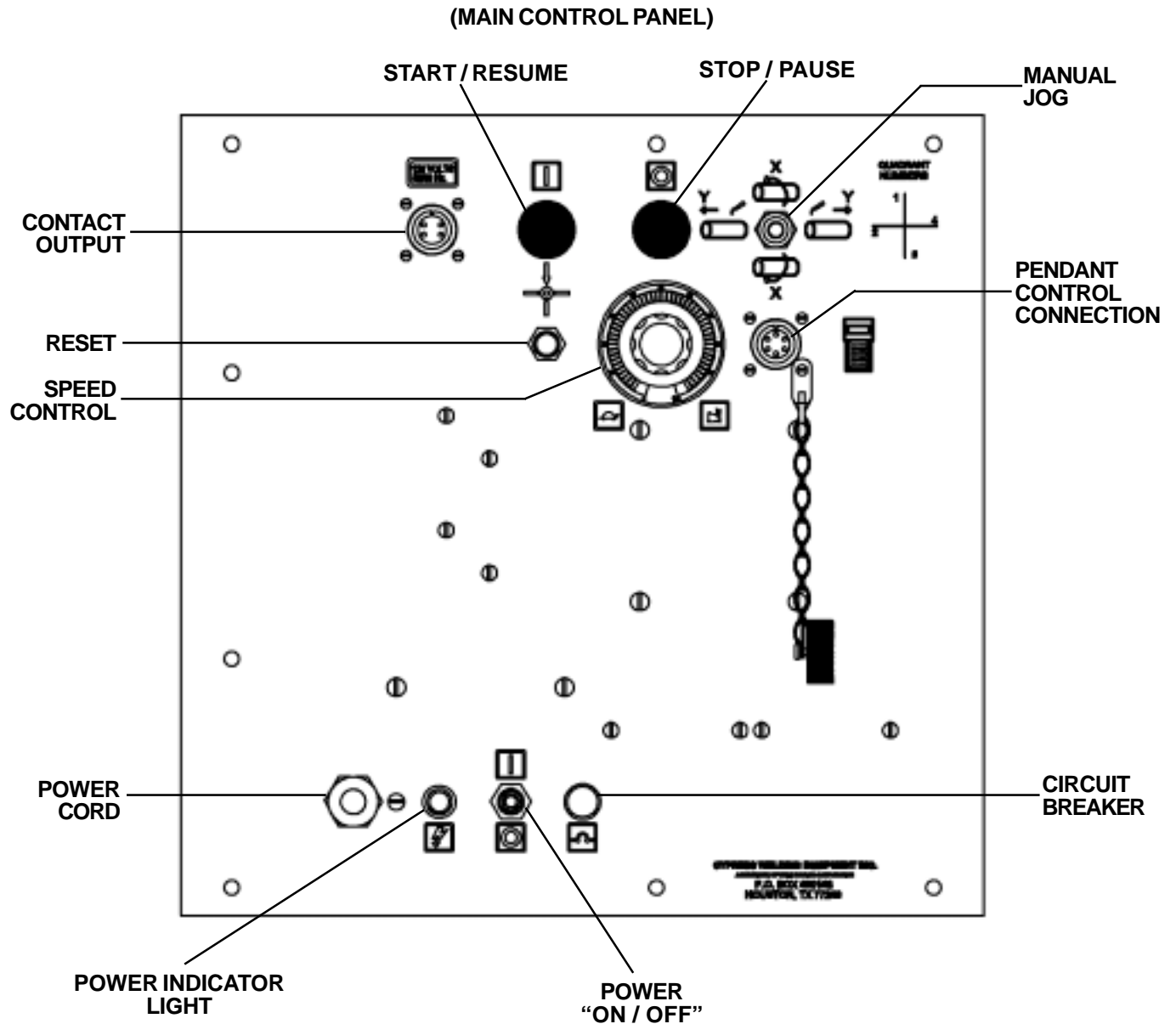
# PENDANT CONTROL:

This is the Pendant Control with keypad and display, which plugs into the Pendant Control Connection on the control panel.

**ALPHA KEYS:**  Press Keys A, B, C, D, or E for the function desired, as described in the programming section of this manual.

**DIGIT KEYS:**  Use he digit keys to enter pipe diameters or dimensions.

**ENTER:**  Push the enter button to store the numeric value entered.

**BACKSPACE:**  The backspace key removes the last digit keyed in before pushing the enter button, if a correction is required.
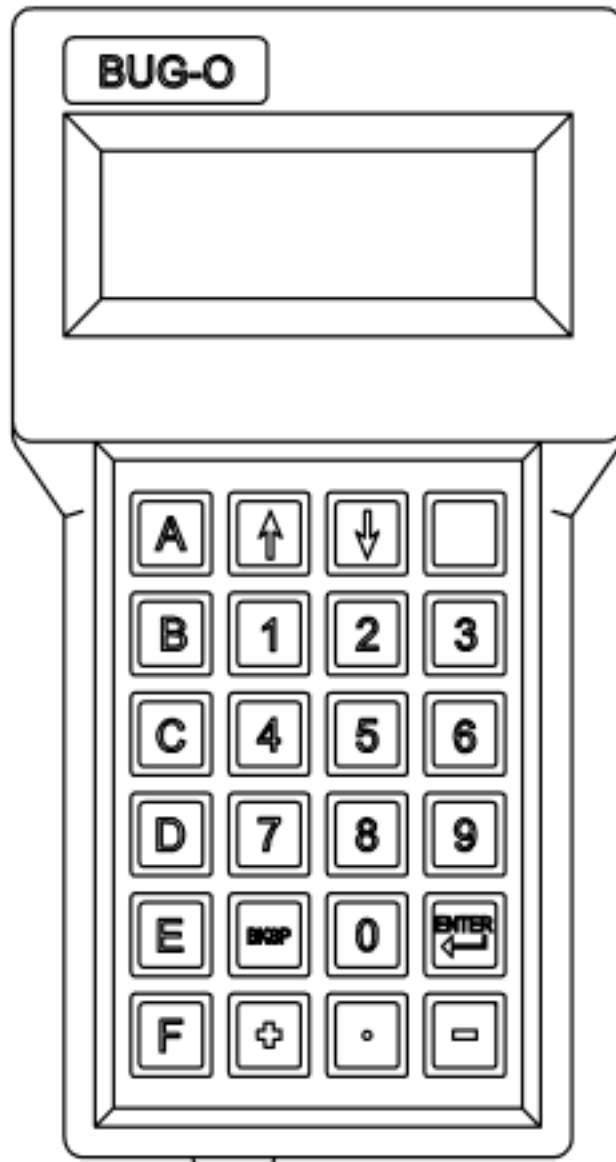
# PENDANT CONTROL CHARACTER MAP: Direct and Shifted Characters.

**Shift Key**

| A | ↑ | ↓ | (Shift Key) | | G | H | I | |
| B | 1 | 2 | 3 | | J | K | L | M |
| C | 4 | 5 | 6 | | N | O | P | Q |
| D | 7 | 8 | 9 | | R | S | T | U |
| E | BKSP | 0 | ENTER | | V | W | X | Y |
| F | + | • | - | | Z | @ | (SP) | ! |
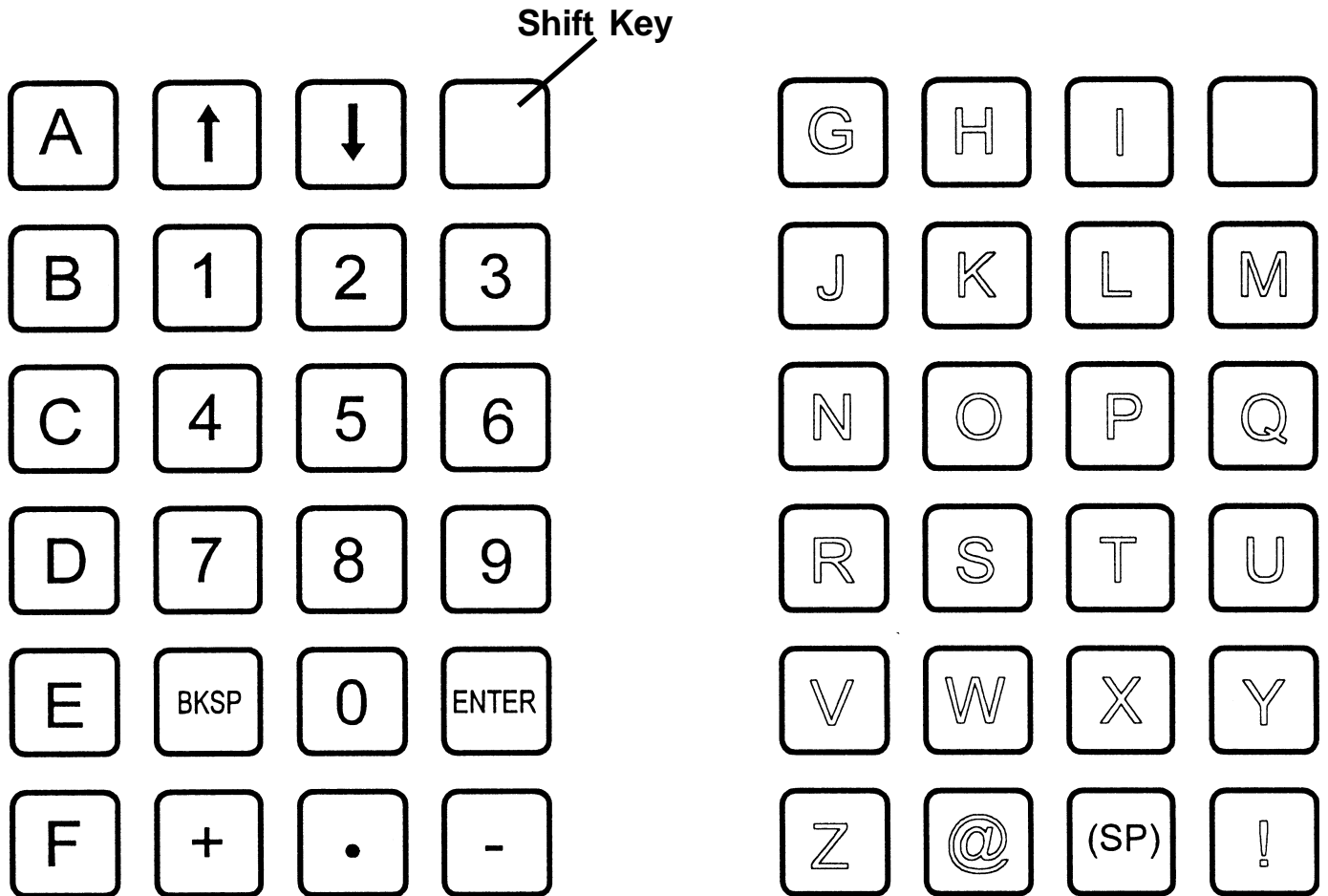
U: set Units, inch or metric
R: set Ratio
T: Test drives & encoders, function
V: Version Number

SHIFTED CHARACTER SET
E.g. to type U for units, press
Shift Key, then "9"

# SWITCHING PROGRAMMING MODES:

The machine runs in either the SHAPE PROGRAM, for custom programmed shapes, or the PIPE PROGRAM, for common pipe intersections

To switch functions:

1.  Press "C" on the pendant keypad
2.  Release the key immediately
3.  Press "F" immediately (within half a second)

The machine should change to the other program:

> **EXAMPLE:**  If the machine was in the PIPE PROGRAM, the Message "SHAPE PROG" will now be displayed on the pendant display.  If the machine was in the SHAPE PROGRAM, the message "PIPE PROG" will now be displayed in the pendant display.

# SAVING PROGRAMS:

The machine has 10 storage areas numbered cut 0 to 9 in memory, either PIPE PROGRAMS or SHAPE PROGRAMS can be saved in memory.  To switch to a different cut number, Push "C" on the pendant keypad and enter the desired number.  Program data is retained until reprogrammed.  At any time, one of these numbers are selected, it will stay selected even when power is shut off and turned back on, it will not change until the program number is changed by the operator.

# PROGRAMMING, DATA ENTRY:

When entering data with the pendant keypad, multiply inches, degrees, or seconds by 100 and enter the number without a decimal point.  For metric dimensions, multiply mm X 10 or cm X 100.

Example:     350 for 3.5 inches,
             800 for 80 mm, on metric machines
             1500 for 15 degrees

Press the return button after the number is entered.

## DATA REQUIRED, Saddle Cuts, Offset Cuts, Laterals, and Miters:

**TYPE 1:**    Requires    A.  Small diameter (pipe being cut)
                                                        B.  Large diameter (pipe it fits on)

**TYPE 2:**    Requires    A.  Small diameter
                                                        B.  Large diameter
                                                         C.  Offset distance between centerlines

**TYPE 3:**    Requires    A.  Small diameter
                                                        B.  Large diameter
                                                         C.  Offset distance
                                                        D.  Angle between pipes

**TYPE 4:**    Requires    A.  Small diameter
                                                        B.  Cutback distance
                                                         C.  Angle of miter cut

**TYPE 5:**    Requires    A.  Small diameter (branch pipe)
                                                        B.  Large diameter (pipe being cut)
                                                       C.  Angle

For plasma cutting, a value for the time delay is also required to allow for the delay in initiating the arc and piercing the material. Longer delays are required for thicker materials.

When entering diameters, use the diameter of the surface along whose intersection the cut has to be made.  Usually they will be the inside diameter of the pipe being cut, and the outside diameter of the pipe it fits on.  This will also allow for any bevel, if necessary.

In TYPE 4 miter cut, cutback refers to the distance on the centerline when making two cuts opposed to each other, for the middle piece of an elbow.  If only one cut is to be made, enter 0 or just press RETURN for cutback.

**NOTE:**  If the STOP / PAUSE button is pushed, the machine will be in pause mode, and cannot be programmed.  Push the reset button to get back to the ready mode for programming.

# PROGRAMMING, Saddle Cuts, Offset Cuts, Laterals, and Miters:

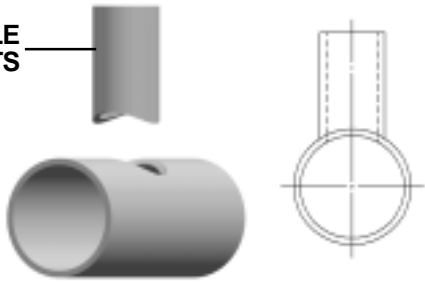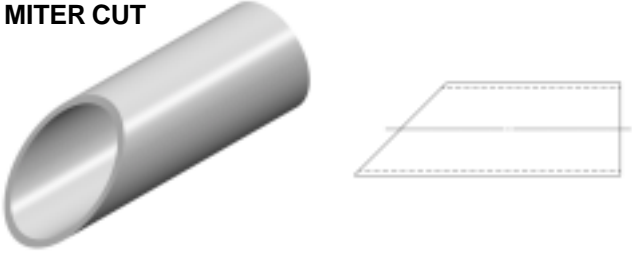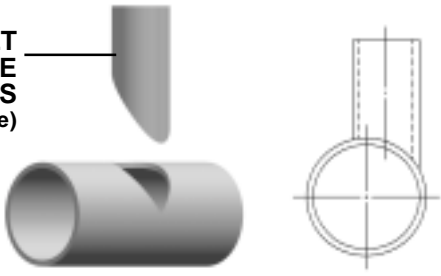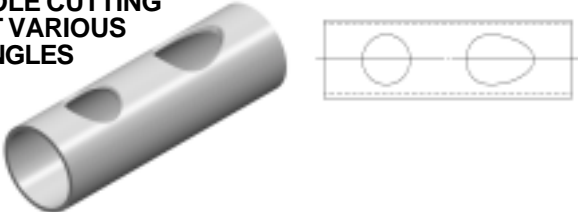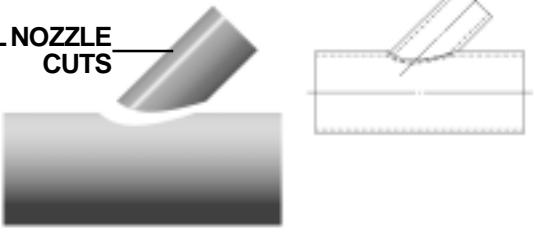**NOTE:** All programming is done using the **PENDANT CONTROL.**

For programming use the following "Alpha Keys".

Push A: To select the type of cut and enter dimensions.
B: To enter the time delay (for plasma cutting).
C: To change Cut Number in memory (numbers 0 – 9).
D: To display the type and dimensions of the cut.
E: To enter end of cut slowdown.

To program a "Pipe Program" cut, select one of the five "Digit Keys" corresponding to the type of cut you wish to make:

TYPE 1: Saddle Cut (centerline).
TYPE 2: Offset Cut (hillside).
TYPE 3: Lateral Cut (offset or centerline, for centerline, put offset = 0).
TYPE 4: Miter Cut.
TYPE 5: Holes (see next page).
* Irregular Shapes (see programming shapes).

## CUT TYPES:

| | |
|---|---|
| **TYPE 1** <br> SADDLE NOZZLE CUTS | **TYPE 4** <br> MITER CUT |
| **TYPE 2** <br> OFFSET SADDLE NOZZLE CUTS (Hillside) | **TYPE 5** <br> HOLE CUTTING AT VARIOUS ANGLES |
| **TYPE 3** <br> LATERAL NOZZLE CUTS | SHAPE PROGRAM CUSTOM IRREGULAR SHAPES |

# PROGRAMMING, CUTTING HOLES: TYPE 5

To program TYPE 5 Holes utilizing the "Pipe Program". The machine is programmed to cut holes in pipes for branch joints, either square (t-joints) or angled (laterals). The joint must be on Centerline.
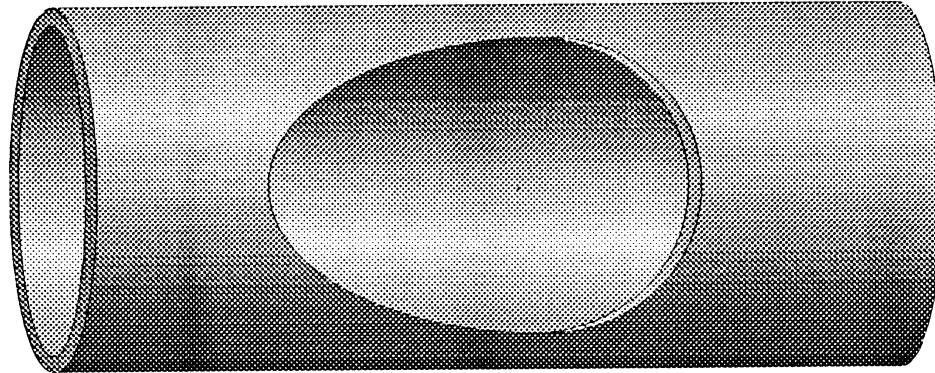
The Display will ask for:

1. The small diameter, and then the large diameter. Enter the diameter of the branch pipe for small diameter, as shown in the diagram below, and the diameter of the pipe being cut for the large diameter.

2. Next the display will ask for the angle. Enter the angle, in degrees X 100 (e.g. for 60 degrees, enter 6000). For square cuts you must enter 9000 (for 90 degrees).

Small Diameter

Angle

Large Diameter
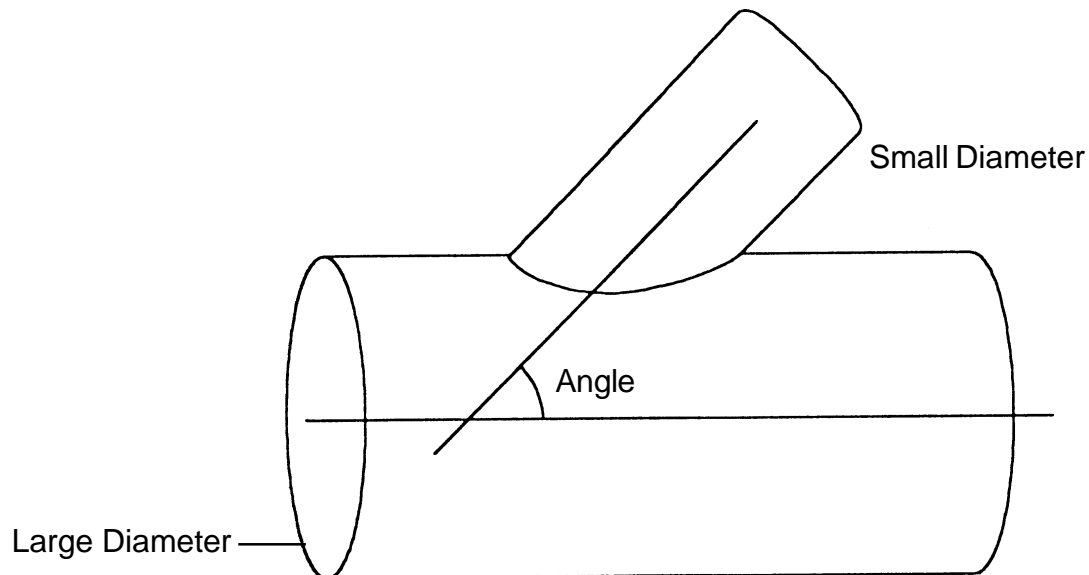
# PROGRAMMING SHAPES:

The following pages describe the shape programming capabilities of the machine. Cuts of any arbitrary shape can be programmed, by building up the shape from a sequence of straight lines and circular arcs.

For every change of pipe diameter in the machine, the new diameter has to be entered into the machine. If the machine is set to cut a square hole on a 4" (102 mm) pipe, and an 8" (203 mm) diameter pipe is put into the chuck, the hole will be rectangular, stretched out to twice the dimension in the circumferential direction.

> **NOTE:** The pipe diameter is a background setting and affects all programs.

Press "E" on the pendant keypad to enter the diameter; the display will prompt you for the pipe diameter first, and then the segment end slowdown. The shapes are laid out on a flat surface as if the pipe had been slit and opened up flat, and the cut line developed on it.

> **NOTE:** If the "SHAPE MACHINE PC" program is used to download shapes, the pipe diameter has to be entered manually as the program does not handle it. This can be done from the computer if desired, by using the F9 function "Emulate Pendant". From there, press E (upper case) and follow the prompts. The machine must be connected to the PC for "Emulate Pendant" function; turn power "ON" and press the RESET button on the machine control panel.

All programming is done using the hand held pendant. Shapes are built up only from the segments provided (see Shape Programming Chart): circular arcs and straight lines, square or inclined, by selecting type and quadrant for each segment. A shape can have up to 50 segments. Some other operations, like solenoid "ON / OFF", TIME DELAY, or REPEAT another shape, also count as one segment each, if used.

For oxy/acetylene cutting, first position the torch at the starting point. Next turn on the preheat gases, and wait until the required preheat is reached. Push the START / RESUME button, the machine will turn on the cutting oxygen and start cutting the current shape. At the end of the shape the machine will turn off the cutting oxygen and stop. Manually turn off the preheat gases.

When plasma cutting, an external contact relay is used instead of the cutting oxygen solenoid. A delay to allow for initiating the arc and piercing the material should be the first segment programmed.

## DATA REQUIRED, PROGRAMMING IRREGULAR SHAPES:

To program a completely new shape (Press "A").

Count the number of segments or operations and enter the total.

For each segment, enter the following:

TYPE:          Select digit keys 1-8
QUADRANT:  1, 2, 3, or 4 (refer to Programming Segment Chart)
SIZE:         One or more dimensions per segment as described below:
                100 X inch or 10 X mm (depending on the machine version):
                or for time, 100 X second of delay.
                (E.g. 150 = 1.5", or for metric 375 = 37.5mm)

**DESCRIPTION OF SEGMENT TYPES** (refer to Programming Segment Chart)

**TYPE 1:** Clockwise, 90-degree arc segments.
Quadrant determined by which quarter of a full circle makes the arc.
Dimensions required:  Radius only.

**TYPE 2:** Counter-clockwise, 90-degree arc segments.
Quadrant determined by which quarter of a full circle makes the arc.
Dimensions required:  Radius only.

**TYPE 3**: Line along X or Y-axis.
Quadrant determined by direction of movement.
(East: 1, North: 2, West: 3, South: 4).
Dimensions require: length only.

**TYPE 4:** Angled straight line.
Quadrant determined by direction of movement.
(Northeast: 1, Northwest: 2, Southwest: 3, Southeast: 4).
Dimensions required:  1.  X-dimension, movement along the X-axis
                       2.  Y-dimension, movement along the Y-axis

**TYPE 5:** Function or Operation.
Quadrant determined by function selected.
   1.  WELD / OXYGEN "ON": turns on the contact relay or oxygen solenoid.
      Dimensions required: None.
   2.  WELD / OXYGEN "OFF": turns off the contact relay or oxygen solenoid.
      Dimensions required: None.
   3.  PAUSE:  Machine stops and waits until START / RESUME button is pushed.
      Dimensions required: None.
   4.  DELAY:  Machine stops and holds position for a programmed period of time up to
      99.99 seconds.
      Dimensions required: time in .01 second units. (E.g. 250 for 2.5 seconds)

**TYPE 6:**  Special Functions.
Quadrant determined by function selected.
1.  REPEAT:  Another complete shape will be repeated a specified number of times.  The "Shape No." of the repeated shape MUST BE LOWER then the "Shape No__." of the current shape being programmed. Therefore it CANNOT BE USED IN "Shape No. 0".
Data required:  1.  "Shape No. __" To be repeated.
                2.  Number of times repeated.

2.  CALL PIPE CUT
This function allows a PIPE cut to be inserted into the SHAPE program segment sequence. For instance: Move back a certain distance, call PIPE cut to make a hole, then move somewhere else and continue cutting.

When programming with the Handlheld Terminal, the display will only ask for "Cut No.?" The PIPE cut has to be programmed separately (either before or after programming the SHAPE), and the Cut No. it is programmed into entered as data. For example: Program a fishmouth PIPE CUT Type 1, 4.00" on 8.00", in Cut No. 2. When entering Type 6, Quad 2 in the Shape Program, it will ask for "Cut No.?; just enter "2."

3.  AUXILIARY MODES:  Provide commands to turn "ON / OFF" two line-switching outputs independently, and also switching speeds from set speed to rapid traverse and back.  Mode numbers are from 0 to 7.
Refer to the Mode Chart in this manual to select a mode.

4.  SET PERCENT SPEED:  Used to change the speed of the machine in the middle of a shape to a lower speed.  Refer to The Set Percent Speed section of this manual.

**TYPE 7:**  Clockwise arc, must be less than 180 degrees.
Quadrant determined by direction of end point of arc relative to the start point.
Dimensions required:      1.  X-dimension, offset along the X-axis from start to end point.
                          2.  Y-dimension, offset along the Y-axis from start to end point.
                          3.  Radius of the arc.

**TYPE 8:**  Counter-clockwise arc, must be less than 180 degrees.
Quadrant determined by direction of end point of arc relative to the start point.
Dimensions required:      1.  X-dimension, offset along the X-axis from start to end point.
                          2.  Y-dimension, offset along the Y-axis from start to end point.
                          3.  Radius of the arc.

## AUXILIARY MODES: Type 6, Quadrant 3

Auxiliary Modes are additional controls to independently turn the two internal solid-state relay outputs "ON and OFF", and to switch the machine into rapid traverse mode or set speed.

The machine is shipped with OUTPUT (1) wired to the external relay or solenoid connector. By default, this output turns "ON" when the START / RESUME button is pressed to run a shape, and turns "OFF" at the end. The output is taken from screws (3) and (4) on the 4-terminal strip on the controller inside the machine.
ONLY OUTPUT (1) IS NORMALLY USED.

OUTPUT (2) is present at screws (1) and (2) on the controller, but not wired. By default the output is "OFF" when a shape is started, until turned "ON" by command TYPE 5, QUADRANT 1. Both the Plasma Kit and the Oxy-fuel Kit use only output (1). Subsequently while running, the TYPE 5 "ON" and "OFF" commands turn both outputs "ON" and "OFF" together, and both then "OFF" at the end.

When programming TYPE 6 QUADRANT 3, a mode number is required to be entered. The eight auxiliary modes, numbered 0 through 7, allow the setting of a mode with any combination of outputs "ON" or "OFF" and choice of set speed by the speed knob or maximum speed regardless of the setting. The combinations are listed in the table below:

**MODE CHART:**

| MODE NO. | OUTPUT 1 | OUTPUT 2 | SPEED |
|----------|----------|----------|-------|
| 0 | OFF | OFF | SET |
| 1 | OFF | ON | SET |
| 2 | OFF | OFF | HI |
| 3 | OFF | ON | HI |
| 4 | ON | OFF | SET |
| 5 | ON | ON | SET |
| 6 | ON | OFF | HI |
| 7 | ON | ON | HI |

## SET PERCENT SPEED: Type 6, Quadrant 4

Selecting TYPE 6, QUADRANT 4 allows the speed to change to a fraction of the set speed. The display will read "Speed %", and data entry is accepted from 1 to 99. Entering 0 or return will make the speed 100%, which is the same as the set speed.

When the program reaches a TYPE 6, QUADRANT 4, segment while running, the speed will change to the percent entered, and continue at this setting until there is a later TYPE 6, QUADRANT 4, segment which changes it to another % setting or back to 100%.

**NOTE:** If TYPE 6, QUADRANT 4, has been set for HI (rapid traverse), then this setting will cut down the HI speed to the same %. Settings below 10% are not recommended

# PROGRAMMING SHAPES OPERATION:

When power is turned "ON", the position of the torch becomes the reference START position. There are three options (the hand held pendant is not needed for the first two):

1. **MOVE**
   To change the start position, push the STOP / PAUSE button, move the machine manually to the desired START position using the MANUAL JOG switch, and push the RESET button.

2. **RUN**
   Push the START / RESUME button to cut a shape.

3. **PROGRAM (entry or change)**
   The programming operation is selected by pressing the alpha keys A, B, C, D, and E.

   **A:** All segments, data entry for a new shape consists of the total number of segments.
   Data for each:    Type          (arc, X/Y line or slope)
                           Quadrant   1-4
                           Size         (radius, or X/Y dimension)

   **NOTE:** See writing a shape program for more details.

   For example, a 2" (51 mm) diameter circle could be four segments:

   1.  2, 1, 100   Counter-clockwise arc, quadrant 1, 1.00 inch radius
   2.  2, 2, 100   Counter-clockwise arc, quadrant 2, 1.00 inch radius
   3.  2, 3, 100   Counter-clockwise arc, quadrant 3, 1.00 inch radius
   4.  2, 4, 100   Counter-clockwise arc, quadrant 4, 1.00 inch radius

   The data should be tabulated on paper from a diagram before entering.

   **B: PROGRAM** Segment
   Press "B" on the pendant keypad to reprogram a single segment. This is useful if there is an error in data for just one segment, so the whole shape does not have to be re-entered.

   **C: CHANGE** Shape number
   Press "C" on the pendant keypad to change the current shape number, and enter the desired number at the prompt. The program switches to the new number in memory, and to whatever shape is stored in that memory location.

   **D: DISPLAY** Shape Data
   Press "D" on the pendant keypad to display the data for the current shape.
   The pendant display shows the total number of segments, and data for each segment one by one each time you press ENTER.

**E: END** of Segment Slowdown
**IN THE SHAPE PROGRAM, FOR THE FIRST CUT OF A GIVEN DIAMETER, THE PIPE DIAMETER MUST BE ENTERED.** Press "E" on the pendant keypad, the display will prompt for the pipe diameter, and then the Slowdown value.

**IMPORTANT:**

1. Once the STOP / PAUSE button is pressed, computer control is halted until the RUN / RESUME or the RESET button is pressed. Therefore the programming cannot be done with the pendant in this state: the RESET button should be pressed first.
2. After pushing "A" and programming a new shape, END of Segment Slowdown will still have the old value unless reprogrammed. To set a new value, push "E".


# WRITING A SHAPE PROGRAM:

The shape to be cut on the pipe must first be laid out flat as if the pipe was slit along the length and opened up flat.

1. Draw the required shape on paper to some convenient scale.
2. Refer to the Segment Chart and divide the shape into straight line and arc segments.
3. Decide on the operation sequence and mark any other operations such as turning torch "ON / OFF", or DELAY.
4. Number all the segments in sequence, including other positions if any, and make a table with the required data.

Example:  For a clockwise circle starting from the top.  (Dimensions described for metric version)

| Segment No. | Type | Quadrant | Dimensions |
|---|---|---|---|
| 1. | 1 | 1 | 300 (30 mm) |
| 2. | 1 | 4 | 300 |
| 3. | 1 | 3 | 300 |
| 4. | 1 | 2 | 300 |

5. With the machine turned on, select which shape number this will be saved in memory as, for instance, No. 3.
   Push "C", display reads Shape No. __.
   Push 3 for No. 3, press the ENTER key (backward arrow).
   The program is now saved as Shape No. 3.

6. Push "A" the display will read "Total Segments ?"
   Push 4 for 4 segments and press the ENTER button.
   The display will read "1 Type ?" waiting for segment 1 data.

**7.** Push 1 for type, clockwise arc. (Refer to Programming Segment Chart)
The display reads "Quadrant ?"
Push 1 for quadrant 1.
The display reads "mm X 10"
Push 3, 0, 0, Enter, for 300, which is 30.0 mm.
Segment 1 has now been entered.
The display will read "2 Type ?" asking for data for Segment 2.

**8.** Repeat the steps above to enter data for all segments, in sequence. The display will read "Ready" after all segments have been entered. The shape program is now stored in memory as "Shape No. 3", and the machine is ready to cut the programmed shape.

# PROGRAMMING SEGMENT CHART:

**QUADRANT:**

| SEGMENT TYPES: | #1 | #2 | #3 | #4 |
|---|---|---|---|---|
| 1. Clockwise 90⁰ Arc | | | | |
| 2. Counterclockwise 90⁰ Arc | | | | |
| 3. X or Y Axis Line | | | | |
| 4. Oblique Line | | | | |
| 5. Functions | WELD / OXY ON | WELD / OXY OFF | WAIT FOR START BUTTON | TIME DELAY |
| 6. Functions | REPEAT ANOTHER SHAPE | CALL PIPE CUT | AUXILIARY MODES | PERCENT SPEED |
| 7. Clockwise Partial Arc | | | | |
| 8. Counterclockwise Partial Arc | | | | |
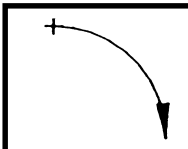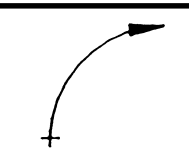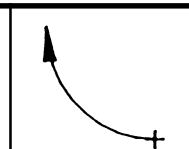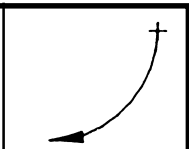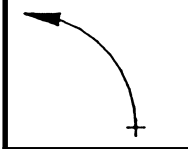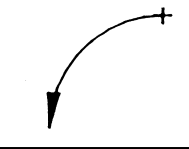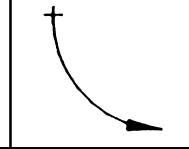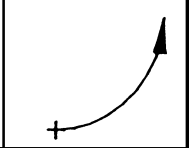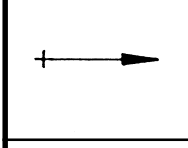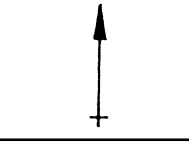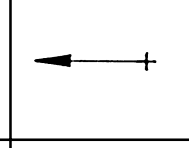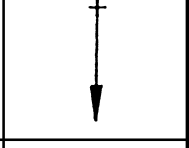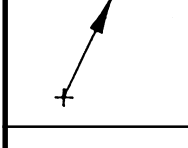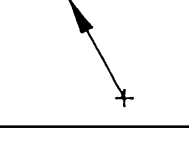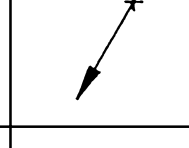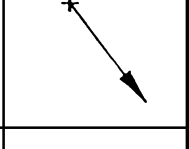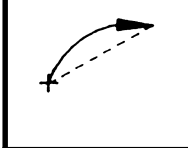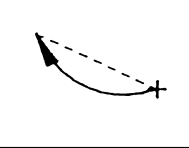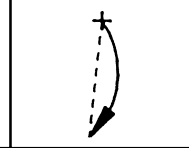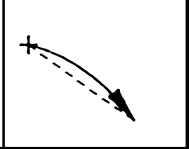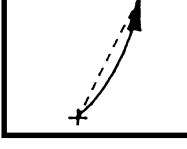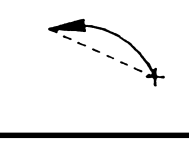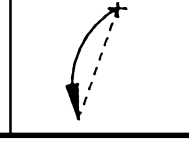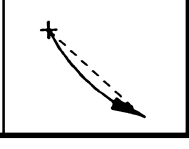
# MAKING A CUT:

## TO MAKE A CUT:

1. Set up the machine with pipe in position and power "ON"

2. Program the desired cut. (Refer to the programming sections in this manual).

3. Push the STOP / RESUME button and use the MANUAL JOG to move the torch to the starting point.

4. Push the RESET button to fix the starting point.

5. For oxy-fuel, turn on and ignite the pre-heat gasses, and wait until it is hot enough to start the cut.  Push the START / RESUME button, and the solenoid for cutting oxygen or plasma trigger is turned on and the machine starts the cut (after the delay which has been set for plasma).

**NOTE:**  TYPE 4, MITER
If a cutback dimension has been entered, the machine will make one cut, shut off the gas or arc, back up for the given distance, and rotate 180 degrees.  The machine will pause until the START / RESUME button is pressed again, and them repeat the same cut but rotated 180 degrees from the first cut.

## TO MAKE A DRY RUN WITHOUT CUTTING:

1. Push the STOP / PAUSE button and hold it down.

2. Push the START / RESUME button and hold it down.

3. Release the STOP / PAUSE button quickly, after step two above.

4. Release the START / RESUME button.

The machine will move along the programmed cut without turning on the contacts for plasma, or the cutting solenoid.

# PROGRAMMING EXAMPLE:

## TO CUT A SLOT IN A PIPE LIKE THE ONE SHOWN BELOW:

1. The cut is split into segments of straight lines and circular arcs that make up the desired pattern.

2. Next, these segments should be listed in a table (as shown), with the Type, Quadrant, and required Dimensions (refer to the Programming Segment Chart).

3. To program the shape, press "A" on the pendant keypad, then enter the total segments at the prompt (6 for this example).

4. Next enter the data for each segment such as Type, Quadrant, and Dimensions, as prompted.

5. Finally enter an End of Segment slowdown value, and the display will read "Ready".

6. **IN THE SHAPE PROGRAM, FOR THE FIRST CUT OF A GIVEN DIAMETER, THE PIPE DIAMETER MUST BE ENTERED.** Press "E" on the pendant keypad, the display will prompt for the pipe diameter, and then the Slowdown value.

| Segment | Type | Quadrant | Dimension |
|---------|------|----------|-----------|
| 1 | 1 | 3 | 400 |
| 2 | 3 | 2 | 600 |
| 3 | 1 | 2 | 400 |
| 4 | 1 | 1 | 400 |
| 5 | 3 | 4 | 600 |
| 6 | 1 | 4 | 400 |

The first **Segment** is a clockwise 90 degree arc, which is **Type** 1, **Quadrant** 3 and the required **Dimension** is the radius, set here as 40 mm.

Free End

3    4

2    5

1    6

START
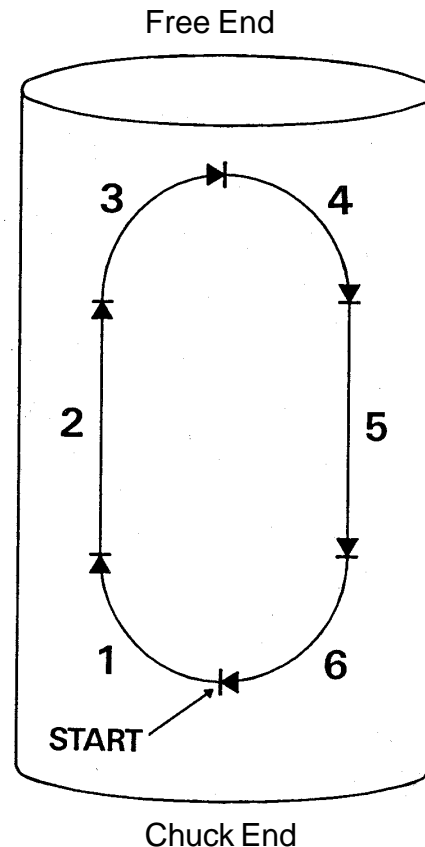
Chuck End

# TECHNICAL DATA:

**Power Requirement:**     120 VAC/50-60/1
                                        240 VAC/50-60/1

**Speed Range:**     3.75 rpm

**Cutting Diameter:**     Pass Through: 1" to 4" (25 mm to 100 mm) O.D.
                                        Externally Chucked: 4" to 14"(25 mm to 355 mm) diameter.

**Pipe Weight Capacity:**     375 lbs. (170 kg) pass through when supported.

**Maximum Overhung Length:**  15" (383 mm)

**Maximum Overhung Weight:**  150 lbs.  (68 kg)

**Net Weight:**     345 lbs.  (157 kg)

**Shipping Weight:**     420 lbs.  (191 kg)

# DIMENSIONS:



35.00"
(889mm)

10.88"
(267mm)

40.00"
(1016mm)

19.00"
(483mm)
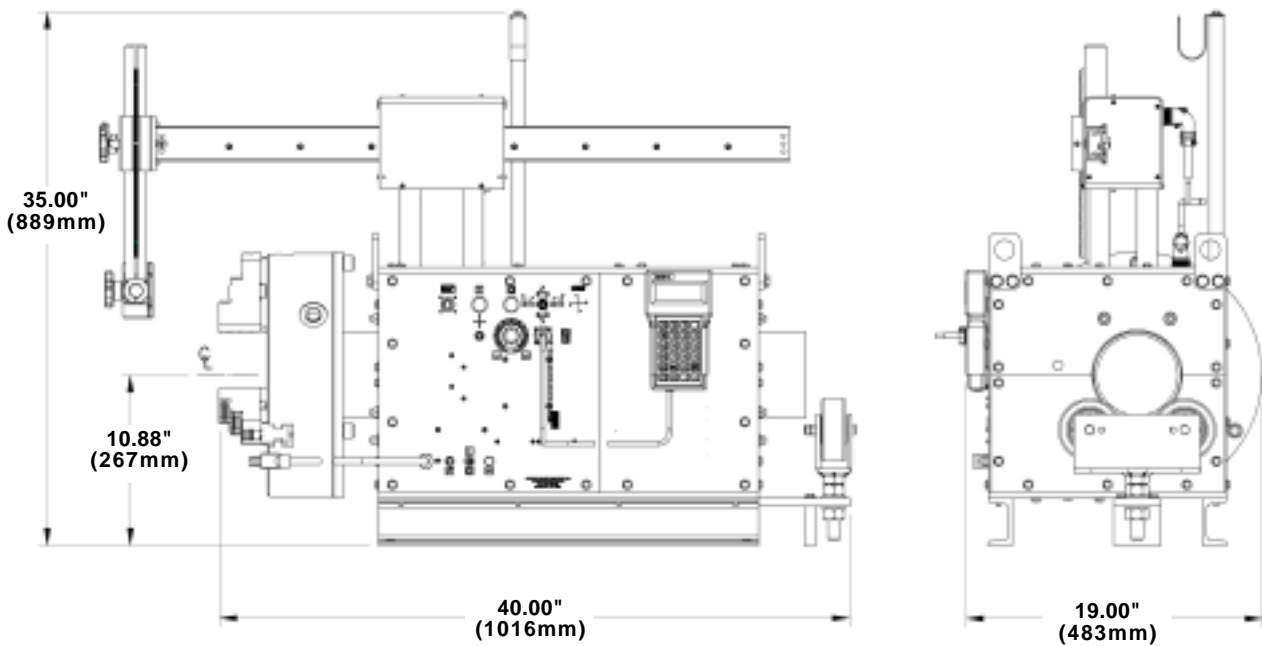
# SE-2PTD EQUIPPED FOR PLASMA CUTTING:
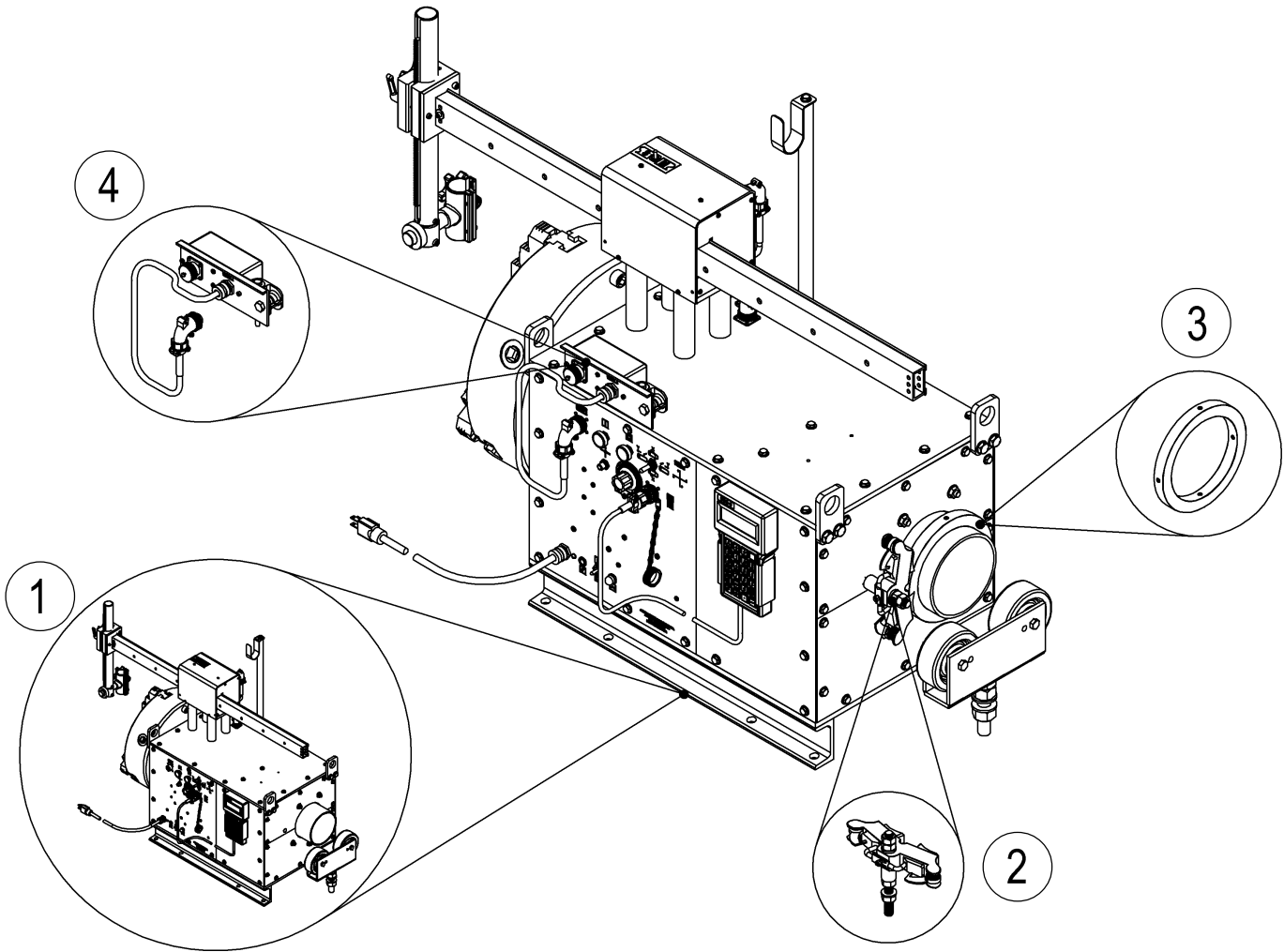


| ITEM | QTY | PART NUMBER | DESCRIPTION |
|------|-----|-------------|-------------|
| 1 | 1 | SEO-4250 | SE-2PTD 120 VAC Common |
| 1 | 1 | SEO-4252 | SE-2PTD 240 VAC Common |

**Plasma Kits and Components**

| ITEM | QTY | PART NUMBER | DESCRIPTION |
|------|-----|-------------|-------------|
| * |  | SEO-4560 | Plasma Kit 120 VAC |
| * |  | SEO-4562 | Plasma Kit 240 VAC |
| 2 | 1 | CWO-5370 | Grounding Brush & Support |
| 3 | 1 | CWO-5380 | Rotary Ground Ring |
| 4 | 1 | CWO-5485 | Contact Relay 120 VAC |
| 4 | 1 | CWO-5487 | Contact Relay 240 VAC |

*When ordering the kit for your voltage, you will receive Items 2, 3
and the appropriate Item 4 for your voltage.

# SE-2PTD EQUIPPED FOR OXY-FUEL CUTTING:
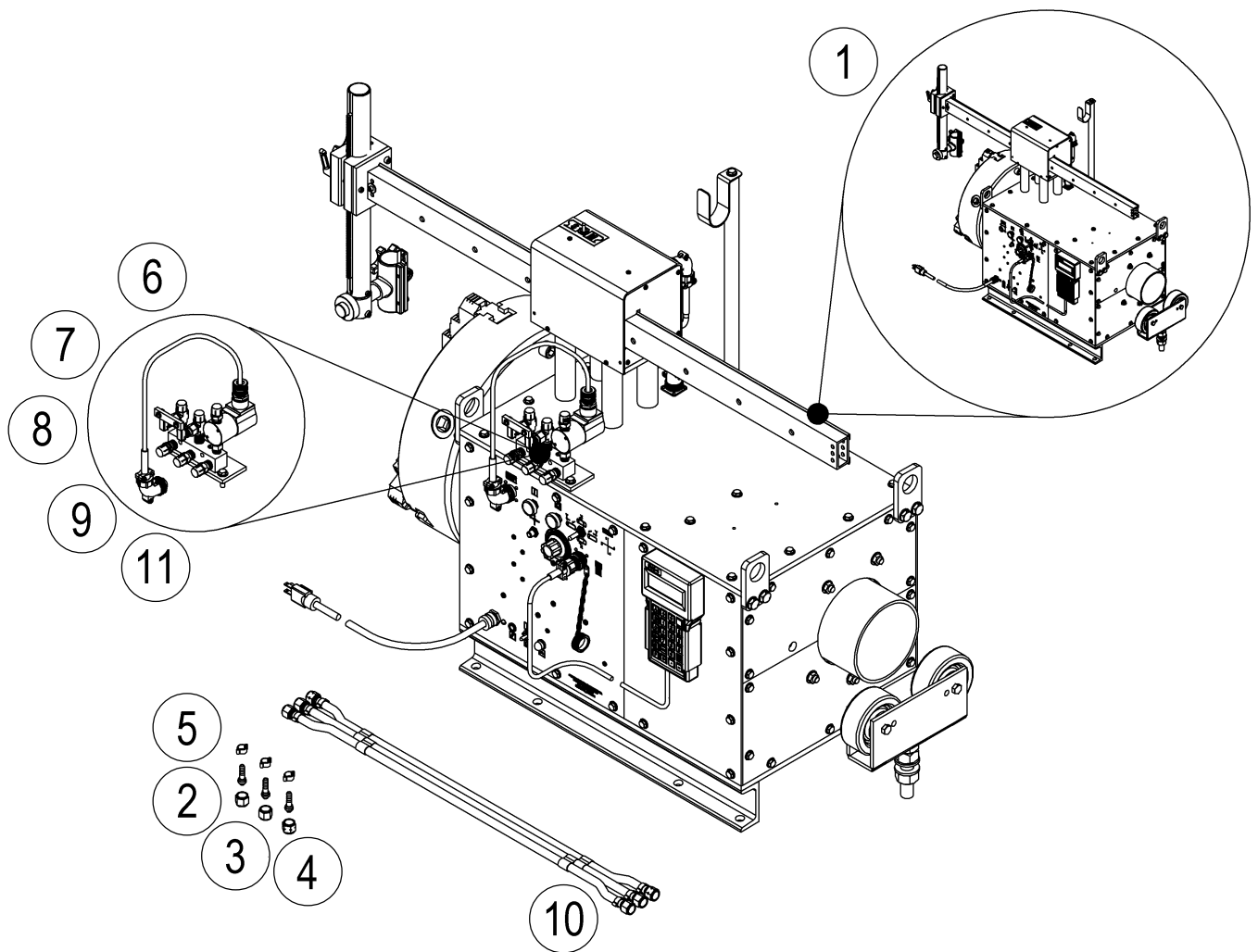
| ITEM | QTY | PART NUMBER | DESCRIPTION |
|------|-----|-------------|-------------|
| 1 | 1 | SEO-4250 | SE-2PTD 120 VAC Common |
| 1 | 1 | SEO-4252 | SE-2PTD 240 VAC Common |

**Plasma Kits and Components**

| ITEM | QTY | PART NUMBER | DESCRIPTION |
|------|-----|-------------|-------------|
| * | | SEO-4480 | Oxy-Fuel Kit 120 VAC |
| * | | SEO-4482 | Oxy-Fuel Kit 240 VAC |
| * | | SEO-4484 | Oxy-Fuel Kit 42 VAC |
| 2 | 2 | CIR-1012 | Hose Nut Oxygen |
| 3 | 3 | CIR-1013 | 1/4" Hose Nipple |
| 4 | 1 | CIR-1014 | Hose Nut Fuel Gas |
| 5 | 3 | CIR-1016 | Hose Clamp |
| 6 | 1 | FAS-0559 | Soc Hd Cap Scr 1/4-20 x 1" |
| 7 | 1 | FAS-0957 | Soc Hd Flt Scr 1/4-20 x 3/4" |
| 8 | 1 | FAS-0359 | Hex Hd Cap Scr 1/4-20 x 1-1/4" |
| 9 | 1 | SEO-4481 | Manifold Mounting Plate |
| 10 | 1 | MUG-1119-60 | 3-Hose Assembly 5' |
| 11 | 1 | SEO-4490 | Q.A. Manifold w/Solenoid 120 VAC |
| 11 | 1 | SEO-4492 | Q.A. Manifold w/Solenoid 240 VAC |

*When ordering the kit for your voltage, you will receive Items 2-10
and the appropriate Item 11 for your voltage.

# SE-2PTD COMMON: EXPLODED VIEW / PARTS LIST

**13** **1** **12**

**2, 15**

**6**

**10**

**14**

**8** **17,18** **3** **9** **4** **8** **7**

**SAME SETUP
ALL FOUR CORNERS**

**11**
**16**

**5**

**RIGHT SIDE INTERIOR VIEW
VARIOUS ITEMS OMITTED FOR CLARITY**

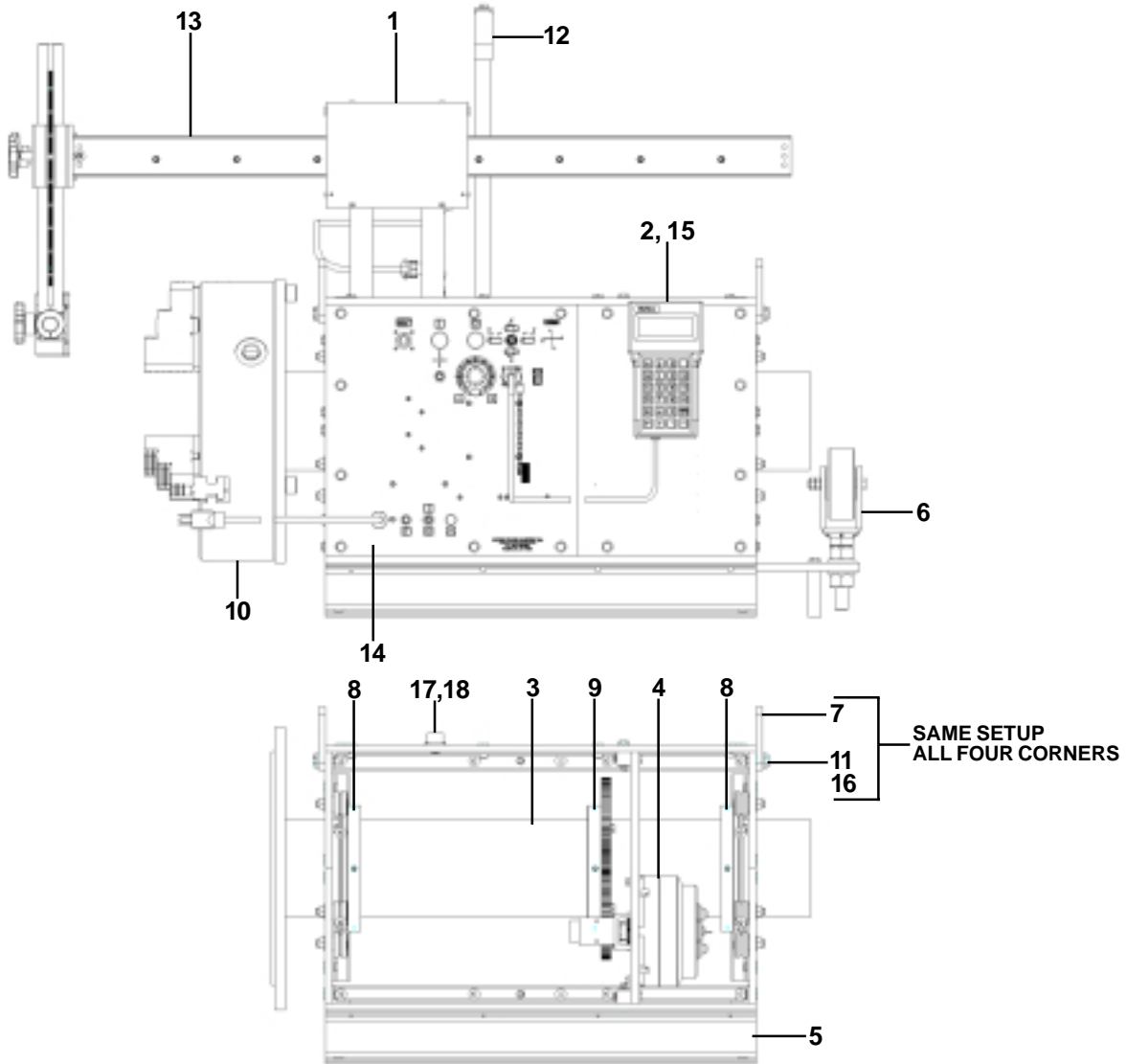| ITEM | QTY | PART NUMBER | DESCRIPTION |
|------|-----|-------------|-------------|
| 1 | 1 | BUG-5605-D | Linear Drive 80:1 |
| 2 | 1 | BUG-6050 | Hand Held Terminal |
| 3 | 1 | CWO-3360 | SE-2PTD Center Tube Assy. |
| 4 | 1 | CWO-3540 | Motor Mount Assy. |
| 5 | 1 | CWO-3885 | SE-2PTD Cabinet Assy. |
| 6 | 1 | CWO-4450 | SE-2PTD Pipe Support |
| 7 | 4 | CWO-4946 | Lifting Eye |
| 8 | 2 | CWO-5460 | SE-2PTD Slide Ring Assy. |
| 9 | 1 | CWO-5730 | SE-2PTD 10" Gear Assy. |
| 10 | 1 | CWO-5924 | Chuck 10" 3-Jaw |
| 11 | 8 | FAS-0399 | Hex Hd Cap Scr 3/8-16 x 1" |
| 12 | 1 | SEO-4106 | Cable Support |
| 13 | 1 | SEO-4145 | V-Guide w/Torch Mount |
| 14 | 1 | SEO-5140-2F | Control Panel Dual Function |
| 15 | 1 | SEO-4165 | Terminal Holster Assy. |
| 16 | 8 | WAS-0260 | 3/8" Washer |
| 17 | 1 | SEO-4113 | Wiring Harness |
| 18 | 4 | FAS-0114 | Pan Hd Scr 6-32 x 3/8" |

# SE-2PTD PROGRAMMABLE PASS THROUGH: WIRING DIAGRAM
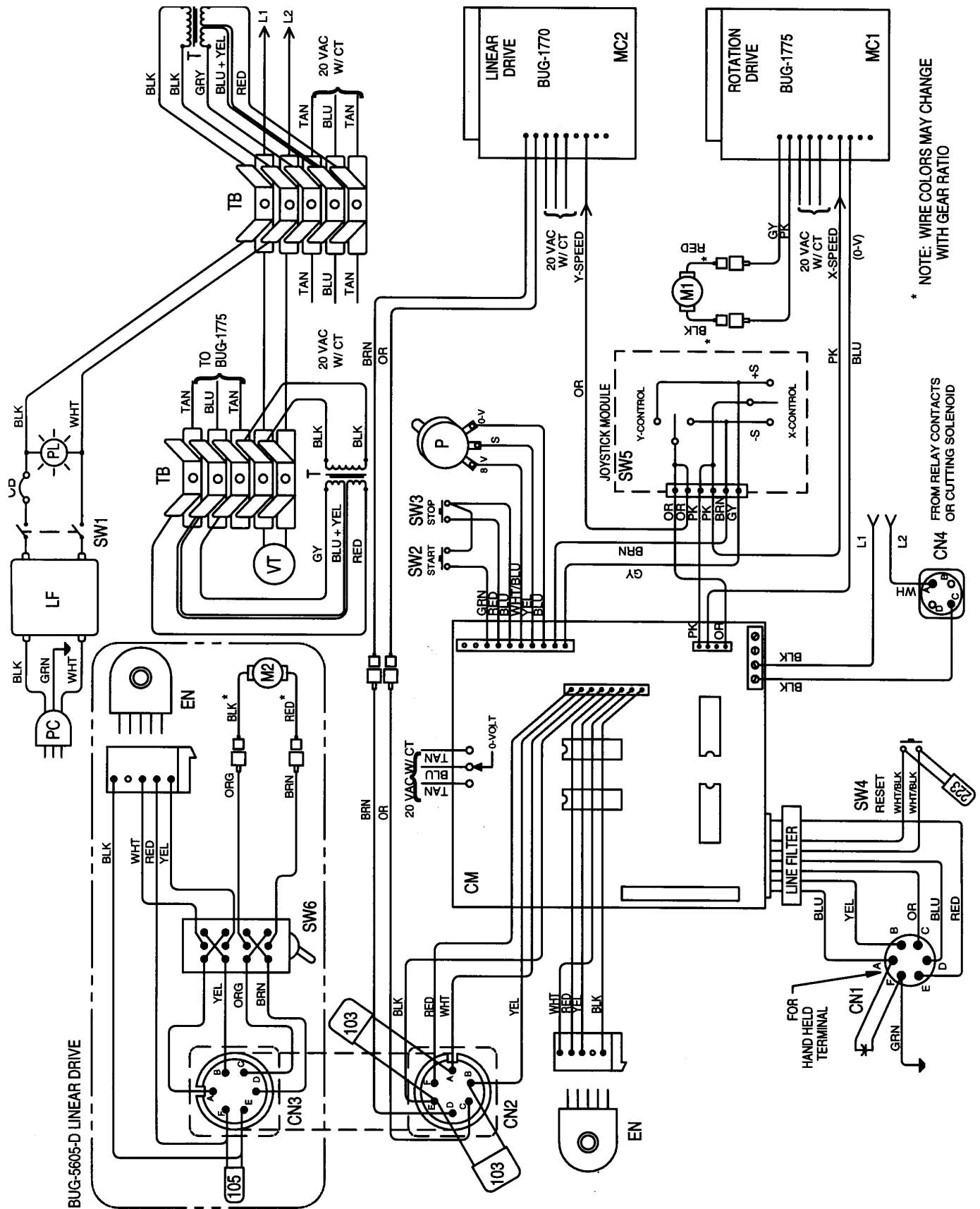
# SE-2PTD PROGRAMMABLE PASS THROUGH: COMPONENT CHART

| ELECTRICAL COMPONENT CHART | | | |
|---|---|---|---|
| ITEM | DESCRIPTION | SEO-4250<br>120 VAC | SEO-4252<br>240 VAC |
| PC | Power Cord | BUG-9445 | GOF-3115 |
| CB | Circuit Breaker | BUG-2931 | BUG-2923 |
| PL | Pilot Light | BUG-1415 | BUG-1428 |
| VT | Volt Trap | BUG-1393 | BUG-1563 |
| ITEM | Transformer | BUG-5218 | BUG-5231 |
| P | Potentiometer | BUG-9686 | Same |
| SW1 | Toggle Switch (Power) | ARM-2279 | Same |
| SW2 | PB Switch (Start) | BUG-1536 | Same |
| SW3 | PB Switch (Stop) | BUG-1536 | Same |
| SW4 | PB Switch (Reset) | BUG-1536 | Same |
| SW5 | Joystick Switch | PRS-1065 | Same |
| SW6 | Toggle Switch (Mirror) | SWT-3601 | Same |
| TB | Terminal Block | BUG-6028 | Same |
| LF | Line Filter | BUG-6069 | Same |
| CM | Control Module | SEO-6030-2F | Same |
| MC1 | Motor Control Board | BUG-1775 | Same |
| MC2 | Motor Control Board | BUG-1770 | Same |
| EN | Encoder | BUG-6039 | Same |
| CN1 | Connector (Pendant) | BUG-9902 | Same |
| CN2 | Connector (Rotating Drive) | BUG-9902 | Same |
| CN3 | Connector (Linear Drive) | BUG-9909 | Same |
| CN4 | Connector (Auxiliary) | MUG-1156 | Same |
| M1 | Gear Motor (80:1) | BUG-5213 | Same |
| M2 | Gear Motor (80:1) | BUG-1590 | Same |

# CWO-3540 MOTOR MOUNT ASSEMBLY: EXPLODED VIEW / PARTS LIST

SAME AS EXPLODED
ABOVE

5, 11
MOTOR MOUNTING
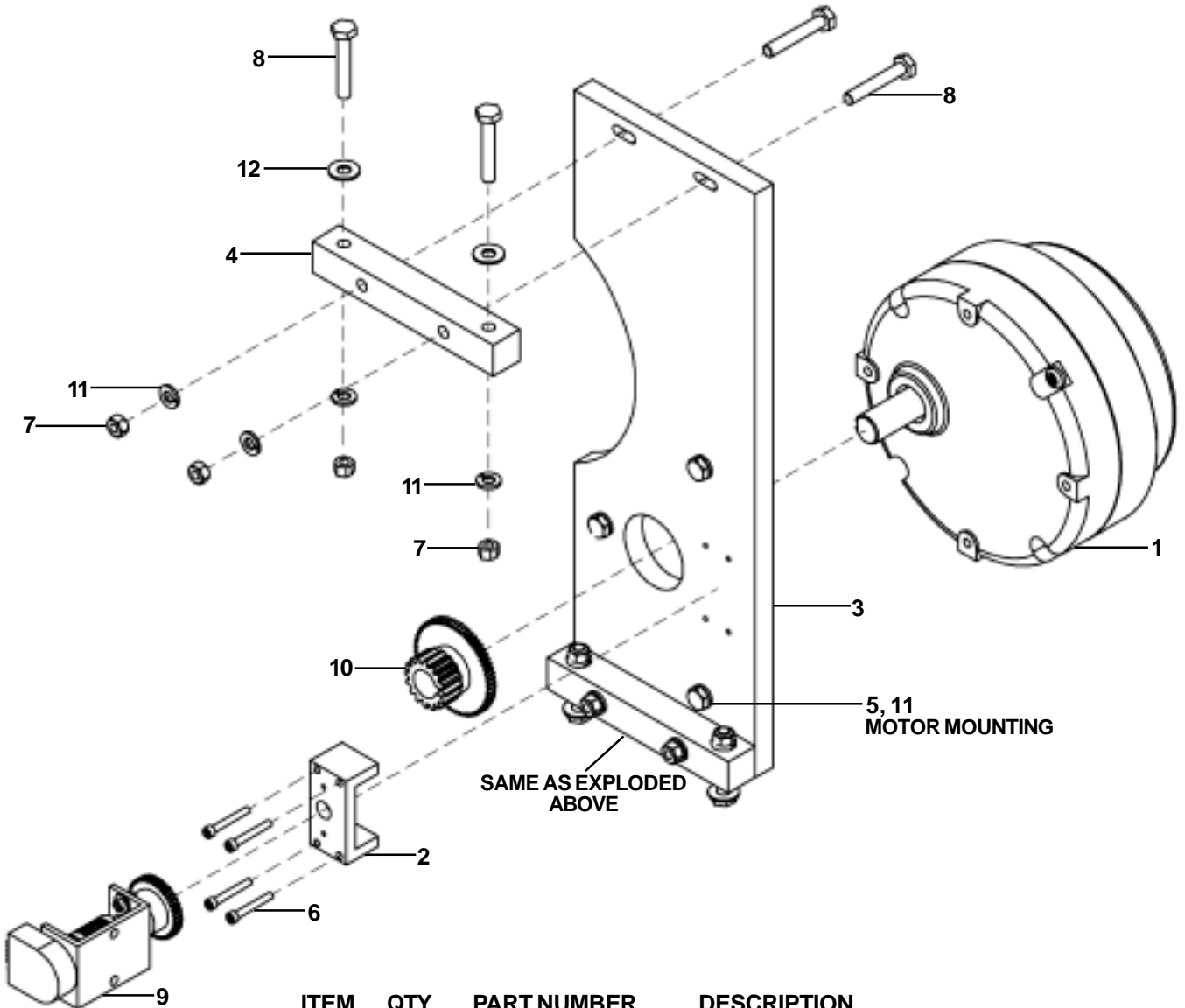
| ITEM | QTY | PART NUMBER | DESCRIPTION |
|------|-----|-------------|-------------|
| 1 | 1 | BUG-5213 | Gear Motor 80:1 |
| 2 | 1 | CWO-4916 | Encoder Mount Bracket |
| 3 | 1 | CWO-5447 | Motor Mount Plate |
| 4 | 2 | CWO-5448 | Motor Support Bar |
| 5 | 3 | FAS-0357 | Hex Hd Cap Scr 1/4-20 x 3/4" |
| 6 | 4 | FAS-0519 | Soc Hd Cap Scr 6-32 x 1" |
| 7 | 8 | FAS-1351 | Hex Nut 1/4-20 |
| 8 | 8 | FAS-2353 | Hex Hd Cap Scr 1/4-20 x 1-1/2" |
| 9 | 1 | SEO-4125 | Encoder Assy. |
| 10 | 1 | CWO-3353 | Encoder Gear Assy. |
| 11 | 11 | WAS-0243 | 1/4" Split Lock Washer |
| 12 | 4 | WAS-0240 | 1/4" SAE Washer |

# CWO-3885 SE-2PTD CABINET ASSEMBLY: EXPLODED VIEW / PARTS LIST
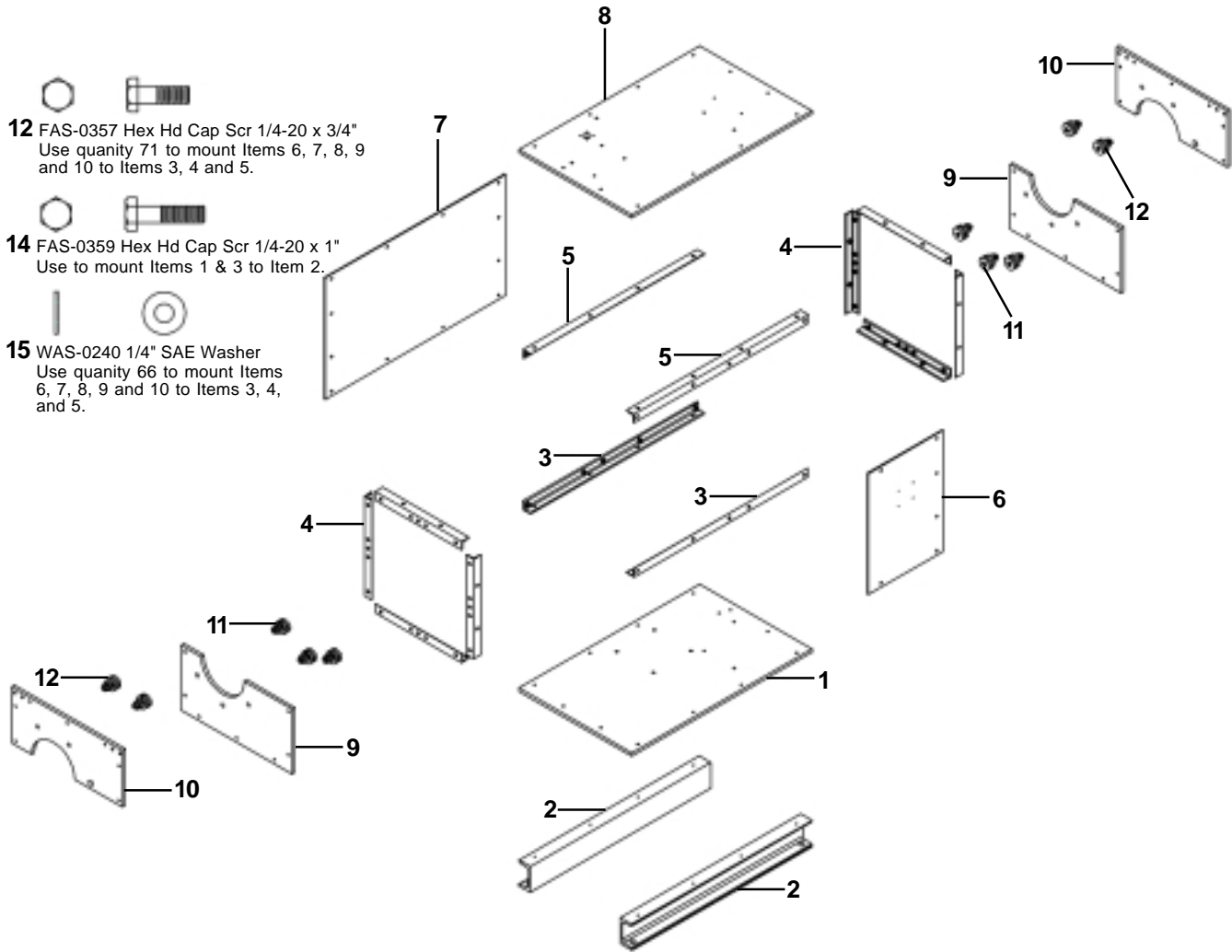
**12** FAS-0357 Hex Hd Cap Scr 1/4-20 x 3/4"
Use quanity 71 to mount Items 6, 7, 8, 9 and 10 to Items 3, 4 and 5.

**14** FAS-0359 Hex Hd Cap Scr 1/4-20 x 1"
Use to mount Items 1 & 3 to Item 2.

**15** WAS-0240 1/4" SAE Washer
Use quanity 66 to mount Items 6, 7, 8, 9 and 10 to Items 3, 4, and 5.

| ITEM | QTY | PART NUMBER | DESCRIPTION |
|------|-----|-------------|-------------|
| 1 | 1 | CWO-5221 | Bottom Plate |
| 2 | 2 | CWO-5222 | Channel Support Leg |
| 3 | 2 | CWO-5223 | L & R Sides To Base Corner Mount Angle |
| 4 | 8 | CWO-5224 | F & B Plates Corner Mount Angle |
| 5 | 2 | CWO-5225 | L & R Sides To Top Corner Mount Angle |
| 6 | 1 | CWO-5228 | Right Side Plate |
| 7 | 1 | CWO-5229 | Left Side Plate |
| 8 | 1 | CWO-5231 | Top Plate |
| 9 | 2 | CWO-5455 | SE-2PTD Bottom End Plate |
| 10 | 2 | CWO-5456 | SE-2PTD Top End Plate |
| 11 | 6 | CWO-5491 | Concentric Bearing |
| 12 | 4 | CWO-5492 | Eccentric Bearing |
| 13 | 71 | FAS-0357 | Hex Hd Cap Scr 1/4-20 x 3/4" |
| 14 | 8 | FAS-0359 | Hex Hd Cap Scr 1/4-20 x 1" |
| 15 | 66 | WAS-0240 | 1/4" SAE Washer |

# CWO-4450 PIPE SUPPORT ASSEMBLY: EXPLODED VIEW / PARTS LIST
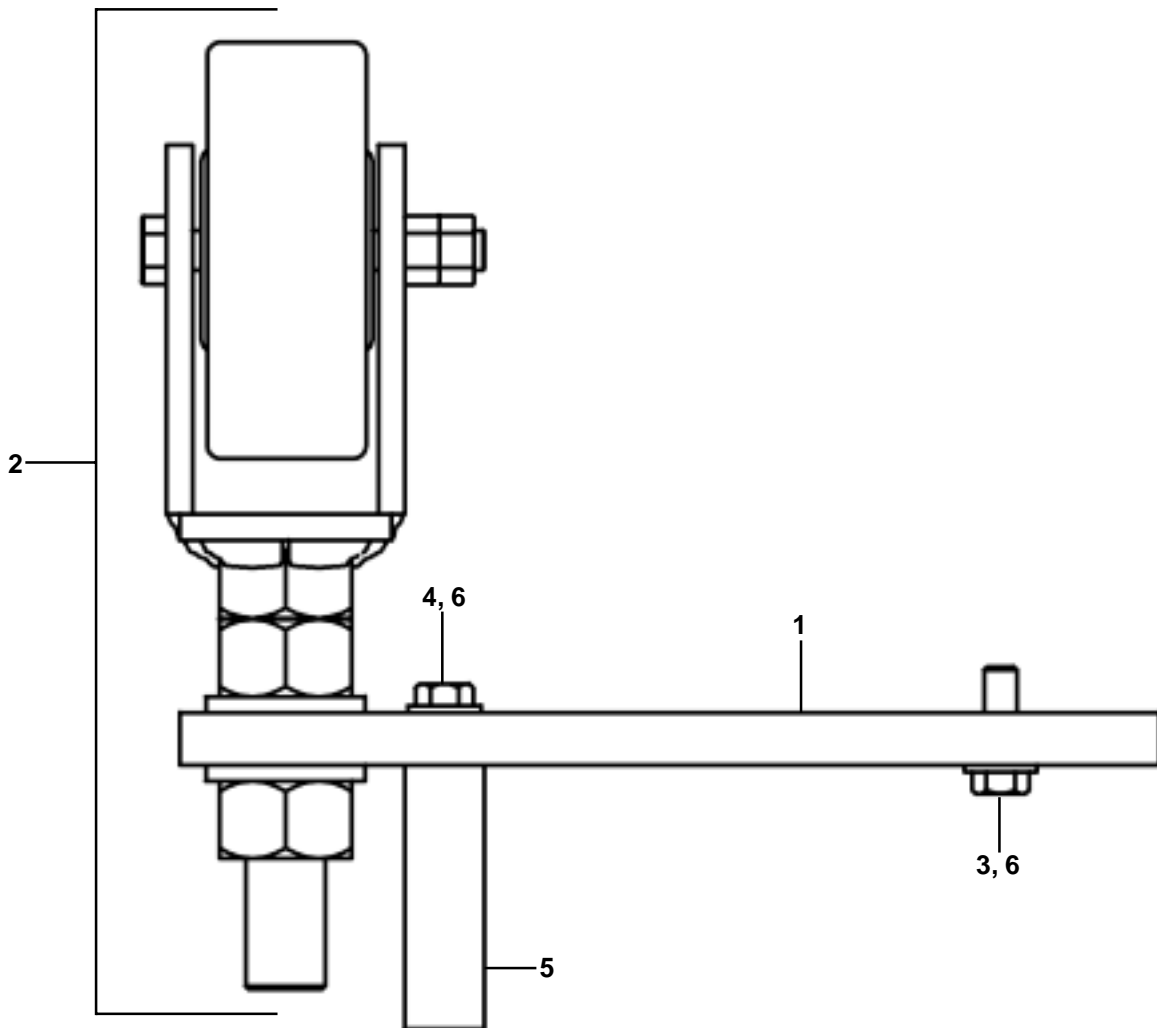
| ITEM | QTY | PART NUMBER | DESCRIPTION |
|------|-----|-------------|-------------|
| 1 | 1 | CWO-4451 | Pipe Support Mt. Plt. |
| 2 | 1 | CWO-4455 | Support Bracket Assy. |
| 3 | 2 | FAS-0379 | Hex Hd Cap Scr 5/16-18 x 1" |
| 4 | 2 | FAS-0389 | Hex Hd Cap Scr 5/16-24 x 1" |
| 5 | 1 | SEO-4453 | Support Foot |
| 6 | 4 | WAS-0250 | 5/16" SAE Washer |

# CWO-5460 SLIDE RING ASSEMBLY: EXPLODED VIEW / PARTS LIST
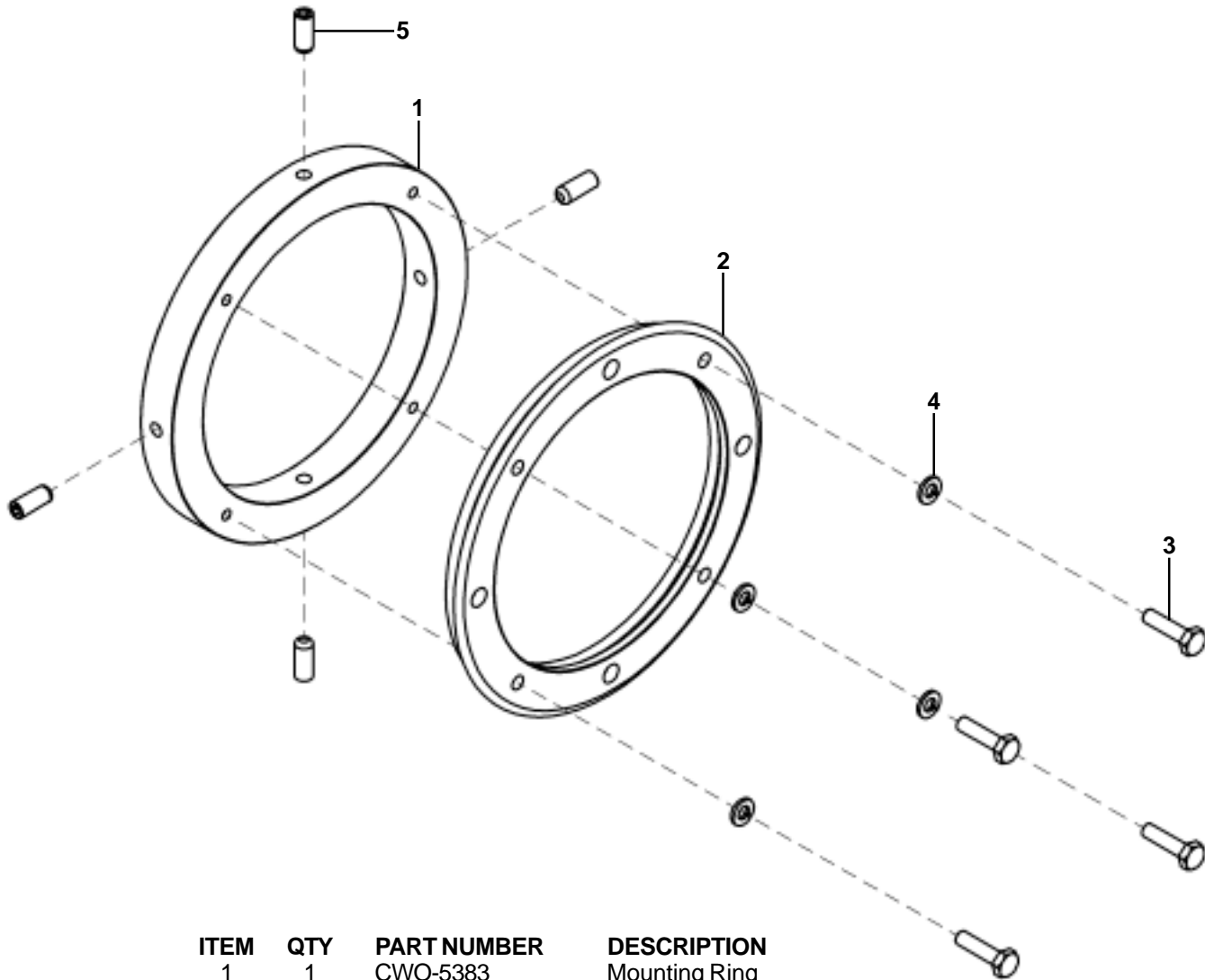


| ITEM | QTY | PART NUMBER | DESCRIPTION |
|------|-----|-------------|-------------|
| 1 | 1 | CWO-5383 | Mounting Ring |
| 2 | 1 | CWO-5457 | Machined Slide Ring |
| 3 | 4 | FAS-0359 | Hex Hd Cap Scr 1/4-20 x 1" |
| 4 | 4 | WAS-0243 | 1/4 Split Lock Washer |
| 5 | 4 | FAS-0477 | Soc Hd Set Scr 5/16-18 x 3/4" |

# CWO-5730 10" GEAR ASSEMBLY: EXPLODED VIEW / PARTS LIST
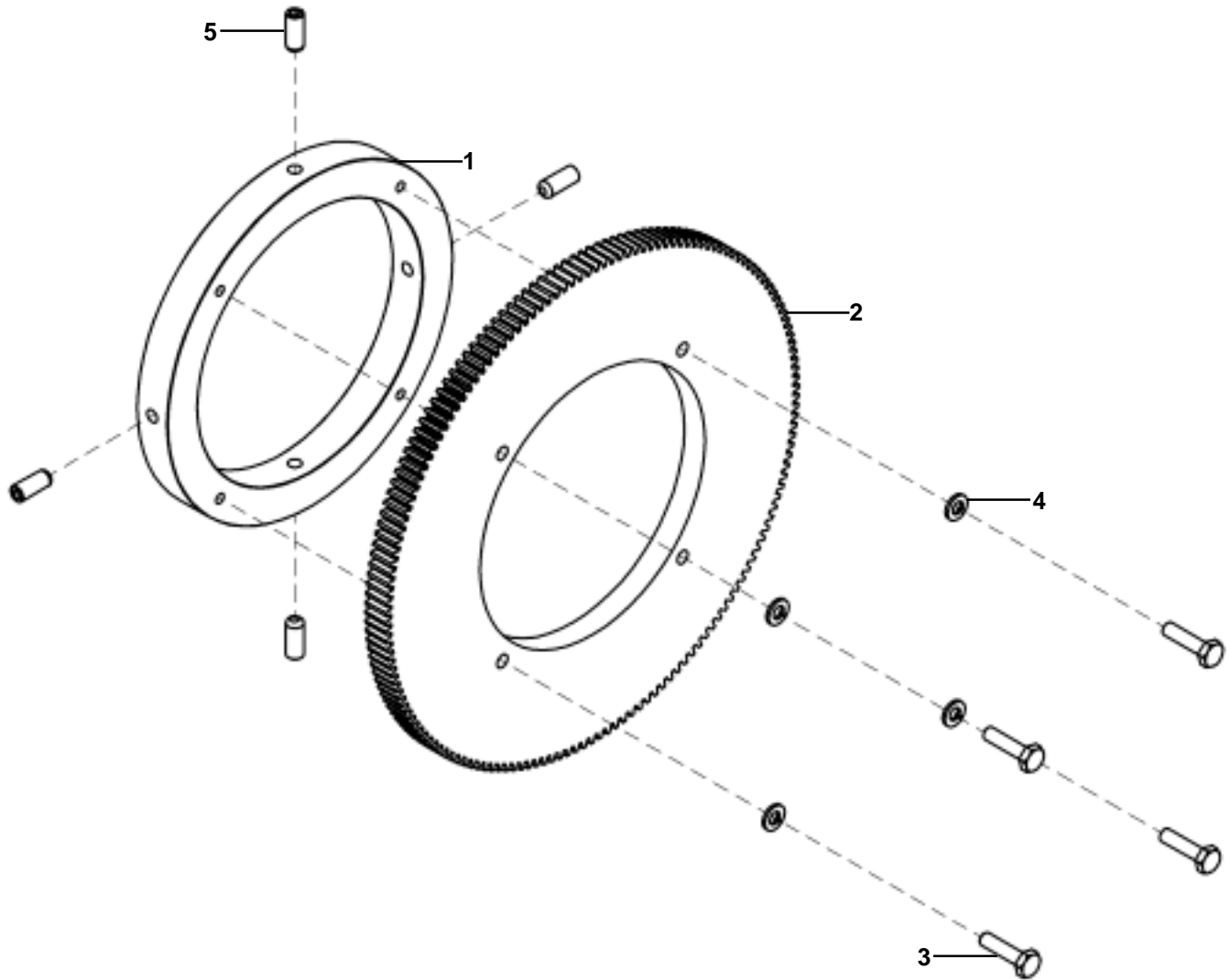
| ITEM | QTY | PART NUMBER | DESCRIPTION |
|------|-----|-------------|-------------|
| 1 | 1 | CWO-5383 | Mounting Ring |
| 2 | 1 | CWO-5729 | SE-2PTD 10" Gear |
| 3 | 4 | FAS-0359 | Hex Hd Cap Scr 1/4-20 x 1" |
| 4 | 4 | WAS-0243 | 1/4 Split Lock Washer |
| 5 | 4 | FAS-0477 | Set Scr 5/16-18 x 3/4" |

# SEO-4145 V-GUIDE w/TORCH MOUNT: EXPLODED VIEW / PARTS LIST
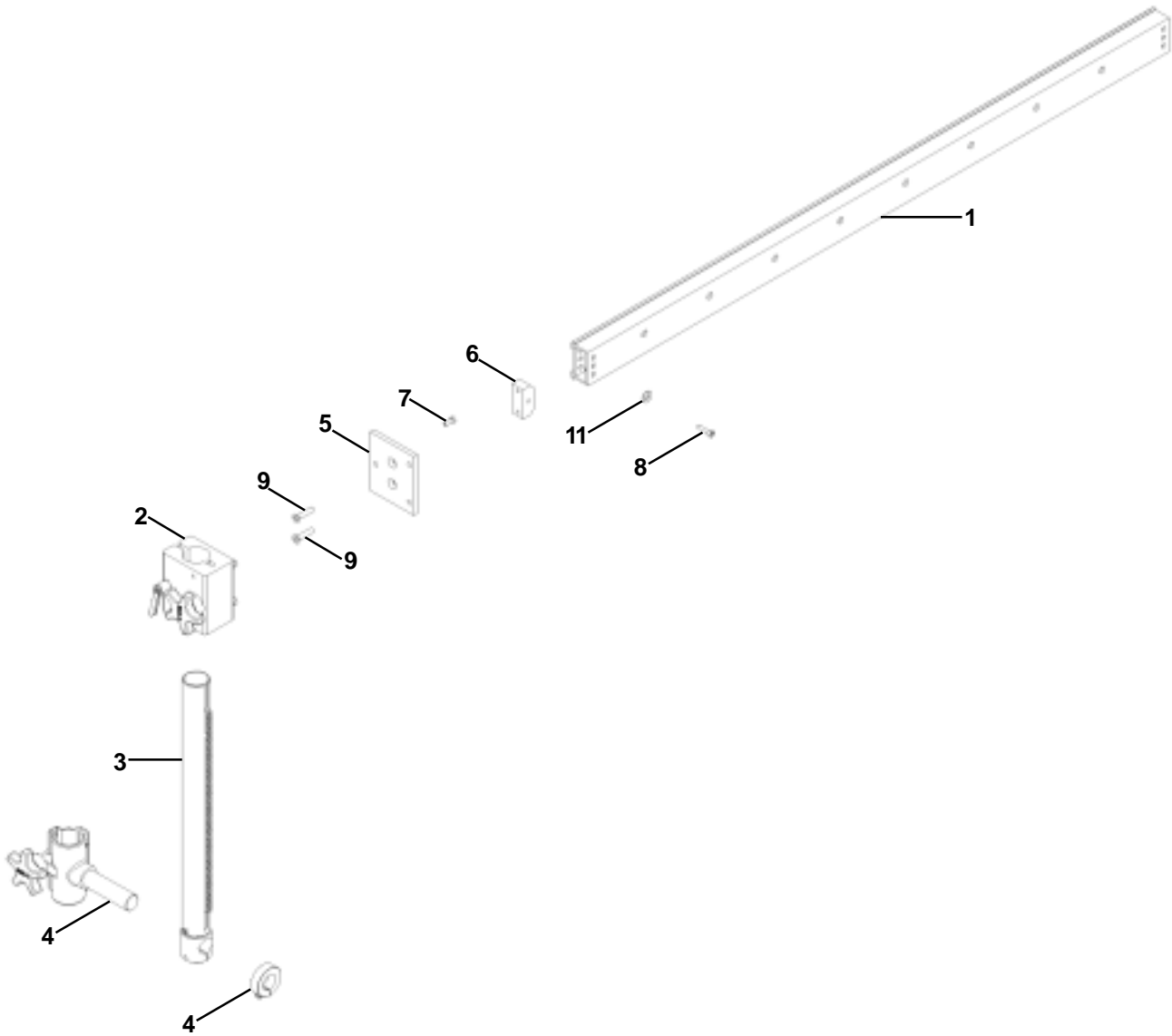
| ITEM | QTY | PART NUMBER | DESCRIPTION |
|------|-----|-------------|-------------|
| 1 | 1 | ABR-1050 | V-Guide Ways 40" |
| 2 | 1 | BGV-1165 | Clamp Block |
| 3 | 1 | BUG-5166-15 | H.D. Rack Assy. |
| 4 | 1 | BUG-5188 | Torch Holder Assy. |
| 5 | 1 | BUG-5546 | Plate |
| 6 | 1 | BUG-5547 | Block |
| 7 | 1 | FAS-0555 | Soc Hd Cap Scr 1/4-20 x 1/2" |
| 8 | 1 | FAS-0557 | Soc Hd Cap Scr 1/4-20 x 3/4" |
| 9 | 2 | FAS-0959 | Flt Hd Soc Scr 1/4-20 x 1" |
| 10 | 1 | MUG-1515 | Collar |
| 11 | 1 | WAS-0240 | 1/4" SAE Washer |

# BUG-5605-D LINEAR DRIVE: EXPLODED VIEW / PARTS LIST
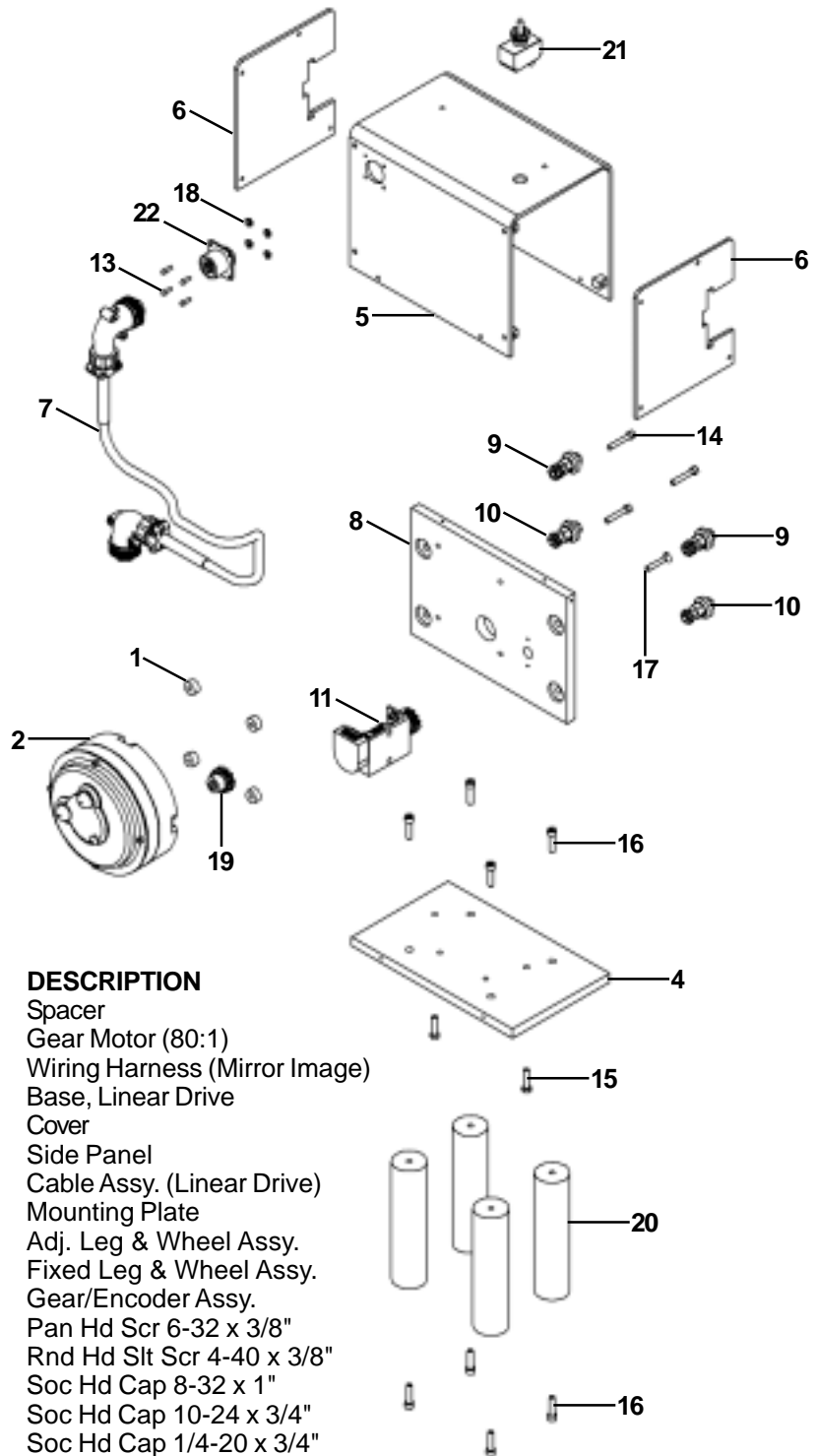


| ITEM | QTY | PART NUMBER | DESCRIPTION |
|------|-----|-------------|-------------|
| 1 | 4 | BUG-1528 | Spacer |
| 2 | 1 | BUG-1590 | Gear Motor (80:1) |
| 3 | 1 | SEO-6050 | Wiring Harness (Mirror Image) |
| 4 | 1 | BUG-5611 | Base, Linear Drive |
| 5 | 1 | BUG-5612 | Cover |
| 6 | 2 | BUG-5613 | Side Panel |
| 7 | 1 | BUG-5617 | Cable Assy. (Linear Drive) |
| 8 | 1 | BUG-5618 | Mounting Plate |
| 9 | 2 | BUG-5670 | Adj. Leg & Wheel Assy. |
| 10 | 2 | BUG-5675 | Fixed Leg & Wheel Assy. |
| 11 | 1 | BUG-6040 | Gear/Encoder Assy. |
| 12 | 14 | FAS-0114 | Pan Hd Scr 6-32 x 3/8" |
| 13 | 4 | FAS-0204 | Rnd Hd Slt Scr 4-40 x 3/8" |
| 14 | 3 | FAS-0529 | Soc Hd Cap 8-32 x 1" |
| 15 | 2 | FAS-0537 | Soc Hd Cap 10-24 x 3/4" |
| 16 | 8 | FAS-0557 | Soc Hd Cap 1/4-20 x 3/4" |
| 17 | 1 | FAS-0829 | Flt Hd Slt Scr 8-32 x 1" |
| 18 | 4 | FAS-1305 | Hex Nut 4-40 |
| 19 | 1 | GOF-3014 | Drive Pinion |
| 20 | 4 | SEO-4444 | Stand Off 1-1/4" dia. x 5" Lg. |
| *21 | 1 | SWT-3601 | Toggle Switch |
| *22 | 1 | BUG-9909 | Panel Connector |

* Included with Item 3

# BUG-6050 HAND HELD PENDANT: WIRING DIAGRAM

BUG-6050-P
HAND HELD PENDANT

BUG-9906
CABLE CONNECTOR,
6-T, MALE

BLK
(SHIELD)

RED
BRN

ORG
YEL

(FRONT VIEW)
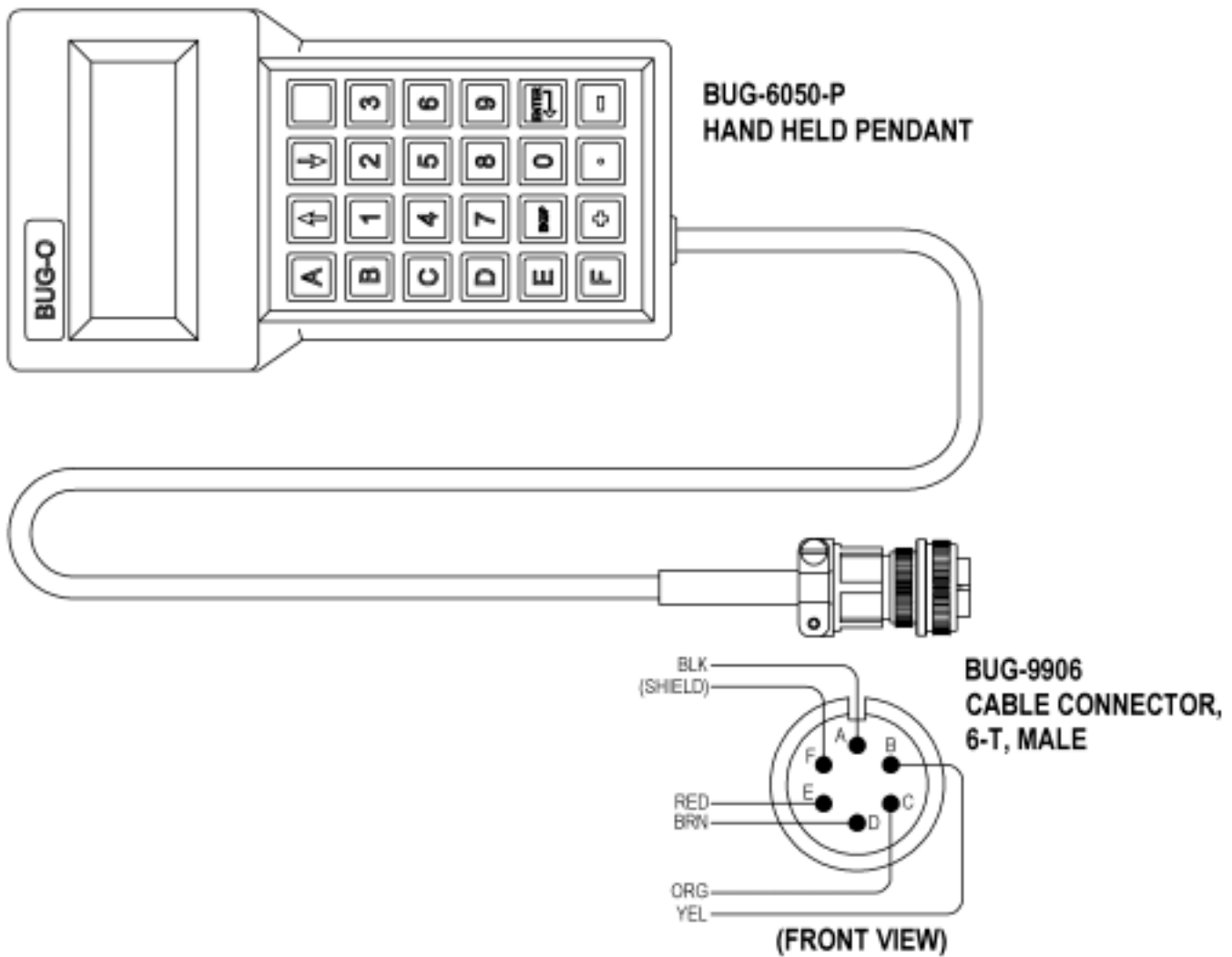
| PIN | COLOR | DESCRIPTION |
|-----|-------|-------------|
| A | Black | Circuit Com |
| B | Yellow | TX (Transmit) |
| C | Orange | RX (Receive) 960 Baud |
| D | Brown | Signal |
| E | Red | Power (5 V) |
| F | Bare | Shielded Drain Wire, Touching Foil Shileding |

# SEO-4113 ENCODER WIRING HARNESS: WIRING DIAGRAM / PARTS LIST
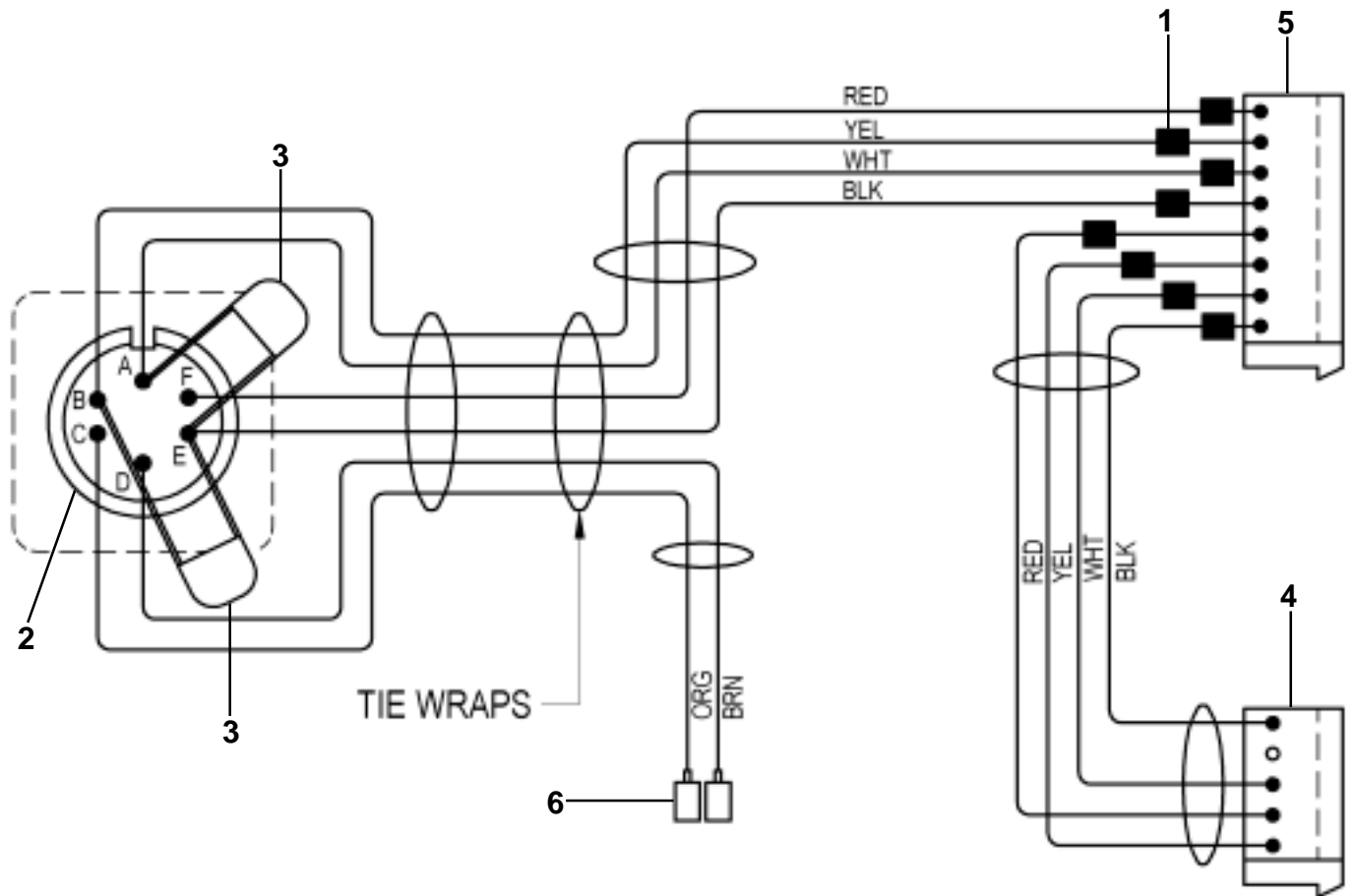


| ITEM | QTY | PART NUMBER | DESCRIPTION |
|------|-----|-------------|-------------|
| 1 | 8 | BUG-6106 | Ferrite Bead |
| 2 | 1 | BUG-9902 | Panel Connector, 6-T, Female |
| 3 | 2 | CAP-0103 | Capacitor, .01 Film |
| 4 | 1 | CNN-0125 | 5-Pin Housing Assy. |
| 5 | 1 | CNN-0128 | 8-Pin Housing Assy. |
| 6 | 2 | GOF-3037 | Male Connector |

# SEO-6050 WIRING HARNESS: WIRING DIAGRAM / PARTS LIST
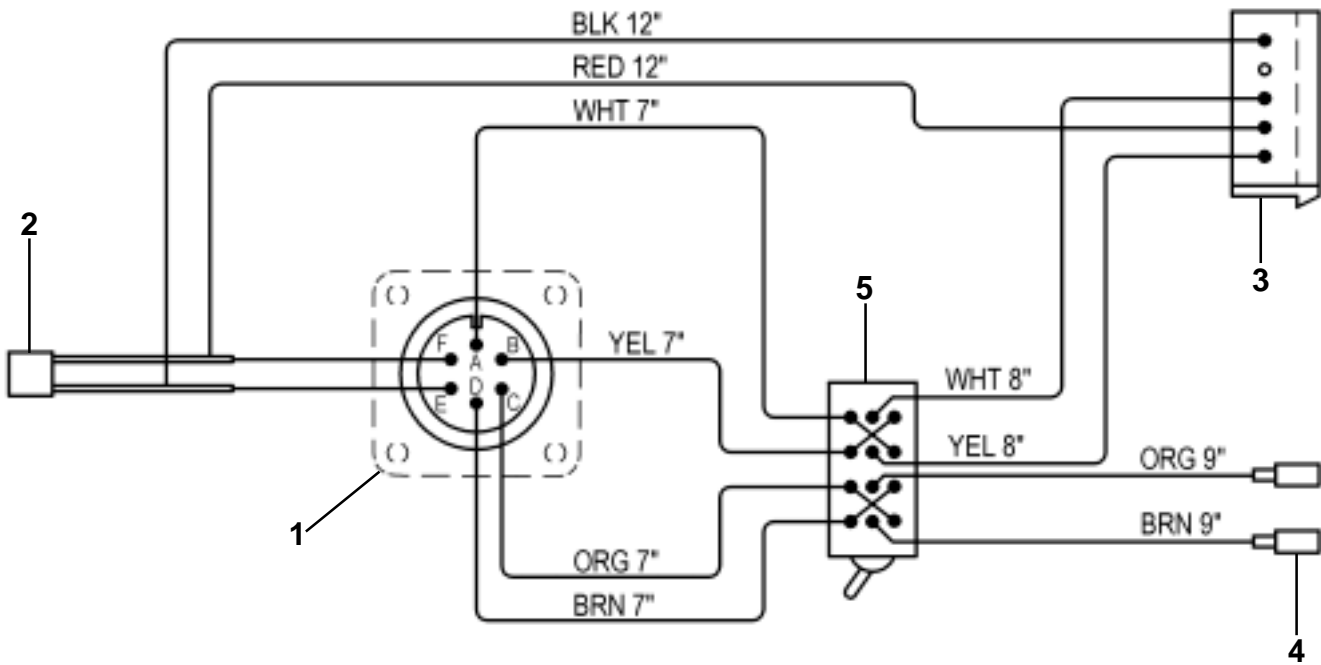


| ITEM | QTY | PART NUMBER | DESCRIPTION |
|------|-----|-------------|-------------|
| 1 | 1 | BUG-9909 | Panel Connector 6-T, Male |
| 2 | 1 | CAP-1105 | Capicitor, 1.0 Ceramic |
| 3 | 1 | CNN-0125 | 5-Pin Housing Assy. |
| 4 | 2 | GOF-3037 | Male Connector |
| 5 | 1 | SWT-3601 | Toggle Switch 4PDT |

# SEO-4119 INTERCONNECTING WIRING HARNESS
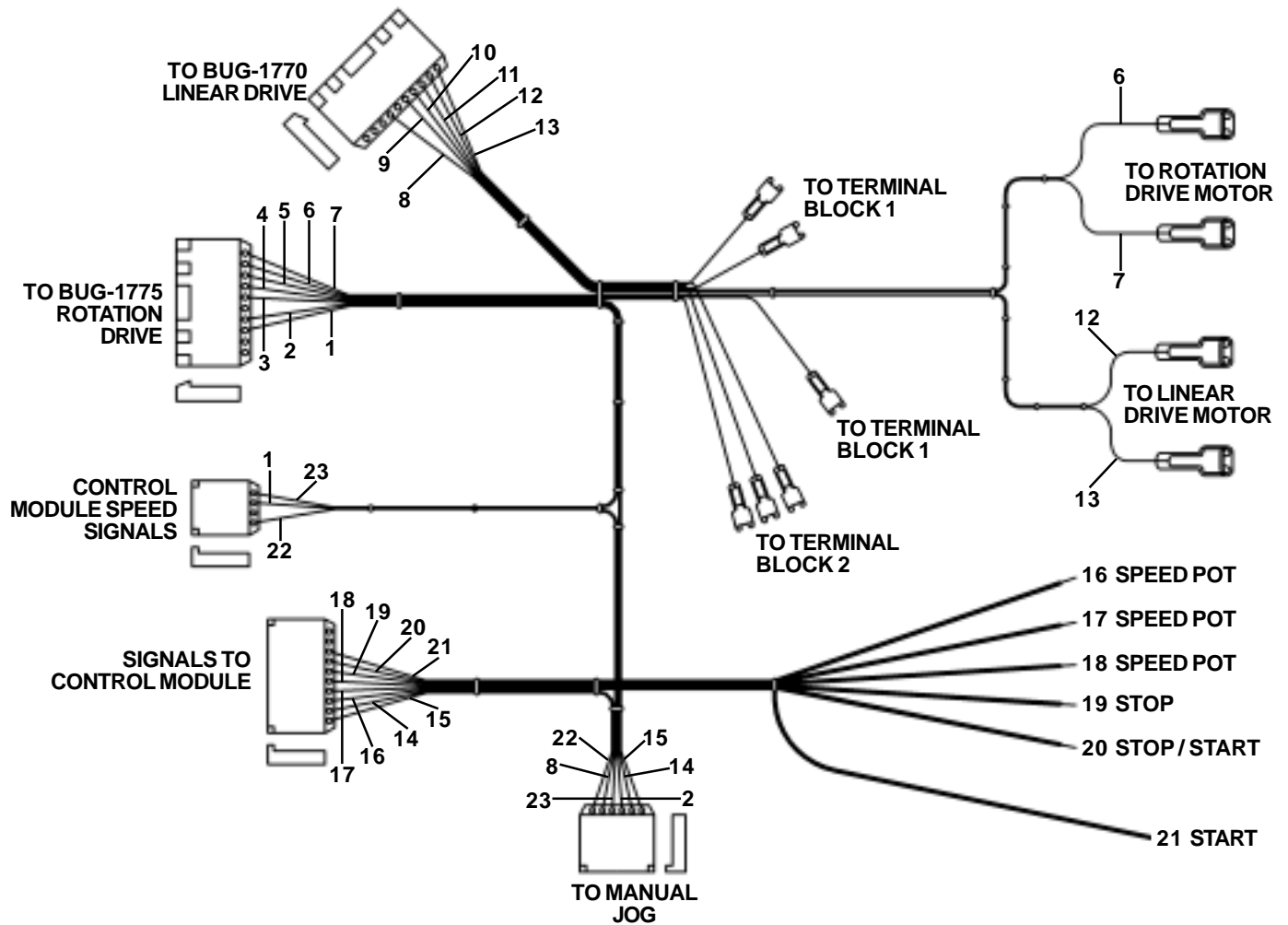


| WIRE | COLOR | WIRE | COLOR |
|------|-------|------|------------|
| 1 | BLUE | 13 | BROWN |
| 2 | PINK | 14 | BROWN |
| 3 | TAN | 15 | GRAY |
| 4 | BLUE | 16 | BLUE |
| 5 | TAN | 17 | YELLOW |
| 6 | PINK | 18 | WHITE/BLUE |
| 7 | GRAY | 19 | BLUE |
| 8 | ORANGE | 20 | RED |
| 9 | TAN | 21 | GREEN |
| 10 | BLUE | 22 | ORANGE |
| 11 | TAN | 23 | PINK |
| 12 | ORANGE | | |

# ACCESSORIES:
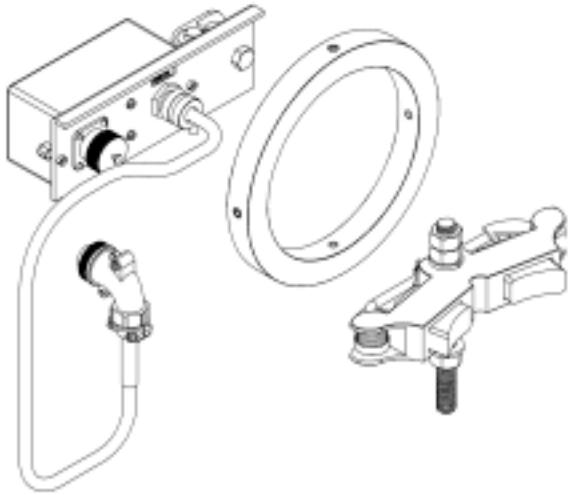
## PLASMA KIT:

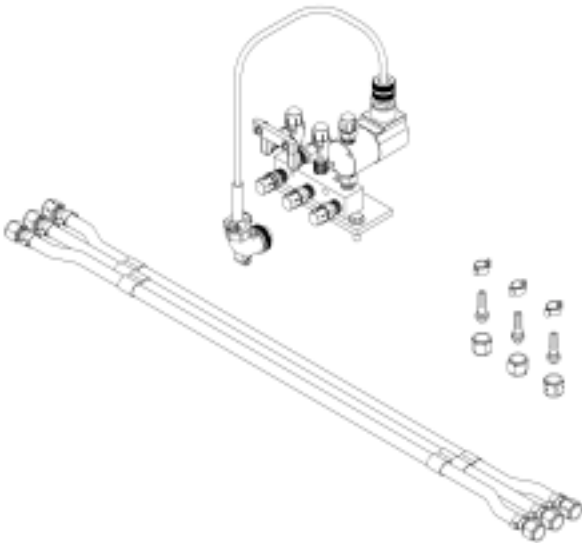The Plasma Kit enables you to convert the machine to use a plasma cutting process. The kit includes a grounding brush and support, rotary grounding ring and a voltage specific contact relay.

SEO-4560    Plasma Kit 120 VAC
SEO-4562    Plasma Kit 240 VAC

## OXY-FUEL KIT:

The Oxy-Fuel Kit enables you to convert the machine to use an oxy-fuel cutting process. The kit includes (2) oxygen hose nuts, (1) fuel gas hose nut, (3) 1/4" hose nipples, (3) hose clamps, 3-hose assembly 5', manifold mounting plate & hardware as well as voltage specific quick acting manifold with solenoid.

SEO-4480    Oxy-Fuel Kit 120 VAC
SEO-4482    Oxy-Fuel Kit 240 VAC
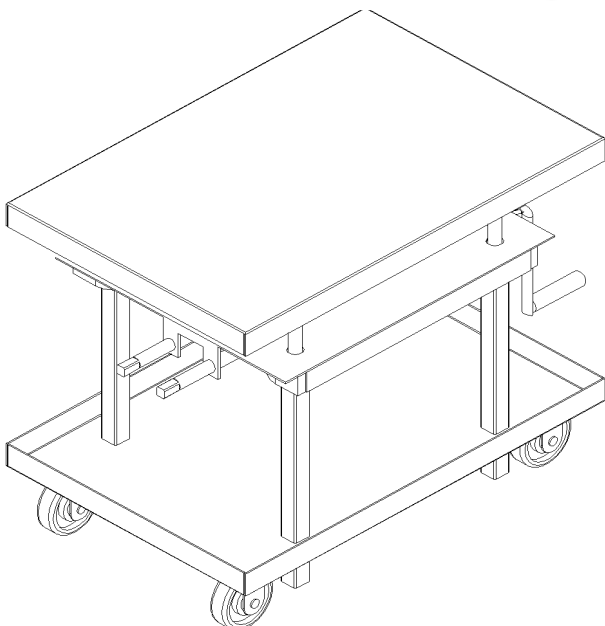
## MECHANICAL ELEVATING TABLE:

The Mechanical Elevating Table provides an adjustable mobile surface for the machine to be mounted to. The Mechanical Elevating Table is equipped with (2) fixed and (2) swivel 5" diameter base-wheels and can be raised from a lowered height of 24" to a raised height of 42". A floor lock is provided for holding the table securely in position when in use.

SEO-5486    Mechanical Elevating Table.

# OPERATION CHECKLIST AND TROUBLESHOOTING:

1. Plug in the machine to the required voltage source and turn "ON / OFF" switch to the "ON" position. Operate the "MANUAL JOG" switch in all four directions. This overrides any speed command from the computer control. If the drive runs in the corresponding direction, and the speed can be varied with the "SPEED CONTROL" this indicates:
   - The speed control board is operating properly.
   - The controller circuit is supplying the required voltages.

   If only one motor does not run correctly and the other one does, then it is likely that the motors speed control is faulty.

   If both do not operate properly, then there may be a component on the control module that prevents proper voltages from being supplied to the "MANUAL JOG" switch.

   A bad connection in the speed signal line to the speed board may also run the motor in one direction at full speed.

   Manual controls must function properly before checking the computer controls.

2. Attach the Handheld Pendant and push the "RESET" button on the control panel. The display should read "Reset OK". Push the "D" Key on the Pendant keypad and push "Return" until the display shows the Cut No. and the data for that programmed cut. If the Pendant display functions, this indicates:
   - The communication line is functioning.
   - The computer is operating its program.

   If the message "Reset OK" comes up but Pushing "D" on the pendant keypad or any other key has no effect, there could be a false signal coming in from the
   "STOP / PAUSE" button, due to a wire short or damage switch.

3. Disconnect the Handheld Pendant and turn the "ON / OFF" switch to the "OFF" position.

   Toggle the "MANUAL JOG" switch in all four directions after pushing the "RESET" button. When the "MANUAL JOG" switch is let go, the machine should go back to its original position.

   This confirms that the computer control is running its program, and also interfacing correctly with the encoders and the speed signal outputs to the speed boards.

   If one motor return home and not the other, then the computer may not be receiving the encoder signals properly from that axis encoder pick up gear or coupling may be loose or the pins in the encoder plug may not be making a good connection.

   If the motor return home from one direction but not from the other, the speed control may be faulty and drive only in one direction.

# PROGRAMMED DIAGNOSTICS FOR SE-2PTD

Some simple diagnostic tests are available in the program, by using the Hand Held Terminal. These require using the "Shift" key on the keypad: refer to the keypad character map for shifted characters, to use these commands.

If the machine is a DUAL FUNCTION SE2/4-PD or SE2/4-PTD, change function to the PIPE PROGRAM to perform the following tests.

Press "**T**" for Test
> The display should show "D-E-F?"

Next press   **D** to check **D**rives
> **E** for **E**ncoders
> **F** to **F**inish; get back to main menu

After selecting either D or E, for Drive or Encoder, the display will show "Axis No."

Press **1** for Axis 1: rotation, or **2** for Axis 2: longitudinal motion.

If **D**rive was selected, the corresponding axis selected should run
> 1 second forward     ( display will show 'F')
> 1 second back     ( display will show 'B')

The drive should move at the speed set by the speed pot, regardless of whether encoder pulses are being counted.

If **E**ncoder was selected, the encoder count of the corresponding encoder (1 or 2) should scroll up continuously in the display. Press any key to stop.
> Rotating the encoder in either direction will increase or decrease the displayed count, if the computer is successfully counting the pulses from it. The encoder can be rotated manually if disengaged, or by using the joystick to move in the desired direction.
>
> Note: the count is in hexadecimal notation (number base 16),
> (10 H=16 decimal, 400 H = 1024 decimal).
>
> 1 rotation of the encoder corresponds to 400 (HEX) counts

Program Version:
Press "**V**" to determine the Version. No.; e.g. SE041, which will show on the display.

# WARRANTY

| Limited Warranty |
| :---: |

Model _____
Serial No. _____
Date Purchased: _____

For a period of twelve (12) months from delivery, Cypress Welding warrants to the original purchaser (does not include authorized distributors), that a new machine is free from defects in material and workmanship and agrees to repair or replace, at its option, any defective parts or machine. This warranty does not apply to machines, which after our inspection, are determined to have been damaged due to neglect, abuse, overloading, accident or improper usage. All shipping and handling charges will be paid by customer.

Cypress Welding makes no warranty of merchantability and makes no other warranty, expressed or implied, beyond the warranty expressly set forth above. Buyer's remedy for breach of warranty, hereunder, shall be limited to repair or replacement of non-conforming parts and machines. Under no circumstances shall consequential damages be recoverable.

*HOW TO OBTAIN SERVICE:*
*If you think this machine is not operating properly, re-read the instruction manual carefully, then call your Authorized Cypress dealer/distributor. If he 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:**