



Item #55132

4' X 4' CNC PLASMA TABLE WITH CNC CUT 60 PLASMA CUTTER INSTRUCTIONS



The **EASTWOOD ELITE 4' X 4' CNC PLASMA TABLE** is a ready-to-run, commercial grade piece of metal working equipment, suitable for home or commercial shop use. The integral CNC Cut Controller and Torch Height Controller allow the machine to operate fully independent of a PC. Additionally, any CAD file post processed in Autodesk® Fusion 360® can be loaded via USB Drive. High precision ± 0.1mm accuracy of movement from the X & Y-axis stepper motors, combined with automatic torch height control, make for accurate cuts. True 4' x 4' cut area means you can cut out any project up to 48" in overall frame size. The included **Eastwood Elite CNC Cut 60 Plasma Cutter** has the capability to make clean, long duration cuts in to up 3/8" steel. Filling the integral waterbed prevents heat soak, warping, and reduces spark & fume hazards.

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SPECIFICATIONS

Table Power Requirements:	110-120VAC, 50/60Hz, 1 Phase, 6.8 Amp
CNC Plasma Cutter Power Requirements:	208-240VAC, 50/60Hz, 1 Phase, 45 Amp
Plate Capacity:	48" x 48" x 0.375" thick
Weight Capacity:	750 lbs. [340kg.]
Waterbed Fluid Capacity:	60 gal [228L]
CNC Torch Travel:	
X-Axis & Y-Axis :	49.2" [1250mm]
Z-Axis :	2.5" [63mm]
Waterbed Dimensions:	
X-axis:	59.05" [1500mm]
Y-axis :	63.00" [1600mm]
Z-axis :	3.75" [95mm]
Overall Assembled Dimensions:	(W x D x H) 77.50" [1970mm] x 84.25" [2140mm] x 46.50" [1180mm]
Overall Assembled Unit Weight:	974 lbs. [442kg.]
Movement Accuracy:	± 0.1mm
Cutting Accuracy:	± 0.5mm

INCLUDES

Verify crate contents. Contact Eastwood if any parts are missing or damaged.

FIG A Components:

CNC Plasma Table Main Assembly [A]

Table Legs [B]

Height Adjustment Feet [C]

Plasma Cutter Shelf Bottom [D]

Plasma Cutter Shelf Sides [E]

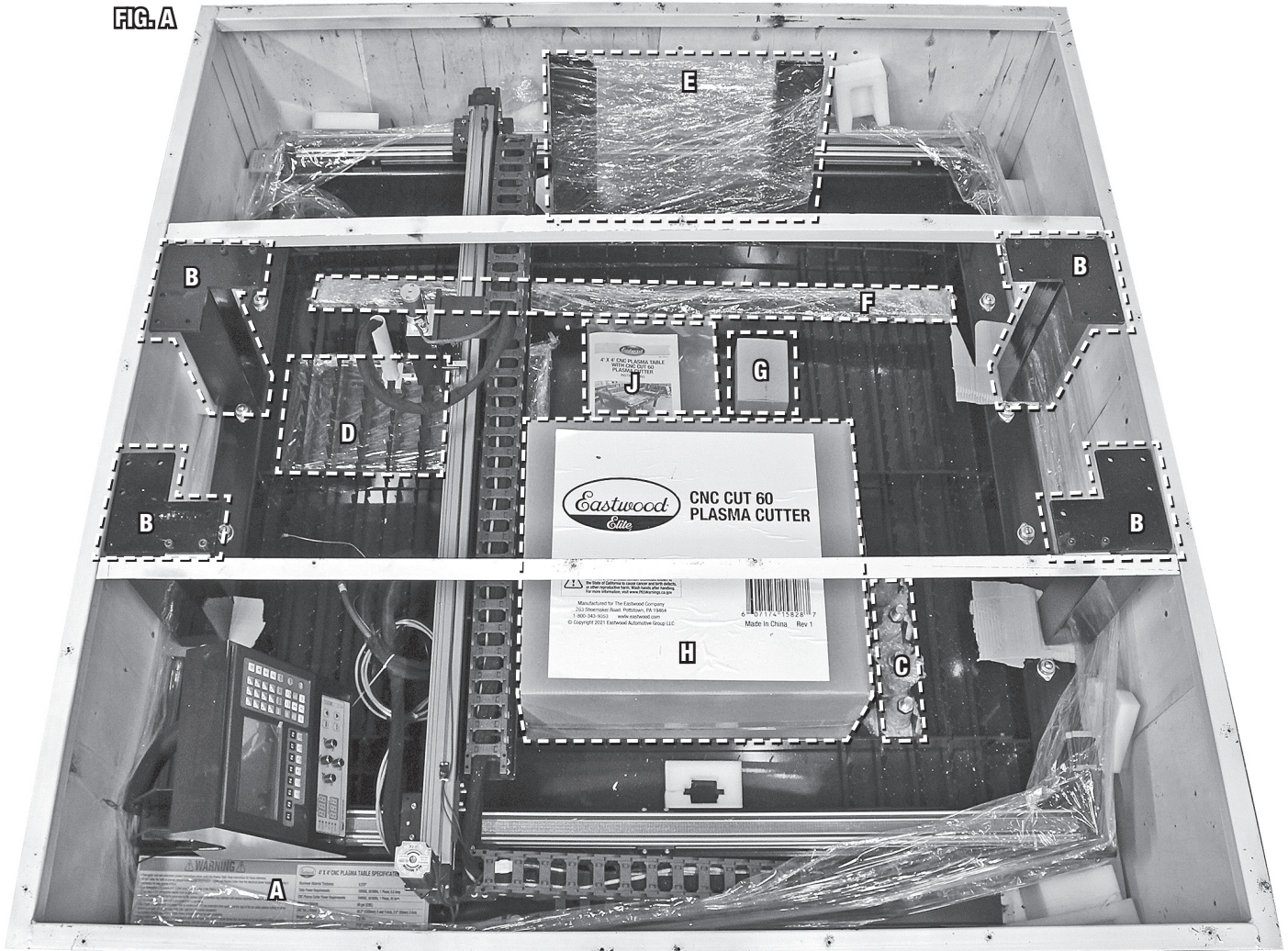
Table Slats [F]

Accessory Box [G]

Eastwood CNC Cut 60 CNC Plasma Cutter Box [H]

Eastwood Instruction Manual [J]

FIG. A



INCLUDES

FIG B Accessory Box, Includes:

- (24) M10x20 Socket Cap Screws [AA]
- (4) M8x16 Socket Cap Screws [CC]
- (4) M8 Nuts [DD]
- (12) M5x10 Socket Cap Screws [EE]
- (12) M5 Nuts [EE]
- (1) Ball Drain Valve [FF]
- (1) Table Power Switch Key Pair [GG]
- (1) Electrical Compartment Key Pair [HH]
- (1) PTFE Tape Roll [JJ]

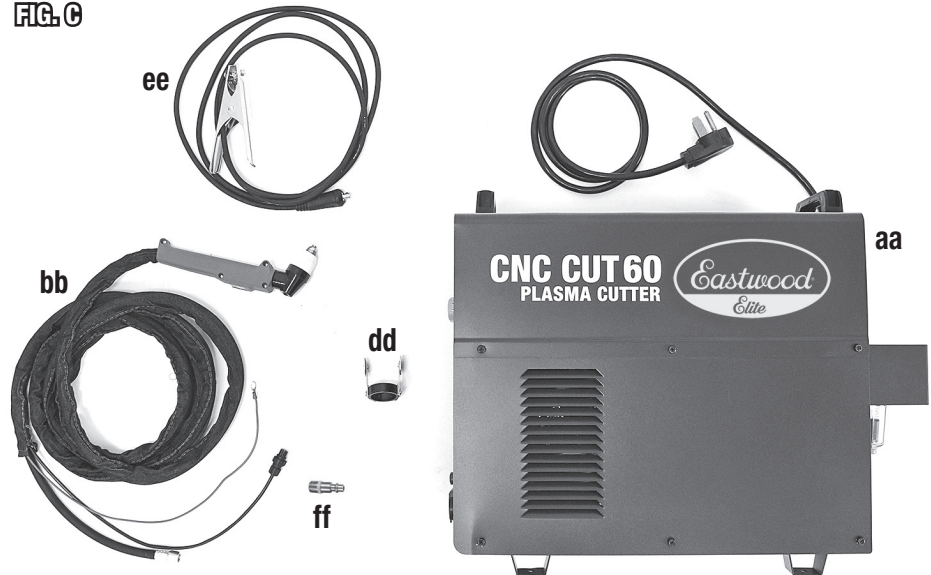
FIG. B



FIG C Eastwood CNC Cut 60 CNC Plasma Cutter

- (1) Eastwood CNC Cut 60 CNC Plasma Cutter with 6ft (1.85m) Cord [aa]
- (1) Plasma Torch with Cable 12.3 ft (3.75m) [bb]
- (1) Plasma Torch Wrench [cc]
- (1) Plasma Torch Standoff [dd]
- (1) Ground Clamp with Cable 9 ft (2.75m) [ee]
- (1) 1/4" NPT Male Thread Quick Connect [ff]

FIG. C



SAFETY INFORMATION

The following explanations are displayed in this manual, on the labeling, and on all other information provided with this product:

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

⚠ NOTICE

NOTICE is used to address practices not related to personal injury.



⚠ READ INSTRUCTIONS

- Thoroughly read and understand these product instructions before using the Eastwood Elite 4' x 4' CNC Plasma Table.
- Keep these product instructions for future reference.



⚠ DANGER SPARKS CAN CAUSE FIRE OR EXPLOSION!

- Plasma cutting produces sparks which can be discharged considerable distances at high velocity igniting flammable or explosive vapors and materials. - Keep flammables a minimum of 6 feet [1.8m] away from the edge of the Eastwood Elite 4' x 4' CNC Plasma Table.
- DO NOT operate electric arc Plasma Cutter in areas where flammable or explosive vapors are present.
- Always keep a fire extinguisher nearby while plasma cutting.



⚠ WARNING EXPLOSION HAZARD!

- NEVER operate at maximum waterbed capacity if metal panel is warped from previous cutting. Hydrogen can be trapped under a sheet and cause an explosion. Always leave 1" minimum [25mm] gap between the sheet being cut and the surface level of the water.



⚠ WARNING FIRE HAZARD!

- DO NOT allow the Table to operate unsupervised. Always disconnect the Table and Plasma Cutter from the electrical power supply before leaving it unattended for long periods of time.



⚠ WARNING ELECTROMAGNETIC FIELDS CAN BE A HEALTH HAZARD!

- The electromagnetic field that is generated by Plasma Cutter operation may interfere with various electrical and electronic devices such as cardiac pacemakers. Anyone using such devices should consult with their physician prior to performing any plasma cutting operations. Exposure to electromagnetic fields from Plasma Cutting may have other health effects which are not known.



⚠ WARNING ARC RAYS CAN INJURE EYES AND CAUSE BURNS!

- Arc rays produce intense ultraviolet radiation which can burn exposed skin and cause eye damage. Use goggles or a shield with the proper filter (a minimum of #11) eye protection from sparks and the rays of the arc when plasma cutting or when observing an open plasma arc (see ANSI Z49.1 and Z87.1 for safety standards).
- Use suitable clothing made from durable flame-resistant material for skin protection.
- If other persons or pets are in the area of a plasma arc, use welding screens to protect bystanders from sparks and arc rays.



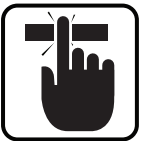
⚠ CAUTION INHALATION HAZARD!

- Fumes, vapors and gasses released during plasma cutting are hazardous. Do not breathe fumes that are produced by the plasma cutting operation.
- Use an OSHA approved respirator when plasma cutting.
- Use extreme caution when plasma cutting coated materials including but not limited to: galvanized, cadmium plated, corrosion inhibitors.



⚠ CAUTION ELECTRICAL SHOCK HAZARD!

- DO NOT touch workpiece or waterbed while operating. Only the control panel may be accessed during operation.
- Improper use of a Plasma Cutter can cause electric shock, injury and death!
- Disconnect Plasma Cutter from power supply before assembly, disassembly or maintenance of the torch, contact tip, and when installing or removing nozzles.
- The electrode, workpiece and Bed (or ground) circuits are electrically “hot” when the Plasma Cutter is on. Do not allow these “hot” parts to come in contact with bare skin or wet clothing.
- Be sure that the workpiece is properly supported and grounded prior to beginning a plasma cutting operation.



⚠ CAUTION PINCH AND CRUSH HAZARD!

- The Eastwood Elite 4 x 4 Plasma Table is a heavy assembly 974 lbs. [442kg.] which can cause serious injuries if allowed to drop. The use of a forklift, crane, hoist or similar mechanical lifting equipment capable of lifting a minimum of 1000lbs [454kg.] is required. Lifting straps or fork extensions rated for a minimum of 1000lbs [454kg.] are required (not included).
- Obtaining the assistance of a capable helper during assembly is strongly recommended.
- Avoid pinching hands while handling parts and during assembly. The use of thick, well-fitting work gloves is strongly recommended.
- The wearing of approved safety shoes is strongly recommended when uncrating, assembling, and operating the Eastwood Elite 4' x 4' Plasma Table.



⚠ CAUTION CUT OR BURN HAZARD!

- Wear protective work gloves when handling metal, it may be sharp and if cut it could be extremely hot. Allow sufficient time for cooling before handling.



⚠ NOTICE HIGH FREQUENCY ARC!

- Damage to sensitive electrical devices may occur from RF emissions when in close proximity to the Eastwood Elite 4' x 4' CNC Plasma Table during cutting. Keep cell phones or other sensitive electronic equipment away from the CNC Plasma Table during operation.

⚠ NOTICE

- DO NOT lift from the table gantry or gantry mounts. Doing so will result in damage to the table gantry.
- Only lift with forklift or sling from under the table and spread the load as wide as possible.

CNC PLASMA CUTTING GLOSSARY OF TERMS

ARC Voltage	Arc Voltage is the voltage of the arc between the electrode and the workpiece being cut. This is used to control the height of the Torch. A higher Arc Voltage means greater height between the Torch and the workpiece. A lower Arc Voltage means a closer gap between the Torch and the workpiece.
CAM	Computer-Aided Machining. A software that takes a drawing file and turns it into a path that can be post processed into a G-code file for CNC machine usage is referred to as CAM software.
CCW	Acronym for Counterclockwise when referencing a rotational direction.
CNC	Acronym for Computer Numerical Control. This means that a machine is primarily controlled by a computer.
Cut Controller	Main Control Unit on the CNC plasma table. It controls all cutting actions and interfaces with the Torch height controller.
Cut Speed	Horizontal movement speed of the Torch head during cutting. It is important to change according to material thickness.
CW	Acronym for Clockwise when referencing a rotational direction.
Drag Chain	Moving cable sheath attached to the X-axis and Y-axis that guards and guides the Torch cables.
Dross	This is the plasma cutting slag left behind after a cut which builds up on the bottom of the cut. Dross is typically knocked off or ground away if necessary.
Electrode	Component of the Plasma Cutting Torch Head that emits the plasma arc. This wears the fastest when cutting thicker materials.
Gantry	X-axis and Y-axis travel assembly that allows the Torch head to move around the plate. Comprised of the extruded aluminum tracks with belt and stepper motors mounted.
G-code	The Program Code Language that CNC machines understand. Typically, movement commands start with a "G", hence the name G-code. Miscellaneous commands, in the case of the CNC table, these typically relate Torch control, start with "M".
IHS	Acronym for Initial Height Setting. This parameter is set in the Torch height controller and dictates the height of the plasma Torch above the workpiece when the pierce is initiated.
Kerf	Kerf is the width of the cut left by the plasma Torch. This is useful for an accurate cut, because if we know how much material the plasma Torch removes, we can compensate for that in the cut path. This width varies depending on material, cutting amperage, nozzle diameter, consumable wear state, and Torch height.
Lead-In & Lead- Out	Lead-In and Lead-Out is the path that extends before and after the desired cut path, respectively. The plasma arc is unstable when starting and stopping which can leave a rough edge or inaccurate cut. The lead is used to smooth this by starting/ending the cut away from the cut path and smoothly transitioning it in/out while the arc is stable.
Main Cut Screen	The home screen displayed when the CNC table is started up. From here all actions in the cut controller are taken.
Nozzle	This component of the Plasma Torch funnels the plasma arc down to an effective size. It wears slightly slower than the electrode.
Pierce	Operation of the Plasma Torch starting a cut in the metal. It must first melt a hole through the sheet which is referred to as the Pierce.
Post Processor	The Post Processor takes a path created in a computer-aided machining software and converts it into the G-code file that the machine understands.
Slats	The toothed metal supports in the waterbed that the workpiece rests on.
Stepper motor	This is a type of motor commonly used on CNC machines. It has discrete phase positions, known as steps, that translate into accurate and fully controlled movement. The X-axis is controlled by one Stepper Motor and Y-axis is controlled by two Stepper Motors.
THC	Acronym for Torch Height Controller, this communicates with the Cut Controller and is capable of automatically controlling Torch height to maintain good distance between the workpiece and the Torch.
Torch	The Plasma Cutting Torch Head is often described as "Torch" for simplification.

CNC PLASMA TABLE SET-UP

LOCATION

- The Eastwood Elite 4' x 4' CNC Plasma Table must be located in an indoor area, on a firm, clean, level surface. Having a solid, level concrete floor is ideal. If the table is fully loaded with water and a 4' x 4' x 0.375" steel plate, total machine weight will be near 1725 lbs. [782kg].
- The table should be placed in an area away from flammables, with ample ventilation. A minimum of 6 feet [1.8m] of free space must be maintained around all sides and above the CNC Table. This is to allow for adequate ventilation and to allow room for a person to access all sides for maintenance purposes. Do not store anything in the immediate vicinity of the table.

⚠ WARNING FIRE OR EXPLOSION HAZARD!

Keep flammables a minimum of 6 feet [1.8m] from the edge of the Eastwood Elite 4' x 4' CNC Plasma Table.

⚠ CAUTION

The CNC Table generates heat, sparks, dust, and gas during operation. Sufficient space and ventilation must be provided around the unit for user safety.

- The temperature environment for proper operation must be between 32°F and 110°F [0°C and 43°C]. The table may not function properly in extreme ambient temperature conditions.
- Plan the location to minimize the transfer time and effort required to load sheet metal.
- The table requires AC single phase 110-120V, 50/60HZ power from a NEMA 5-15R outlet.
- Additionally, the included plasma cutter requires AC single phase 208-240V, 50/60HZ power from a NEMA 6-50R outlet capable of supplying 50A.

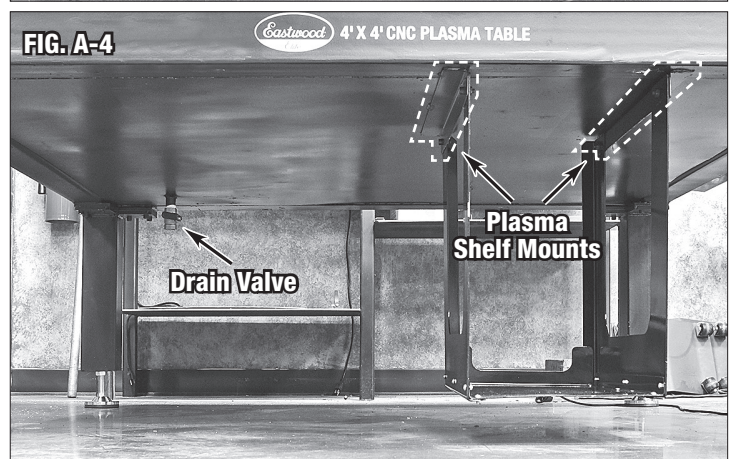
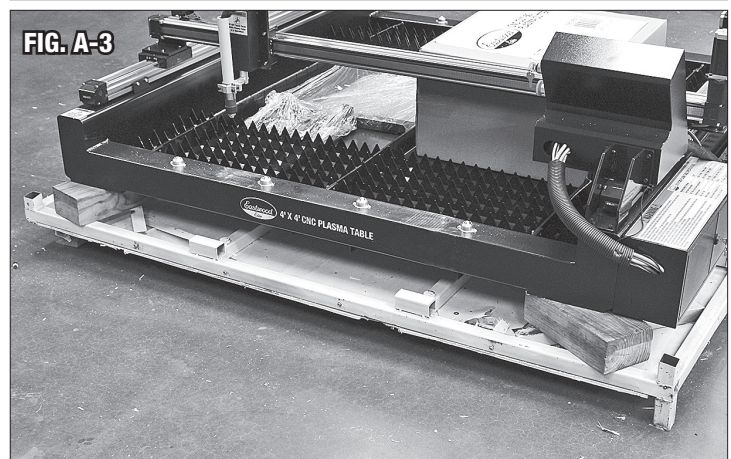
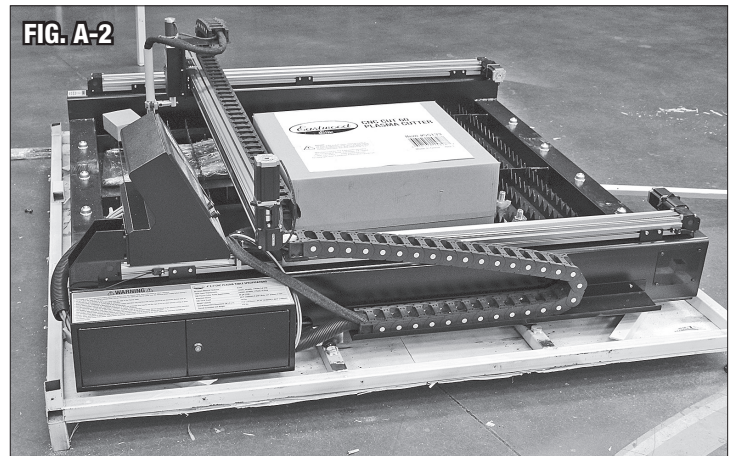
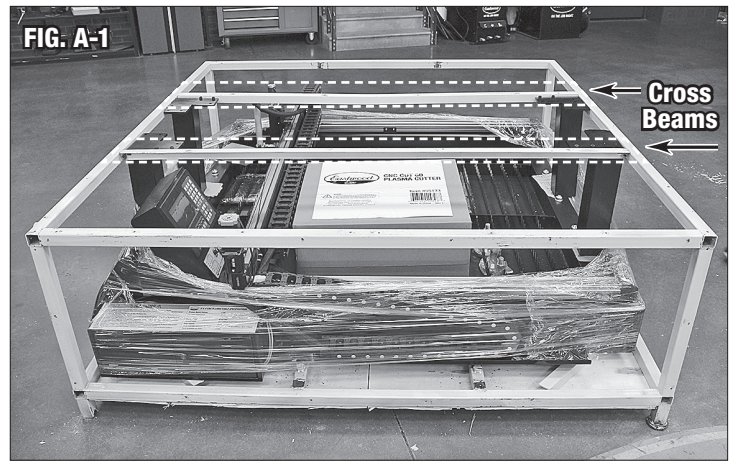
UNCRATING AND ASSEMBLY

- Remove all screws holding the exterior wooden panels to the steel crate frame. Remove the wooden panels (FIG A-1).
- Unscrew all four Table Legs [B] from the frame and set aside for assembly. Remove the four Height Adjustment Feet [C] from water table and install into the legs.
- Unbolt the cross beams and remove (FIG A-1).
- Remove all remaining components from the water table: Plasma Cutter Shelf Bottom [D], Plasma Cutter Shelf Sides [E], Table Slats [F], Accessory Box [G], Eastwood CNC Cut 60 Plasma Cutter Box [H].
- Cut the steel crate frame off at the base. Carefully lift it off and set it aside (FIG A-2).
- Lifting of the table is ideally done with long straps and a crane, or forklift with fork extensions.

⚠ CAUTION PINCH AND CRUSH HAZARD!
DO NOT utilize a forklift with short forks to lift the table. The minimum recommended fork length is 6ft [1.85m]. If the table tips off the forks it could result in serious bodily injury and property damage.

⚠ NOTICE
DO NOT lift from the table gantry or gantry mounts. Doing so will result in damage to the table gantry.

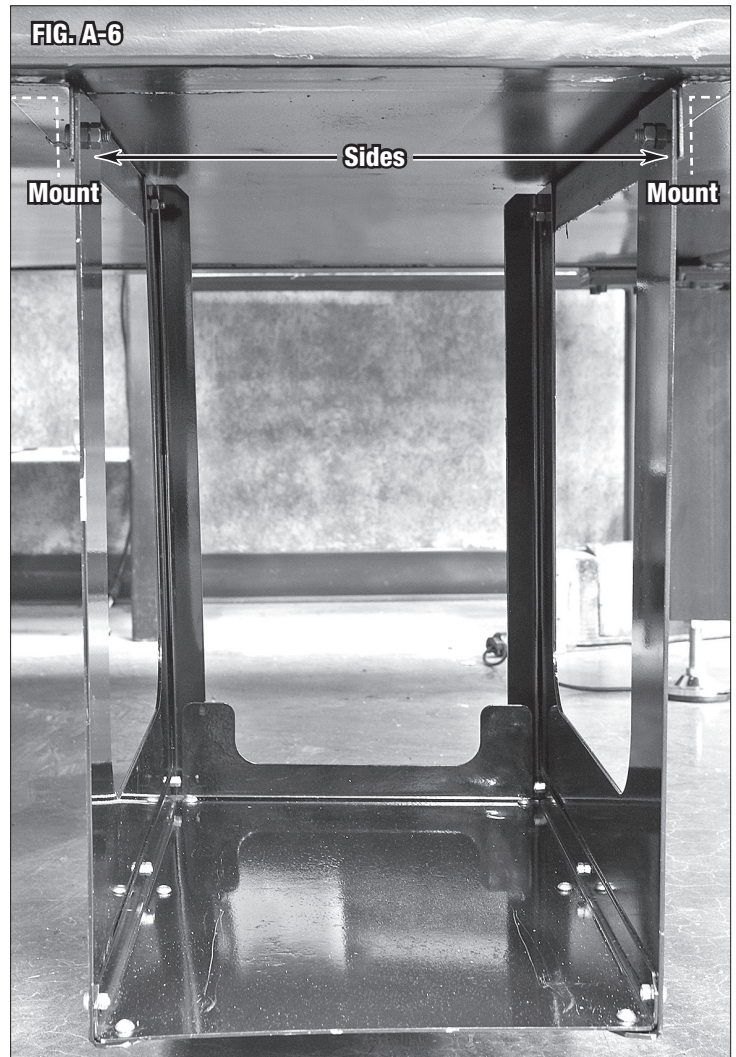
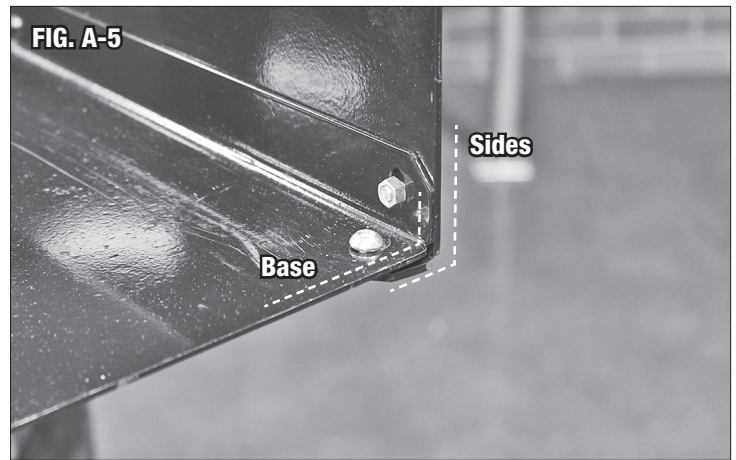
- Lift one side of the plasma table at a time and set it on cribbing so the bottom side can be accessed (FIG A-3).
- Now that it is elevated off the crate, pass straps underneath or carefully slide the extended length forks underneath. Be conscious of the drain valve stud and plasma shelf mounting provisions, as they could be damaged by forks (FIG A-4).



⚠ CAUTION PINCH AND CRUSH HAZARD!

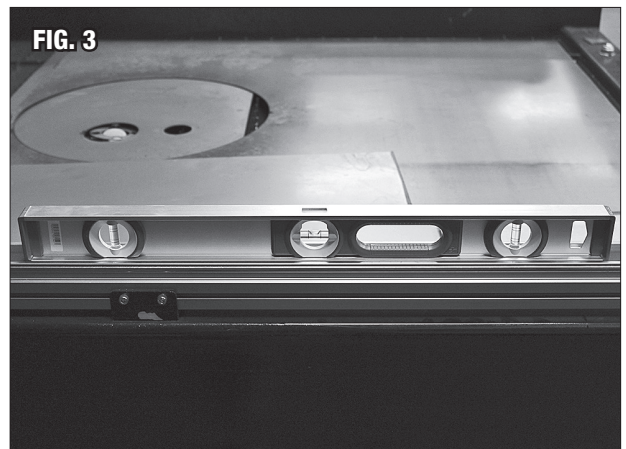
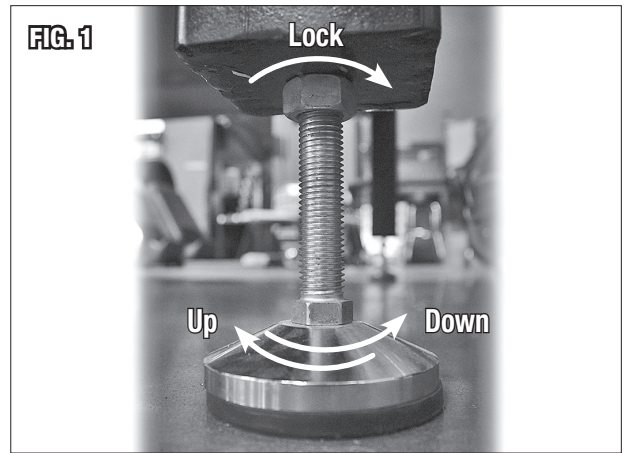
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- Lift the plasma table up and remove the crate base from underneath. Fasten the legs with leveling feet using the included M10x20 Socket Cap Screws [AA] and tighten to 22 foot-pounds (30 Nm).
- Install the Ball Drain Valve [FF] and utilize the included PTFE Tape Roll [JJ] on the threads to ensure it does not leak.
- Assemble the Plasma Cutter Shelf Sides [E] to the Plasma Cutter Shelf Bottom [D] with the included M5x10 Round Cap Screws and Nuts [EE]. The base sets inside of the sides (FIG A-5).
- Fasten the plasma cutter shelf assembly to the mounting flanges on the table bottom with the included M8x16 Socket Cap Screws [CC] and M8 Nuts [DD]. Tighten to 20 foot-pounds (28 Nm). The sides set inside of the mounting flanges (FIG A-6).
- Unmount the base of the Control Panel Mount and remount it 180° facing outward for operation.
- Install the included slats. Use of a mallet or hammer may be necessary to fully seat them.



CNC PLASMA TABLE SET-UP

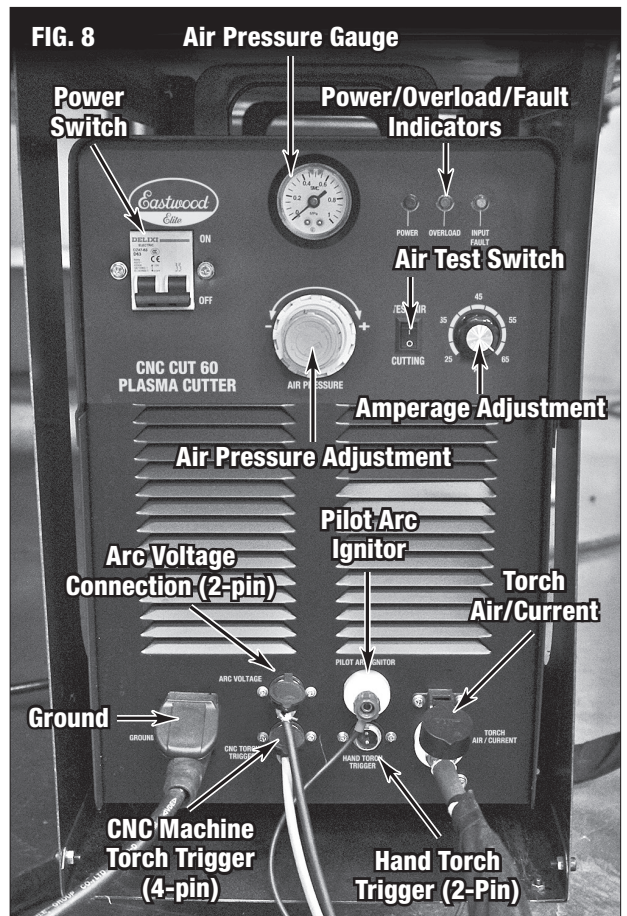
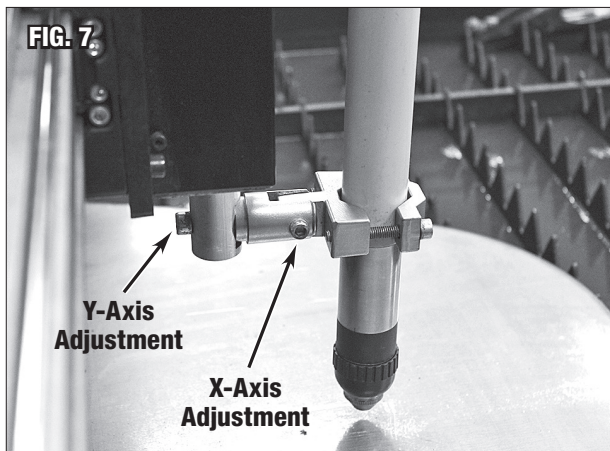
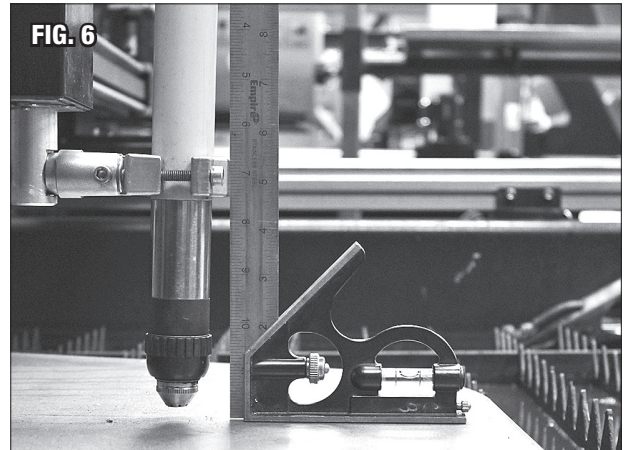
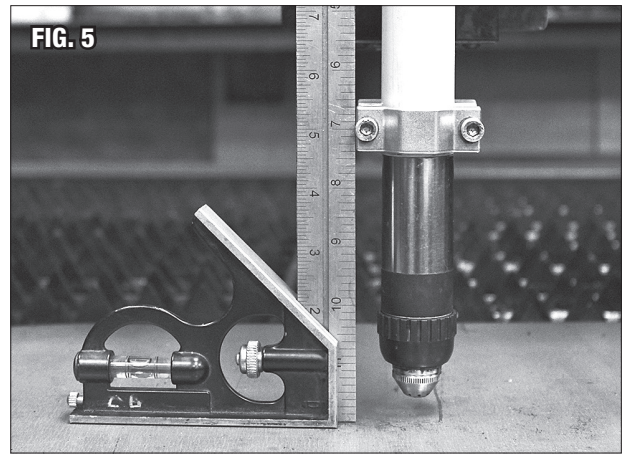
- If the table is not level, adjust the leveling feet (**FIG 1**) accordingly with a 15/16" or 24mm wrench. Use a level on the sides of the table (**FIG 2**) & (**FIG 3**) and adjust the threaded feet until it levels out. When level, hold the stem and snug the lock nuts with a 1-1/8" or 28mm wrench (**FIG 1**).
- Water can then be added to the waterbed if desired. See WATERBED below for more information regarding the usage of the waterbed.
- Connect 120V power to the table. Draw is approximately 6.8A. Turn the CNC table on by inserting the table key [GG] into the key operated switch and rotating it clockwise (**FIG 4**).



- After the start sequence, press any key to continue from the Eastwood Elite logo screen. Controls are covered in detail below, but if needed, use arrow keys to jog the torch to a suitable position for squaring.
- Place a flat piece of metal on the table slats and verify the torch head is square with the workpiece (**FIG 5**) & (**FIG 6**). If not, utilize a 5mm hex key to loosen and adjust it about the X-Axis (**FIG 7**) and a 6mm hex key to adjust about the Y-Axis (**FIG 7**).

CNC CUT 60 PLASMA CUTTER SET-UP

- Install the included quick connect air fitting **[ff]** to the air input at the rear of the CNC Cut 60. Utilizing PTFE sealant tape **[JJ]** will help ensure no air leaks are present.
- Connect a clean and dry air supply capable of supplying at least 3 CFM at 60 psi to the rear of the CNC plasma cutter.
- Install the CNC machine torch connections to the front of the plasma cutter as shown in (**FIG 8**). Do not overtighten the brass air/current fitting. It only needs to be snug to seal. Plasma cutter controls are also labelled in (**FIG 8**).
- Connect 240V power to the plasma cutter with the attached NEMA 6-50P plug. The minimum breaker size recommended is 50A.
- Power the plasma cutter on and utilize the test air switch. With the air flowing, adjust the regulator to achieve 0.40MPa of pressure indicated on the gauge.
- Attach the ground clamp to the workpiece and adjust plasma cutter amperage to the desired output.
- To utilize the included hand torch **[bb]**, the CNC machine torch air/current fitting and arc strike line must be swapped to the hand torch leads. The trigger can be connected to the open two pin trigger port (**FIG 8**).



WATERBED

The Waterbed is used to reduce heat soak, sparks, slag spatter, and dust. If your machine is not utilized frequently you may find it easier to leave the Waterbed dry and simply cut without any coolant. This is perfectly fine and causes no additional harm to the Table or Plasma Cutter. However, the workpieces will be extremely hot after cutting. Additional downsides to air cooled cutting are far more dust and flying sparks, and increased warpage.

The Waterbed can be filled with tap water, however it can contain many minerals and impurities which may affect performance. Eastwood strongly recommends adding the Eastwood Plasma Cutting Fluid, #33863 1 Gal. or #33864 5 Gal., to the water in a 5:1 solution to eliminate corrosion and fungal build up. This additive also eliminates risk of explosion when cutting aluminum sheet by preventing the creation of hydrogen. Many other plasma fluid additives are hazardous, toxic, or carcinogenic.

Extensive in-house, R&D research was done to make sure the Eastwood Plasma Cutting Fluid is completely safe for usage and fully effective. For the Waterbed on the 4' x 4' Table, add 10 gallons [37.85 liters] and then fill the rest of the table with water to get the right solution. As the fluid evaporates out over time, it can be topped off with water. The solution concentration will remain effective until approximately 15 gallons [56.75 liters] of water have been added to replace evaporated water. At this point the solution should be replaced. Alternatively, as water evaporates, mixed solution can be added to keep the solution effective.

When filling the waterbed keep in mind that it is most effective when the water level is high. Plasma Cutting is not affected by the water level and can even be done submerged for maximum cooling.

CAUTION INHALATION HAZARD!

DO NOT utilize additives which present inhalation and/or fire hazards when vaporized by the plasma arc.
Example: Anti-freeze, sodium nitrite-based additives.

OPERATION OF THE CNC CUT CONTROLLER

The following sections will sequentially detail each menu and option in the CNC Cut Controller, then Torch Height Controller.

To get an abbreviated version and start cutting quickly go to page 31 for the quick start guides.

PHYSICAL CONTROLS

The CNC Cut Controller has a color 7" LCD display and 45 keys. The key switch and emergency stop (FIG 4) control power to both the cut controller and the Torch height controller. Pressing the emergency stop button will immediately cut power to the controllers, halting cutting and movement operations, until it is rotated clockwise to restore power.

The main control clusters for the CNC Cut Controller are highlighted in (FIG 9).

A LCD screen used to monitor and navigate the Controller.

B Main function keys used for accessing menus and altering settings quickly. The function of these keys will be shown in a bar at the bottom of the LCD screen. Key **F8**, along with **Enter** is commonly used as a key to confirm a change or select continue.

C USB drive connection for importing and exporting files.

D Manual controls for cutting functions. In configuration as a plasma cutter, only the Plasma button is utilized to toggle start/stop manual cutting.

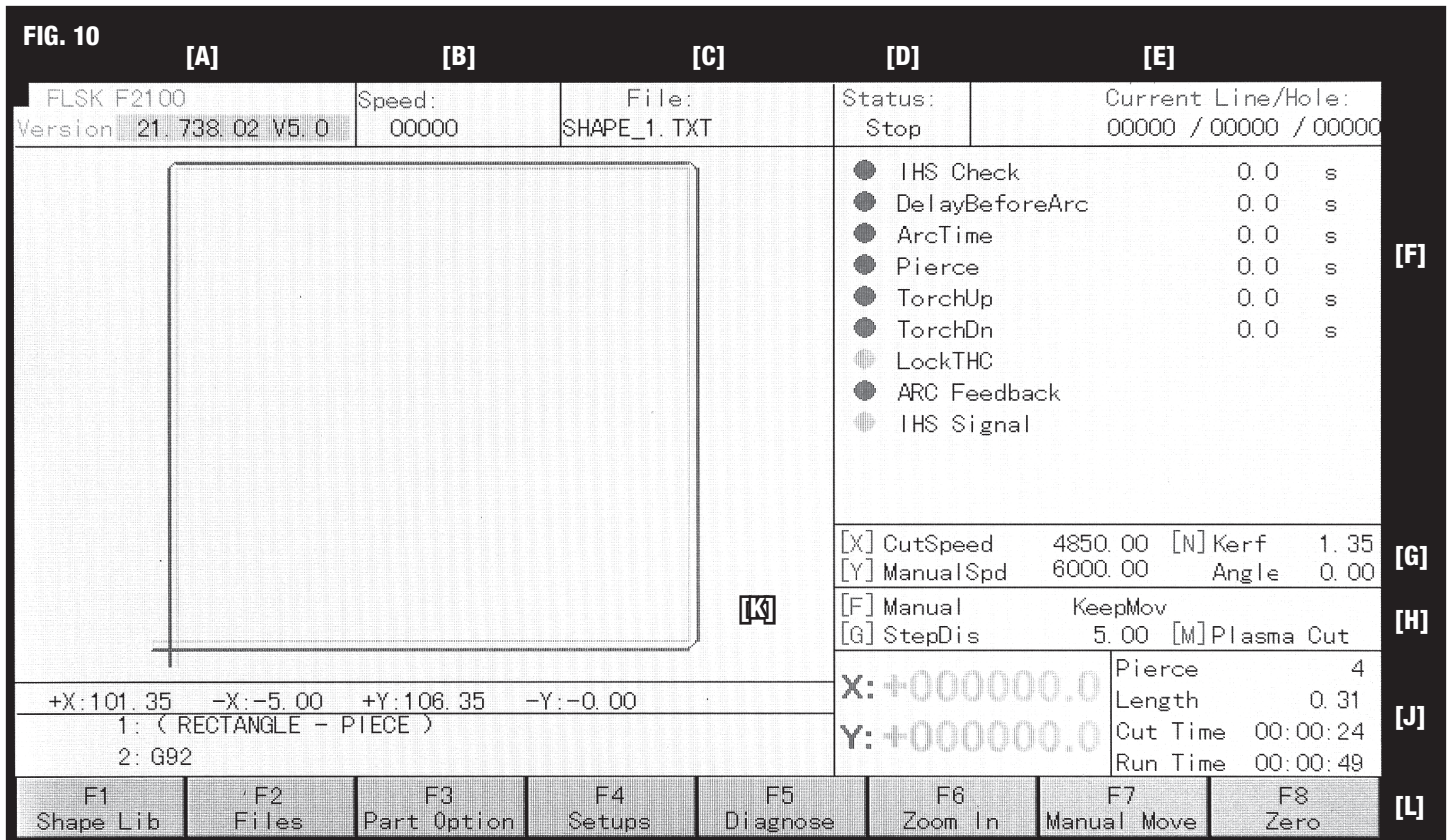
E Green arrow movement controls manually traverse the plasma Torch and are used in some menu navigation. The Torch height can be manually moved by the **S ↑** and **S ↓** keys. **F+ HOME** and **F- END** can be used to change cut speed quickly before cutting. **ESC** is the common key for returning back to the previous menu, reverting a change, or canceling a cut in progress.

F Machine movement/program controls. To start a program, first **START** is pressed then **Enter** to confirm. **STOP** will pause a program; **START** will resume it.

G Quick access settings used to alter key settings without having to go into the settings menus. Key **Enter**, along with **F8** is commonly used as a key to confirm a change or select continue.

H Number and letter keypad is mostly used for setting entry and file naming. **Shift** is a modifier key that can be used in conjunction with the other letter/number combo keys to input the letter.





MAIN CUT SCREEN

- Upon powering up the table it will run through a series of diagnostic checks.
- Once the Eastwood Elite logo Screen (FIG 9) is displayed, **press any key to continue**.
- The first screen shown is the Main Cut Screen (FIG 10). From here all the other menus can be accessed.

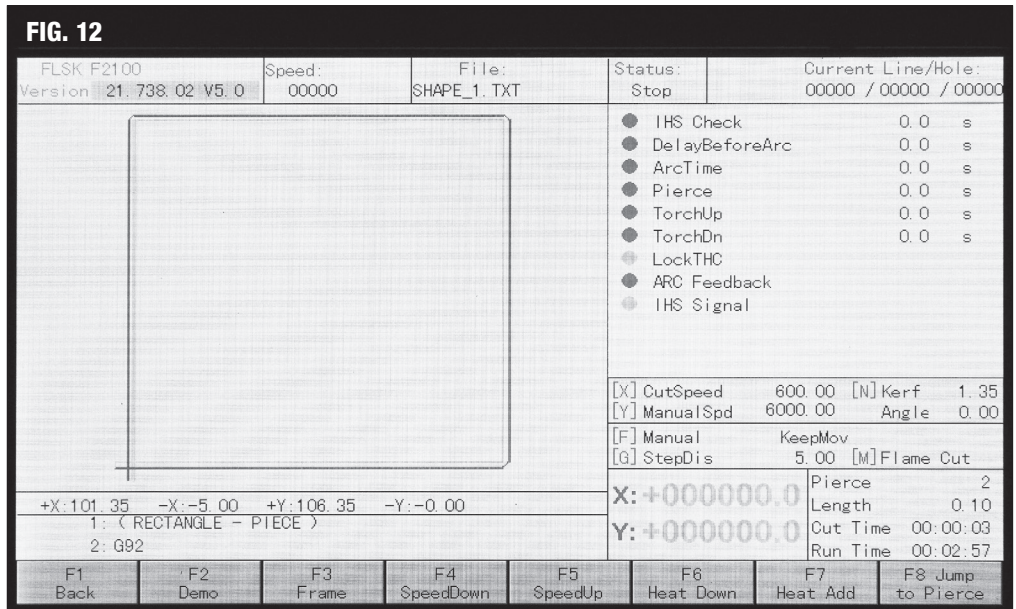
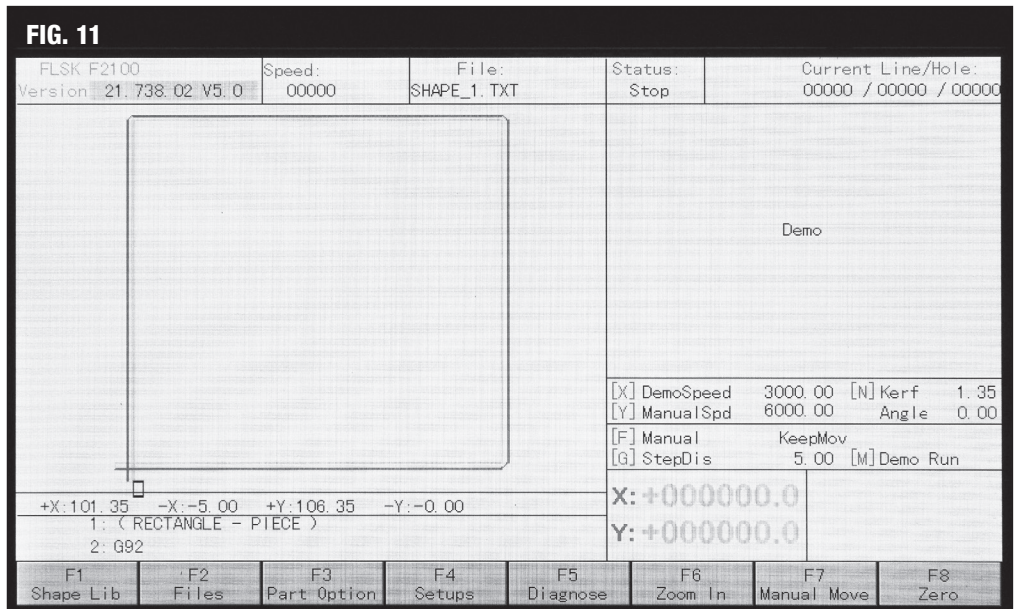
NOTICE

Return to the Main Cut Screen by pressing Esc as many times as necessary.

MAIN CUT SCREEN INTERFACE DESCRIPTION (FIG 10)

- [A] The software version the controller is running.
- [B] Current Torch speed (mm/min or inch/min).
- [C] Current file open. If it is a file loaded directly from the USB drive it saves to the machine storage as "UFile.TXT" until another overwrites it.
- [D] Status of the cutting operations, will display if the Torch is starting the arc, cutting, or stopped.
- [E] Current cut line segment and cut hole number.
- [F] Current mode indicators, plasma mode shown. Demo mode simply shows "Demo" in this space.
- [G] Current cut speed, manual speed, kerf setting, and their respective quick access keys. Angle is unused.
- [H] Movement modes/cut mode and their respective quick access keys.
- [J] Machine pierce counter, cut length, cut time, and run time display.
- [K] Current position of the Torch head with respect to the zero point.
- [L] The bottom bar always shows the menu that the function keys will open.

- **Shift plus M** will cycle through the three modes: Plasma (**FIG 10**), Flame Cut, and Demo (**FIG 11**). Since this table is not configured for it, the Flame Cut mode is unused.
- Using the yellow quick access keys or **Shift** plus the white letters can change cut settings without going into the settings menu. For example, **Shift + N** can be used to change the kerf width quickly.
- Pressing **Space** will open quick access demo options (**FIG 12**).
 - **Frame** will run the Torch in a rectangular circuit at the min./max. X and Y values of the cut file.
 - **Demo** will run the Torch over the exact path of the cut. Demo speed can be changed with **F4** and **F5**.
 - **F8** is quick access to the pierce selector.



F1 - SHAPE LIBRARY

- Pressing **F1** on the Main Cut Screen takes you to the shape library (**FIG 13**), here preloaded shapes can be selected by using the arrow keys.
- Pressing **F8** on the part opens a screen to modify its dimensions. Lead in and lead out are how far away from the Torch starts and stops cutting from the actual piece being cut. The dimensions are in the unit the machine is configured to, by default millimeters and can be changed to inches (**FIG 14**).
- Good lead in/out helps ensure cut smoothness at the entry and exit points. Generally, as much lead in as possible is better up to approximately 15mm or 0.60in. Lead out is not as critical and can be much lower, or zero.
- After the dimensions have been entered press **F8** to open the shape in the main cut screen.
- For some shapes, such as the one shown in (**FIG 15**), **F1** and **F2** can be used to switch between inside and outside lead cuts. For example, inside would be used to cut out a circle. Whereas outside would be used to cut a hole in a panel.

FIG. 13

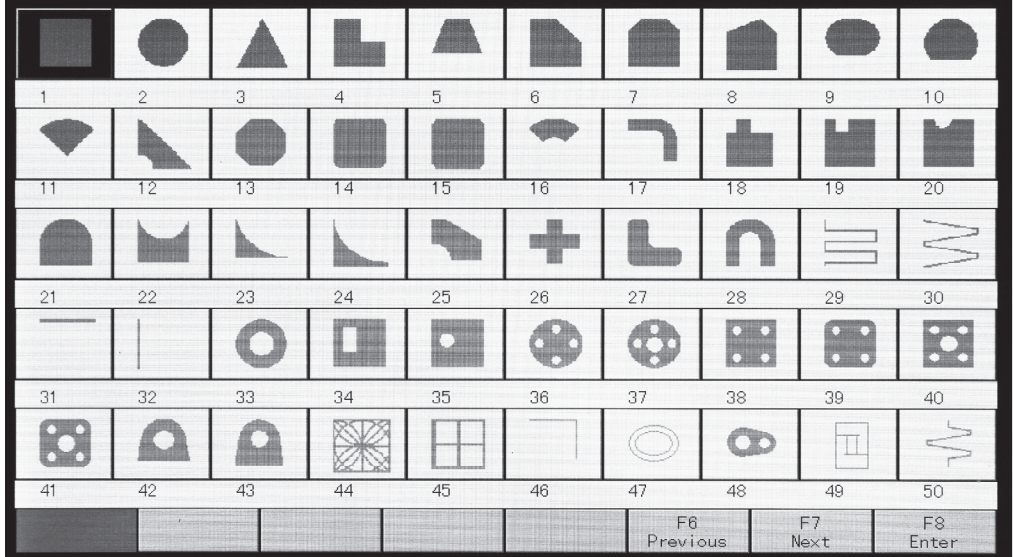


FIG. 14

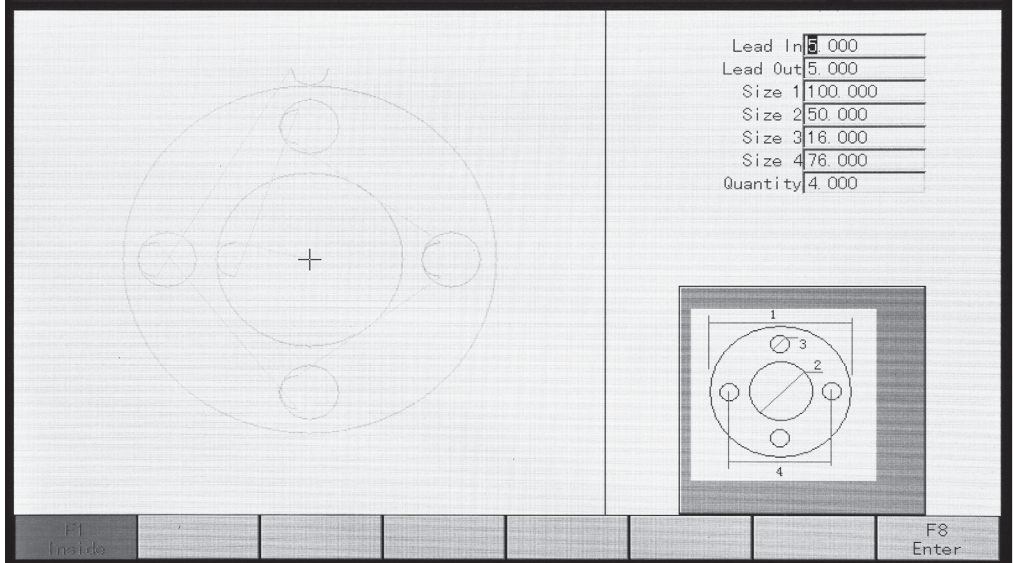
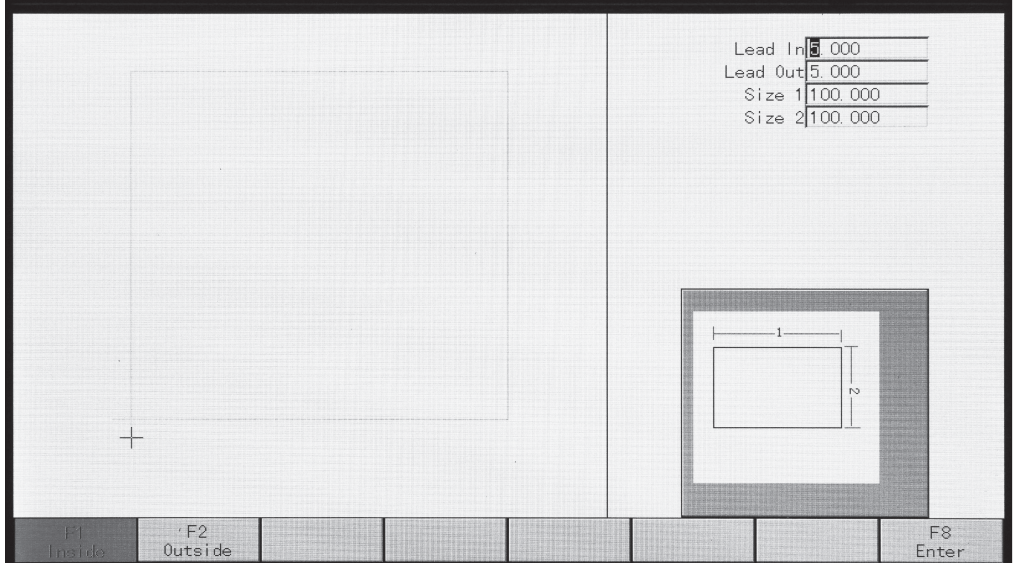


FIG. 15



F2
Files

F2 – FILES

- **F2** opens the file browser (**FIG 16**) where G-code is stored to the machine, or a USB drive. Files can be searched, edited, deleted, copied, previewed, saved, and re-named here. The maximum USB drive size supported is 16GB, and USB drive must be formatted to FAT or FAT32 file system.
- Use the arrow keys and **Enter** button to navigate a file directory.
- Pressing **Enter** on a G-code file will open it as a temporary saved file, this file will save over machine power cycles until another part file is opened.

F3
Part Option

F3 – PART OPTION

- Pressing **F3** opens the part modification menu (**FIG 17**). Any changes made in this menu can be quickly reverted with **ESC**.
- **F1** can be used to change the cut start point to centered, left and bottom, left and top, right and bottom, or right and top.
- **F2** can be used to change the cut angle.
 - **F1** - Steel Plate Adjust uses the position of the Torch head and movement to orient a plate.
 - **F2** - Input Rotation Angle allows the user to rotate the orientation of the cut path 360° clockwise or counterclockwise - this is the most common and intuitive option for part rotation.
 - **F3** - Input Steel plates Adjust Angle is similar to the first option but allows the user to specify the plate angle.
- **F3** opens array nesting options, the three options are outlined below. When nesting parts, the computer will perfectly mate the “frame” view of each part together, this offset spacing may be too tight. We recommend always adding at least 10mm or 0.4” to both X and Y Pattern Offset spacing options to get good clearance between cuts. For example, adding to 10mm the default offset of “106.35” in **FIG 18** would simply mean changing to “116.35”. (**FIG 18**) shows the options screen for straight and stagger nests. Rows is the number of horizontal rows top to bottom, and columns is the number of vertical left to right columns the array will make. The offset spacing parameter is also seen here.

FIG. 16

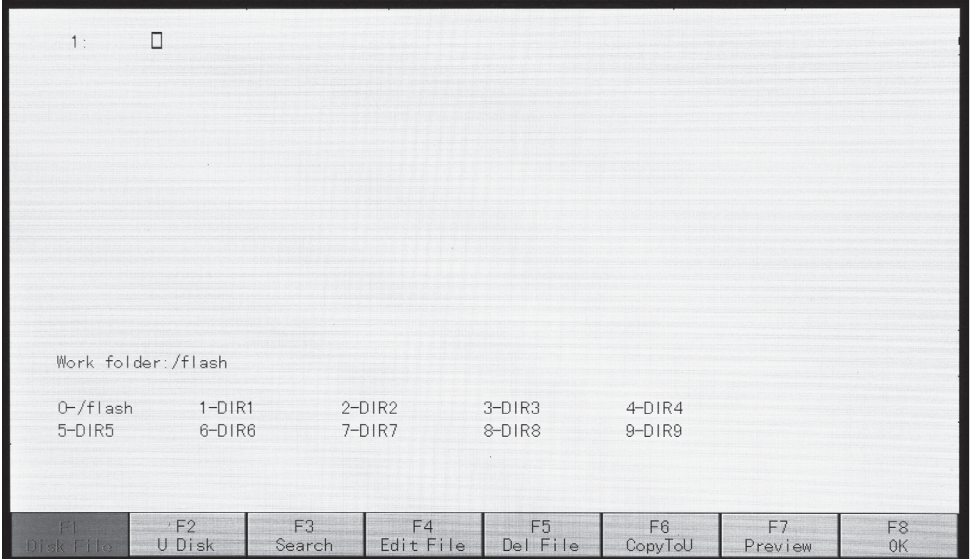


FIG. 17

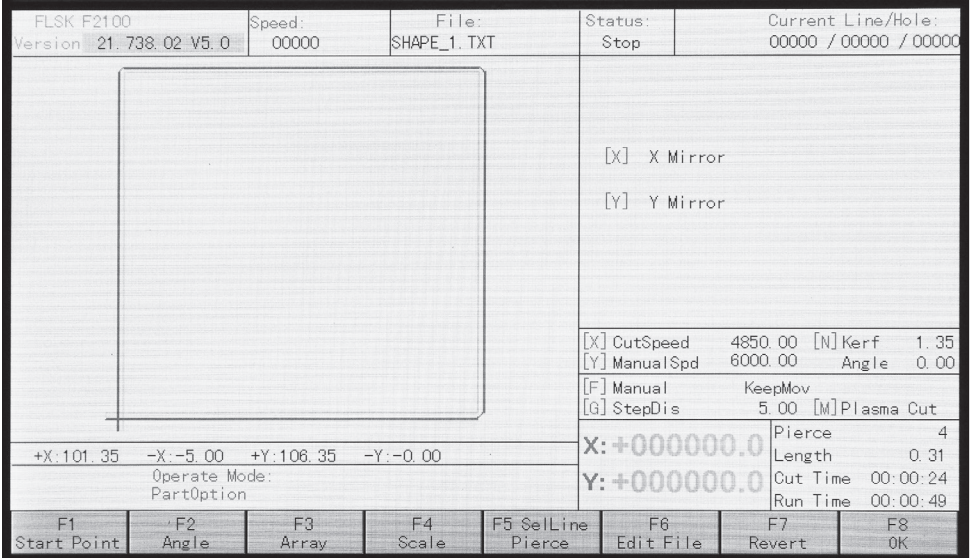
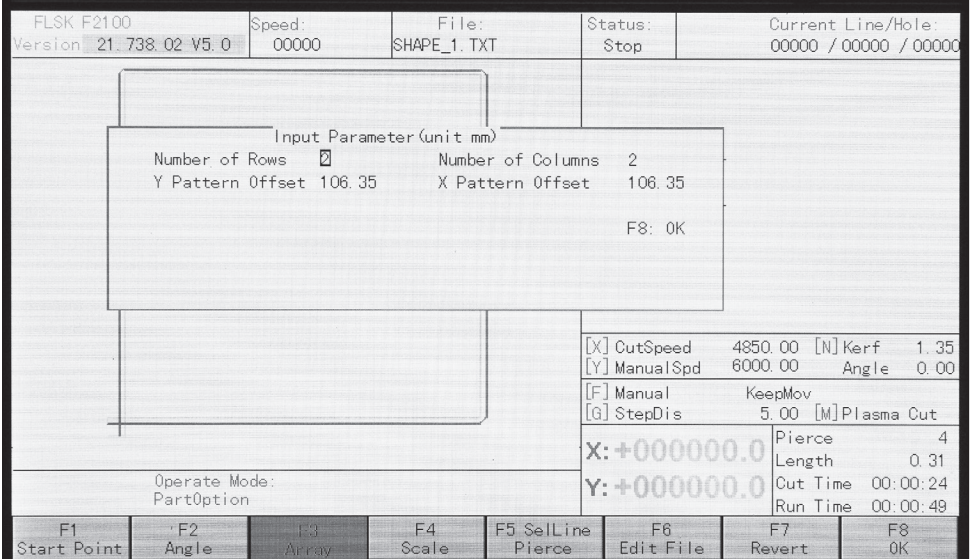


FIG. 18



- **F1: Straight** - Provides a straight layout with no offset or rotation of the parts (**FIG 19**).
- **F2: Stagger** - Staggeres the parts vertically every other column (**FIG 20**).
- **F3: Nest** - Attempts to nest parts better by mirroring them in column pairs. This means you will have twice as many columns as you input (**FIG 21**).
- **F4** can be used to change the scale, with 1.00 being the current size of the part. For example, to scale a part up 25% input 1.25 to reduce size by 63% input 0.63.
- **F5** is for selecting a specific line of the code or pierce in the code to start with, this can be helpful when recovering a failed cut or if you want to skip certain features without creating a new G-code file. For example, to skip to the third pierce select **F2** Select Pierce and input 3. Now the cut will start from the third pierce.
 - **F1 Select Line** - Allows you to input the code line you want to start from.
 - **F2 Select Pierce** – Allows you to input the pierce number you want to start from.
- **F6** is used to view and manually edit the G-code file loaded.
- **F7** reverses changes.
- **F8** saves changes.
- X mirrors the part about the X-Axis, and Y mirrors the part about the Y-Axis.

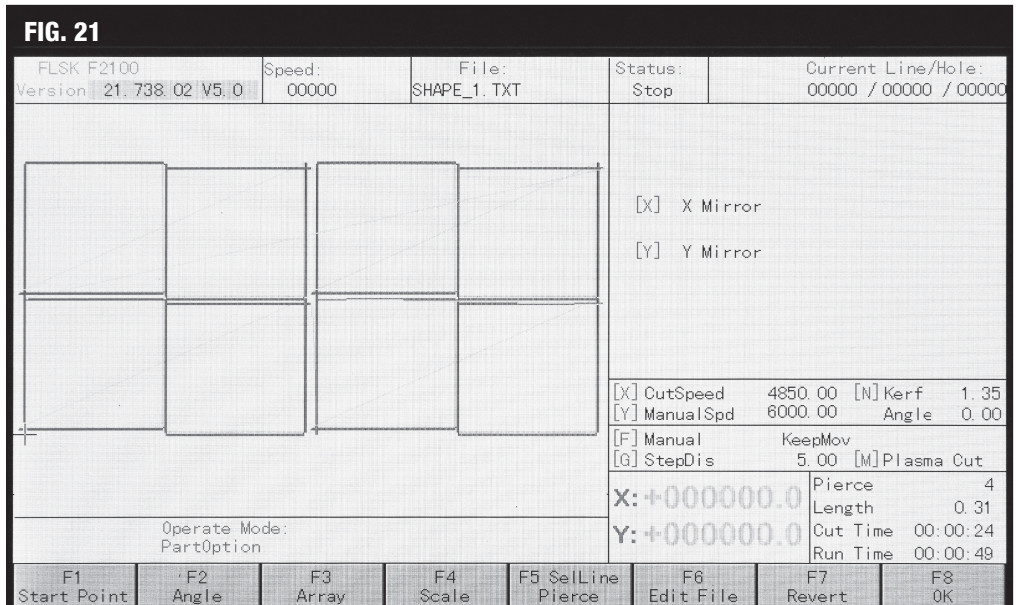
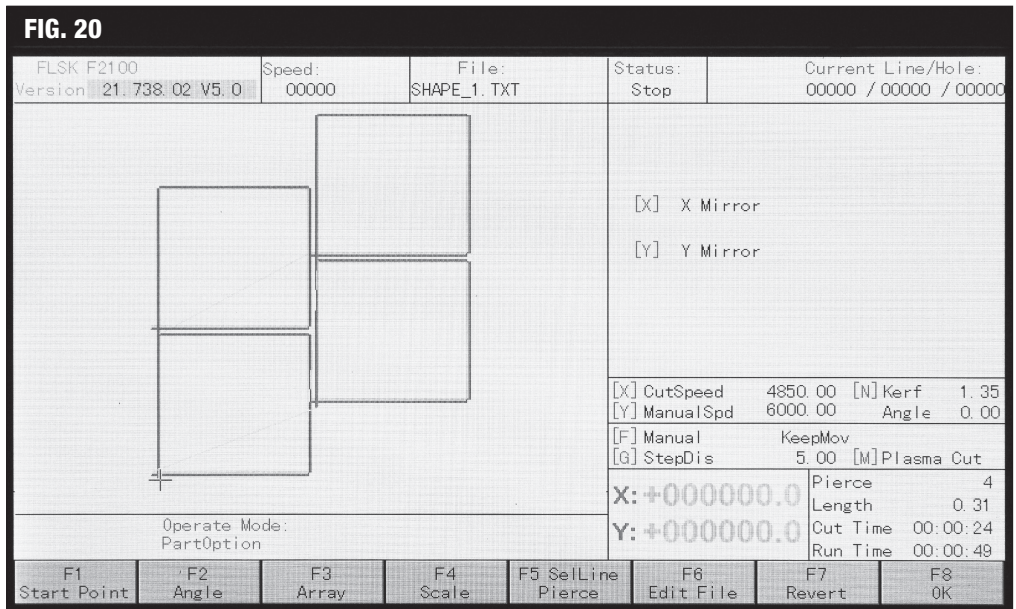
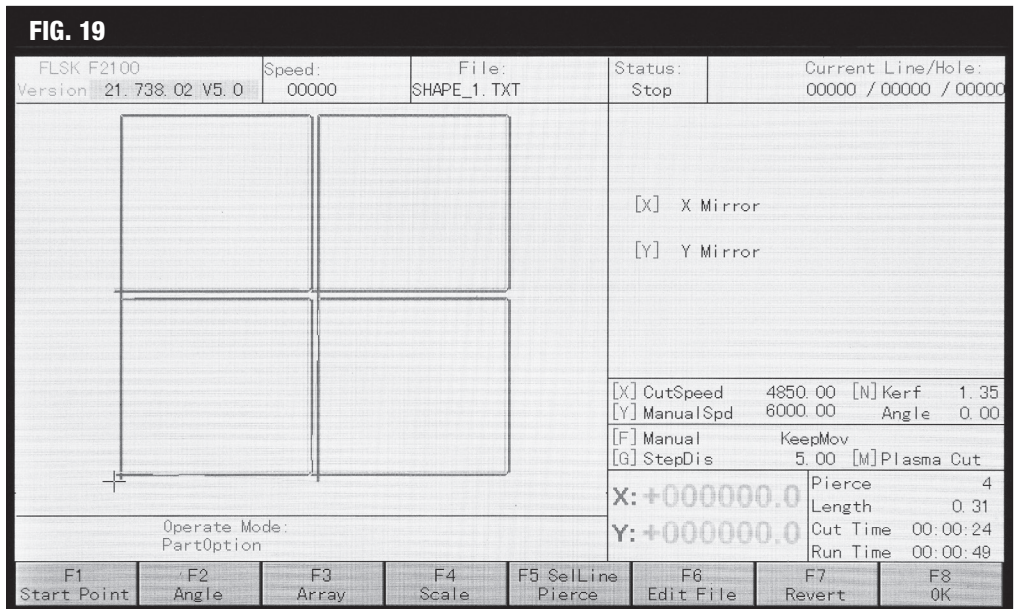
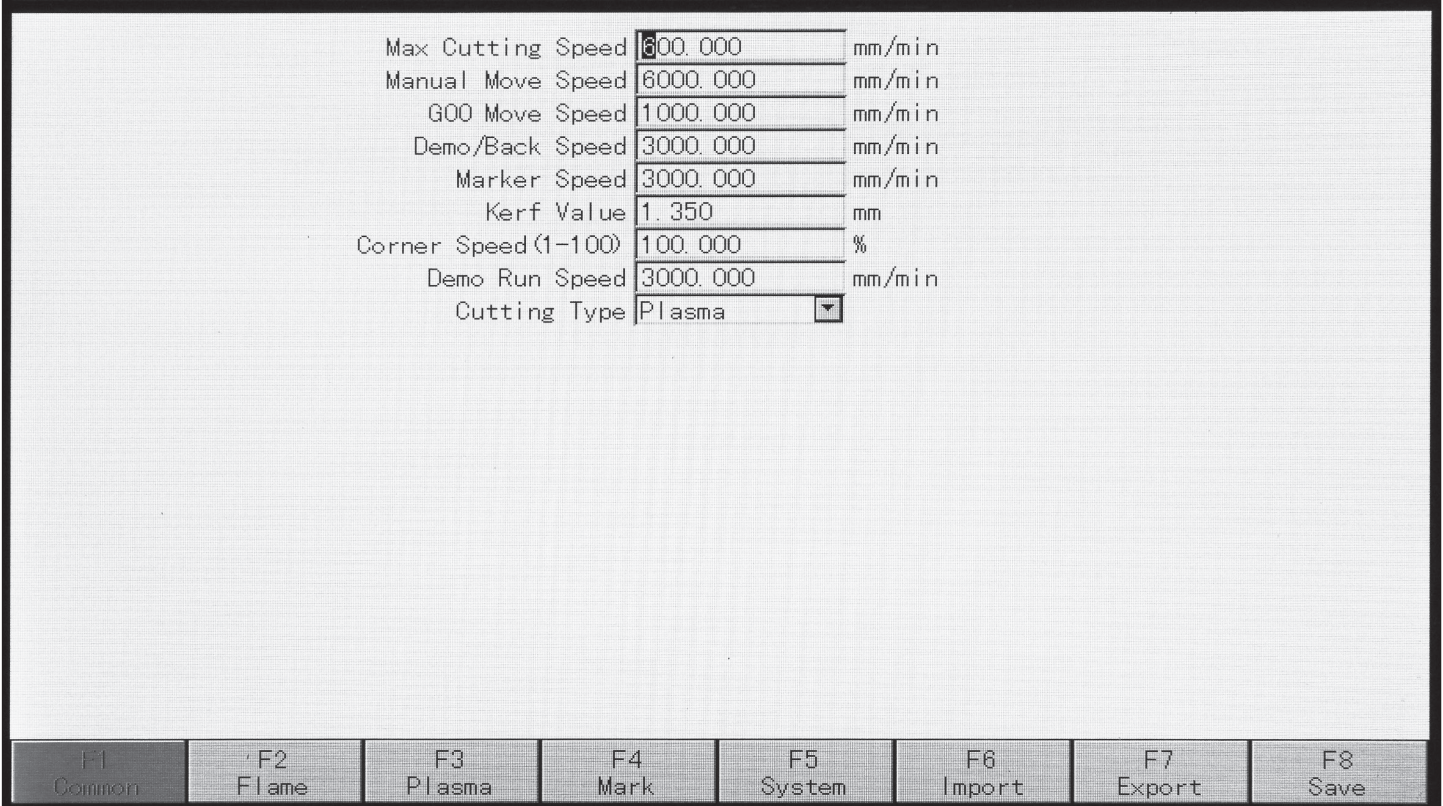


FIG. 22

F4
Setups

F4 – SETUPS

- **F4** opens the machine settings menu where more in-depth options can be accessed.
- To change these settings navigate using the arrow keys and **Enter** to select a field for modification. Then use the number pad to enter values.
- **F1 Common** opens the common settings menu. Shown in **(FIG 22)**, these settings are relevant to all cut modes.
 - **Max Cutting Speed** – Maximum speed when cutting. (mm/min or inch/min).
 - **Manual Move Speed** – Speed used when manually moving the Torch. (mm/min or inch/min)
 - **G00 Move Speed** – Speed used when automatically moving from one cut to the next or going to/from the current position. (mm/min or inch/min)
 - **Demo/Back Speed** – Speed used when running a frame or demo test via the Space menu. (mm/min or inch/min)
 - **Marker Speed** – Speed used in marker mode. (mm/min or inch/min)
 - **Kerf Value** – Width of the material removed when cutting, used to compensate and obtain accurate results. (mm or inch)
 - **Corner Speed (1-100)** – Percentage of the maximum speed used when the machine rounds corners. (%mm/min or %inch/min)
 - **Demo Run Speed** – Speed used during demo cut mode. (mm/min or inch/min)
 - **Cutting Type** – Select cutting mode.
- **F2 Flame** is for flame cut settings. The CNC plasma table is not configured for this cutting operation type so it is unused.

FIG. 23

DelayBeforeArc	0.000	s	Pierce Count	4	Clear
Pierce Time	0.100	s	WorkPiece Count	1	Clear
Torch Up Time	2.000	s	Cut Length (m)	0.306	Clear
Arcing Check Time	15.000	s	Cut Time	00:00:24	Clear
IHS Check Time	0.000	s	Run Time	00:00:49	Clear
IHS Up Time	0.000	s			
Speed to Lock THC	95.000	mm/min%			
Distance to Lock THC	5.000	mm			
Time of Disable THC After Piercing	0.000	s			
Lose Arc Delay	0.000	s			
Off Arc Before M08	0.000	s			
Watch Arc Enable	<input checked="" type="checkbox"/>				
Use Cylinder THC	<input type="checkbox"/>				

F1 Common	F2 Flame	F3 Plasma	F4 Mark	F5 System	F6 Import	F7 Export	F8 Save
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- **F3 Plasma** opens the plasma settings menu shown in (FIG 23). Settings can be changed and pierce count, workpiece count, cut length, cut time, and run time can be reset as well.
 - **Delay Before Arc** – The amount of time the system will pause before starting the initial height sensor. (Seconds, Default: 0)
 - **Pierce Time** – The amount of time after arc start the plasma Torch will remain stationary. (Seconds, Default: 0.1)
 - **Torch Up Time** – The amount of time the Torch will rise when a cutting operation is finished or stopped. (Seconds, Default: 2)
 - **Arcing Check Time** – The amount of time until the machine stops and displays an error if there is no initial arc. (Seconds, Default: 10)
 - **IHS Check Time** – Check function for the Torch Height Controller, this is the amount of time it will run the Torch down before initial height setting. (Seconds, Default: 0)
 - **IHS Up Time** – Check function for the Torch Height Controller, this is the amount of time it will run the Torch up before initial height setting. (Seconds, Default: 0)
 - **Speed to Lock THC** – Speed percentage of normal when the THC is locked. (% mm/min or % inch/min, Range: 90-100 Default: 95)
 - **Distance to Lock THC** – Distance the from the beginning or end of the cut segment the THC will be locked. (mm or inch), Range = 0-15mm [0-0.6"], Default = 10mm.
 - **Time of Disable THC After Piercing** – Amount of time the Torch Height Controller will be disabled after the initial arc. (Seconds, Default: 0)
 - **Lose Arc Delay** – The amount of time the machine will wait until stopping and displaying an error if it detects no arc is present during the cut. (Seconds, Default: 0.5)
 - **Off Arc Before M08** – Time it will lock the height controller before turning off the arc. (Seconds, Default 0.00)
 - **Watch Arc Enable** – Enables real time monitoring of the arc voltage. (Default: Yes)
 - **Use Cylinder THC** – For other types of height controllers, keep unchecked.

FIG. 24

Horizontal Axis Pulse	135.200	pulse/mm
Vertical Axis Pulse	135.200	pulse/mm
Max Cutting Speed	6000.000	mm/min
Max G00 Speed	6000.000	mm/min
Max Manual Speed	6000.000	mm/min
Accelerate Time in Flame	0.400	s
Accelerate Time in Plasma	0.300	s
Emergency Stop Time	0.080	s
Start Speed	250.000	mm/min
Max +X	100000.000	mm
Max +Y	100000.000	mm
Min -X	-100000.000	mm
Min -Y	-100000.000	mm

F1 Common	F2 Flame	F3 Plasma	F4 Mark	F5 System	F6 Import	F7 Export	F8 Save
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- F5 System settings can be used to change machine settings such as limits and stepper motor settings (FIG 24).
 - “Accelerate Time in Plasma” changes the speed at which the stepper motors accelerate when plasma cutting. Small adjustments here make a big difference, 0.300s is the default value.
 - **Eastwood does not recommend altering other settings in this menu without direction from Eastwood Technical personnel.**
- F6 Import can load saved machine setting profiles from the machine storage drive or a USB drive.
- F7 Export can save machine setting profiles to the machine storage drive or a USB drive. This is useful to save a machine setting profile for a specific material and then quickly retrieve it with the import option.
- Press **Enter** again to input the values and remember to press **F8** to save your changes.
- F2 Flame and F4 Mark are settings for flame cutting operations and not used with plasma cutting.

▲ NOTICE

Eastwood does not recommend altering settings that we do not explicitly describe in the System menu (FIG 24) as this could cause the machine to become nonfunctional or function erratically. Only change machine settings as described in this manual or at direction of Eastwood Technical personnel.

FIG. 25

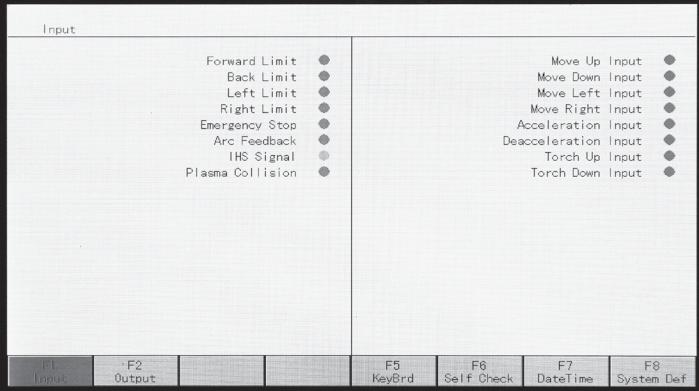


FIG. 26

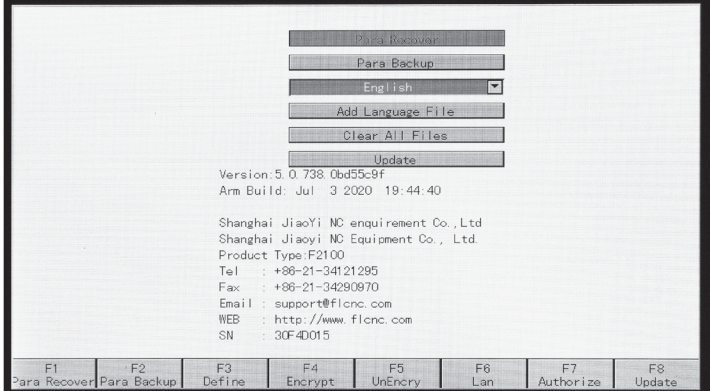


FIG. 27

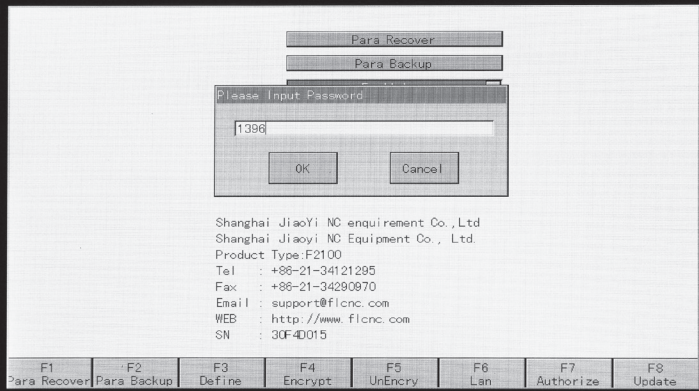
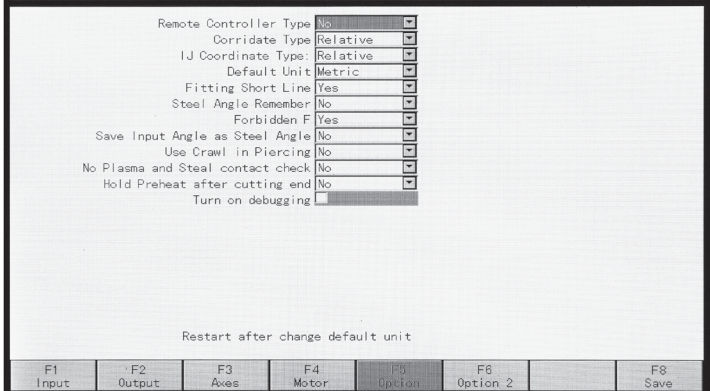


FIG. 28



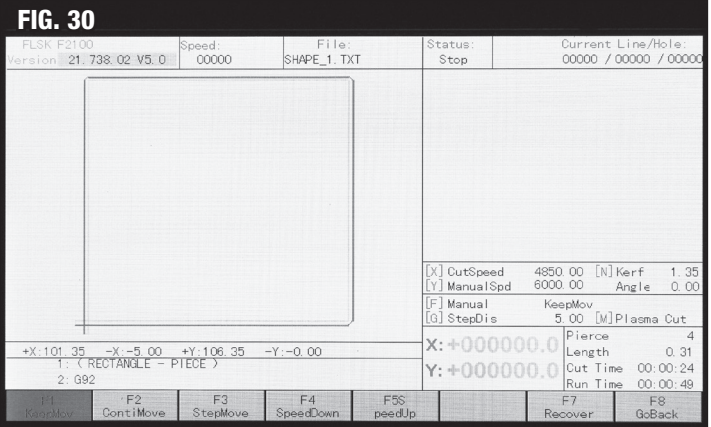
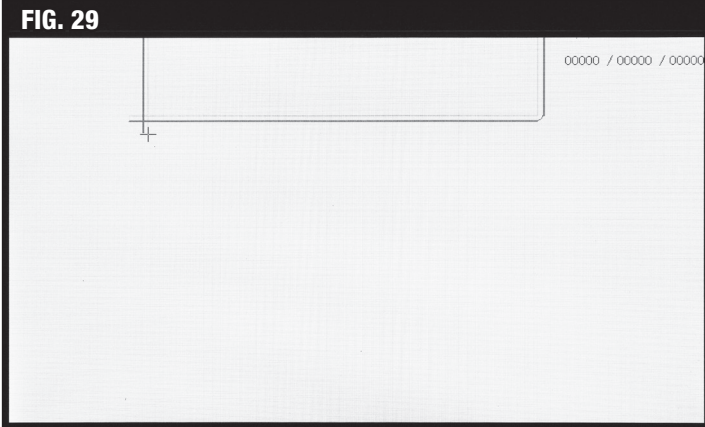
F5 Diagnose

F5 – DIAGNOSE

- **Eastwood does not recommend altering settings left not described in these menus without direction from Eastwood Technical personnel.**
- The diagnose (FIG 25) menu can be used to monitor inputs, outputs, and keyboard so that machine functionality can be tested.
- Setting the date and system recovery/update options are also accessed here using **F7** and **F8**, respectively.
- Machine interface language can be changed from the **F8** System Def option (FIG 26).
- To change the machine’s unit setting from the diagnose menu, go to the **F8** System Def (FIG 26) then **F3** Define and enter the password “1396” (FIG 27). With the correct password entered, navigating to **F5** Option (FIG 28) will open a menu that includes the option to switch units listed as Default Unit (FIG 28). The machine power must be cycled to put this change in effect.

NOTICE

Eastwood does not recommend altering settings that we do not explicitly describe in the diagnostics/settings menus (FIG 25, FIG 26, FIG 27, FIG 28) as this could cause the machine to become nonfunctional or function erratically. Only change machine settings described this manual or at direction of Eastwood Technical personnel.



F6
Zoom In **F6 – ZOOM IN**

- To magnify the screen image of the cut press **F6**, then use the arrow keys to move the view around (**FIG 29**).

F7
Manual Move **F7 – MANUAL MOVE**

- **F7** activates the dedicated manual move mode. This is helpful for making manual plasma cuts (**FIG 30**).
- “KeepMov” will move the Torch while a key is held. “ContiMove” will move the Torch in the arrow key direction until the key is pressed again. “StepMove” will move the Torch in the specified distance increments when the key is pressed.
- Speed can be changed with **F4** and **F5**.
- **F8** will return the Torch to the starting position.
- **F7** exits the manual move menu.
- Manually turning the plasma Torch on can be done by pressing the “Plasma” key and pressing it again will turn it off. Keep in mind that the cut controller can only recognize one key input at a time. Meaning, pressing “Plasma” again while holding a movement key will not stop the plasma cut.

F8
Zero **F8 – ZERO**

This resets all path history and zeroes the coordinate system at the Torch's current location.

FIG. 31

FLSK F2100 Version 21.738.02 V5.0		Speed: 00250	File: SHAPE_37.TXT	Status: Arcing	Current Line/Hole: 00005 / 00002 / 00000		
				<ul style="list-style-type: none"> ● IHS Check 0.0 s ● DelayBeforeArc 0.0 s ● ArcTime 0.8 s ● Pierce 0.2 s ● TorchUp 1.0 s ● TorchDn 0.0 s ● LockTHC ● ARC Feedback ● IHS Signal 			
				<input type="checkbox"/> CutSpeed 2500.00 <input type="checkbox"/> Kerf 0.00 <input type="checkbox"/> ManualSpd 6000.00 <input type="checkbox"/> Angle 0.00 <input type="checkbox"/> Manual KeepMov <input type="checkbox"/> StepDis 5.00 <input type="checkbox"/> Plasma Cut			
+X: 50.00 -X: -50.00 +Y: 55.00 -Y: -50.00 B 16: M07 17: G03 X-5.00 Y-5.00 I0 J-5.00 C				X: -000003.0 Pierce 210 Y: +000043.0 Length 100.09 Cut Time 00:56:11 Run Time 01:16:03			
F1 Back	F2 Demo	F3 GoBack	F4 SpeedDown	F5 SpeedUp	F6 Heat Down	F7 Heat Add	F8 ZoomIn

MAIN CUT SCREEN DURING CUTTING

(FIG 31) and (FIG 32) show the screen options displayed while cutting is in progress at different stages of the cut. (FIG 31) is supplement to (FIG 10), it highlights displays/options that are changed while cutting is in progress. These are defined on the next page.

(FIG 33) is the window that shows when the cut is paused with the STOP button and you jog the torch off the cut path. It asks you to select how the torch should return to the stop point using the letter keys.

[G] CUTTING RETURN will ignite the arc at the torch's current location and cut a direct path to the paused point and continue the rest of the program. This is a great option for restarting a cut because you are effectively setting a manual lead in which will minimize rough cuts where the program was paused. However, in some circumstances there may not be enough space to use this option without damaging another part of the workpiece.

[X] OFFSET CUTTING will offset the cut path to the current location of the torch. Essentially, wherever the torch lies it will re-zero the coordinate system such that the pause point is the current torch location, and cutting will continue. This option is not as useful as the others.

[Y] ONLY RETURN simply returns the torch to the paused point, then the Start button can be used to continue the cut.

FIG. 32

FLSK F2100 Version 21.738.02 V5.0		Speed: 00000	File: SHAPE_37.TXT	Status: Pause	Current Line/Hole: 00009 / 00002 / 00000		
				<ul style="list-style-type: none"> ● IHS Check 0.0 s ● DelayBeforeArc 0.0 s ● ArcTime 2.0 s ● Pierce 0.2 s ● TorchUp 1.0 s ● TorchDn 0.0 s ● LockTHC ● ARC Feedback ● IHS Signal 			
				<input type="checkbox"/> CutSpeed 2500.00 <input type="checkbox"/> Kerf 0.00 <input type="checkbox"/> ManualSpd 6000.00 <input type="checkbox"/> Angle 0.00 <input type="checkbox"/> Manual KeepMov <input type="checkbox"/> StepDis 5.00 <input type="checkbox"/> Plasma Cut			
+X: 50.00 -X: -50.00 +Y: 55.00 -Y: -50.00 22: G00 X38.00 Y-28.00 23: G41				X: +000013.4 Pierce 216 Y: +000020.9 Length 100.86 Cut Time 00:56:32 Run Time 01:16:46			
F1 Back	F2 Demo	F3 GoBack	F4 SpeedDown	F5 SpeedUp	F6 Heat Down	F7 Heat Add	F8 Jump to Pierce

FIG. 33

21.738.02 V5.0		Speed: 00000	File: SHAPE_37.TXT	Status: Pause	Current Line/Hole: 00001 / 00001 / 00000		
				<ul style="list-style-type: none"> ● IHS Check 0.0 s ● DelayBeforeArc 0.0 s ● ArcTime 0.0 s ● Pierce 0.0 s ● TorchUp 0.0 s ● TorchDn 0.0 s ● LockTHC ● ARC Feedback ● IHS Signal 			
				<input type="checkbox"/> Cutting Return <input type="checkbox"/> Offset Cutting <input type="checkbox"/> Only Return			
+X: 50.00 -X: -50.00 +Y: 55.00 -Y: -50.00 8: M07 9: G03 X-5.00 Y-5.00 I0 J-5.00				X: -000008.3 Pierce 385 Y: +000010.2 Length 181.93 Cut Time 02:07:20 Run Time 02:45:39			
F1 Back	F2 Demo	F3 GoBack	F4 SpeedDown	F5 SpeedUp	F6 Heat Down	F7 Heat Add	F8 Jump to Pierce

DESCRIPTION OF MAIN CUT SCREEN DURING CUTTING (FIG 31)

A – Status of THC sensors and programs. Useful to troubleshoot if for example the arc is breaking due to height. If the “Lock THC” indicator is green, it is likely breaking because the Torch height is locked.

- **IHS Check** - Status indicator light for an IHS check. Typically, red.
- **Delay Before Arc** - Status indicator light and timer on the delay before starting the arc after IHS. Typically, Red since the cut controller handles the delay.
- **Arc Time** - Status indicator and timer for time from arc start signal sent to arc started.
- **Pierce** - Timer for pierce delay.
- **Torch Up** - Timer for Torch uptime before moving to the next cut.
- **Torch Dn** - Typically red as the Torch is not programmed to move down unless IHS setting.
- **Lock THC** - Status indicator light for whether the Torch height is locked or not. Red indicates the Torch head should be adjusting dynamically, green indicates the height has hit lock parameters.
- **Arc Feedback** - Status indicator light for ARC voltage is detected, should be green when cutting and red when not cutting.
- **IHS Signal** - Status indicator for signal from the IHS.

B – This display shows the size of the part being cut with respect to the origin. The origin of the part shown is the center. Its overall size window is 50mm in the X+, X-, and Y- directions, but 55mm in the Y+ direction due to the additional size of the lead in. This is easily visualized with the frame function (see MAIN CUT SCREEN).

C – Live stream of the G-code lines being run.

D – Cutting progress display.

- **Blue Line** - Cut path, uncut.
- **Red Line**- Cut path, cut.
- **Yellow Line** - Torch travel line, untraveled.
- **Pink Line** - Torch travel, traveled.
- **Black Line** - Cut path, traveled, but uncut because demo mode was used.
- **Black Rectangle** - One black rectangle remains where the program path started, the other indicated where the Torch is. Position is the top left corner of the rectangle.

F1 - Back

- The back button allows you to return to the previous pierce start from the current position when stopped. This is helpful for if a cut fails, and you must go back to complete it.

F2 - Demo

- Run the path in demo mode when stopped, this results in the cut path being shown as black on the display (Fig 32). Useful if you wish to skip cutting a segment of the file.

F3 - GoBack

- Returns to the start position and resets the current cut in progress. Pressing this will ask you if you want to return before resetting the cut.

F4 - SpeedDown

- Used to adjust speed on the fly while cutting, adjustment increment size scales depending on speed.

F5 - SpeedUp

- Used to adjust speed on the fly while cutting, adjustment increment size scales depending on speed.

F6 - Heat Down

- Unused, for flame cutting.

F7 - Head Add

- Unused, for flame cutting.

F8 – Zoom In

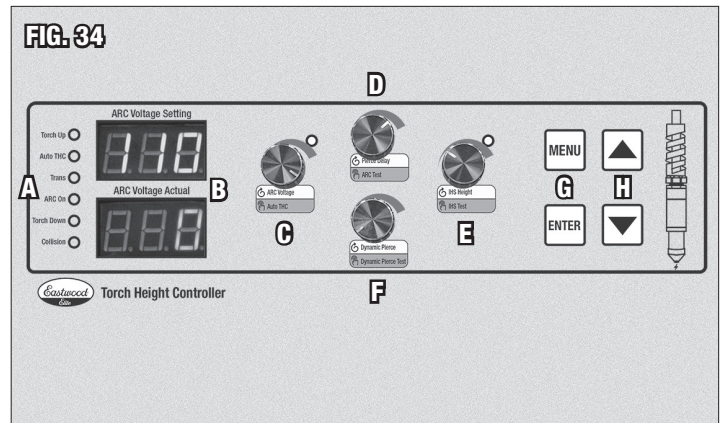
- Toggles a zoomed picture of the cutting progress. Esc to exit zoom view.

OPERATION OF THE TORCH HEIGHT CONTROLLER

PHYSICAL CONTROLS

The Torch Height Controller (**FIG 34**) interfaces with the Cut Controller and is capable of automatically adjusting the height of the Torch in real time to adapt to height variations in the material. The controller does this by monitoring the arc voltage, which is the voltage of the plasma arc.

Higher arc voltage means the plasma arc is longer, lower arc voltage means it is shorter. With the Eastwood Elite CNC Cut 60 optimal arc voltage lies between 100 - 120V typically. If arc voltage is too low the consumables will wear quicker because of slag blowback. If it is too high the cut will have an excessive bevel, or the arc will not be sustainable.



A – Indicator LEDs. The left column indicates which actions the THC is performing.

- **UP** - Illuminates when the motor is adjusting the Torch upward.
- **AUTO THC** - Illuminates when the automatic Torch height control program is actively adjusting the Torch.
- **TRANS** - Illuminates when piercing is successful and arc voltage is being read.
- **ARC ON** - Illuminates when the arc is triggered to start.
- **DOWN** - Illuminates when the motor is adjusting the Torch downward.
- **COLLISION** - Illuminates when the Torch height switch has tripped. During cutting this means the Torch has pushed into the workpiece too much.

B – The two digital displays default to show the set arc voltage on top and the measured arc voltage on the bottom. When cycling menu options or fine-adjusting other settings, the display will show the setting being changed.

C – The **Arc Setting** knob adjusts the arc voltage setting, shown in the top digital display, in real time. Pressing the knob in toggles the automatic Torch height control on and off, when on the LED next to the knob illuminates.

D – The **Pierce Delay** adjustment knob changes the pierce time; however, it is not functional because the cut controller controls the pierce time. Leave this setting at zero. Pressing the knob activates the Arcing test which will turn the Torch on for a split second to verify functionality.

E – The **IHS Height** adjustment knob changes the initial height the plasma Torch sets to, measured in seconds of ascending. When adjusting the knob, the top digital display will show “IHS”, and the bottom will show the current value. The display will reset to arc voltage display when adjustment is finished. Pressing the knob activates the IHS test which will set it to the IHS height, this is good for verifying your Torch start height without cutting. The indicator light next to the knob will illuminate during this test.

F – The **Dynamic Pierce** adjustment knob is not set up to be functional on the Eastwood CNC tables.

G – Pressing **MENU** will cycle through the different menu options on the digital display. The default is the arc voltage display, the first press cycles to the “P” parameters, the second press cycles to the “H” parameters and the last option displays the system version number. To scroll through each menu, use the IHS Height knob. To adjust an option, press **ENTER** and use the IHS height knob to adjust the setting, then press **ENTER** again to save it.

H – Manual Torch height controlling keys for quick adjustments.

DISPLAY SETTINGS

The default display setting displays the set arc voltage and actual arc voltage on the digital display.

Pressing the **MENU** button once goes to the P05 - P99 parameters. These determine how the auto height control works. To adjust these, press the **ENTER**.

PARAMETER	DESCRIPTION	UNIT	RANGE
P05	Parameter used to prevent collision caused by a gap in the material. If the arc voltage exceeds the arc voltage set point plus this set number, the Torch height control will disable until it returns within set range.	Volts	10 - 50 Default: 30
P06	Arc voltage precision, this is the minimum adjustment difference for the height controller. If set to 1V, and the actual arc voltage is more than 1V high or low, the height controller will adjust to compensate.	Volts	1 - 10 Default: 1
P07	Sensitivity coefficient, this determines how quickly the Torch height will react to an arc voltage change. The bigger the number, the faster and more extremely the Torch will adjust. However, too much can cause the Torch to get caught in a feedback loop where it will go up and down rapidly.	-	1 - 50 Default: 6
P11	Collision limiter. If the collision switch is triggered over the set number of times, the cut will be halted.	-	0 - 5 Default: 0
P18	Motor time ascending the Torch after the cut has finished.	Seconds	0.1 - 9.99
P19	Time the Torch will ascend when the arc is started. In some circumstances this can help prevent slag from getting into the Torch nozzle when the arc begins.	Seconds	0 - 10 Default: 0.00
P20	Rapid descent time for dual speed IHS mode.	Seconds	0 - 20 Default: 6.0
P99	Unused	-	-

The third option is the "H" parameters, which are used to interface the cut controller with the Torch height controller. These should only be altered at direction of Eastwood Technical personnel.

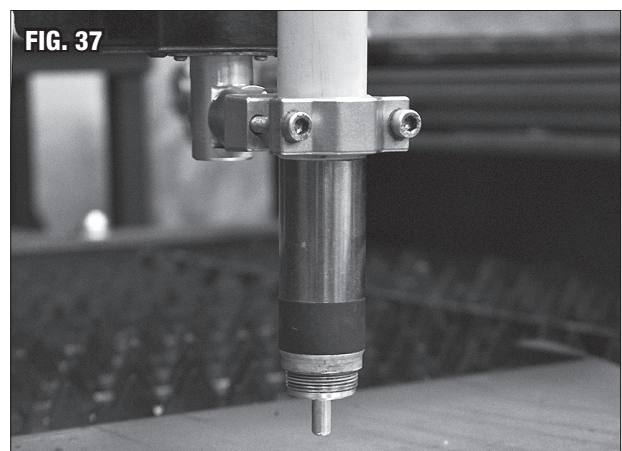
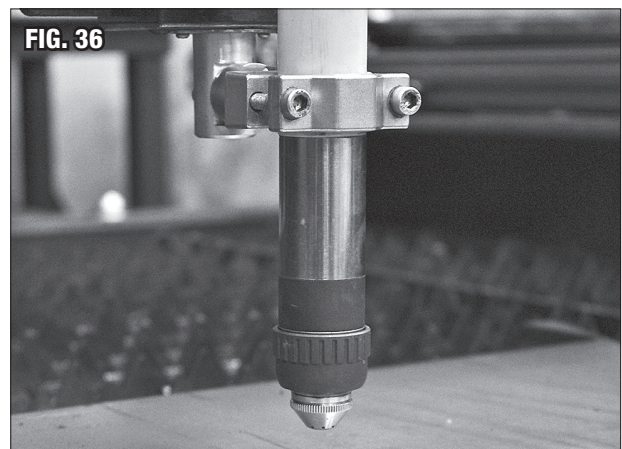
The last, "SYS", is the system version number.

MAINTENANCE AND REPAIR

- The belt track of the CNC should be kept clear of debris and dust build up. The track should be lubricated regularly depending on usage. If the track is poorly lubricated it may be loud and not traverse smoothly.
- Consumables should be replaced as needed. For best performance replace the Nozzle & Electrode in pairs, but usually the Nozzle life can be stretched longer than that of the Electrode. The Nozzle Guard should be replaced if damaged.

CONSUMABLE REPLACEMENT

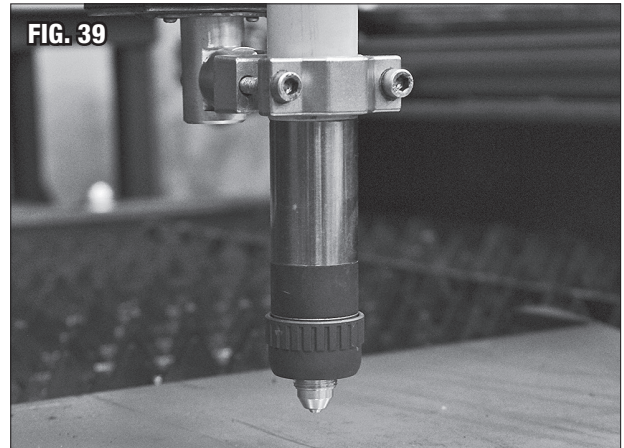
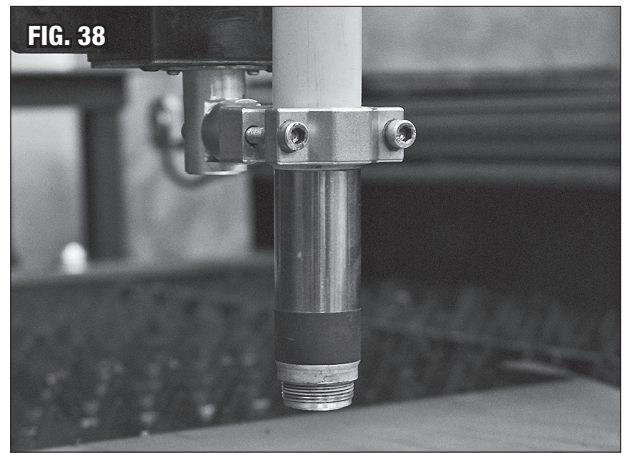
- Replacing consumables, shown in exploded view in **(FIG 35)** and as installed on the unit on in **(FIG 36)** is very simple. To begin, make sure that cutting is stopped, and the plasma cutter unit is switched off.
- Unthread the Torch Main Cap Body counterclockwise to remove. It should be hand tight. If too tight, gently utilize channel lock pliers, or similar, to break it loose.
- With the Main Cap Body removed **(FIG 37)** the Nozzle can be inspected and replaced easily by lifting it out and placing a new one inside. Replacement Nozzles are available in different Nozzle sizes for different amperage ranges, as listed below:
 - #55158 Eastwood CNC Plasma Torch Nozzles (30A) 20-Pack
 - #55159 Eastwood CNC Plasma Torch Nozzles (35-60A) 20-Pack
 - #55160 Eastwood CNC Plasma Torch Nozzles (65A-120A) 20-Pack



- The Electrode is threaded into the Torch. To remove it, a 5/16" or 8mm deep socket or wrench (not included) is needed. With the socket, turn it counterclockwise to loosen and remove (**FIG 38**). When installing a new one, always start the threads by hand. Cross threading is easy to do and will result in damage requiring Torch replacement.
- The Electrode does not need to be very tight. A gentle turn with a 1/4" ratchet to snug it just past hand tight is enough. Replacement Electrodes for all amperage ranges are available as #55156 Eastwood CNC Plasma Torch Electrodes, 10-Pack.
- The Nozzle Guard Cap can be loosened from the main cap body counterclockwise (**FIG 39**) and replaced if damaged. With good height settings and maintained consumables the Nozzle Guard Cap should last a long time. If damaged, a Nozzle Guard Cap Pack can be purchased #55157 Eastwood CNC Plasma Torch Nozzle Guard Cap, 5-Pack.
- When reinstalling the Main Cap Body and Nozzle Guard Cap, snugging them down by hand is sufficient. Over tightening with pliers could result in damage.

▲ NOTICE

The components of the Torch do not need to be torqued to any spec to function properly. Hand tightening is sufficient to prevent loosening from vibration.



DETERMINING CONSUMABLE CONDITION

Consumables for the CNC Plasma Table can take great abuse before total failure, but for best cut quality and a stable arc, the consumables should be replaced before total failure. Consumable life will vary depending on usage. Cutting thick material at high amperage for long duration, consumables will wear far faster than thin gauge metal at lower amperage.

ELECTRODE (FIG 40)

MINOR WEAR – Electrode exhibits discoloration and light charring from heat with a small dimple or no dimple on the bottom. Cutting is not affected noticeably, quality is best in this range.

MODERATE WEAR - Electrode has more significant charring and discoloration with a larger, but still uniform, dimple on the bottom. During cutting the arc remains stable, and quality is less uniform but acceptable in this range.

SEVERE WEAR - Results in extreme Electrode charring. The dimple is no longer uniform, or the bottom has deformed severely. At this point cutting will be very difficult and of poor quality. In this wear state damage to the nozzle guard cap and nozzle is more likely to occur. Replace Electrode immediately.

NOZZLE (FIG 41)

MINOR WEAR – Nozzle exhibits discoloration and light charring from heat, but the inside is still smooth, and the nozzle is not deformed significantly. Cut quality is best in this range.

MODERATE WEAR – Nozzle has more significant charring and discoloration. Inside of Nozzle may have some light slag at the bottom and the hole may no longer be perfect but is still round. Light arcing to the inner Nozzle wall may be present. Cut quality will be slightly degraded and kerf may enlarge, but quality is still acceptable.

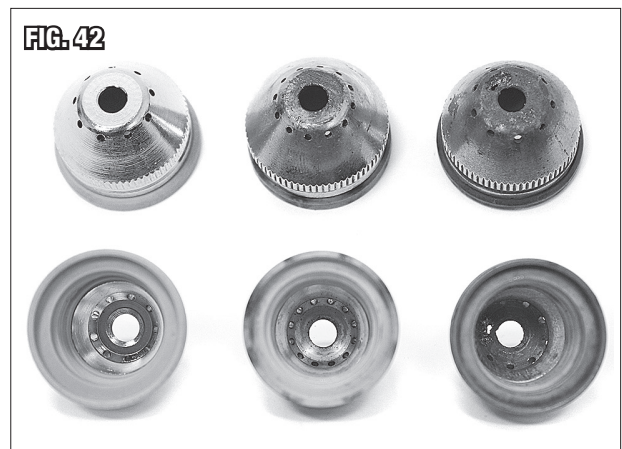
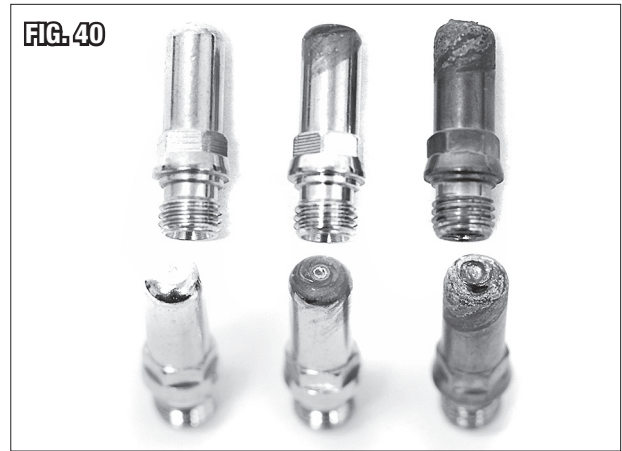
SEVERE WEAR - Results in extreme Nozzle charring. The inside and outside the Nozzle may have severe arcing damage. The Nozzle tip is no longer round and has major deformation. Cut quality will be inconsistent and the arc is unstable. In this wear state, damage to the Nozzle Guard Cap is more likely to occur. Replace the Nozzle immediately.

NOZZLE GUARD (FIG 42)

MINOR WEAR – Nozzle Guard exhibits discoloration and light charring from heat, but no damage is present. Any slag can be knocked off and diffuser holes are clear. Consumable life is best in this range.

MODERATE WEAR – No damage present, but discoloration is permanent. Slag can still be removed, and diffuser holes can be cleared. Consumable life is still unaffected in this range.

SEVERE WEAR – Nozzle Guard has sustained noticeable damage. Hole blockage or damage from arcing is present and slag may be permanently stuck to the guard. The Nozzle Guard should be replaced immediately to prevent shortened consumable life.



TROUBLESHOOTING

PROBLEM	CAUSE	CORRECTION
Controllers Will Not Power On	No Power	Check 120 VAC, 60Hz, 6.8 Amp power source and connection to CNC table.
	Power supply circuit breaker tripped	Reset circuit breaker.
	Computer malfunction	Contact Eastwood Technical Assistance: techelp@eastwood.com or 800.544.5118.
Plasma Arc Will Not Start	No power	Power supply circuit breaker tripped.
	Power supply circuit breaker tripped	Reset circuit breaker.
	Plasma cutter unit overloaded	Check for overload indicator. Allow unit to cool. Ensure the duty cycle is not exceeded.
	Consumable failure	Check consumable condition and replace if necessary.
	Torch height too high	Lower arc voltage and/or initial height setting.
	Incorrect mode	Cut Controller must be in Plasma mode.
	Settings altered too far, making plasma cutting difficult	Refer to FIG 22, FIG 23, FIG 24, FIG 28, and the Torch Height Controller Settings table in Page 25 for safe default settings. If machine is still not functional contact Eastwood Technical Assistance: techelp@eastwood.com or 800.544.5118.
Plasma Arc Repeatedly Breaks	Gap traversed is too large	Modify pathing so the plasma Torch does not attempt to cross large gaps in the workpiece.
	Lose arc delay set too low	Raise the lose arc delay setting so it does not immediately stop the machine when arc break is detected.
	Check arc time too low	Increase arc check time so there is sufficient time for the height to set and the arc to fire.
	Consumable failure	Check consumable condition and replace if necessary.
	Torch height too high	Lower arc voltage and/or initial height setting.
	Torch height is locked	Check lock indicator during cut. If the Torch height is being locked change a lock setting such as THC disable or THC lock to not lock the height.
	Settings altered too far, making plasma cutting difficult	Refer to FIG 22, FIG 23, FIG 24, FIG 28, and the Torch Height Controller Settings table in Page 25 for safe default settings. If machine is still not functional contact Eastwood Technical Assistance: techelp@eastwood.com or 800.544.5118.
Poor Cut Quality	Low supply air pressure to plasma unit	Check for 60 PSI [4.13bar] during cut. On the Eastwood CNC Cut 60 the air toggle switch can be flipped on to check this.
	Air leak at fittings, lines, hose, or air-powered device	Stop plasma unit, locate leak, and perform repair.
	Improper arc voltage	Check arc voltage reference table for use with Eastwood CNC Cut 60, but for thin gauge metal Torch height should be 0.11-0.19" [3-5mm] above workpiece during cut.
	Consumable failure	Check consumable condition and replace if necessary. Check that consumables are properly installed. Consumables can touch and cause an air blockage or poor arc in some circumstances. Observe that good air is flowing through the Torch and the arc is a tightly formed vertical beam.
	Improper amperage	Reference cut setting tables for optimal amperage.

TROUBLESHOOTING

PROBLEM	CAUSE	CORRECTION
Poor Dimensional Accuracy	Improper kerf	Before cutting an important piece, run a test piece without any kerf compensation. Measure the kerf by subtracting the measured size from the set size and dividing by two for an outer dimension. Use this calculated kerf as your new kerf setting. Remember, CNC plasma cutting has inconsistencies which make it difficult to get better tolerance than $\pm 0.02"$ [0.5mm] consistently. Furthermore, there will always be some positive bevel, the thicker the material the more noticeable the bevel is.
	CNC system is not calibrated	Contact Eastwood Technical Assistance: techelp@eastwood.com or 800.544.5118.
Limit Alarm Triggered Randomly	Failed limit sensor	Turn off the sensor so the table may be operated without it by pressing "F5" from the main cut screen. Then press "F8", followed by "F3". The machine will open a password prompt window. Type "1396" and press "Enter". From here the limit sensors will be on the left side. Switch the "Type" for the problem sensor from "NC" to "NO". If this resolves the problem, contact Eastwood Technical Assistance: techelp@eastwood.com or 800.544.5118 for a replacement sensor.
	Failed wiring	Check for damaged wiring to the problem sensor.
	Ferrous metal buildup	Check that the sensor is clean from buildup of ferrous metal and no large metal objects are triggering it.
USB Drive Not Detected Or Files Load Incorrectly	USB drive is too large	Maximum USB drive size supported is 16GB.
	USB drive is not formatted to the correct file system	Reformat to FAT or FAT32 file system, this can be done on a Windows PC by right clicking the USB drive in File Explorer and selecting Format.
	USB drive file system is corrupted	Reformat the USB drive as described above. USB drive file systems can corrupt over time, especially in usage with the CNC plasma table where the drive is frequently connected and disconnected. This usually results in a part loading distorted or missing parts.

QUICK GUIDES

▲ NOTICE

Read and understand all previous content before attempting operate the CNC Plasma Table.

START CUTTING A LIBRARY SHAPE

- Refer to CNC PLASMA TABLE SET-UP and CNC CUT 60 PLASMA CUTTER SET-UP at the front of before proceeding. This will make sure the table is set up.
- Verify table and the cutter have power supplied and are switched on. Verify the plasma cutter has air supplied regulator is set to 0.40MPa.
- Verify the workpiece is grounded.
- At the Eastwood Elite logo screen press any key to continue to the main cut screen.
- You are now at the main cut screen. Press key **F1** for the shape library. Use the green arrow keys to change selection and **F8** to select.
- Input desired dimensions. Each dimension is shown on the part below the dimension input area. The default unit is millimeters.
- **Lead In** and **Lead Out** are be used to help smooth the cut where the machine starts and finishes cutting. Generally, at least 6mm (0.2 in) should be used. More lead in will make a smoother entry cut with thick materials.
- Press **F8** when finished dimensioning. Simultaneously press **Shift + M** to cycle modes to until plasma is shown.
- Before starting the operation, go to the CUT SPEED REFERENCE TABLE seen below and make sure your settings will work with the material at hand. If not, alter them by using the **F4** key for settings, then **F1** and **F3** keys for common and plasma settings, respectively. Double clicking **F8** will save settings, and **ESC** will return you to the main cut screen.
- Additionally, check the ARC volts and IHS setting on the torch height controller against the reference table.
- Now that the machine is set up, to run the operation jog the torch to the desired start location using the arrow keys and press **F8** to zero it as your start point. Verify that your cut path is correct by pressing **Space** then **F2** to run a demo of the path. This is covered in greater detail below in HOW TO UTILIZE DEMO MODE and on Page 13.
- If torch path needs to be changed move the torch, zero again, and run a demo again to verify the correction.
- When ready to cut, press **Start** followed by **Enter** to initiate the cut. The torch will move to the cut start point, level the torch, and then start the arc.
- The operation can be paused at any time by pressing Stop and started again by pressing Start.
- If you stop and manually jog the torch when you press Start a prompt will list several options for returning the torch to the cut path. Typically, for best cut continuity return only should be used. With the torch returned press Start again to continue cutting. This is described in more detail on Page 22.
- To exit a cut press ESC then Enter.

CUT SPEED REFERENCE TABLE

Thickness	Amperage	Cut Speed	Corner Speed	Pierce Time	Disable THC Time	Accelerate Time	Arc Volts	IHS Height
(inch) – [mm]	(A)	(ipm) - [mm/min]	(%)	(sec)	(sec)	(sec)	(V)	(sec)
0.0375 (20 gauge) [0.952]	60	(137) - [3500]	95	0.00	0.10	0.2	102	0.25
0.050 (18 gauge) [1.27]		(118) - [3000]	95	0.00	0.10	0.2	102	0.25
0.0625 (16 gauge) [1.59]		(88) - [2250]	95	0.15	0.20	2	105	0.25
0.125 [3.18]		(43) - [1100]	95	0.30	0.50	0.4	108	0.30
0.25 [6.35]		(37) - [950]	95	0.5	0.7	0.5	110	0.30
0.375 [9.52]		(29) - [750]	99	0.75	0.9	0.6	112	0.30

HOW TO UTILIZE DEMO MODE

- There are two independent ways to run a demo mode on the CNC table. Dedicated Demo Mode and Frame.
- The first option is the Dedicated Demo Mode accessed on the main cut screen by cycling to it with **Shift + M**. This mode simply runs the Torch through the cut path or to a certain point without activating the plasma cutter or Torch height controller.
- This is useful in some scenarios as you can seamlessly transition between cutting a part in plasma mode, pause, and then run the file in demo mode if you wanted to skip over a section or to a section.
- The other demo method is very useful for pre-cut checks because it can be accessed while in the plasma cutting mode by pressing **Space**. The functions can be seen in the bottom bar. Demo will run the cut path, exactly as the demo mode does, but the speed set between these two modes is independent.
- The second mode is Frame. This is highly recommended to be used before every cut because it will move the Torch around the cut in a rectangular manner. This gives a quick idea if a cut will have any interference with objects, existing cut outs, and table limits. When running the machine, we highly recommended running the Frame function before every cut.

CREATING AND CUTTING A G-CODE FILE WITH AUTODESK® FUSION 360®

- Once the sketch is created, extruding the design in the manner you desire it to be cut out is recommended (extruded distance does not matter). This will make pathing simpler.
- Using the “Change Workspace” drop down menu on the left of the main toolbar, change from the current workspace to the “MANUFACTURE” workspace.
- In the main toolbar switch to the “FABRICATION” tab.
- Select the “2D Profile” tool in the “CUTTING” box. The 2D Profile window will open and default to the “Tool” tab.
- In the “Tool” tab the select the desired plasma tool. The “Select Tool” window will open.
 - To create a tool, navigate to the local library in the “Libraries” box (Local -> Library), then press the “Create new tool for waterjet, laser, and plasma cutting.” icon in the top right of the window.
 - In the “Cutter” tab switch the type to “Plasma cutter” and change the unit to Millimeters or Inches, depending on which unit your Eastwood CNC Plasma Table is currently configured for.
 - Set the kerf width to the desired value. At maximum amperage with the Eastwood Plasma Cutter, kerf width is typically 1.48mm or 0.0583”, but for best dimensional accuracy, measure the kerf width yourself.
 - Press **OK** to finish. Now this tool will always be available for future selection in the local library.
- In the “Geometry” tab, click the face that is to be cut out.
- In the “Passes” tab, Tolerance of the machine path can be adjusted. For best cut quality Sideways Compensation should be set to Left. Compensation Type controls whether the kerf width is to be controlled by the Cutting Control System “In control” or by Fusion 360 “In Computer”.
 - For designs with small and/or intricate features allowing Fusion 360 to compensate is highly recommended. The Cutting Control System cannot calculate compensation pathing for these and will default to zero kerf. If using Fusion 360 to compensate, check that the kerf width in the Cutting Control System is set to zero.
- In the “Linking” tab Lead-In/Lead-Out can be adjusted and cut entry/exit positions can be altered.
- When finished, press the **OK** button. If no errors appear, the toolpath has been generated.
 - To view the toolpath in motion, select “Simulate” in the “ACTIONS” box. The path the plasma Torch will take can be manipulated with the control arrows at the bottom center of the window.
- To output the path as G-Code for the Eastwood CNC Plasma Table, select “Post Process” in the “ACTIONS” box. This will generate the G-Code for the selected toolpath(s). Press the **Post** button and save it to the desired location.
 - If running the Post Process for the first time, download the Eastwood CNC Plasma table post configuration file. Using the “...” button in the Configuration Folder box select the folder the post configuration was downloaded to. Now in the Post Configuration box the Eastwood CNC Plasma Table post configuration can be selected. The default output folder can also be changed below.
- Transfer the file you just saved to a USB flash drive and then plug it into the machine.
- Once the USB stick is inserted, a drawing can be imported from the Main Cut Screen by pressing **F2** to enter the file menu, then pressing **F2** again to go to USB device.
- The USB stick’s files can be navigated using the arrow keys, **Enter** and, **Esc**.
- When the desired file is selected, press **Enter** to open it in the Main Cut Menu.
- Files can be saved to the machine’s storage by pressing **F6** on the file when it is selected in the USB Stick Menu.

CONVERTING AN IMAGE OR .PDF TO .DXF FOR CUTTING

- To cut an image file or .PDF file, it must be converted to a .dxf file so that Fusion 360 can open it in a manner that a cut path can be created from.
- This is easily done for free from a website such as <https://convertio.co/> which can translate a variety of file types to a .dxf drawing.
- When converting an image, if it does not convert the file to a .dxf as desired it may be helpful to use a photo editor to increase the contrast, neutralize colors, or edit certain aspects out. This can also be done from inside Fusion 360.
- On convertio.co, choose your file to be converted, then in the drop-down menu to the right of to navigate to CAD > DXF.
- Press the Convert button and download the converted file.
- In Fusion 360 navigate to File > Open or use key combo CTRL + O, then select Open from my computer... and find the converted .DXF file.
- From here, follow steps in the previous section CREATING AND CUTTING A FILE WITH AUTODESK FUSION 360.

RECOVERING AN INCOMPLETE/FAILED CUT

If for any reason a cut does not complete, the steps below can be taken to rerun a cut segment. These steps can also be used if a setting must be changed before continuing to cut, as settings cannot be changed during a cut. Note that restarting the cut mid segment is never as smooth as a continuous cut; for best results stop the machine between cuts.

IF THE INCOMPLETE CUT IS NOTICED BEFORE PROGRAM ENDS

- When you notice the incomplete cut, press the **Stop** button. The **F1** button will serve as a back button to run G-code segments in reverse. Pressing it will travel the Torch back to the last cut start point.
- Return to a point prior to the incomplete section, then use **Shift** plus **M** to switch to Demo Mode. Now press start, and a few millimeters before the incomplete section hit the **Stop** button. Using **F4** & **F5** to speed and slow movement while lining it up can be helpful.
- Use **Shift** plus **M** again to switch back to Plasma Mode, and press start. Now the program will resume.
- To alter settings during a cut, the same basic idea is used, but press **F1** until the Torch returns to the zero point of the file. Now press Esc and then **Enter** to exit the cut back to the Main Cut Screen and alter settings.
- Now switch to Demo Mode and run up to the point where the program was stopped and switch back to Plasma Mode to resume cutting.

IF THE INCOMPLETE CUT IS NOTICED AFTER PROGRAM FINISHES

- When you notice the incomplete cut after the program has finished, move the Torch back to the start point (0.000). Typically after a program ends the machine will prompt you, asking if you would like to automatically return to start. DO NOT press zero.
- Use **Shift** plus **M** to switch to Demo Mode. Now press **Start** and **Enter**, a few millimeters before the incomplete section hit the **Stop** button.
- Use **Shift** plus **M** again to switch back to Plasma Mode, and press **Start**.

CHANGING SETTINGS DURING CUTTING

- If a menu setting must be changed during cutting, press **Stop**, then press **F3** to make the Torch return to the starting point of the program. Now settings can be changed.
- Now use **Shift** plus **M** to switch to Demo Mode. Press Start and a few millimeters before stopping point, press the **Stop** button. Using **F4** & **F5** to speed and slow movement while lining it up can be helpful.
- Use **Shift** plus **M** again to switch back to Plasma Mode, and press **Start**. Now the program will resume with the updated settings.

DETERMINING MACHINE SETTINGS

AMPERAGE

For anything thicker than 0.0625" [1.59mm], 60A output on the Plasma Cutter is optimal for max speed and required for thicker materials. Thinner gauge steels can be cut with lower amperage and the smaller 30A nozzle if desired. Lower amperage with the smaller nozzle is ideal for intricate sheet metal cuts to reduce warp and increase detail.

CUT SPEED - To perfect cut speed, first start with a speed from the reference table. Depending on condition of consumables and amperage, the speed can be fine-tuned. The best speed is the fastest possible with minimal dross on the finished piece. Large chunky dross means speed is too low, a small hard bead means too fast. When cutting in the optimal speed range, it is typical for a narrow spray of sparks to shoot out over top the sheet.

CORNER SPEED - This does not have a drastic effect, but generally a slight reduction in corner speed is optimal when cut speed is high.

PIERCE TIME - Improper pierce time can cause two things: failure to penetrate, resulting in a spark and slag shower with poor initial cut; or arc failure and sputtering at the beginning of a cut. Thick metal may require nearly a second pierce time or more, while thin gauge may not require any.

DISABLE THC TIME - This is the time the THC will be locked after starting the cut. With thick metal increasing this can improve stability of the cut at start, where extreme variations in arc voltage cause unstable Torch height.

ACCELERATE TIME - The jumpiness of the movement is greatly affected by accelerate time, and high speeds increasing it makes movement smoother.

ARC VOLTS - Voltage drop across the arc is measured, which is useful for measuring height. The height controller will attempt to keep the arc volts at the setpoint; the optimal range will vary depending on the plasma cutter used.

IHS SETTING - The initial height is set in seconds of motor run time upwards. Ideally the pierce height is physically slightly higher than the cut height (arc volts). With thick material, good initial height is critical because damage to consumables can occur if a low start height is used and results in slag being shot back into the Torch.

KERF - The kerf varies depending on a lot of factors, and even slightly varies as the table cuts. However, it is typically between 0.04" and 0.06" [1.0mm and 1.50mm]. To get the most accurate kerf width, measure a cut piece with zero kerf and subtract the actual size from the desired size. If both sides being measured have been cut divide by two. Due to the nature of plasma cutting there will almost always be a positive bevel, meaning the piece will be larger overall at the bottom of the cut.

CUT SPEED REFERENCE TABLE

These settings will provide a good starting point for cutting various thicknesses and types of metals.

Thickness	Amperage	Cut Speed	Corner Speed	Pierce Time	Disable THC Time	Accelerate Time	Arc Volts	IHS Height
(inch) – [mm]	(A)	(ipm) - [mm/min]	(%)	(sec)	(sec)	(sec)	(V)	(sec)
0.0375 (20 gauge) [0.952]	60	(137) - [3500]	95	0.00	0.10	0.2	102	0.25
0.050 (18 gauge) [1.27]		(118) - [3000]	95	0.00	0.10	0.2	102	0.25
0.0625 (16 gauge) [1.59]		(88) - [2250]	95	0.15	0.20	2	105	0.25
0.125 [3.18]		(43) - [1100]	95	0.30	0.50	0.4	108	0.30
0.25 [6.35]		(37) - [950]	95	0.5	0.7	0.5	110	0.30
0.375 [9.52]		(29) - [750]	99	0.75	0.9	0.6	112	0.30

OPTIONAL ITEMS

- #33863 Plasma Cutting Fluid - 5 Gallon
- #33864 Plasma Cutting Fluid - 1 Gallons

CONSUMABLES

- #55156 Eastwood CNC Plasma Torch Electrodes 10-Pack
- #55157 Eastwood CNC Plasma Torch Nozzle Guard Cap 5-Pack
- #55158 Eastwood CNC Plasma Torch Nozzles (30A) 20-Pack
- #55159 Eastwood CNC Plasma Torch Nozzles (35-60A) 20-Pack
- #55160 Eastwood CNC Plasma Torch Nozzles (65A-120A) 20-Pack
- #55161 Eastwood Hand Plasma Torch Electrode 10-Pack
- #55162 Eastwood Hand Plasma Torch Nozzle 10-Pack
- #55163 Eastwood Hand Plasma Torch Cup 10-Pack

If you have any questions about the use of this product, please contact

The Eastwood Technical Assistance Service Department: 800.343.9353 >> email: tech@eastwood.com

PDF version of this manual is available at eastwood.com

The Eastwood Company 263 Shoemaker Road, Pottstown, PA 19464, USA 800.343.9353 eastwood.com

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