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Hypertherm®
Automation

PHOENIX® SOFTWARE FOR HYPERTHERM SHAPE CUTTING CONTROL

OPERATOR'S MANUAL

Version 8.5 for Touch Screen CNCs

January 2009

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Contents

Safety

Read This Manual

Read and understand this instructional manual, the cutting machine manuals, and your employer's safety practices.

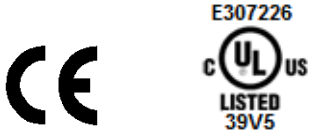
Note: This product is not designed to be field serviceable. Please return to an authorized repair center for any required service.

Product Listings

MicroEdge and Voyager III

Note: This product has been designed and manufactured in accordance with CE and UL Safety Standards.

Edge TI



Note: This product has been designed and manufactured in accordance with CE and UL Safety Standards.

Please contact Hypertherm Automation for further safety listing information.

RECOGNIZE SAFETY INFORMATION

The symbols shown in this section are used to identify potential hazards. When you see a safety symbol in this manual or on your machine, understand the potential for personal injury, and follow the related instructions to avoid the hazard.

FOLLOW SAFETY INSTRUCTIONS

Read carefully all safety messages in this manual and safety labels on your machine.

- Keep the safety labels on your machine in good condition. Replace missing or damaged labels immediately.
- Learn how to operate the machine and how to use the controls properly. Do not let anyone operate it without instruction.
- Keep your machine in proper working condition. Unauthorized modifications to the machine may affect safety and machine service life.

DANGER WARNING CAUTION

A signal word DANGER or WARNING is used with a safety symbol. DANGER identifies the most serious hazards.

- DANGER and WARNING safety labels are located on your machine near specific hazards.
- WARNING safety messages precede related instructions in this manual that may result in injury or death if not followed correctly.
- CAUTION safety messages precede related instructions in this manual that may result in damage to equipment if not followed correctly.

CUTTING CAN CAUSE FIRE OR EXPLOSION

Fire Prevention

- Be sure the area is safe before doing any cutting. Keep a fire extinguisher nearby.
- Remove all flammables within 35 feet (10 m) of the cutting area.
- Quench hot metal or allow it to cool before handling or before letting it touch combustible materials.
- Never cut containers with potentially flammable materials inside – they must be emptied and properly cleaned first.
- Ventilate potentially flammable atmospheres before cutting.
- When cutting with oxygen as the plasma gas, an exhaust ventilation system is required.

Explosion Prevention

- Do not use the plasma system if explosive dust or vapors may be present.
- Do not cut pressurized cylinders, pipes, or any closed container.
- Do not cut containers that have held combustible materials.

WARNING

Explosion Hazard
Argon-Hydrogen and Methane

Hydrogen and methane are flammable gases that present an explosion hazard. Keep flames away from cylinders and hoses that contain methane or hydrogen mixtures. Keep flames and sparks away from the torch when using methane or argon-hydrogen plasma.

WARNING

Hydrogen Detonation with Aluminum Cutting

- When cutting aluminum underwater, or with the water touching the underside of the aluminum, free hydrogen gas may collect under the workpiece and detonate during plasma cutting operations.
- Install an aeration manifold on the floor of the water table to eliminate the possibility of hydrogen detonation. Refer to the Appendix section of this manual for aeration manifold details.


ELECTRIC SHOCK CAN KILL

Touching live electrical parts can cause a fatal shock or severe burn.

- Operating the plasma system completes an electrical circuit between the torch and the workpiece. The workpiece and anything touching the workpiece are part of the electrical circuit.
- Never touch the torch body, workpiece or the water in a water table when the plasma system is operating.

Electric Shock Prevention

All Hypertherm plasma systems use high voltage in the cutting process (200 to 400 VDC are common). Take the following precautions when operating this system:

- Wear insulated gloves and boots, and keep your body and clothing dry.
- Do not stand, sit or lie on – or touch – any wet surface when using the plasma system.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground. If you must work in or near a damp area, use extreme caution.
- Provide a disconnect switch close to the power supply with properly sized fuses. This switch allows the operator to turn off the power supply quickly in an emergency situation.
- When using a water table, be sure that it is correctly connected to earth ground.
- Install and ground this equipment according to the instruction manual and in accordance with national and local codes.
- Inspect the input power cord frequently for damage or cracking of the cover. Replace a damaged power cord immediately. **Bare wiring can kill.**
- Inspect and replace any worn or damaged torch leads.
- Do not pick up the workpiece, including the waste cutoff, while you cut. Leave the workpiece in place or on the workbench with the work cable attached during the cutting process.
- Before checking, cleaning or changing torch parts, disconnect the main power or unplug the power supply.
- Never bypass or shortcut the safety interlocks.
- Before removing any power supply or system enclosure cover, disconnect electrical input power. Wait 5 minutes after disconnecting the main power to allow capacitors to discharge.
- Never operate the plasma system unless the power supply covers are in place. Exposed power supply connections present a severe electrical hazard.
- When making input connections, attach proper grounding conductor first.
- Each Hypertherm plasma system is designed to be used only with specific Hypertherm torches. Do not substitute other torches which could overheat and present a safety hazard.

STATIC ELECTRICITY CAN DAMAGE CIRCUIT BOARDS

Use proper precautions when handling printed circuit boards.

- Store PC boards in anti-static containers.
- Wear a grounded wrist strap when handling PC boards.

TOXIC FUMES CAN CAUSE INJURY OR DEATH

The plasma arc by itself is the heat source used for cutting. Accordingly, although the plasma arc has not been identified as a source of toxic fumes, the material being cut can be a source of toxic fumes or gases that deplete oxygen.

Fumes produced vary depending on the metal that is cut. Metals that may release toxic fumes include, but are not limited to, stainless steel, carbon steel, zinc (galvanized), and copper.

In some cases, the metal may be coated with a substance that could release toxic fumes. Toxic coatings include, but are not limited to, lead (in some paints), cadmium (in some paints and fillers), and beryllium.

Gases produced by plasma cutting vary based on the material to be cut and the method of cutting, but may include ozone, oxides of nitrogen, hexavalent chromium, hydrogen, and other substances if such are contained in or released by the material being cut.

Caution should be taken to minimize exposure to fumes produced by any industrial process. Depending upon the chemical composition and concentration of the fumes (as well as other factors, such as ventilation), there may be a risk of physical illness, such as birth defects or cancer.

It is the responsibility of the equipment and site owner to test the air quality in the area where the equipment is used and to ensure that the air quality in the workplace meets all local and national standards and regulations.

The air quality level in any relevant workplace depends on site-specific variables such as:

- Table design (wet, dry, underwater).
- Material composition, surface finish, and composition of coatings.
- Volume of material removed.
- Duration of cutting or gouging.
- Size, air volume, ventilation and filtration of the work area.
- Personal protective equipment.
- Number of welding and cutting systems in operation.
- Other site processes that may produce fumes.

If the workplace must conform to national or local regulations, only monitoring or testing done at the site can determine whether the site is above or below allowable levels.

To reduce the risk of exposure to fumes:

- Remove all coatings and solvents from the metal before cutting.
- Use local exhaust ventilation to remove fumes from the air.
- Do not inhale fumes. Wear an air-supplied respirator when cutting any metal coated with, containing, or suspected to contain toxic elements.
- Assure that those using welding or cutting equipment, as well as air-supplied respiration devices, are qualified and trained in the proper use of such equipment.
- Never cut containers with potentially toxic materials inside. Empty and properly clean the container first.
- Monitor or test the air quality at the site as needed.
- Consult with a local expert to implement a site plan to ensure safe air quality.

A PLASMA ARC CAN CAUSE INJURY AND BURNS

Instant-On Torches
Plasma arc comes on immediately when the torch switch is activated.

The plasma arc will cut quickly through gloves and skin.
- Keep away from the torch tip.
- Do not hold metal near the cutting path.
- Never point the torch toward yourself or others.

ARC RAYS CAN BURN EYES AND SKIN

Eye Protection Plasma arc rays produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin.
- Use eye protection in accordance with applicable national or local codes.
- Wear eye protection (safety glasses or goggles with side shields, and a welding helmet) with appropriate lens shading to protect your eyes from the arc's ultraviolet and infrared rays.

Arc Current	Lens Shade AWS (USA)	Lens Shade ISO 4850
Up to 100 A	No. 8	No. 11
100-200 A	No. 10	No. 11-12
200-400 A	No. 12	No. 13
Over 400 A	No. 14	No. 14

Skin Protection Wear protective clothing to protect against burns caused by ultraviolet light, sparks and hot metal.
- Gauntlet gloves, safety shoes and hat.
- Flame-retardant clothing to cover all exposed areas.
- Cuffless trousers to prevent entry of sparks and slag.
- Remove any combustibles, such as a butane lighter or matches, from your pockets before cutting.

Cutting Area Prepare the cutting area to reduce reflection and transmission of ultraviolet light:
- Paint walls and other surfaces with dark colors to reduce reflection.
- Use protective screens or barriers to protect others from flash and glare.
- Warn others not to watch the arc. Use placards or signs.

GROUNDING SAFETY

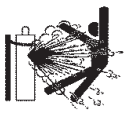
Work Cable Attach the work cable securely to the workpiece or the work table with good metal-to-metal contact. Do not connect it to the piece that will fall away when the cut is complete.

Work Table Connect the work table to an earth ground, in accordance with appropriate national or local electrical codes.

Input Power
- Be sure to connect the power cord ground wire to the ground in the disconnect box.
- If installation of the plasma system involves connecting the power cord to the power supply, be sure to connect the power cord ground wire properly.
- Place the power cord's ground wire on the stud first, then place any other ground wires on top of the power cord ground. Fasten the retaining nut tightly.
- Tighten all electrical connections to avoid excessive heating.

COMPRESSED GAS EQUIPMENT SAFETY

- Never lubricate cylinder valves or regulators with oil or grease.
- Use only correct gas cylinders, regulators, hoses and fittings designed for the specific application.
- Maintain all compressed gas equipment and associated parts in good condition.
- Label and color-code all gas hoses to identify the type of gas in each hose. Consult applicable national or local codes.



GAS CYLINDERS CAN EXPLODE IF DAMAGED

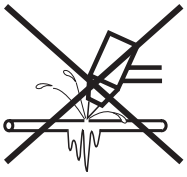
Gas cylinders contain gas under high pressure. If damaged, a cylinder can explode.

- Handle and use compressed gas cylinders in accordance with applicable national or local codes.
- Never use a cylinder that is not upright and secured in place.
- Keep the protective cap in place over valve except when the cylinder is in use or connected for use.
- Never allow electrical contact between the plasma arc and a cylinder.
- Never expose cylinders to excessive heat, sparks, slag or open flame.
- Never use a hammer, wrench or other tool to open a stuck cylinder valve.

NOISE CAN DAMAGE HEARING

Prolonged exposure to noise from cutting or gouging can damage hearing.

- Use approved ear protection when using plasma system.
- Warn others nearby about the noise hazard.



A PLASMA ARC CAN DAMAGE FROZEN PIPES

Frozen pipes may be damaged or can burst if you attempt to thaw them with a plasma torch.

PACEMAKER AND HEARING AID OPERATION

Pacemaker and hearing aid operation can be affected by magnetic fields from high currents.
Pacemaker and hearing aid wearers should consult a doctor before going near any plasma arc cutting and gouging operations.

To reduce magnetic field hazards:

- Keep both the work cable and the torch lead to one side, away from your body.
- Route the torch leads as close as possible to the work cable.
- Do not wrap or drape the torch lead or work cable around your body.
- Keep as far away from the power supply as possible.

ADDITIONAL SAFETY INFORMATION

1. ANSI Standard Z49.1, *Safety in Welding and Cutting,* American Welding Society, 550 LeJeune Road P.O. Box 351020, Miami, FL 33135
2. ANSI Standard Z49.2, *Fire Prevention in the Use of Cutting and Welding Processes,* American National Standards Institute 1430 Broadway, New York, NY 10018
3. ANSI Standard Z87.1, *Safe Practices for Occupation and Educational Eye and Face Protection,* American National Standards Institute, 1430 Broadway, New York, NY 10018
4. AWS F4.1, *Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances,* American Welding Society 550 LeJeune Road, P.O. Box 351040, Miami, FL 33135
5. AWS F5.2, *Recommended Safe Practices for Plasma Arc Cutting,* American Welding Society 550 LeJeune Road, P.O. Box 351040, Miami, FL 33135
6. CGA Pamphlet P-1, *Safe Handling of Compressed Gases in Cylinders,* Compressed Gas Association 1235 Jefferson Davis Highway, Arlington, VA 22202
7. CSA Standard W117.2, *Code for Safety in Welding and Cutting,* Canadian Standards Association Standard Sales 178 Rexdale Boulevard, Rexdale, Ontario M9W 1R3, Canada
8. NFPA Standard 51B, *Cutting and Welding Processes,* National Fire Protection Association 470 Atlantic Avenue, Boston, MA 02210
9. NFPA Standard 70–1978, *National Electrical Code,* National Fire Protection Association, 470 Atlantic Avenue, Boston, MA 02210
10. OSHA, *Safety and Health Standards,* 29FR 1910 U.S. Government Printing Office, Washington, D.C. 20402

WARNING LABEL

This warning label is affixed to some power supplies. It is important that the operator and maintenance technician understand the intent of these warning symbols as described. The numbered text corresponds to the numbered boxes on the label.

1. Cutting sparks can cause explosion or fire.

1.1 Keep flammables away from cutting.

1.2 Keep a fire extinguisher nearby, and have a watchperson ready to use it.

1.3 Do not cut on any closed containers.

2. The plasma arc can cause injury and burns.

2.1 Turn off power before disassembling torch.

2.2 Do not hold the material near cutting path.

2.3 Wear complete body protection.

3. Electric shock from torch or wiring can kill. Protect yourself from electric shock.

3.1 Wear insulating gloves. Do not wear wet or damaged gloves.

3.2 Insulate yourself from work and ground.

3.3 Disconnect input plug or power before working on machine.

4. Breathing cutting fumes can be hazardous to your health.

4.1 Keep your head out of the fumes.

4.2 Use forced ventilation or local exhaust to remove the fumes.

4.3 Use ventilating fan to remove the fumes.

5. Arc rays can burn eyes and injure skin.

5.1 Wear hat and safety glasses. Use ear protection and button shirt collar. Use welding helmet with correct shade of filter. Wear complete body protection.

6. Become trained and read the instructions before working on the machine or cutting.

7. Do not remove or paint over (cover) warning labels.

Operating the CNC

Front Panel Layout

The Phoenix software is designed for 15” TFT touch screens with 1024 x 768, or higher, resolution and is used on all CNC models. Individual human machine interface (HMI) and front panels may vary.

Power Switch

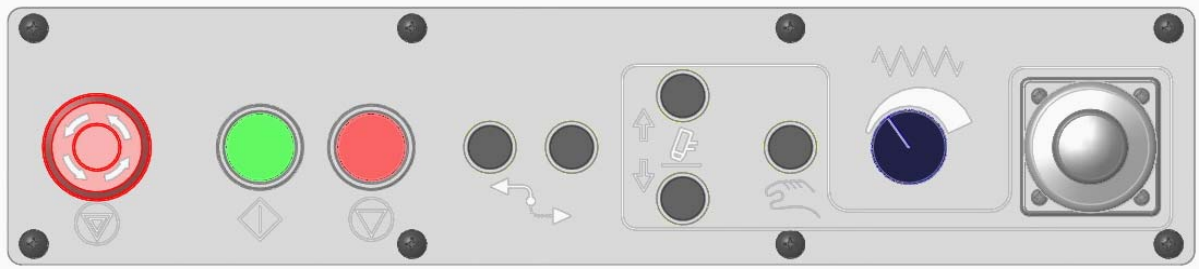
Hypertherm Automation controls are equipped with a momentary contact power switch. Press this switch briefly then release to power on and power off the CNC.

Press the power switch for 10 seconds to force a hard system shutdown of Windows and the CNC. Generally, a hard shutdown is not recommended.

Touch Screen

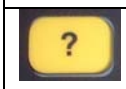
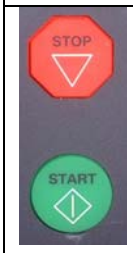
The touch screen software interface allows direct key input on the screen through the use of check boxes, radial boxes, drop down selections and data input. Data input boxes will automatically display a numeric or alphanumeric keypad depending on datatype.

Front Panel (selected models)



Icon	Function
	Emergency stop
	Start
	Stop
	Move forward or backward on path
	Torch up/down
	Manual
	Speed Pot (manual feedrate)

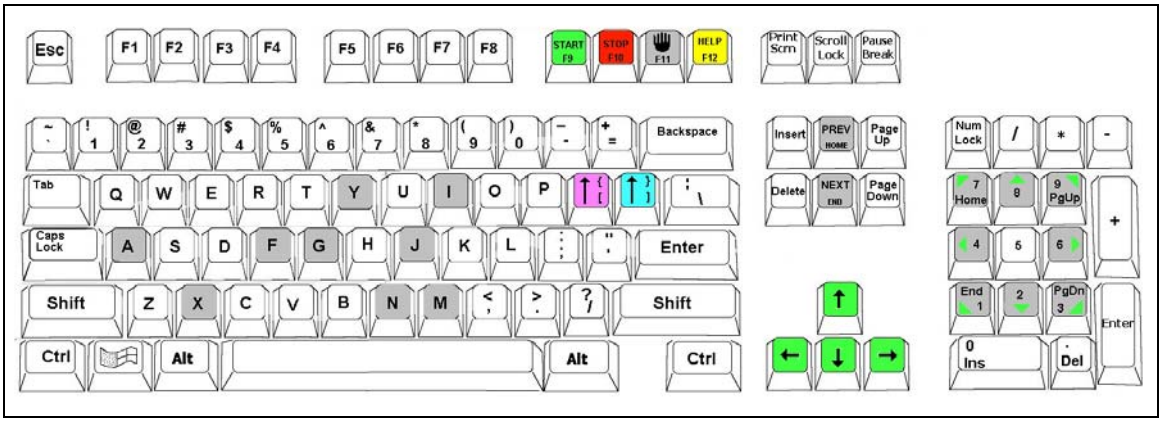
Front Panel Keypad (Voyager III model)

Key	Function
	Press this key to view the online Help file.
	Use the arrow keys to select items in a dialog box.
	Use the arrow keys to jog in manual mode. Manual key functions (indicated in green) are available at the Manual, Pause and Align screens. This keypad is also used for navigating through a multi-variable dialog box (indicated in yellow). Use the Prev and Next buttons to move through the field boxes. Use Page Up and Down buttons to scroll.
	Press the Start key to start a program. Press the Stop button to stop a program.

	Enter numbers or text with the alpha–numeric keypad. To enter a number, press the key. To enter a word, press and hold the matching colored shift key (up arrow) while pressing the desired letter key. The + (plus) and – (minus) keys are used to add and delete features at selection and check boxes.
	The alternate (ALT) soft key indicates that more soft keys and features are available when you press this soft key on screen.
	**When the alternate soft key is displayed, use the purple shift to view additional soft keys.**
	Press the space key to insert a space in a data entry field. Use the space key to toggle between settings (for example, preheat sense input open or closed). You can also use the space key to add or delete features at selection and check boxes.
	Deletes the current character in the data entry field and backs up one position. Use the * and ? characters as wild cards to search for files.
	Press this key (except during cutting) to return to the previous menu without saving any changes. Use the \ and : characters for mapping network drives.
	Press Enter to accept the preceding entry. Use the < and > characters for mapping network drives.

PC Keyboard Layout and Functions

A PC keyboard is a feature on selected CNC models but can be added to all models.



Key	**Equivalent Function**
F1-F8	Soft keys on the display screen
F9	Start
F10 and Pause	Stop
F11	Manual mode
F12	Help
Arrow keys	Direction for manual motion
Home	Previous field
End	Next field
[	Purple arrow shift key
]	Blue arrow shift key
Alt F4	Exit Phoenix software.

Warning: This key combination will terminate the application.

Alt Tab — Alternate between applications.

Warning: The selected application window displays on top of the desktop and may cover or hide the CNC software window.

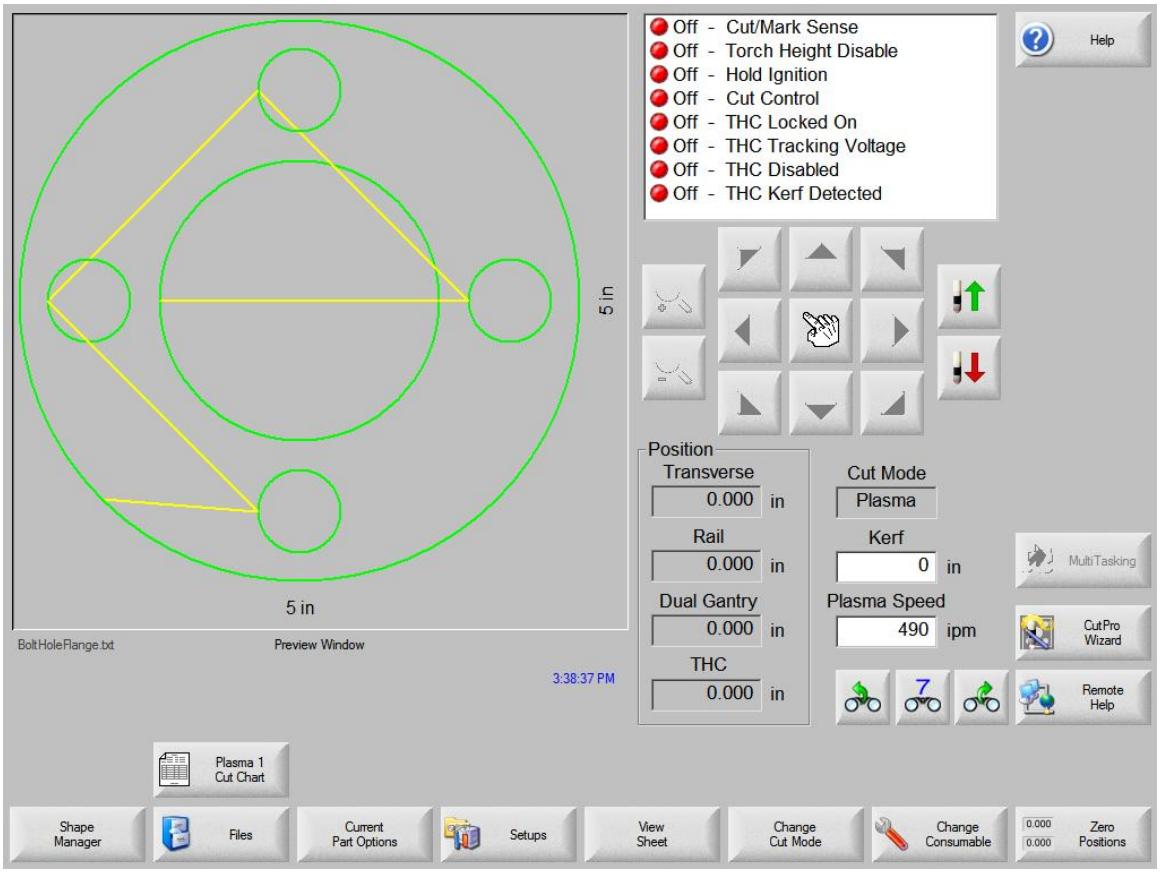
Key and Menu Functions

The following is a short form description of all menu functions in the control. This is only a brief description of each function. Please consult the subsequent manual sections for more complete information on operational usage of specific keys.

Note: Screens and features will vary depending on interface selection of Beginner, Intermediate, or Advanced. For convenience, information provided here is in Advanced Mode showing all options.

Screen Navigation

The eight keys located at the bottom of the screen act as programmable soft keys.



Soft keys to accept (OK) and reject (Cancel) changes.

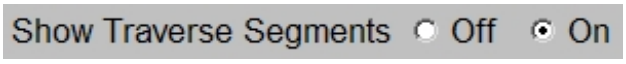
The touch screen software interface allows direct key input on the screen through the use of check boxes, radio boxes, dropdown lists and data input.

Dropdown List

Press the arrow in the dropdown list to view options.

Radio Buttons

Press the round button to select the corresponding option.



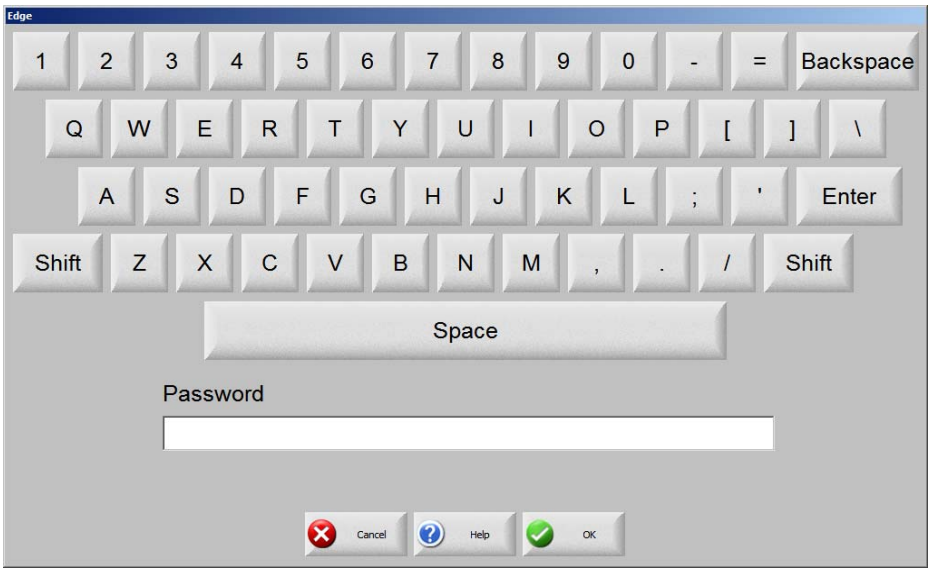
Check Box

Press the square box to enable the corresponding option.

Data Input

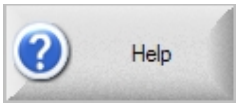
Data input boxes automatically display a numeric or alphanumeric keypad depending on data type. Double click on the field to enter data.

Alpha Numeric Keypad

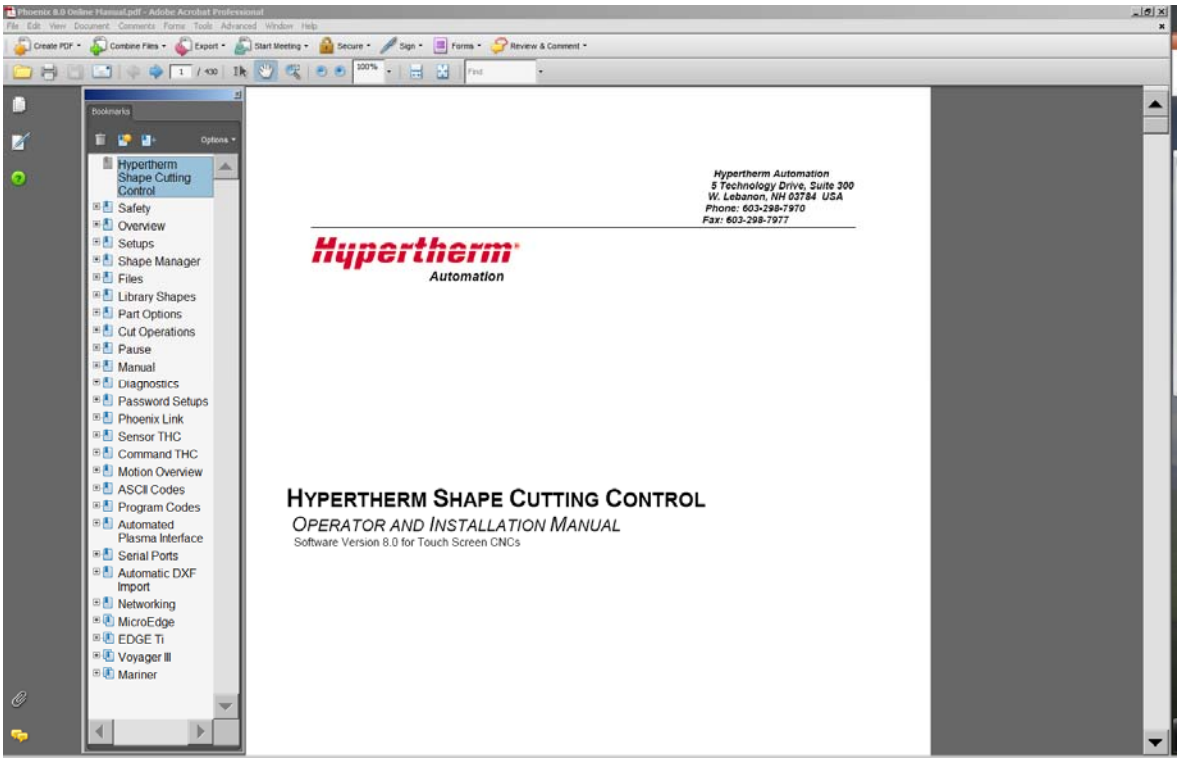


Numeric Keypad

Help Screen



The CNC has a help screen function. Press the Help soft key to display Help information for the screen you are looking at. Press the OK soft key to exit the Help screen and return to the control screen.



Show Bookmarks

Press the Show Bookmarks soft key on the Help screen to view the list of Help topics. Click on a topic in the list for additional information.

Automated Operations

The Phoenix software that is loaded on your CNC includes two “wizards” that are designed to automate your part aligning and cutting operations.

Align Wizard

The Align wizard automates the sequence of operations to enter information for a skewed plate on the table and to align parts on a skewed or aligned plate.

The Align wizard opens automatically from the Align screen or you can press the Align Wizard soft key on the Align window. For more information, see Align Wizard in the *Arranging Parts* chapter.

CutPro Wizard

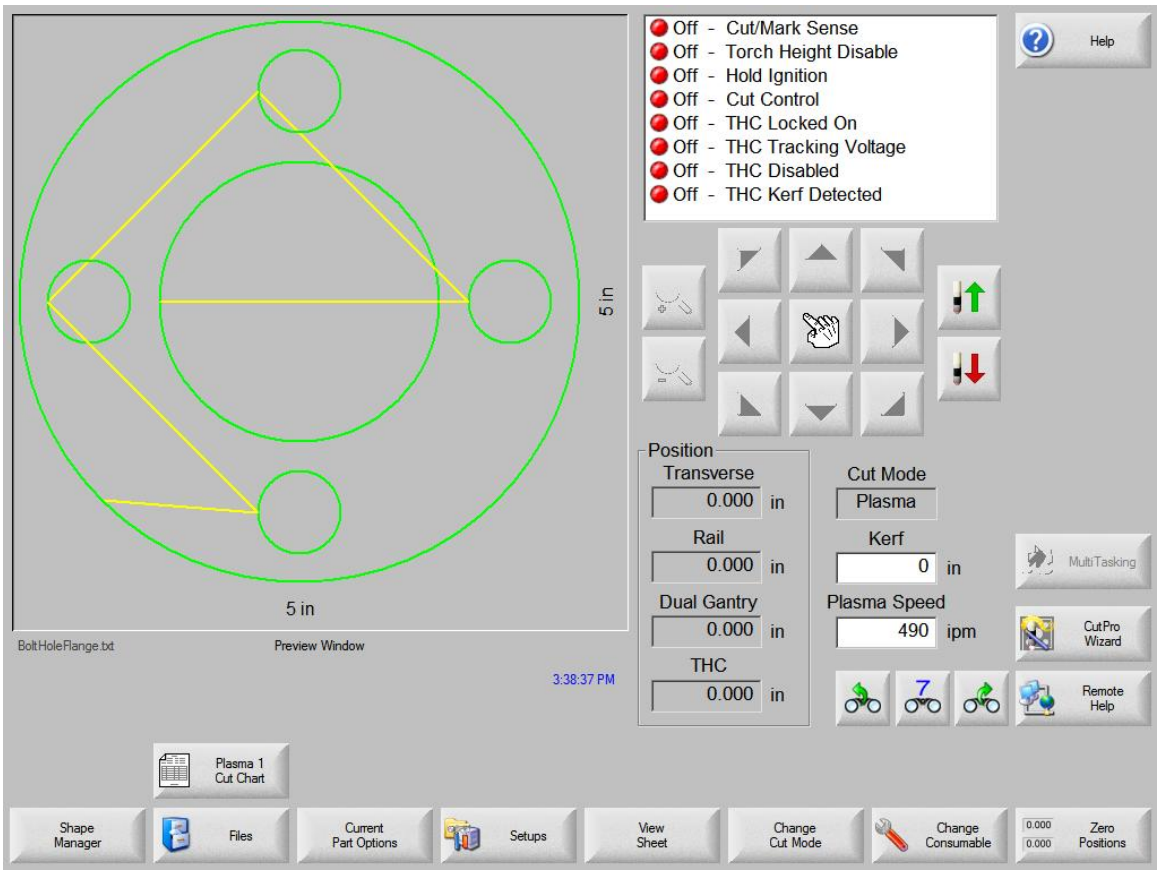
The CutPro wizard automates the sequence of choices and selections that you must make before you begin cutting parts. If you have parts, nests, and cutting processes stored on your system, you can use the CutPro wizard to simplify cutting operations.

You can launch the Align wizard from the CutPro wizard so you can align plates and parts during your cut setup.

The CutPro wizard opens automatically from the Main screen or you can press the CutPro Wizard soft key on the Main screen. For more information on the CutPro wizard, see CutPro wizard in the *Cutting Parts* chapter.

The Main Screen

The Main screen is the first screen you see when the CNC powers up.



Preview Window

This window displays the current part that is stored in memory, including its dimensions.

Watch Window

The watch window is the right part of the screen where monitoring features, such as a speedometer, job keys, positions indicators, cut mode, and time are displayed. You can configure this part of the screen, using the 10 different monitoring features in the Setups window.

Soft Keys

The following table describes the soft keys on the Main screen and how they function.

Soft Key	Function
Shape Manager	This soft key takes you to the Shape Manager screen where you can load a simple shape, edit a part using the text editor or shape wizard or teach trace a part.

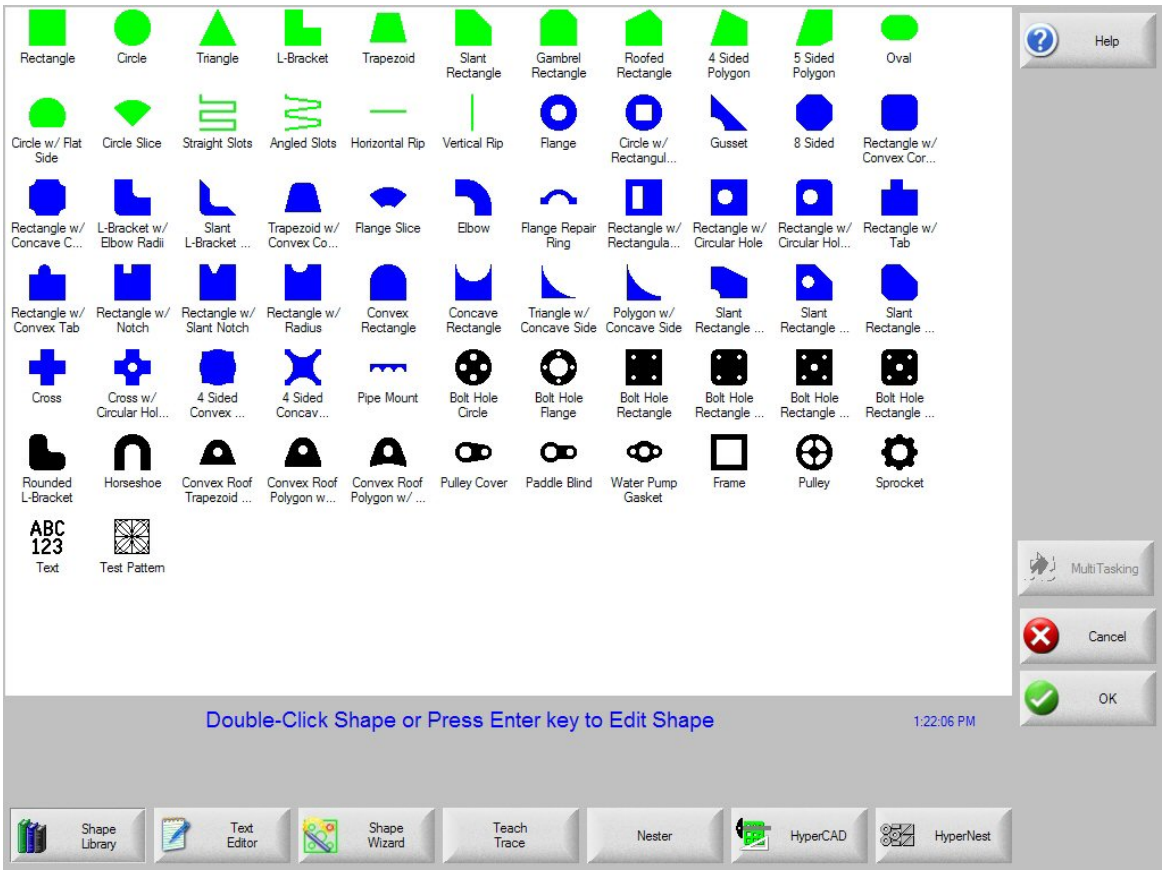
Files	This soft key takes you to the Files screen where you can load, save, download or upload part files.
Current Part Options	This soft key takes you to the Part Options screen where the current part can be scaled, rotated, mirrored and/or repeated.
Setups	This soft key takes you to the setup screens.
View Part/ View Sheet	View Part lets you view the entire current part in the Preview Window. View Sheet lets you view a part as it would appear on the plate. After you press the View Sheet soft key, the display window zooms out to show the part in relationship to the entire plate. View Sheet is more useful when proper Plate Size values have been entered in Cutting Setups.
Zoom +/-	These soft keys allow you to change zoom level.  After zooming out, the display can be zoomed in again by pressing the + key, which causes horizontal and vertical scroll bars to be displayed. Press the - key to zoom back out.
Scroll bars	While the scroll bars are displayed and the control is not cutting, the view of the plate can be shifted horizontally and vertically by pressing and moving the scroll bar or by holding down a shift key and pressing the arrow keys on the keypad. While the control is cutting, the view will automatically be shifted as the cut path reaches one of the edges of the view. This mode is useful in normal cutting to closely follow the cut-path while in zoom.
Change Cut Mode	Allows you to select trial, oxy fuel, plasma, water jet and laser cutting modes, depending on the setup configuration.
Change Consumable	This soft key takes you to the Change Consumable screen.
Zero Position	This soft key zeros the current positions on the Transverse and Rail axes as well as the Dual Gantry axis if used.

Loading a Part

This chapter describes how to load a part from the Shape Library, a disk, or a host, as well as how to save files and import DXF files.

Loading a Part from the Shape Library

The CNC contains a built-in Shape Library with more than 68 commonly used shapes. These shapes are *parametric*, that is, shapes whose size or geometry you can edit. The shapes in the library are color-coded from simplest (green) to most complex (black).



To select a simple shape:

1. On the Main screen, press Shape Library.
2. Double click a shape.
3. Press OK.
4. If the selection is incorrect, press Cancel and select the shape again.

Keypad operation:

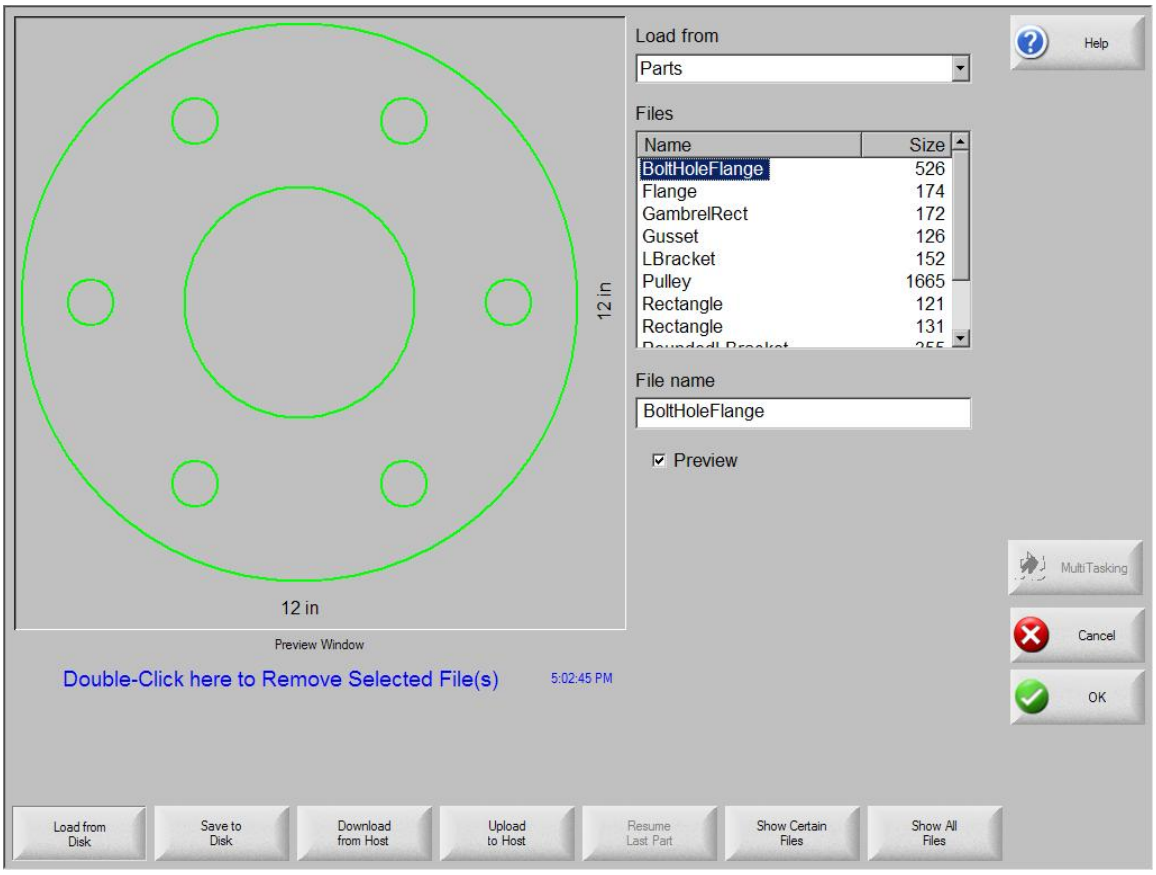
1. Use the arrow keys to navigate to a shape.
2. Press Enter.

The shape is displayed with the default parameters or the parameters from the last time this shape was edited. For more information on the individual shapes and how to edit them, see Appendix A: Library Shapes.

Loading a Part from a Disk

You can load part programs from internal disk drives, a USB memory stick or external mapped drives (network option) into working memory on the CNC.

The following screen is used to load a part from a diskette, USB memory stick, or the hard drive.



Load from — Select the source from which you load a part: diskette, USB memory stick, or a directory on the hard disk. To add or remove a directory, double-click on the touch screen where indicated.

Keypad operation: To select a different directory, use the ↑ and ↓ keys on the keyboard. To add or remove new directory use the + or – key.

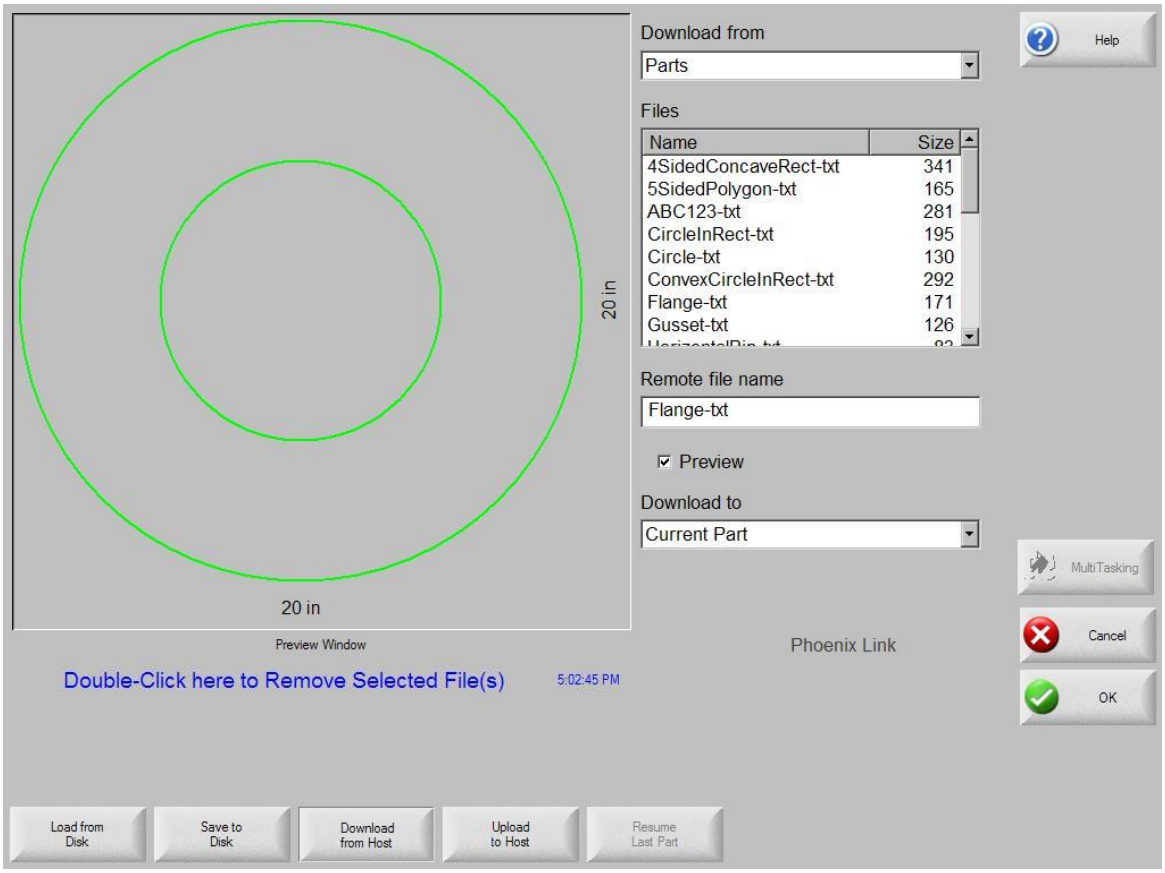
Files — Lists the files that are in the directory you selected in the Load from

	field. Press the name of the files that you want to load. **Keypad operation:** To scroll through different files, use the ↑, ↓**,** Page Up and Page Down keys on the keyboard. To remove a file, use the **-** key on the keyboard. To select multiple files to load, highlight the first file selection, then use the ↑ and ↓ keys while pressing the shift key to highlight the remaining files. **Note:** You can only select multiple files if you are loading them from a diskette or USB memory stick to the hard drive.
File name/ Diskette file name	Displays the name of the file you selected. To remove a file, highlight the file name and double-click on the touch screen where indicated. **Keypad operation:** To remove a file using the keyboard, use the **–** key.
Preview	Check this box to preview the files you selected in the Preview Window.
Load to	Select the destination for the part; either load the part for cutting or save it in a directory on the hard disk. To add or remove a directory, double-click on the touch screen where indicated. **Keypad operation:** • To select a different directory, use the ↑ and ↓ keys on the keyboard. • To add a new directory, use the **+** key on the keyboard. • To remove a directory, use the **-** key on the keyboard. **Note:** This selection is only available if you are loading the part from the diskette or USB memory stick.
Hard drive file name	Enter the name for the file that you are loading on the hard drive. **Note:** This selection is only available if you are loading the part from the diskette or USB memory stick.
Show Certain Files	Allows the operator to search the selected folder for specific part files by using wildcard searches with both the asterisk (*) and question mark (?). **Keypad operation:** To input the asterisk when using a keyboard,

	press the left shift key (purple) and the backspace key. To input the question mark, press the right shift key (blue) and the backspace key.
Show All Files	Allows the operator to switch from viewing the selected files to viewing all files with the predetermined file extensions.
	After all the parameters are set, press Enter on the keyboard to load the part.

Downloading a Part from a Host

The following screen is where you download a part from a host computer through a RS-232C/ RS-422 serial port. After all the parameters below are set, press Enter on the keyboard to start the download.



Download from — Selects the directory on the host computer from which you want to download a part. To add or remove a directory, double-click on the touch screen where indicated.

Keypad operation:

- To select a different directory, use the ↑ and ↓ keys on the keyboard.
- To add or remove new directory use the + or – key.

Files — Lists the files in the download from directory that can be downloaded from the host computer.

Keypad operation:

- To scroll through different files, use the ↑, ↓, PAGE UP and

PAGE DOWN keys on the keyboard.

- To remove a file, use the **-** key on the keyboard.
- To select multiple files to download, highlight the first file selection, then use the ↑ and ↓ keys while pressing the shift key to highlight the remaining files.

Remote file name — The name of the remote file that will be downloaded from the host computer.

Preview — Check this box to preview the file that you selected in the Files list box. To check or uncheck the box, press the SPACE key on the keyboard when the Preview box has the focus.

Download to — Select where you want to download the part -- to the current part in memory or to a directory on the local hard disk. If you select one of the local directories, the Local file name field displays.

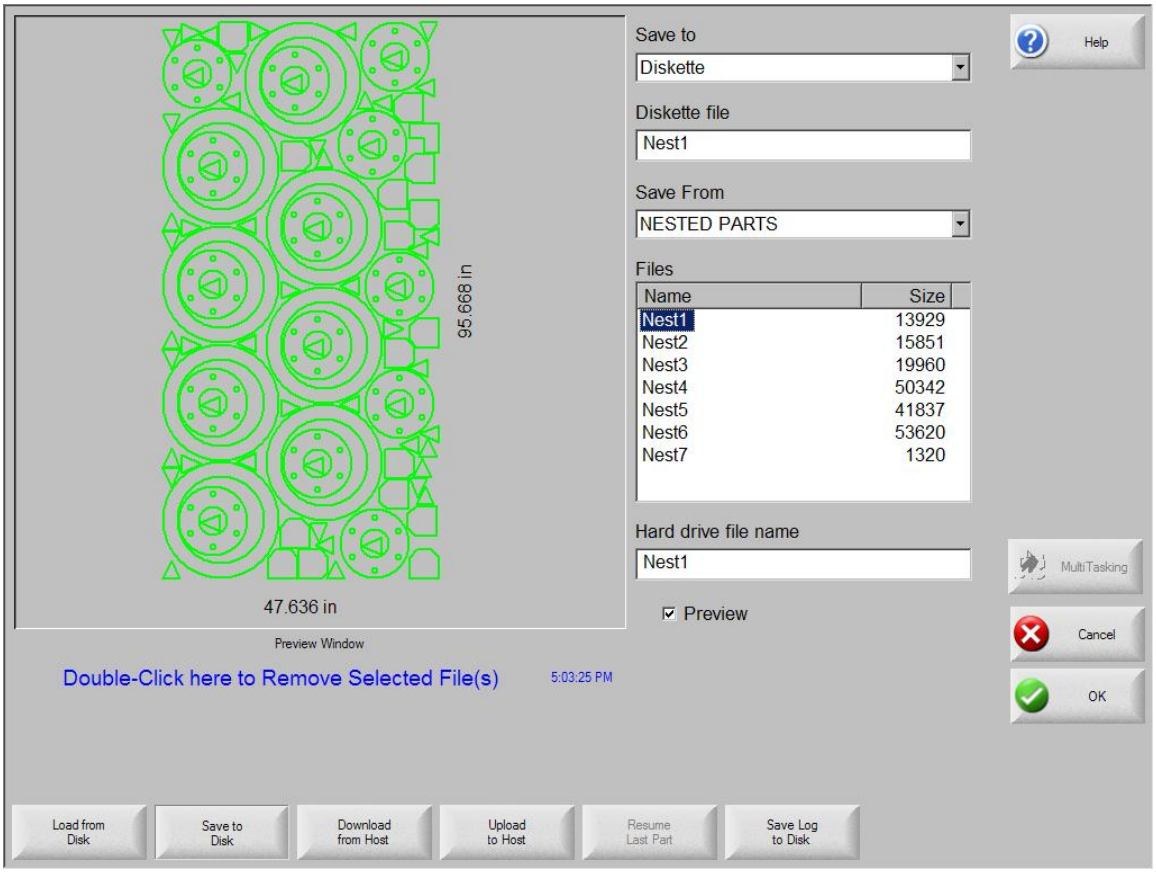
Keypad operation:

- To select a different directory, use the ↑ and ↓ keys on the keyboard.
- To add a new directory, use the **+** key on the keyboard.
- To remove a directory, use the **-** key on the keyboard.

Local file name — The user-defined file name assigned to the file that is being downloading to the hard drive.

Saving Part Files to Disk

This screen is used to save a part to a diskette, USB memory stick, or the hard drive.



Save to

Select whether you save to the diskette, USB memory or to a directory on the hard disk. To add or remove a directory, double-click on the touch screen where indicated.

Keypad operation:

- To select a different directory, use the ↑ and ↓ keys on the keyboard.
- To add a new directory, use the **+** key on the keyboard.
- To remove a directory, use the **-** key on the keyboard.

File name/ Diskette file

Enter the file name that you are giving the file you are loading on the disk.

If you select the Save Original Text option, the system will save the part to the disk in its original programming format.

Note: This selection is not available if you are saving the file to the

diskette or USB memory stick from the hard drive.

Save From

Select whether you save from the current part or from a directory on the hard disk.

To add or remove a directory, double-click on the touch screen where indicated.

Keypad operation:

- To select a different directory, use the ↑ and ↓ keys on the keyboard.
- To add a new directory, use the **+** key on the keyboard.
- To remove a directory, use the **-** key on the keyboard.

Note: This selection is only available if saving to the Diskette or USB memory stick from the hard drive.

Files

Select one or more part files from the list of all the files that are in the Load from directory that can be loaded from the disk. To remove a file, double-click on the touch screen where indicated.

Keypad operation:

- To scroll through different files, use the ↑, ↓**,** PAGE UP and PAGE DOWN keys on the keyboard.
- To remove a file, use the **-** key on the keyboard.
- To select multiple files, highlight the first file selection, then use the ↑ and ↓ keys while pressing the shift key to highlight the remaining files.

Note: This selection and Multiple file selection are only available if you are saving files to the diskette or USB memory stick from the hard drive.

Hard drive file name

Enter the name that you are giving to the file if you are loading it on the hard drive.

Note: This selection is only available if you are saving files to the diskette or USB memory stick from the hard drive.

Preview

Check this box to preview the file that is selected in the Files listbox.

Keypad operation: To check or uncheck the box, press the Space

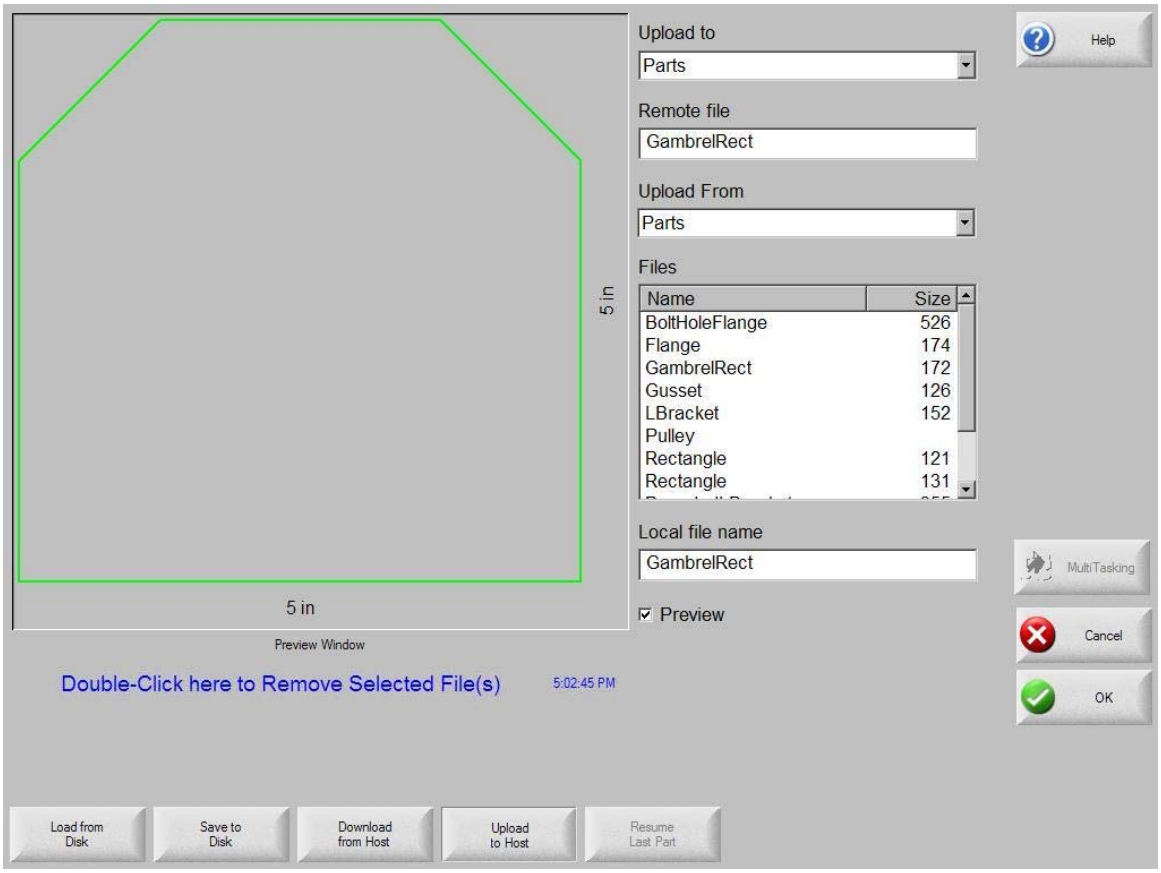
key on the keyboard when the Preview box has the focus.

Note: This selection is only available if you are saving files to the diskette or USB memory stick from the hard drive.

After you have made all your selections and entries, press OK to save the part.

Uploading Part Files to a Host

Use this screen to upload a part to a host computer. After all the parameters are set, press Enter on the keyboard to start the upload.



Upload to	Select the directory on the host computer to which you want to upload a file. To add or remove a directory, double-click on the touch screen where indicated. **Keypad operation:** To select a different directory, use the ↑ and ↓ keys on the keyboard. To add a new directory, use the **+** key on the keyboard. To remove a directory, use the **-** key on the keyboard.
Remote file name	Enter the name of the file that you are uploading to the host computer.
Upload from	Select whether you upload the current part in memory or from a directory on the local hard disk. If you select one of the local directories, the Files, Local file name and Preview fields display. To

add or remove a directory, double-click on the touch screen where indicated.

Keypad operation: To select a different directory, use the ↑ and ↓ keys on the keyboard. To add a new directory, use the **+** key on the keyboard. To remove a directory, use the **-** key on the keyboard.

Note: This selection is only available if you are saving a file to the diskette or USB memory stick from the hard drive.

Files — Lists all the files in the upload from directory that can be uploaded to the host computer. To remove a file, double-click on the touch screen where indicated.

Keypad operation: To scroll through different files, use the ↑, ↓, Page Up and Page Down keys on the keyboard. To remove a file, use the - key on the keyboard. To select multiple files to upload, highlight the first file selection, then use the ↑ and ↓ keys while pressing the shift key to highlight the remaining files.

Local file name — The name of the local file that will be uploaded to the host computer.

Preview — If you check this box, you can preview the file you selected in the Preview window.

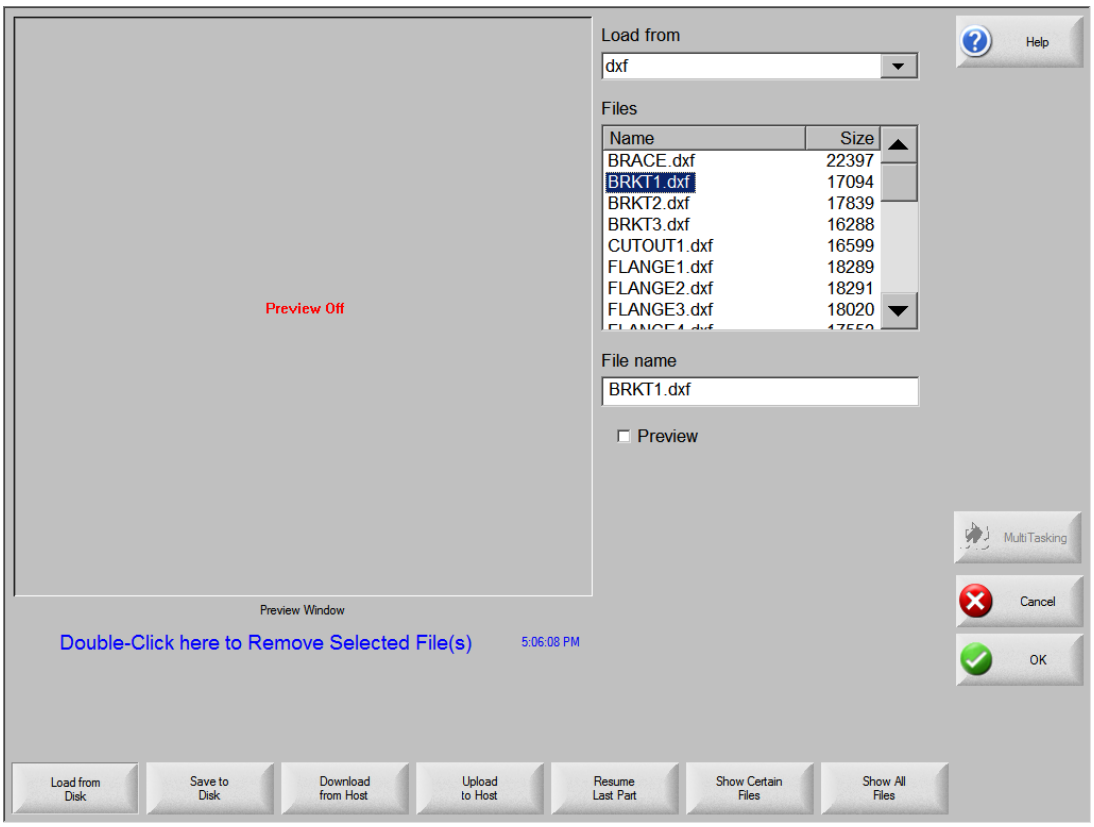
Keypad operation: To check or uncheck the box, press the SPACE key on the keyboard when the Preview box has the focus.

Importing DXF Files

Hypertherm Automation CNCs offer two styles of automated DXF import. The first DXF feature allows the CAD designer to prepare a DXF file that includes the location of pierces, pierce order and direction. When this file is loaded into the control, an EIA format part program will be created for use at the control.

The second type of DXF file is a fully automatic DXF import feature that allows the control operator to select lead style and length. The CNC Auto DXF software automatically places the lead-in and lead-out based on the operator selections and creates an EIA format part program ready for use and the CNC.

To load a DXF file, access the Files Load screen and select the source location and file.



Load from	Select dxf from the dropdown list.
File name	Select a .dxf file from the scroll box.
Preview	Check this box to preview the file that is selected in the File name scroll box.
Show Certain	This soft key allows the operator to show only certain files from the

Files	selected directory. Both the asterisk and question mark may be used in defining the files to show. **Keypad operation:** The asterisk is generated by holding down the left shift key and pressing the backspace key. The question mark is generated by holding down the right shift key and pressing the backspace key.
Show All Files	This soft key allows the operator to undo Show Certain Files. **Note:** An optional Network Card for connecting directly to a PC Network for part file allocation is available.

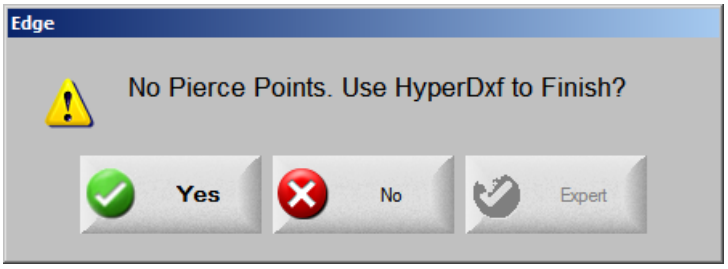
If the file includes the lead-in and direction, the CNC detects this and translates the file.

If the file contains no pierce or lead-in /lead-out information, the HyperDxf utility prompts the user for this information.

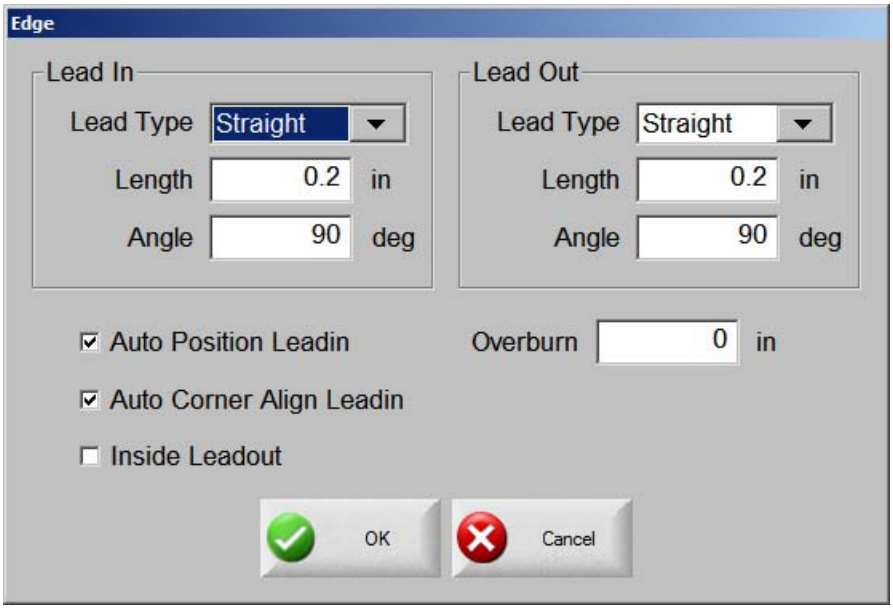
Note: To load DXF files the DXF extension must first be added to the Special Setups screen.

Raw DXF Files

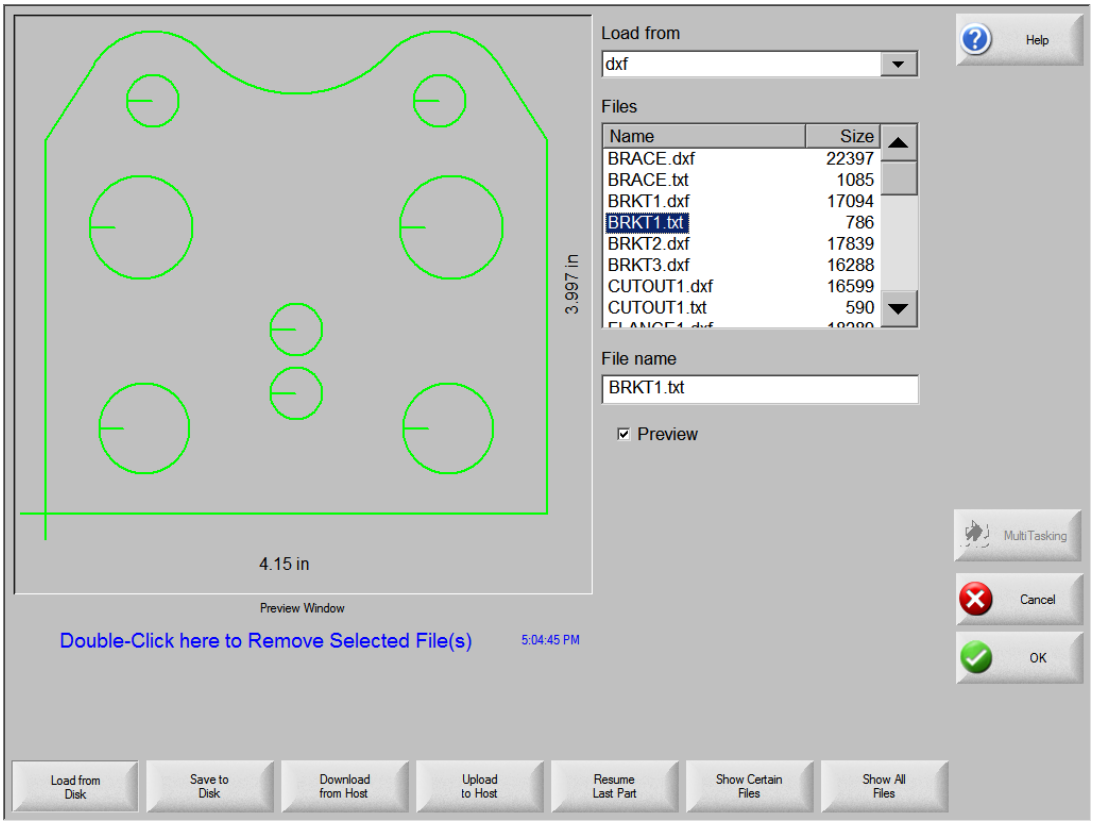
If the CNC does not detect pierce information in the DXF file, the operator has the option to use the Hyper DXF translation utility to import the file and add lead-in and lead-out information.



If you select Yes, a configuration screen displays fields to define the lead-in/ lead-out format.

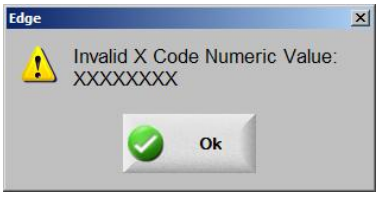


Lead In/Out	Select a Straight or Radius lead-in or lead-out.
Length / Radius	Select the lead-in or lead-out length or radius.
Angle	Select the angle, in degrees, for the lead-in or lead-out.
Auto Position Lead-in	If this box is checked, the software attempts to find a suitable corner for the lead-in.
Auto Corner Align Lead-in	If this box is checked, the software attempts to find a suitable corner for the lead-in.
Inside Lead-out	If this box is checked, a lead-out is used on both internal and external cuts. If the box is not checked, lead-outs are added to external cuts only.
Overburn	Overburn provides an overlapping cut in the lead-in/ lead-out area of a hole. After import, an EIA part program with a .txt extension is created and placed in the source folder.



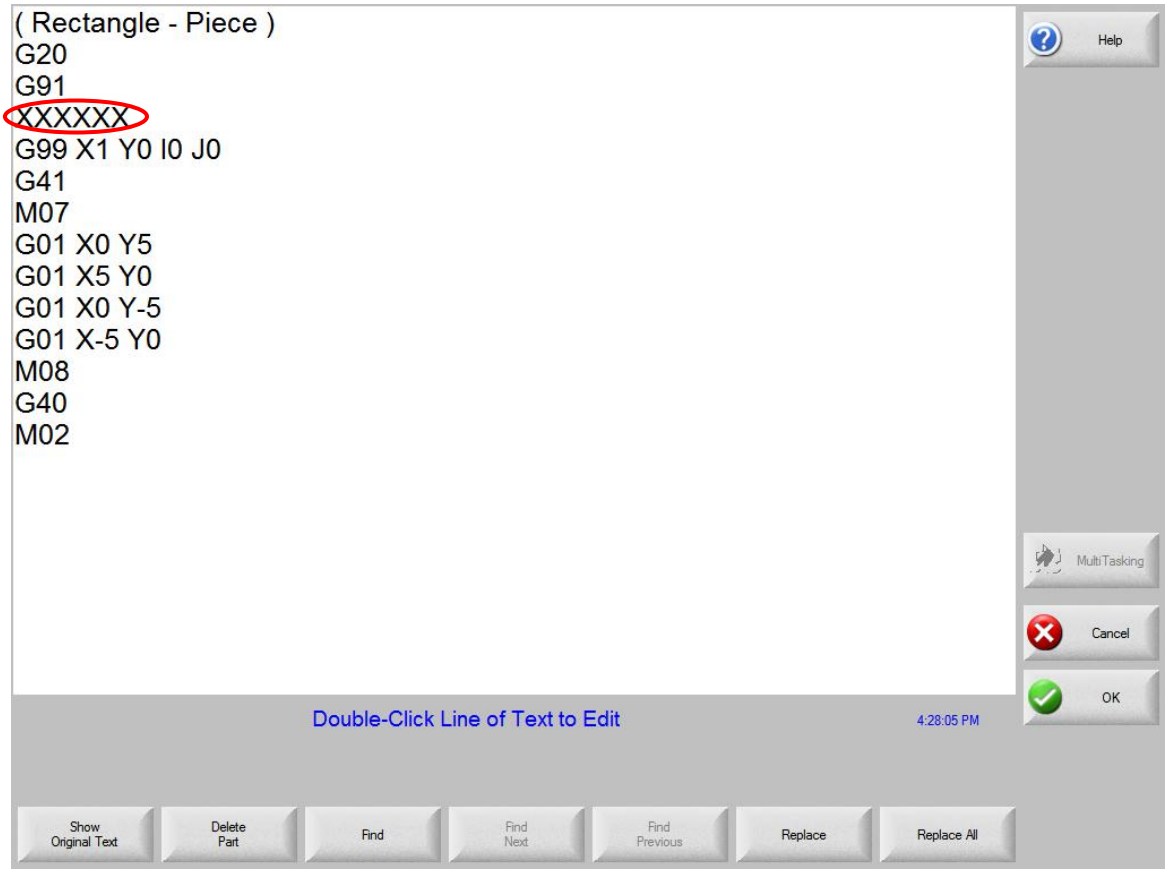
Invalid Files

While loading the desired part file, the CNC checks the part for proper geometry and other errors. If an error is detected, a message is displayed:



If the system attempts to load the part, the control highlights the invalid line of code in the text editor.

For example, in the following sample code, the line of code “XXXXXXXX” is invalid and has been circled for easy detection. Correct the file using the text editor. After the invalid code is corrected, the control will attempt to translate the part file and will indicate additional invalid codes.



Resume Last Part

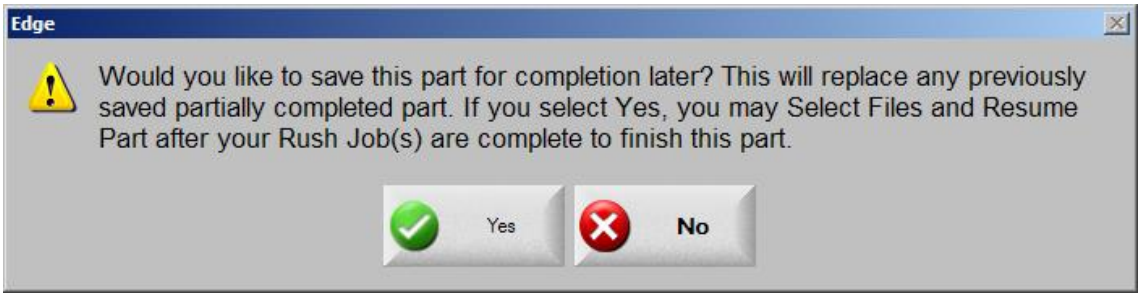
Displays when the Rush Job Interrupt or Automated Power Loss Recovery feature is in use. These features allow you to pause the current part program and retain the part and current position information. You can load and execute another part program and return to the original part using the Resume Last Part soft key.

The Resume Last Part soft key is visible when the Rush Job Interrupt or Automated Power Loss Recovery feature is in use. These features allow the user to pause the current part program and retain the part and current position information. Then you can load and execute another part program and return to the original part using the Resume Last Part soft key.

Note: CNCs with the SERCOS interface will save position information every minute to the hard drive. Some motion on path may be required for power or position loss recovery.

Rush Job Interrupt

Allows you to pause the current part program and retain the part and current position information. At the Pause screen, press the Cancel key. A message window offers you the opportunity to save the part information to use later.



If you select Yes, the Resume Last Part button will be viewable at the Files Screen. The user can load and execute another part program and then press the Resume Last Part soft key to return to the original part and resume cutting.

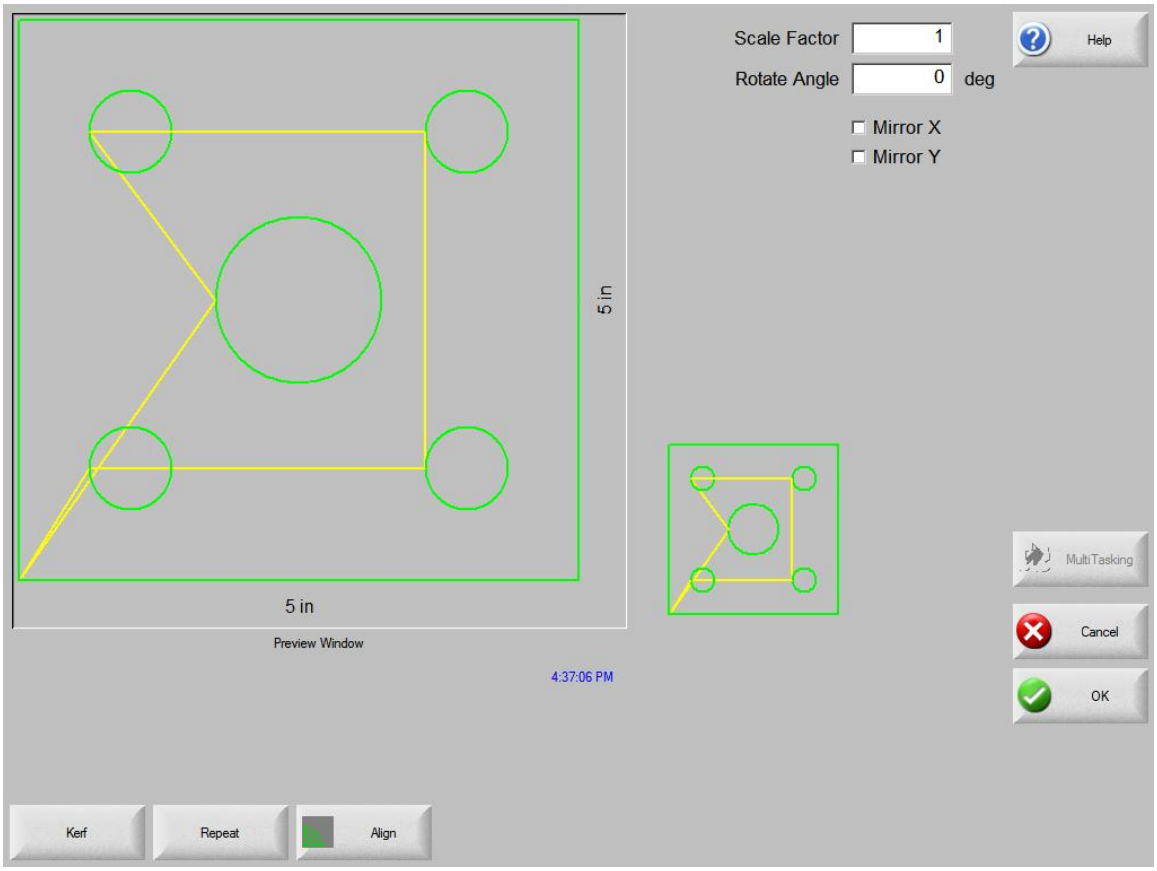
Automated Power Loss Recovery

Uses the Resume Last Part feature similar to the Rush Job Interrupt. However, the machine must be homed to ensure proper positioning before it can resume cutting the part.

You can also use this feature if there is an overtravel, or similar fault.

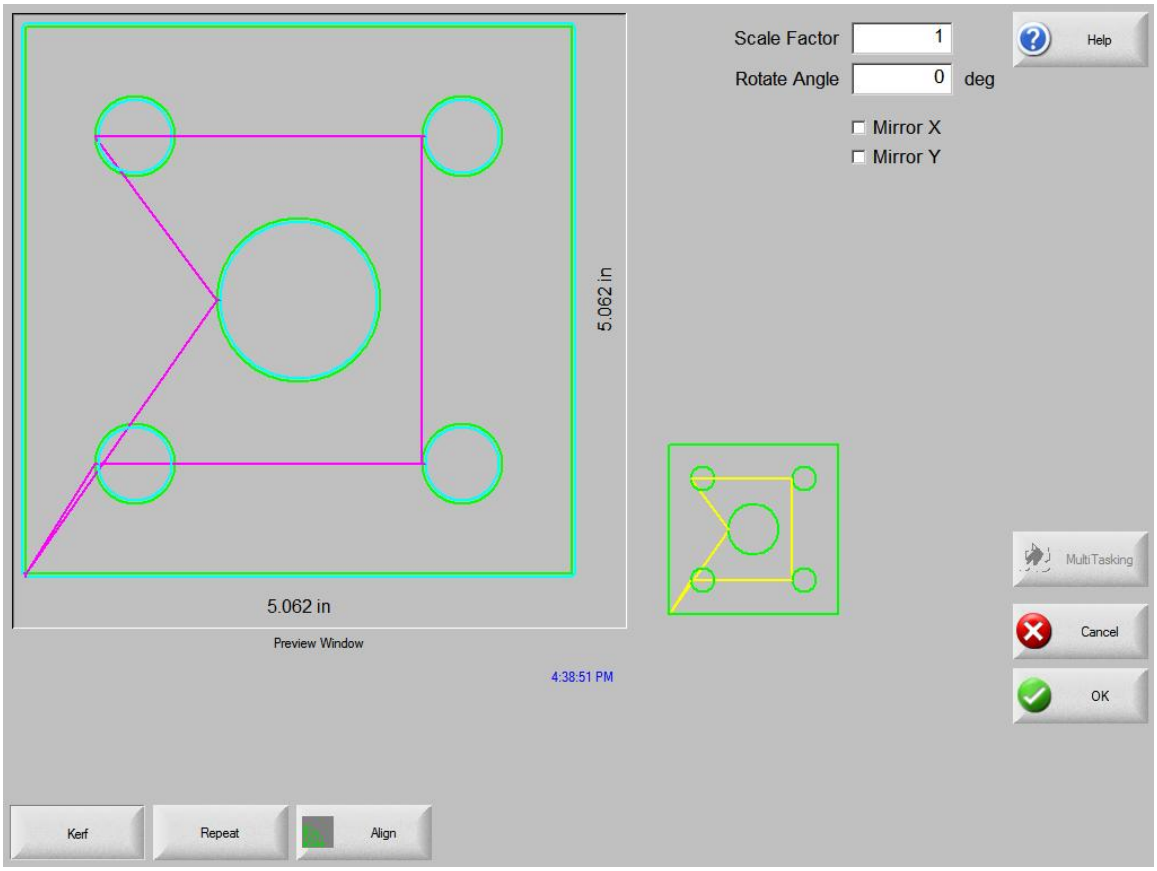
Arranging Parts

There are a number of options available on the Part Options screen. These options can be used to customize the current part loaded into working memory. All options will display the effects of the changes in the Preview Window.



Scale Factor	Allows the operator to scale the current part in memory by a programmed factor. After a new scale factor has been entered, the part is redrawn and its overall dimensions shown. The scale factor must be greater than zero.
Rotate Angle	Allows the operator to rotate the current part in memory by a programmed value. After a new rotate angle has been entered, the new part is displayed in the Preview window. The rotate angle can be any positive or negative angle.
Mirror X/Mirror Y	These checkboxes make the X or Y dimensions negative. The result is a mirror image of the current part in memory. For keypad operation, press the Next or Enter key to toggle to the X or Y field. When the cursor is on the field, press the Space key to enter a checkmark in the current highlighted field.
Kerf	Press the Kerf soft key to show the kerf path in light blue. This helps you see the Kerf path before cutting. Press the button again to turn

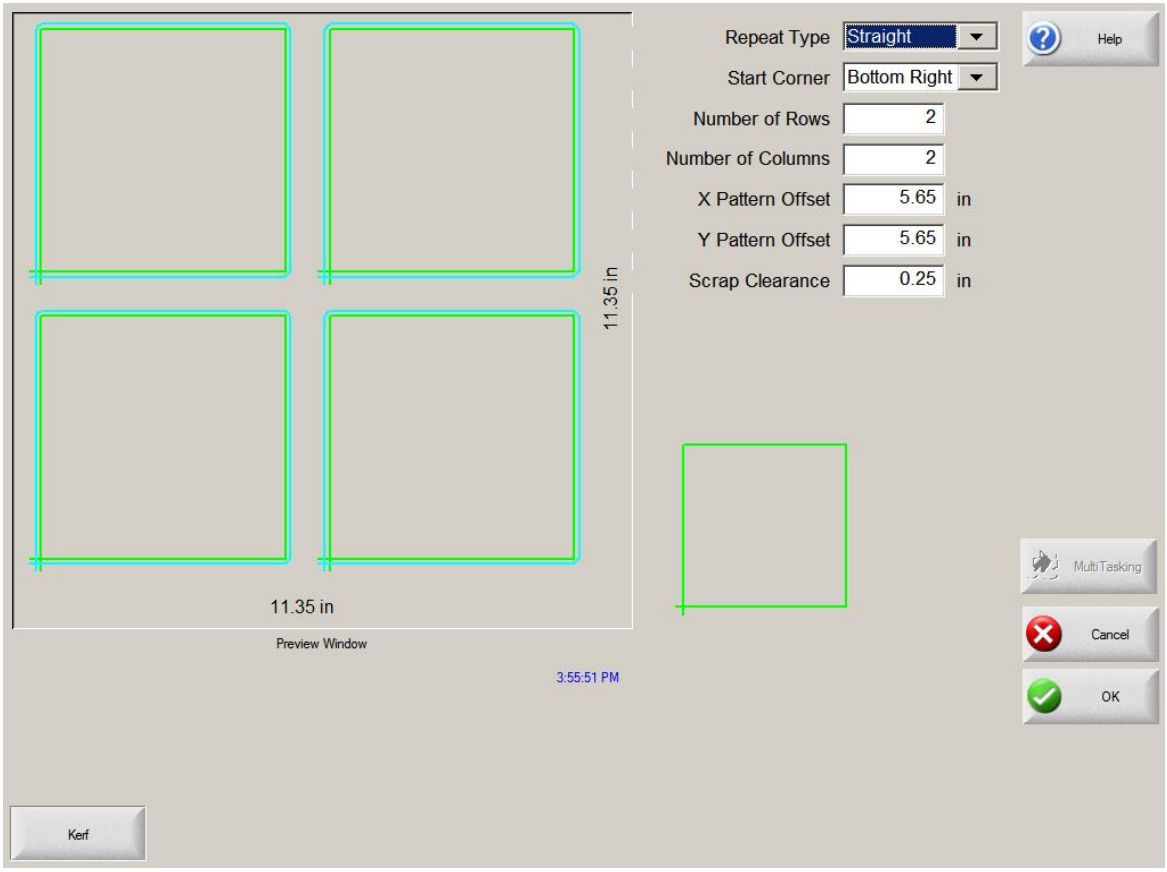
the Kerf part graphics off.



Repeating Parts

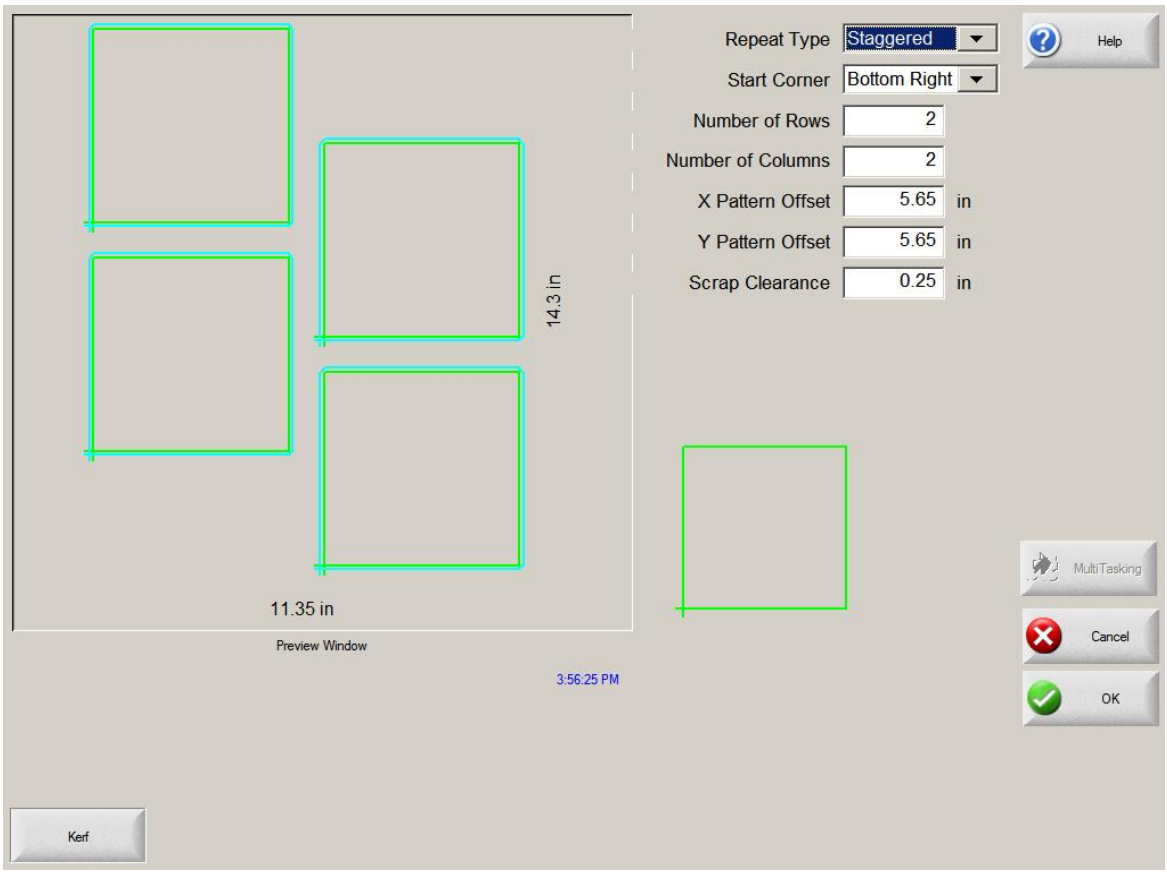
The control has three built-in automatic repeat types: straight, staggered, and nested.

Straight Repeat



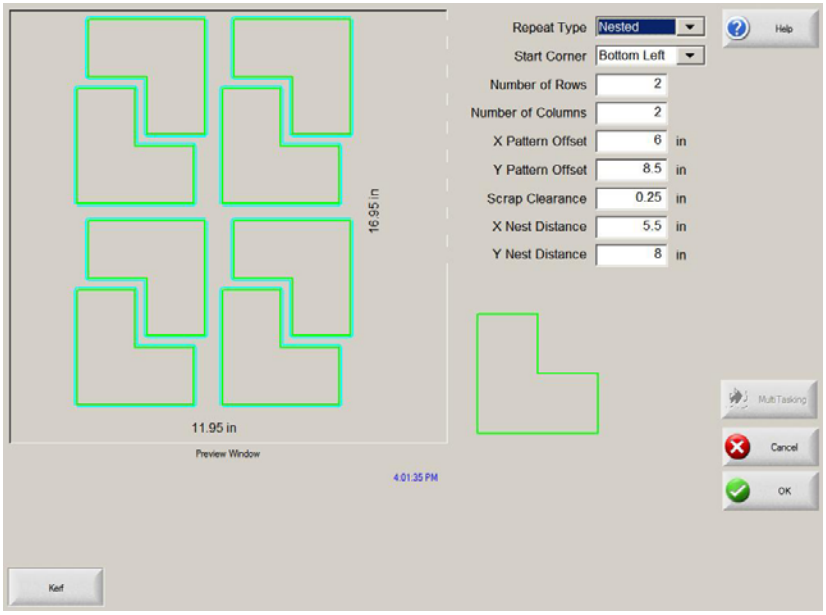
Repeat Type	Allows the user to select which type of the three repeats to use: Straight, Staggered or Nested.
Start Corner	Allows the user to select which corner of the plate from which to start the shape repeat.
Number of Rows	Program the number of rows to cut.
Number of Columns	Program the number of columns.
X Pattern Offset/ Y Pattern Offset	This control automatically calculates the pattern offset based on the dimension of the current part in memory.
Scrap Clearance	Allows the user to insert scrap clearance between parts in the grid pattern. The same value is used for X and Y dimensions.

Staggered Repeat



X Nest Distance/ Y Nest Distance	The control automatically calculates the nest offset based on the dimension of the current part in memory. This parameter is only available for the Nested type of repeat.

Nested Repeat



Pattern Offsets

This is an automated feature that calculates the minimum spacing required between repeated parts. The spacing is based on the size of the part (including lead-in and lead-out), the kerf value and scrap clearance. This calculated spacing allows the part to be repeated without overlapping.

You can use this pre-calculated value or select new values manually. If you enter new pattern offset values, the CNC automatically draws the new pattern with the new values.

Nest Distance

This automated feature calculates the minimum spacing required between nested parts. The spacing is based on the size of the part (including lead-in and lead-out), the kerf value and scrap clearance. This calculated spacing allows the part to be repeated without overlapping.

You can choose to use this pre-calculated value or select new values manually. As you enter new offset values, the CNC automatically draws the new nested pattern with the new values.

Tip: If you change Nest Distance values manually, start with a simple nest (1 column, 1 row) and perform adjustments based on the display. The pattern in the Preview window changes as you change values. When the Nest Distance is what you want, increase the nest size to a 2-column, 2-row nest, then adjust the X and Y pattern offsets again. When you have the nest spacing you want, increase the nest size to the maximum that the plate allows.

Aligning Parts

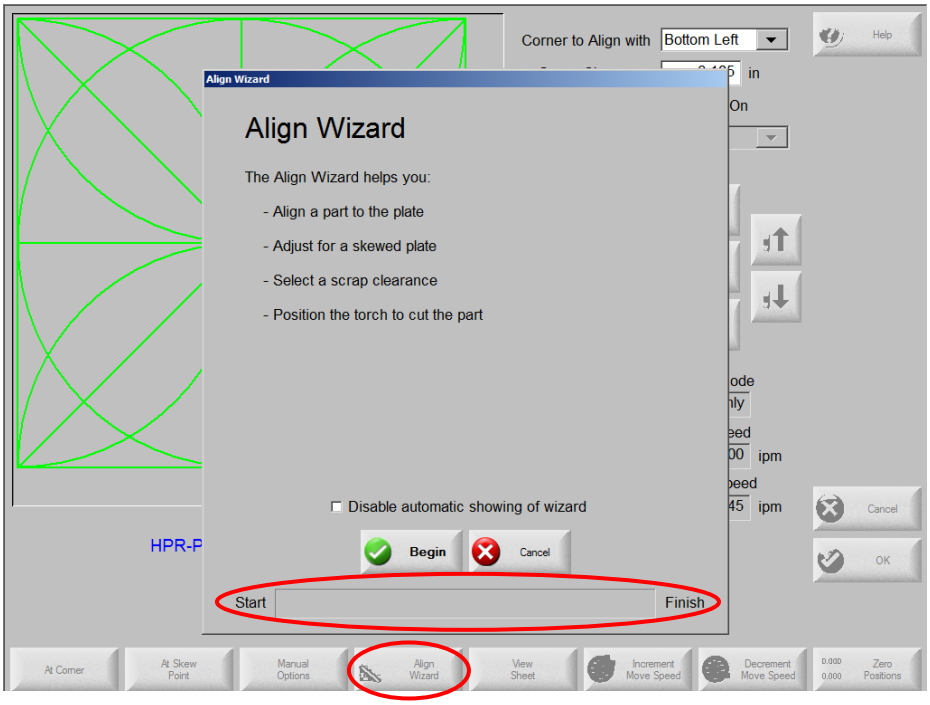
This screen allows you to:

- Launch the Align wizard.
- Align the current part to one of the four corners of the plate. This is common with parts that have an internal pierce point such as a flange.
- Accommodate skewed plates when aligning the part. This is commonly used with a nest of parts that has a small margin of error for placement of the nest on the plate.

Align Wizard

The Align wizard automates the sequence of operations to enter coordinates for a skewed plate on the table and to align parts to a skewed or aligned plate.

The Align wizard opens automatically from the Align screen or you can press the Align Wizard soft key on the Align window.



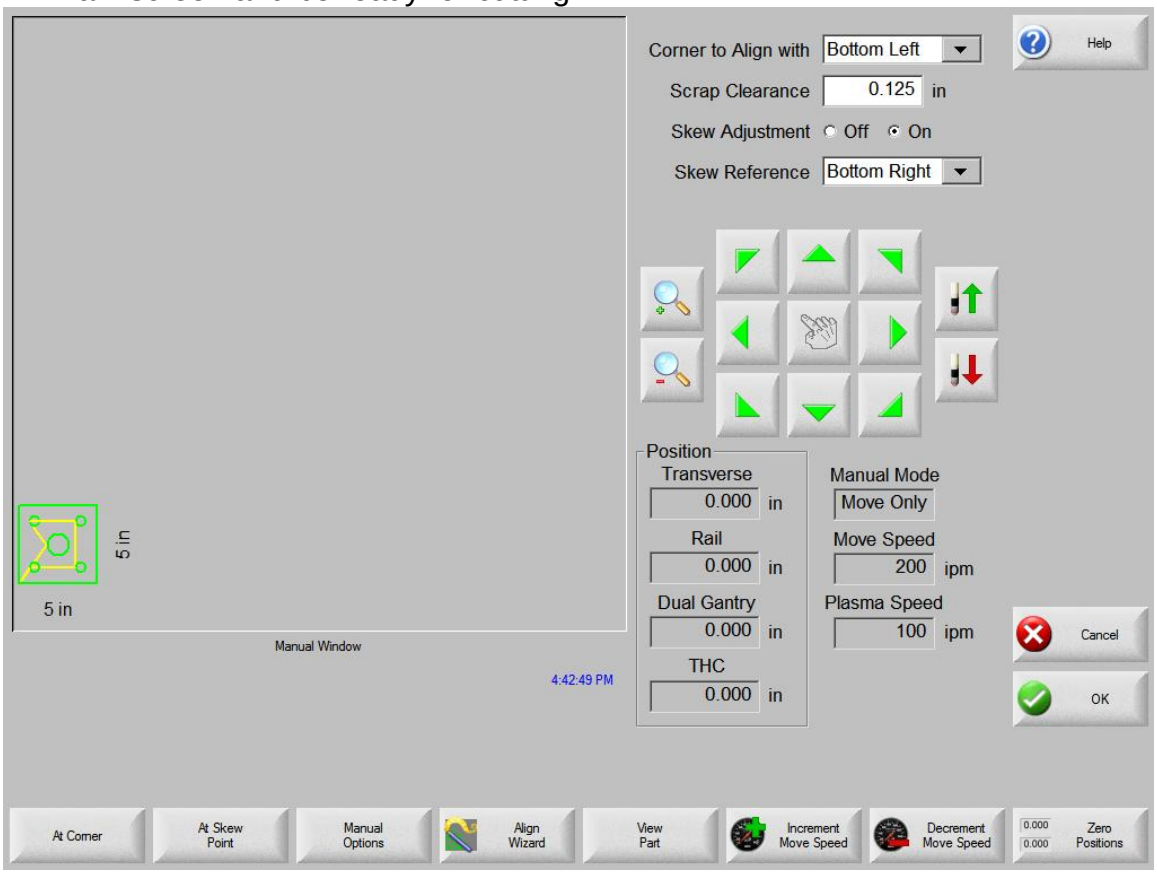
As you work with the Align wizard, it keeps track of your progress and displays it at the bottom of the wizard window in the progress bar.

You can choose to use the torch or a laser pointer to align the plate. If you choose the laser pointer, you must have a marker offset value of at least 1 entered for Marker Offset 10, 11, or 12 on the Setups screen.

Aligning Parts Manually

To align a part manually on the plate:

1. Set parameters that are needed to align your part in the upper right corner of the screen.
2. Move the torch to the first corner location (Corner to Align with) using the jog keys.
3. Press At Corner.
4. If you are aligning a part, go to step 7.
5. Move the torch to a point along the edge of the plate toward the selected Skew Reference.
6. Press At Skew Point.
7. Press OK. The machine will move to the start point for the part and return to the Main screen and be ready for cutting.



Corner to Align with	Selects the corner of the plate to align the part in.
Scrap Clearance	This is the amount of clearance between the edge of the plate and the part the control will add in when moving to the start point of the part.
Skew Adjustment	This determines if the control will adjust for plate skew when performing the align function.

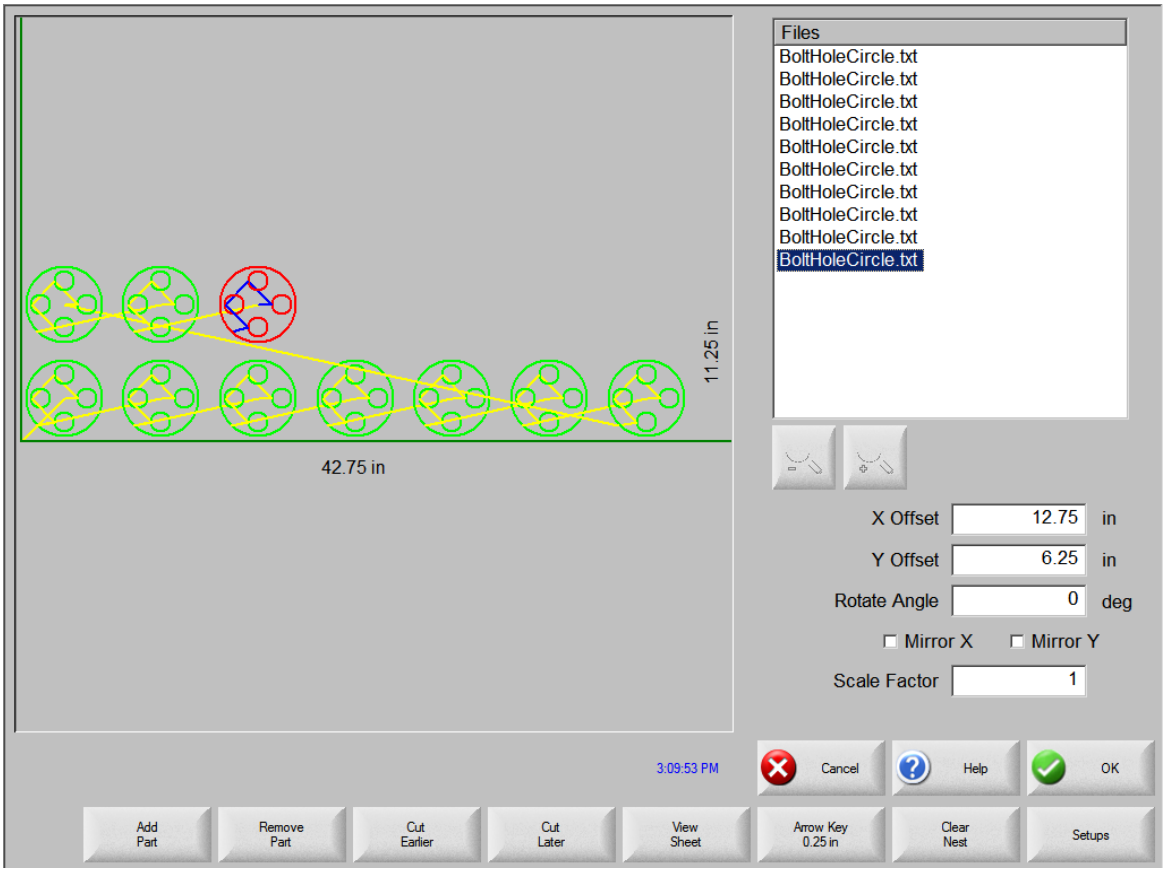
Skew Reference	This is the skew reference corner which you will move towards and mark a point along the edge. This is only available if Skew Adjustment is On.
At Corner	Press this soft key when at the corner of the plate you want to align the part in.
At Skew Point	Press this soft key when at the edge of the plate for skew adjustment. This is only available if Skew Adjustment is On.

Nesting Parts

Manual Nesting

The main viewing area is the largest area of the screen and is located in the upper left corner. The edge of the plate is displayed in dark green. The plate size displayed is based on plate information that has been selected at the main setup screen.

The upper right corner of the main screen displays the part program list for the nest in order of cut sequence. In the lower right, part position and orientation information for the selected part program is displayed and can be manipulated for use as new parts are added.

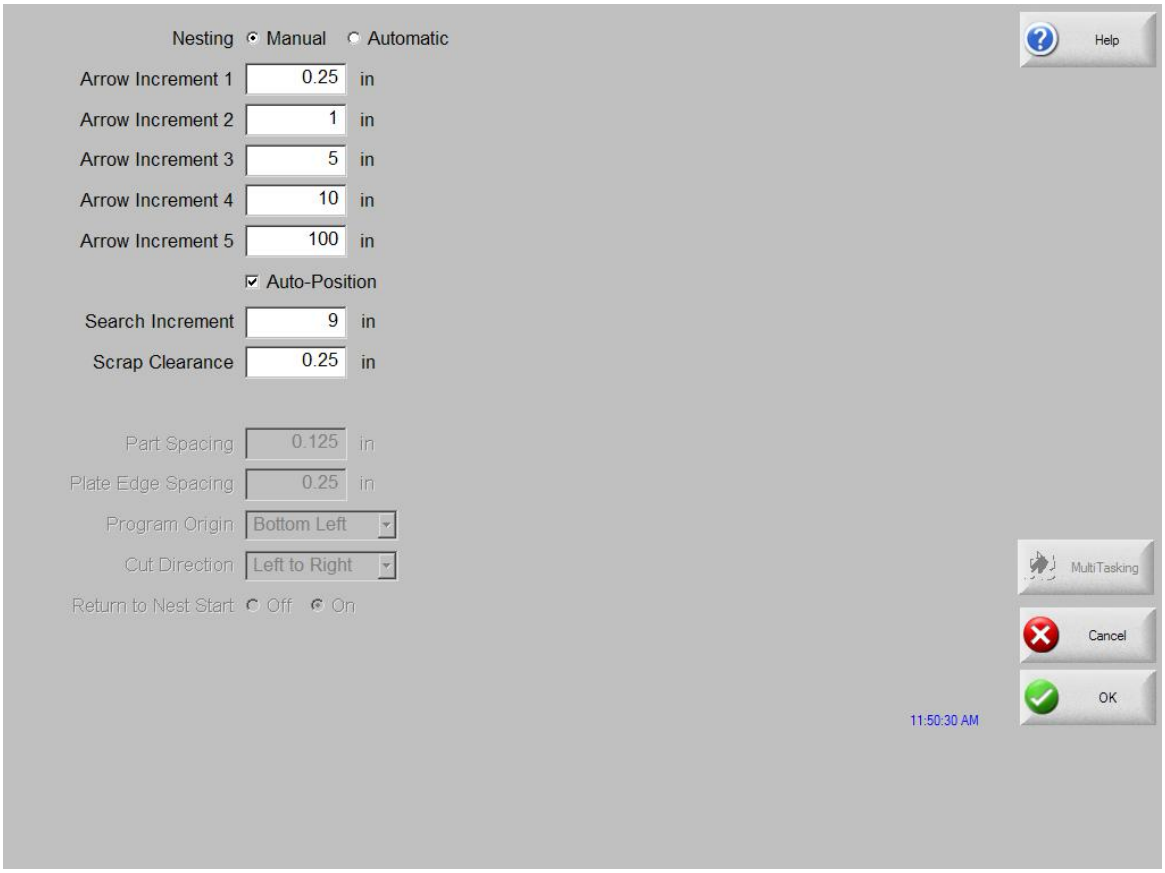


Add Part	Allows you to select a part program from a selected source to add to the nest.
Remove Part	Remove the selected part from the nest parts list.
Cut Earlier	Pressing the Cut Earlier soft key will move the selected part program to an earlier position in the part cut list. The sequence in which the parts are cut changes, but not the selected part location in the nest.
Cut Later	Pressing the Cut Later soft key will move the selected part program to a later position in the part cut list. The sequence in which the parts are cut changes, but not the selected part location in the nest.

View Sheet/ View Part	View Sheet allows the viewing of a part as it would appear on the plate. After pressing the View Sheet soft key, the display window zooms out to show the part in relationship to the entire plate. After zooming out, the display can be zoomed in again by pressing the **+** key, which causes horizontal and vertical scroll bars to be displayed. Pressing the **-** key will zoom back out. More information on use of this feature is provided in the Manual cutting section.
Arrow Key (Distance)	The Arrow Key allows the user to select one of five different preset move distances when the arrow keys are pressed to locate parts in the nest. These five distances are definable and are selected in the Nester setup screen.
Clear Nest	Clear Nest will delete all the parts located in the nested parts list from temporary memory.
Setup	Pressing the Setup soft key accesses the Nester setup screen for configuring the variable parameters when using Nester.

Nester Setup

The following Setup parameters are used to configure the manual nesting process.



Nesting	Select Manual.
Arrow Increment 1-5	At this screen, the user can select different move increment dimensions. These dimensions are used as move distance references when the control arrow keys are pressed to place parts in position on the plate.
Autoposition	Autoposition is an automated feature of the Nester software that enables block nesting. This type of nesting compares the overall block dimensions of the selected part and searches for the next available block on the plate that is large enough to accommodate the part being loaded. Autoposition does not allow parts to be placed on top of other parts or inside other parts. However, it can be disabled if you want to add parts to scrap areas. If Autoposition is not selected, imported parts are stacked in the lower left corner of the plate and must be manually arranged.
Search	The distance for the next available block on the plate that can be used

Increment	for the next nested part.
Scrap Clearance	The amount of space that is added to a block in the nest.

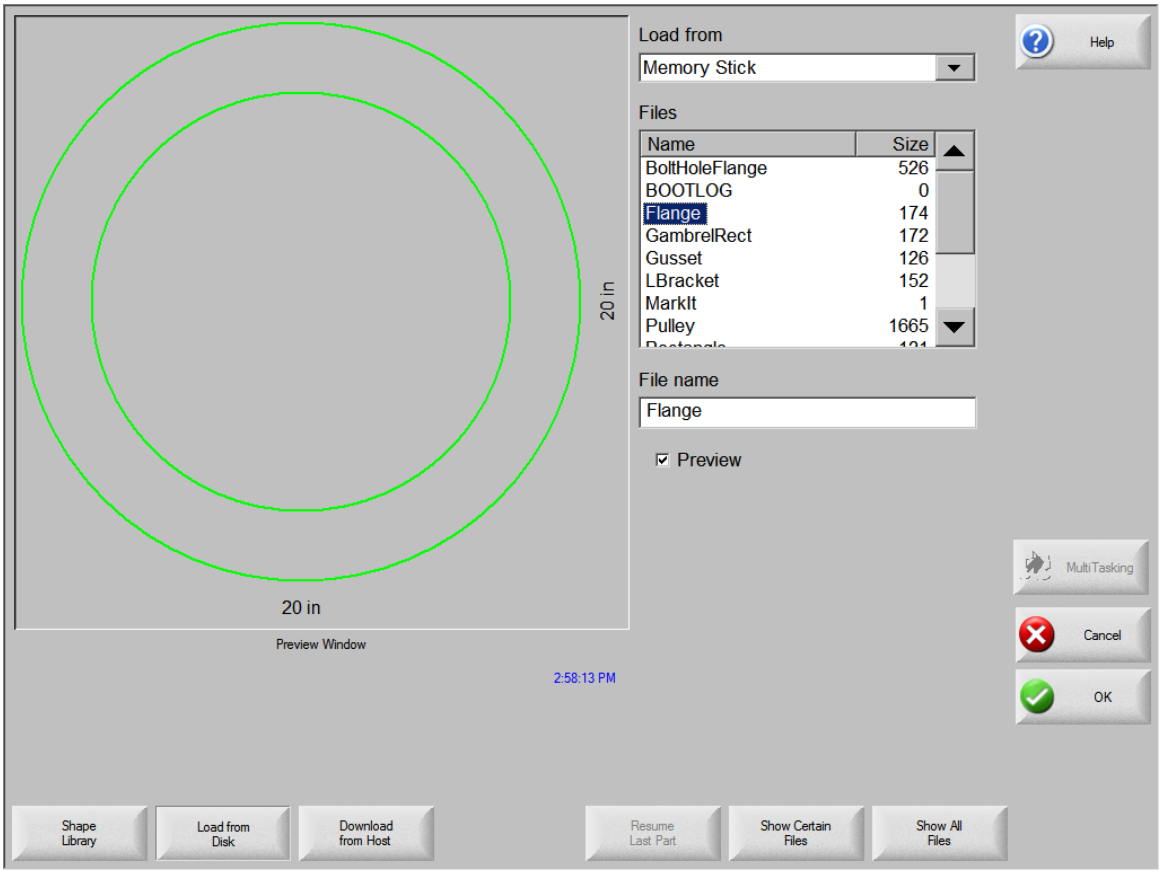
Using Manual Nester

To begin, first select the plate size requirements for the nest at the Main Setup screen. This information is used to display the plate size and plate orientation at the main view screen to place parts on the plate. The plate information is retained with the nested part program when saved.

Press the Nester soft key from the Shape Manager screen then enter the Nester Setup Screen to configure the nesting software for use. Press OK to return to the Nester Main Screen to begin placing parts in the nest.

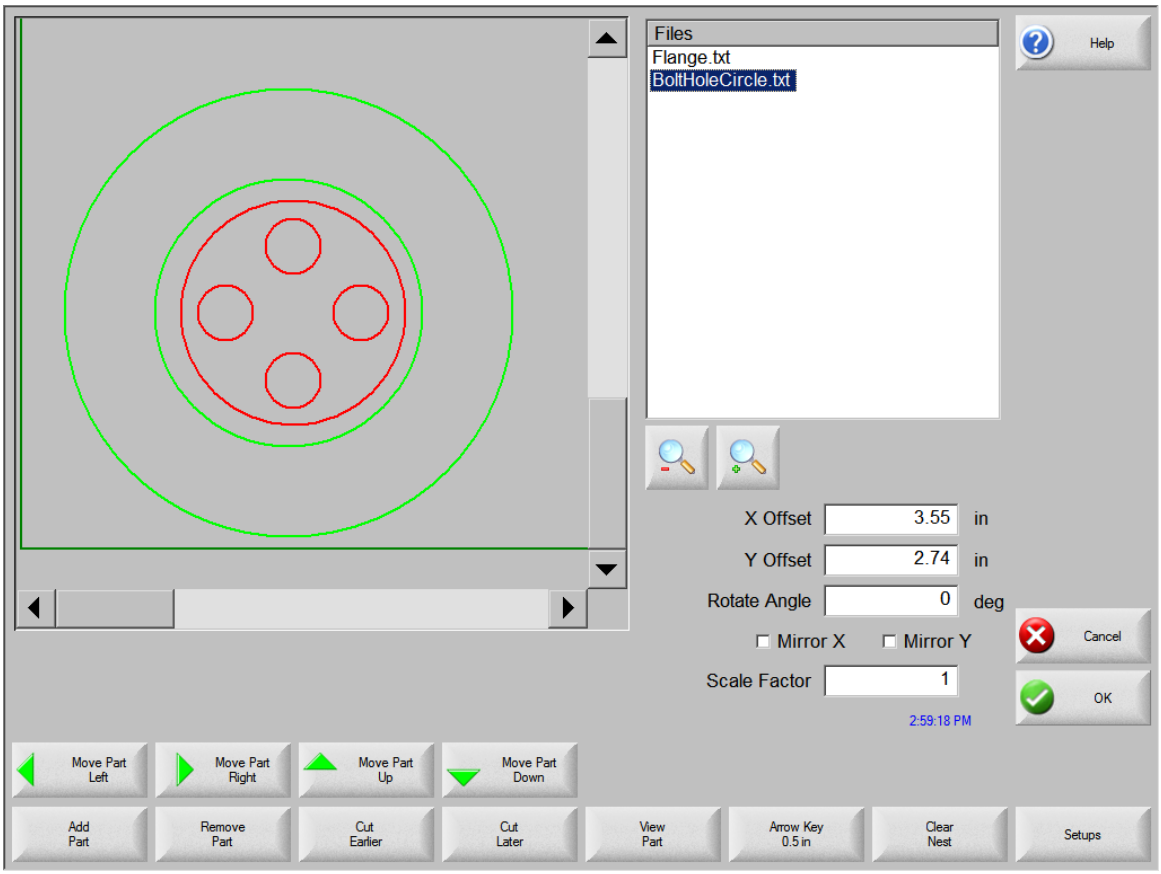
Adding Parts

At the Nester Screen, press the Add Part soft key to add a new part to the nesting part list. The first screen viewed will allow the user to select a part from the Simple Shape Library, from a disk or from the host computer via link communications.



After a part has been selected from either location, the user will be prompted to select the number of pieces desired.

As new parts are added, they are displayed on the selected plate in preparation for final placement.



At this screen, the part can be oriented, scaled and moved to final position. This is done by moving to the Nester Part List and highlighting the file name. Then select the desired field to manually offset, rotate, mirror and scale the part.

To position the selected part, use the manual direction keys. The view screen will be outlined by a bold blue border indicating that the arrow keys are active. Pressing the arrow keys will allow movement of the part to the desired location on the plate. Each time the arrow keys are pressed, the selected part will move in the direction of the arrow by the increment set by the Arrow Key distance soft key. Use the arrow distance key, arrow keys and zooming in the view field, to place the part exactly as you need it.

Add more parts to the nest in the same fashion as described above. To customize your nest, you may decide to delete parts or add parts to the list and change the order in which they are cut by use of the soft keys displayed. When finished, press OK to return to the Main Cut screen and begin cutting the nest. The part nest is currently saved as a temporary file until another part is loaded.

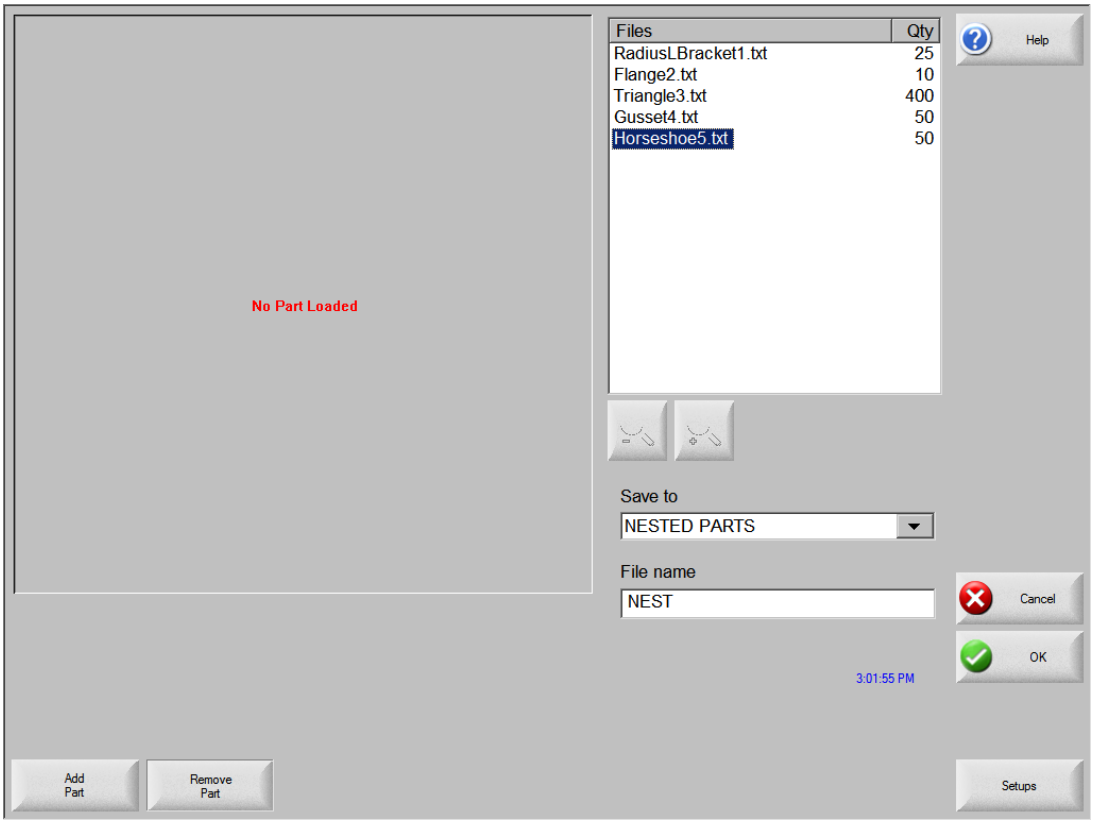
Saving a Nest

From the Main Cut screen, press the Files soft key then Save to Disk. From here the part can be saved to a hard disk folder on the CNC, Diskette or USB memory stick. The nested parts file may be saved as a nest or a part. Saving as a nest using the save as Nester File feature, will create a larger file which will allow future modification of the nest through Nester. Nested parts saved as a part file cannot be modified.

HyperNest – CNC Automatic Nesting

The main viewing area of the Nester screen is in the upper left corner and is used to preview manual nests. During an automatic nest, this area remains blank. The plate size used during Automatic nesting is based on plate information that has been selected at the main setup screen.

The upper right corner of the main screen displays the list of part programs and quantities of parts that have been selected for nesting. In the lower right are fields for saving the nest with a name and to a folder.

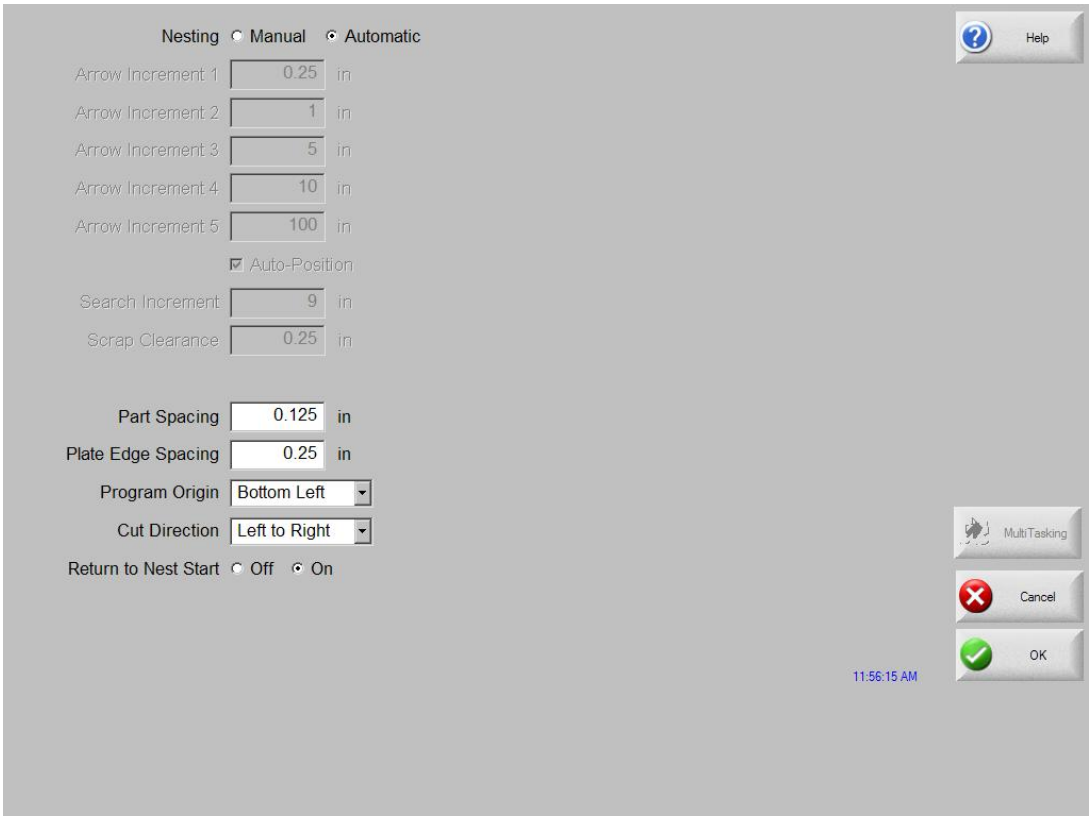


Note: This software feature is protected both by a software enable and a hardware key (dongle) installed on the CNC.

Setting Up HyperNest -- CNC

Pressing the Setup soft key accesses the following setup parameters and can be used to configure the automatic nesting process for use.

Note: If this feature is not available (grayed out), the feature has not been enabled on your CNC. Contact your CNC vendor for details on how to enable the Automatic Nesting feature.

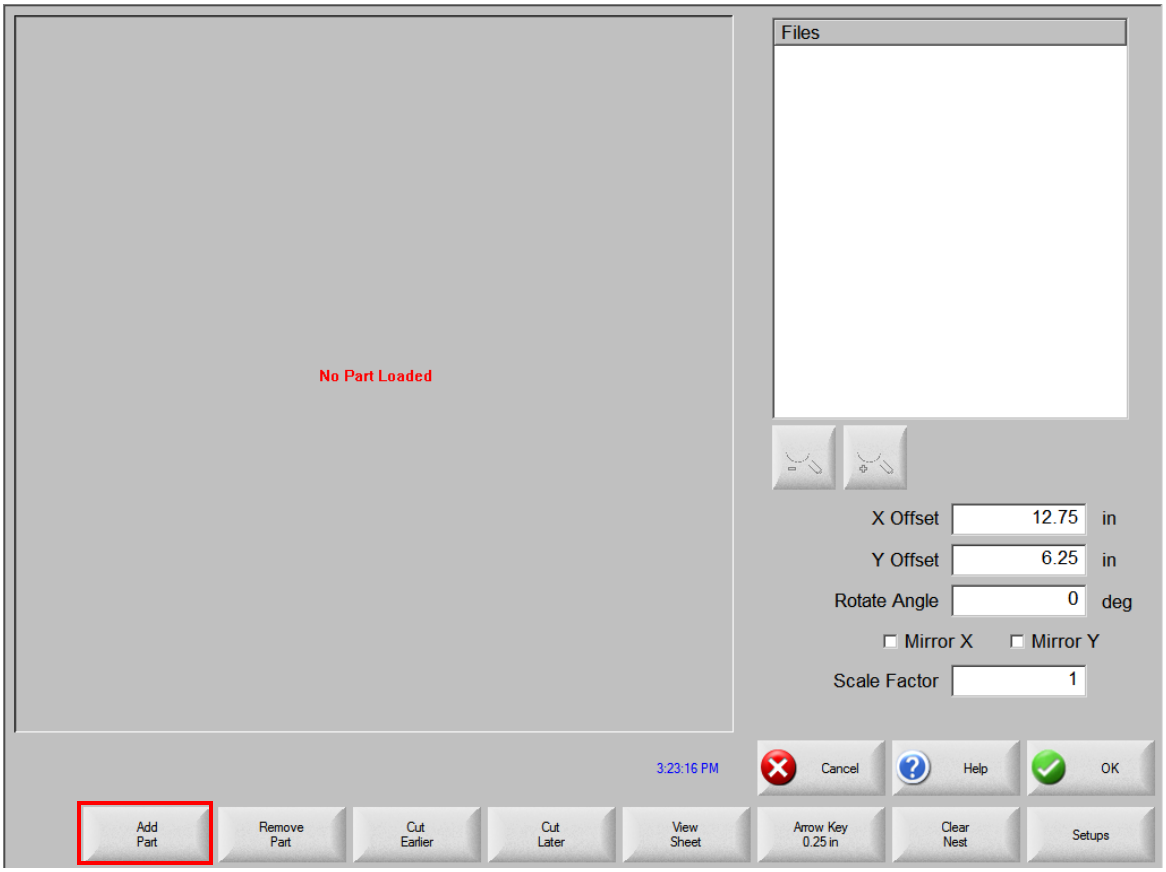


Nesting	Switching the Nesting Parameter to Automatic enables the feature.
Arrow Increment 1-5	The Part Spacing feature sets the spacing between parts during the Automatic Nesting process.
Search Increment	This parameter allows the user to set spacing around the edge of the plate to be used during the Autoposition Nesting process.
Scrap Clearance	The Program Origin (nest start location) may be set to lower left, upper left, bottom left or bottom right.
Cut Direction	Cut Direction allows to user to select the direction the parts will be placed in during the automatic nesting process. Options are: Left or Right, Right to Left, Top to Bottom and Bottom to Top.
Nest Direction	Select the direction in which nests are placed in the automatic nesting process.
Return to Nest Start	When enabled, the Return to Nest Start feature will insert a traverse segment back to the start point at the end of the nest.
Use Remnant	If remnants are created and saved for future use, select On to use one of these remnants for automatic nesting.
Generate and Cut Offcut	Select On to generate offcuts for standard, rectangular nests. If this feature is enabled, offcuts are created when 30% or more of the sheet remains after nesting. The offcut is cut after a pause at the end of the nest on the last nested rectangular sheet.

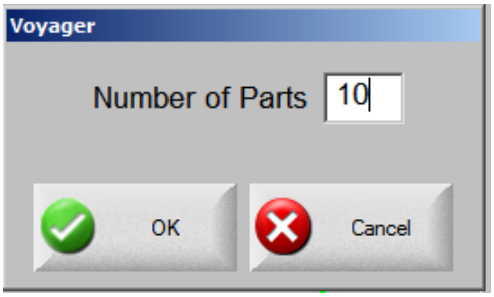
M65 Auto Reload	Select On to allow new sheets to be reloaded automatically. When this feature is selected, there is a pause at the end of each sheet until the operator presses Start to Resume. Then, a new sheet automatically loads and runs. Auto reload works with standard, rectangular nests only.

Using Nesting

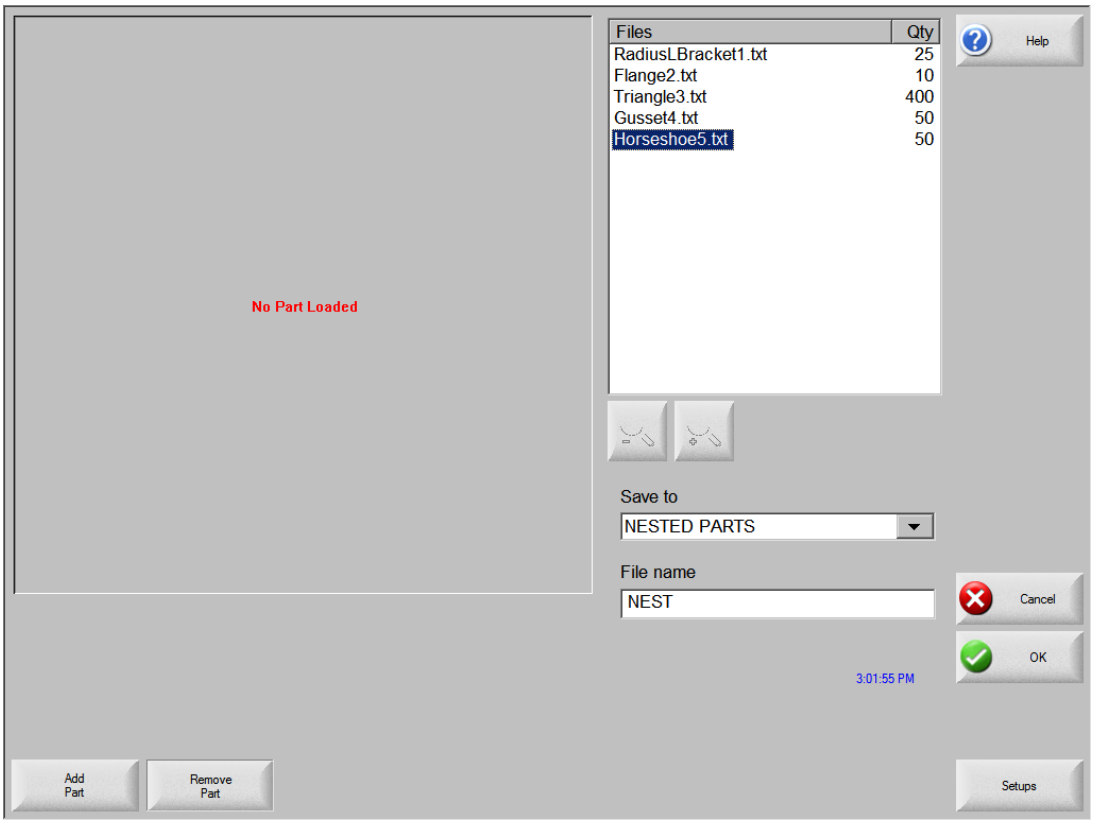
1. On the Main Setup screen, select Shape Manager > Nester.
2. On the Nester Screen, press the Add Part soft key to add a new part to the nesting part list.



3. Select a part from the Shape Library, from a disk or from the host computer via link communications.
4. In the popup that displays, enter the number of pieces to be included in the nest.

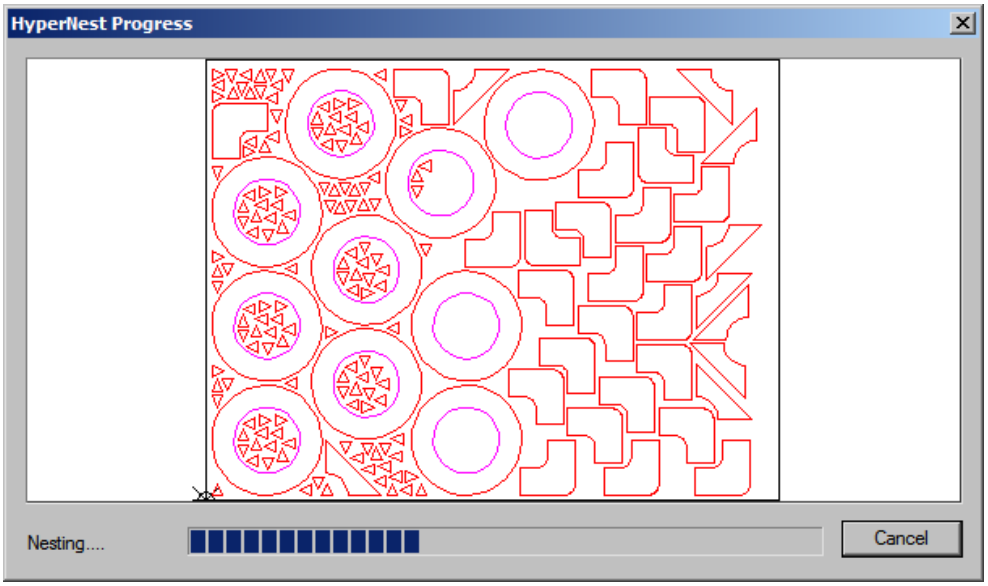


5. As new parts are added, the part file name and quantity are listed in the Files window in preparation for final placement during the automatic nesting process.



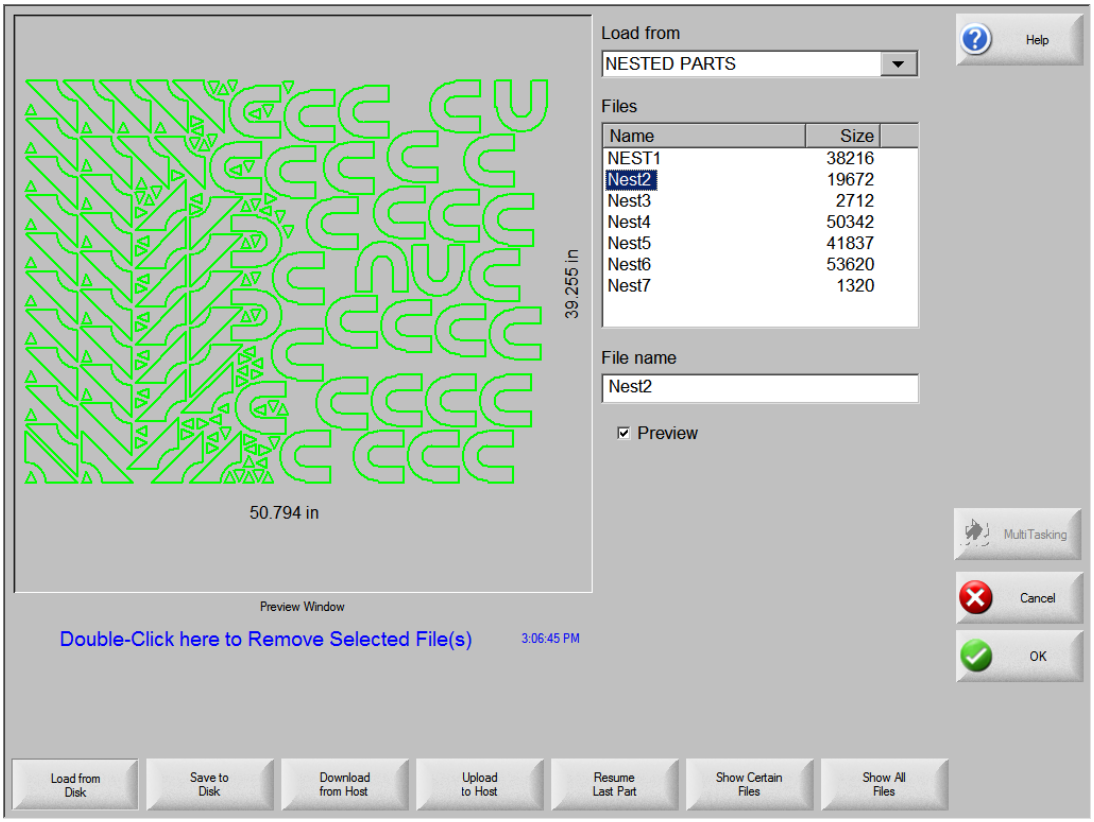
6. Select a folder for the nest in the Save to dropdown list.
7. Enter the name of the nest in the File name field.
8. Press OK.

A progress window will be displayed during the nesting process.



Note: The nest process progresses quickly and not all shapes may be visible on screen or other drawing anomalies may be noted during the nesting process.

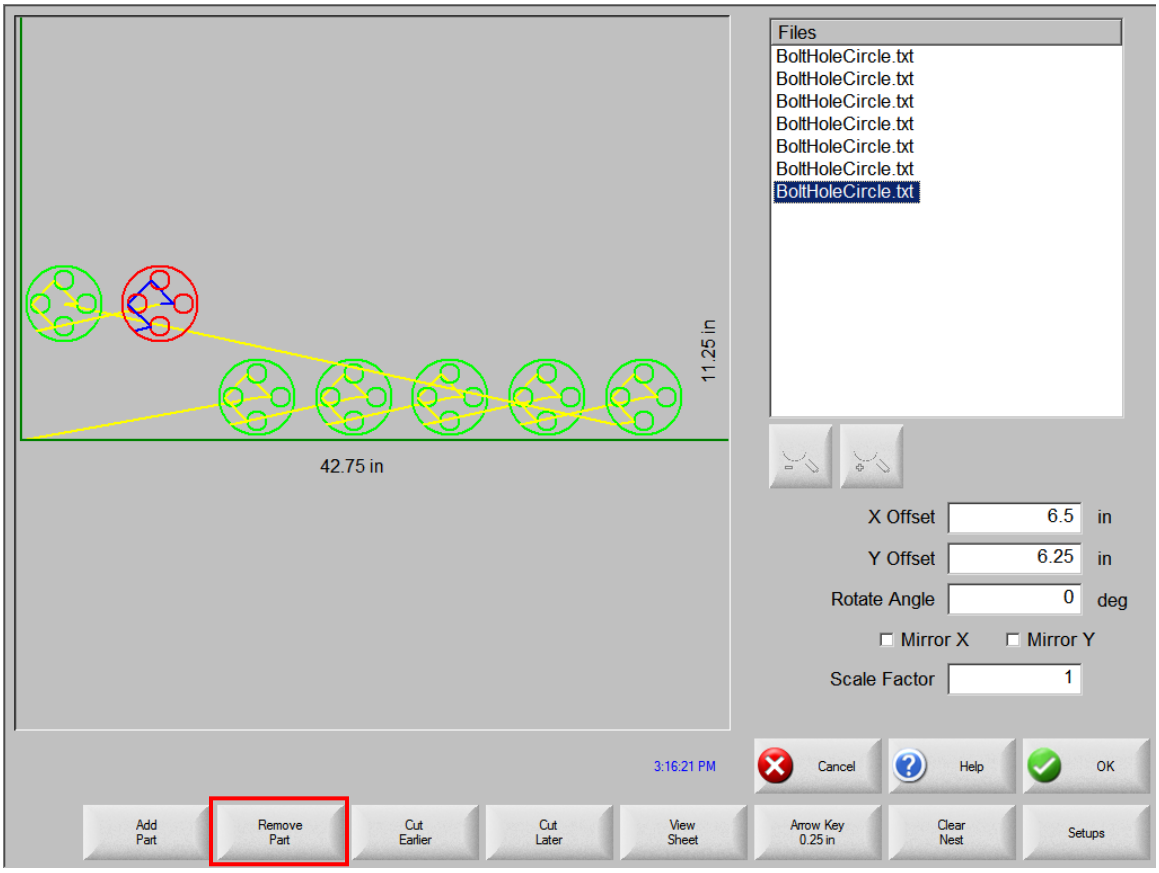
If more parts are selected than can fit on one plate, multiple plates or sheets (nested program) files will be generated and saved in the selected folder with the selected file name, but a numeric suffix will be added. For example, saving the part file as Nest may generate multiple part files named NEST1.txt, NEST2.txt, NEST3.txt, etc.



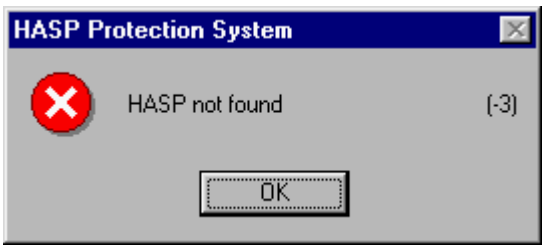
Removing a Part from a Nest

To remove a part from a nest:

1. Highlight the selected part in the Files list.
2. Press the Remove Part soft key.

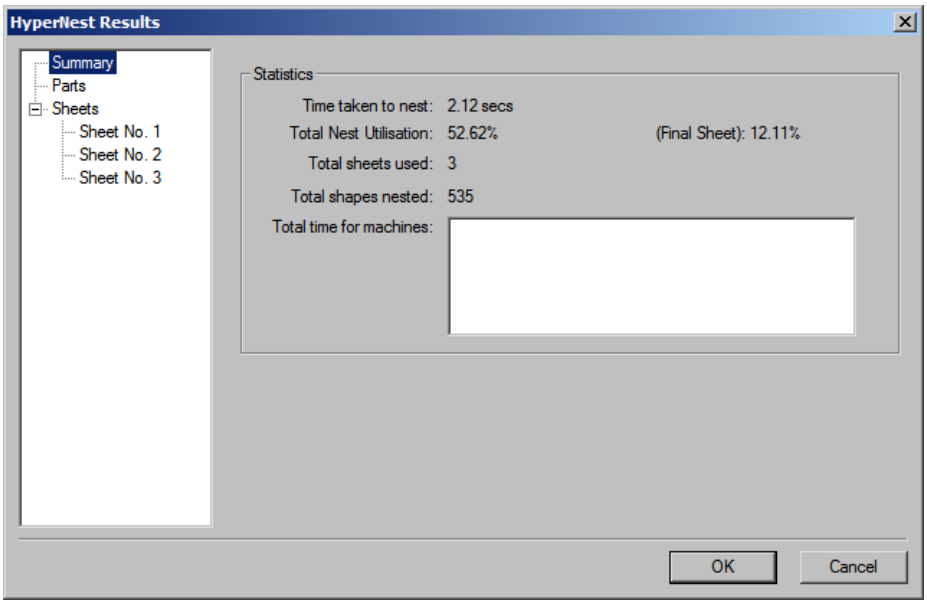


Note: The software feature on the CNC is protected by a hardware key or dongle. If the hardware key has been removed from the CNC, the following message will appear when the Nest Parts soft key has been pressed.



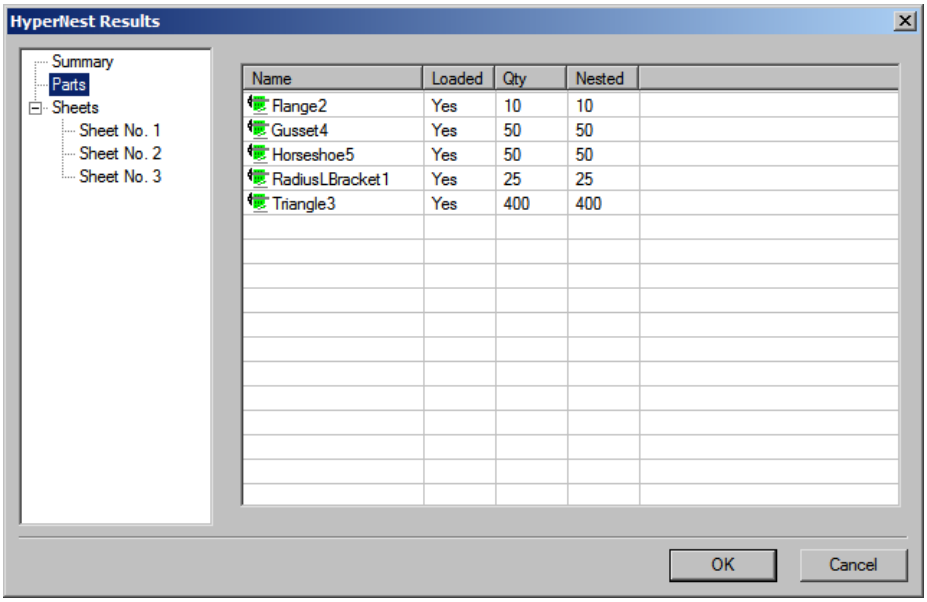
Nest Summary

Upon completion of the nest, the software will provide a summary of the Automatic Nesting process.

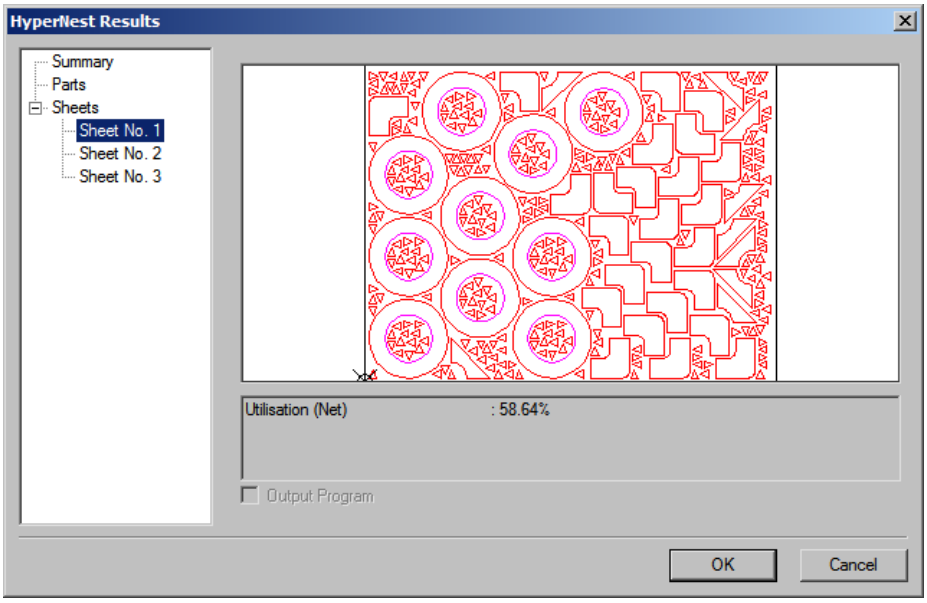


Statistical analysis of the process is provided for the number of sheets, time to execute nest, total nest utilization and total number of shapes nested.

Note: Sheets that are generated with the exact same part configuration will be listed as “Sheet No. # (total #)”.

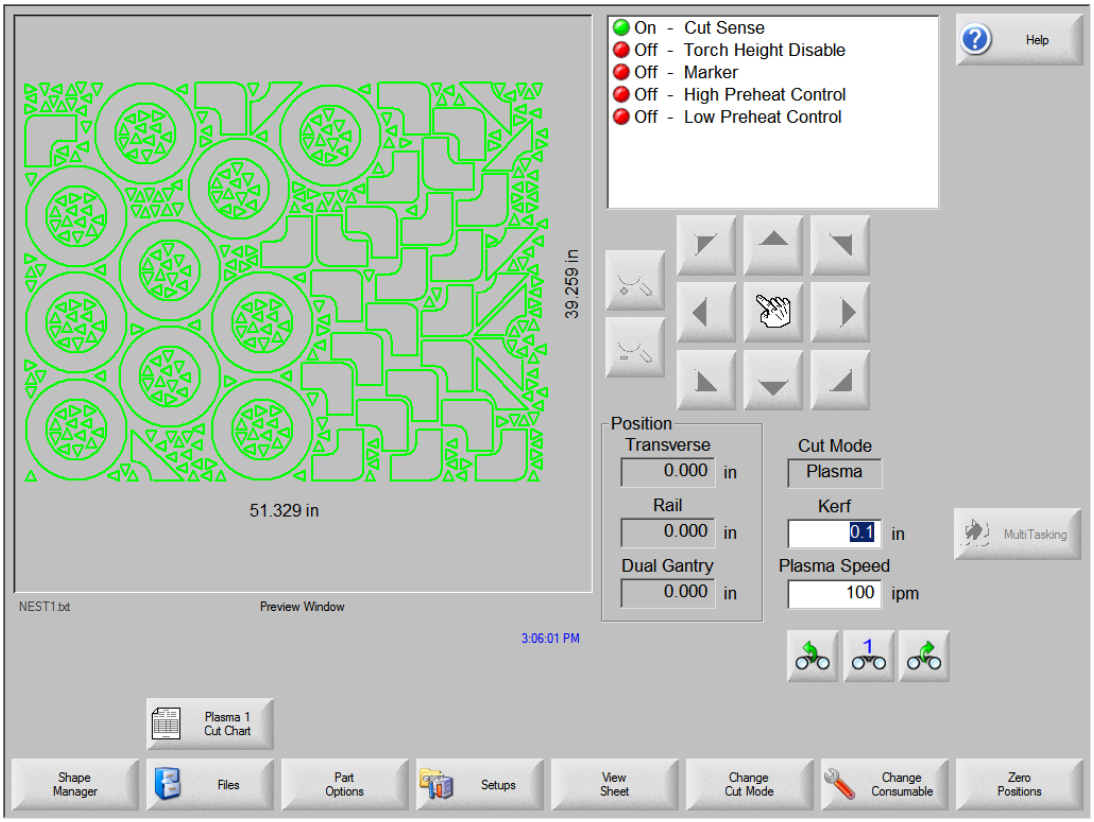


Scroll down to view an analysis of the parts used and to view the individual sheets produced and a listing of the net utilization for the specific sheet.



Press OK to accept the nest and have the first sheet become the current part. Press the Cancel key to reject the nest and return to the main nesting screen to add or remove parts from the nest.

Main Screen View of Nest



Note: Parts with open loops or other invalid geometries may not be able to be automatically nested. It may be possible to manually nest parts which have been rejected by the Automatic Nesting function.

Cutting Parts

CutPro Wizard

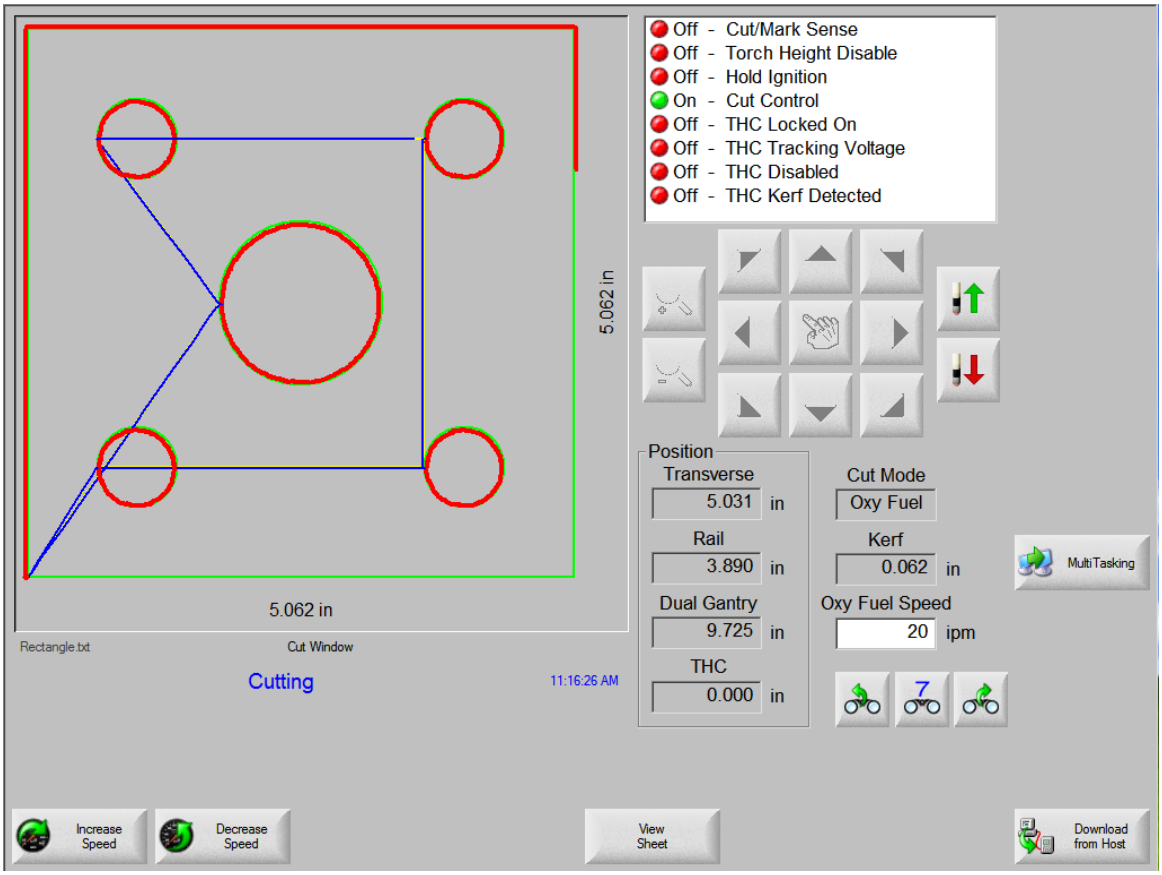
The CutPro wizard automates the sequence of choices and selections that you must make before you begin cutting parts. If you have parts, nests, and cutting processes stored on your system, you can use the CutPro wizard to simplify cutting operations.

The CutPro wizard also helps you to align parts and handle plate skew with the Align wizard. For more information on the Align wizard, see the *Arranging Parts* chapter.

The CutPro wizard opens automatically from the Main screen or you can press the CutPro Wizard soft key on the Main screen. As you work with the CutPro wizard, it keeps track of your progress and displays it at the bottom of the wizard window in the progress bar.

Cutting in Manual Mode

After you verify that the cut mode, cut speed and Kerf values are set correctly, press the Start key on the Main or Manual window to cut a part. The following window is displayed:



To cut the part:

1. Verify that the Cut Mode is set to the selected cut type and that the Kerf and Cut Speed settings are correct.
2. Press the Start key on the front panel.
   This starts cutting in the selected Cut Mode.

To preview the path:

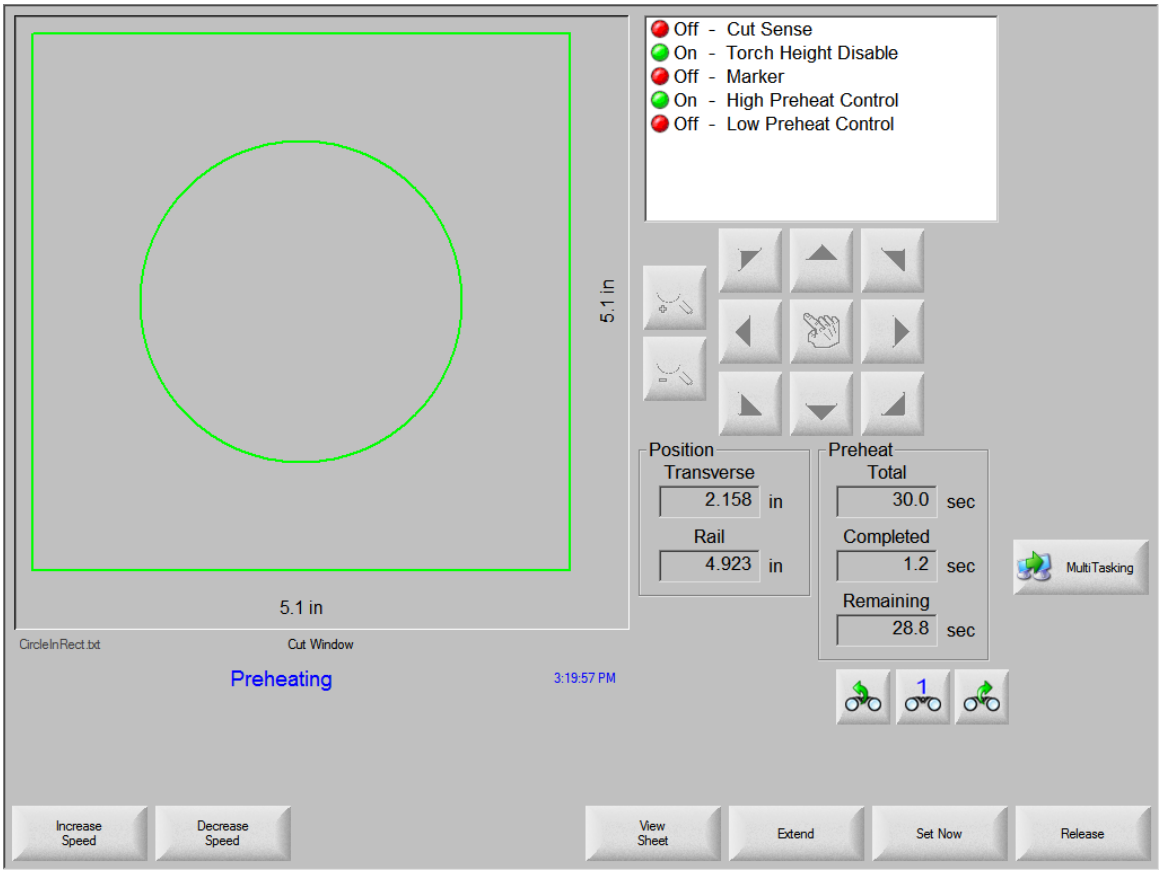
1. Press the Change Cut Mode soft key until Trial appears in the Cut Mode window.
2. Press the Start key to have the cutting device follow the cut path without cutting. Motion is performed at the programmed speed.
3. Press the Stop key on the front panel to stop a cut.
   The machine decelerates to a smooth stop along the cut path. If the cutting process was on when you pressed the Stop key, it is de-activated according to the programmed cut logic.

During a cut, the Watch window displays information about the part being cut, such as the current cut speed, current axes positions and path position.

In sheet view, the control automatically scrolls to keep the cut location centered within the view screen. This feature is useful during normal cutting to zoom in and follow the cut-path.

View Sheet is useful when proper plate size values have been entered in Cutting setups and when the machine has been homed. If you attempt to view large parts with a fully zoomed screen, the part may not be fully drawn on the screen before the next view location displays and the screen may flash. Zoom out to correct this and view a larger area.

Increase Speed	Increases the current cut speed by 3%.
Decrease Speed	Decreases the current cut speed by 3%.
	Note: Double click the speed field to enter a new speed value.
	Keyboard operation: To change the current cut speed while cutting a part, press the Enter key once to highlight the current cut speed, enter the new cut speed, and press Enter again.
Repeats	If a Shape Repeat option has been enabled, press the Repeats soft key to see the number of rows and columns remaining to be cut. The Repeats soft key operates with the Extend soft key which is only active during initiation of the cut sequence.
Cut Delay Timers	Cut Delay Timers define the timing logic for the cut and are available for both Oxy-fuel and plasma at the Cut Types setup screen. In cut mode, the control displays the preset delays as they are executed in the lower right corner of the screen. For certain delay times, such as Preheat and Pierce, a countdown timer shows the preset time and time remaining. An example of the Preheat Timer is illustrated below:
	The Preheat times, Total, Completed and Remaining, are shown to a tenth of a second.



When you activate the Cut Sense input, the Preheat delay time cycle ends. The time at the point of activation becomes the new Preheat time for subsequent cuts.

Three soft keys are also displayed which can be used to modify the Preheat cycle in progress. The function of these keys is explained below:

Extend	Extends the Preheat timer until it is stopped with either the Set-Now or Release soft key.
Set Now	Ends the selected delay timer and saves the new set time. Use the Set Now soft key with the Extend soft key to modify the preset Preheat time.
Release	Ends the selected delay timer, but does not modify the original delay time.

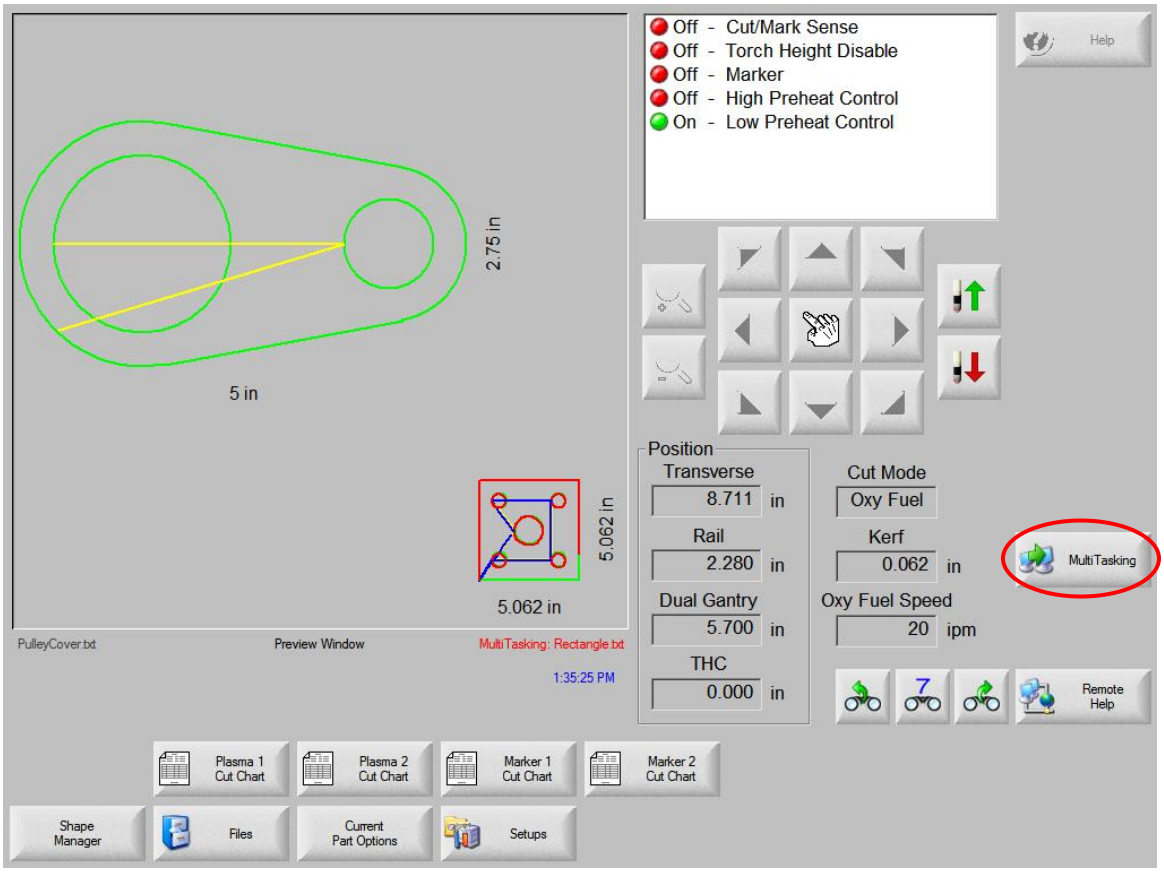
Press the Start key twice to bypass the Preheat and Pierce Time Delays and begin the cut in the Oxy Fuel cut mode.

Multitasking

Multitasking allows you to load and configure a new part program while another part program is cutting. This feature is only available in advanced operation mode.

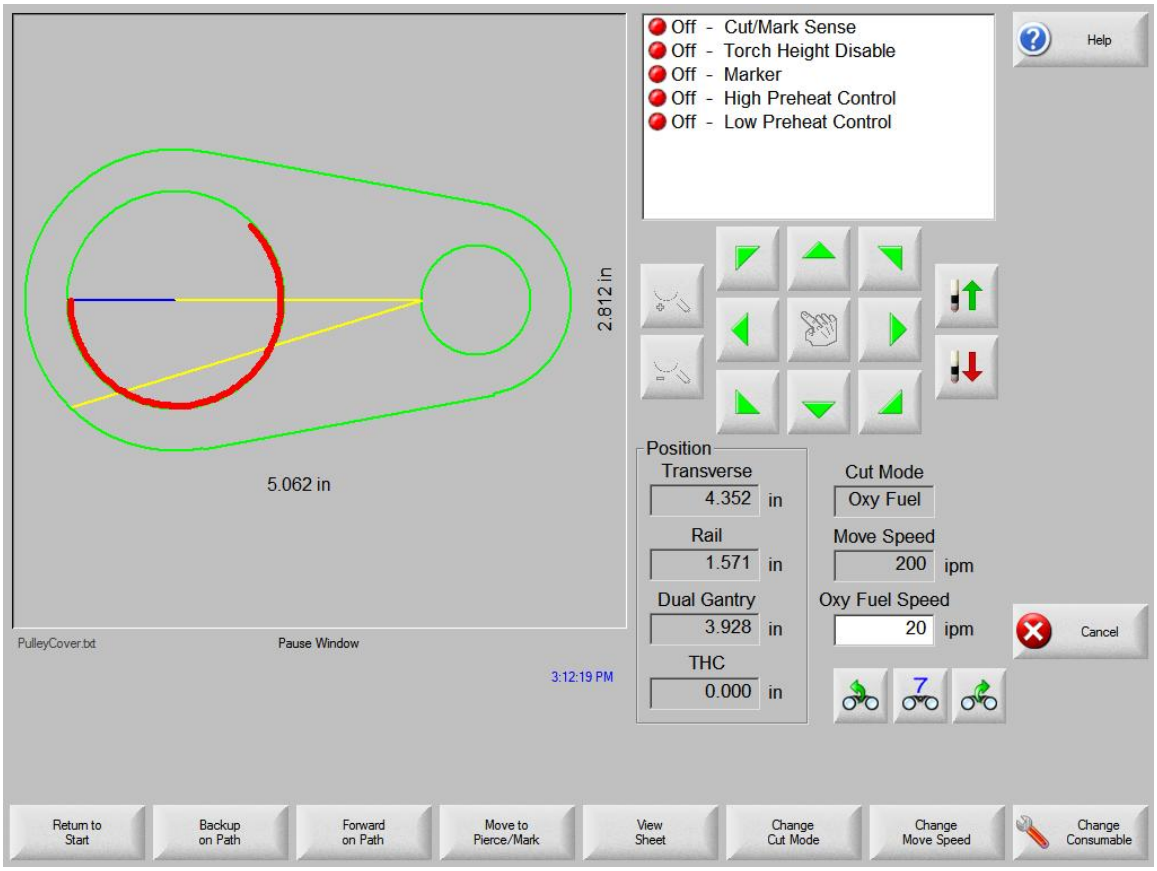
To use the multitasking feature:

1. On the Shape Manager screen, press the Multitasking soft key.
   The current part program displays in the lower right corner of the Preview Window.
2. Select another part program from the Shape Library or a storage device.
   The new program displays in the Preview Window.



3. Press the multitasking soft key to switch between programs.

Pausing Cutting



If the cut process fails, the CNC has recovery capabilities that are described in the following table:

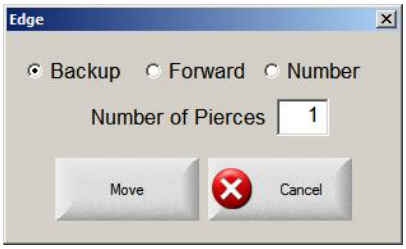
Cut Loss Recovery	The Cut Loss Recovery features of the CNC are available from the Pause screen which displays when the operator presses Stop or if cut sense is lost. Press the Cancel key on the Pause screen to cancel the current part.
Return to Start	This feature allows the operator to return to the initial starting point of the part program. **Note:** If you use the Return to Start function after a cut loss, all information about the current position of the cutting device on the path is lost.
Backup and Forward on Path	Use these two soft keys to move backward and forward along the cut path at the selected move speed to locate the pierce restart point. Press the Start key to resume the cut at the programmed cut speed. In addition to all segments of a standard part, the Backup and Forward on Path functions allow full movement through all sections of Shape Repeat part, as well.

Like the Manual Mode functions, Backup and Forward on Path use the currently selected move speed. The different speeds allow moving rapidly along the path, or precisely positioning the cutting device.

When a cut loss occurs, the initial backup and forward speed is the one that was used last. To toggle between the move speeds, press the Change Move Speed soft key in the Pause window. The corresponding speed is displayed in the Move Speed window.

Move to Pierce/Mark

Press the Move to Pierce/Mark soft key to move directly to any pierce point.



Enter the information for the pierce point and press Enter. The cutting device moves directly to the selected pierce point.

Change Cut Mode

Alternates the restart mode between Cut and Trial. This allows the operator to move through the part partially as a trial cut and partially as an actual cut.

Change Move Speed

Cycles through the four move speeds that are available. The four move speeds are the Maximum Machine Speed, High Jog Speed, Medium Jog Speed and Low Jog Speed from the Speeds setups.

On-Path Restart

To restart the cut at the pierce point that you selected using On-Path Backup, press the START key. The cut speed and the cut mode are the same as they were before the motion was paused unless the values have been edited in the Watch window.

While the Pause Window is displays, the manual arrow keys are fully functional so you can move the cutting device. This allows you to move the machine in any direction (not necessarily along the path) to inspect the partially cut piece. Once the cutting device is moved off the cut path, the Off-path Pause Window displays.

Return to Path

Press the Return to Path soft key in the Off-path Pause window to return the cutting device to the point on the cut path from which it was jogged away. This feature is useful for inspecting or replacing components after cut loss and then returning to the cut loss point. When the cutting device is back on the cut path, the On-path Pause Window is restored and cutting can resume.

Move Part

Moves the entire part on the plate. The point along the cut path to which the cutting device moves becomes the current position of the cutting device. The On-path Pause window displays again because

the cutting device is on path.

Off-Path Restart

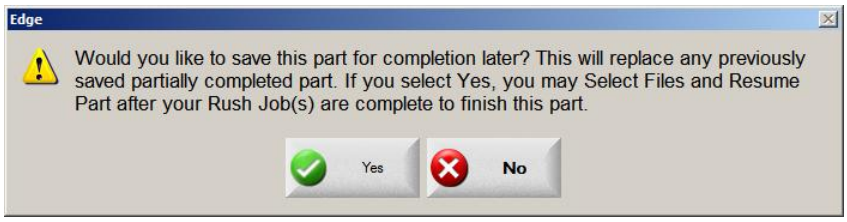
Press the Start key from the Off-path Pause window, to construct a lead-in from the off-path point back to the original part.

In a cut loss situation, the operator can use the Backup on Path key in the On-path Pause window menu to position the cutting device on the cut path where the cut was lost. The operator can then use the manual arrow keys to jog the cutting device off path to a suitable pierce point.

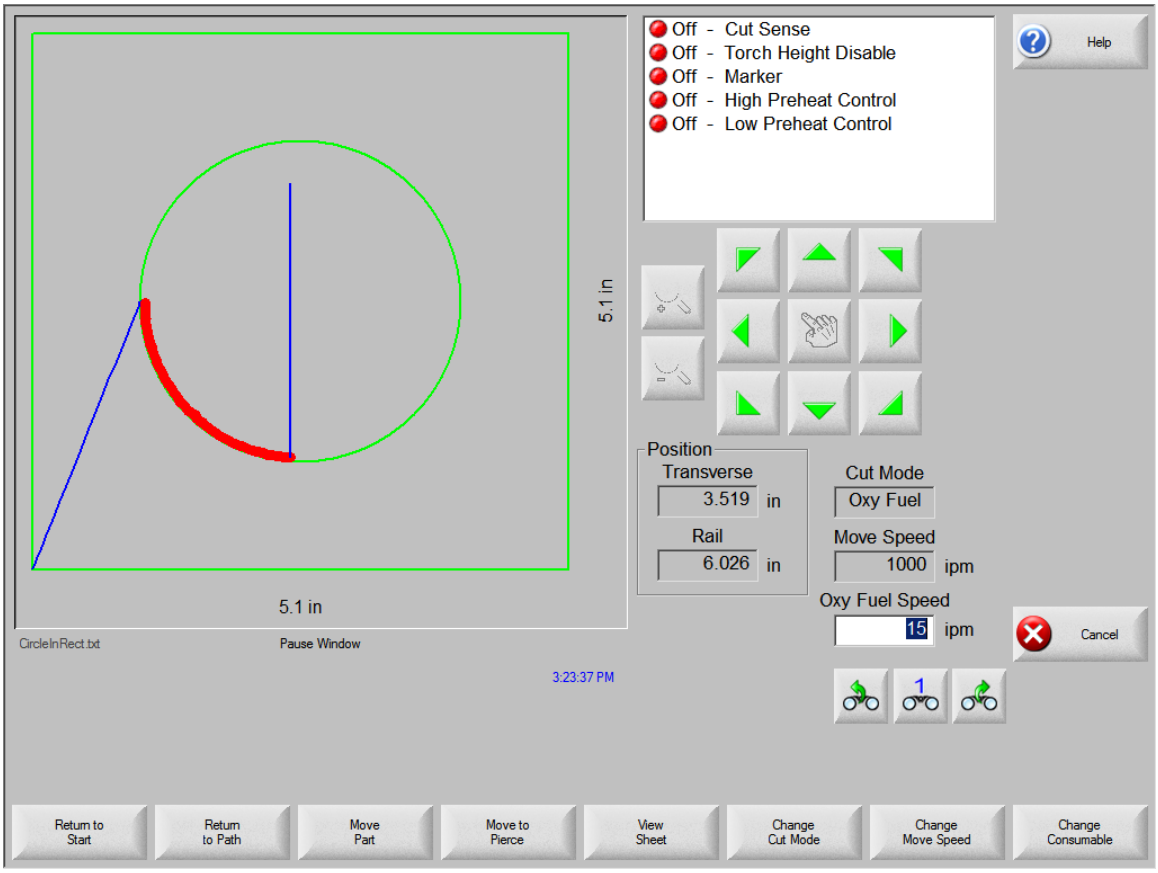
Press Start at this point to cut a new lead-in from the off-path pierce point to the point along the path from which the cutting device was jogged away. When the cutting device is back on path, it continues along the path to cut the remainder of the part.

Rush Job Interrupt

Allows the user to pause the current part program and retain the part and current position information. On the Pause screen, press the Cancel key. A prompt displays on the screen to allow you to save the part information.



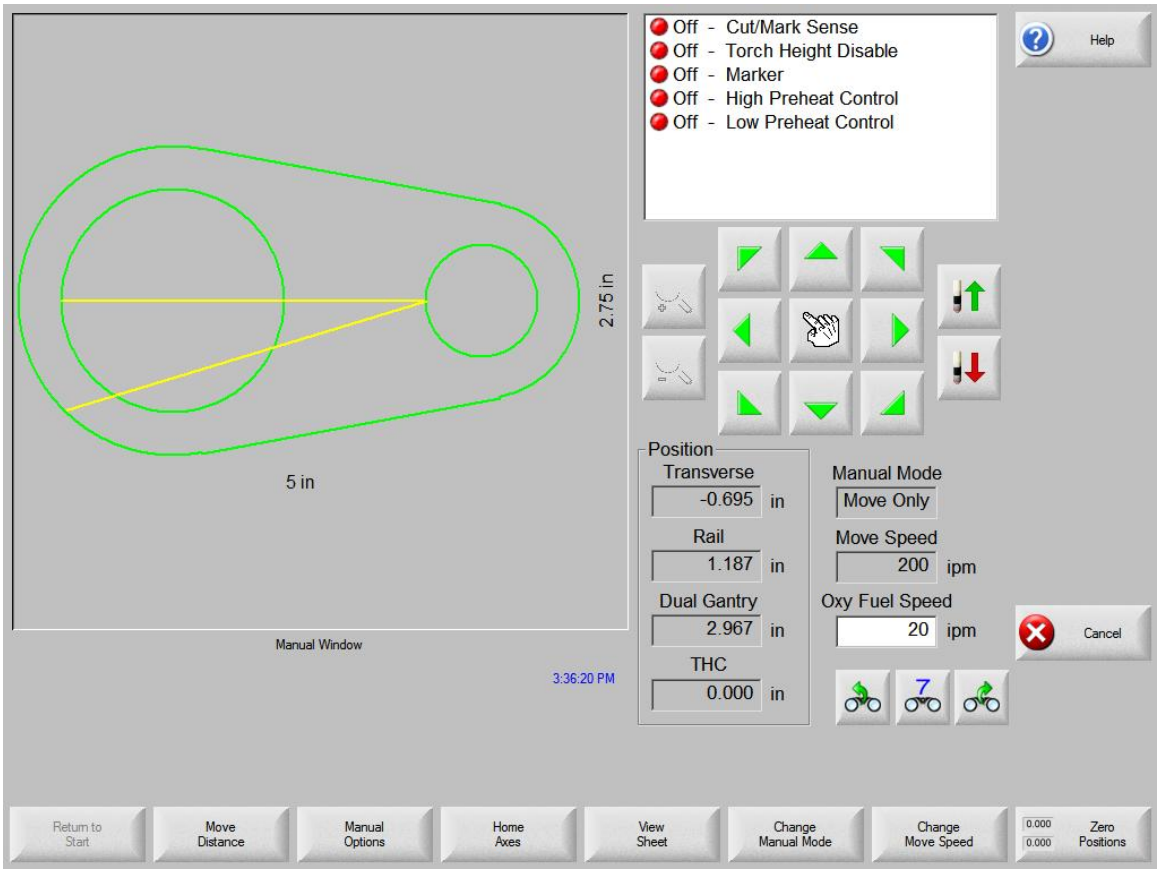
If you select Yes, the Resume Last Part button displays on the Files Screen. You can load and execute another part program and then return to the original part using the Resume Last Part soft key. The part program and position resumes.


Off - Cut Sense
Off - Torch Height Disable
Off - Marker
Off - High Preheat Control
Off - Low Preheat Control
Help
5.1 in
5.1 in
Position
Transverse
3.519 in
Rail
6.026 in
Cut Mode
Oxy Fuel
Move Speed
1000 ipm
Oxy Fuel Speed
15 ipm
Cancel
CircleInRect.txt
Pause Window
3:23:37 PM
1
Return to Start
Return to Path
Move Part
Move to Pierce
View Sheet
Change Cut Mode
Change Move Speed
Change Consumable

Manual Operations

The manual key is indicated by the hand icon.

Press the manual key on the screen to view the following screen. The directional jog keys are active when they are green.



Whenever the manual keys are active, the cursor icon in the graphics display window is the shape of a hand.

From the Manual window, the machine can be moved in one of eight directions using the arrow keys. The cutting device moves while you hold an arrow key down. When the key is released, the cutting device comes to a smooth stop.

If the latched manual key feature is enabled in the control setups, press the manual key a second time to allow motion to continue without holding down the arrow key.

This feature is available for the manual direction keys in the Manual, Align and Pause screens. When this feature is activated, the dialog "Latched Manual Keys On" will be displayed in red at the bottom right corner of the part window.

Motion can be paused by use of the Stop, Cancel or an arrow key. The latched manual key feature can be turned off by pressing the manual key again.

Return to Start

Whenever the Manual window is opened, the transverse and rail positions at that point are saved.

After rip cutting or other manual operations, it may be necessary to return to this "start" position.

Press the Return to Start soft key to generate motion in the transverse and rail axes from the machine's current position to the position that was saved when the Manual window opened.

Move Distance

When Move Only is displayed in the Manual Mode window, the second soft key from the left changes to Move Distance.

The Move Distance soft key allows you to perform moves over exact distances. After you press Move Distance, the CNC prompts you for traverse and rail distance values for the machine's motion. Enter the appropriate values and press ENTER.

The cutting device moves the distance you entered in a straight line without executing any cut logic.

As with any automatic motion, you may press STOP on the front panel at any time to bring the machine smoothly to a stop before the programmed motion is complete.

Cut Distance

When Rip Cut mode is selected in the Manual Mode window, the second soft key from the left changes to Cut Distance.

This soft key allows you to make rip cuts of an exact length. After you press Cut Distance, the control prompts you for traverse and rail distance values for machine motion. Enter the appropriate values and press ENTER.

After the cutting device executes the cut logic sequence, it moves the distance you entered in a straight line.

If you enter incorrect values, press the CANCEL key at any time.

After motion has begun, press STOP on the front panel to bring the

	machine smoothly to a stop before the programmed motion is complete. Rip Cut mode is useful for making a cut along a specified linear path. Motion stops and cutting action ceases when the new position is reached or when the STOP key is pressed. If you do not know the exact distance, enter a distance longer than needed in the right direction, and then press STOP to end the cut.
Manual Options	Press the Manual Options soft key to access the Manual Options screen.
Home Axes	Press the Home Axes soft key to access the Homes Axes screen.
View Sheet/View Part	View Sheet allows you to view a part as it would appear on the plate. After you press the View Sheet soft key, the display window zooms out to show the part in relationship to the entire plate. After the display zooms out, you can zoom in again by pressing the **+** key, which adds horizontal and vertical scroll bars. Press the **-** key to zoom out again. While the scroll bars are displayed, you can hold down the scroll bar and move it to adjust the view of the machine horizontally and vertically. This mode is useful in normal cutting to closely follow the cut path while in zoom. While cutting in sheet view, the control automatically scrolls to keep the cut location centered within the view screen. This feature is useful in normal cutting to follow the cut-path while zoomed in. View Sheet is more useful when proper plate size values have been entered in cutting setups and when the machine has already been homed. If you are viewing large parts being cut with the display fully zoomed, the system may not be able to draw the part on screen before it has to move to the next view location. In this case, the view screen may flash but you can correct this by zooming out to a larger view area.
Change Manual Mode	This soft key alternates the control Manual Mode between Move Only and Rip Cut. If you press this soft key the second soft key from the left to changes function from Move Distance to Cut Distance. Rip Cutting is described in more detail below.
Change Move Speed	This soft key toggles through the four Move Speeds: maximum machine speed, high jog speed, medium jog speed and low jog speed from the Speeds setups.
Zero Positions	Press this soft key to return all axes positions to 0 (zero).

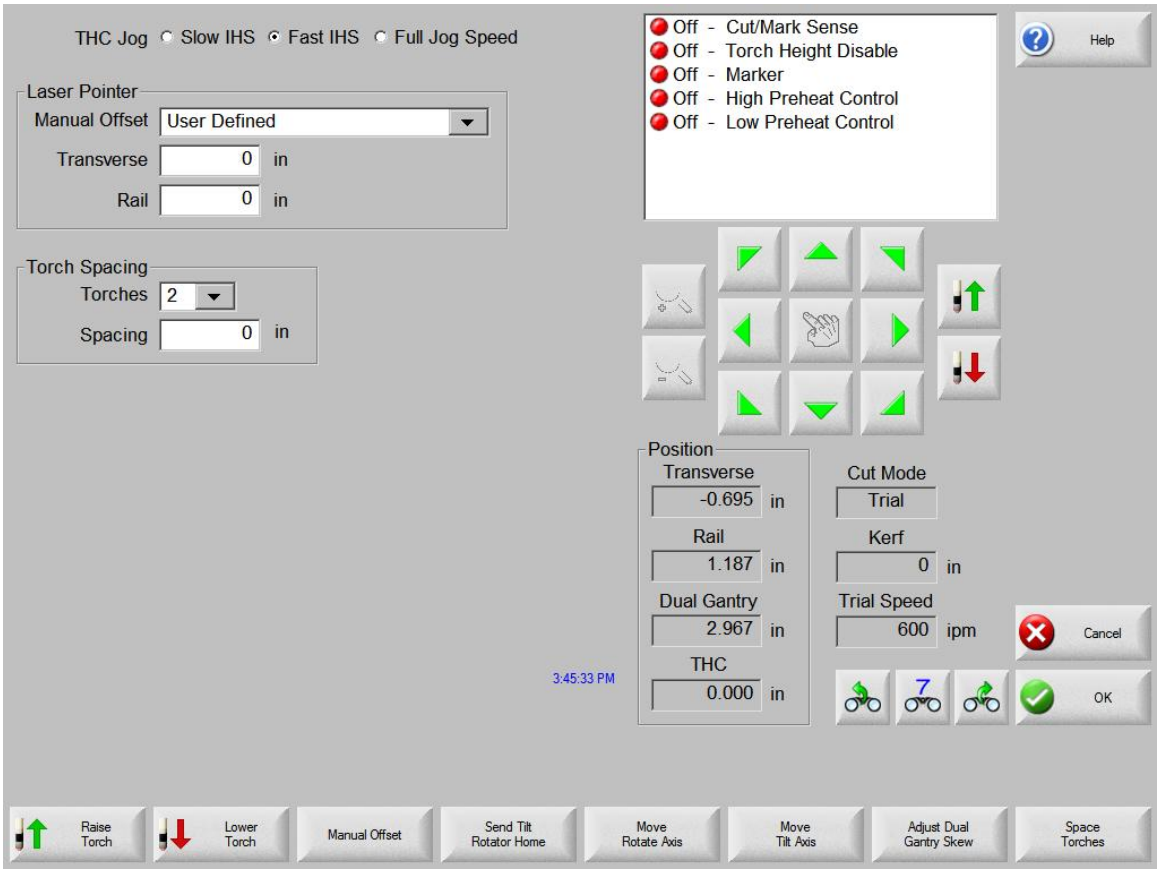
Rip Cutting

When the Manual Mode window displays Rip Cut, you can use the arrow keys to begin a cut sequence and machine motion in the chosen direction.

To initiate a rip cut:

1. Verify that the correct cut-mode has been selected.
2. Verify that the proper cut speed is displayed in the Cut Speed window (editable in Rip Cut mode).
3. Press the arrow key corresponding to the desired start direction for the cut.
   The cutting sequence proceeds even after the key is released; however, machine motion is generated **only as long as an arrow key is held down**, unless the latched manual key feature has been enabled.
4. Use the arrow keys to change direction.
5. Press Stop, Cancel, or Manual to stop the operation of the cutting device.

Manual Options



Raise Torch — Raises the cutting torch while the soft key is pressed or until the Torch Up sense input is activated.

Lower Torch — Lowers the cutting torch while the soft key is pressed or until the torch down sense input is activated. If the torch down output has been enabled to stay on during the cut in plasma setups, press the Lower Torch soft key to keep the torch in the down position until the Lower Torch soft key is depressed a second time.

Manual Offset — Manual Offset is useful for cutting tables that have a laser alignment tool attached and allows you to use your laser alignment tool for aligning a part to a plate.

The offset will stay in place until it is turned off from this screen or a part is cut in either oxy-fuel or plasma cut mode.

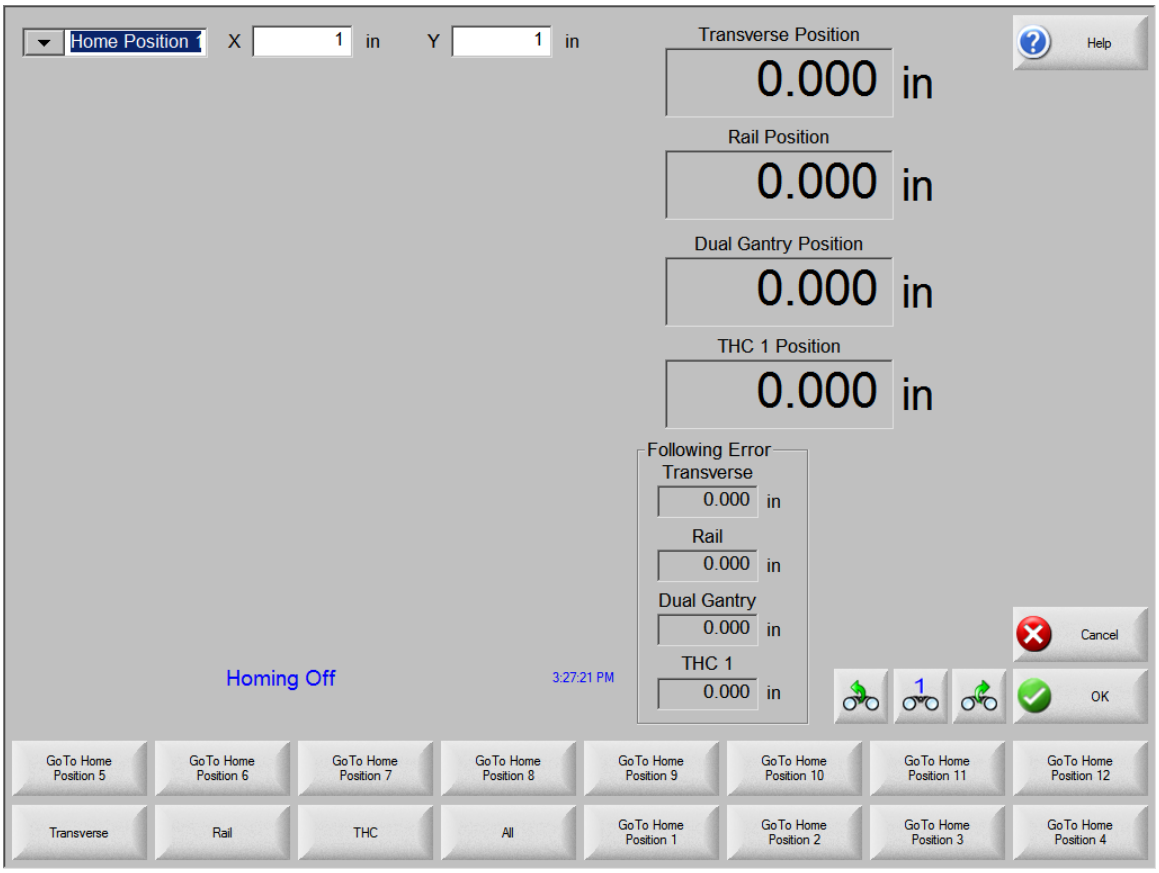
You can select the following offsets:

- User Defined – Uses the selected X / Y Offset distance.
- Laser pointer to Plasma 1 – Offset 10
- Laser pointer to Plasma 2 – Offset 11
- Laser pointer to Oxy Fuel – Offset 12

Send Tilt Rotator Home	
Move Rotate Axis	
Move Tilt Axis	
Adjust Dual Gantry Skew	Allows you to realign the Dual Gantry Axis manually using the directional manual jog (arrow ↑ and ↓) keys.
Space Torches	

Home Axes

From the Home screen, each axis or all axes can be "homed". In addition, the transverse and rail axes can be sent to one of up to 12 programmed alternate home positions.



The home feature sets a known, absolute physical position location on the cutting table that is used for referencing future manual “Go to Home” and other motion commands. This is generally performed through activation of a home switch positioned on the appropriate axis giving it a known physical location.

When the homing command is entered at the CNC, the CNC moves the axis toward the home switches at the fast home speed until the switches have been activated. After the switches have been activated, motion stops and the axis moves in the opposite direction off switch at the slow home speed.

When switch is deactivated, the position is recorded at the CNC and provides an absolute reference point for future motion commands.

Transverse — Press the Transverse soft key to initiate the automated homing procedure. This procedure generally produces machine motion in the transverse axis, depending on the homing parameters set in the

	Setups.
Rail	Press the Rail soft key to initiate the automated homing procedure. This procedure generally produces machine motion in the Rail axis, depending on the homing parameters set in the Setups.
CBH	Press the CBH soft key to initiate the automated homing procedure. This procedure generally produces machine motion in the CBH axis, depending on the homing parameters set in the Setups.
THC	Press the THC soft key to initiate the automated homing procedure for the Sensor THC. This procedure generally produces machine motion in the THC axis, depending on the homing parameters set in the Setups.
Tilt	Press the Tilt soft key to initiate the automated homing procedure for the Tilt Axis.
Rotate	Press the Rotate soft key to initiate the automated homing procedure for the Rotate Axis.

Note: If tilt and rotate axes are enabled, the following window will appear and allow access to the Tilt/ Rotate or other axes.

Select Yes to access Homing for the Tilt and Rotate Axes.

Select No to access the Homing functions for the other axes.

All	Press the All soft key to initiate the automated homing procedure. This procedure generally produces machine motion in one or more axes, depending on the homing parameters set in the Setups.
Go To Home Position	Press one of the four Go To Home Position soft keys to move the transverse and rail axes to the predefined position set in the corresponding edit window. The Go To Positions are absolute and require that an automated home procedure already be executed.

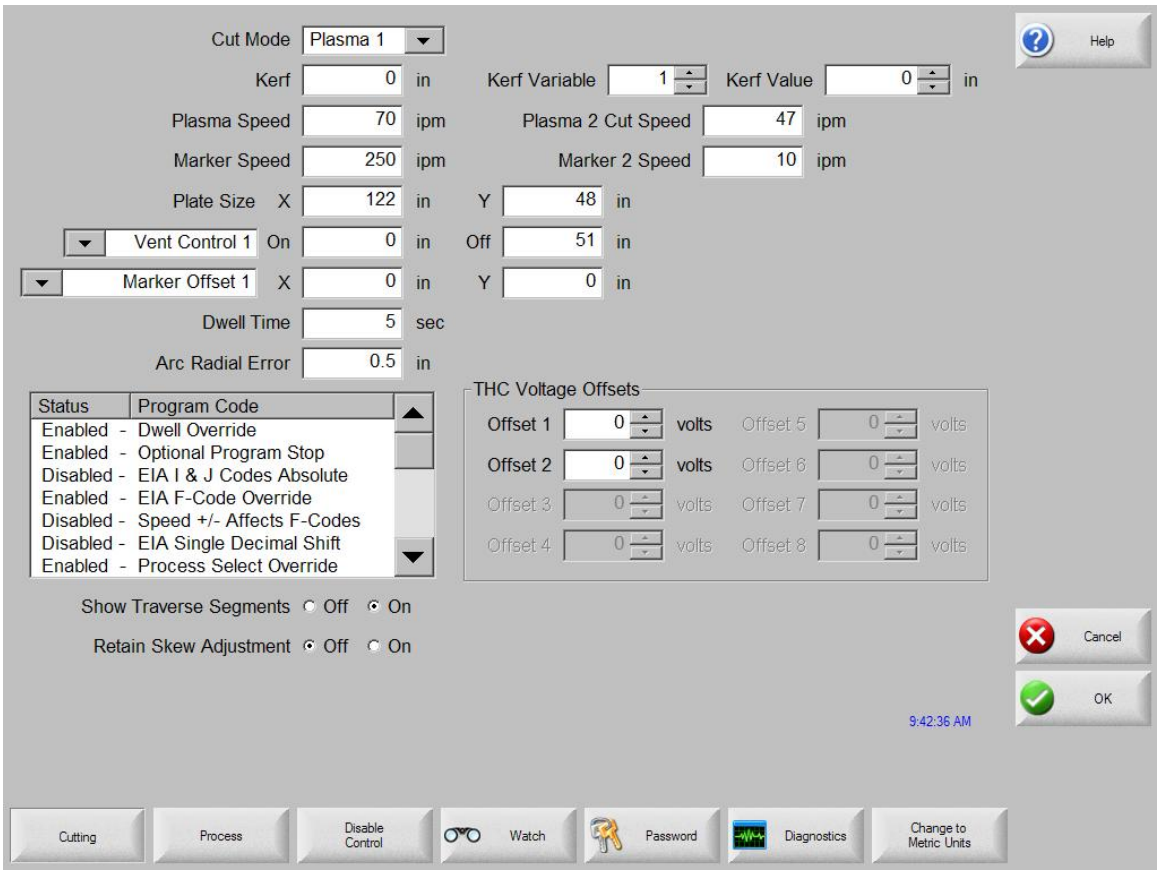
System Setup

On the Setup screen, you make the selections that determine how you are going to cut.

Cutting Setup

If you press the Cutting soft key, you can adjust the parameters for the cut mode you want to use. The available modes are:

- Trial (no cutting) motion
- Oxy-Fuel
- Plasma
- Laser
- Water jet



Cut Mode	Specifies the current cut mode. Trial mode allows the operator to dry-run the current part program without cutting.
Kerf	Specifies the amount of kerf that will be applied to the current part program. Care should be taken when selecting a kerf value as this parameter can cause invalid geometries to be generated. For

	example, adding a kerf of 0.5" to an arc with a radius of 0.25". After entering a kerf value, the kerf compensated cut path can be viewed by pressing the Kerf soft key under the Part Options menu.
Kerf Variable / Kerf Value	Creates a kerf variable table that assigns a variable to a Kerf value. Up to 200 variables can be entered to create a reference table. This kerf variable can be used within a part program to define the kerf value and as torch parts wear, the kerf value changes. If the kerf variable value is updated as the consumable wears and changes, the new value will be called by the kerf variable command with all programs loaded that use the variable. The EIA-274D part code for left kerf variable is the G43 code. In the following example, G43 D1 X0.06: • G43 is the kerf variable setting • D1 is the kerf variable. Any number from 1 – 200 can be used. • X0.06 is the selected kerf value.
Trial/Cut Speed	Specifies the speed for the current cut mode. These speeds are saved independently for trialing and cutting. Both speeds are limited to the maximum machine speed. Cut and trial speeds can be executed at the embedded F-code speed within a part program.
Marker 1 / Marker 2 Speed	Specifies the speed for the selected marker. These speeds are saved independently for each marker and are executed through the marker tool selection within a part program. Marker 1 is activated by EIA RS-274D M09 and M10, or an ESSI 9 and 10. Marker 2 is activated by EIA RS-274D M013 and M14, or an ESSI 13 and 14.
Plate Size	Specifies the dimensions of the current plate. This dimension is used when loading a part to determine if it will fit on the plate. It is also used for viewing the part in screen view.
Vent Controls 1 - 50	Enter rail values for up to fifty programmable zones for fume extraction damper control. Based on the rail position, the vent controls digital outputs to activate dampers at the selected zone for increased performance.
Marker Offsets 1 - 12	Enter values for up to twelve programmable marker offsets. The machine is offset by this amount at maximum speed when the

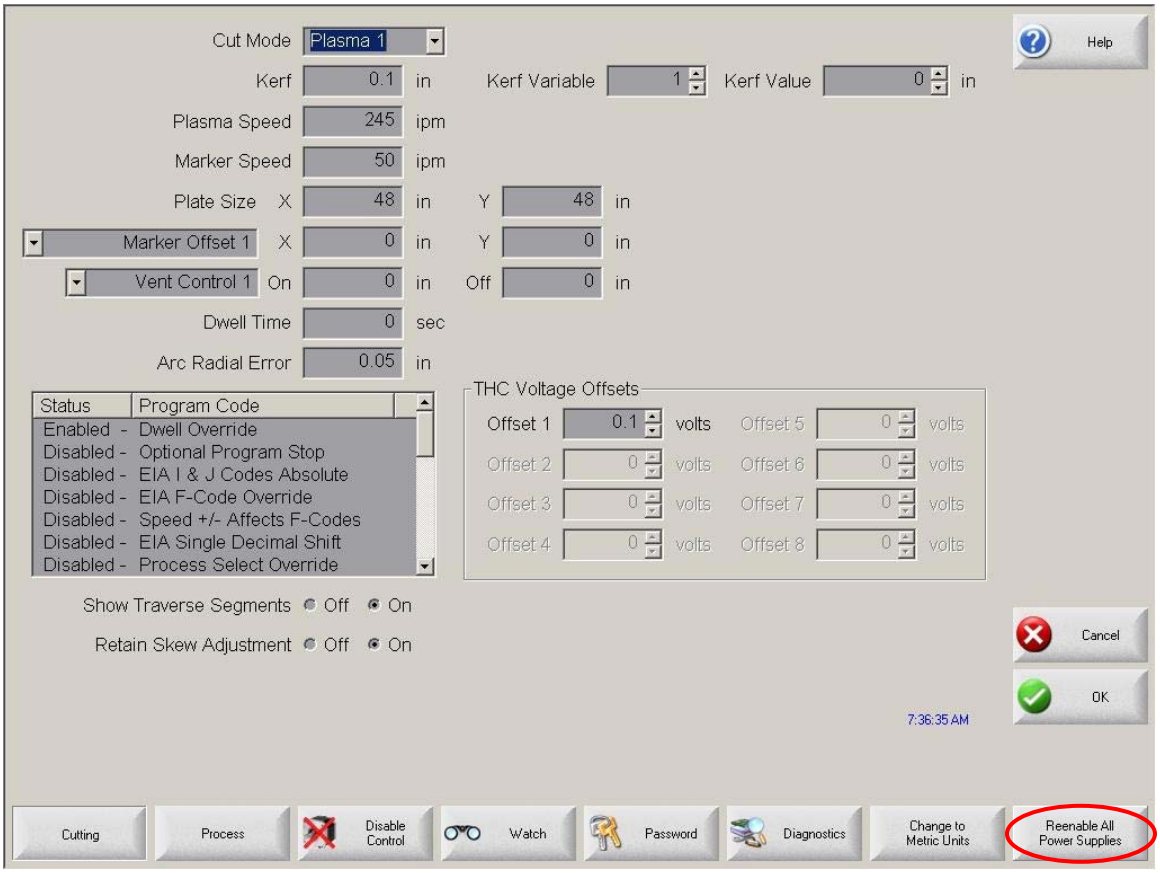
	appropriate marker code is detected. If values other than 1 are entered for marker offsets 10, 11 or 12, the Align wizard and CutPro Wizard will automatically allow the you to select the use of the laser pointer or the torch for alignment
Dwell Time	Specifies the amount of dwell (delay) that is inserted into the current part program when an appropriate RS-274D program block is reached. This time can be overridden in the part program. For example, in EIA programming a G04 X3 causes a three second dwell to be inserted at the current program block. A G04 with no X-code inserts a dwell with the current Dwell Time parameter.
Arc Radial Error	Specifies the arc error tolerance to be used when checking the current segment for dimensional accuracy. All ESSI or EIA programs are comprised of lines, arcs, and circles. Arc Radial Error is used to make sure that the starting and ending radial vectors are within tolerance to describe a valid geometry.
Dwell Override	When this parameter is enabled, embedded dwell G04 X *value* codes in an RS-274D program override the operator-entered dwell time.
Optional Program Stop	Allows overriding of the optional program stop code M01 in the current part program. If enabled, an M01 code operates identically to M00. If disabled, the M01 code is ignored.
EIA I & J Codes	Selects absolute or incremental RS-274D programming mode. In incremental mode, all offsets for X, Y, I and J are relative to the current block. In absolute mode, all offsets for X, Y, I and J are relative to an absolute reference point unless they are changed by using a G92 (set axis presets) program code.
EIA F-Code Override	When this parameter is enabled, embedded F-codes in an RS-274D program override any operator-entered cut speed.
Speed +/- Affects F-Codes	When this parameter is enabled, the control applies the speed increase/decrease percentage to all embedded F-codes that are encountered in the part program.
EIA Decimal Shift	Some programming styles are structured so that the decimal point in the EIA positioning affecting part sizing is assumed. The EIA decimal shift parameter allows the operator to select the location of the decimal point when translating parts by selecting normal or single for the correct translation. The selection should be set to Normal unless your part programs have only a single digit to the right of the decimal point.

Process Select Override	When enabled, this feature allows the part program to override the process select input.
Station Select Override	When enabled, this feature allows the part program to override the currently selected station select input.
Auto Torch Spacing Override	When enabled, this feature allows the part program to override the manually selected torch spacing inputs.
G97 Loop Count Prompt	When enabled, this feature will post a message on the screen to enter the number of loops or repeats to be selected when an EIA G97 code without a "T" value is encountered in the part program.
ESAB Multi Torch Support	When enabled, this feature allows ESAB style ESSI part programs to map codes to specific station selects.

ESSI Code	EIA Code	Description
7	M37 T1	Select station 1
8	M38 T1	Deselect station 1
13	M37 T2	Select station 2
14	M37 T2	Deselect station 2
15	M37 T3	Select station 3
16	M38 T3	Deselect station 3

Force G40 Kerf Disable	In a part program, kerf is enabled and disabled using EIA G41/ G42 and G40 codes. Standard operation is to disable kerf at the cut off even if the G40 kerf disable is not in a program. With this parameter, you can turn off the "forced" G40 kerf disable if no G40 is used in the program by disabling the parameter.
G40 Used in Simple Shapes	This parameter is used with the Force Kerf Disable parameter to allow the G40 code that is normally inserted in to a simple shape from the shape library to be omitted by disabling the parameter.
Auto Start after APA	This parameter is used with the Automatic Plate Alignment feature to allow cutting to begin automatically after completion of the automatic plate alignment.
EIA Code 2 Decimal Shift	Some programming styles are structured so that the decimal point in the EIA positioning affecting part sizing is assumed. The EIA Code 2 Decimal Shift parameter allows the operator to select the location of the decimal point when translating parts by selecting normal or single for correct translation. The selection should be set to Normal unless your part programs require two decimal shift to the right of the decimal point.
M17, M18	This allows the EIA-274D M17 and M18 codes to be used for cut on

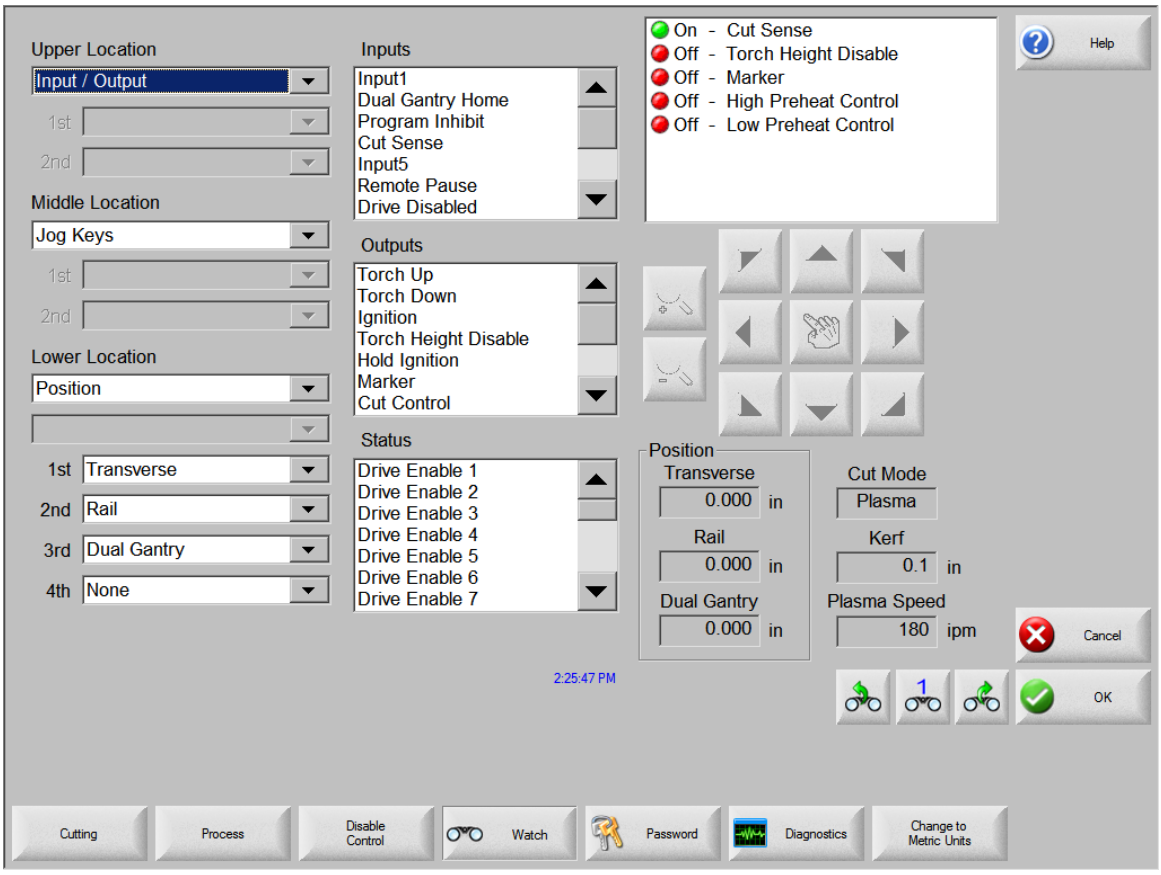
Used as Cut Codes	and off commands when enabled.
M76 Rotary Shortest Path	When enabled, this disables tilt and rotate software overtravels for dual tilt-style bevellers and allows the EIA-274D M76 Rotate go to Home command to select shortest path. When disabled it allows motion by longest path when homing. This is advantageous for some bevel head designs.
EIA Kerf Override	If this setting is disabled, all kerf value codes and Load Kerf Table variable are ignored. This parameter is enabled by default and cannot be changed while the part program is paused. This is useful when a process is used at a cutting machine that is different from the one that was used to create the part program.
EIA G59 Code Override	If this setting is disabled, all G59 codes are ignored. This parameter is enabled by default and cannot be changed while the part program is paused. This is useful when a process is used at a cutting machine that is different from the one where the program was created.
Stop on Single Arc Lost	If this setting is enabled, any cut sense input that is lost for longer than the arc off time during the cut pauses the part program or nest with a Cut Sense Lost message.
Show Traverse Segments	Allows traverse segment lines (displayed in yellow) to be turned OFF or ON during all part preview displays.
Retain Skew Adjustment	Retains the last calculated plate skew for all subsequent parts that are loaded. If disabled, any new part that is loaded will remove any previously calculated plate skew.
THC Voltage Offset	The THC Voltage Offset parameter is used to offset individual Sensor THC arc voltages from the master set arc voltage. This allows the individual THCs to be adjusted to compensate for consumable wear and obtain optimum cut quality. **Note:** The THC Voltage Offset parameter can be adjusted automatically using the Volts per Minute parameter on the Change Consumable screen.
Reenable All Power Supplies	Press this soft key to re-enable any disabled HD4070 or HPR power supply with auto gas. This key is enabled only if a power supply has been disabled.


Cut Mode
Plasma 1
Help
Kerf
0.1
in
Kerf Variable
1
Kerf Value
0
in
Plasma Speed
245
ipm
Marker Speed
50
ipm
Plate Size
X
48
in
Y
48
in
Marker Offset 1
X
0
in
Y
0
in
Vent Control 1
On
0
in
Off
0
in
Dwell Time
0
sec
Arc Radial Error
0.05
in
Status
Program Code
Enabled - Dwell Override
Disabled - Optional Program Stop
Disabled - EIA I & J Codes Absolute
Disabled - EIA F-Code Override
Disabled - Speed +/- Affects F-Codes
Disabled - EIA Single Decimal Shift
Disabled - Process Select Override
THC Voltage Offsets
Offset 1
0.1
volts
Offset 2
0
volts
Offset 3
0
volts
Offset 4
0
volts
Offset 5
0
volts
Offset 6
0
volts
Offset 7
0
volts
Offset 8
0
volts
Show Traverse Segments
Off
On
Retain Skew Adjustment
Off
On
Cancel
OK
7:36:35 AM
Cutting
Process
Disable Control
Watch
Password
Diagnostics
Change to Metric Units
Reenable All Power Supplies

Watch Window Setup

The CNC comes with a unique function for watching critical process-related parameters during cutting. The Watch window allows the operator to customize a certain portion of the screen to display functions that are critical for your particular cutting operation. Whether it is Current Speed, Position, I/O status, or torch consumable life, you can display the information that you want to view during operations.

As these parameters are turned on or off, the Watch window is updated.



Several options are available to personalize the Watch window and not all options can be viewed at one time. The options are grouped into two sizes of widgets or icons. Large widgets may be placed into the upper position at the top of the Watch window or in the middle of the Watch window. Small widgets are positioned in the lower left corner of the Watch Window next to the cut information and clock. The cut information and clock at the lower right may not be edited.

Selections in the Watch window will change slightly based on the CNC I/O configuration and machine option selections that have been enabled.

The Watch positions will allow for the following selections.

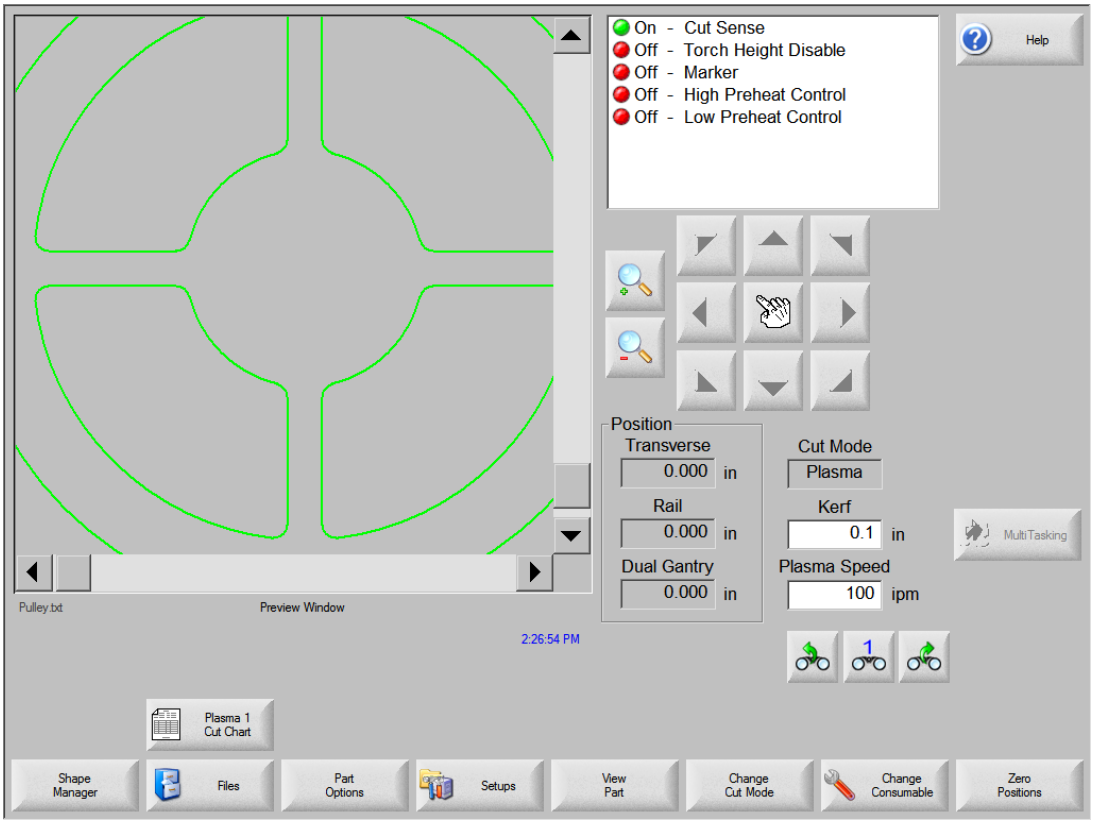
None Select None to leave the position blank.

Input/Output	Allows current state of selected Input, Outputs or Status information to be displayed during cutting. This can be especially useful in debugging gas control sequencing problems. To add or delete a desired Input, Output or Status point to the Input/Output list box, double-click an item or highlight an item and + (add) or **–** (delete) keys on the alpha-numeric keypad.
Digital Speedometer	Allows the cut speed, maximum machine speed and current machine speed to be numerically displayed.
Position	Allows the position for the selected axis to be displayed. Only two axes may be displayed at the Upper or Middle locations. The Lower location will allow up to four axes to be displayed.
Following Error	Allows the Following Error to be displayed. Following Error is the distance between the position the control has calculated and the actual position of the torch. A large Following Error may indicate that the cut speed selected may be beyond the capability of the cutting system. Only two axes may be displayed at the Upper or Middle locations. The Lower location will allow up to four axes to be displayed.
Command Voltage	Allows the user to view directional motion command voltage being sent to the amplifier for velocity type drives. This displayed voltage also equates to current being commanded for motion in current type drives. Peak voltage can be displayed for a specified amount of time.
Temperature	Selecting to add the Temperature information to the Watch window will display the current temperature inside the control in Fahrenheit or Celsius (selected at the Special Setups screen). **Note:** Specific control hardware is required.
Speedometer	Allows cut speed, maximum machine speed and current machine speed to be graphically displayed while cutting.
Oxy Fuel Torch Tip	Allows the selected oxy fuel torch tip (1- 12) consumable life to be graphically displayed while cutting. This helps determine when the torch tip should be replaced and keeping track of torch tip data for statistical process control (SPC).
Plasma Torch Tip	Allows the selected plasma torch tip (1- 8) consumable life to be graphically displayed while cutting. This helps determine when the torch tip should be replaced and keeping track of torch tip data for statistical process control (SPC).
Plasma	Allows the selected plasma electrode (1- 8) consumable life to be

Electrode	graphically displayed while cutting. This helps determine when the electrode should be replaced and keeping track of electrode data for statistical process control (SPC).
Jog Keys	Selecting the jog keys option allows a directional keypad to be added to the watch window for manual motion directly from the touch screen. The operator can press the hand icon in the middle of the navigation pad to enable manual mode. Select a move speed and press an arrow for manual motion in the corresponding direction.
Laser Nozzle	Laser Nozzle consumable life to be graphically displayed while cutting. This helps determine when the nozzle should be replaced and keeping track of nozzle data for statistical process control (SPC).
HPR Power Supply	Allows the user to view status for inputs, outputs and gas pressures for the HPR autogas console. Up to four power supplies may be monitored. This is generally used for service diagnostics only.
Cut Time	Allows the operator to see an estimate of the amount of time it will take to cut the selected part or nest. This window also displays how much time has been completed and how much remains. A progress bar gives a graphical display of the cut time. The estimate of the cut time is based on the complexity of the parts or nest and the cut speed. This window can help you optimize production plans and the use of resources.
Pierces	Shows the operator how many pierces are needed for the part or nest that has been selected, how many pierces have been completed and how many remain. Operators can use this window to plan consumable changes.
Process Data	The Process Data option allows the user to view up to four selected items for a selected cut or marking process. Process timers and status items for Oxy Fuel, Plasma, Marker, Water jet and Laser may be selected. **Note:** The process data will only be displayed during the current cut process. Example: Plasma 1 process parameters will only be displayed in the Watch window at the main cut screen while cutting in Plasma 1 Mode.
Multiple Watch Windows	Up to ten different Watch windows may be configured on the control for quick selection and viewing of the Watch icons.

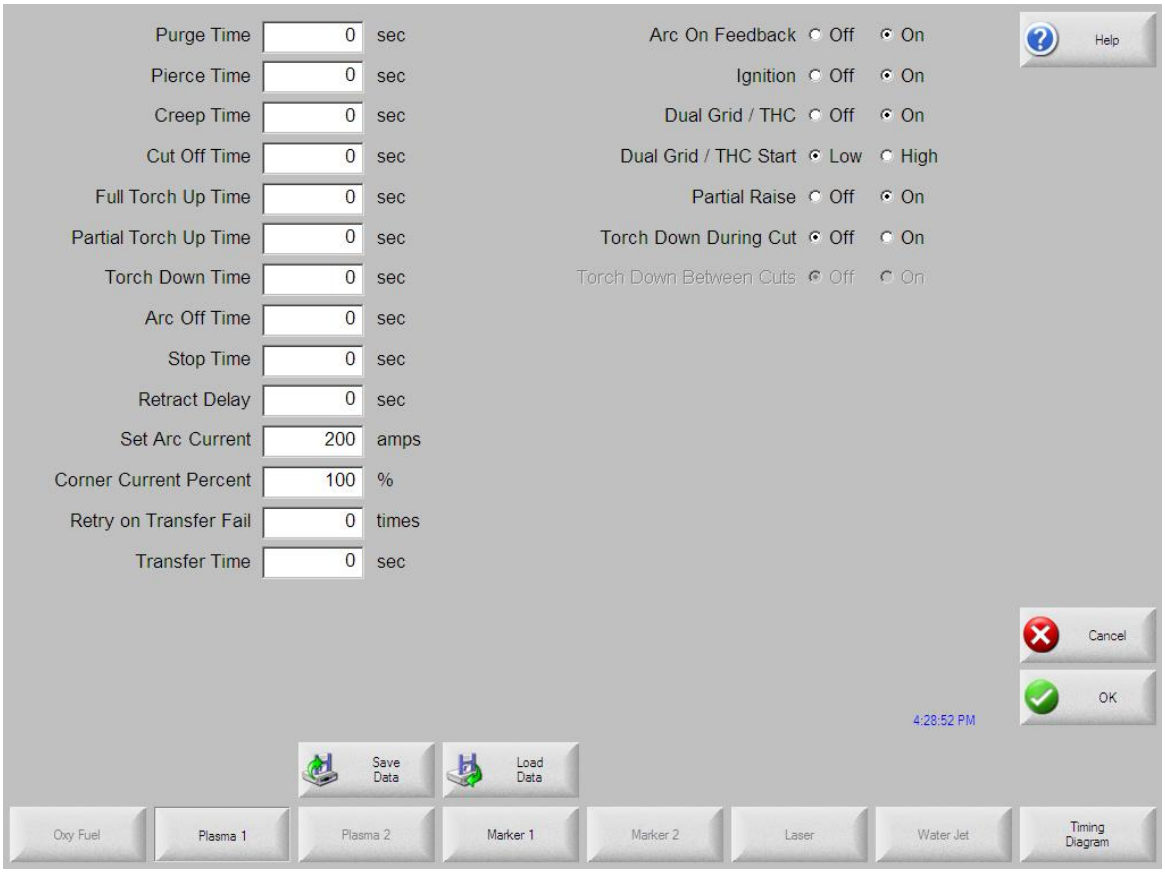
To configure different Watch windows for viewing, first access the Watch setup screen. Press the number ICON to enter a number or the Left/Right arrows to move up and down through the selections. The different Watch windows can be selected and viewed during operation using the same selection process.

Example


On - Cut Sense
Off - Torch Height Disable
Off - Marker
Off - High Preheat Control
Off - Low Preheat Control
Help
Position
Transverse
0.000 in
Rail
0.000 in
Dual Gantry
0.000 in
Cut Mode
Plasma
Kerf
0.1 in
Plasma Speed
100 ipm
MultiTasking
Pulley.txt
Preview Window
2:26:54 PM
Plasma 1 Cut Chart
Shape Manager
Files
Part Options
Setups
View Part
Change Cut Mode
Change Consumable
Zero Positions

Process Setup

Your CNC comes standard with several styles of built-in cut process logic which allows the cut process timing to be configured for optimum performance. Selection will vary due to control configuration.



In the Plasma Cut Type example provided above, various process timing adjustments may be made to tune the process to the Plasma System and material being cut for the desired performance. Pressing the Timing Diagram soft key or the space key on a keyboard allows the user to view a graphical diagram of the process logic

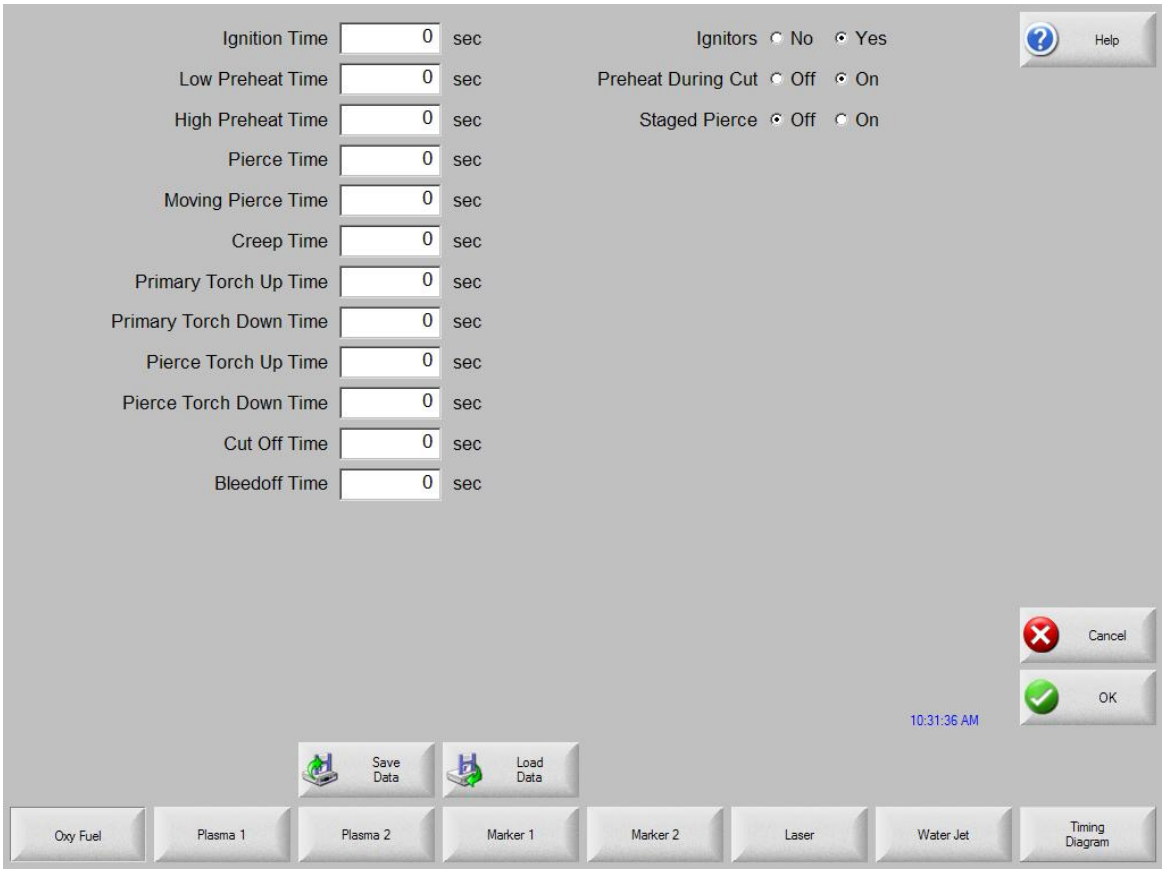
Additionally, each cut type has the ability to save and load the process setups in a file on the hard drive or to a floppy Diskette or USB memory stick. Pressing the ALT key allows the Save Data and Load Data functions to be available.

Oxy Fuel

The system supports configurations with both the Sensor OHC and other OHC lifters. In such a mixed configuration, stations must be defined and using stations selects, auto/all selects or manual selects. Although the system allows both types of OHC lifters, only one type can be used at a time.

The CNC comes with the following built-in control logic for Oxy Fuel cutting. When oxy fuel is selected, the following parameters are available to customize the logic for the metal being cut. As these parameters are changed, the timing diagram below changes to show the new timing parameters. This screen is located under the Cut Types soft key in the Setups.

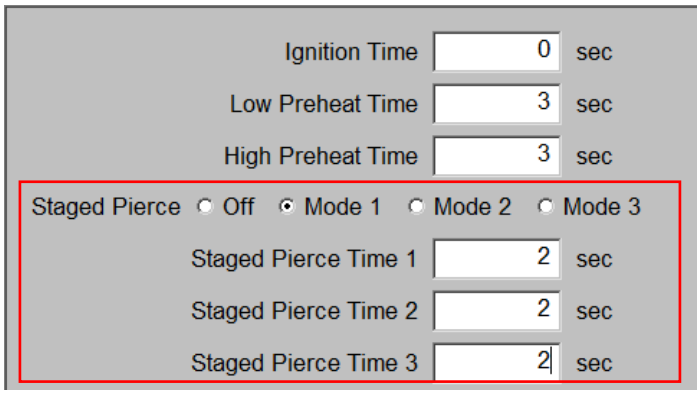
Note: Press the Start key twice to bypass all timers and begin the cut.



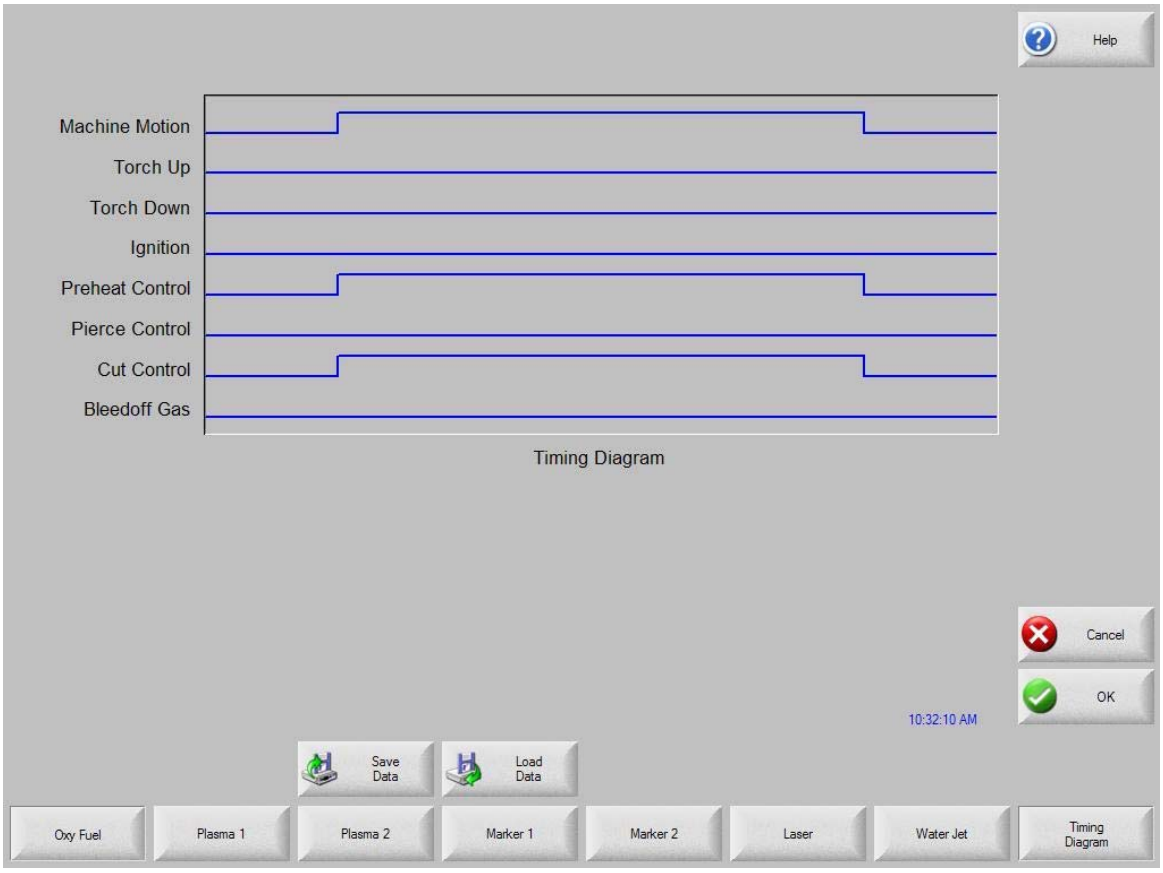
Ignition Time	Specifies the length of time that the oxy fuel igniter is held on at each ignition of the flame.
Low Preheat	For those cutting systems that are equipped with a Low Preheat feature, this parameter allows the operator to input a timing delay to activate the Low Preheat output prior to the High Preheat.
High Preheat	Specifies the length of time to wait at each pierce position for preheating the piece prior to piercing. During the run-time, the operator may use the SET, EXTEND, or RELEASE soft keys to

	customize the preheat length for the particular metal being cut.
Pierce Time	Specifies the amount of delay after the cutting gas is turned on before lowering the torch to the cut position.
Moving Pierce Time	The Moving Pierce Time parameter specifies the amount of time that the Pierce Output remains on while piercing with motion.
Creep Time	Specifies the amount of time after piercing the part that the torch travels at creep speed. Creep Speed is determined by a setup parameter at the Speeds setup screen and is a percentage of the programmed cut speed. After the Creep Time is completed, the control accelerates to full cut speed. This parameter is helpful in allowing the operator to bring the cutting surface up to temperature and completely pierce the metal before cutting at full speed. **Note:** Depending on the performance of the plasma system, a creep time may be required to allow for ramp up of the cut voltage after a pierce.
Primary Torch Up Time	Specifies the amount of time used for torch lift after completing each cut. This is normally used to provide torch head clearance and return the torch to its predefined rest position.
Primary Torch Down Time	Specifies the amount of time used to lower the torch at the beginning of each new cut. This is usually longer than the Pierce Torch Down Time as it involves lowering the torch from its predefined rest position.
Pierce Torch Up Time	Specifies the amount of time used for torch lift during piercing. This parameter is used to provide distance between the torch tip and metal surface for cutting.
Pierce Torch Down Time	Specifies the amount of time used for torch lowering during piercing.
Cut Off Time	The Cut Off delay parameter species the amount of time the cut on output will remain on at the end of a cut.
Bleedoff Time	Specifies the amount of time that the cut torch will pause to purge the oxygen at the end of a cut segment before traversing to the next cut segment.
Igniters	When “No” is selected, this feature will turn the Preheat on between cut segments. This is to keep the torch lit for those cutting systems that do not have automatic torch igniters. For those cutting systems which have automatic torch igniters or that control the torch gases outside of the control, set this parameter to “Yes”. This tells the control not to turn on the Preheat between cut segments.
Preheat During Cut	Specifies whether the Preheat will be left on while cutting.
Staged Pierce	This unique feature works with selected outputs to perform the pierce in a staged progression of gas pressures.

To enable this setting, select one of the three modes and set the three staged pierce values:

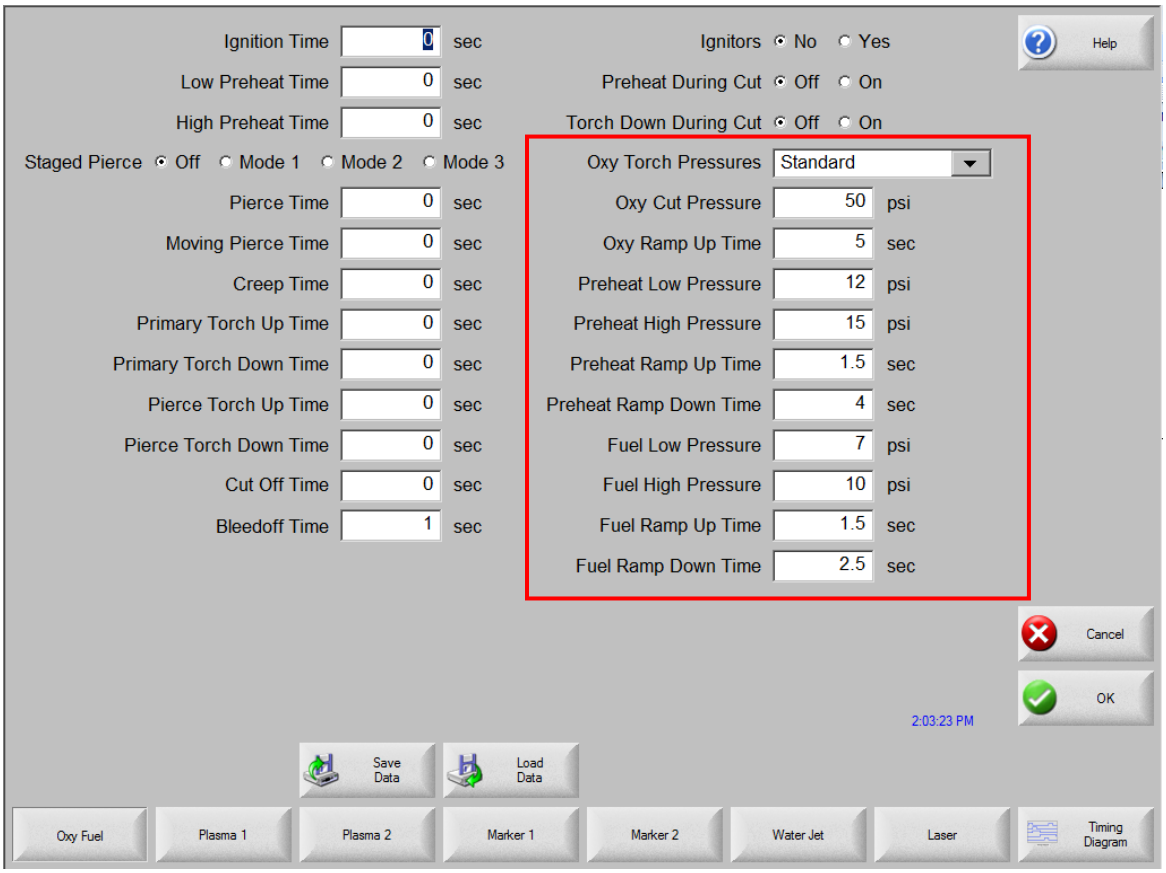


Press the Timing Diagram soft key to view the timing diagram from setups.



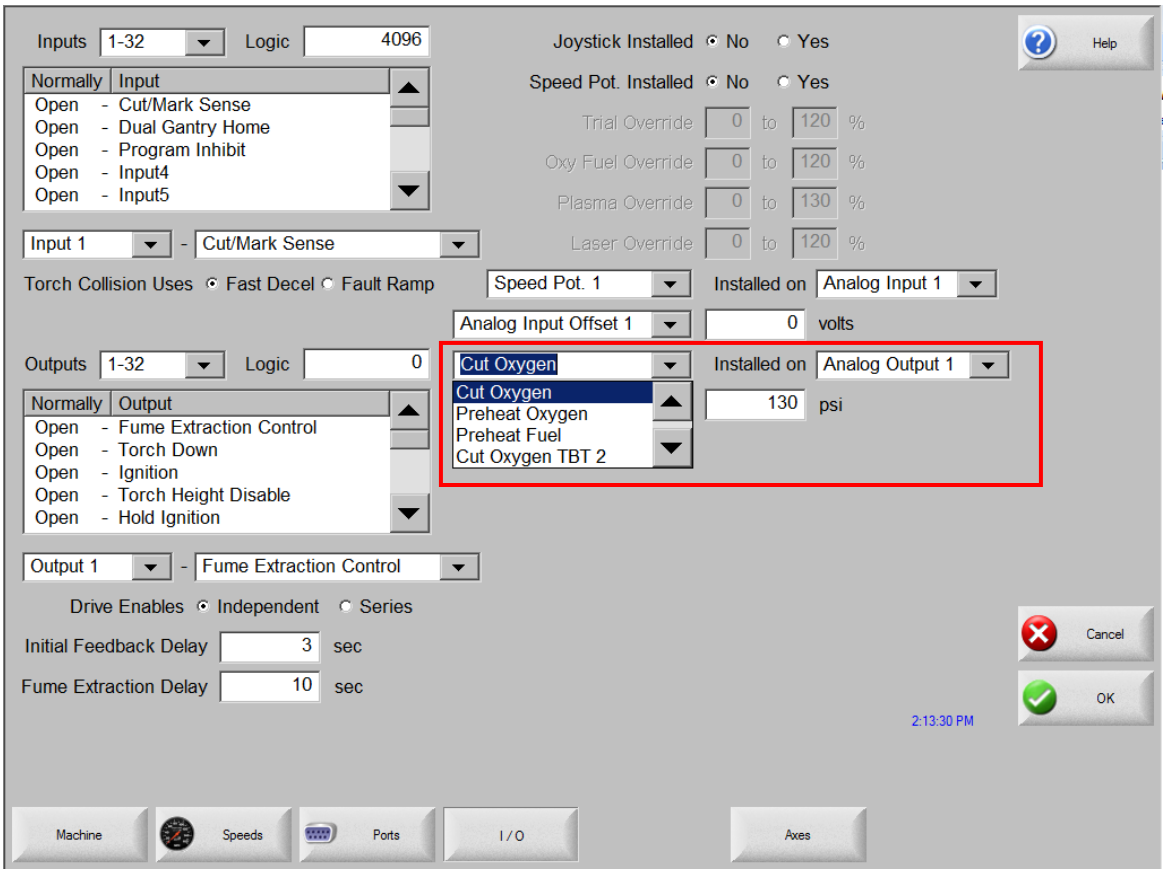
Controlling Oxy Fuel with Analog Outputs

You can select analog outputs on the I/O screen to control oxygen fuel pressures.



To select the analog signals that are used for oxygen valve pressure control:

1. On the Machine Setups password screen, press the I/O button.



2. Select each control and assign an analog output for it.
   The controls are listed in groups. All items in each group should be selected and matched with an analog output:
   - Cut Oxygen
   - Preheat Oxygen
   - Preheat Fuel

   - Cut Oxygen TBT 2
   - Preheat Oxygen TBT 2
   - Preheat Fuel TBT 2

   - Cut Oxygen TBT 3
   - Preheat Oxygen TBT 3
   - Preheat Fuel TBT 3

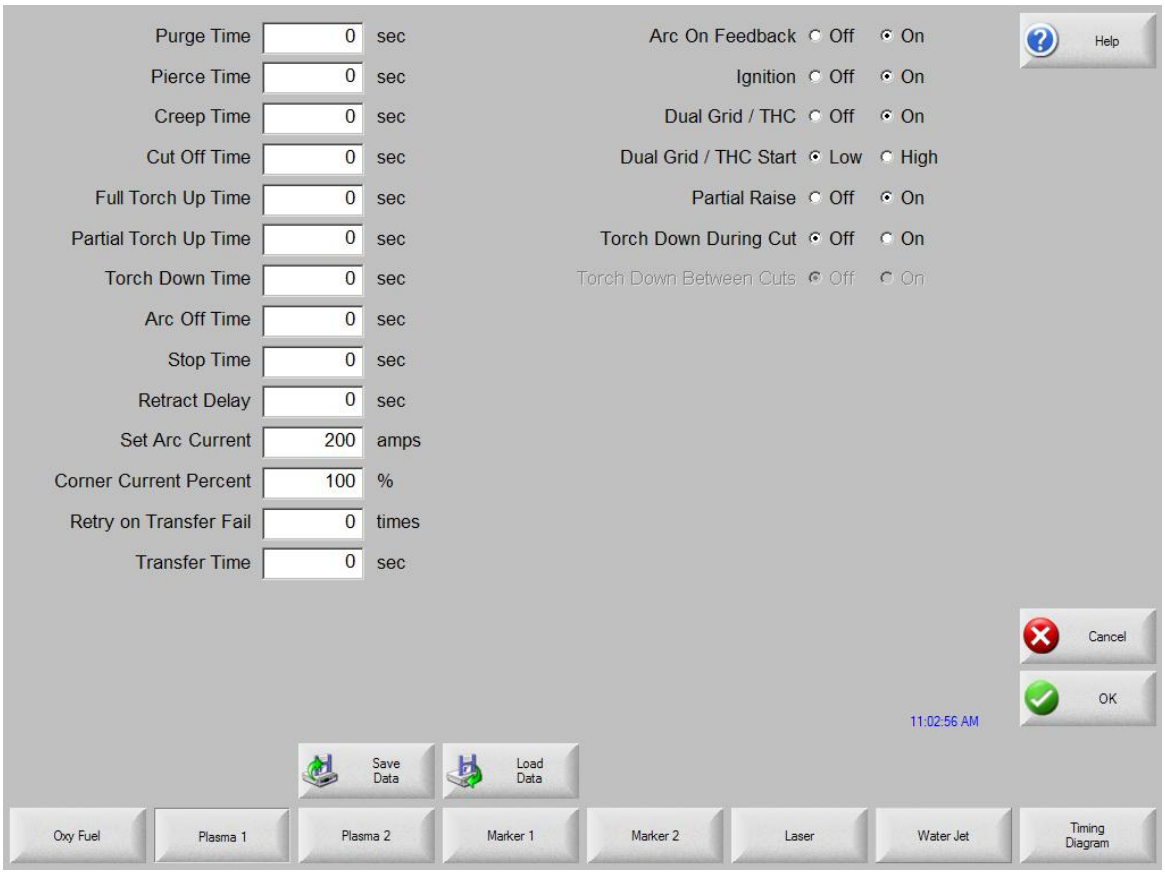
   - Preheat Oxygen TBPT
   - Preheat Fuel TBPT

3. When you finish selecting controls and assigning outputs, press or click OK. When you return to the Oxy Fuel screen, the parameters for the control you selected are added to the screen.
4. Edit the values for the parameters to meet the needs of your process.

Oxy Torch Pressures	Select the type of oxy fuel torch for the process.
Oxy Cut Pressure	Enter the pressure, in pounds per square inch, of the oxy fuel during cutting.
Oxy Ramp Up Time	Enter the time, in seconds, that the oxy fuel takes to reach cutting pressure.
Preheat Low Pressure	Enter the pressure, in pounds per square inch, of the oxy fuel at low pressure during preheat.
Preheat High Pressure	Enter the pressure, in pounds per square inch, of the oxy fuel at high pressure during preheat.
Preheat Pressure	Enter the preheat pressure, in pounds per square inch, for the triple bevel head.
Preheat Ramp Up Time	Enter the number of seconds that the process takes to move from low to high pressure during preheat.
Preheat Ramp Down Time	Enter the number of second that the process takes to move from high to low pressure during preheat.
Fuel Low Pressure	Enter the pressure, in pounds per square inch, of the oxy fuel at low pressure during cutting.
Fuel High Pressure	Enter the pressure, in pounds per square inch, of the oxy fuel at high pressure during cutting.
Fuel Pressure	Enter the fuel pressure, in pounds per square inch, for the triple bevel head.
Fuel Ramp Up Time	Enter the number of seconds that the process takes to move from low to high pressure during cutting.
Fuel Ramp Down Time	Enter the number of second that the process takes to move from high to low pressure during cutting.

Plasma

The CNC comes with the following built in control logic for Plasma cutting. When Plasma is selected, the following parameters are available to customize the logic for the particular metal being cut. As these parameters are changed, the timing diagram below will change to show the new timing parameters.

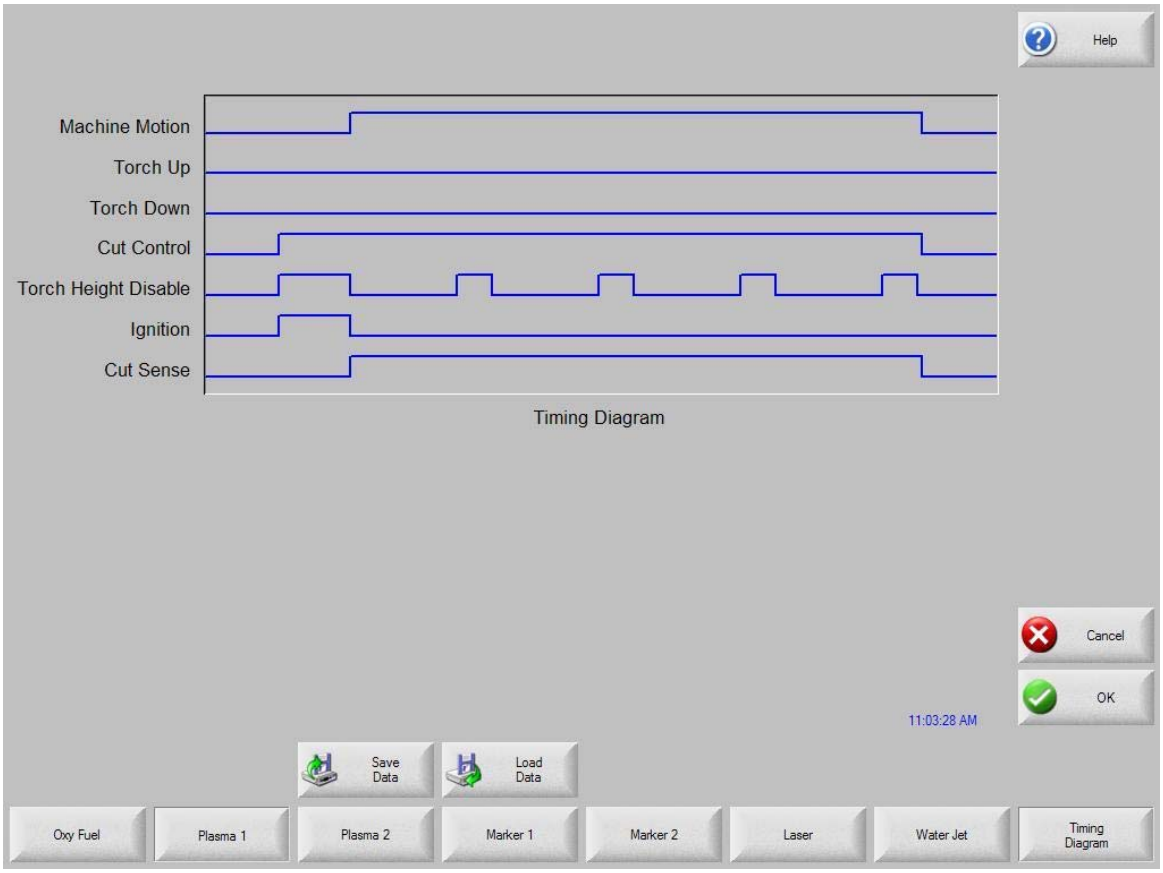


Purge Time	Specifies the time delay from torch ignition until motion is enabled if Arc On Feedback is off. Purge Time should be set to zero if Arc On Feedback is on.
Pierce Time	Specifies the time delay from when the torch completes lowering until motion is initiated at Creep Speed. Used to allow the plasma torch to completely pierce the material before moving.
Creep Time	Specifies the amount of time after piercing the part that the torch travels at Creep Speed. Creep Speed is determined by a setup parameter at the Speeds setup screen and is a percentage of the programmed cut speed. After the Creep Time is completed, the control accelerates to full cut speed.
Cut Off Time	The Cut Off delay parameter species the amount of time the cut on output will remain on at the end of a cut. A negative Cut Off time up to

	one second may be used to terminate the cut output prior to the end of the cut segment. This is used to compensate for response delays of the cut gases that will maintain the cut arc and widen the cut path at the end of the cut segment.
Full Torch Up Time	Specifies the length of time to raise the torch at the beginning and end of each cut to provide clearance over the cut pieces. **Note:** If you are using an automatic height control system, set Torch Up Time to zero.
Partial Torch Up Time	Specifies the length of time for a partial raise of the torch at the beginning and end of each cut to provide clearance over the cut pieces. If you are using an automatic height control system, set Torch Up Time to zero. **Note:** The Partial Raise parameter must be enabled.
Torch Down Time	Specifies the length of time to lower the torch at the beginning of each cutting cycle. **Note:** If you are using an automatic height control system, set Torch Down Time to zero.
Arc Off Time	Specifies the amount of delay to allow prior to indicating a lost cut signal. This can be useful in helping to minimize nuisance trips when traveling over previously cut paths in complex nested parts.
Stop Time	Specifies the amount of time that X/Y motion will pause at the end of a cut. This pause is advantageous for allowing the torch to completely raise and clear any cut irregularities before continuing to the next cut segment.
Retract Delay	Retract Delay specifies the amount of time X/Y and lifter motion will pause at the end of a cut. This allows the cut process to finish before lifting the torch and moving to the next pierce.
Set Arc Current	The Set Arc Current feature allows the user to set the arc current at the plasma supply. This feature uses the “Set Current BCD” digital output from the control to activate the BCD inputs at the plasma supply. The Set Arc Current parameter is also available for the HD4070 via the serial link. EIA RS-274D part program code G59 V*value* F*value* for setting current is supported.
Corner Current Percent	The Corner Current Percent feature allows the operator to select a reduced current setting to be executed when cutting corners to improve cut quality. This value is a percentage of the Set Arc Current (above) and is active when the Torch Height Disable Output is on. The Corner Current parameter is also available for the HD4070 via the serial link.
Retry On Transfer Fail	The Retry On Transfer Fail feature is used to specify the number of times the control will attempt to fire the torch in the event that the

	torch fails to ignite.
Transfer Time	The Transfer Time parameter specifies the amount of time used to attempt ignition of the torch. The ignition is confirmed by the Arc Sense Input (Arc on Feedback) to the CNC.
Arc on Feedback	Specifies whether an arc-on (also called Plasma Go, Current Sense, Arc Transferred) signal from the plasma system to the control is used. With Arc On Feedback on, the control waits for Cut Sense input to activate before initiating machine motion.
Ignition	Enables use of the Ignition output for use in igniting the plasma torch. If your plasma system requires a separate ignition signal, toggle Ignition to ON. If not, leave Ignition OFF.
Dual Grid/THC	The Dual Grid parameter enables use of the Torch Height Disable output. This output is used to disable an automatic torch height sensor or reduce the plasma current in a switchable current plasma system when machine speed is less than Plasma Hi/Lo Speed.
Dual Grid/THC Start	If Dual Grid is ON, the start mode can be configured to start (HI) or (LOW) at ignition time. For switchable plasma systems, this usually means that in low mode the plasma system will only deliver 50% of the maximum output power.
Partial Raise	Enabling the Partial Raise feature will execute a tool raise at the end of the cut segment within a nest for the time specified in the Partial Up Time parameter. Full raise will be executed at the end of the final cut segment.
Torch Down During Cut	Turning on the Torch Down During Cut feature forces the torch down output to remain on throughout the cut process. This is advantageous for pneumatic style torch lifters that require a constant output.
Torch Down Between Cuts	Turning on the Torch Down Between Cuts feature forces the Torch Down Output to remain on while traversing between cut segments.

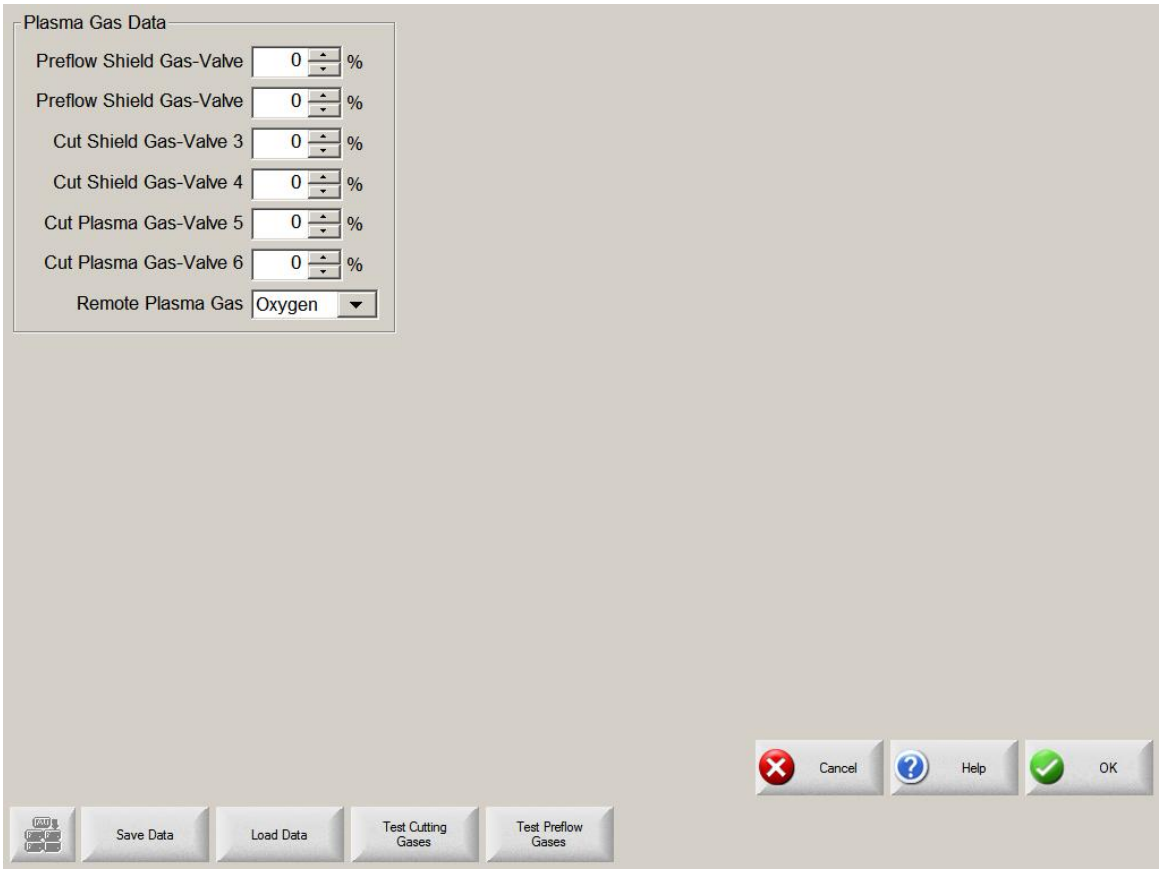
Press the Timing Diagram soft key to view the timing diagram from setups.



HD3070 Auto Gas Interface

This section provides information on the Hypertherm HD3070® Auto Gas Interface. The Auto Gas screen is available from the Cut Types screen.

Note: The Auto Gas feature must first be enabled at the Special Password screen and is designed for use with the six valve autogas console only



The top of the Auto Gas screen lists the valve parameter settings for the HD3070. Valve settings for the 3070 Auto Gas console are documented in the HD3070 manual. When the values are set, these become the current setting and the operator can choose to save the file to the diskette, USB memory stick or hard drive.

The settings at the supply are updated at control power up, whenever the settings are changed at this screen or through commands in a part program. Supply settings are also updated if power is lost and re-enabled at the power supply. There may be a brief delay as these power supply settings are communicated from the control to the power supply.

Save Data	Pressing the Save Data soft key will allow the operator to save the current Auto Gas setting to diskette, USB memory stick or hard drive.
Load Data	Pressing the Load Data soft key will allow the operator to load stored Auto Gas settings from diskette, USB memory stick or hard drive.

G59 V65 B0

G59 V66 B0

G59 V67 B0

G59 V68 B0

G59 V69 B0

G59 V70 B0

G59 V71 B0

Test Cutting Gases — If you save the data, a file is created with G59 codes with the selected valve settings. Here is an example of the data file where all percentages are set to zero.

Test Preflow Gases — Pressing the Test Cutting Gases soft key allows the operator to test the HD3070 Cut Gases.

HD3070 Auto Gas I/O

The Interface to the HD3070 Auto Gas console is made through of Single Ended and BCD (Binary Coded Decimal) inputs. The BCD style of interface allows for exact settings by use of multiple inputs being active at any time. The active BCD inputs values are summed together to obtain the exact set point.

These I/O points are wired in the same fashion as our other Single Ended I/O points. The following I/O points are supplied for use of the HD3070 Auto Gas Console:

Inputs

- Gas Control Read Complete
- Gas Control Error

Outputs

- Gas Control Write
- Remote Test Operate
- Remote Test Preflow
- Remote Air Plasma
- Remote H35/ N2 Plasma
- Remote O2 Plasma
- Gas Flow Set 1-100 (BCD)
- Valve Select 1-8 (BCD)

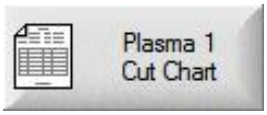
HD4070 and HPR Overview

The Mariner ™ and Voyager™ III controls offer the additional option of connecting directly to the Hypertherm HD4070 HyDefinition®, HPR130™ and HPR260™ plasma supplies for setup. This feature has the ability to improve power supply setup and operational accuracy while having the flexibility to fine tune the process specific to the operator's needs.

When using this advanced feature, all necessary power supply settings are transmitted from the control directly to the Plasma Supply configuring it for use via serial communications. The Plasma Supply setup is performed through the use of a Cut Chart (cut process parameter database) which is based on eight process variables. The combination of these eight process variables are tied to the settings for the cut process parameters (e.g. arc voltage, pierce delay, etc.) that are transmitted to the supply. For additional convenience, consumable part numbers for the Plasma supply are displayed at the Change Consumable screen.

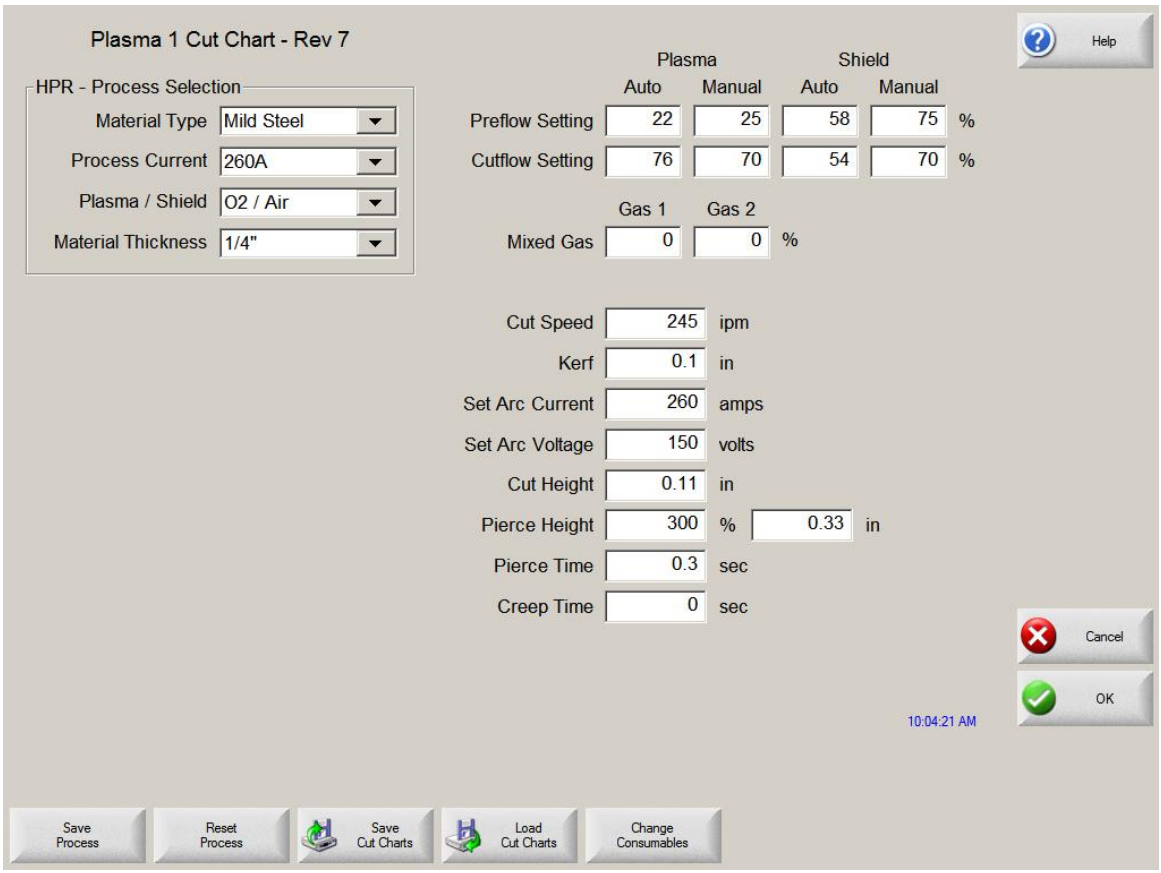
This database allows the user to select factory recommended settings or amend the database for personalized settings. The Cut Chart information may be saved or loaded via the hard drive or floppy drive. The Cut Chart files containing the factory recommended settings are available from Hypertherm.

Access to the Cut Chart data is available from the Plasma Cut Types or Marker Cut Types screen using the soft key, as indicated below. The Plasma Supply parameters must first be enabled in the password protected Station Configuration setups to allow the Cut Chart Information for the Plasma Supply to be available for use.



Note: Screen information will vary depending on THC selection.

HPR Cut Charts



The Cut Chart Database (cut process parameters) transmitted to the power supply is based on the following eight process variables.

Material Type	Select the material type, such as mild steel, stainless steel or aluminum.
Current Settings	Select the appropriate current setting for the material thickness and material type.
Plasma / Shield Gases	Select the appropriate Plasma / Shield gases for the desired process.
Material Thickness	Select the material thickness.

The following are the Cut Process parameters within the database which are used to configure the process. Appropriate parameter information is transmitted to the power supply.

Cut Speed	Specifies the speed for the selected process variables.
Kerf	Specifies the amount of kerf that is applied to the current part program.

Set Arc Voltage	Enter the desired Arc Voltage for the material being cut.
Cut Height	Select the desired cut distance from the plate.
Pierce Height	Select the desired pierce height. This may be entered as a multiplication factor that is calculated times the Cut Height or an actual Pierce Height distance.
Preflow Setting	Select the appropriate Plasma / Shield Preflow percentages for the process.
Cutflow Settings	Select the appropriate Plasma / Shield Cutflow percentages for the process.
Preflow Time	Specifies the amount of time the Preflow gases are on.
Purge Time	Specifies the time delay from torch ignition until motion is enabled.
Pierce Time	Specifies the time delay from when torch completes lowering until motion is initiated at Creep Speed. This parameter allows the plasma torch to completely pierce the material before moving.
Creep Time	Specifies the amount of time after piercing the part that the torch travels at Creep Speed. Creep Speed is determined by a setup parameter at the Speeds setup screen and is a percentage of the programmed cut speed. After the Creep Time is completed, the control accelerates to full cut speed.
Save Process	Press the Save Process soft key to save the current process settings to the hard drive and create a custom user database based on the eight process variables selected.
Reset Process	Press the Reset Process soft key to reset the current settings to factory recommend factory defaults based on the eight process variables selected.
Save Cut Charts	Press the Save Cut Charts soft key to save the current User and Factory databases to Diskette or USB memory stick. User files are designated with a .usr file extension and the factory files are designated with a .fac file extension. Examples of user and factory file names: • Mild Steel-HT4400-HD4070.usr • Mild Steel-HT4400-HD4070.fac
Load Cut Charts	Press the Load Cut Charts soft key to load the factory default database files which are supplied by Hypertherm in a Text file (.txt), user files (.usr) or factory files (.fac) from Diskette or USB memory stick. Factory text file names: • Mild Steel Cut Chart Datamschart.txt

- Aluminum Cut Chart Dataalchart.txt
- Stainless Steel Cut Chart Datasschart.txt

The Database should be updated through the CNC rather than the power supply if the serial communications link is enabled.

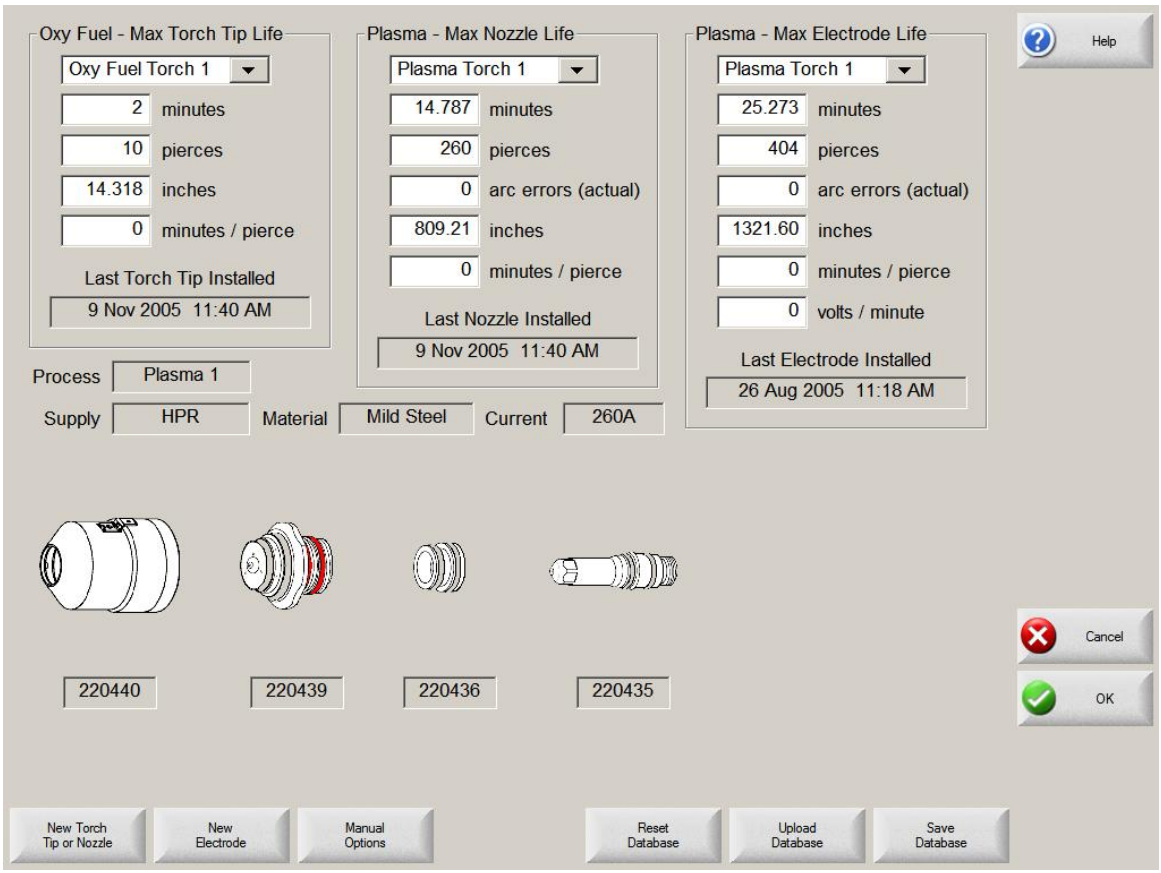
Test Preflow — Press the Test Preflow soft key to perform the Test Preflow Gases function at the plasma supply.

Test Cutflow — Press the Test Cutflow soft key to perform the Test Cutflow Gases function at the plasma supply.

Notes:

- Refer to the power supply operator's manual for complete information on the operation and setup of the plasma supply.
- A serial communication port for the plasma supply must first be selected at the port configuration screen to be enable the feature for use.
- The Plasma supply parameters must first be enabled in the password protected Station Configuration screen to allow the cut chart information for the plasma supply to be available for use.
- Power supplies equipped with the integrated Command THC can be used with the control setups.
- The Command THC must first be enabled in the Station Configuration screen.

Changing HPR Consumables



When the power supply link feature has been enabled, consumable data information may be viewed at the Change Consumable screen.

FineLine Overview

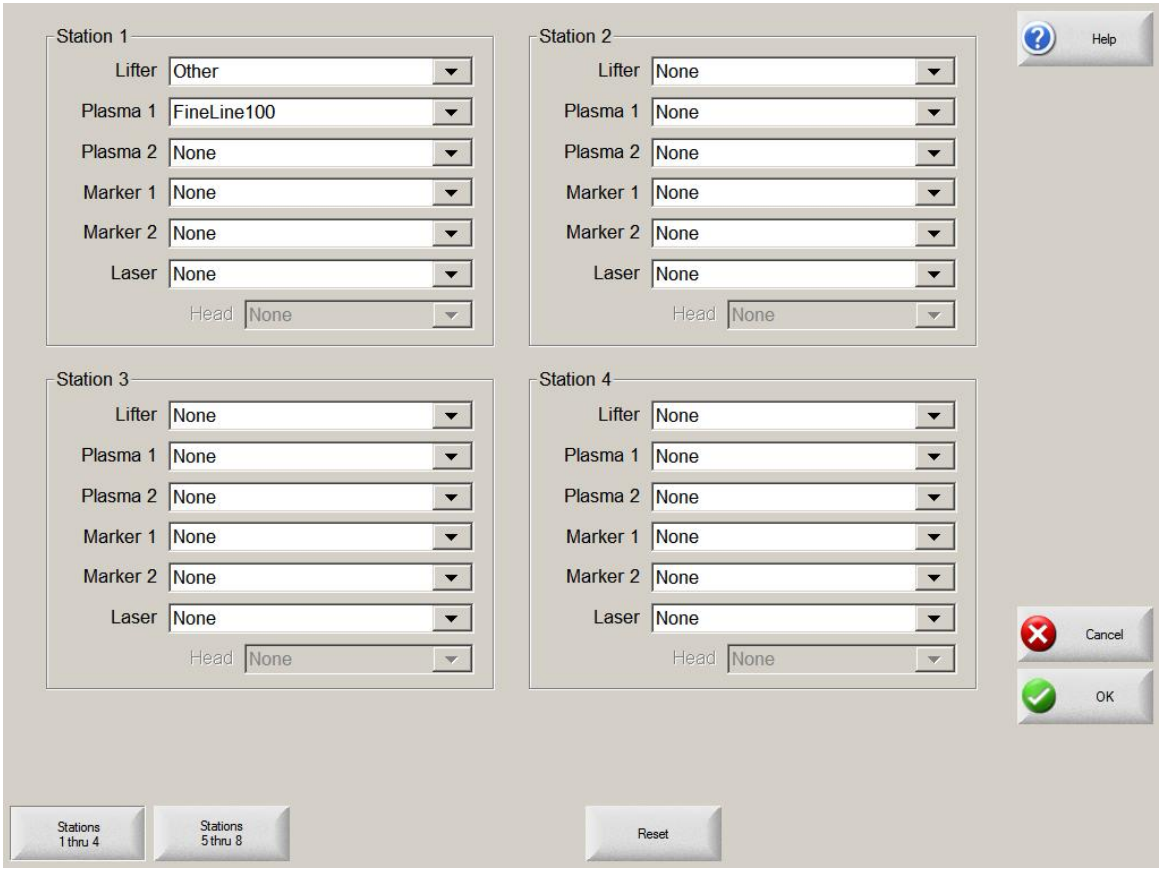
The "Type V" control offers the additional option of interfacing directly to InnerLogic's FineLine Power Supply for setup via a user selected RS-422 serial port. This advanced feature transmits all necessary power supply settings from the control directly to the FineLine power supply.

The power supply setup is performed through the use of a Cut Chart (cut process parameter database) which is based on eight process variables. The combination of these eight process variables are tied to the settings for the cut process parameters (e.g. arc voltage, pierce delay, etc.) that are transmitted to the supply. For additional convenience, consumable part numbers for the FineLine are displayed at the Change Consumable screen.

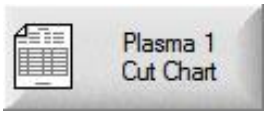
This database allows the user to select factory recommended settings or amend the database for personalized settings. The Cut Chart information may be saved or loaded via the hard drive or floppy drive. Specialized Cut Chart files containing the factory recommended settings are available from the control vendor.

The Power Supply parameter must first be enabled in the password protected Station Configuration setups to allow the Cut Chart Information for the feature to be enabled for use. Once selected at the Station Configurations screen, the port must then be selected for communications on the Ports setup screen and the selected port must then be configured as RS-422. For more information on configuration of the port, refer to the Configuring Ports section of the *Installation and Setup Manual*.

Station Configuration (example)

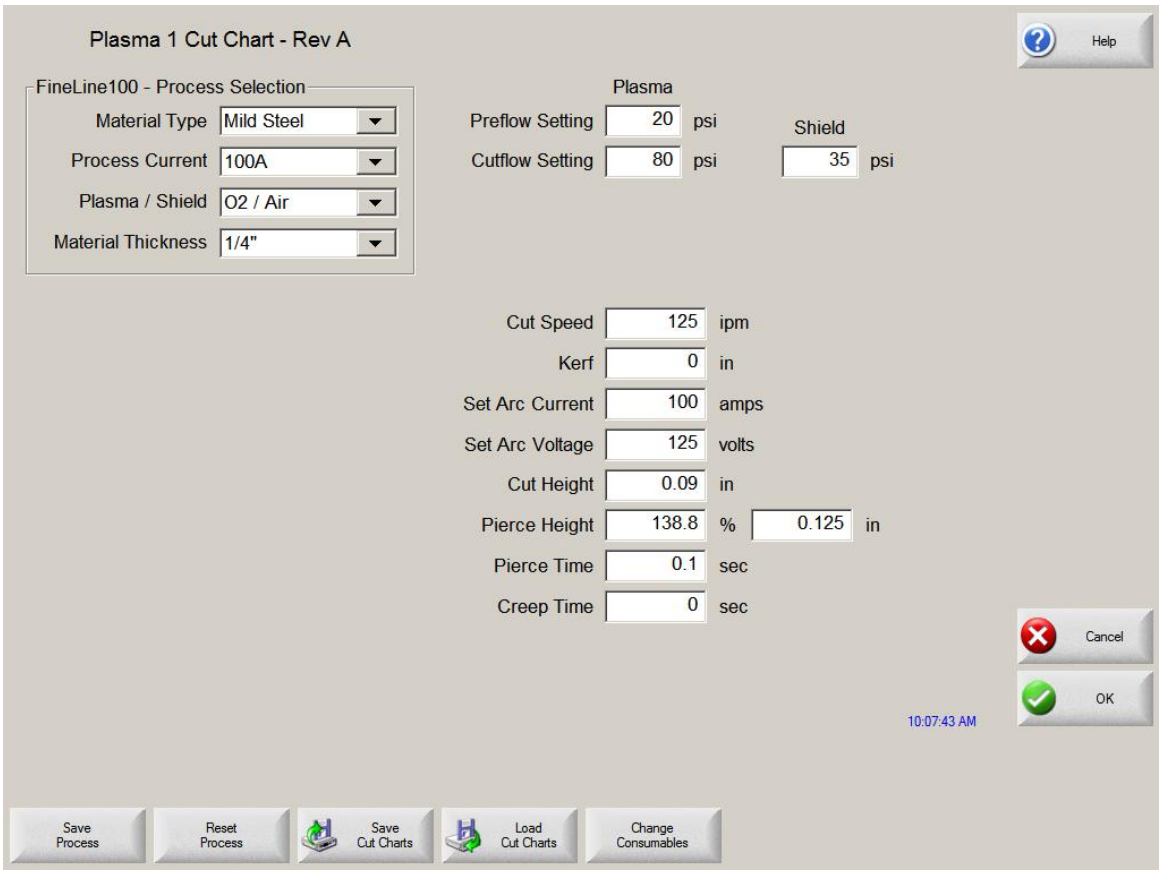


Access to the FineLine Cut Chart data is available from the Plasma Cut Types or Marker Cut Types screen using the soft key, as indicated below.



Note: Screen information will vary depending on THC selection.

FineLine Cut Charts



The Cut Chart Database (cut process parameters) transmitted to the power supply is based on the following process variables.

Material Type	Select the Material Type, such as mild steel, stainless steel or aluminum.
Current Settings	Select the appropriate current setting for the material thickness and material type.
Plasma / Shield Gases	Select the appropriate Plasma / Shield gases for the process.
Material Thickness	Select the material thickness.

The following are the Cut Process parameters within the database which are used to configure the power supply. Appropriate parameter information is transmitted to the power supply.

1. Material Type – Mild Steel, Stainless Steel, Aluminum, or Mild Steel (Cold Rolled).
2. Thickness
3. Set Current

4. Pierce Delay
5. Set Preflow Pressure
6. Set Plasma Gas type
7. Set Plasma Pressure
8. Set Shield Gas Type
9. Set Shield Pressure
10. Set Process (Cut/Mark)

The following items are stored in the Cut Chart Data file and will be automatically updated on the control.

Test Preflow	Pressing the Test Preflow soft key performs the Test Preflow Gases feature at the HD4070 power supply.
Test Cutflow	Pressing the Test Cutflow soft key performs the Test Cutflow Gases feature at the HD4070 power supply.
Cut Speed	Specifies the speed for the selected process variables.
Kerf	Specifies the amount of kerf that will be applied to the current part program.
Preflow Time	Specifies the amount of time the Preflow gases are on.
Purge Time	Specifies the time delay from torch ignition until motion is enabled.
Pierce Time	Specifies the time delay from when torch completes lowering until motion is initiated at Creep Speed. This parameter allows the plasma torch to completely pierce the material before moving.
Creep Time	Specifies the amount of time after piercing the part that the torch travels at Creep Speed. Creep Speed is determined by a setup parameter at the Speeds setup screen and is a percentage of the programmed cut speed. After the Creep Time is completed, the control accelerates to full cut speed.
Save Process	Pressing the Save Process soft key allows the user to save the current process settings to the hard drive creating a custom user database based on the eight process variables selected.
Reset Process	Pressing the Reset Process soft key allows the user to reset the current settings to factory recommend factory defaults based on the eight process variables selected.
Save Cut Charts	Pressing the Save Cut Charts soft key allows the user to save the current User and Factory databases to Diskette or USB memory stick. User files are designated with a .usr file extension and the factory files are designated with a .fac file extension.Examples of user and factory file names.Mild Steel-Fineline200-Fineline200.usrMild Steel-Fineline200-Fineline200.fac
Load Cut	Pressing the load Cut Charts soft key allows the user to the factory default database files which are supplied by Hypertherm as a user

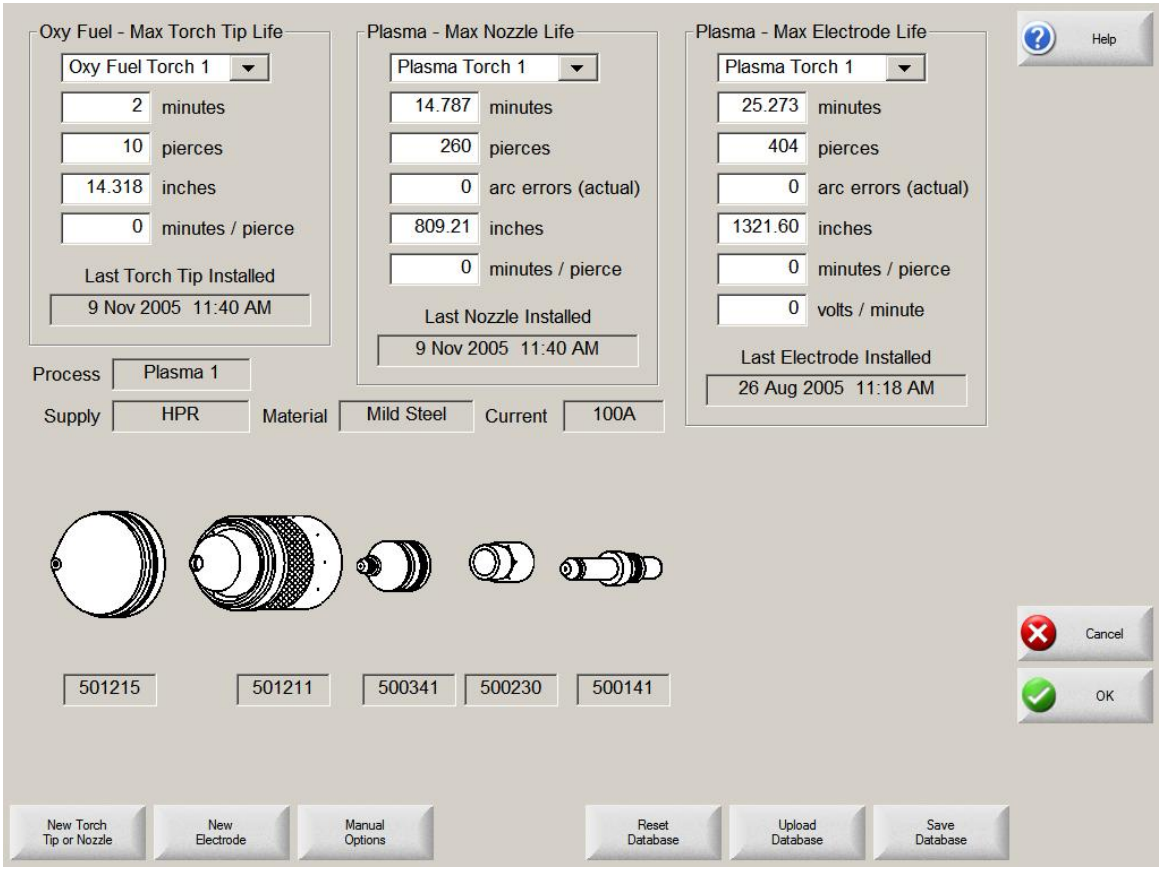
Charts files (.usr) or factory files (.fac) from Diskette or USB memory stick.

It is recommended that the Database be updated through the control rather than the Power Supply if the serial communications link is enabled.

Notes:

- Please refer to the power supply operator's manual for complete information on the operation and setup of the FineLine Power Supply.
- The FineLine Power Supply parameters must first be enabled in the password protected Station Configuration Screen to allow the Cut Chart Information for the FineLine to be available for use.
- Serial communications for the FineLine Power supply are established on the user select communication port. The port must be configured for RS-422 operation.

Changing FineLine Consumables



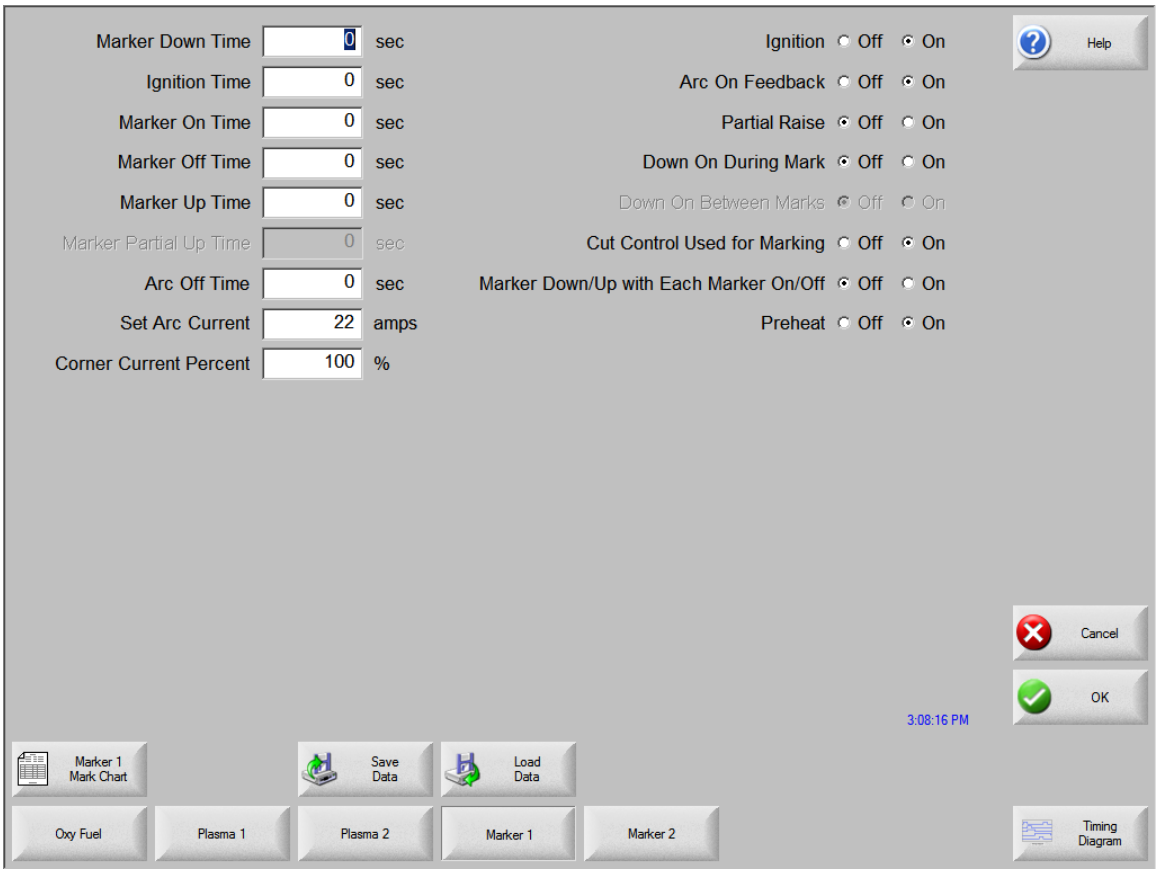
When the FineLine feature has been enabled, consumable data information may be viewed at the Change Consumable screen.

Marker

The control comes with built in control logic for marking. When marking is selected, the following parameters are available to customize the logic for the particular metal being marked. As these parameters are changed, the timing diagram below will change to show the new timing parameters. This screen is located under the Cut Types soft key in Setups.

Marker Interface

The Marking feature from the control is operated through the use of existing I/O points for cutting torches on the control I/O connector. These I/O points may be switched from the cutting torch to the marking tool by use of an external relay(s) activated by the Marker Output or the Marker Output may be used to activate the marking tool.

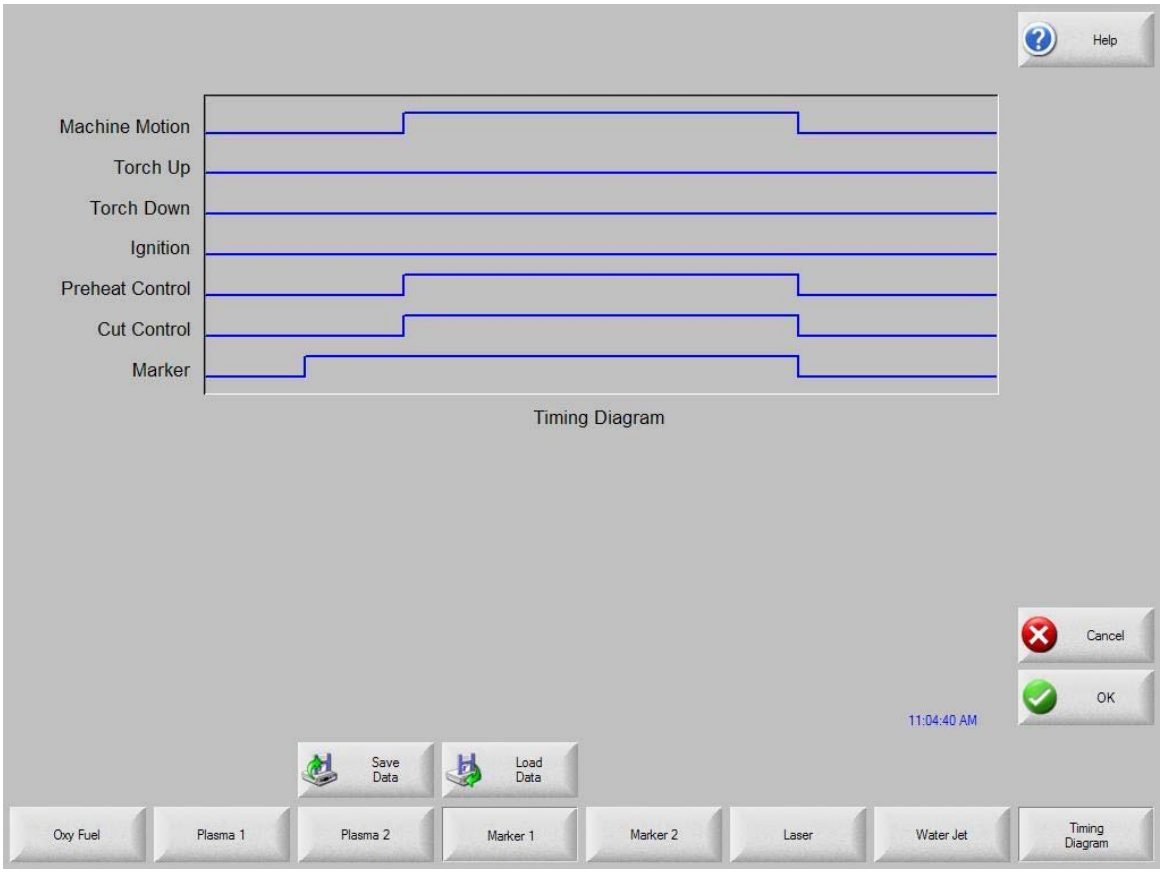


Ignition Time	(Ignition Output) Specifies the length of time that the ignition output is held on at each ignition point.
Marker On Time	(Time Delay) This parameter allows the operator to insert a time delay, which allows the marker to prepare for operation prior to the start of Marker motion.
Marker Off	(Time Delay) This parameter allows the operator to insert a time delay, which allows the marker to prepare for operation prior to the

Time	end of Marker motion.
Marker Up Time	(Torch Up Output) Specifies the length of time to raise the marker at the beginning and end of each mark.
Marker Partial Up Time	(Torch Up Output) Specifies the length of time for partial raise of the marker at the beginning and end of each mark. **Note:** The Partial Raise parameter must be enabled.
Marker Down Time	(Torch Down Output) Specifies the length of time to lower the marker at the beginning of each marking cycle.
Set Arc Current	The Set Arc Current feature allows the user to set the arc current at the Plasma Marking supply. This feature uses the Current Set BCD output from the control to activate the BCD inputs at the Plasma Marking supply. EIA RS-274D part program code G59 V*value* F*value* for setting current is supported.
Corner Current Percent	The Corner Current Percent feature allows the operator to select a reduced current setting to be executed when cutting corners to improve marking quality. This value is a percentage of the Set Current (above) and is active when the Torch Height Disable Output is on.
Ignition	(Ignition Output Enable) The Ignition Off/On selection allows the operator to use the Ignition Output when marking if set to On.
Arc On Feedback	Specifies whether an arc-on signal from a plasma marking system to the control is used. With Arc On Feedback ON, the control waits for Cut/Mark Sense input to activate before initiating machine motion.
Partial Raise	Enabling the Partial Raise feature will execute a tool raise at the end of the Mark within a nest for the time specified in the Partial Up Time parameter. Full raise will be executed at the end of the final Mark segment.
Down On During Mark	Turning on the Down On During Mark feature forces the torch down output to remain on throughout the marking process. This is advantageous for pneumatic style torch lifters that require a constant output.
Down On Between Marks	Turn on the Down On Between Marks feature to force the Torch Down Output to remain on while traversing between marking segments. **Note:** For more information, refer to the *Programmer's Reference* for information on the Marker Font Generator feature.
Cut Control Used for Marking	This parameter is used to determine if the Cut Control output is to be used for activating the Marking tool. If set to no, the Marking Output would be used.
Marker Down/Up With	The Marker Down/Up With Each Marker On/Off will command the send the appropriate Up/Down Output commands at each Mark On/

Each Marker On/Off	Off.
Preheat	If you are marking with plasma, turn off Preheat by selecting Off.

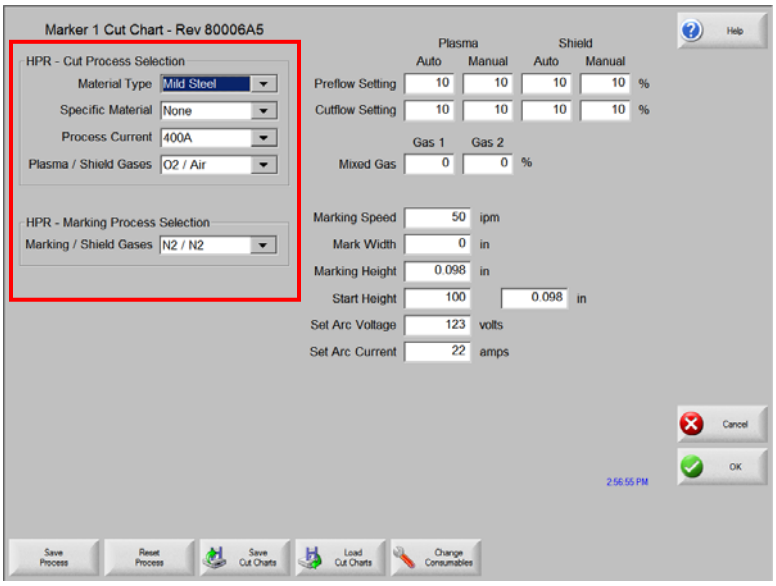
Press the Timing Diagram soft key to view the timing diagram from setups.



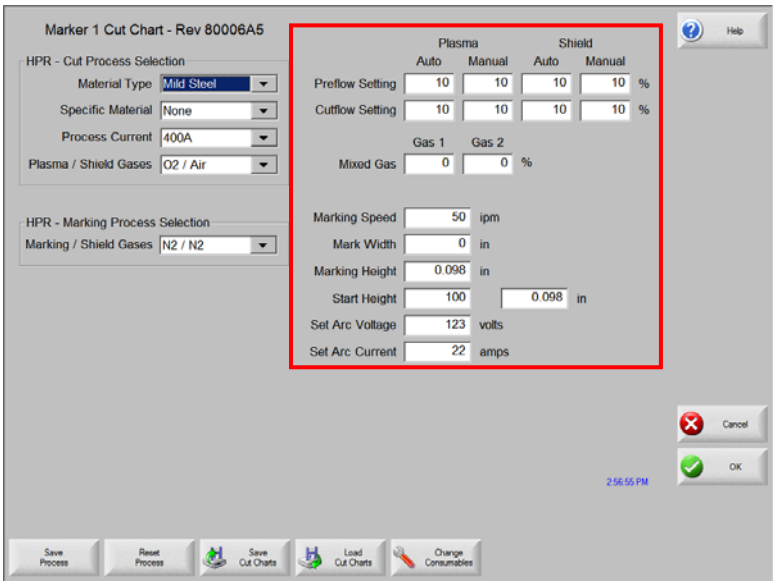
Using Cut Consumables for Marking

If your plasma supply is an HPR or HPR bevel system, you can use the same consumables for marking as for cutting. To use the same consumables for both processes:

1. Select a cut chart for the plasma cut process you are using.
2. Click OK.
3. On the Main screen, select the marking cut chart for the corresponding marking process.
4. On the marking cut chart screen, the values for the cut process are displayed in the HPR – Cut Process Selection group box. If you change any of these, a message displays to inform you that the consumables no longer match the plasma cut chart you selected.



5. f you are using HPRXD consumables, you can select either argon or nitrogen for the marking and shield gasses in the HPR – Marking Process Selection dropdown list. If you are using any other HPR system, you can use only nitrogen gas.
6. Make any necessary changes to the marking cut chart variables on the right side of the screen.



7. Click OK.
8. Click Yes to save any changes you made to the marking process.
9. Select Yes again to save the changes to the user plasma cut chart. This allows you to use these settings for marking whenever you select the corresponding plasma cut chart.

Laser Overview

The Mariner CNC offers a unique Laser process screen directly integrates to the Hypertherm *FAST* Laser™ head. This feature has the ability to improve Laser setup and operational accuracy while having the flexibility to fine tune the process specific to the operator's needs.

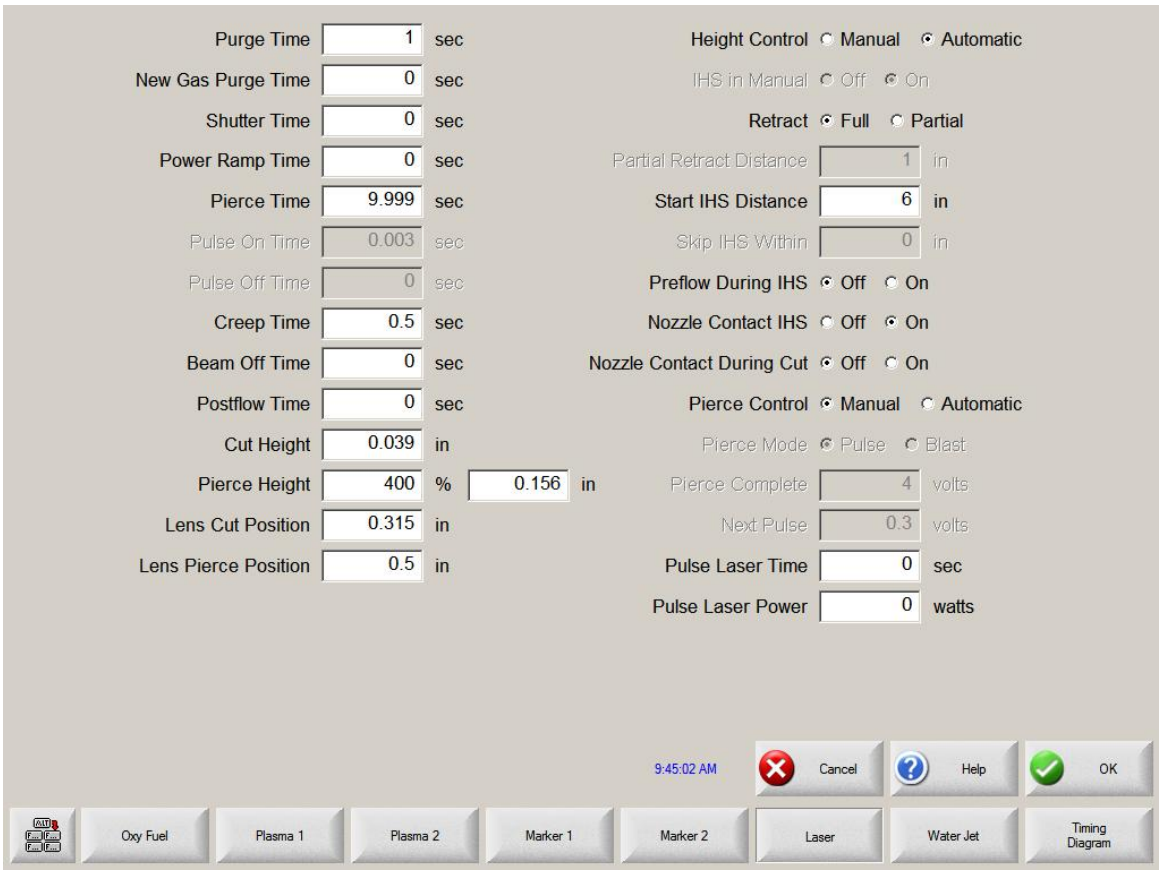
FAST Laser uses a patented design to create a dual flow zone that allows significantly higher oxygen assist gas pressures in the tightly defined cut zone established by the beam geometry, without the uncontrolled burning in the surrounding zone normally induced by increased assist gas pressures. This accelerated high-velocity oxygen flow along the beam path not only increases cut speed by fueling the exothermic reaction, but also reduces sensitivity to common plate fabricating conditions and variables, most notably plate chemistry and condition.

With this technology, Hypertherm has introduced a line of laser cutting heads that utilize the *FAST* Laser process to deliver up to a 20% increase in cut speed over standard CO_2 laser heads on plate steel while also significantly expanding the capacity and quality range of plate laser cutting systems. These combined benefits produce substantial gains in productivity and unattended operation potential for dedicated plate lasers (4 to 6 kW) – whether integrated or retrofitted – while also offering expanded capacity range and cost performance for shared-duty systems (2 to 3 kW). The Hypertherm LH2100 head offers two different focal lengths: 7.5 and 10.0 inches; the LH2125 adds a 12.5-inch focal length option for thicker plate. The Hypertherm LH2125/2100 series is used on laser systems with 1.5" or 2.0" optics. The Hypertherm LH1575 head offers two different focal lengths: 5.0 and 7.5 inches for 1.5 inch optics.

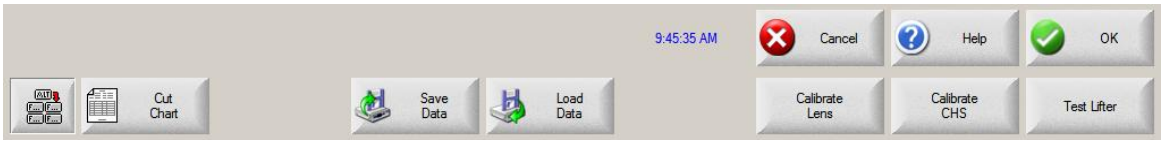
Integrated with Hypertherm Automation's Mariner CNC, on-board *FAST* Laser process intelligence coupled to process monitoring optics standard on LH-series cutting heads, achieves improved overall control of the cutting process with fewer system faults and reduced operator involvement. Dynamic Pierce Control senses and initiates each cut once the pierce is complete. These combined capabilities maximize uptime while minimizing total cycle time.

Note: Refer to Laser Information provided with the *FAST* Laser head for proper operation.

Laser Cut Types Screen



The Alt soft key indicates that additional soft keys are available. Among these additional keys is the Test Lifter key.



Test Lifter	Press the Test Lifter soft key to command the laser head THC1 lifter to lower to the plate, sense the plate and retract to the pierce height.

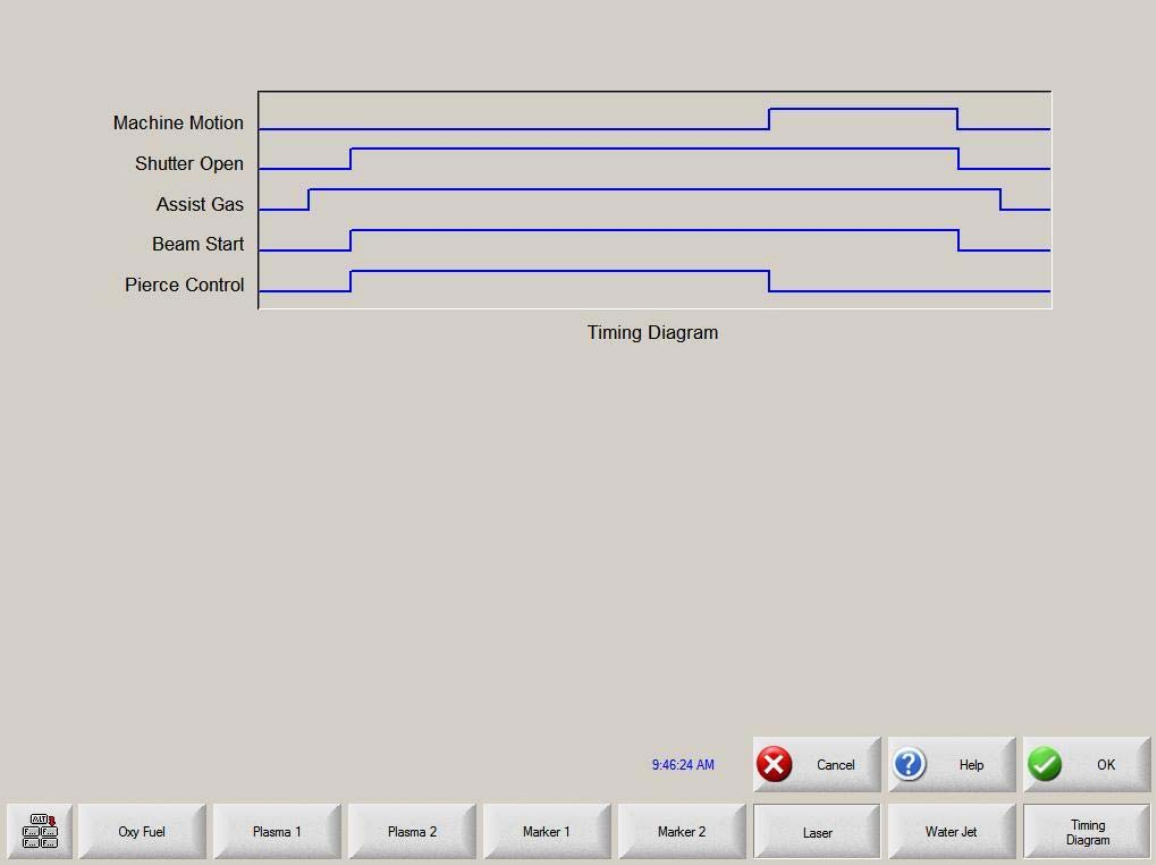
The following parameters allow you to set up a laser process.

Purge Time	Specifies the time delay for cutting gas purge before start of the laser cut motion is enabled.
New Gas Purge Time	Specifies the Gas Purge Time for switching from one cutting gas to another cutting gas.
Shutter Time	The Shutter Time parameter is used to specify the amount of time to

	open the shutter prior to the laser beam on.
Power Ramp Time	The Power Ramp Time parameter is used to specify the amount of time to ramp up the laser power prior to the laser pierce.
Pierce Time	Specifies the time delay from when laser head completes lowering until motion is initiated at creep speed for cutting. When Manual Pierce Control is selected, this is the total pierce time allowed. With Automatic Pierce Control is selected, this time is an additional delay after pierce is complete.
Pulse On Time	When Automatic Pulse Mode is selected for pierce control the user can select Pulse On and Off Time to adjust duty cycle response of the sensor pulses from the laser cutting head.
Pulse Off Time	When Automatic Pulse Mode is selected for pierce control the user can select Pulse On and Off Time to adjust duty cycle response of the sensor pulses from the laser cutting head.
Creep Time	Specifies the amount of time after piercing the material that the laser head travels at Creep Speed for cutting. Creep Speed is determined by a setup parameter in the Speed Setup Screen and is a percentage of the programmed cut speed. After the Creep Time is completed, the control accelerates to full cut speed.
Beam Off Time	The Beam Off Time parameter specifies the amount of time the beam output will be turned off prior to the stop of motion. This feature can be used to tab parts for attachment to the skeleton.
Postflow Time	Specifies the amount of time that the cutting gas remains on after the cut is complete.
Cut Height	The Cut Height setup parameter is used to select the desired cut distance above the plate. This will set the initial cut height before the laser cut motion is activated. Cut Height is derived from the CHS signal and the calibration curve and represents cut distance from nozzle tip to the plate.
Pierce Height	The Pierce Height setup parameter is used to select the desired Pierce Height above the plate. This can be entered as a multiplication factor that is calculated times the Cut Height or an actual Pierce Height distance.
Lens Cut Position	Sets the focal lens position in the laser head for cutting.
Lens Pierce Position	Sets the focal lens pierce position in the laser head for cutting.
Pulse Laser Time	Sets the Laser Pulse Time duration for a one shot beam alignment.

Pulse Laser Power	Sets the Laser Pulse Power for a one shot beam alignment.
Height Control Manual/ Automatic	Allows the user to either select a Manual or Automatic Height control for the laser head.
IHS in Manual	The IHS in Manual setup parameter allows the operator to select whether or not to use the Initial Height Sense feature when operating the Z axis lifter (THC1) in manual mode.
Retract Full/Partial	Selects the retract distance to be set at Full or Partial. In the Full retract mode, the laser head will retract to the Z-Axis Home position. In Partial retract mode, the laser head will retract to the set retract distance.
Partial Retract Distance	This setup parameter is used to select the THC 1 Retract Distance when configured for partial retract mode.
Start IHS Distance	The Start IHS Distance specifies the distance of travel for the THC 1 to move the laser head at high speed before switching to low speed and beginning Initial Height Sense. Caution should be taken when selecting this distance so that the laser head does not crash into the plate.
Preflow During IHS	Selecting ON will activate Preflow gases during the IHS cycle.
Nozzle Contact IHS	This parameter would be set to ON to select the THC 1 to use Contact Sense to detect the plate during the IHS cycle.
Nozzle Contact During Cut	Nozzle Contact During Cut allows the CNC to detect contact with the plate and generates a fault if this condition occurs.
Pierce Control Manual/ Automatic	Allows the user to select manual or automatic pierce control. Automatic control uses sensors in the laser head to detect when the pierce is complete. Manual mode uses a preset pierce time and preset laser program. Automatic mode dynamically controls laser duty cycle.
Pierce Mode Pulse/Blast	When Automatic Pierce is selected the user can select to use a definable pulse output or a single blast.
Pierce Complete	The Automatic Pierce monitors the voltage of sensors in the laser head and compares them to the value set by this parameter to detect the completion of the pierce.
Next Pulse	Based on sensors in the laser head, the system can determine when the next Laser Pulse is delivered during Automatic Pierce control. The voltage is derived from the feedback of the sensors in the laser cutting head.

Press the Timing Diagram soft key to view the timing diagram from setups.



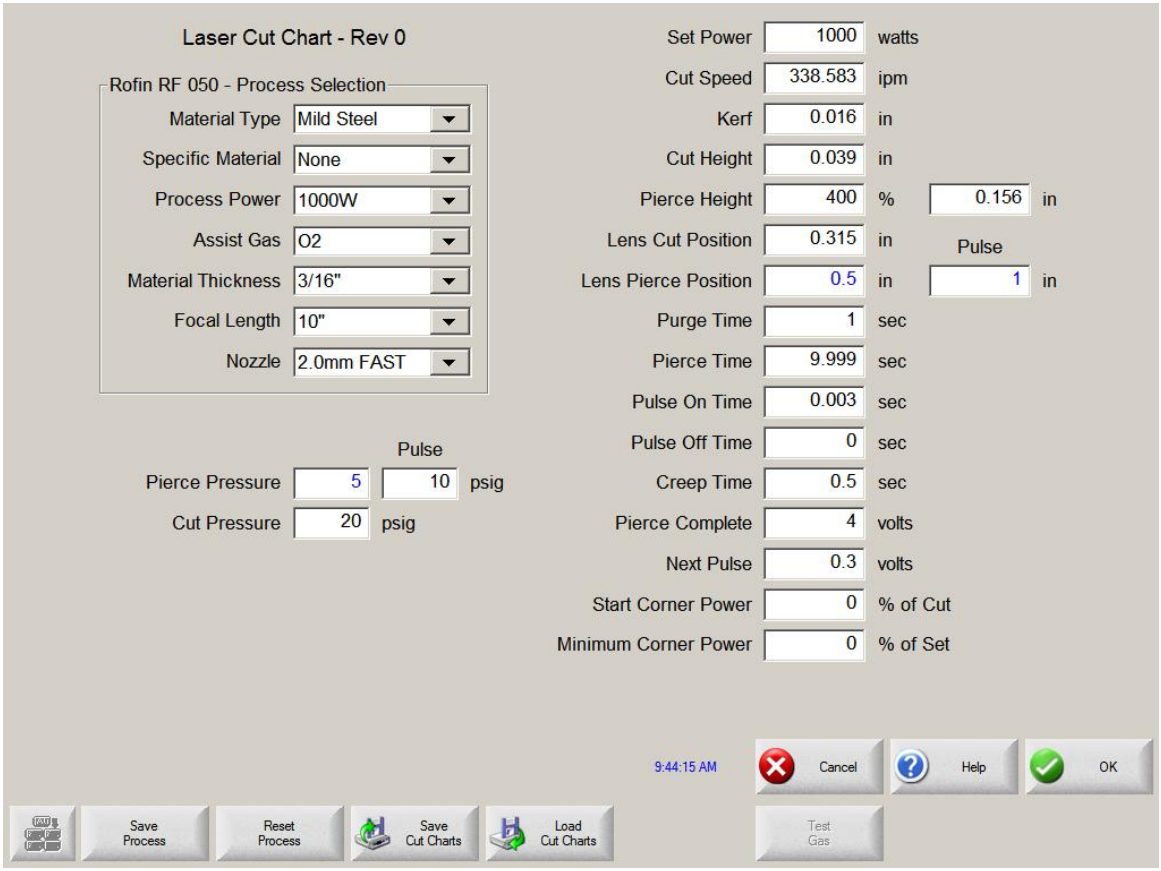
Laser Cut Charts

A cut chart database allows the user to select factory recommended settings or amend the database for personalized settings. The Cut Chart information can be saved or loaded via the hard drive, floppy drive or USB memory stick. The Cut Chart files contain the factory recommended settings that are available from Hypertherm.

Notes:

- Refer to the *FAST* Laser operator's manual for complete information on the operation and setup of the *FAST* Laser head.
- The *FAST* Laser Laser parameters must first be enabled in the password protected Station Configuration screen to allow use of the Cut Chart Information.
- Specific Material, Process Power, Assist Gases, Material Thickness, Focal Length and Nozzle data fields allow new values to be added. Double click on the field to enter an new value or press the Plus key + to add or - to delete on the keypad.

Laser Cut Chart Screen



The Cut Chart Database (cut process parameters) transmitted to configure the laser head are based on the following process variables. All values are user definable.

Material Type	Select the material type, such as mild steel, stainless steel or aluminum.
Specific Material	Allows the user to create a custom database based on unique characteristics of the material type. Double click on the field or press the Plus key "+" to enter an new material name or "-" to delete on the keypad.
Process Power	Select the appropriate process power (wattage) for the material thickness and material type.
Assist Gas	Select the appropriate assist gas for the desired process.
Material Thickness	Select the material thickness for the material type.
Focal Length	Select the specific focal length lens that must be installed in the laser head.
Nozzle	Select the diameter and type of nozzle that must be installed for the process.

Test Gas	Press the Test Gas soft key to perform the Test Gas function of the cutting assist gas delivery system.

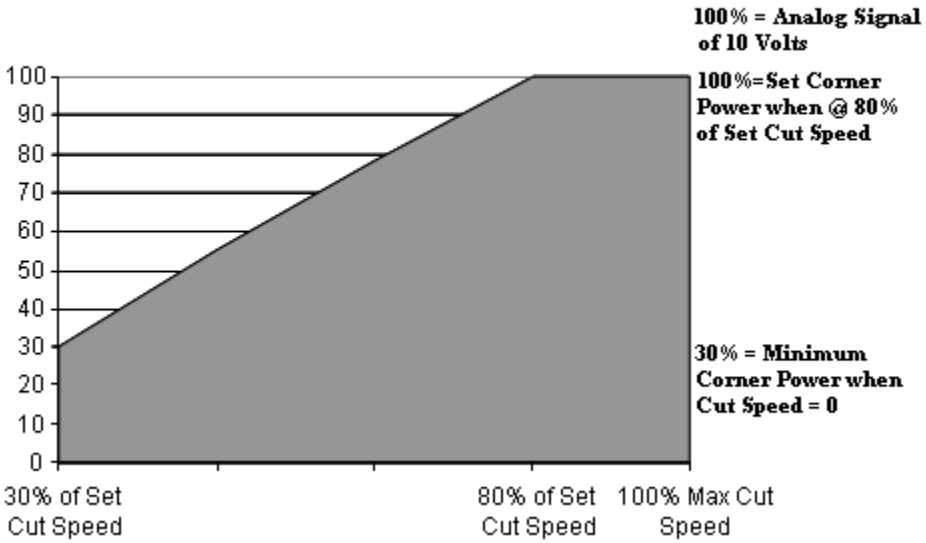
The following parameters are the Cut Process parameters within the database, which are then available to configure the specific process.

Set Power	Allows you to set the power (watts) to be used during the cut process. This value can be less than the process power.
Cut Speed	Specifies the Cut Speed for the selected material process.
Kerf	Specifies the amount of kerf that will be applied to the current part program.
Cut Height	Select the cut distance from the nozzle tip to the plate. Cut Height is derived from the CHS signal and the calibration curve.
Pierce Height	Select the Pierce Height. This can be entered as a multiple factor that is calculated value of the Cut Height or an actual Pierce Height distance.
Lens Cut Position	Sets the focal lens position in the laser head for cutting.
Lens Pierce Position	Sets the focal lens pierce position in the laser head for cutting.
Resonator On Time	Allows a specific time for the resonator to power up.
Purge Time	Specifies the time delay from switching from one cutting gas type to another cutting gas type.
Pierce Time	Specifies the time delay from when laser head completes lowering until motion is initiated at creep speed for cutting.When Manual Pierce Control is selected, this is the total pierce time allowed.With Automatic Pierce Control is selected, this time is an additional delay after pierce is complete.
Pulse On Time	When Automatic Pulse Mode is selected for pierce control the user can select Pulse on time to adjust the pulse.
Pulse Off Time	When Automatic Pulse Mode is selected for pierce control the user can select Pulse on and off time to adjust the pulse. The Off Time starts when the sensor signal falls below the next pulse threshold.
Creep Time	Specifies the period after pierce complete that the laser head travels at Creep Speed. Creep Speed is determined by a setup parameter in the Speeds setup screen and is a percentage of the programmed cut speed. After Creep Time is complete, the control accelerates to full cut speed.
Pierce Complete	The Automatic Pierce monitors voltage of sensors in the laser head to detect completion of the pierce. This is used in conjunction with Pulse On Time, Pulse Off Time and next pulse.

Next Pulse	Based on sensors in the laser head, the system can determine when the next pulse occurs. The Next Pulse will be delivered when the voltage drops below the Next Pulse setting.
Start Corner Power	The Start Corner Power allows the user to define a speed where the corner power analog signal will be used to start to decrease laser power. This is defined as a percentage of cut speed.See Corner Power graph, where the example shows this set to 80%.
Minimum Corner Power	This parameter defines the minimum laser resonator power to switch when the cut speed reduces to zero in a corner. This is defined as a percentage of selected power (watts). See Corner Power graph, where the example shows 30%.
Save Process	Press the Save Process soft key to save the current process settings to the hard drive and create a custom user database based on the eight process variables selected.
Rest Process	Press the Reset Process soft key to reset the current settings to factory recommended defaults based on the eight process variables selected.
Save Cut Charts	Press the Save Cut Charts soft key to save the current user and factory databases to diskette or USB memory stick. User files are designated with a .usr file extension and the factory files are designated with a .fac file extension
Load Cut Charts	Press the load Cut Charts soft key to load the factory default database files which are supplied by Hypertherm in a Text file (.txt), user files (.usr) or factory files (.fac) from Diskette or USB memory stick.
Pulse Laser Time	Sets the Laser Pulse Time duration for a one shot beam alignment.
Pulse Laser Power	Sets the Laser Pulse Power for a one shot beam alignment.
Height Control Manual/Automatic	Allows the user to select a manual or automatic height control for the laser head.
IHS in Manual	The IHS in Manual setup parameter allows the operator to select whether to use the Initial Height Sense feature when operating the Z axis lifter (THC1) in manual mode.
Retract Full/Partial	Selects the retract distance to be set at full or partial. In the Full retract mode, the laser head will retract to the Z-Axis Home position. In partial retract mode, the laser head will retract to the set retract distance.
Partial Retract Distance	This setup parameter is used to select the THC Retract Distance when configured for partial retract mode.

Start IHS Distance	The Start IHS Distance specifies the distance of travel for the THC to move the laser head at high speed before switching to low speed and beginning Initial Height Sense. Take care when selecting this distance so that the laser head does not crash into the plate.
Preflow During IHS	Select ON to activate Preflow gas during the IHS cycle.
Nozzle Contact IHS	Set to this parameter to ON to configure the THC to use Contact Sense to detect the plate during the IHS cycle.
Nozzle Contact During Cut	Allows the CNC to detect contact with the plate and fault.
Pierce Control Manual/Automatic	Allows the user to select manual or automatic pierce control. Automatic control uses sensors in the laser head to detect when the pierce is complete.
Pierce Mode Pulse/Blast	When Automatic Pierce is selected, you can select to use a definable pulse output or a single blast.
Pierce Complete	Monitors voltage of sensors in the laser head to detect completion of the pierce.
Next Pulse	Based on sensors in the laser head, the system can determine when the next Pulse Pierce occurs during Automatic Pierce control. The voltage is derived from the feedback of the sensors.
Cut Chart	A cut chart database allows the user to select factory recommended settings or amend the database for personalized settings. The Cut Chart information can be saved or loaded via the hard drive, floppy drive or USB memory stick. The Cut Chart files contain the factory recommended settings that are available from Hypertherm.

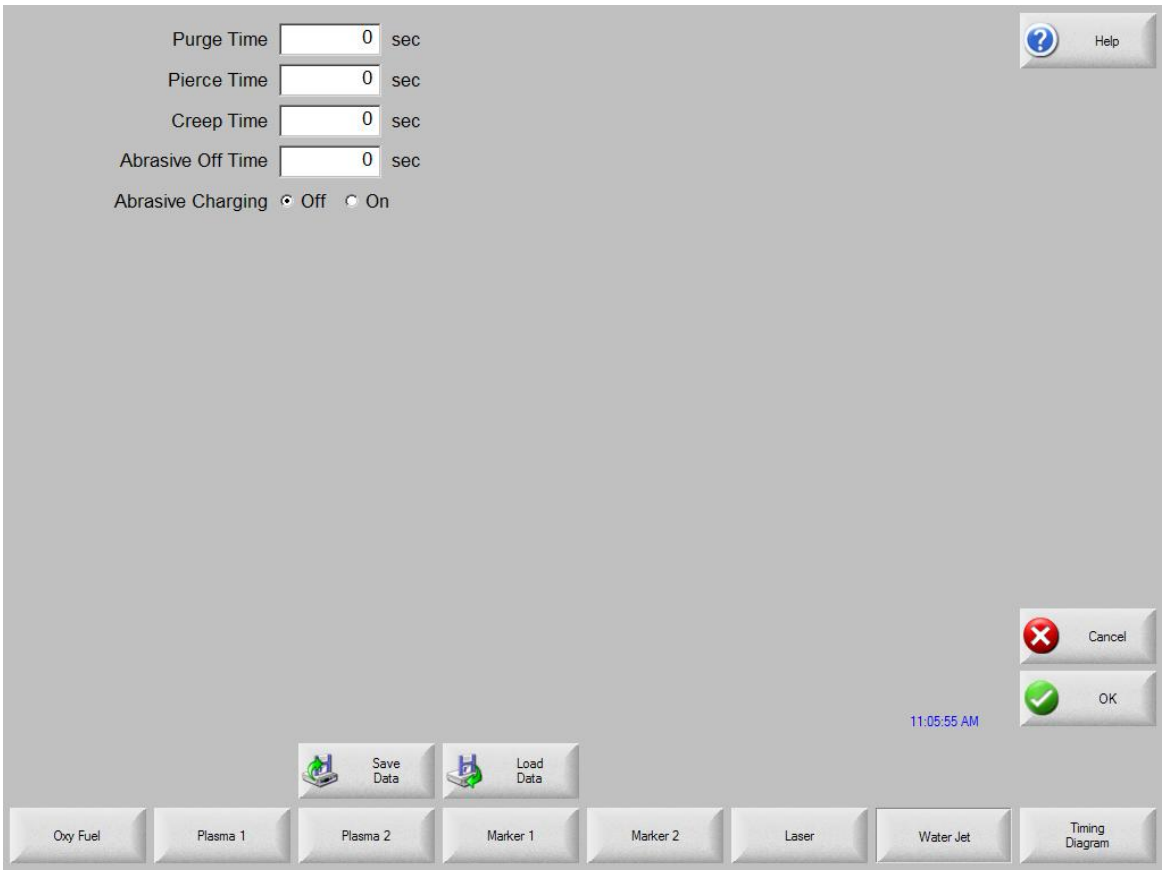
Example of Corner Power Graph



Notes:

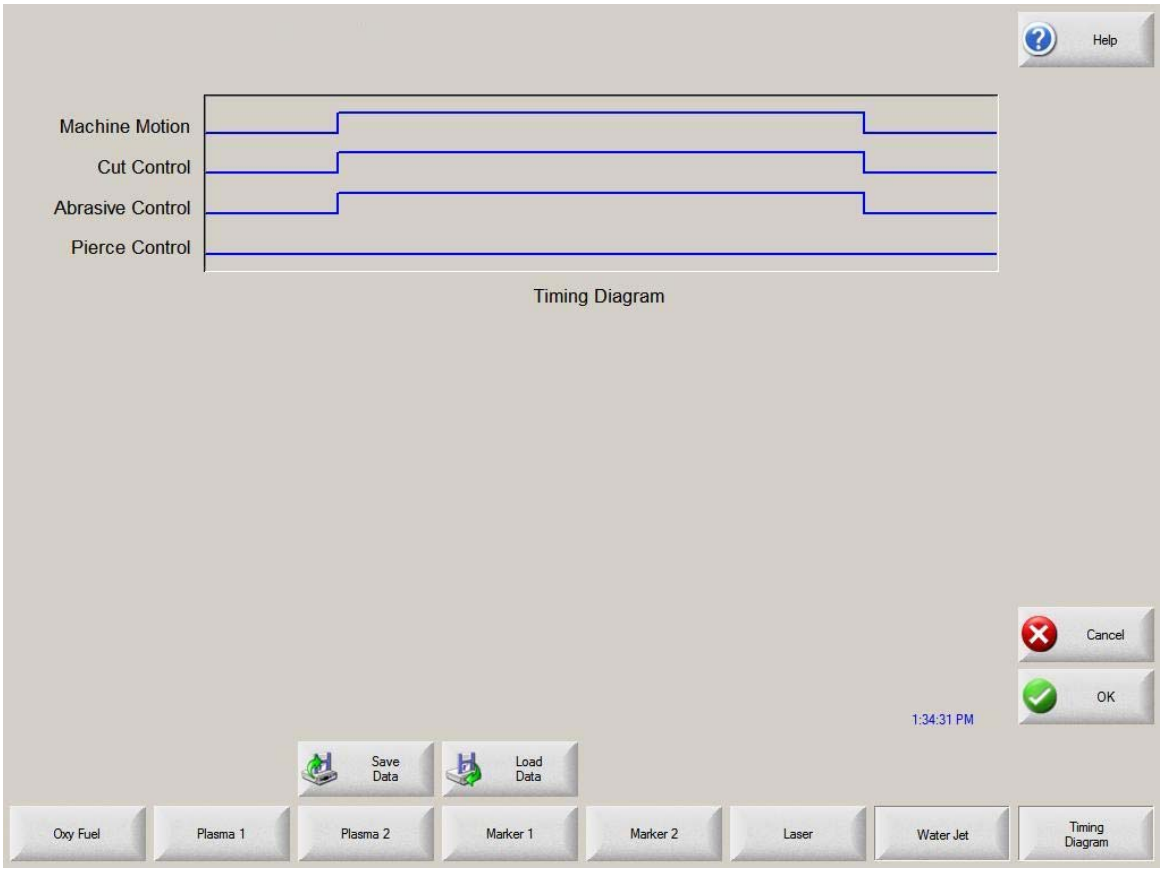
- Refer to the *FAST* Laser operator's manual for complete information on the operation and setup of the *FAST* Laser head.
- The *FAST* Laser Laser parameters must first be enabled in the password protected Station Configuration screen to allow use of the Cut Chart Information
- Specific Material, Process Power, Assist Gases, Material Thickness, Focal Length and Nozzle data fields allow new values to be added. Double click on the field to enter an new value or press the Plus key "+" to add or "-" to delete on the keypad.

Water Jet



Purge Time	Specifies the time delay from torch ignition until motion is enabled.
Pierce Time	Specifies the time delay from when cutting tool completes lowering until motion is initiated at Creep Speed. Used to allow the cutting tool to completely pierce the material before moving.
Creep Time	Specifies the amount of time after piercing the part that the torch travels at Creep Speed. Creep Speed is determined by a setup parameter at the Speeds setup screen and is a percentage of the programmed cut speed. After the Creep Time is completed, the control accelerates to full cut speed.
Abrasive Off Time	The Abrasive Off delay parameter species the amount of time the abrasive will remain on at the end of a cut.
Abrasive Charging	When selected, the Abrasive Charging feature will charge or fill the abrasive into the cutting system for use while cutting.

Press the Timing Diagram soft key to view the timing diagram based on your setup.



Sensor THC Setup

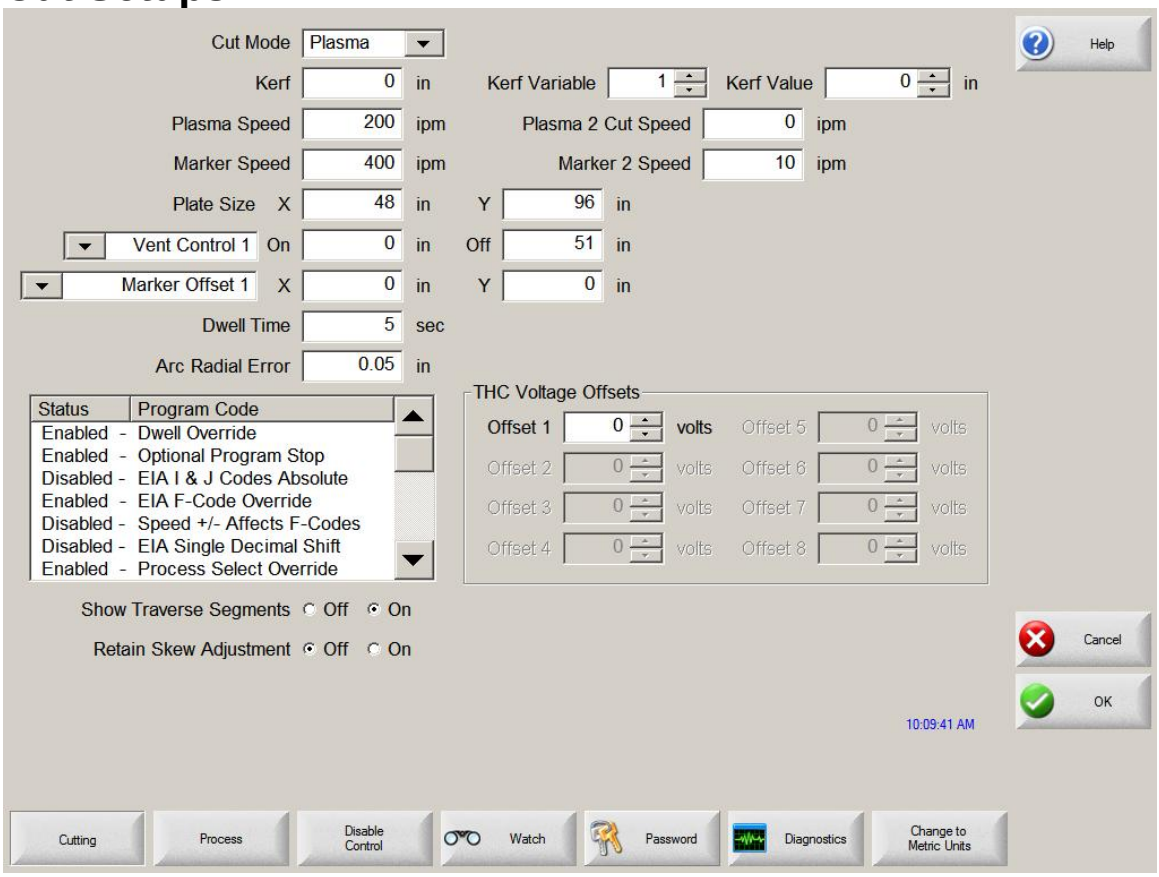
The Sensor THC (Torch Height Control) system is an automated torch height control that maintains the appropriate cut height for the set arc voltage to obtain the optimum cut quality regardless of variations in plate positioning.

Sensor THC is operated as a separate closed-loop servo axis on the control and has several setup parameters available to customize the system for optimal performance and individual requirements. The THC system includes four parts: the control, the analog input card mounted in the control, the voltage divider card and the mechanical slide with a motor to operate the slide. The voltage divider card, which is mounted in the plasma power supply, monitors the arc voltage of the cutting process at the torch then transmits 1/40th of this voltage to the analog input card in the control where it is restored to the original value. This value is then compared to the value of the Set Arc Voltage field. If the values are different, the control will raise or lower the torch on the slide to correct the cut voltage.

For operation, the Sensor THC must first be enabled in the password machine setups. Setup parameters specific to the cut process and the THC axis will then be available for configuration.

 **Warning!** Installation, Setup and Calibration should only be performed by trained service personnel.

Cut Setups

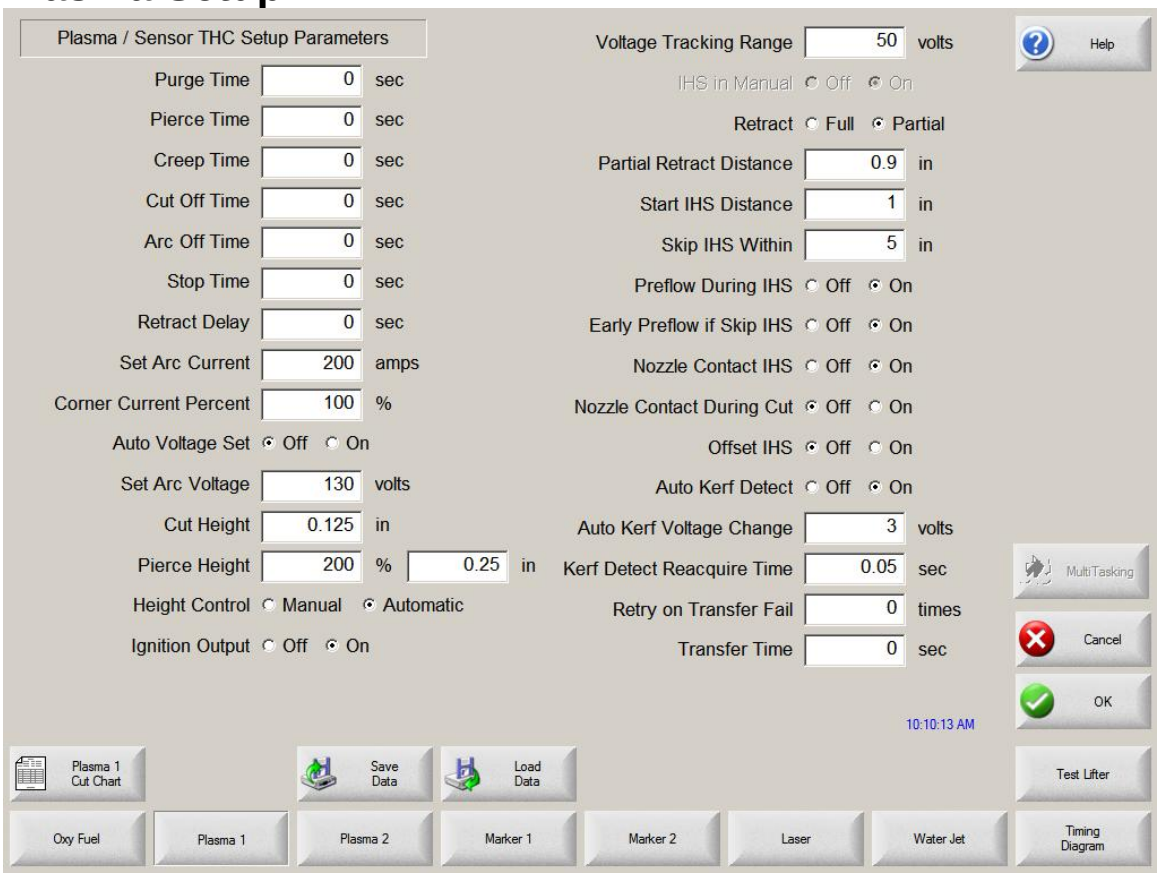


THC Voltage Offset

Offsets the individual Sensor THC arc voltages from the master set arc voltage. This allows the individual THCs to be adjusted to compensate for consumable wear and obtain optimum cut quality.

Note: The THC Voltage Offset parameter can be automatically adjusted using the Volts per Minute parameter of the Change Consumable screen. For more information see Change Consumables.

Plasma Setup



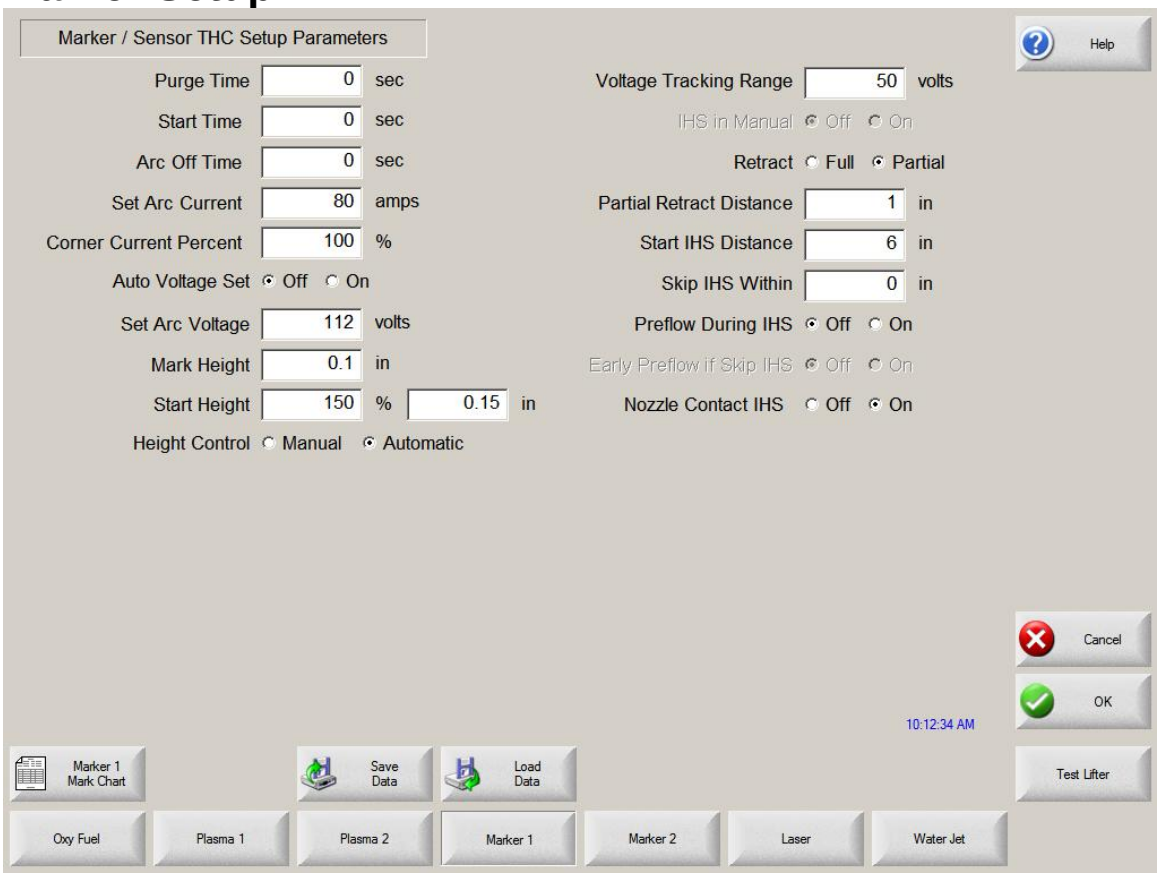
Test Lifter	The test lifter soft key allows you to test the IHS function. Press the Test Lifter soft key to command the torch lifter to descend to the plate, sense the plate, and retract to the pierce height.
Timing Diagram	Press the Timing Diagram soft key to view the timing diagram from setups.
Retract Delay	Specifies the delay between the cut off and the torch retract.
Auto Voltage Set	Samples the Arc Voltage that is generated when cutting at a specific cut height. The Arc Voltage value relative to the manual cut height sample is used when cutting the part instead of a predetermined Arc Voltage.
Set Arc Voltage	The Arc Voltage to use for the material being cut.
Cut Height	Selects the cut height from the plate. This sets the initial cut height before arc voltage control is activated when the system is operating in automatic mode.
Pierce Height	Selects the pierce height. This can be entered as a percentage of the cut height or as an actual distance.

Voltage Control	Allows the operator to select whether the Sensor THC operates in manual or automatic mode. Manual mode disables the torch height control and allows the torch to cut at the specified cut height and voltage. Automatic mode allows the THC to command the torch up and down to maintain the voltage at the specified arc voltage set point.
Ignition Output	Enables the use of the ignition output to ignite the plasma torch. If your plasma system requires a separate ignition signal, select On. If not, leave Ignition Off.
Voltage Tracking Range	Specifies the allowable variation in arc voltage from the set point. If the arc voltage goes above or below this allowable range, the system faults and pauses cutting.
IHS in Manual	Allows the operator to select whether to use initial height sensing when operating the Sensor THC in manual mode.
Retract Full/Partial	Allows the retract distance to be set at full or partial. During a full retract, the torch retracts to the home position. During a partial retract, the torch retracts to the set retract distance.
Partial Retract Distance	Selects the THC retract distance for a partial retract.
Start IHS Distance	Specifies the distance that the THC travels to move the torch at high speed before switching to low speed and beginning initial height sense. Take care to select a distance that allows the torch to clear the plate.
Skip IHS Within	Disables initial height sense at pierce points if IHS falls within the selected distance. This setting increases cutting productivity. The distance is measured from the end point of the cut segment to the next pierce point.
Preflow During IHS	Select On to activate preflow during the IHS cycle.
Early Preflow if Skip IHS	Select On to activate preflow during the traverse before the pierce if skip IHS is enabled.
Nozzle Contact IHS	Select On to require the Sensor THC to use contact sense to detect the plate during the IHS cycle. Use this parameter when cutting light gauge material to prevent plate deflection.
Nozzle Contact During Cut	Select On to require the Sensor THC to use the contact sense input to detect the plate contact during cut and pause operations.
Offset IHS	Activates a remote probe for plate detection and initial height sense. If this feature is enabled, the control system executes the Tool Offset 9 or Marker Offset 9. The plasma torch moves the distance of the offset, performs the IHS and then returns the torch to the pierce location at each commanded pierce or cut on. The Z

axis parameter is used to adjust for height differences between the torch and the probe.

Auto Kerf Detect	Reduces the possibility of the torch diving into the plate. When Yes is selected, the THC detects sudden changes in arc voltage when crossing a kerf path and freezes the height motion of the THC.
Auto Kerf Voltage Change	Sets the change in voltage that disables the THC when the torch passes over a previous cut. This setting prevents the torch from diving and requires that the Auto Voltage Lock On parameter be active.
Kerf Detect Reacquire Time	Determines the amount of time after a change in voltage is detected that the CNC disables THC height motion.

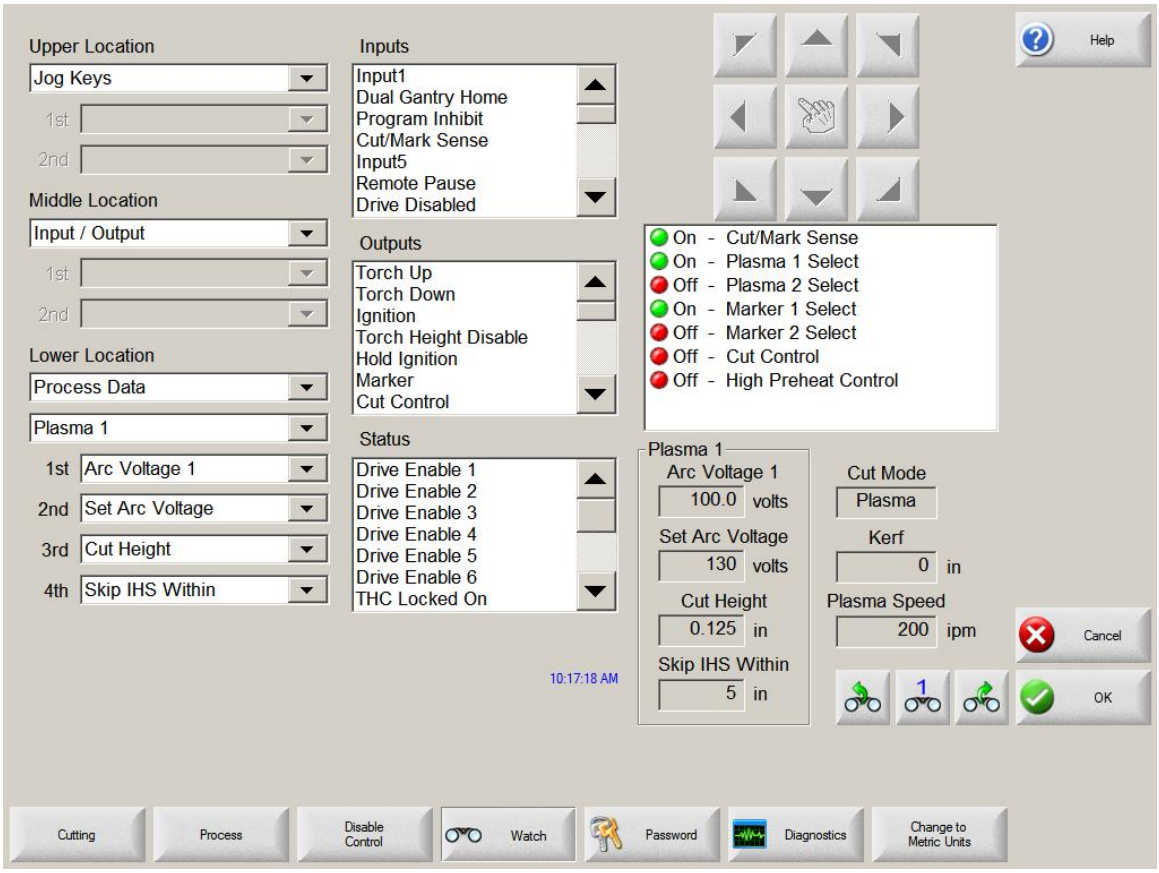
Marker Setup



Test Lifter	The test lifter soft key is available to test the IHS function. Press the Test Lifter soft key to command the torch lifter to descend to the plate, sense the plate, and retract to the pierce height.
Purge Time	Specifies the time delay from torch ignition until motion is enabled.
Start Time	Specifies the time delay from when torch completes lowering until motion is initiated at Creep Speed. Used to allow the Marker to completely transfer to the material before moving.
Sample Voltage	If this parameter is enabled, it samples the Arc Voltage that is recorded when cutting at a specified cut height. The value of this sample arc voltage is used to cut the part instead of a predetermined arc voltage.
Set Arc Voltage	Records the arc voltage for the material being cut.
Mark Height	Sets the cut distance from the plate. This value sets the initial cut height before arc voltage control is activated when operating in automatic mode.
Start Height	Sets the start height for the cut. This can be entered as a percentage of the start height or as an actual start height distance.

Voltage Control	Allows the operator to select the Sensor THC to operate in manual or automatic mode. Manual mode disables the torch height control and allows the torch to cut at the specified cut height and voltage. Automatic mode allows the THC to command the torch up and down to maintain the voltage at the specified arc voltage set point.
Voltage Tracking Range	Sets the allowable variation in arc voltage from the set point. If the arc voltage exceeds this range, the system faults and pauses cutting.
IHS in Manual	Allows the operator to select whether to use the initial height sense when the Sensor THC is in manual mode.
Retract Full/Partial	Selects the retract distance. If Full is selected, the torch retracts to the home position. If Partial is selected, the torch retracts to the distance set in the Partial Retract Distance field.
Partial Retract Distance	Sets the distance that the THC retracts when partial retract is selected.
Start IHS Distance	Specifies the distance that the THC moves the torch at high speed before switching to low speed and beginning initial height sense. Take care to select a distance that allows the torch to clear the plate.
Skip IHS Within	Disables initial height sense at pierce points if IHS falls within the selected distance. This setting increases cutting productivity. The distance is measured from the end point of the cut segment to the next pierce point.
Preflow During IHS	Select On to activate preflow during the IHS cycle.
Nozzle Contact IHS	Select On to require the Sensor THC to use contact sense to detect the plate during the IHS cycle. Use this parameter when cutting light gauge material to prevent plate deflection.

Process Watch

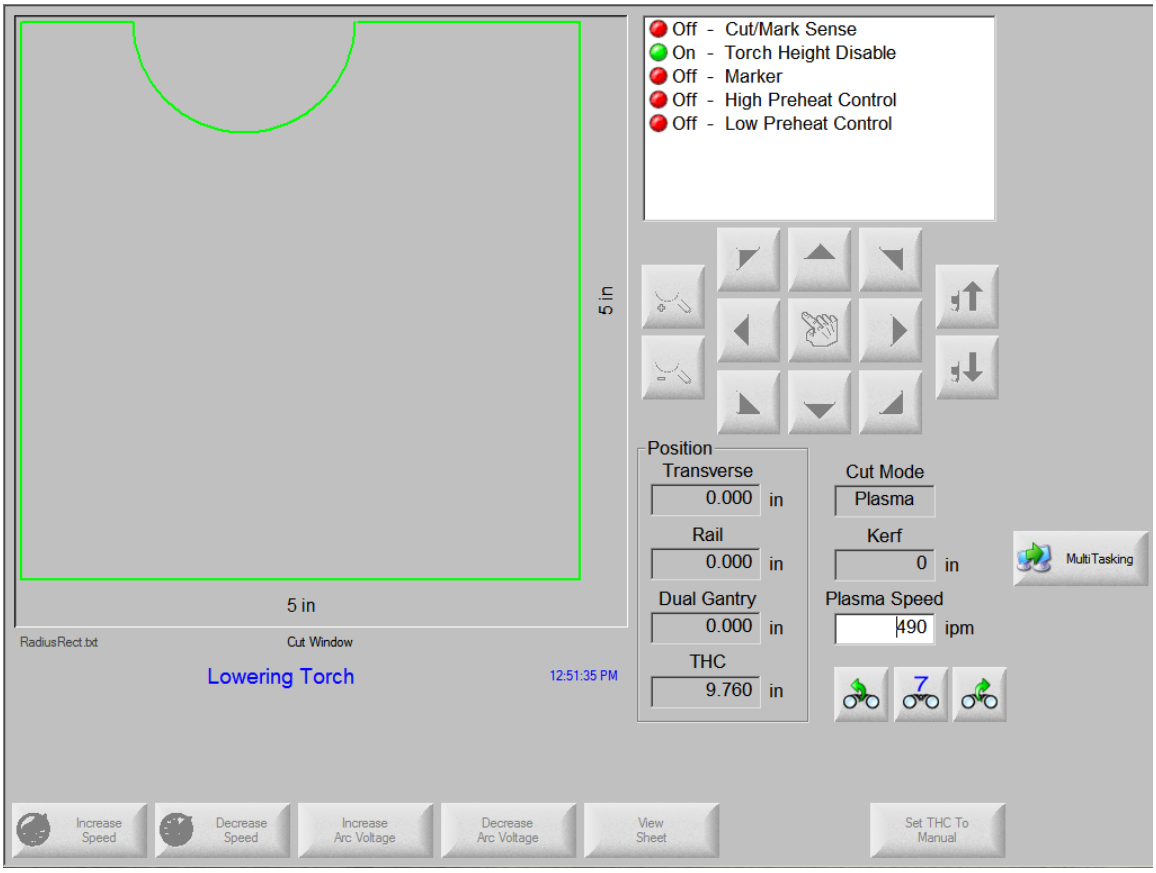


Input/Output	In addition to the standard I/O options, the Watch window can be configured to include the status of the voltage tracking for the Sensor THC. This indicates when the automated voltage tracking has "locked on" and is adjusting the torch height based on voltage.
Position	The Sensor THC is operated as a separate axis on the CNC. Position information for the THC axis can be displayed in the Watch window.
Plasma Process	Information critical to the THC operation may be added to the Lower Location. This information includes Arc Voltage, the Set Arc Voltage, Cut Height and Pierce Delay. Values for the Set Arc Voltage, Cut Height and Pierce Delay can be adjusted on the main cut screen to customize the cut process.

Main Cut Screen

You can operate the Sensor THC in automatic or manual mode.

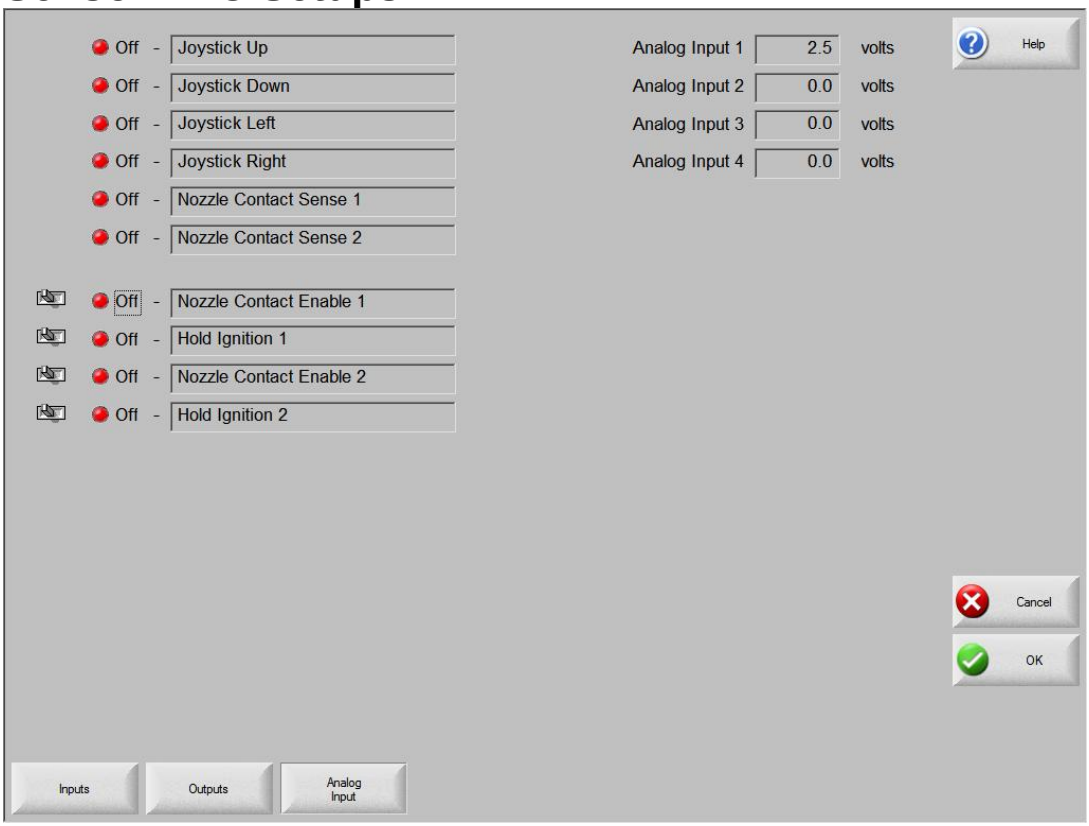
Automatic THC Mode



When the Sensor THC is cutting in automatic mode, three soft keys are available on the main cut screen that allow the operator to manually increase and decrease arc voltage for the cut and to switch to manual mode.

When the Sensor THC is cutting in manual mode, three soft keys are available on the main cut screen that allow the operator to manually raise and lower the manual cut height and to switch to automatic mode.

Sensor THC Setups

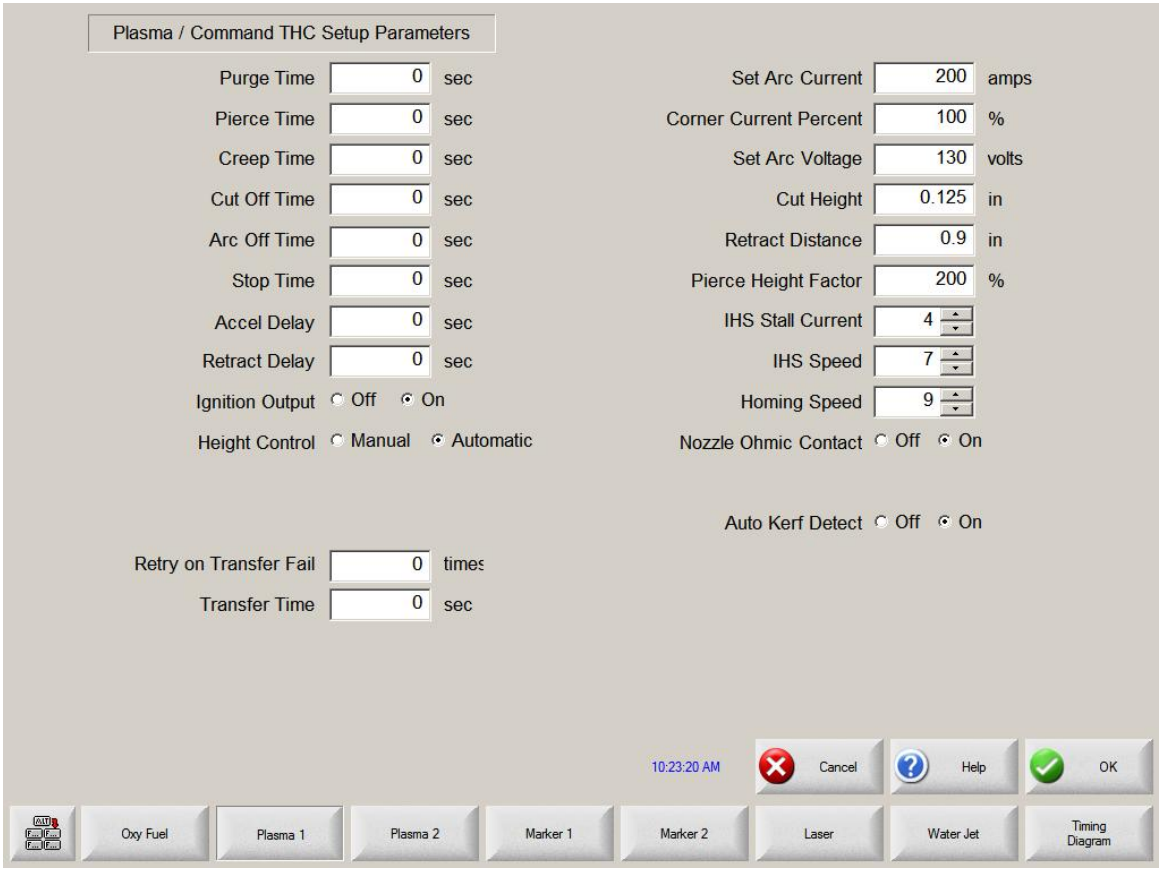


Analog Input	The Sensor THC requires that additional inputs, outputs and analog voltage be transmitted to the CNC to monitor the process. These signals are transmitted to the CNC through an analog input card that is installed in the CNC. In addition to THC operations, this analog input card can also be used for operation of an optional joystick and external speed pots. **Note:** The appearance of the view screens varies depending upon the analog input card that has been installed.
Inputs / Outputs	Single-ended inputs and outputs located on the analog input card are displayed.
Analog Inputs	The analog input values shown in the upper right of the screen are the actual voltages coming into the analog card. Analog inputs that are assigned to the THC axis and the analog input for the THC are visible here.

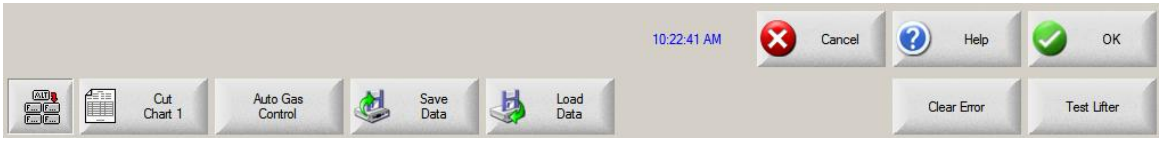
Command THC Setup

The Command THC is an automated torch height control system that adjusts the distance between the plasma torch and the work surface to provide improved cut quality. After the Command TCH is set up using the password-protected parameters, you can set up operational parameters for the Command THC on the Plasma Setups screen.

For additional information on the use of the Command THC, refer to the operating instructions provided with the Command THC system.

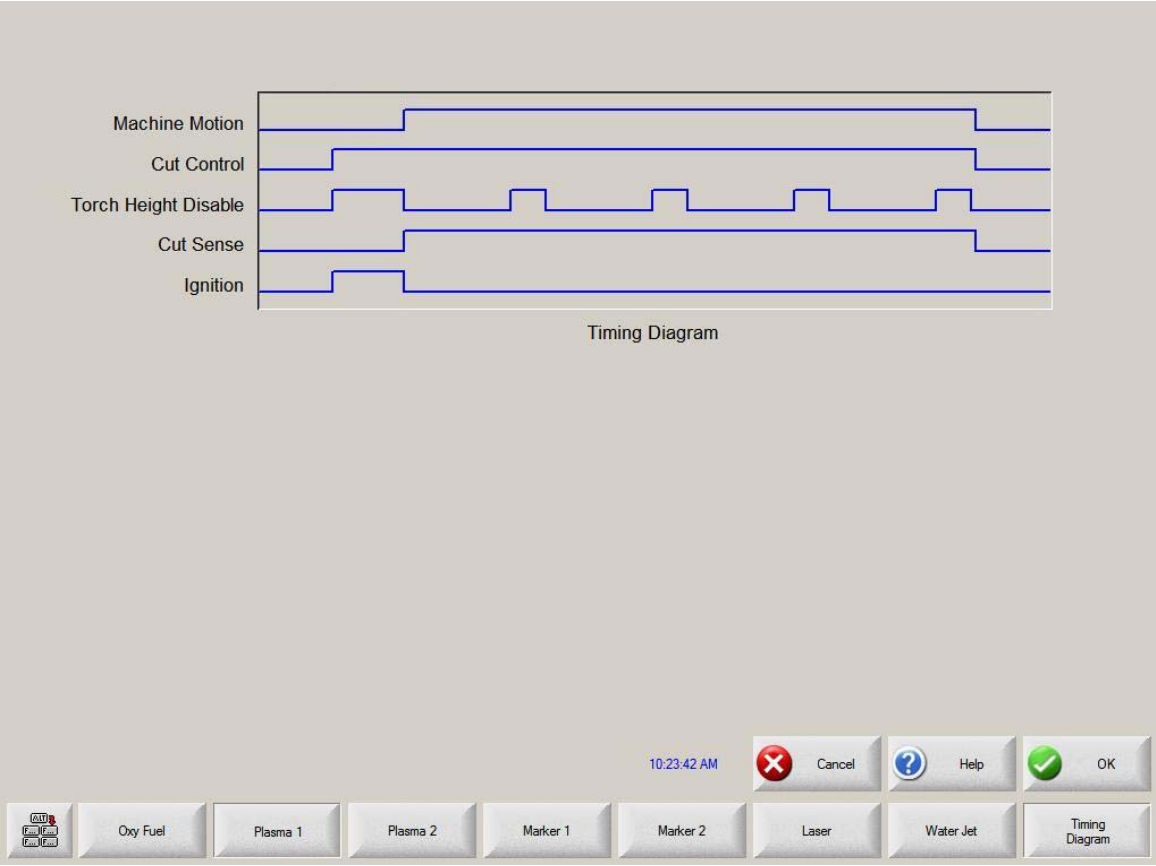


Additional soft keys:



Clear Error	The Clear Error soft key allows you to clear an error at the Command THC control box. After the soft key is pressed, a message is posted on the CNC displaying a description of the error.
Test Cycle ON/OFF	Press the Test Cycle ON/ OFF soft key to operate the Command THC in test mode. In test mode, the Command THC completes the

	cycle without firing the torch.
Test Lifter	Press the Test Lifter soft key to command the torch lifter to lower to the plate, sense the plate and retract to its pierce height.
Timing Diagram	Press the Timing Diagram soft key to view the timing diagram from setups.



Purge Time	Specifies the time delay from torch ignition until motion is enabled, if the value for Arc On Feedback is Off. Enter 0 (zero) for the Purge Time if the value for Arc On Feedback is On.
Pierce Time	Specifies the delay between the time that the torch is fully lowered until motion is initiated at Creep Speed. This value allows the plasma torch to pierce the material completely before moving.
Creep Time	Specifies the amount of time that the torch travels at creep speed after piercing the material. Creep Speed is a percentage of the programmed cut speed and is determined by a setup parameter on the Speed Setup screen. After Creep Time has elapsed, the CNC accelerates to full cut speed.

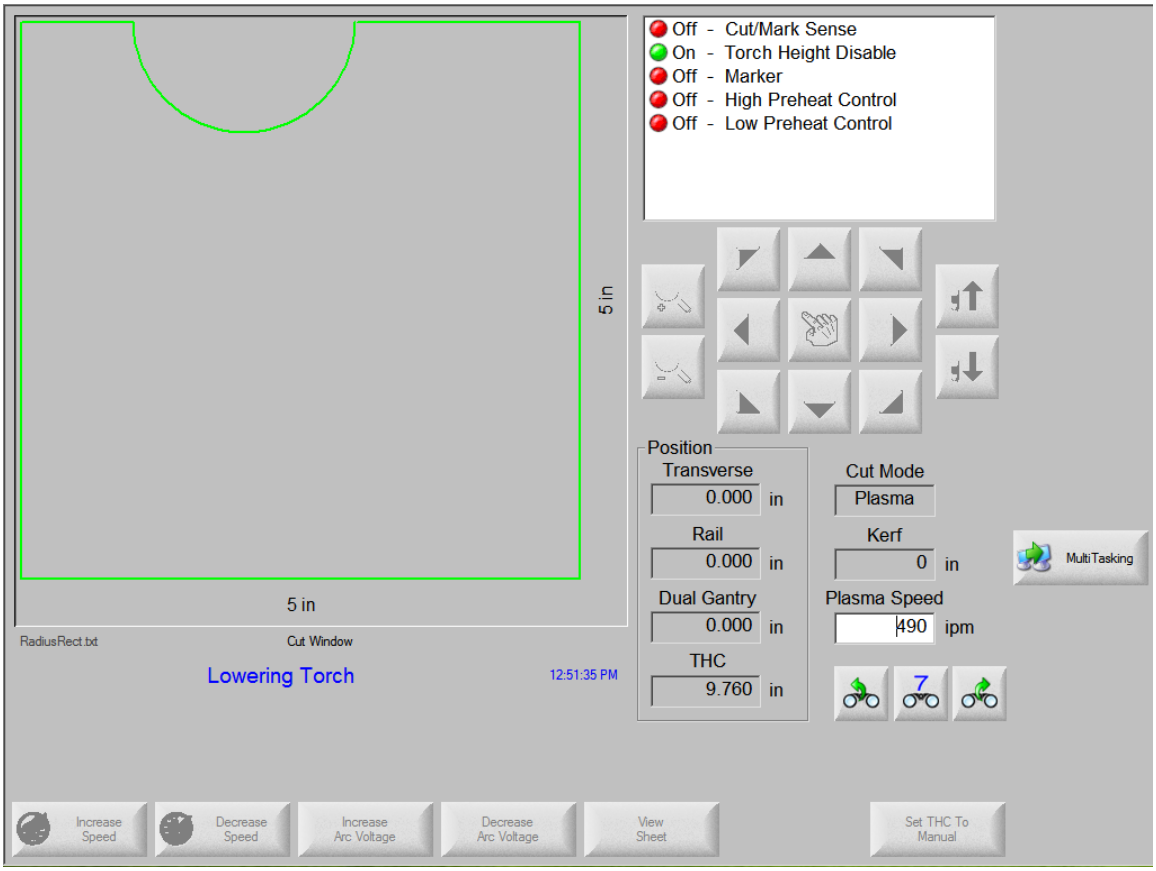
Arc Off Time	Specifies the amount of time to wait before indicating a lost cut signal. This delay helps minimize nuisance trips when the torch travels over previously cut paths in complex nested layouts.
Stop Time	Specifies the amount of time that motion pauses at the end of a cut. This pause allows the torch to raise completely and clear cut irregularities before advancing to the next cut segment.
Accel Delay	Delays the activation of the Automatic Voltage Control so the cutting table can reach a steady cutting speed. This parameter should be set as low as possible without allowing the torch to dive excessively at the beginning of a cut.
Retract Delay Time	Specifies the delay between the end of the cut signal and retracting the torch.
Ignition	Enables the Ignition output to ignite the plasma torch. If your plasma system requires a separate ignition signal, select On. If your system does not require a separate ignition signal, select Off.
Voltage Control	Allows the operator to select manual or automatic mode for the Command THC. Manual mode disables the torch height control and allows the torch to cut at the specified cut height and voltage. Automatic mode allows the THC to command the torch up and down to maintain the voltage at a specified set point.
Retract Full/Partial	Selects a full or partial retract distance for the torch. In the Full retract mode, the torch retracts to the Home position. In Partial retract mode, the torch retracts to the set retract distance.
Retry On Transfer Fail	Specifies the number of times the CNC attempts to fire the torch if the torch fails to ignite.
Transfer Time	Specifies the amount of time to attempt ignition of the torch. The ignition is confirmed by the Arc Sense Input (Arc on Feedback) to the CNC.
Set Arc Current	Allows the user to set the arc current at the plasma supply. This feature uses the “Set Current BCD” output from the CNC to activate the BCD inputs at the plasma supply and supports EIA RS-274D part program code G59 V*value* F*value* for setting current.
Corner Current Percent	Allows the operator to improve cut quality at corners by selecting a reduced current setting for cutting corners. This value is a percentage of the Set Current (above) and is active when the Torch Height Disable output is on.
Set Arc Voltage	Selects the necessary arc voltage for the material being cut.
Cut Height	Selects the desired cut distance from the plate and sets the initial cut height before Arc Voltage control is activated.
Retract Distance	Selects the THC Retract Distance when partial retract mode is

	configured.
Pierce Height Factor	Is a factor that is multiplied by the Cut Height value to set the distance for the pierce height.
IHS Stall Current	Sets the lifter downward force to detect when the torch makes contact with the plate during the IHS cycle. This is a relative factor between 1 and 10. The limited stall force is always used if nozzle ohmic sense is turned off.
IHS Speed	Sets the lifter downward speed during the IHS cycle. This is a relative factor between 1 and 10.
Homing Speed	Determines the retract or homing speed. This is a relative factor between 1 and 10.
Nozzle Ohmic Contact	Select On for the Command THC when using Ohmic Contact Sense to detect the plate during the IHS cycle.
Preflow During IHS	Select On to activate preflow during the IHS cycle.
Auto Kerf Detect	Select On to reduce the possibility of the torch diving into the plate. When this feature is enabled, the THC detects sudden changes in arc voltage when it crosses a kerf path and freezes the THC.

Command THC Main Cut Screen

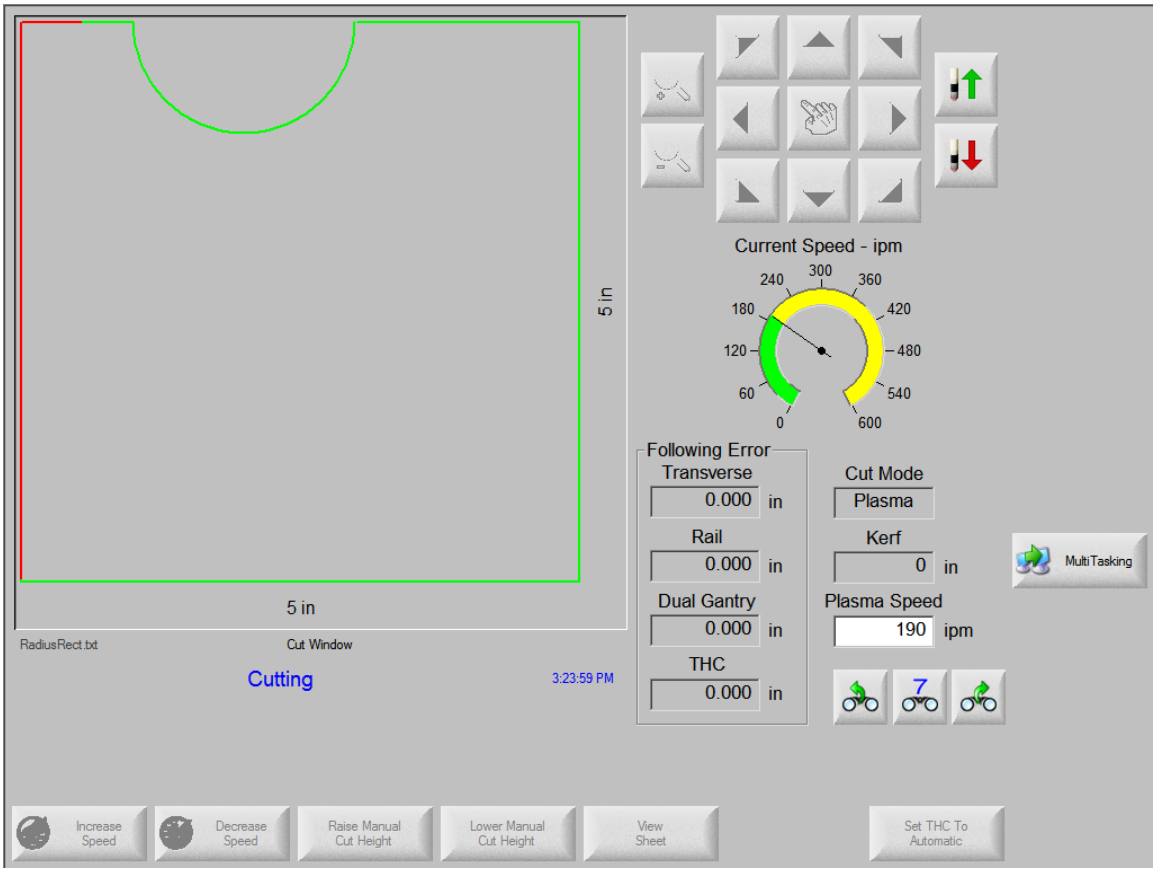
You can operate the Command THC in automatic or manual mode.

Automatic THC Mode



Increase/Decrease Arc Voltage	These two soft keys display on the main cut screen while the Command THC is operating in automatic mode. These soft keys allow you to increase and decrease the Arc Voltage for the cut.
Extend	Press this soft key during the pierce cycle to extend the pierce timer until it is stopped either by the Set-Now or Release soft key.
Set Now	Press the Set Now soft key to end the pierce cycle and save the new pierce time. The Set Now soft key is often used in with the Extend soft key to modify the preset pierce time.
Release	Press the Release soft key to end a pierce cycle without modifying the original pierce time. The original pierce time is saved for the remaining pierces.

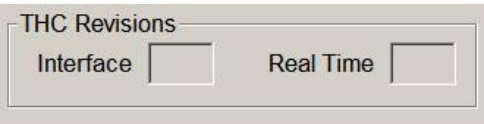
Manual THC Mode



Raise/Lower Torch	These two soft keys, display on the main cut screen while the Command THC is operating in Manual mode. These soft keys allow you to raise and lower the torch for the cut.
Extend	Press this soft key during the pierce cycle to extend the pierce timer. To stop the timer, press either the Set-Now or Release soft key.
Set Now	Press the Set Now soft key to end the pierce cycle and save the new pierce time. The Set Now soft key operates with the Extend soft key to modify the preset pierce time.
Release	Press the Release soft key to end a pierce cycle but keep the original pierce time.
Diagnostics	

Machine Interface

The current Command THC Interface and Real Time Revision Levels are displayed at the Control Information screen when it is enabled.



Warning! Configure the port for RS-422 operation before connecting to the Command THC. The Command THC Link must first be enabled on the Machine Setup screen for Type “P” controls and on the Station Configuration screen for type “V” controls. For more information on configuring the serial port for RS-422 communication, refer to the Serial Ports chapter of the *Installation and Setup Manual*.

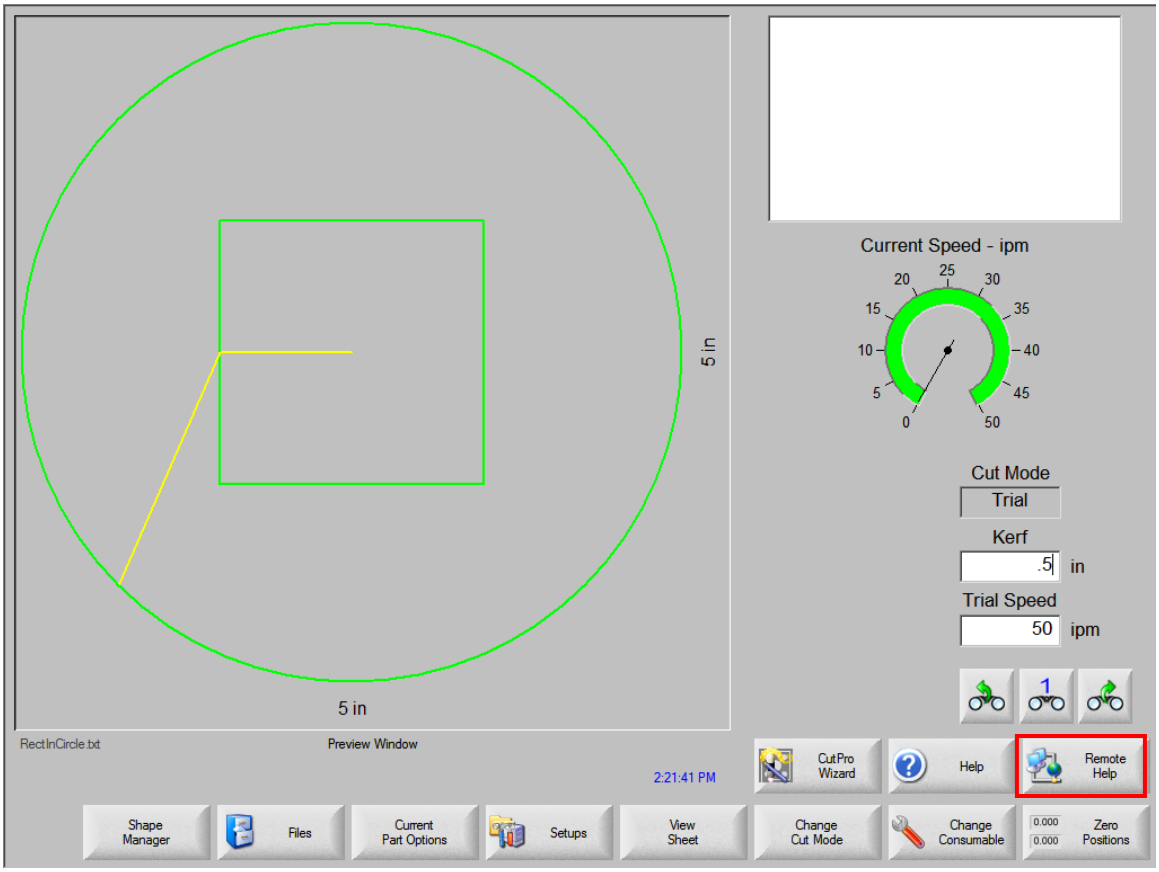
Diagnostics and Troubleshooting

The following sections describe tools that you can use to diagnose and troubleshoot your CNC and Phoenix software.

Remote Help

Remote Help allows up to 15 computers or CNCs to be connected in a single internet session, in which local touch screen, mouse, and keyboard control, as well as screens, files, and chat information can be passed between all 15 members.

Remote Help insures system security by using a secure connection to the central SharedView service. If firewall protections require it, SharedView can also use secure https. In addition, only screen data is shared so viruses cannot be transmitted during sessions. The CNC has virus protection software preinstalled. If you are using the Handouts feature you should verify that all the other computers that download the file also have virus protection software installed.



Installing Shared View

To install SharedView on a CNC:

1. Press Remote Help.
2. Press Yes to indicate that you want Remote Help.
3. Press Yes to download SharedView.
4. On the Microsoft website, press the Shared View download field.
5. Press Run on the Free Download popup window.
6. Press Run on the Internet Explorer Security Warning popup.
7. Select Accept on the SharedView Service Agreement and press Next.
8. Remove all checks from the boxes on the SharedView setup window and press Install.
9. Press Finish after the setup is complete.
10. Close the Internet Explorer window after SharedView is intalled.

To install SharedView on a PC:

1. Enter the following URL in your browser's Address field: http://www.sharedview.com.
2. On the Microsoft website, press the Shared View download field.
3. Press Run on the Free Download popup window.
4. Press Run on the Internet Explorer Security Warning popup.
5. Select Accept on the SharedView Service Agreement and press Next.
6. Remove all checks from the boxes on the SharedView setup window and press Install.
7. Press Finish after the setup is complete.

Using Remote Help

A certified technician is required to administer a Remote Help session. Before you launch Remote Help, contact your machine manufacturer or a certified technician to request a session. Include the email address of all participants.

To use Remote Help from the console or PC:

1. At the CNC, press the Remote Help button on the Main screen.
   At a PC, launch SharedView using Windows.
2. Click or press Yes on the message popup that asks if you need Remote Help.
3. Click or press Yes to use the on-screen keyboard.
   This is helpful for users at a CNC who have no keyboard.
4. When you receive an email from the Remote Helper with the session name and password, press or click Join a session.
5. Enter the session name and password from the Remote Helper.
6. When the session is created, click or press Join Now.
7. Click Share.

8. Click Share Entire Desktop to share the CNC with the Remote Helper.
   Note: If your CNC or PC does not have the latest version of SharedView, an upgrade message pops up and you can upgrade.
9. When the Remote Helper requests control, click or press Allow on the message popup.
   Note: If you click anywhere on the screen after this step, the Remote Helper loses control and must request it again.
10. Click or press the message field at the top of the SharedView screen to enter text messages to other participants.
11. To share files, click or press on Handouts and add or download a handout.

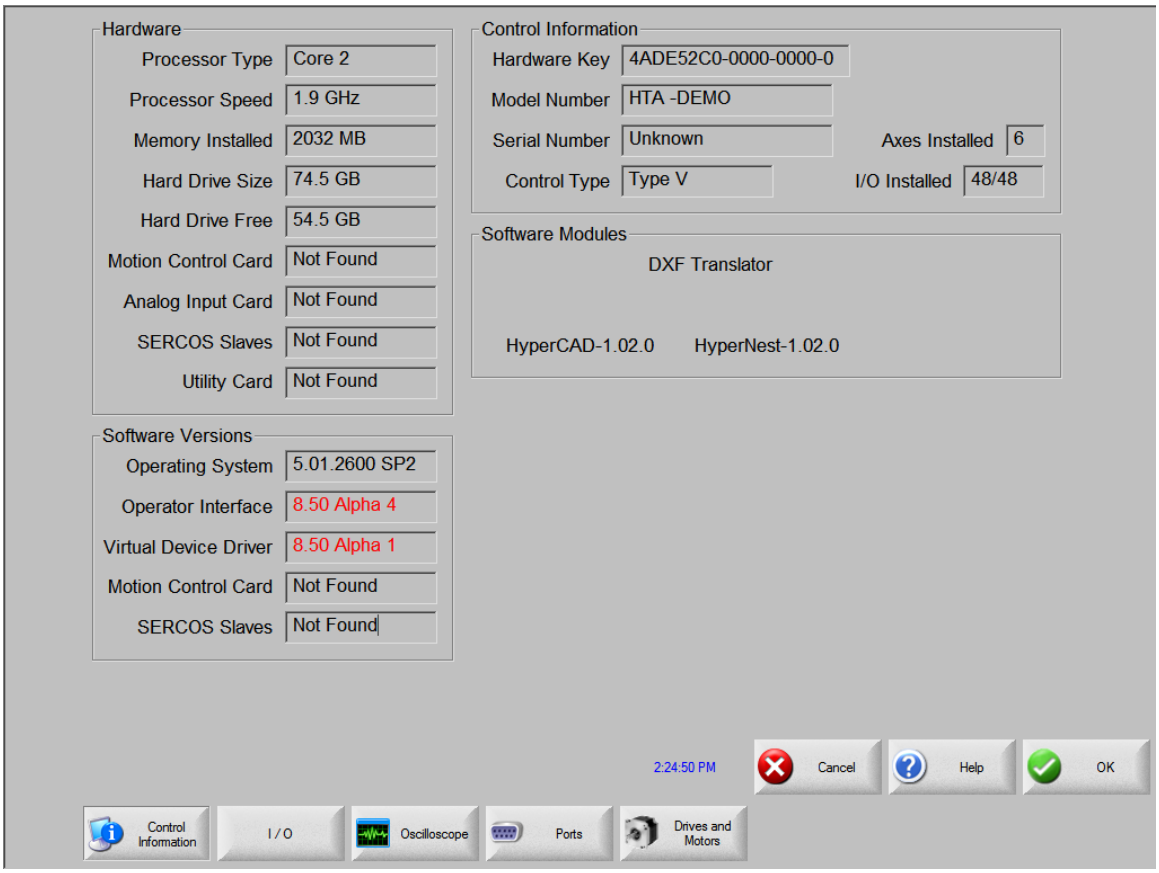
Notes:

- The Remote Helper is not allowed to control motion unless the CNC is in forced simulation mode or is a demo version of software running on a desktop. However, the Remote Helper can view motion that is controlled by the user.
- If a user loses the on-screen keyboard:
    1. Press Remote Help.
    2. Press Yes to use the same session.
    3. Press Yes to use the on-screen keyboard.

CNC Information

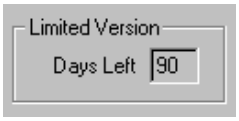
This screen displays the current software versions and hardware configuration of the CNC. You must provide this information if you contact the factory for support.

From the Main screen, select Setups > Diagnostics > Control Information.

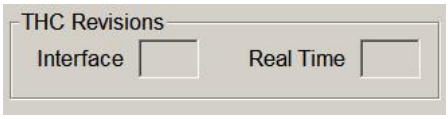


Hardware	The Hardware section shows the current hardware configuration which includes the Processor Type, Processor Speed, Memory Installed, Hard Drive Size, Hard Drive Free Space and Motion Control Card revision.
Software Versions	The Software Versions section shows the current version of the CNC's operating system, operator interface (software version), virtual device driver and the motion control card software.
Control Information	The control Information section displays the hardware key number, the CNC model number, serial number, control I/O type, axes enabled and I/O enabled.
Software Modules	The Software Modules information displays the optional software that has been installed, such as DXF Translator, McAfee VirusScan Software, or NJWIN font Viewer. If a number appears after the name of a software option, a timer is associated with this software and the number lets you know how many days/uses remain.
Voltage	System Voltages at the motherboard are displayed for motherboards

	equipped with this monitoring feature.
Temperature	Temperature at the motherboard is displayed for motherboards equipped with this monitoring feature.
Fans	Fan speeds at the motherboard are displayed for motherboards equipped with this monitoring feature.
Limited Version	The Limited Version information is displayed if the CNC is operating on a trial version of the software. The version of software is available for 90 days. Contact your CNC vendor to have this timer reset.



Control Days Left	Appears only when a timer has been set up on the Control Information screen to limit the number of days that the Phoenix software is valid, for example when a limited version upgrade has been installed. Contact your OEM to have this timer reset.
OEM Days Left	A timer that the OEM can set on the Phoenix software on the Control Information screen. Contact your OEM to have this timer reset.
THC Revision	The current Command THC Interface and Real Time Revision Levels are displayed at the Control Information screen when enabled.

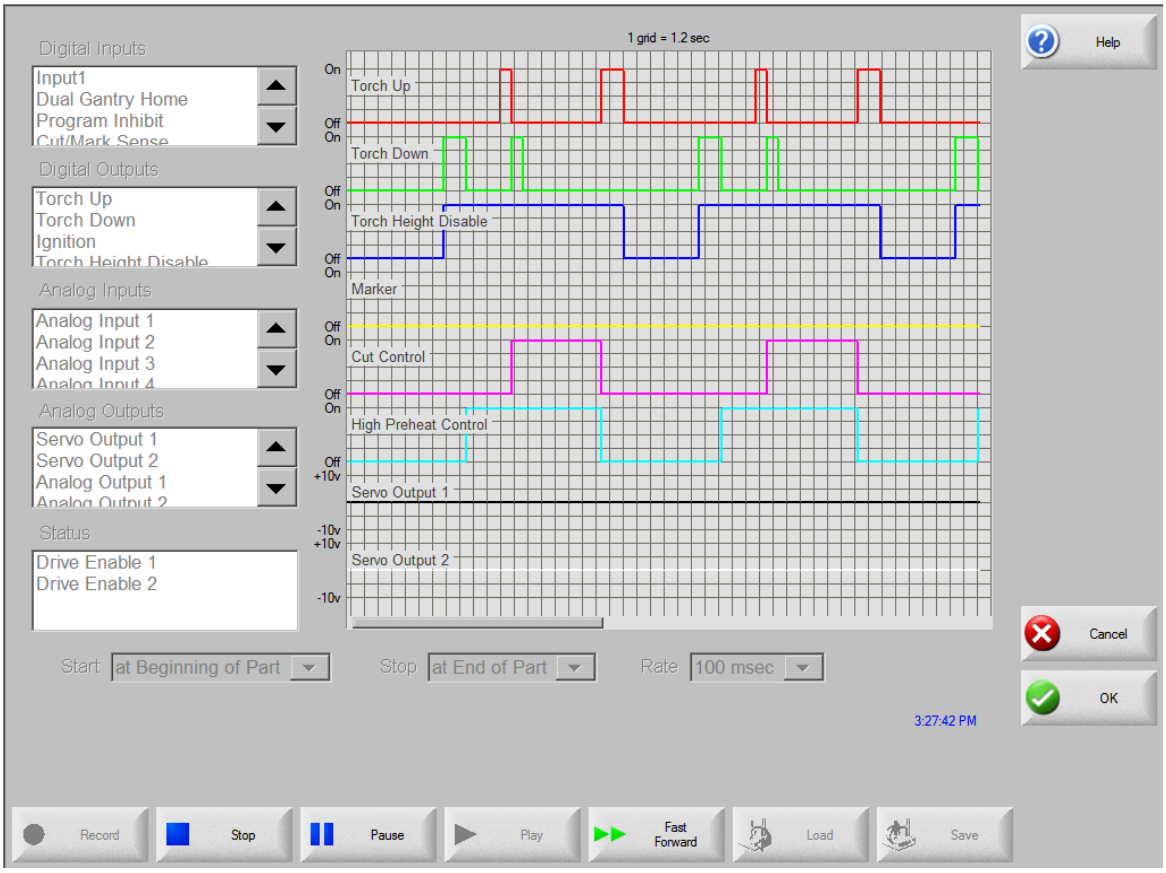


System Diagnostics	Press the System Diagnostics soft key to access the touch screen calibration utility for tuning touch screen response.

Using the Oscilloscope Function

You can use the Oscilloscope to log I/O, servo output voltage to the drive amplifiers, analog inputs, and drive status while the CNC is operating. The grid represents the time rate in which the function is recording data.

You can set up the Oscilloscope to help you understanding an issue with an input or output or to log a function and then provide a visual representation of the log file.



To create an Oscilloscope log:

1. Double click on an item in the scroll boxes on the left of the screen to add it to the Oscilloscope grid. You can add up to eight items.
2. To remove an item from the grid, double-click on it in the appropriate scroll box.
3. In the Start dropdown list, select when you want the Oscilloscope to begin recording.
4. In the Stop dropdown list, select when you want the Oscilloscope to end recording.
5. In the Rate dropdown list, select the intervals at which the Oscilloscope to record the data you selected.

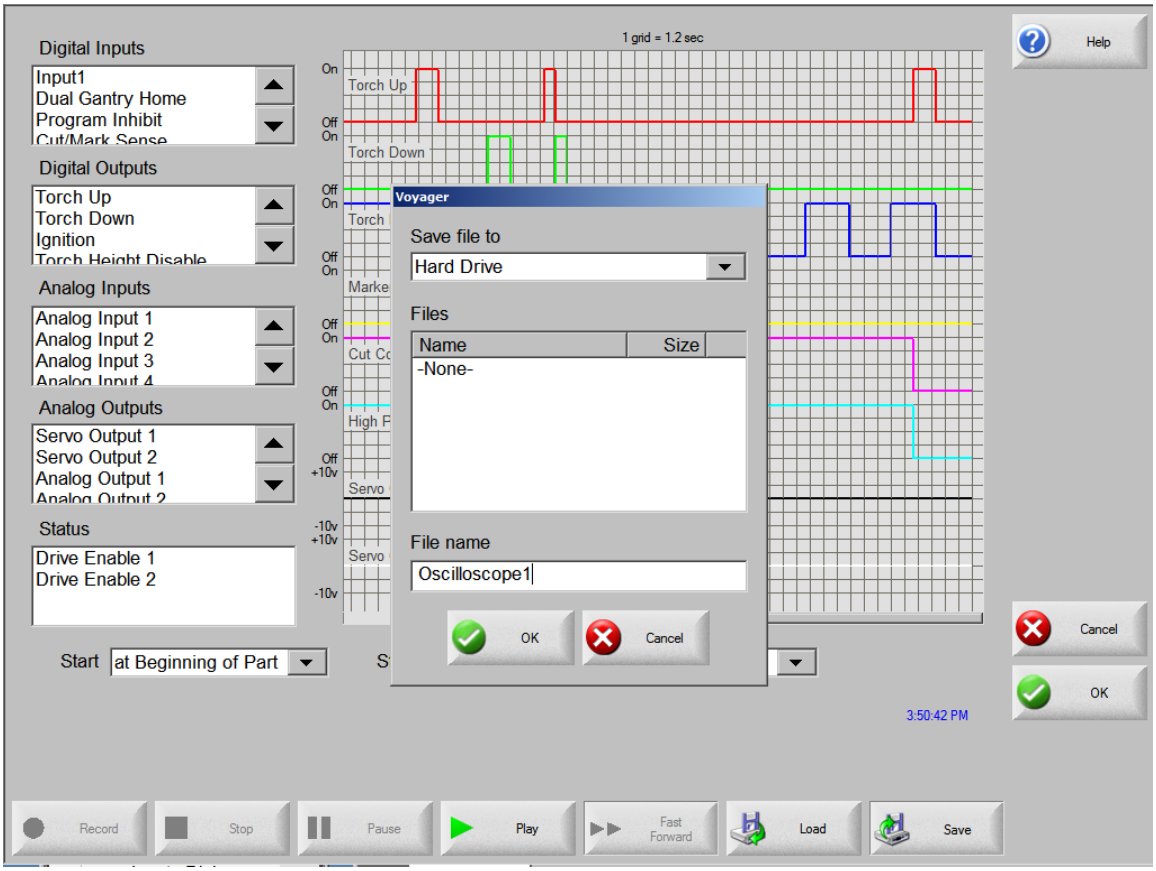
Saving the Oscilloscope File

When you are finished with a test, you can save the log file so you can use it later.

If you have created a function that starts recording at the beginning of a part program and ends at the last cut off, the file will be overwritten when the next part program is started. Be sure to save the file before executing the next nest.

To save the log file:

1. Press the Save soft key.
   The window where you enter file information opens.
2. Select the device where you want to save the file from the Save file to dropdown list.
3. Enter a name for the file in the File name field.
4. Press or click OK.



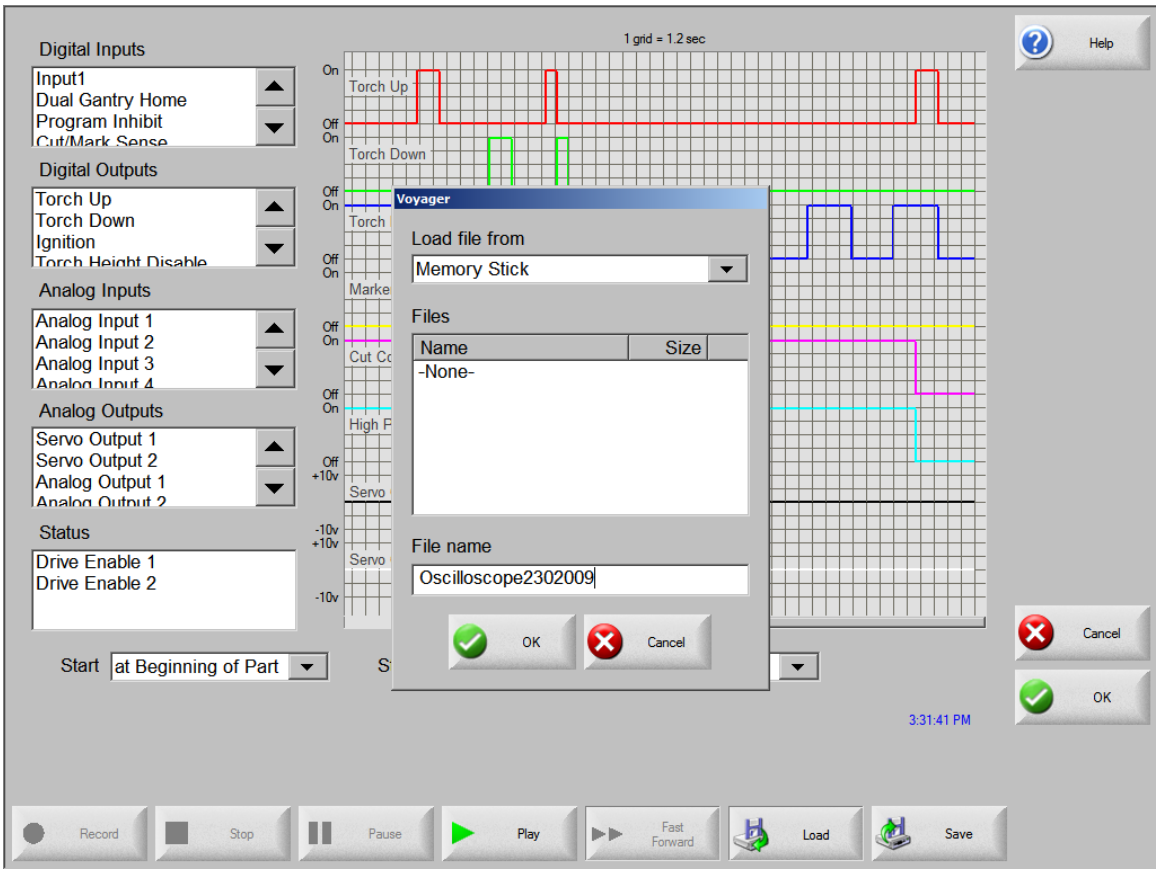
Loading an Oscilloscope File

After you have saved an Oscilloscope file, you can reload it and play it back on the CNC. This is the only way you can view this type of file.

In addition, a technical support organization can develop a customized log file for your operation, save it, and email it to you. You can load this customized file onto your CNC, and execute the function.

To load an oscilloscope log file:

1. Press Load on the Oscilloscope screen.
   The window where you enter file information opens.
2. Select a device from the Load file from dropdown list.
3. Enter the name of the file you want to load in the File name field.
4. Click or press OK.



Viewing an Oscilloscope File

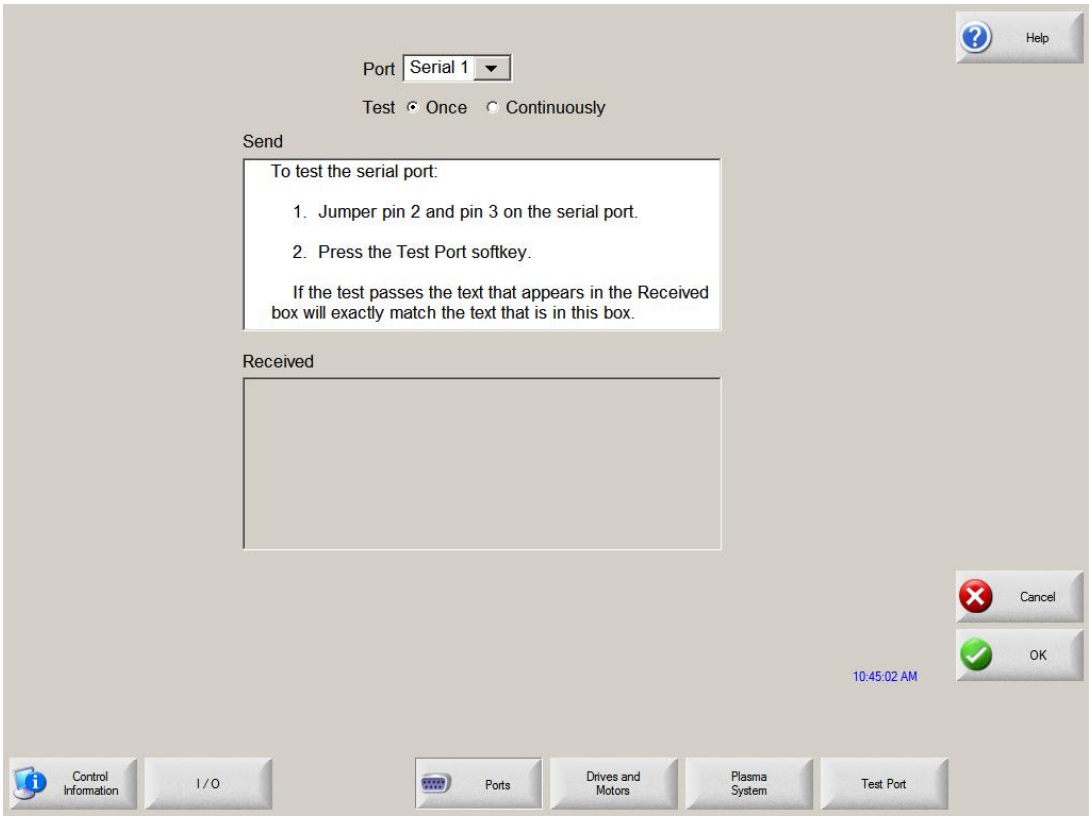
After you create and save a log file, you can replay it for diagnostics and troubleshooting.

To play an Oscilloscope log file:

1. Reload the file using the steps in the previous procedure.
2. Use the soft keys at the bottom of the screen to control the file:
   - Press Play to start the file.
   - Press Stop to end the file.
   - Press Pause to stop the file temporarily.
   - Press Fast Forward to speed up the file.

Serial Port

This diagnostic screen allows you to test the CNC serial ports.



To perform the test:

1. Install the appropriate jumper or jumpers.
   - If the serial port you are testing is configured for RS-232, jump pin 2 to pin 3.
   - If you are testing a serial port that is configured for RS-422, jump pin 2 to pin 3 and pin 4 to pin 7.
2. Select the appropriate serial port to test.
3. Press the Test Port soft key to initiate the test.
   - If the serial port is functioning properly, the text in the Send window will appear in the Received window.
   - If the serial port is not functioning properly, a Communications Time Out message will appear below the Received window.
   - If the serial port test fails, the CNC may be defective and the factory should be consulted for further instructions.

Port	Select the port that you want to test.
Test	Select a single or continuous signal to send for testing.

Send window	Contains the text that will be transmitted during the serial port test.
Received window	Displays the text that is received during the serial port test. If the test is successful, the text in the Send and Received windows is the same.
Test Port	Initiates the serial port test on the selected port.

Plasma System

After serial link communication has been established between the power supply and the CNC, I/O and remote diagnostics screens are accessible through the standard Diagnostic screen. You can view status for the plasma supply software revision, gas pressure, usage, I/O and remote tools.

Test Preflow	Tests the preflow gases at the power supply. This feature is used to set the inlet gas pressures under normal flow conditions to the recommended level.
Test Cutflow	Tests the cutflow gases at the power supply. This feature is used to set the inlet gas pressures under normal flow conditions to the recommended level.
Test Gas Console	Performs automated tests for the AutoGas console. Contact an authorized service agent for use of these tests.
Coolant Override	Overrides a coolant error and tests the coolant pump. This is useful for bypassing the error and purging the coolant line of air bubbles at initial power up.
Inputs	Displays inputs to the plasma supply or gas console.
Outputs	Displays the current status of the outputs from the plasma supply or gas console. **Note:** Outputs for the supply cannot be activated through the diagnostic screen.
HPR Information	Status items for the plasma supply are available on the Information screen.

Error Messages

The CNC displays error messages when programming, machine, or internal errors are detected.

A number of different errors can be posted from the SERCOS Interface for both motor and I/O performance. The error messages are specific to the drive and I/O modules in use. Refer to information supplied by the drive and I/O hardware supplier for the appropriate actions.

SERCOS Ring Not Running
This error indicates that communication with the SERCOS ring has been lost. Generally, this is caused by a fault condition on the ring. Check SERCOS hardware, SERCOS software settings, and cycle power.

No Part Loaded
This message displays if the CNC does not contain a valid part program in memory. To clear this error message, load a valid part program from either the Shape Library, hard drive, diskette USB memory, or from a host system.

Part Larger than Plate
This message displays if the part program that has been loaded is larger than the plate size information in Setups. The operator can ignore the message and continue the cut or return to Setups to correct the plate size.

Kerf too Large, Arc/Line has Disappeared. Abort Cut?
This message displays if the kerf size selected is too large and will affect the shape of the part. The operator can continue to cut the part, abort the cut to review the kerf that was selected, or abort the cut to review the part program for errors. If the operator chooses to continue cutting the part program that prompted this error, unexpected results can result.

Cut Sense Lost
This message displays if the Arc ON Feedback setup parameter is enabled and the Cut Sense input is deactivated by the plasma unit while cutting. When this condition occurs, the CNC displays the Pause screen. The operator can then use the Cut Recovery feature to finish cutting the piece.

Communications Time Out
This message displays if the host system does not respond within the time set in the Link Time Out field for either a Host Upload or Download.

To correct this problem:

Increase the Link Time Out setup parameter.
Check the communications setup parameters on the host system and the CNC.

Host Not Responding

This message displays if communication to the Host system is lost after initial communication has been established.

To correct this problem:

Re-establish communications to the host by exiting and re-entering the Upload or Download to Host screens.
Review the communications setup parameters on the Host system and the CNC.

Scale Factor must be between .001 and 1000
This message displays if a value less than .001 or greater than 1000 is entered for a Scaling Factor.

To correct this problem, enter a value between .001 and 1000 for the Scaling Factor.

Radius at Arc Beginning and Radius at Arc End are not within the Arc Radial Error Tolerance
This message displays if the radius beginning-arc and the radius-ending arc of a part program are not within the Arc Radial Error setup parameter in the Main Setup screen.

To correct this problem:

Increase the Arc Radial Error Tolerance setup parameter.
Correct the part program itself.

Transverse Position Error Exceeded
This message displays if the current Transverse position error exceeds the Servo Error Tolerance Setup parameter in the machine setups screen. This message also displays if the position feedback loops are not operating properly, or the machine is being commanded to move or accelerate faster than it is able.

Generally, this error is displayed if the setting for Incremental or Absolute EIA I and J codes is set to the wrong state for the active part program. To correct this problem:

Increase the Servo Error Tolerance Setup parameter in the machine setups screen.
Re-tune the system.
Decrease the Maximum machine speed setup or acceleration rate setup parameters.

Rail Position Error Exceeded
This message displays if the current Rail position error exceeds the Servo Error Tolerance Setup parameter in the machine setups screen. It can also appear if the position feedback loops are not operating properly or if the machine is being commanded to move or accelerate faster than it is able.

This error generally indicates a servo drive or motor problem. To correct this problem:

Check for fault indications on the servo drives.
Increase the Servo Error Tolerance Setup parameter in the machine setups screen.
Re-tune the system.
Decrease the maximum machine speed setup or acceleration rate setup parameters.

Dual Gantry Position Error Exceeded

This message displays if the current Dual Gantry position error exceeds the Servo Error Tolerance Setup parameter in the machine setups screen. It also may appear if the position feedback loops are not operating properly or the machine is being commanded to move or accelerate faster than it is able.

This error generally indicates a servo drive or motor problem. To correct this problem:

Check for fault indications on the servo drives.
Increase the Servo Error Tolerance Setup parameter in the machine setups screen.
Re-tune the system.
Decrease the Maximum machine speed setup or the acceleration rate setup parameters.

Transverse Positive Hardware Overtravel Reached
This message displays if the CNC detects a positive limit switch in the Transverse axis. This can also occur if the limit switch input is set for the wrong polarity or the limit switch wiring is not properly connected.

This error generally indicates a servo drive or motor problem. First check for fault indications on the servo drives. If the Transverse axis tripped the positive limit switch, use Manual mode to jog the Transverse axis away from the limit switch.

Rail Positive Hardware Overtravel Reached
This message displays if the CNC detects a positive limit switch in the Rail axis. This can also occur if the limit switch input is set for the wrong polarity or the limit switch wiring is not properly connected.

If the Rail axis tripped the positive limit switch, use Manual mode to jog the Rail axis away from the limit switch.

Transverse Negative Hardware Overtravel Reached
This message displays if the CNC detects a negative limit switch in the Transverse axis. This can also occur if the limit switch input is set for the wrong polarity or the limit switch wiring is not properly connected.

If the Transverse axis tripped the negative limit switch, use Manual mode to jog the Transverse axis away from the limit switch.

Rail Negative Hardware Overtravel Reached
This message displays if the CNC detects a negative limit switch in the Rail axis. This can also occur if the limit switch input is set for the wrong polarity or the limit switch wiring is not properly connected.

If the Rail axis tripped the negative limit switch, use Manual mode to jog the Rail axis away from the limit switch.

Transverse Positive Software Overtravel Reached
This message displays if the Transverse axis position is greater than the Maximum Travel Limit setup parameter for the Transverse axis.

If this occurs, use Manual mode to jog the Transverse axis to a position within the Travel Limit setup parameters.

Rail Positive Software Overtravel Reached
This message displays if the Rail axis position is greater than the Maximum Travel Limit setup parameter for the Rail axis.

If this occurs, use Manual mode to jog the Rail axis to a position within the Travel Limit setup parameters.

Transverse Negative Software Overtravel Reached
This message displays if the Transverse axis position is less than the Minimum Travel Limit setup parameter for the Transverse axis.

If this occurs, use Manual mode to jog the Transverse axis to a position within the Travel Limit setup parameters.

Rail Negative Software Overtravel Reached
This message displays if the Rail axis position is less than the Minimum Travel Limit setup parameter for the Rail axis.

If this occurs, use Manual mode to jog the Rail axis to a position within the Travel Limit setup parameters.

Dual Gantry Skew Error Exceeded
This message displays when the CNC has detected a position error fault between the two drive axes on the dual gantry. It also may appear if the position feedback loops are not operating properly, or the machine is being commanded to move or accelerate faster than it is capable.

To correct this problem:

Increase the Skew Error Tolerance Setup parameter in the machine setups screen.
Re-tune the system.
Decrease the maximum machine speed or the acceleration rate setup parameters.

Need Station Selection
This message displays if the input for a station or process has not been activated. Example: When cutting in Plasma mode, a Plasma 1 or Plasma 2 input may be required to execute the selected Plasma cut process.

Buffer Time Out
This message displays if there is an instance where the motion buffer is full and cannot record the data being saved. This error allows the operator to stop the motion, back up on path to the last pierce and start over without a position error. This error should be reported to the CNC vendor.

CNC Time Out
This is a general error that may appear if there is an instance when any buffer is full and cannot record the data being saved. This error allows the operator to stop the motion,

back up on path to the last pierce and start over. This error should be reported to the CNC vendor.

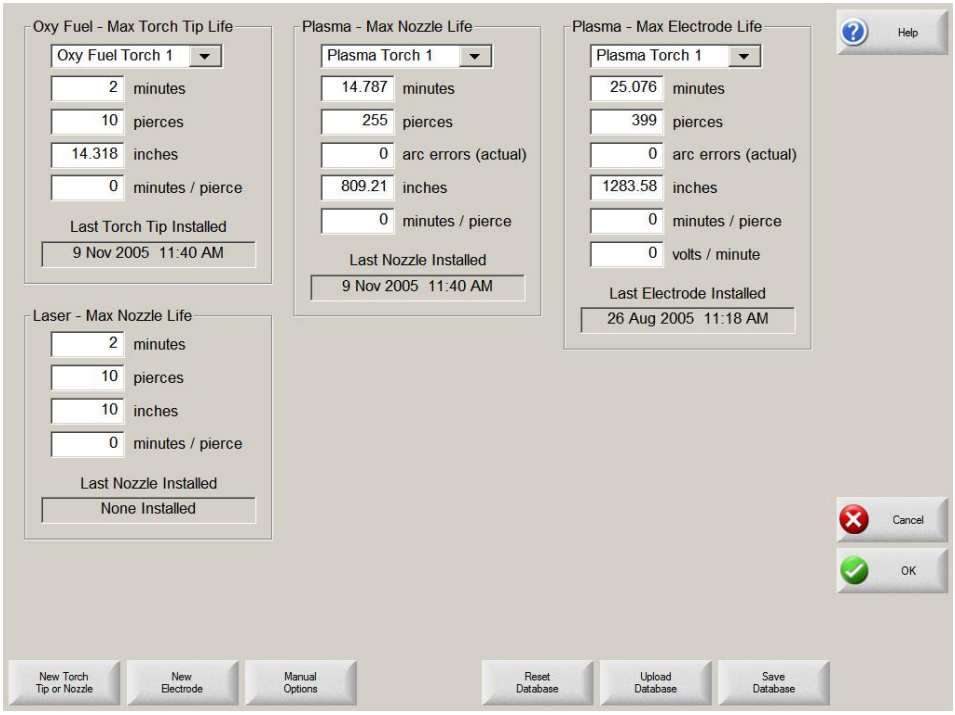
Unable to Find HASP

The HASP is a hardware protection key (dongle) that enables the software. If the HASP is not installed, the CNC will not work. If this message appears and the hardware key is in place, contact your CNC vendor for assistance.

Changing Consumables

This screen tracks consumable life data for statistical analysis. In addition, the feature can prompt the operator that a consumable has reached its expected life by using an output from the CNC to activate an indicator such as an indicator lamp or audible alarm. This feature allows the operator to change the consumable and avoid a consumable failure that can affect cut quality or damage the torch.

Note: This Change Consumable feature can only track consumable life data and offer features related to that data. The CNC cannot detect consumable condition or failures.



If the New Torch Tip or New Electrode soft key is pressed every time a torch tip or electrode is changed, the last information for the corresponding consumable will be added to a database. This database shows the date a consumable was changed and how long it lasted in minutes, pierces, inches and millimeters.

To reset the current consumable value, press the New Tip/New Electrode button. Select the torch tip or electrode to be updated. The value of the tracking information is reset to zero and starts counting up as you cut in the selected mode. The “Installed on” date for the selected consumable is updated and the current values for the selected consumable are recorded, with the date, in a database that can be saved to disk.

In addition, you can set up a Watch Window to view this data during cutting.

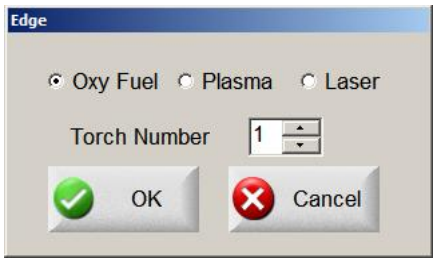
The consumable information that is updated (Oxy torch 1-12 / Plasma torch 1-8) is determined by the “Station Select 1-20” inputs.

In the previous example, Plasma Torch #1 torch tip has a limit of 5000 minutes of operation. After 5000 minutes, the Change Consumable output becomes active and is indicated with a lamp or audible alarm. The intent is to set the limits at an expected life

value of the consumable so that the operator is reminded to change the consumable when it has reached its expected life.

The data collected on the consumable life automatically updates to the new highest value. In the previous example, the new maximum value could extend above 5000 minutes when the new value is reached so the value would increase to 5001 and continue. This auto update feature can be disabled in the password protected Special Setups screen.

Minutes	The estimated life in time that the torch tip or electrode lasts. This value increases to the maximum life achieved or a maximum value can be entered.
Pierces	The estimated life in pierces that the torch tip or electrode lasts. This value increases to the maximum life achieved or a maximum value can be entered.
Inches/ millimeters	The estimated life in distance that the torch tip or electrode lasts. This value increases to the maximum life achieved or a maximum value can be entered.
Minutes per Pierce	Piercing causes additional wear on the consumables. This parameter allows the user to enter a value which is added to the overall minutes value for each pierce, providing a more accurate representation of overall consumable wear.
Arc Errors	Actual Arc Errors can be tracked using the Arc Error Input to the CNC from the Plasma supply. The power supply indicates an Arc Error when the Plasma Arc did not achieve a long-life ramp down. The Arc Error input to the CNC is through the HD4070 serial communication or through the discrete Arc Error input.
Volts per Minute	The Volts per Minute parameter allows the user to enter a value that is used to change the cut Arc Voltage, based on the number of minutes that have elapsed while cutting in Plasma mode. This value adjusts the Voltage offset value. **Note:** This feature is only available for systems configured with the Sensor THC.
Last Torch Tip Installed	Displays the date and time when the selected tip was installed.
Last Electrode Installed	Displays the date and time when the selected electrode was installed.
New Torch Tip	Press the New Torch Tip soft key to select which Torch Tip has been replaced and to update the database.



New Electrode — Press the New Electrode soft key to select which Electrode has been replaced and to update the database.

Setups — Press the Setups soft key to access the CNC setups and adjust the cutting process.

Reset Database — Resets the values in the database on the CNC and clears the torch tip or electrode information after uploading or saving the database.

Upload Database — Uploads the current database to a host computer running our link.

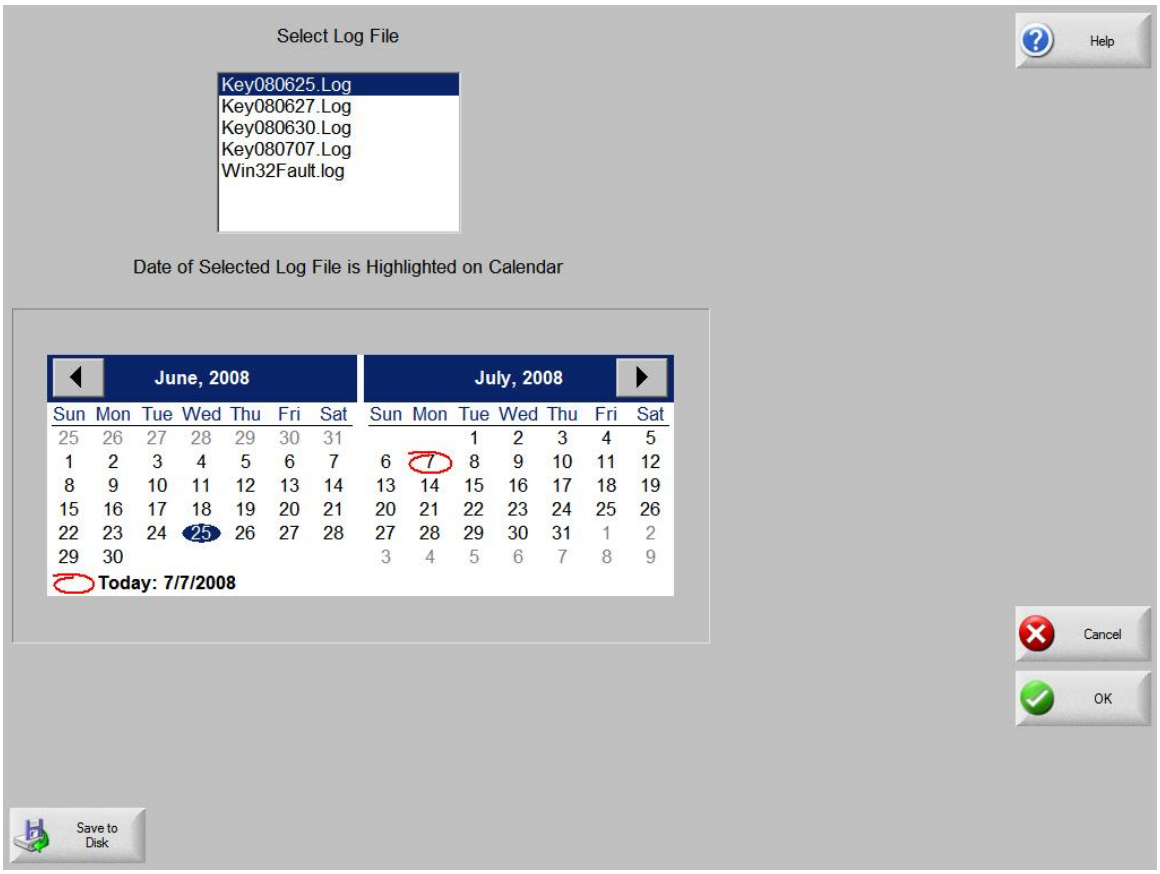
Save Database — Saves the current database to the diskette or USB memory stick.

Saving the Key Log to Disk

If the Key Logging feature is enabled on your system, is can be used as a diagnostic tool to record key presses that are made at the CNC. When this feature is enabled, all key preses and application faults are saved in a daily log file that can be sent to the CNC manufacturer for evaluation.

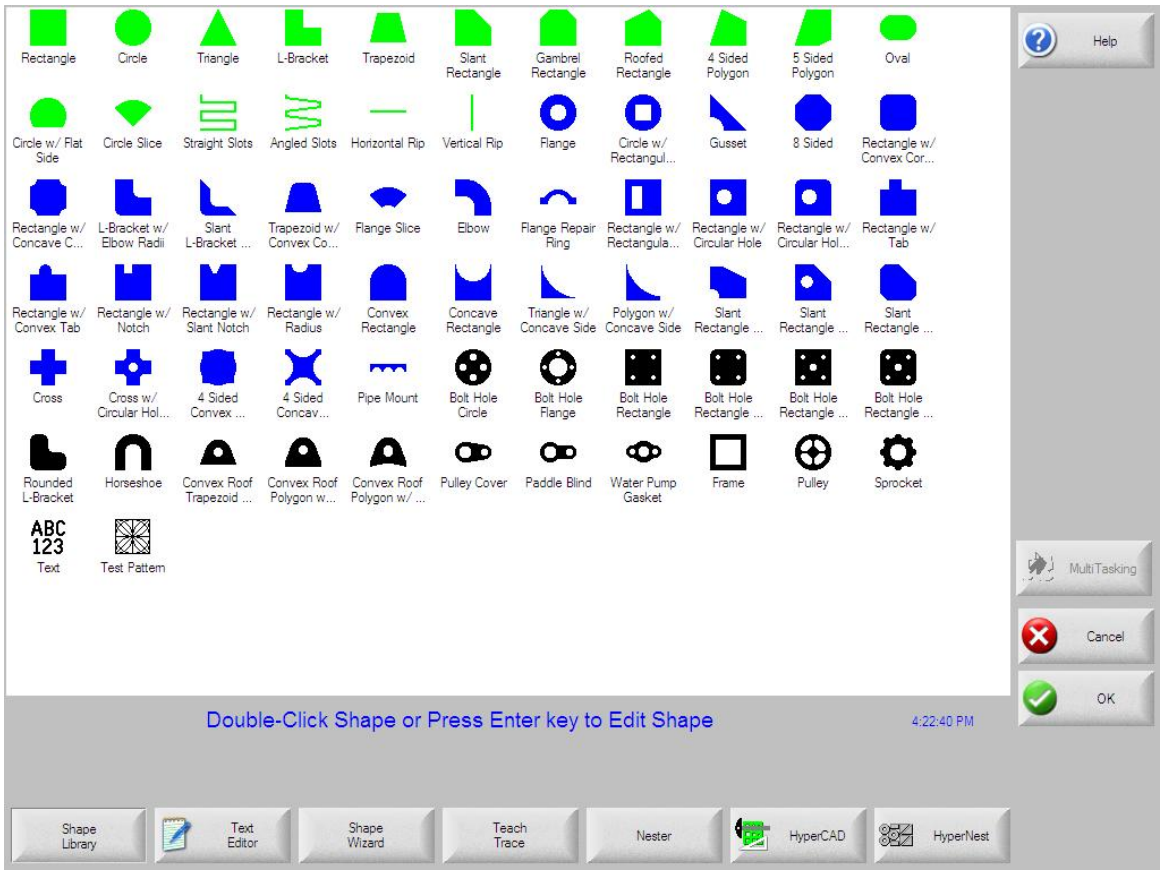
To save a key log to disk:

1. From the Main screen, select Files > Save Log to Disk.
2. On the Log File screen, select a file from the Select Log File list. The date of the file is highlighted on the calendar below.
3. Press or click Save to Disk.

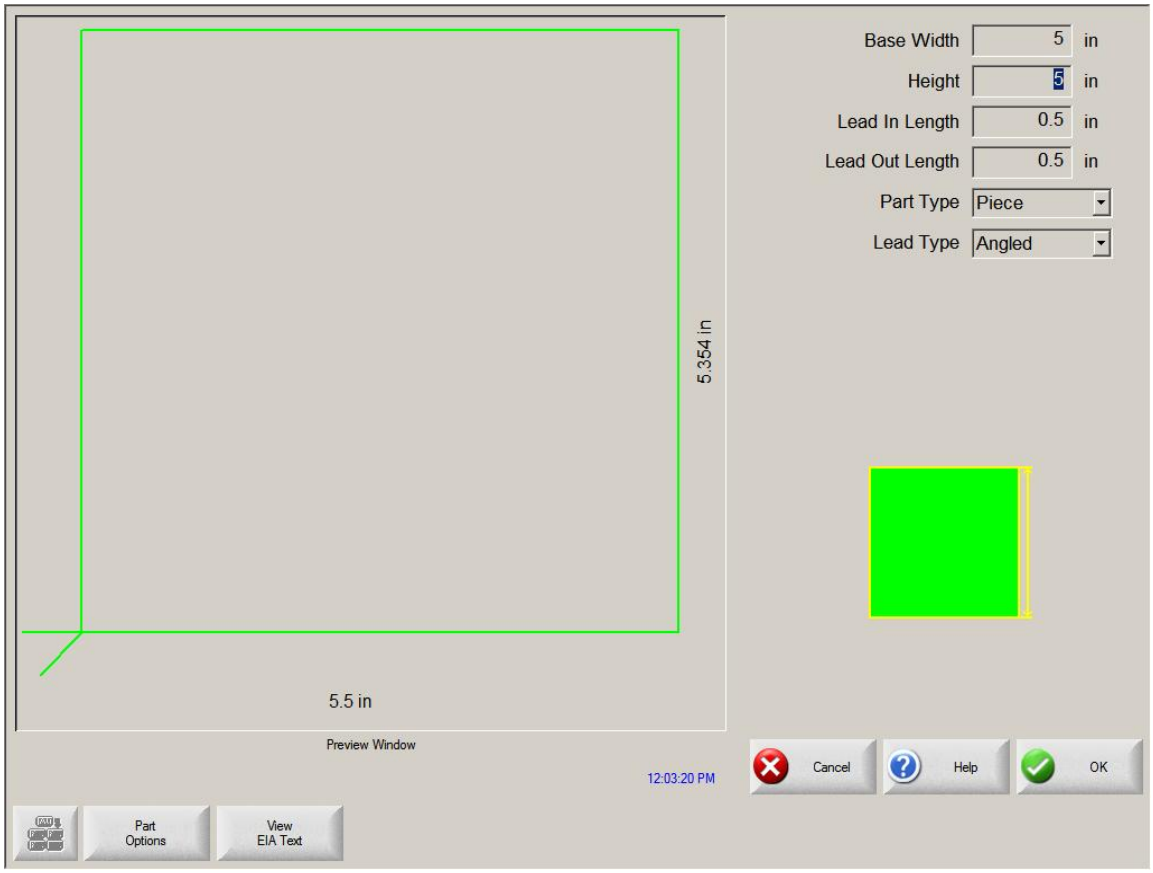


Appendix A: Library Shapes

Double-click on a shape to edit it.



Rectangle



Library Shape Setup

Enter the correct dimensions to create the part you require. There is a small Help icon in the lower right hand corner of the display to indicate which parameter the control is looking for. The current parameter is highlighted with a yellow arrow.

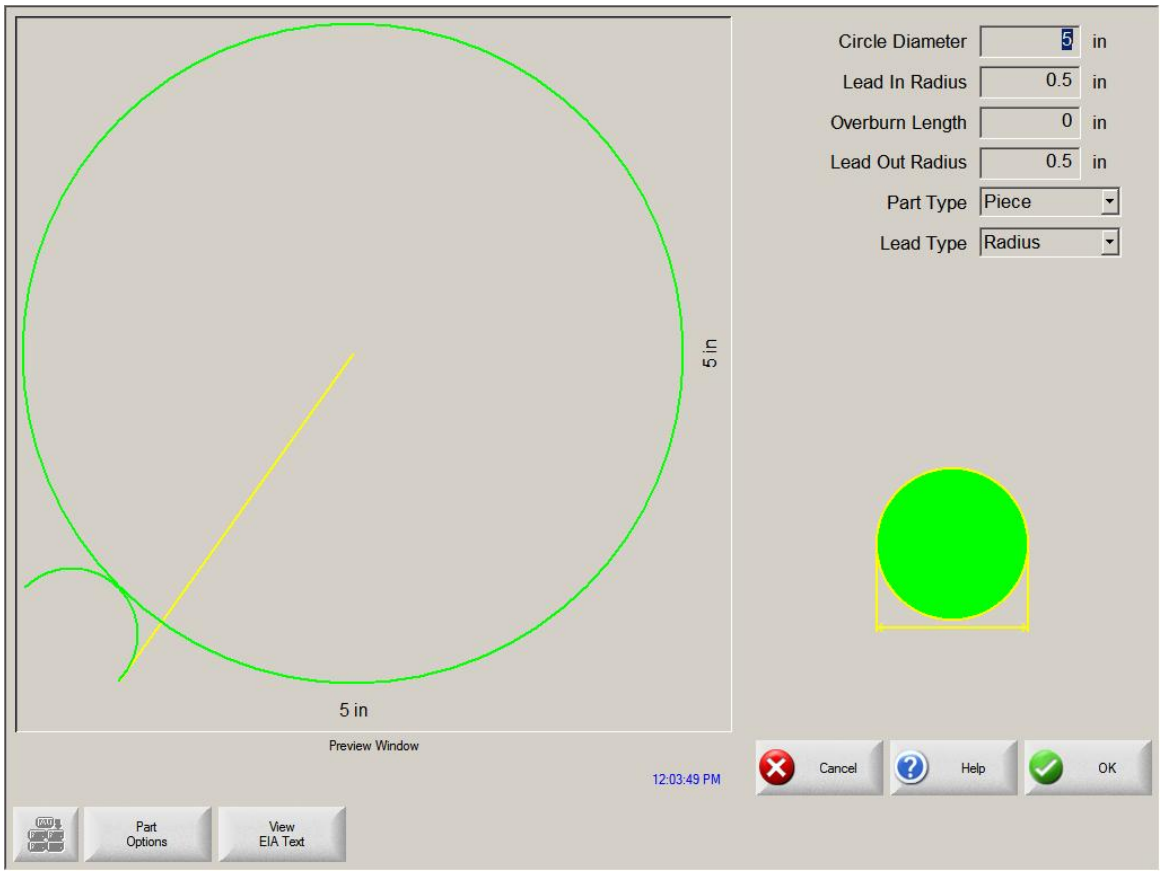
While you are entering parameters, the control is performing some general checks for proper geometries. If the control finds a set of parameters that conflict, a warning message is displayed and the parameters in conflict are highlighted in red.

Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Height	Enter the height of the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk. **Note:** the Rectangle simple shape has the ability to select the location for the lead-in and lead-out by pressing the Space key. Press the Space key to move the lead-in and lead-out to the next available location.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.
Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Circle



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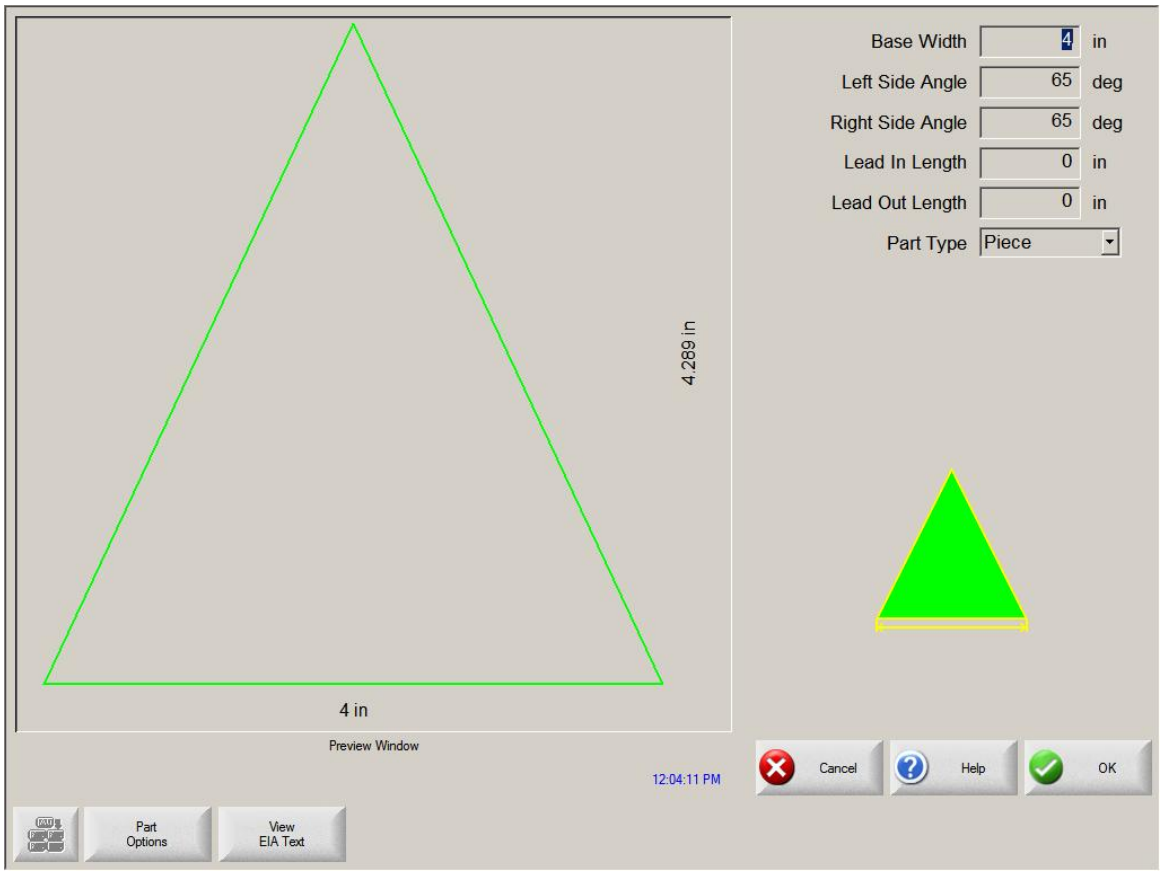
Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Circle Diameter	Enter the diameter of the part.
Lead In Radius	Enter the radius of the lead-in arc.
Overburn Length	Parts that contain a circular element use overburn. Overburn specifies the arc length that the torch will travel past the circle closure point. The dimension entered is the chord length of the overburn-arc. In some cases it is desirable to have an underburn length. For these conditions, enter a negative number for the overburn length.
Lead Out Radius	Enter the radius of the lead-out arc.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.
Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Triangle



Library Shape Setup

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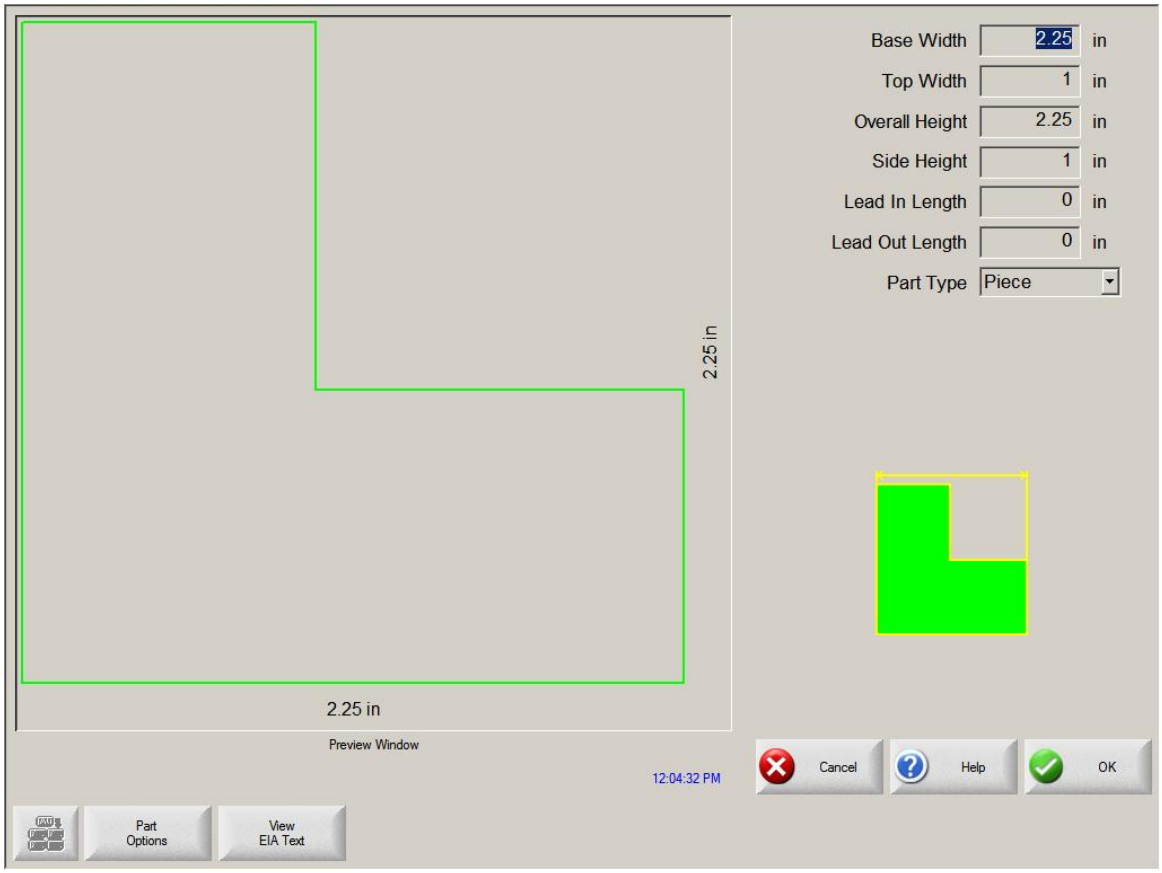
While you are entering parameters, the control is performing some general checks for proper geometries. If the control finds a set of parameters that conflict, a warning message is displayed and the parameters in conflict are highlighted in red.

Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Left Side Angle	Enter the number of degrees for the angle on the left side of the part.
Right Side Angle	Enter the number of degrees for the angle on the right side of the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths..

L-Bracket



Library Shape Setup

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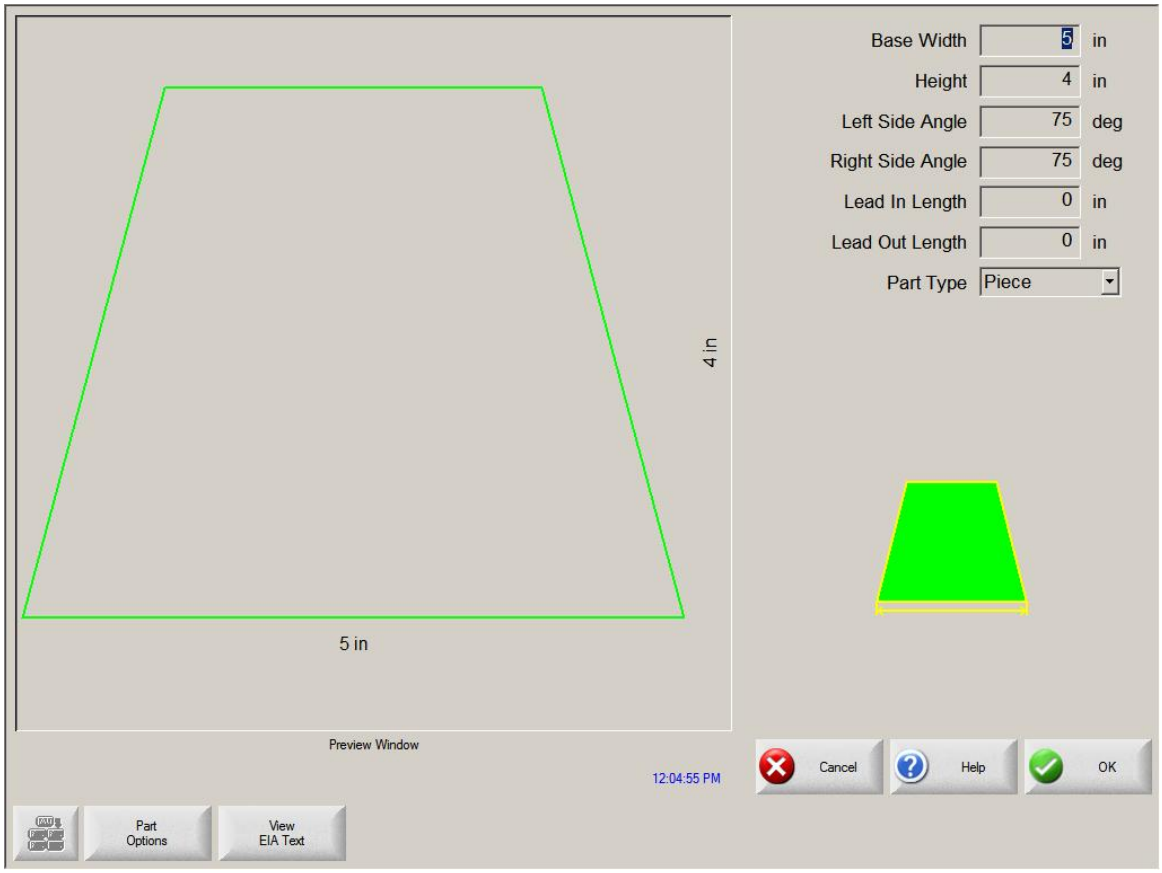
While you are entering parameters, the control is performing some general checks for proper geometries. If the control finds a set of parameters that conflict, a warning message is displayed and the parameters in conflict are highlighted in red.

Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Top Width	Enter the width of the top of the part.
Overall Height	Enter the height of the part from the base to the top.
Side Height	Enter the height of the shortest side of the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

Trapezoid



Library Shape Setup

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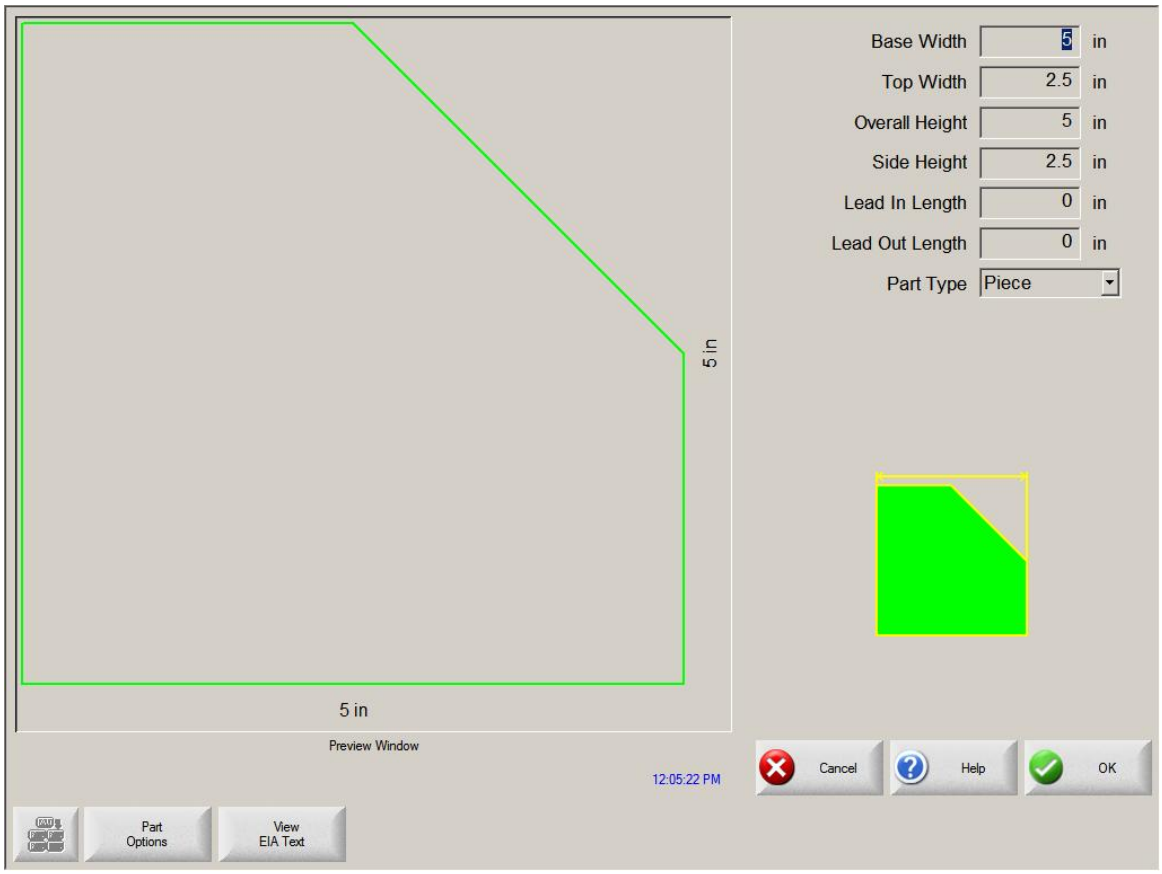
While you are entering parameters, the control is performing some general checks for proper geometries. If the control finds a set of parameters that conflict, a warning message is displayed and the parameters in conflict are highlighted in red.

Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Height	Enter the height of the part.
Left Side Angle	Enter the number of degrees for the left side angle of the part.
Right Side Angle	Enter the number of degrees for the right side angle of the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

Slant Rectangle



Library Shape Setup

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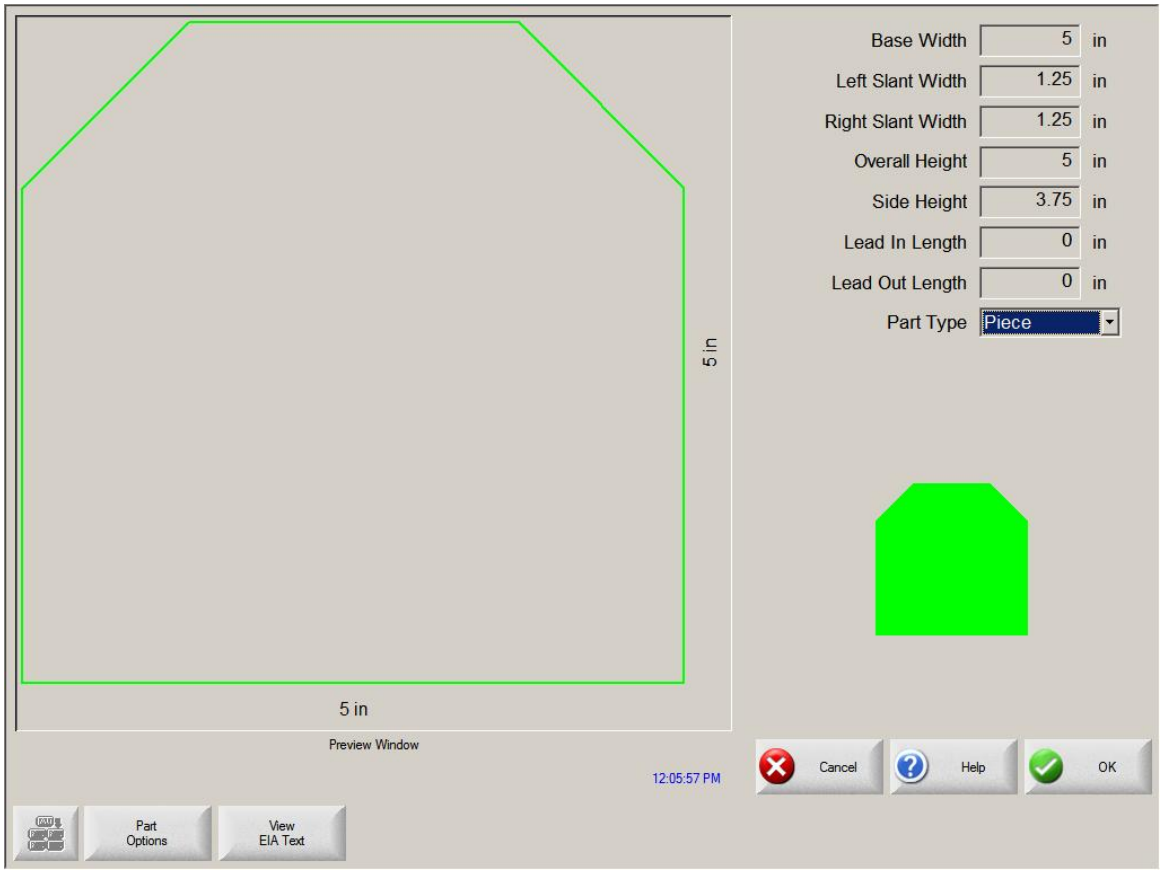
While you are entering parameters, the control is performing some general checks for proper geometries. If the control finds a set of parameters that conflict, a warning message is displayed and the parameters in conflict are highlighted in red.

Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Top Width	Enter the width of the top of the part.
Overall Height	Enter the height of the part from the base to the top.
Side Height	Enter the height of the shortest side of the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

Gambrel Rectangle



Library Shape Setup

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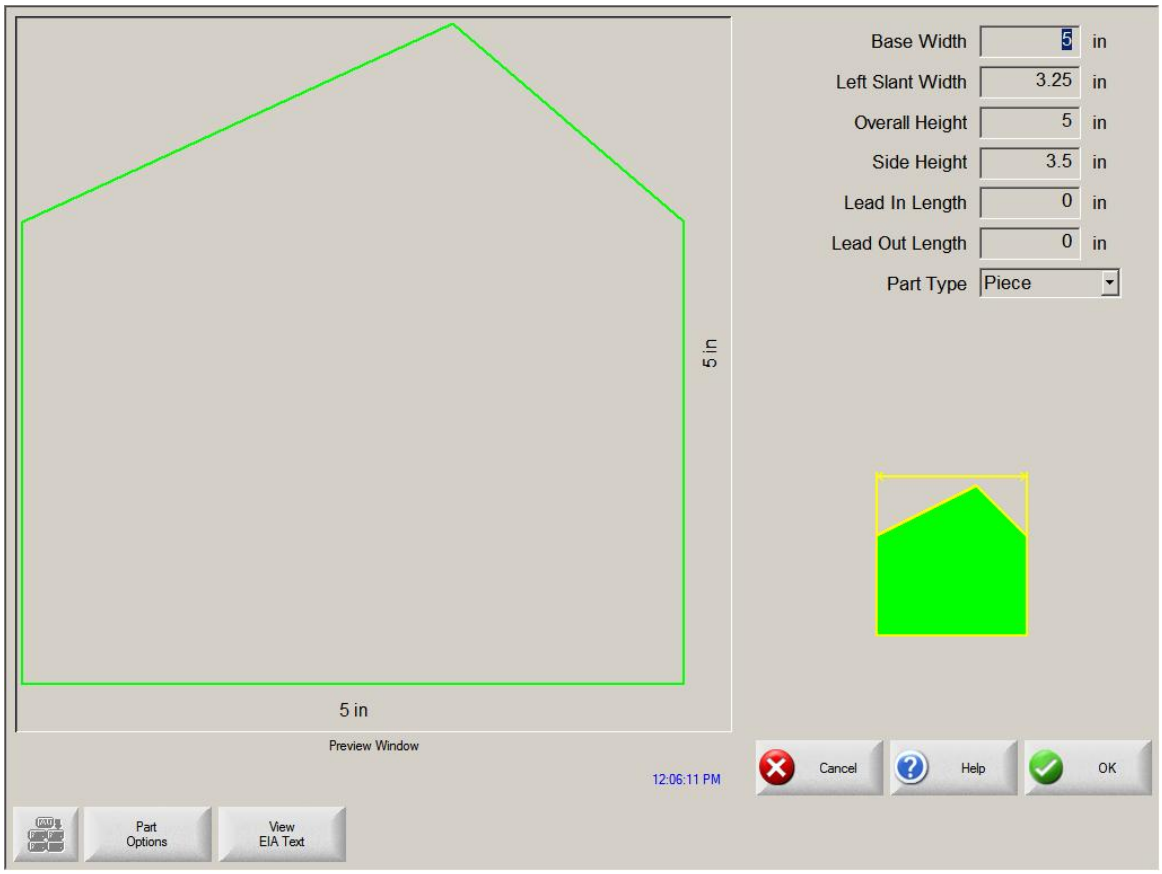
Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Left Slant Width	Enter the width (measured horizontally) of the left, slanted side of the part.
Right Slant Width	Enter the width (measured horizontally) of the right, slanted side of the part.
Overall Height	Enter the height of the part from the base to the top.
Side Height	Enter the height of the sides of the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

Roofed Rectangle



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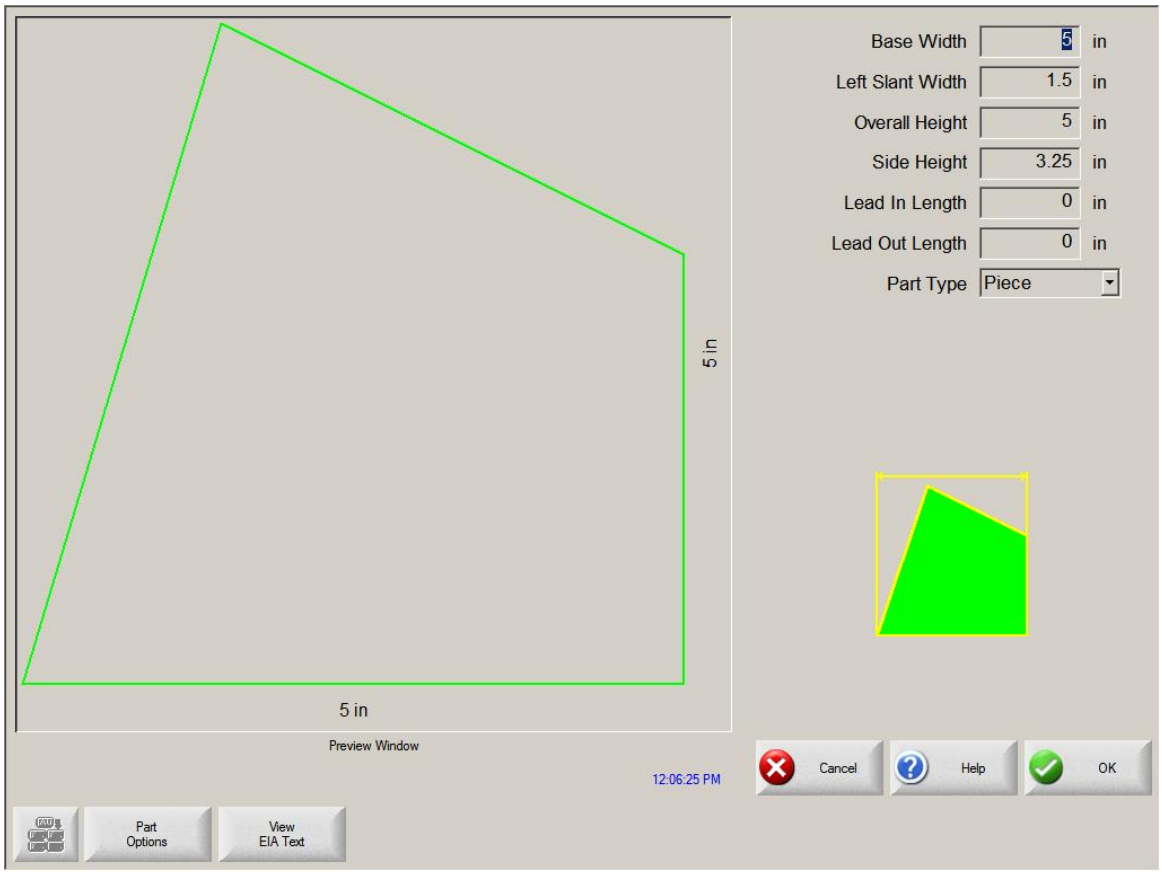
Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Left Slant Width	Enter the width (measured horizontally) of the left, slanted side of the part.
Overall Height	Enter the height of the part from the base to the point at the top.
Side Height	Enter the height of the sides of the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

4-Sided Polygon



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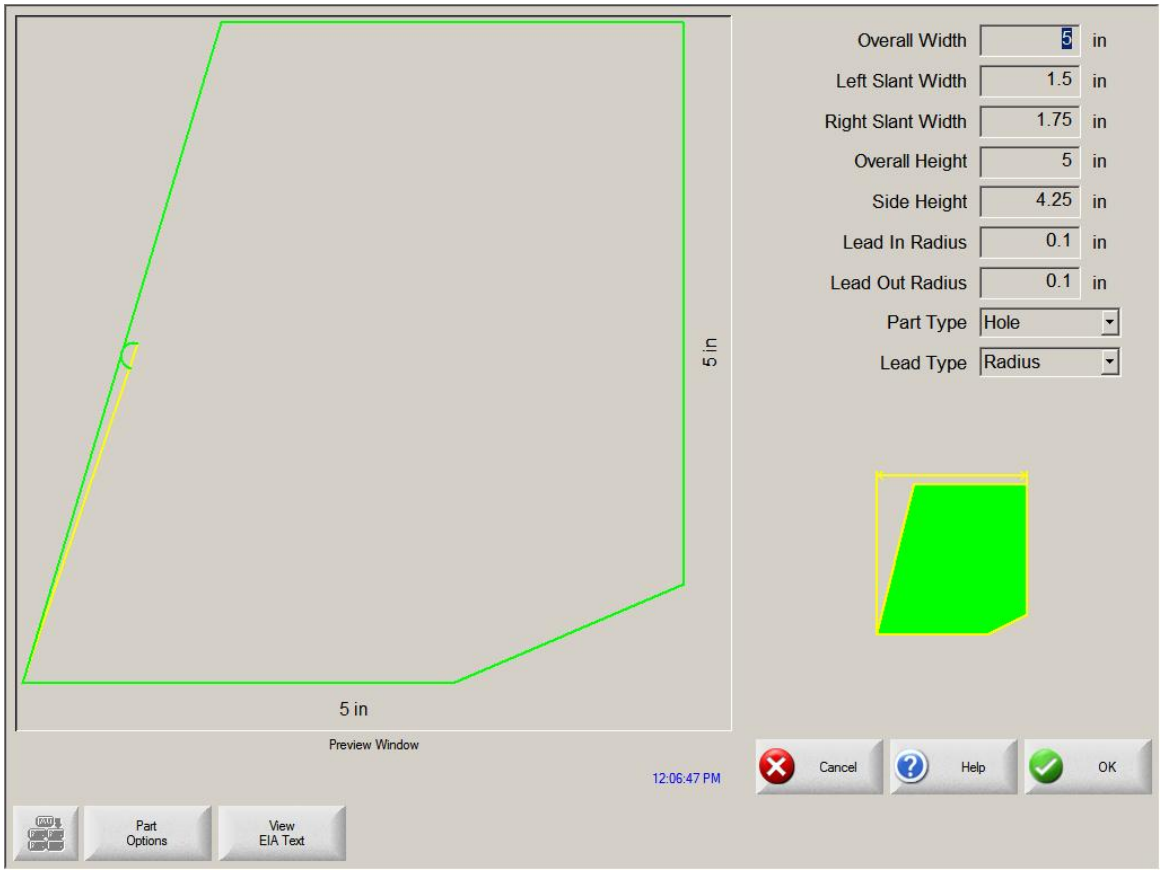
Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Left Slant Width	Enter the width (measured horizontally) of the left, slanted side of the part.
Overall Height	Enter the height of the part from the base to the point at the top.
Side Height	Enter the height of the sides of the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

5-Sided Polygon



Library Shape Setup

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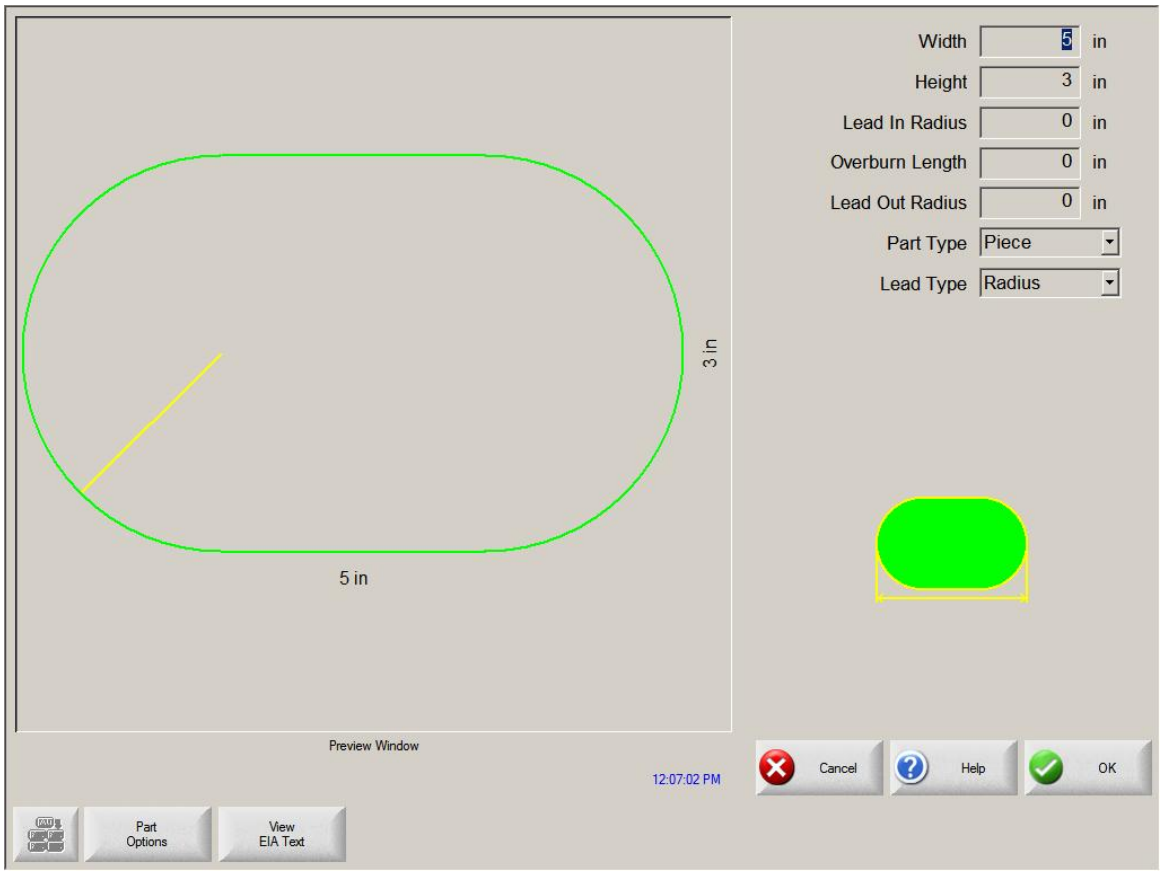
While you are entering parameters, the control is performing some general checks for proper geometries. If the control finds a set of parameters that conflict, a warning message is displayed and the parameters in conflict are highlighted in red.

Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Overall Width	Enter the width of the part.
Left Slant Width	Enter the width of the slant (measured horizontally) of the left side of the part.
Right Slant Width	Enter the width of the slant (measured horizontally) of the right side of the part.
Overall Height	Enter the height of the part, from base to top.
Side Height	Enter the height of the right side of the part.
Lead In Radius	Enter the radius of the lead-in arc.
Lead Out Radius	Enter the radius of the lead-out arc.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.
Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Oval



Library Shape Setup

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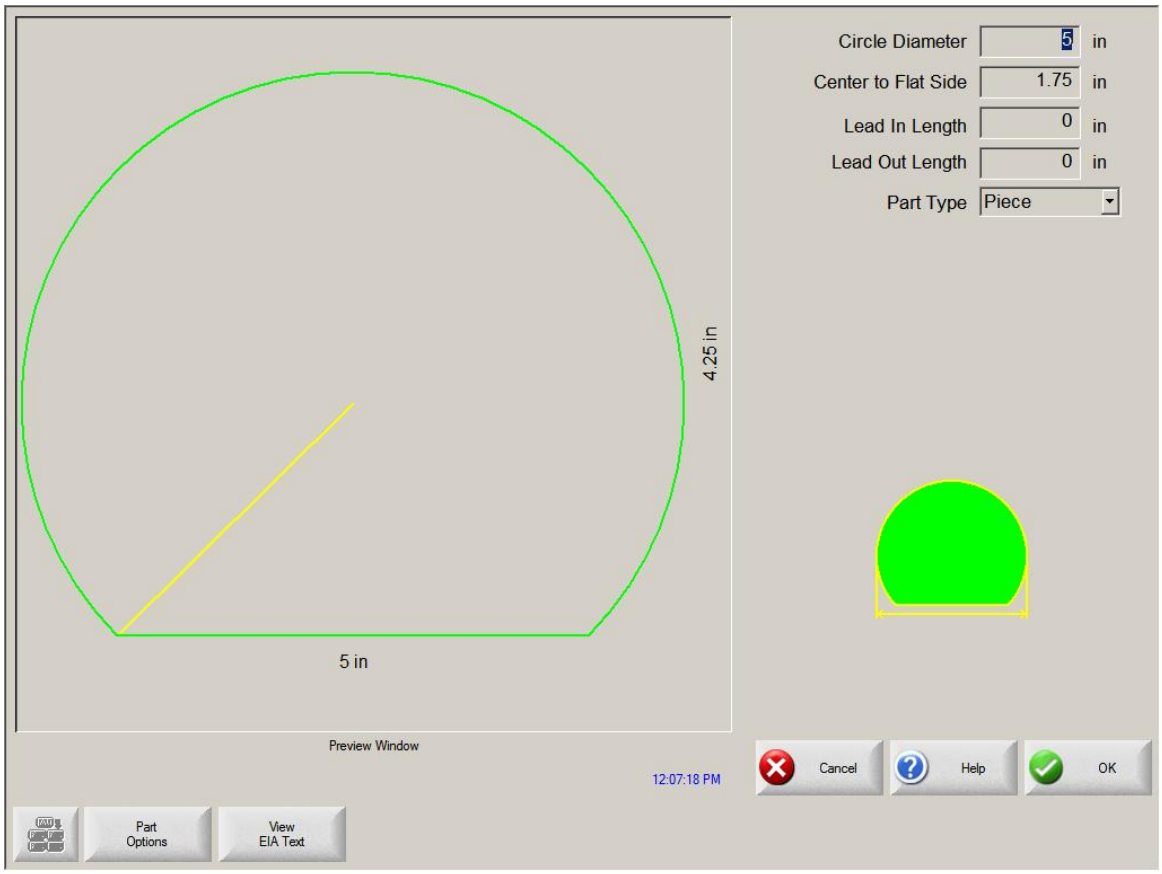
While you are entering parameters, the control is performing some general checks for proper geometries. If the control finds a set of parameters that conflict, a warning message is displayed and the parameters in conflict are highlighted in red.

Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Width	Enter the width of the part.
Height	Enter the height of the part.
Lead In Radius	Enter the radius of the lead-in arc.
Overburn Length	Parts that contain a circular element use overburn. Overburn specifies the arc length that the torch will travel past the circle closure point. The dimension entered is the chord length of the overburn-arc. In some cases it is desirable to have an underburn length. For these conditions, enter a negative number for the overburn length.
Lead Out Radius	Enter the radius of the lead-out arc.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.
Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Circle with Flat Side



Library Shape Setup

Enter the correct dimensions to create the part you require. There is a small Help icon in the lower right hand corner of the display to indicate which parameter the control is looking for. The current parameter is highlighted with a yellow arrow.

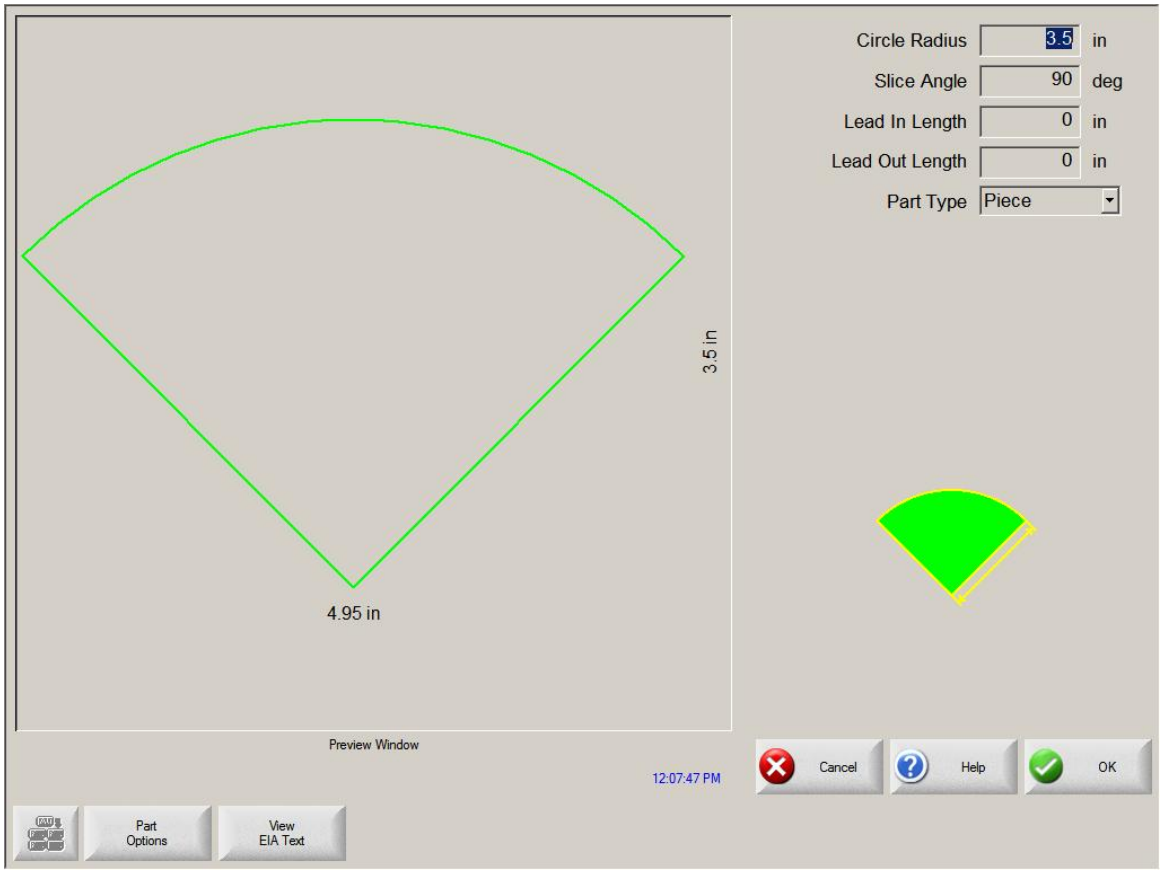
While you are entering parameters, the control is performing some general checks for proper geometries. If the control finds a set of parameters that conflict, a warning message is displayed and the parameters in conflict are highlighted in red.

Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Circle Diameter	Enter the length of the diameter of the part.
Center to Flat Side	Enter the distance from the center to the flat side of the part.
Lead-In/Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

Circle Slice



Library Shape Setup

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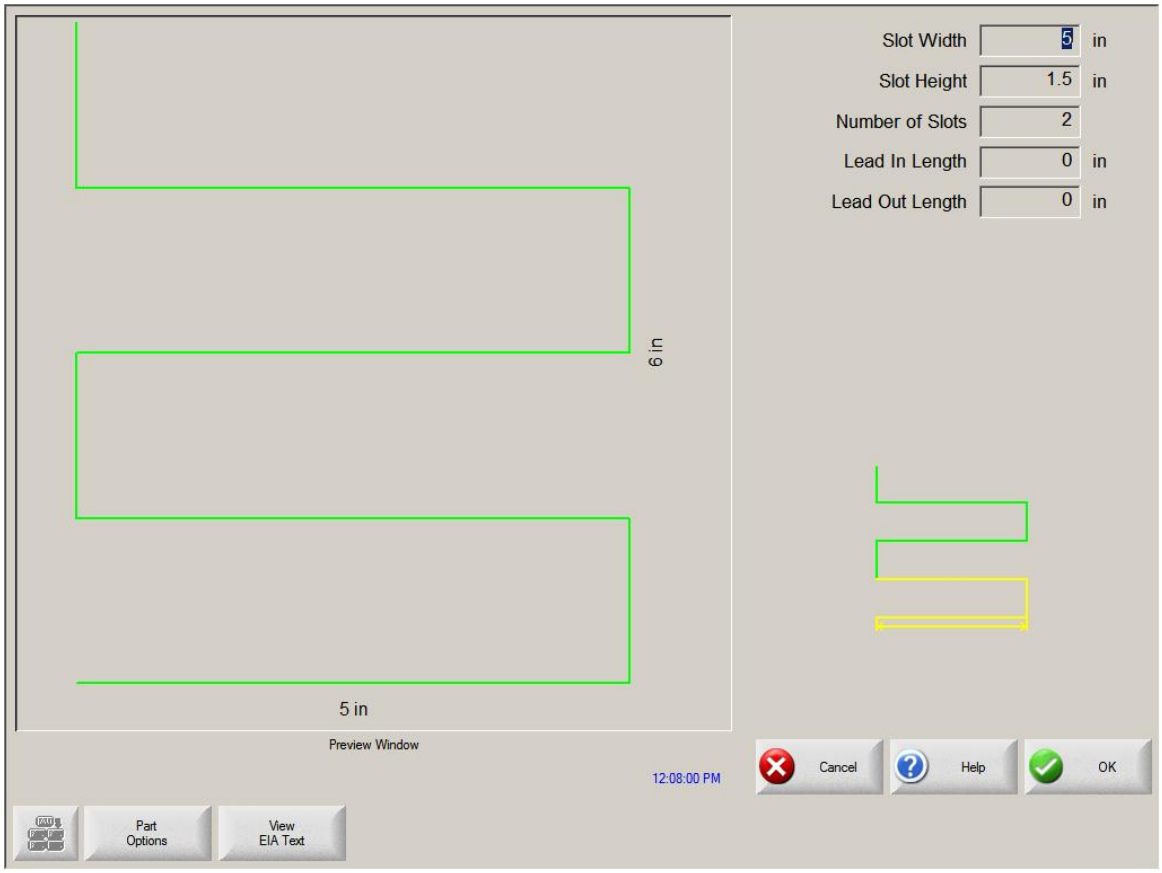
Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Circle Radius	Enter the radius (straight side) of the part.
Slice Angle	Enter the number of degrees of the angle of the part.
Lead-In/Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

Straight Slots



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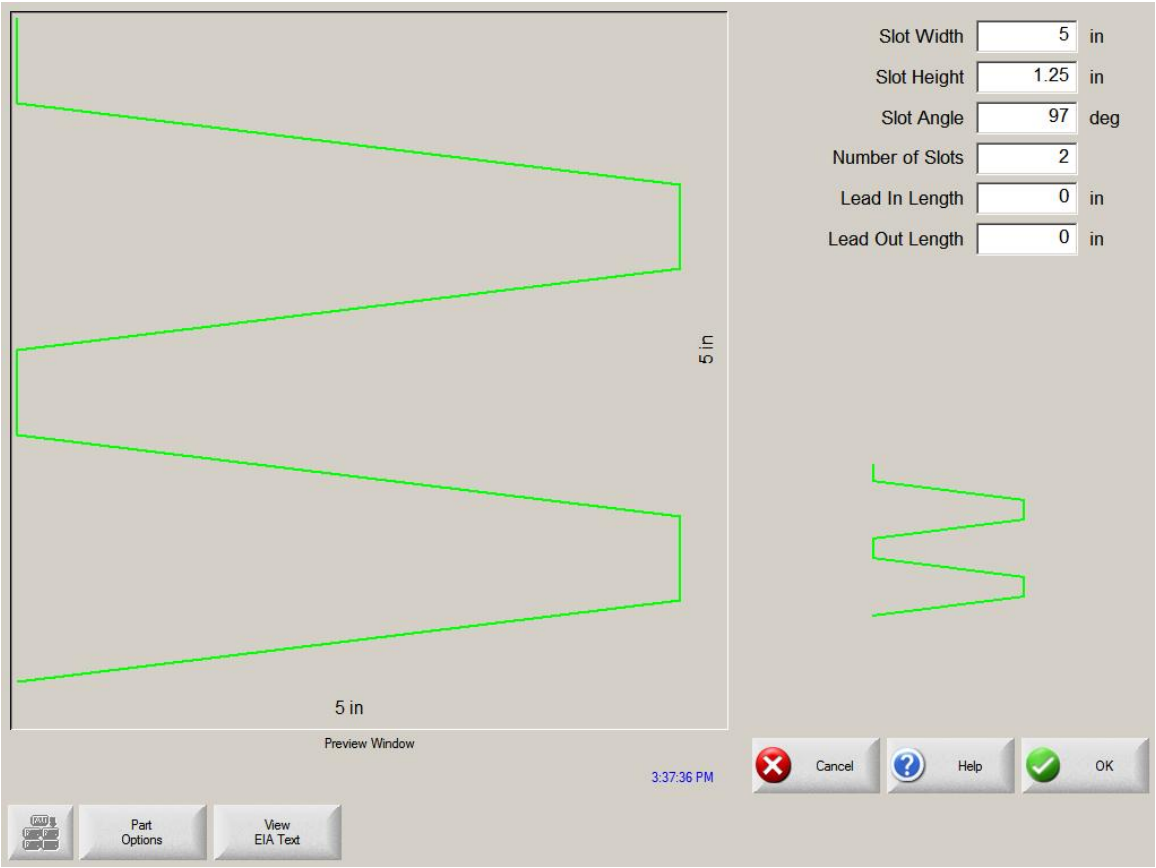
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Slot Width	Enter the width of the slots.
Slot Height	Enter the height of the slots.
Number of Slots	Enter the number of slots in the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.

Angled Slots



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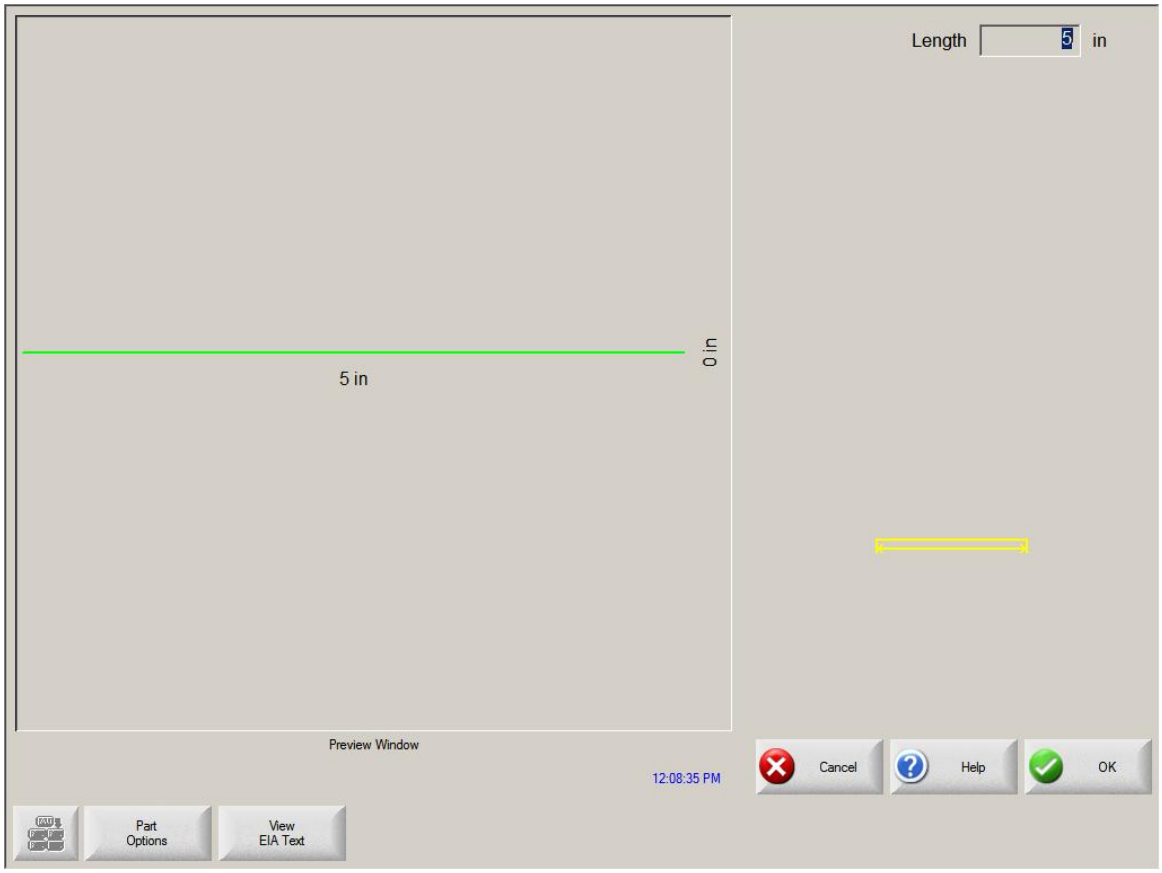
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Slot Width	Enter the width of the slots.
Slot Height	Enter the height of the slots.
Slot Angle	Enter the number of degrees for the angles at the end of each slot.
Number of Slots	Enter the number of slots in the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.

Horizontal Rip



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As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Length	Enter the length of the horizontal rip.

Vertical Rip

Library Shape Setup

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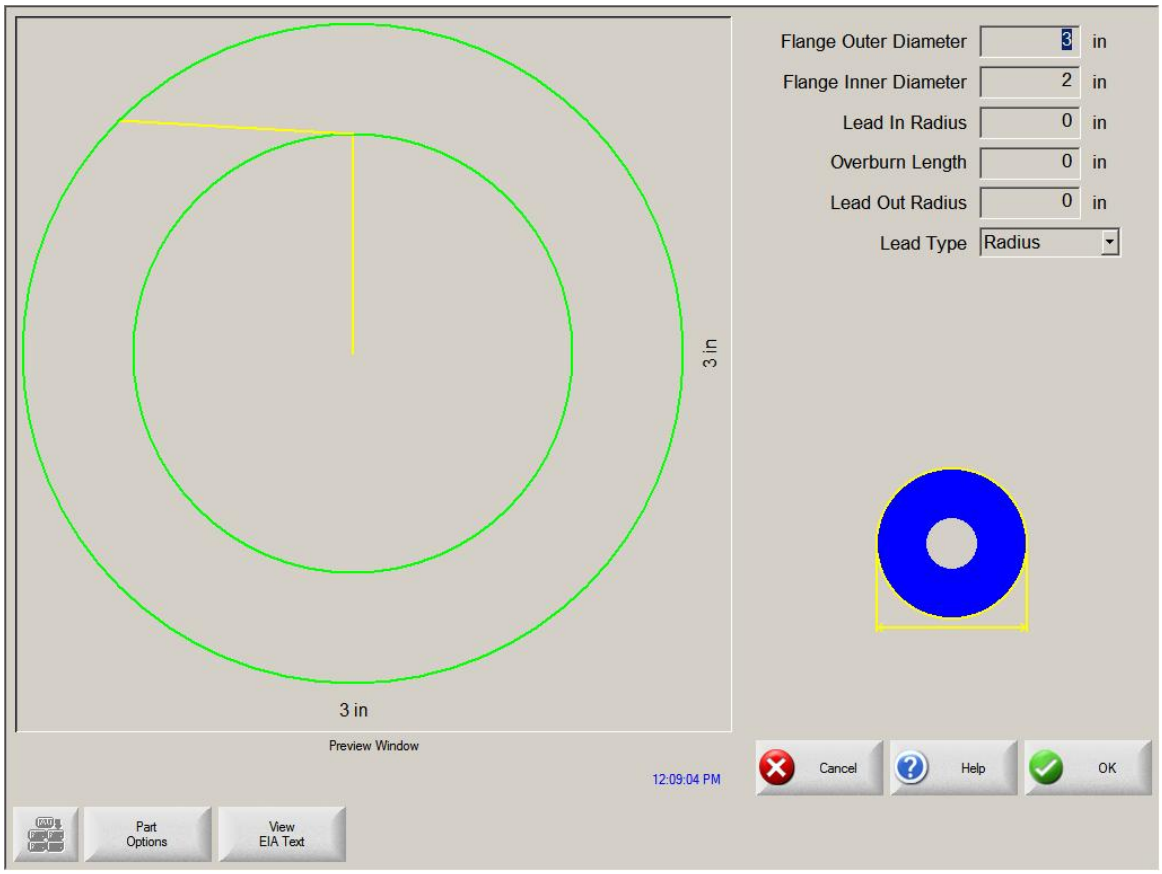
Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Length	Enter the length of the vertical rip.

Flange



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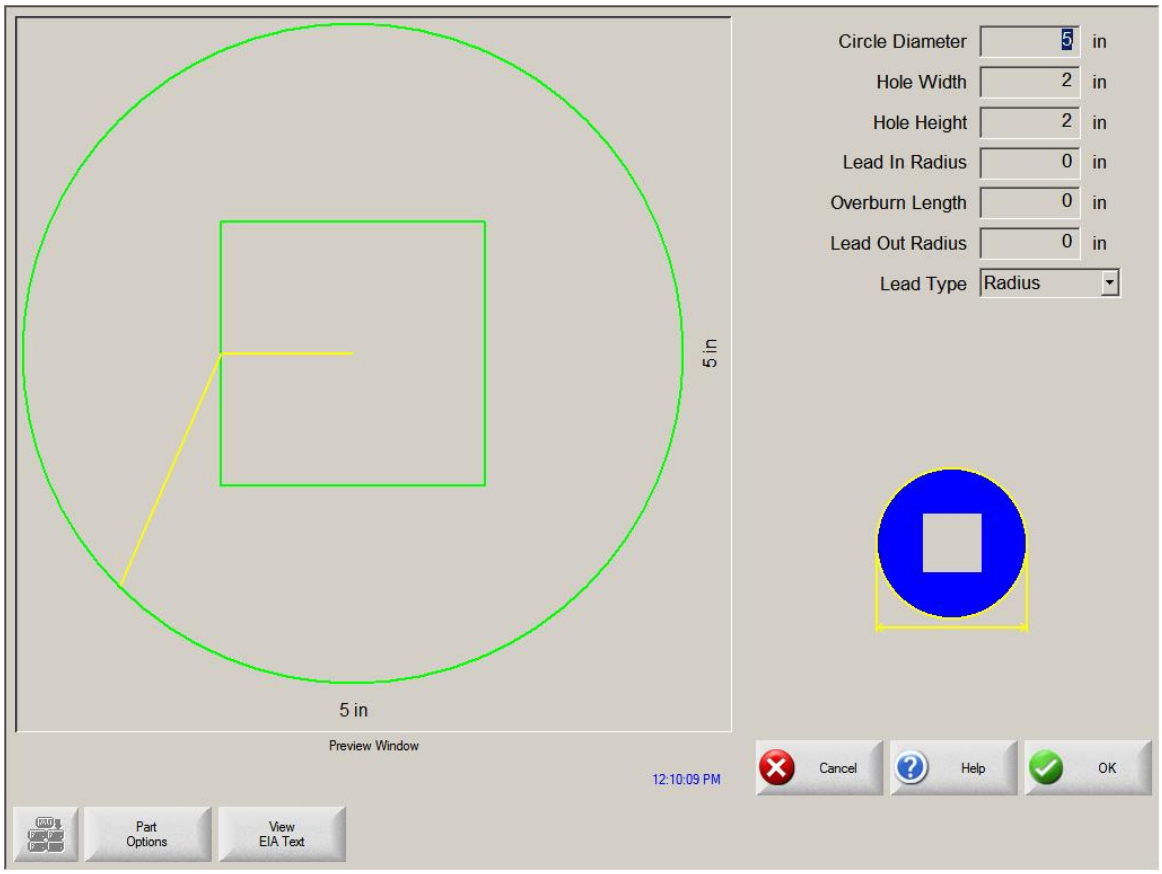
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Flange Outer Diameter	Enter the diameter of the outer edge of the part.
Flange Inner Diameter	Enter the diameter of the inner edge of the part.
Lead In Radius	Enter the radius of the lead-in arc.
Overburn Length	Parts that contain a circular element use overburn. Overburn specifies the arc length that the torch will travel past the circle closure point. The dimension entered is the chord length of the overburn-arc. In some cases it is desirable to have an underburn length. For these conditions, enter a negative number for the overburn length.
Lead Out Radius	Enter the radius of the lead-out arc.
Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Circle with Rectangular Hole



Library Shape Setup

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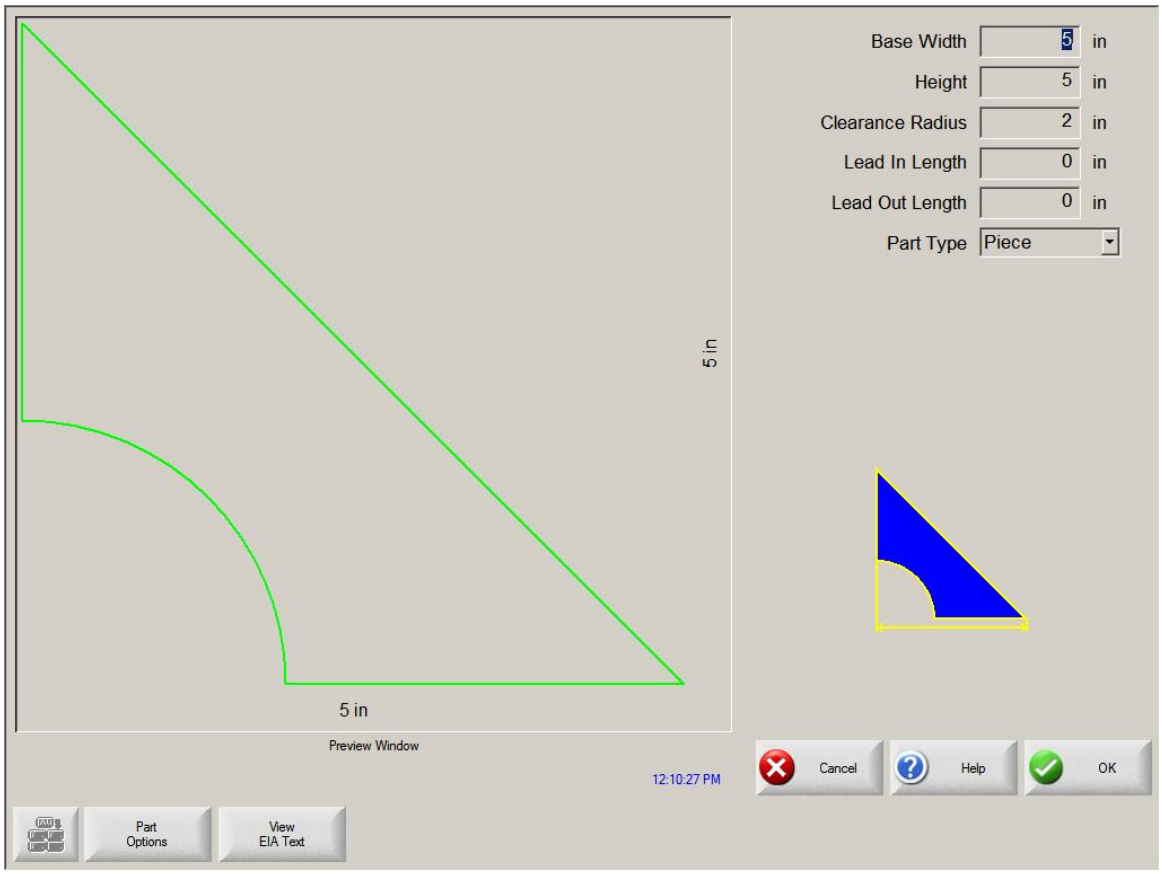
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Circle Diameter	Enter the diameter of the outer circle.
Hole Width	Enter the width of the rectangular hole.
Hole Height	Enter the height of the rectangular hole.
Lead In Radius	Enter the radius of the lead-in arc.
Overburn Length	Parts that contain a circular element use overburn. Overburn specifies the arc length that the torch will travel past the circle closure point. The dimension entered is the chord length of the overburn-arc. In some cases it is desirable to have an underburn length. For these conditions, enter a negative number for the overburn length.
Lead Out Radius	Enter the radius of the lead-out arc.
Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Gusset



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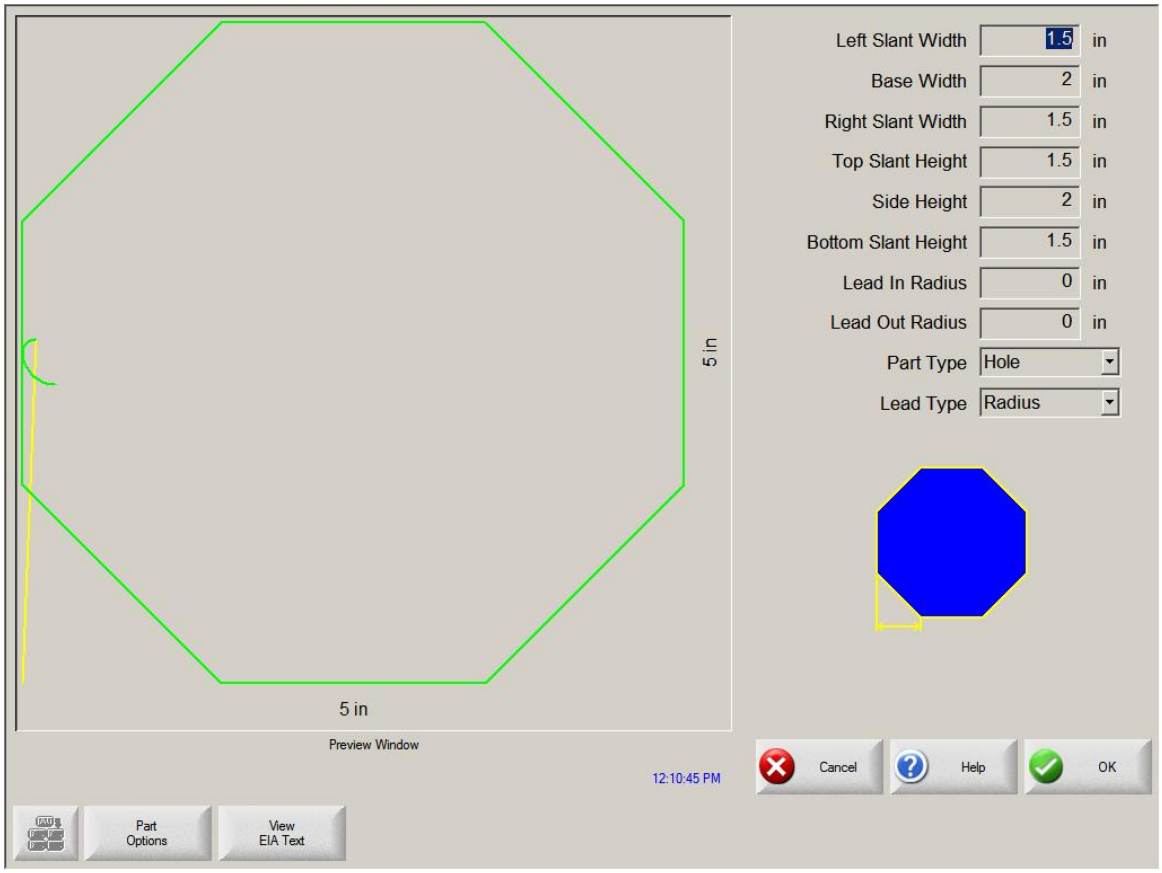
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Height	Enter the height of the part.
Clearance Radius	Enter the length of the radius of the clearance curve.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

8-Sided



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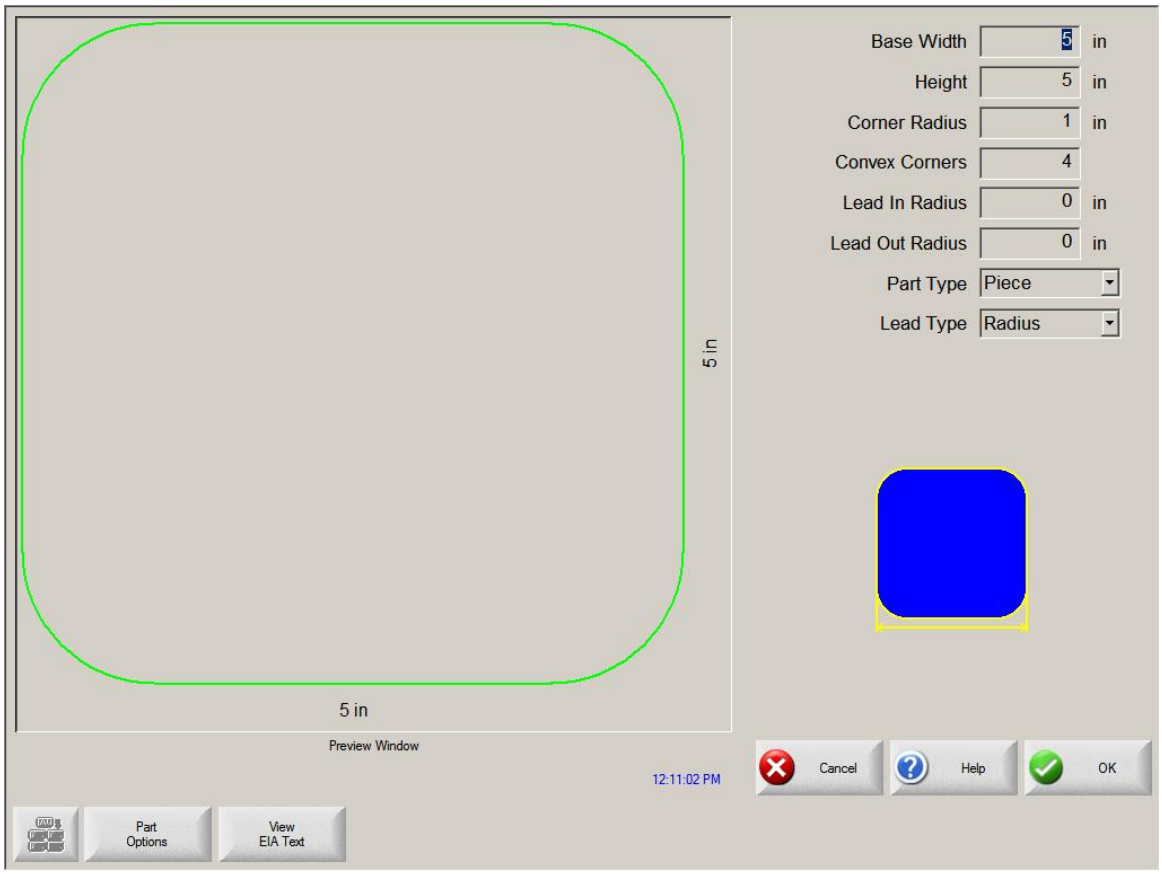
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Left Slant Width	Enter the width of the side that slants to the left.
Base Width	Enter the width of the base of the part.
Right Slant Width	Enter the width of the side that slants to the right.
Top Slant Height	Enter the height of the slanted sides on the top of the part.
Side Height	Enter the length of each side.
Bottom Slant Height	Enter the height of the slanted sides on the bottom of the part.
Lead In Radius	Enter the radius of the lead-in arc.
Lead Out Radius	Enter the radius of the lead-out arc.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.
Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Rectangle with Convex Corners



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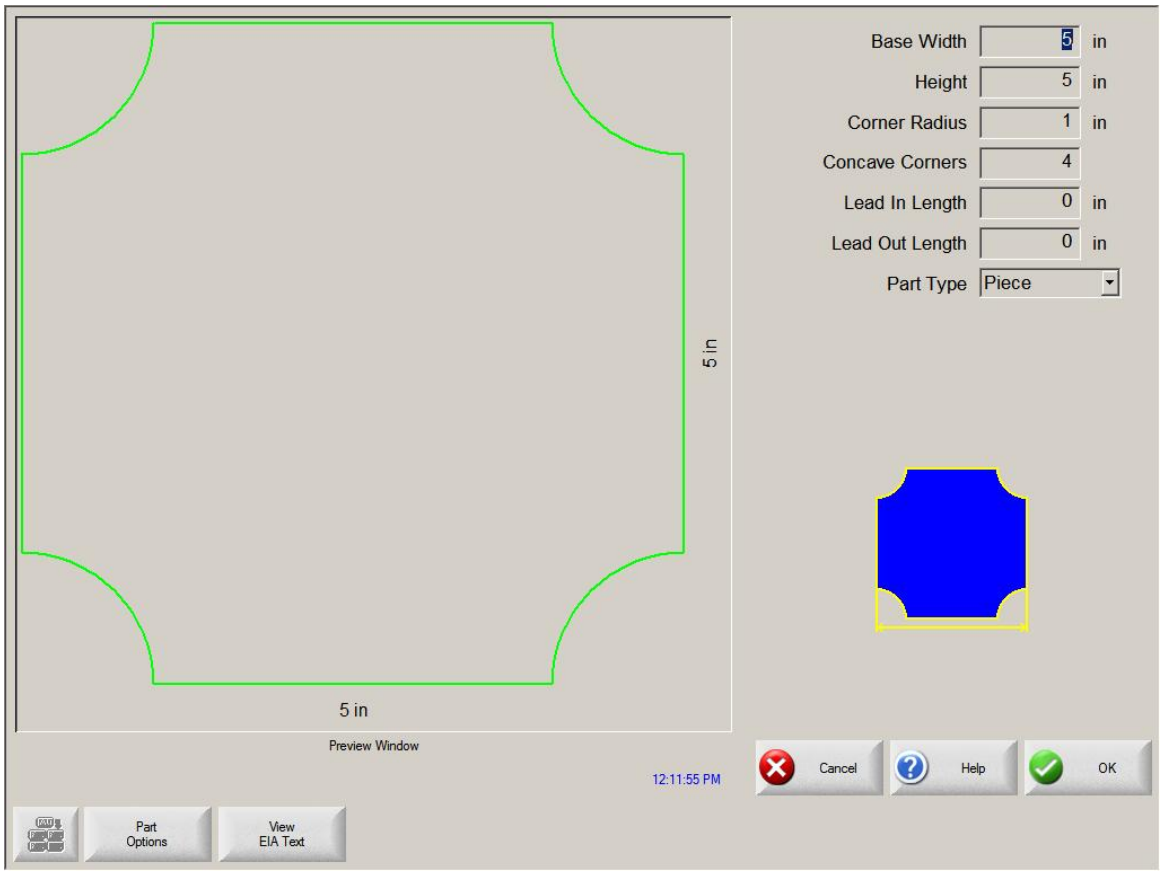
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Height	Enter the height of the part.
Corner Radius	Enter the length of the radius of the curve in the convex corners.
Convex Corners	Enter the number of convex corners on the part.
Lead In Radius	Enter the radius of the lead-in arc.
Lead Out Radius	Enter the radius of the lead-out arc.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.
Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Rectangle with Concave Corners



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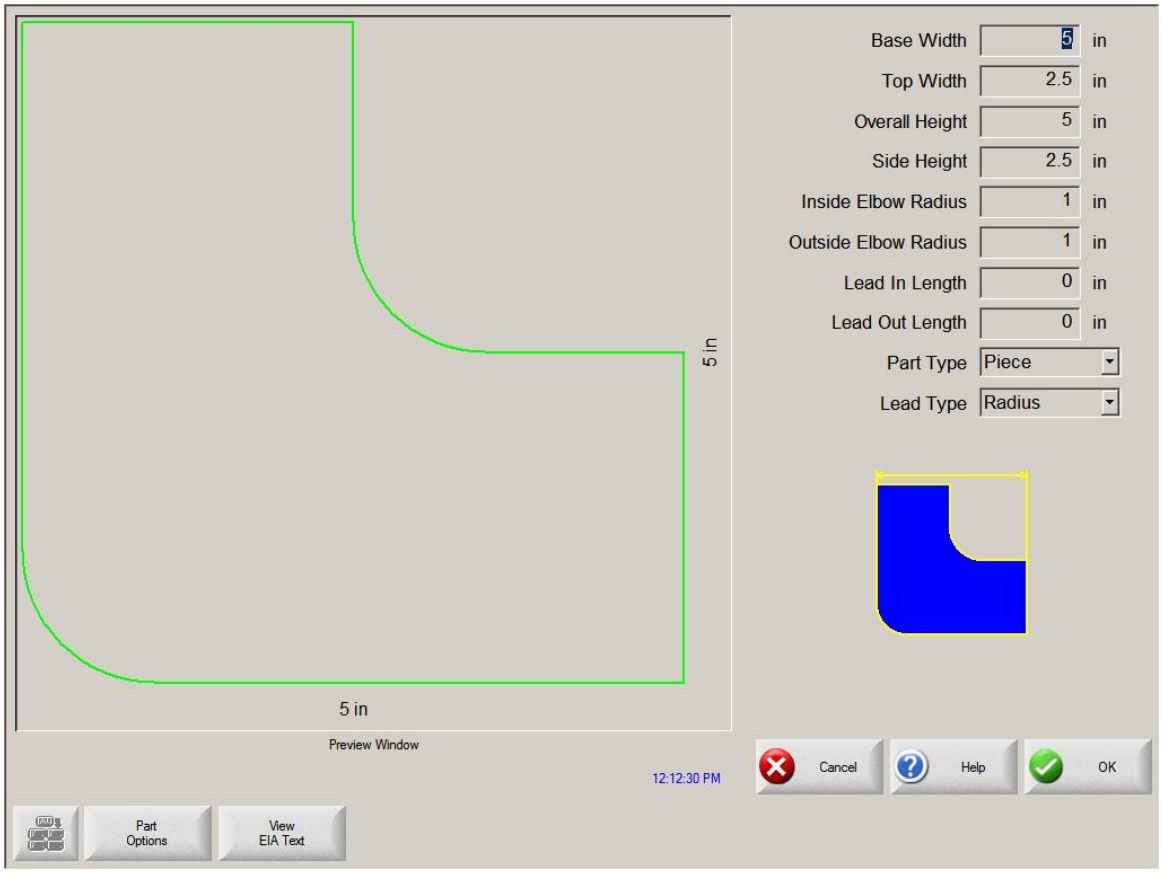
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Height	Enter the height of the part.
Corner Radius	Enter the length of the radius of the curve in the concave corners.
Convex Corners	Enter the number of convex corners for the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

L-Bracket with Elbow Radii



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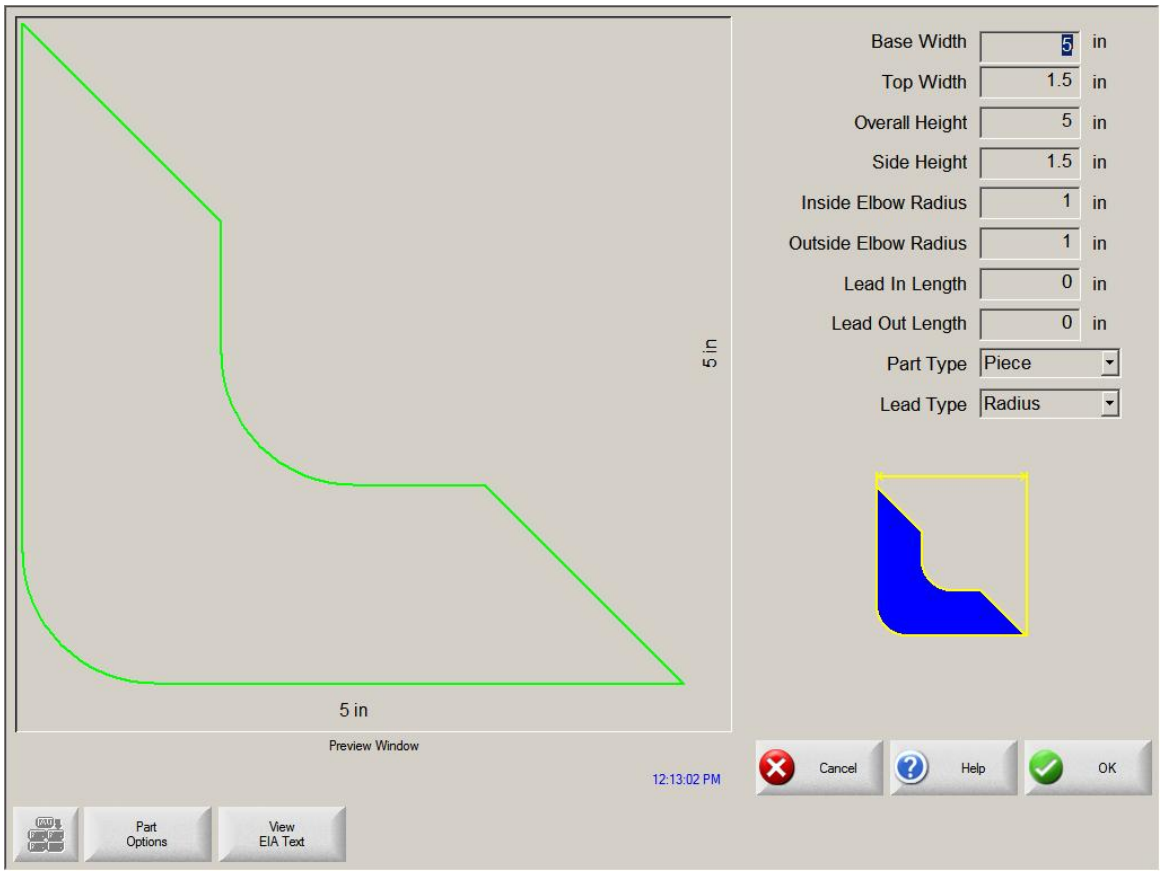
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Top Width	Enter the width of the top of the part.
Overall Height	Enter the height of the part, from base to top.
Side Height	Enter the height of the right side of the part.
Inside Elbow Radius	Enter the radius of the inside curve of the part.
Outside Elbow Radius	Enter the radius of the outer curve of the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.
Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Slant L-Bracket with Elbow Radii



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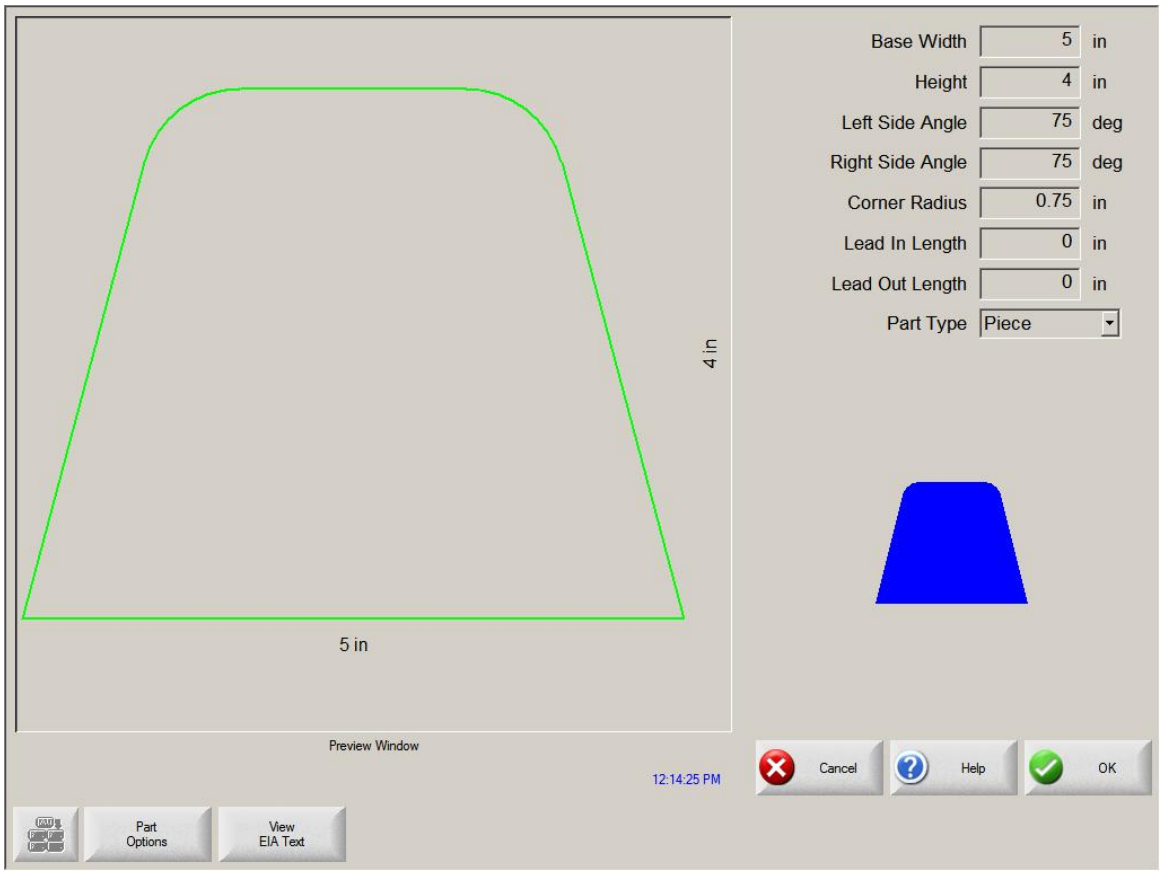
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Top Width	Enter the width of the top of the part.
Overall Height	Enter the height of the part from base to top.
Side Height	Enter the height of the short side of the part.
Inside Elbow Radius	Enter the radius of the inside curve of the part.
Outside Elbow Radius	Enter the radius of the outer curve of the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths..
Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Trapezoid with Convex Corners



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As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Height	Enter the height of the part.
Left Side Angle	Enter the number of degrees for the angle on the left side of the part.
Right Side Angle	Enter the number of degrees for the angle on the right side of the part.
Corner Radius	Enter the radius of the curve in the convex corners of the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

Flange Slice

Library Shape Setup

Enter the correct dimensions to create the part you require. There is a small Help icon in the lower right hand corner of the display to indicate which parameter the control is looking for. The current parameter is highlighted with a yellow arrow.

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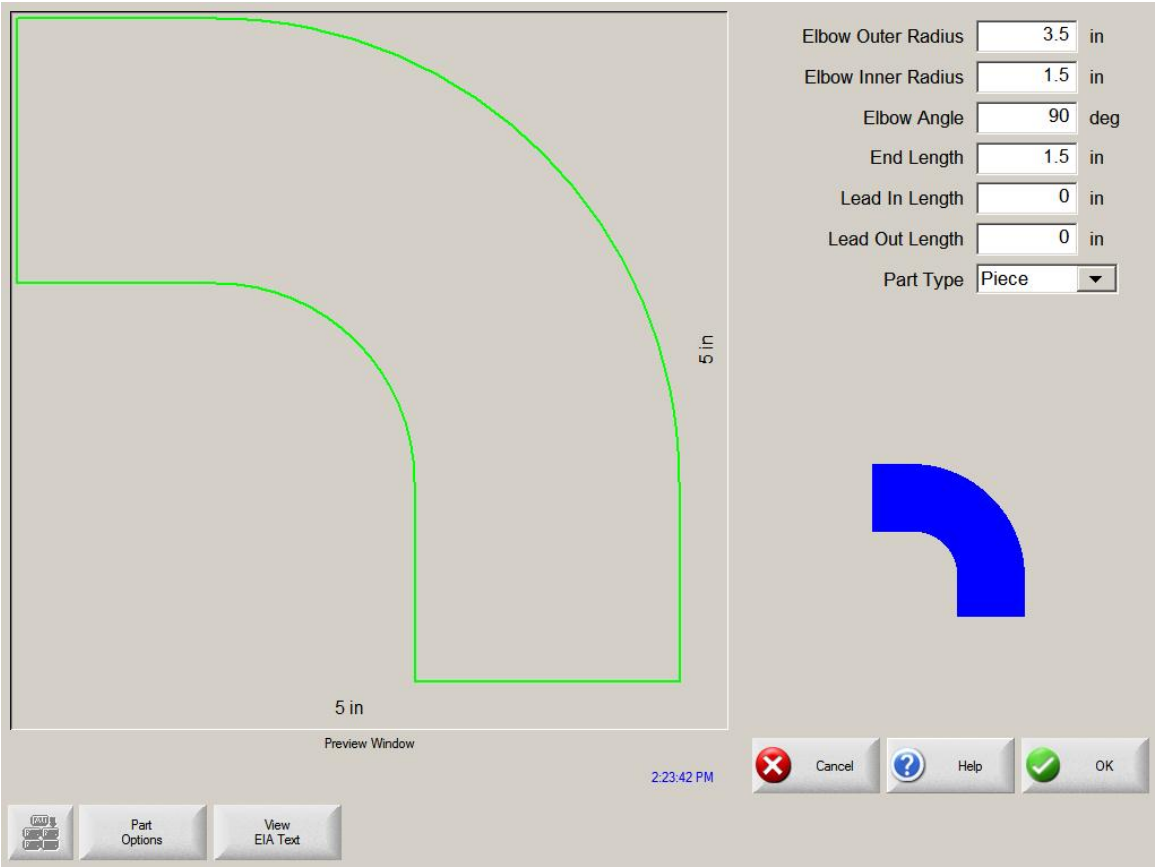
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Flange Outer Radius	Enter the radius of the outside curved edge of the part.
Flange Inner Radius	Enter the radius of the inside curved edge of the part.
Slice Angle	Enter the angle of the straight sides of the part
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

Elbow



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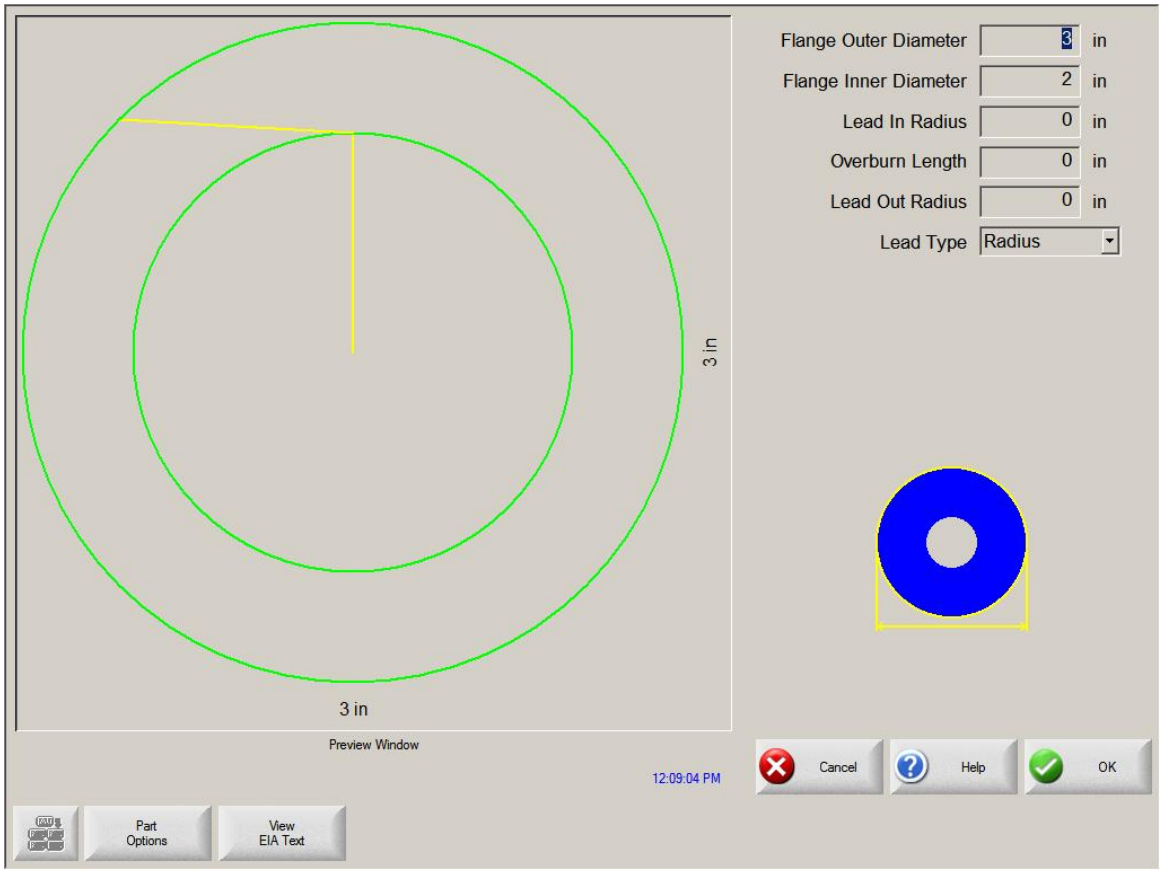
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Elbow Outer Radius	Enter the radius of the outer edge of the part.
Elbow Inner Radius	Enter the radius of the inner edge of the part.
Elbow Angle	Enter the number of degrees of the angle formed by the straight edges of the part.
End Length	Enter the length of the ends of the part.
Lead-In/Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

Flange Repair Ring



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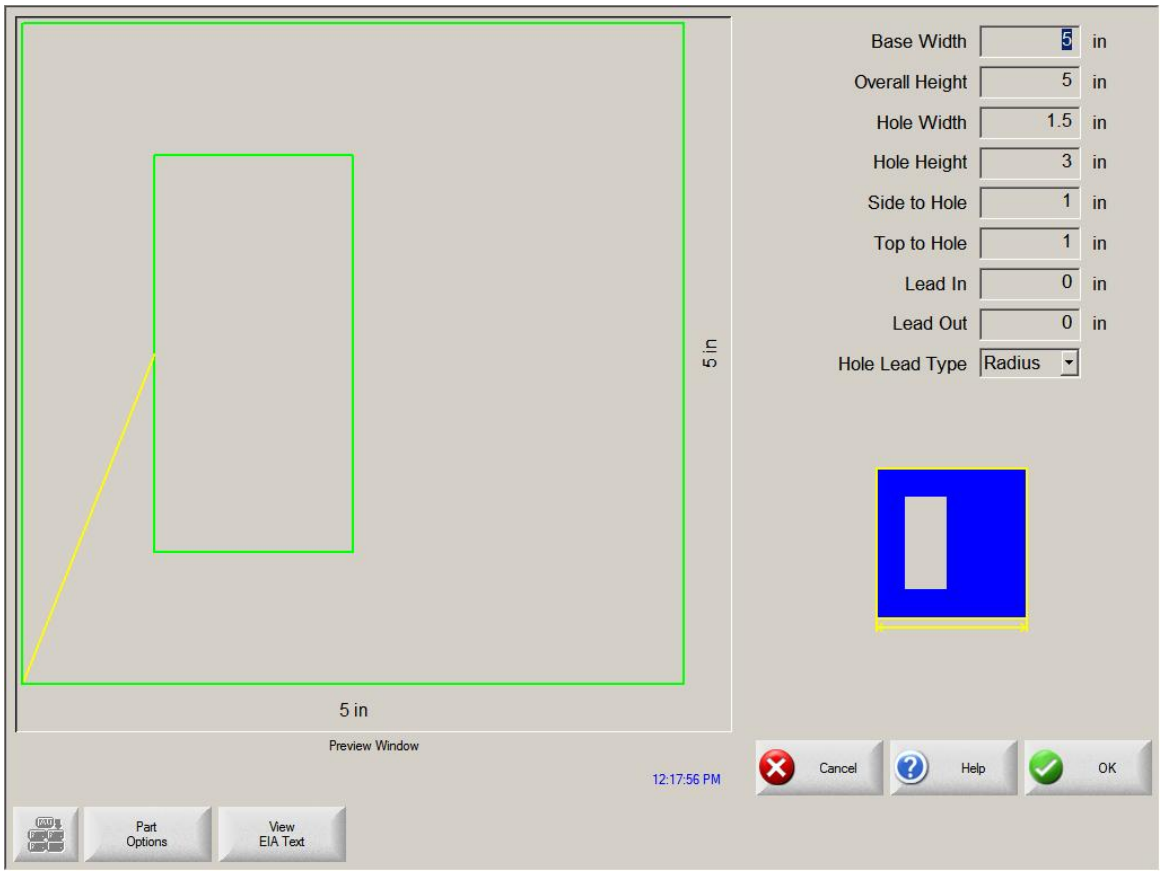
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Flange Outer Diameter	Enter the length of the diameter of the outer, circular edge of the part.
Flange Inner Diameter	Enter the length of the diameter of the inner hole within the part.
Lead In Radius	Enter the radius of the lead-in arc.
Overburn Length	Parts that contain a circular element use overburn. Overburn specifies the arc length that the torch will travel past the circle closure point. The dimension entered is the chord length of the overburn-arc. In some cases it is desirable to have an underburn length. For these conditions, enter a negative number for the overburn length.
Lead Out Radius	Enter the radius of the lead-out arc.
Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Rectangle with Rectangular Hole



Library Shape Setup

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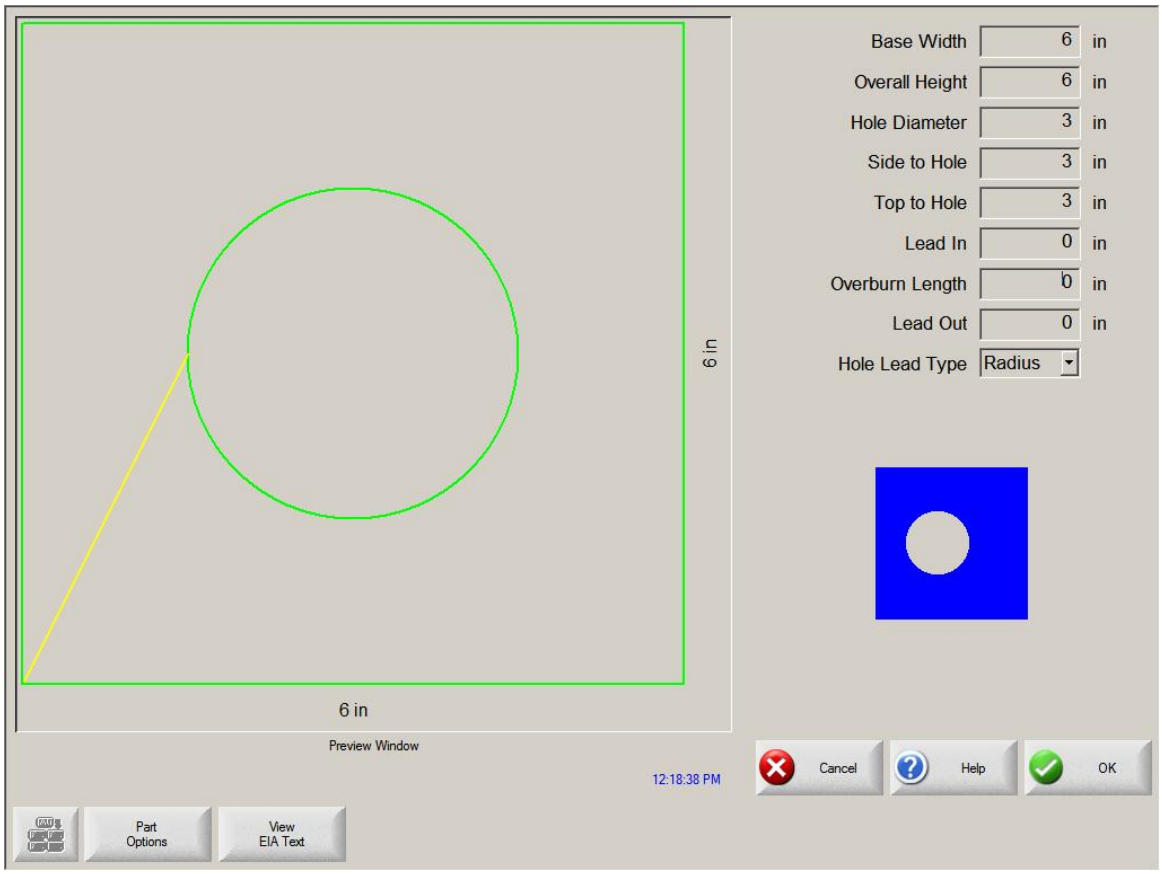
Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Overall Height	Enter the height of the part from base to top.
Hole Width	Enter the width of the hole within the part.
Hole Height	Enter the height of the hole within the part.
Side to Hole	Enter the distance between the left edges of the part and the hole within it.
Top to Hole	Enter the distance between the top of the part and the top of the hole within it.
Lead-In/Lead-Out	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Hole Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Rectangle with Circular Hole



Library Shape Setup

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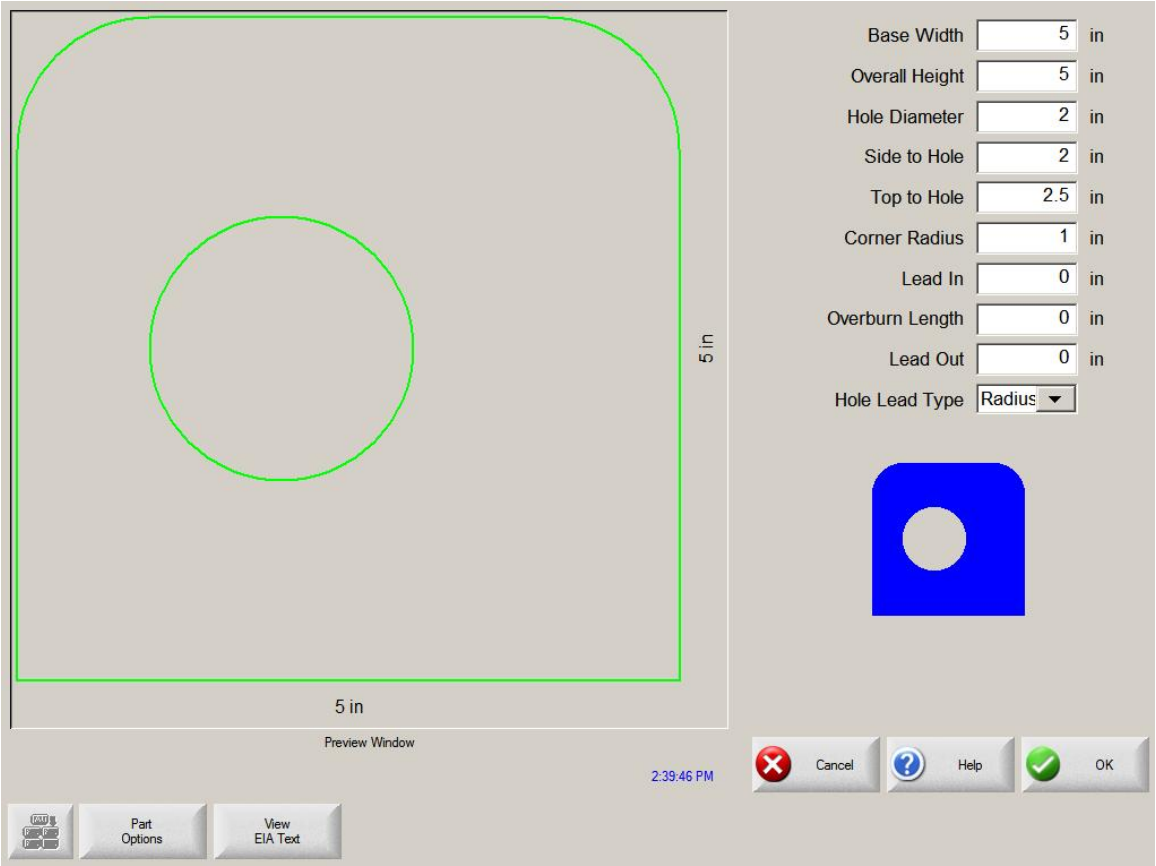
Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Overall Height	Enter the height of the part from base to top.
Hole Diameter	Enter the diameter of the hole within the part.
Side to Hole	Enter the distance from the left side of the part to the center of the hole within it.
Top to Hole	Enter the distance from the top of the part to the center of the hole within it.
Lead-In/Lead-Out	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Overburn Length	Parts that contain a circular element use overburn. Overburn specifies the arc length that the torch will travel past the circle closure point. The dimension entered is the chord length of the overburn-arc. In some cases it is desirable to have an underburn length. For these conditions, enter a negative number for the overburn length.
Hole Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Rectangle with Circular Hole and Convex Corners



Library Shape Setup

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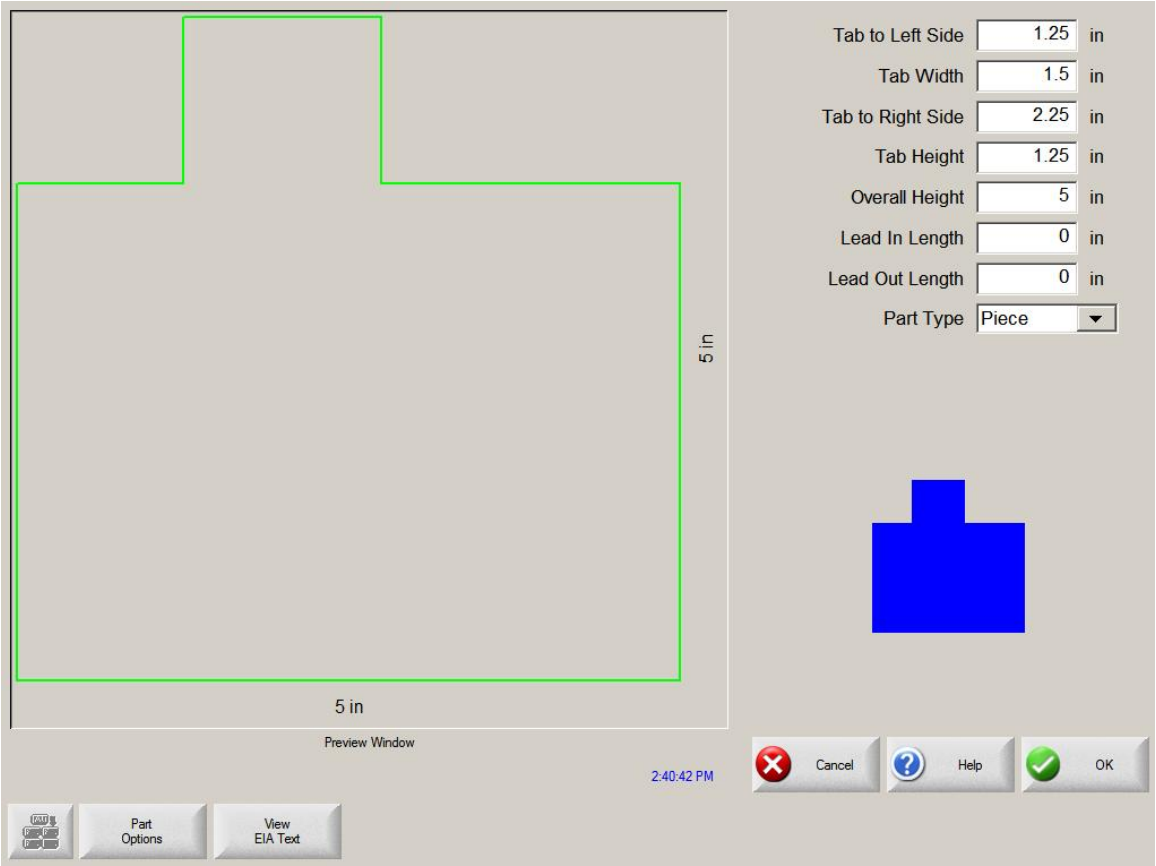
Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Overall Height	Enter the height of the part from the base to the top.
Hole Diameter	Enter the diameter of the hole within the part.
Side to Hole	Enter the distance between the left side of the part and the center of the hole within it.
Top to Hole	Enter the distance between the top of the part and the center of the hole within it.
Corner Radius	Enter the length of the radius of the convex corners.
Lead-In/Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Overburn Length	Parts that contain a circular element use overburn. Overburn specifies the arc length that the torch will travel past the circle closure point. The dimension entered is the chord length of the overburn-arc. In some cases it is desirable to have an underburn length. For these conditions, enter a negative number for the overburn length.
Hole Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Rectangle with Tab



Library Shape Setup

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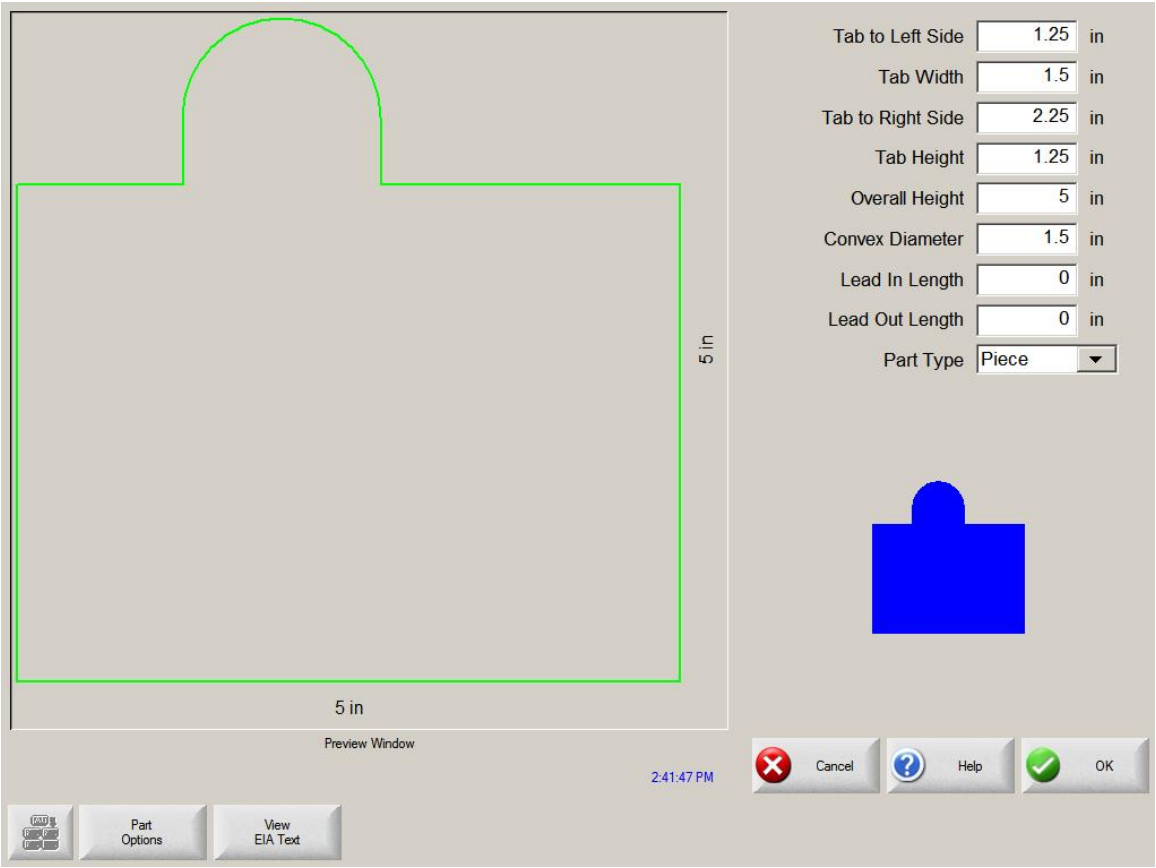
Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Tab to Left Side	Enter the distance between the left side of the part and the left side of the tab.
Tab Width	Enter the width of the tab.
Tab to Right Side	Enter the distance between the right side of the part and the right side of the tab.
Tab Height	Enter the height of the tab.
Overall Heigth	Enter the height of the part from the base to the top of the tab.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

Rectangle with Convex Tab



Library Shape Setup

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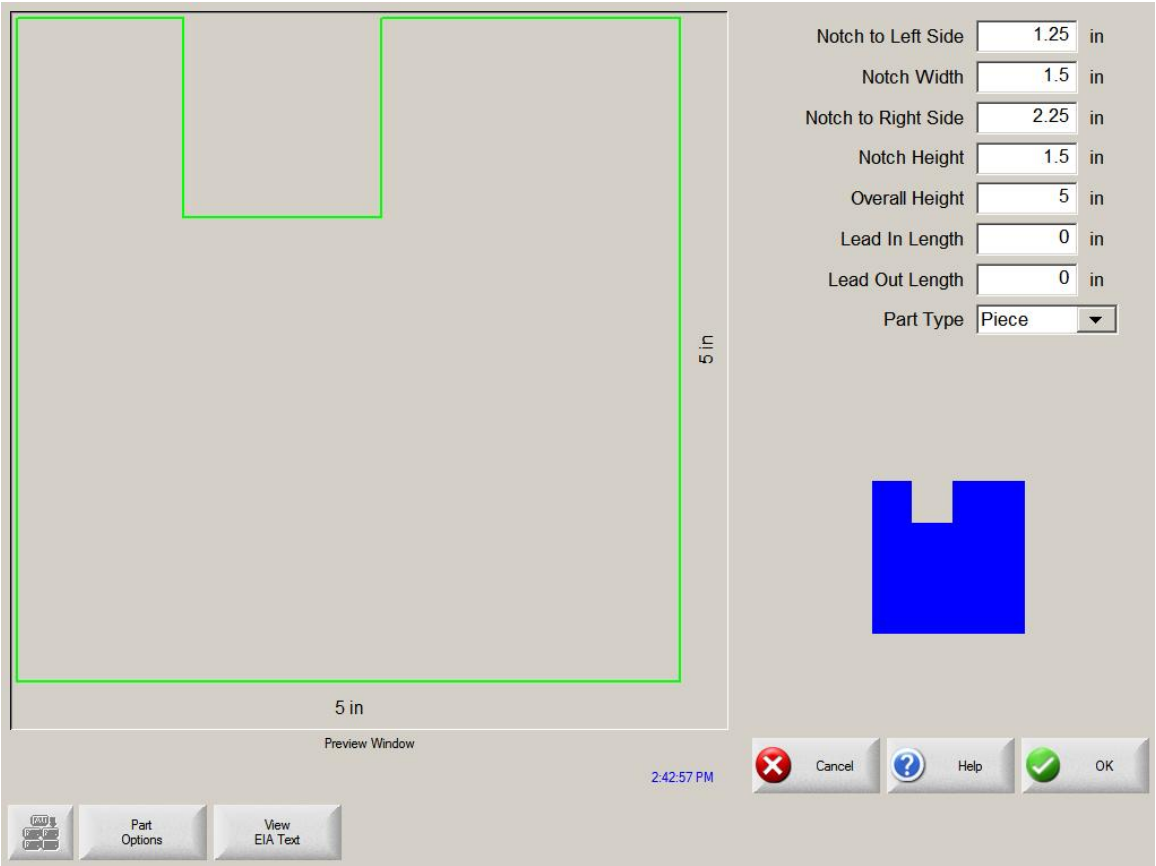
While you are entering parameters, the control is performing some general checks for proper geometries. If the control finds a set of parameters that conflict, a warning message is displayed and the parameters in conflict are highlighted in red.

Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Tab to Left Side	Enter the distance between the left side of the part and the left side of the tab.
Tab Width	Enter the width of the tab.
Tab to Right Side	Enter the distance between the right side of the part and the right side of the tab.
Tab Height	Enter the height of the tab.
Overall Height	Enter the height of the part from the base to the top of the tab.
Convex Diameter	Enter the diameter of the convex curve of the tab.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

Rectangle with Notch



Library Shape Setup

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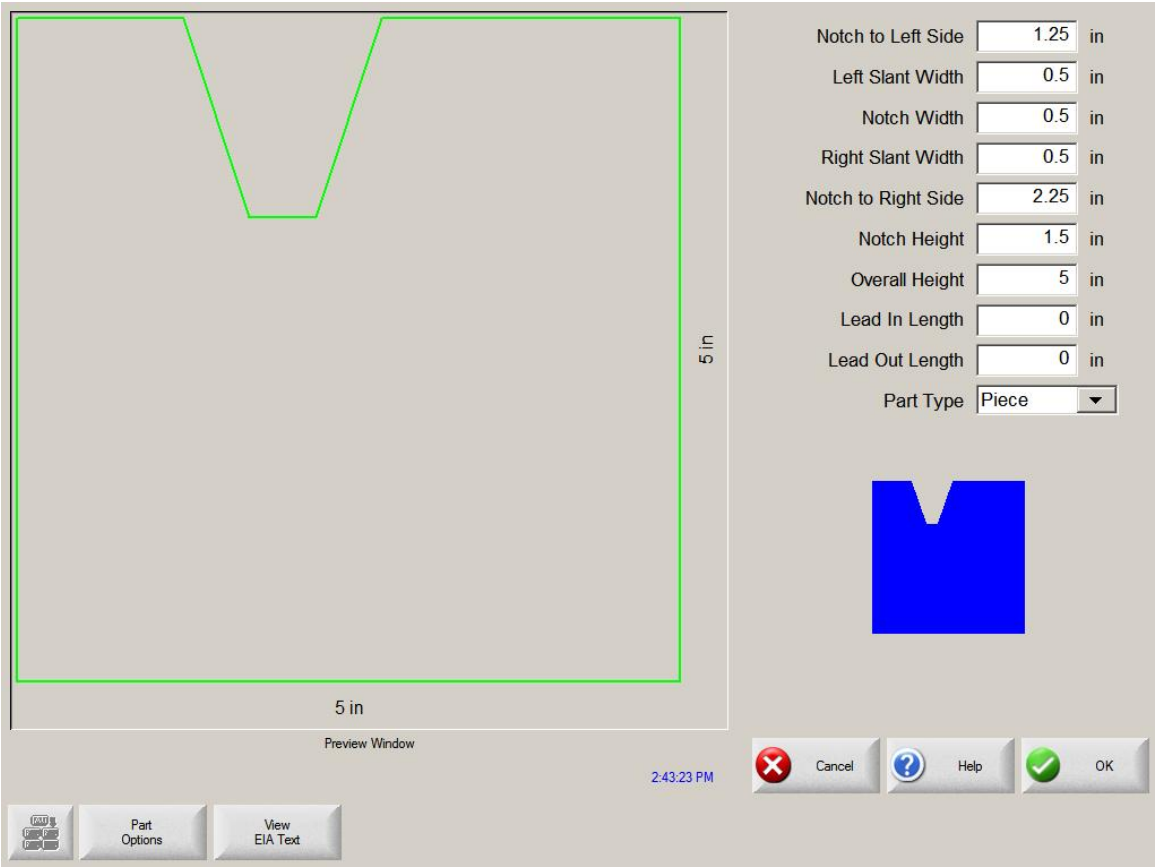
Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Notch to Left Side	Enter the distance between the left sides of the part and the notch.
Notch Width	Enter the width of the notch.
Notch to Right Side	Enter the distance between the right sides of the notch and the part.
Notch Height	Enter the height of the notch.
Overall Height	Enter the height of the part from base to top.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

Rectangle with Slant Notch



Library Shape Setup

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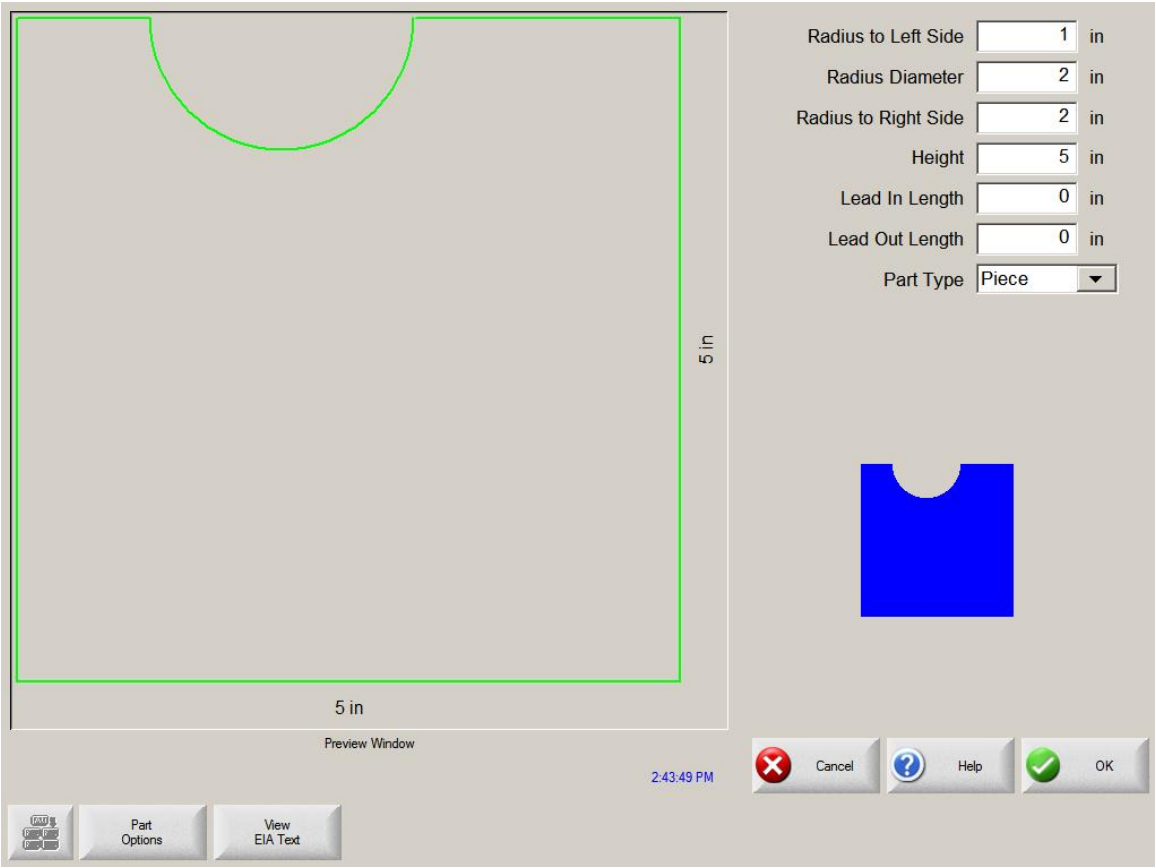
Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Notch to Left Side	Enter the distance between the left sides of the part and the notch.
Left Slant Width	Enter the width of the left slant in the notch.
Notch Width	Enter the width of the notch.
Right Slant Width	Enter the width of the right slant in the notch.
Notch to Right Side	Enter the distance between the right sides of the notch and the part.
Notch Height	Enter the height of the notch.
Overall Height	Enter the height of the part from base to top.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

Rectangle with Radius Notch



Library Shape Setup

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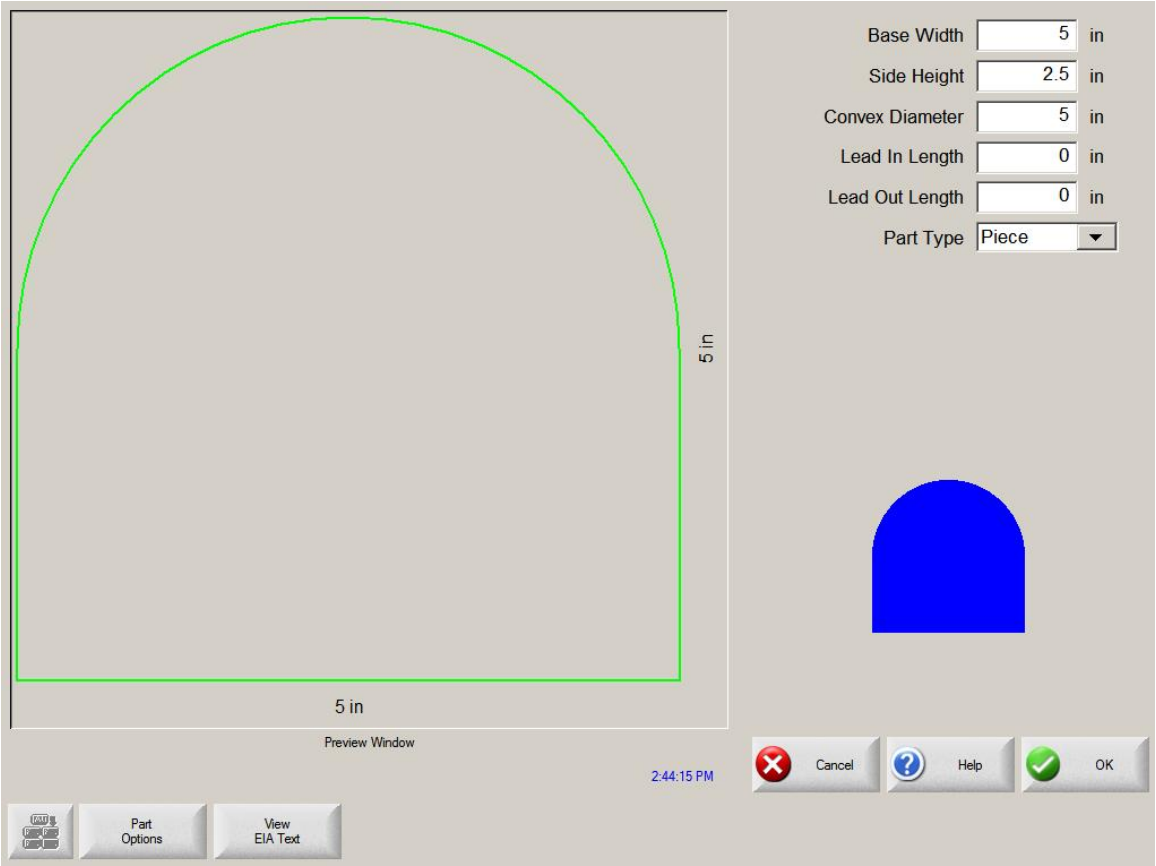
While you are entering parameters, the control is performing some general checks for proper geometries. If the control finds a set of parameters that conflict, a warning message is displayed and the parameters in conflict are highlighted in red.

Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Radius to Left Side	Enter the distance between the left sides of the part and the radius.
Radius Diameter	Enter the diameter of the radius.
Radius to Right Side	Enter the distance between the right sides of the part and the radius.
Height	Enter the height of the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

Convex Rectangle



Library Shape Setup

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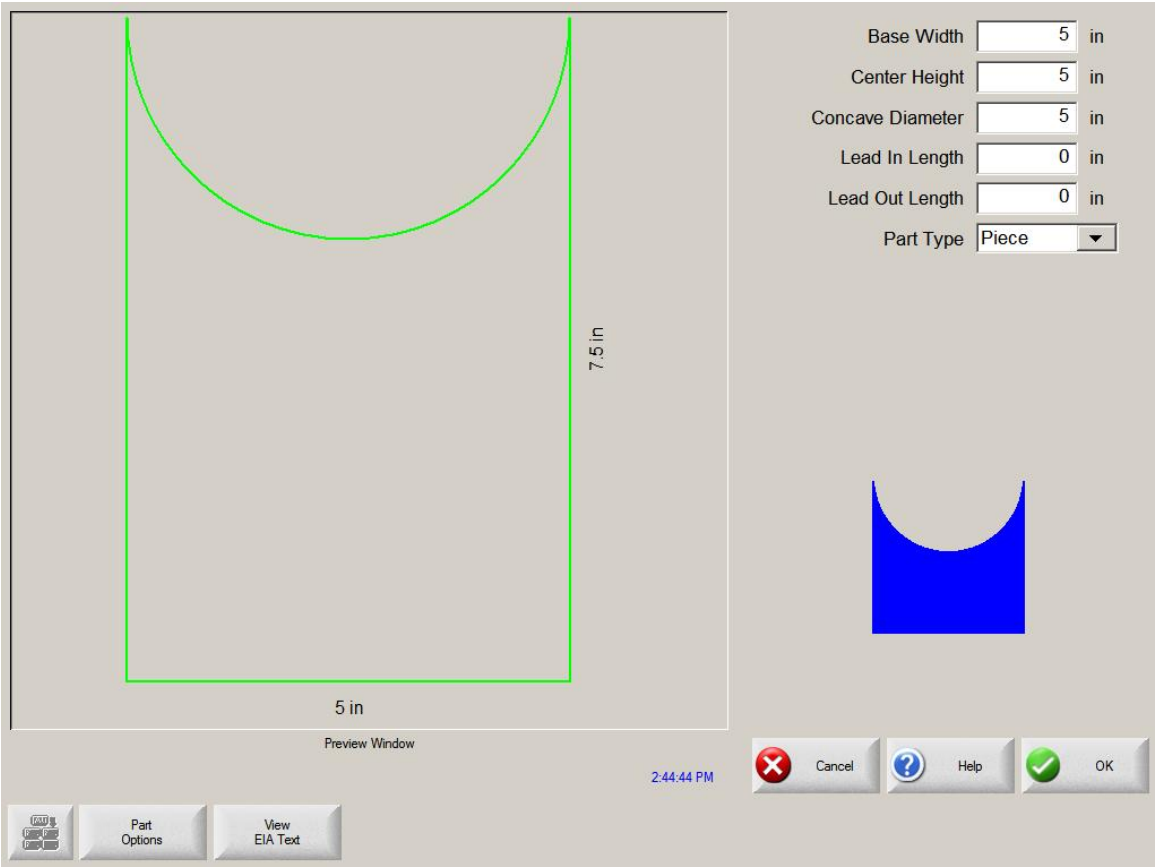
While you are entering parameters, the control is performing some general checks for proper geometries. If the control finds a set of parameters that conflict, a warning message is displayed and the parameters in conflict are highlighted in red.

Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Side Height	Enter the height of the rectangular portion of the part.
Convex Diameter	Enter the diameter of the convex portion of the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

Concave Rectangle



Library Shape Setup

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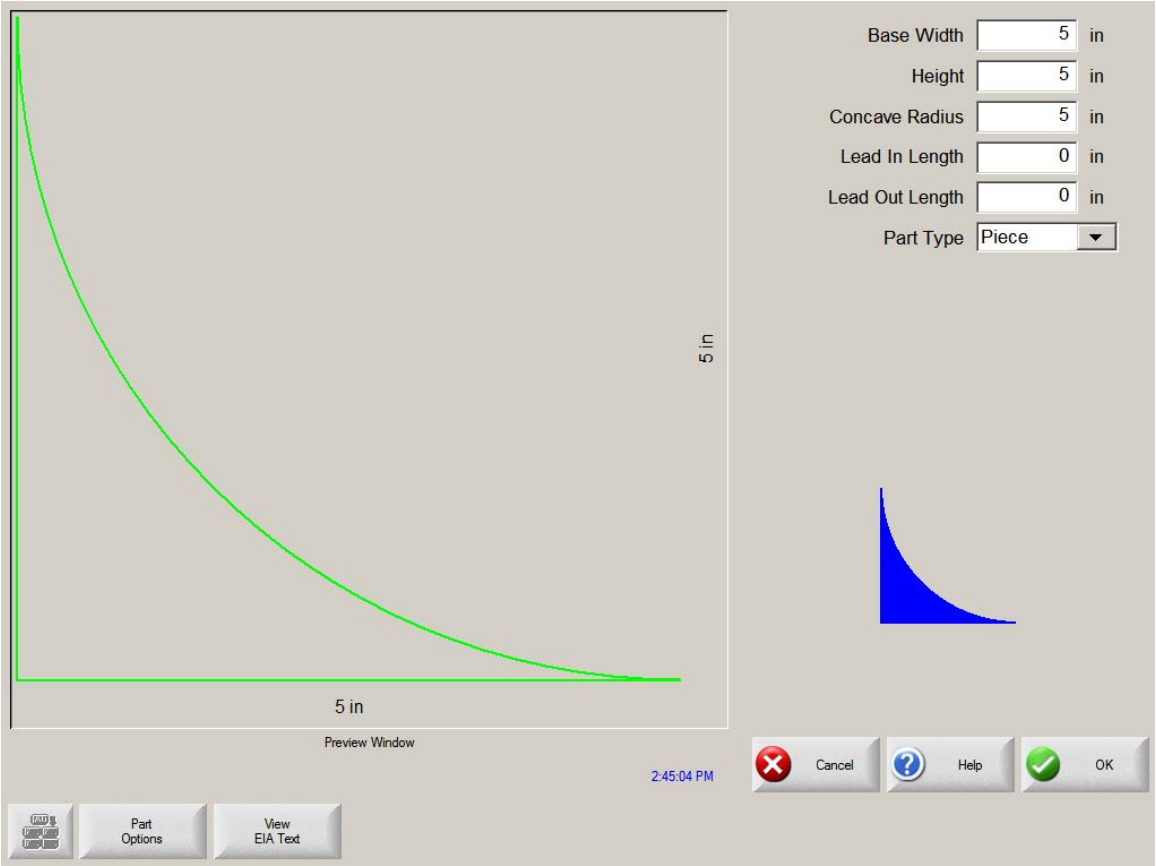
Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Center Height	Enter the height of the part between the base and the lowest point of the concave side.
Concave Diameter	Enter the diameter of the concave portion of the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

Triangle with Concave Side



Library Shape Setup

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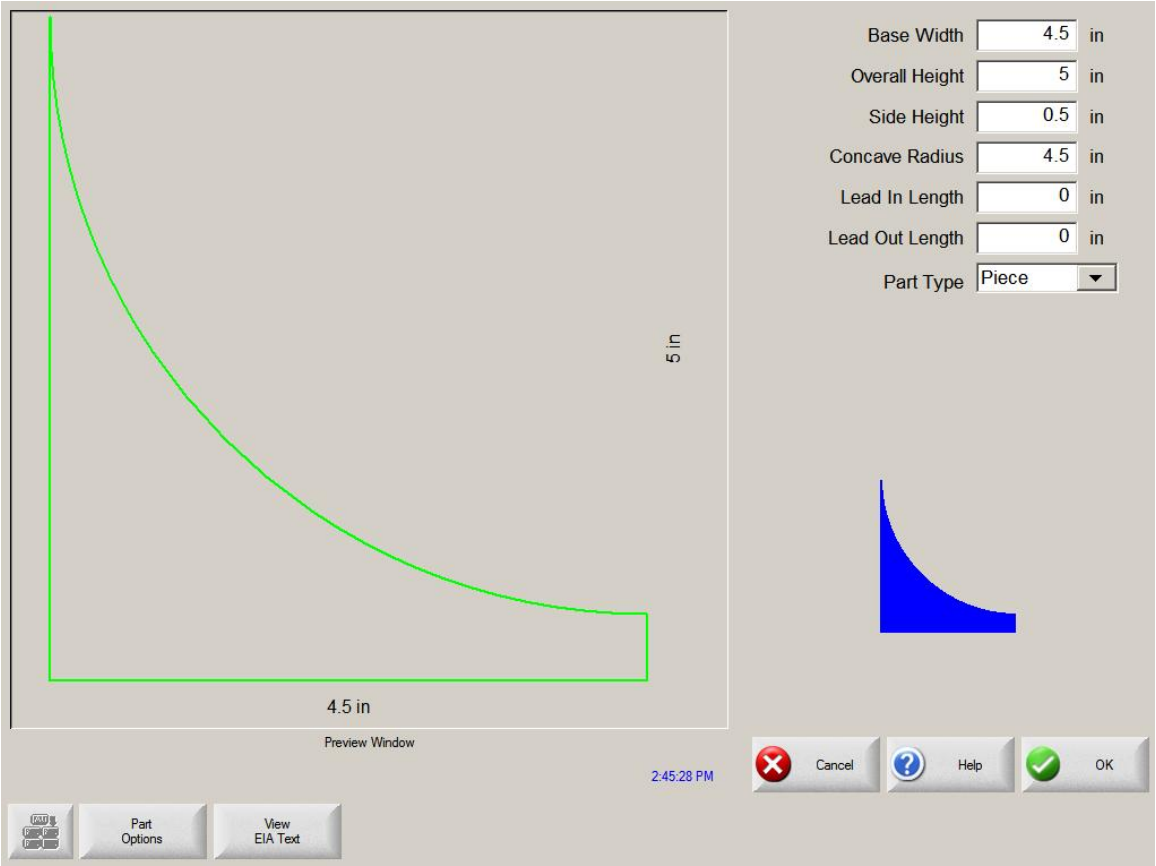
Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Height	Enter the height of the part.
Concave Radius	Enter the length of the radius of the concave portion of the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

Polygon with Concave Side



Library Shape Setup

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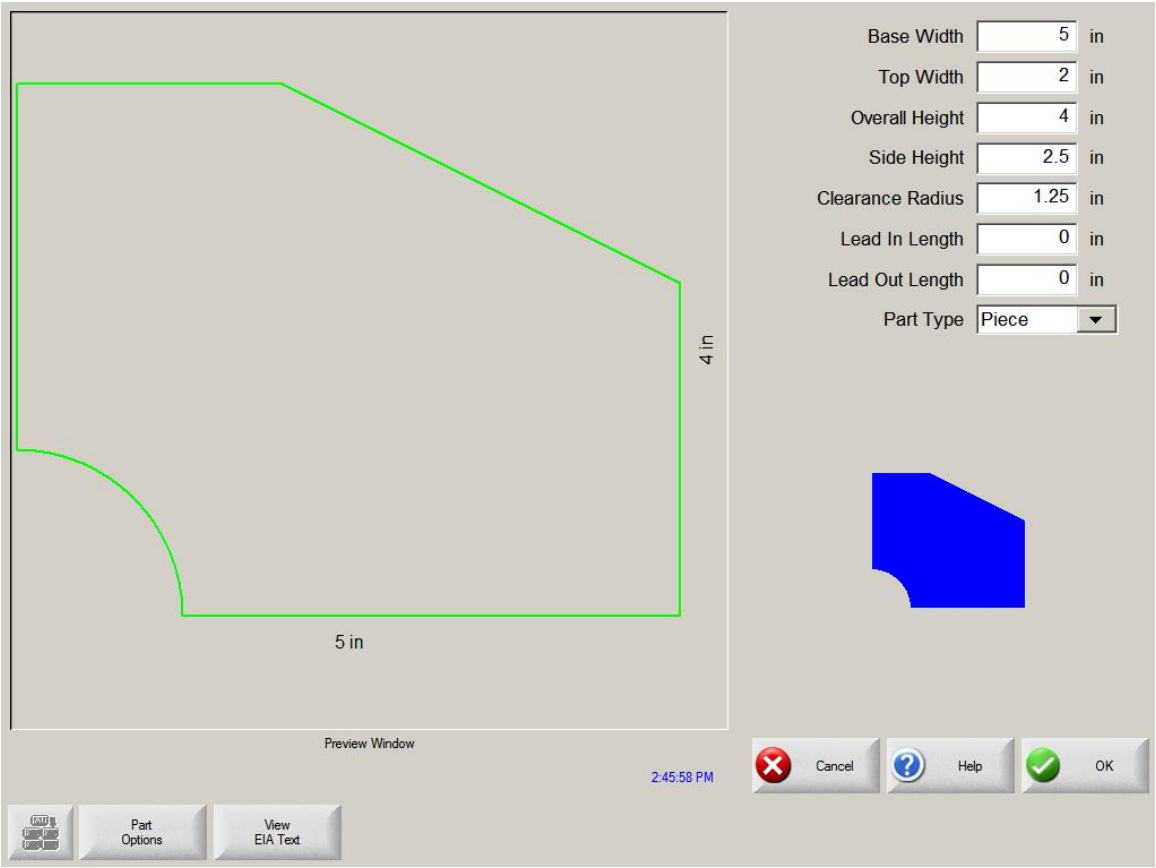
Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Overall Height	Enter the height of the part from the base to the top.
Side Height	Enter the height of the right side of the part.
Concave Radius	Enter the radius of the concave portion of the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

Slant Rectangle with Radius



Library Shape Setup

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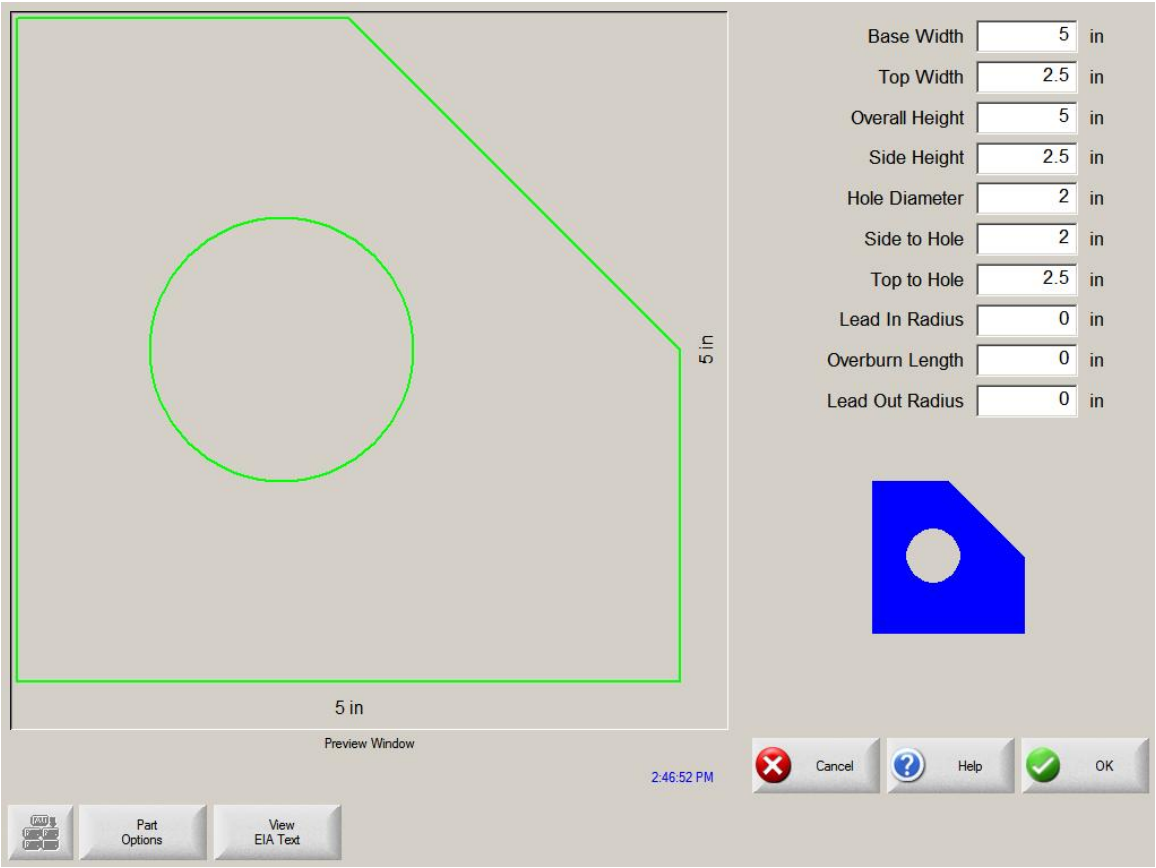
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Top Width	Enter the width of the top of the part.
Overall Height	Enter the height of the part from the base to the top.
Side Height	Enter the height of the right side of the part. The height of the side must be less than the overall height of the part.
Clearance Radius	Enter the length of the radius of the clearance curve.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

Slant Rectangle with Circular Hole



Library Shape Setup

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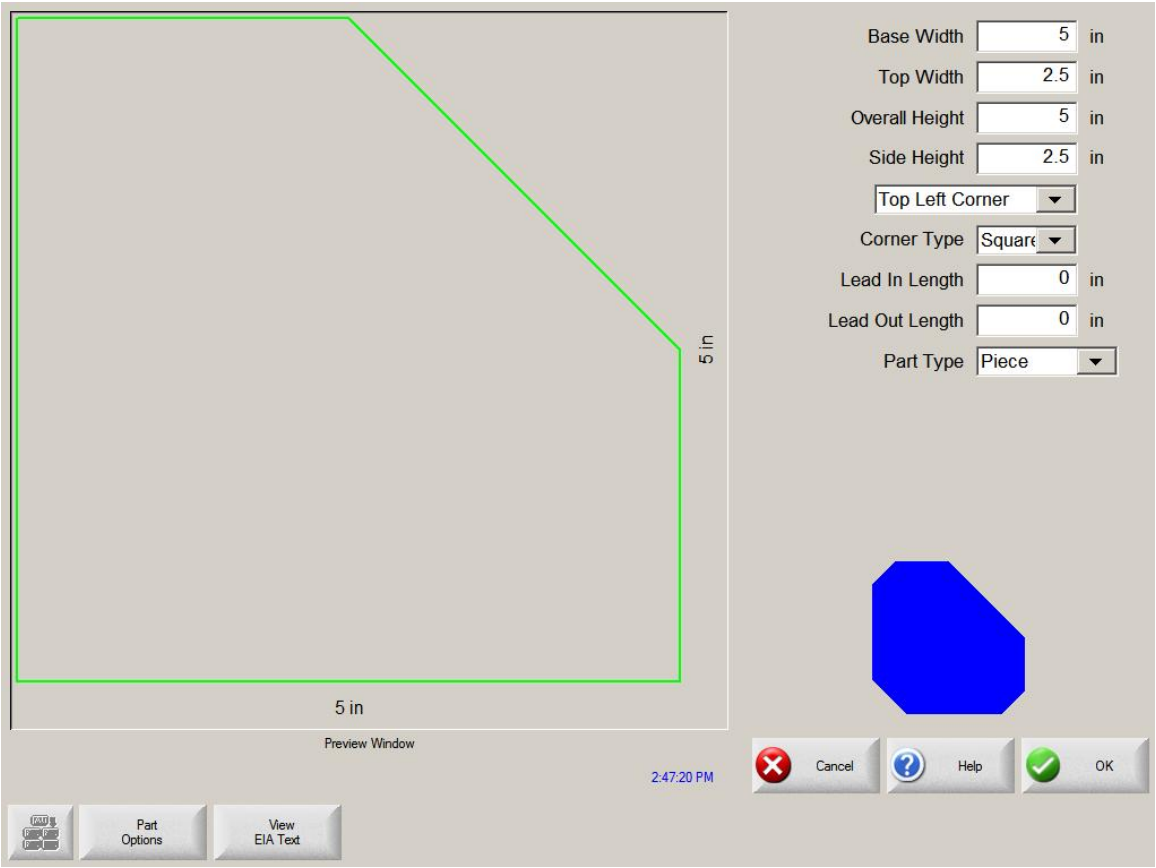
Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Top Width	Enter the width of the top of the part.
Overall Height	Enter the height of the part from the base to the top.
Side Height	Enter the height of the right side of the part. The height of the side must be less than the overall height of the part.
Hole Diameter	Enter the diameter of the hole within the part.
Side to Hole	Enter the distance from the left side of the part to the center of the circle within it.
Top to Hole	Enter the distance from the top of the part to the center of the circle within it.
Lead In Radius	Enter the radius of the lead-in arc.
Overburn Length	Parts that contain a circular element use overburn. Overburn specifies the arc length that the torch will travel past the circle closure point. The dimension entered is the chord length of the overburn-arc. In some cases it is desirable to have an underburn length. For these conditions, enter a negative number for the overburn length.
Lead Out Radius	Enter the radius of the lead-out arc.

Slant Rectangle with Beveled Corners



Library Shape Setup

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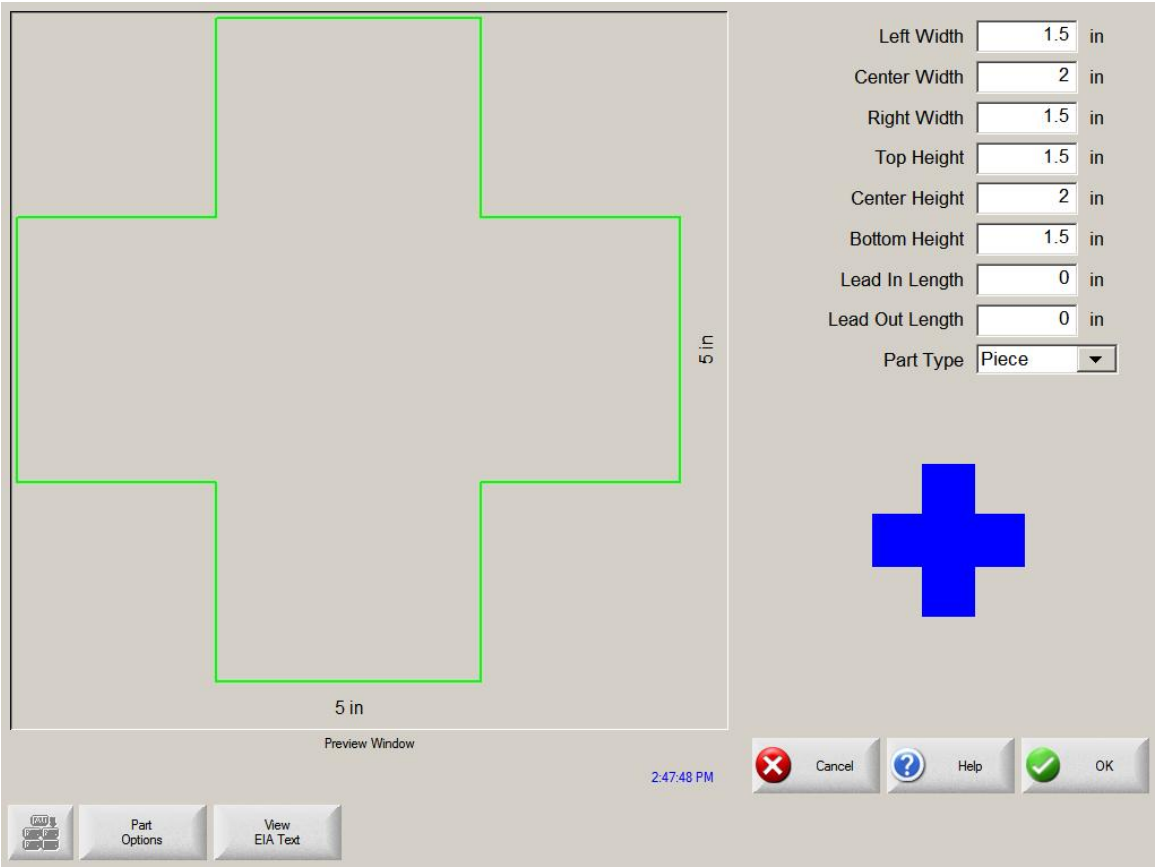
Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Top Width	Enter the width of the top of the part.
Overall Height	Enter the height of the part from the base to the top.
Side Height	Enter the height of the right side of the part. The height of this side must be less than the height of the left side.
Corner Selection	Use the dropdown list to select a corner of the part. Use the remaining fields to specify the style of that corner. Repeat your selections for up to three corners.
Corner Type	Use the dropdown list to select a square or bevel corner. If you select a bevel corner, use the Corner Width and Corner Height fields to enter the dimensions of the bevel.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

Cross



Library Shape Setup

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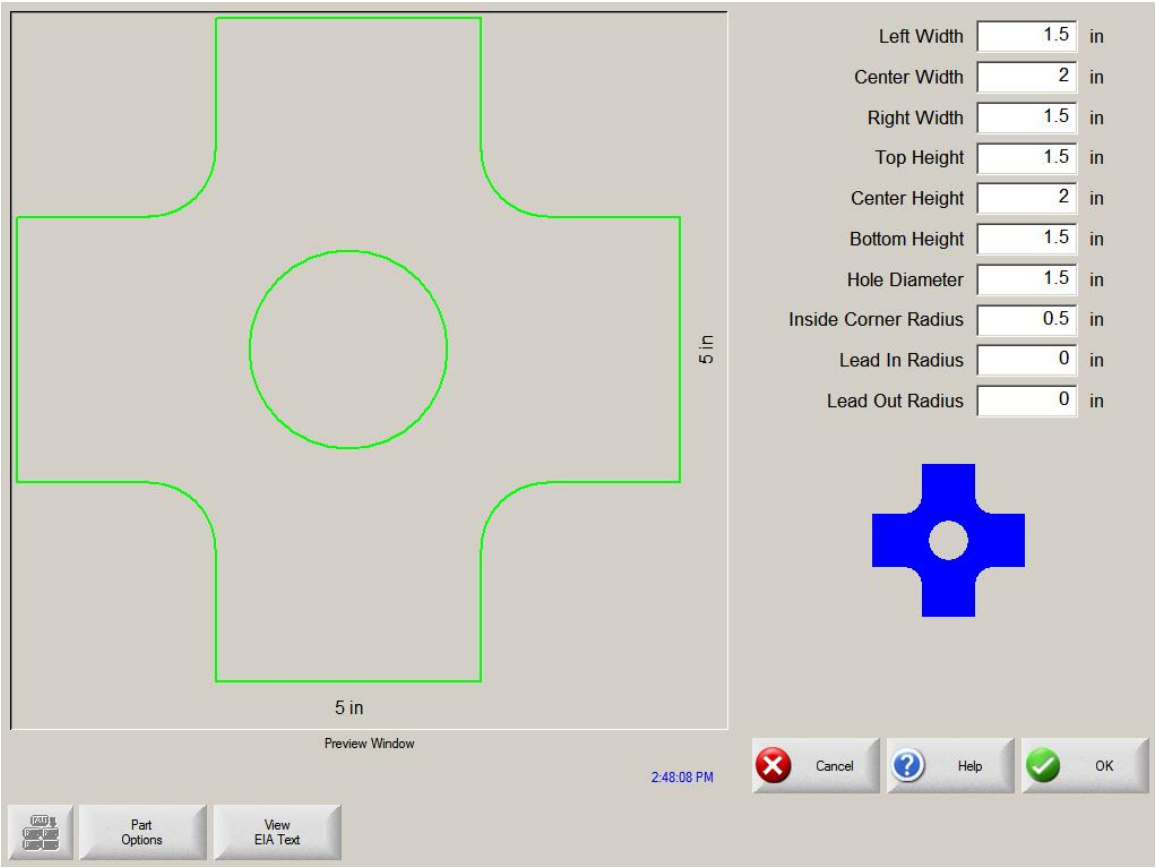
While you are entering parameters, the control is performing some general checks for proper geometries. If the control finds a set of parameters that conflict, a warning message is displayed and the parameters in conflict are highlighted in red.

Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Left Width	Enter the width of the left side of the part.
Center Width	Enter the width of the center of the part.
Right Width	Enter the width of the right side of the part.
Top Height	Enter the height of the top of the part.
Center Height	Enter the height of the central portion of the part.
Bottom Height	Enter the height of the bottom portion of the part
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

Cross with Circular Hole and Concave Inside Corners



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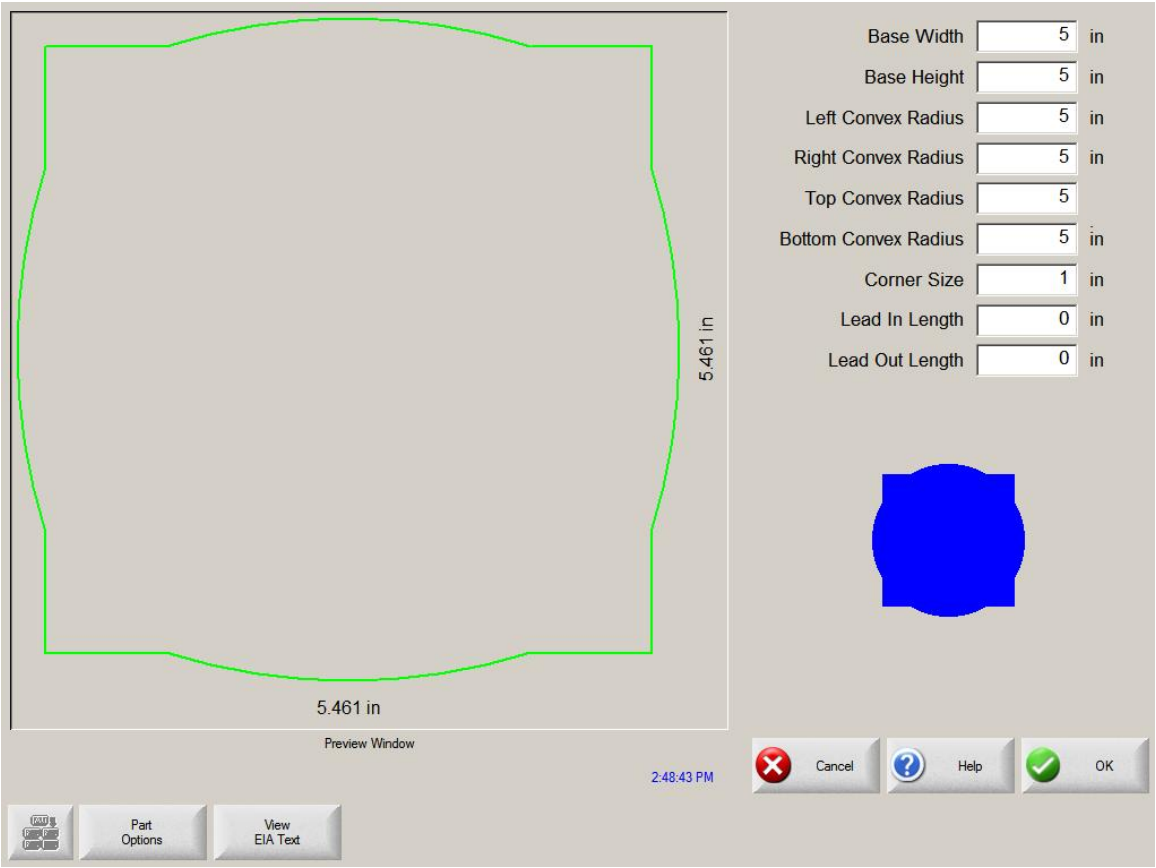
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Left Width	Enter the width of the left side of the part.
Center Width	Enter the width of the center of the part.
Right Width	Enter the width of the right side of the part.
Top Height	Enter the height of the top of the part.
Center Height	Enter the height of the central portion of the part.
Bottom Height	Enter the height of the bottom portion of the part
Hole Diameter	Enter the length of the diameter of the hole within the part.
Inside Corner Radius	Enter the length of the radius of the curve on the inside of the corner.
Lead In Radius	Enter the radius of the lead-in arc.
Lead Out Radius	Enter the radius of the lead-out arc.

4 Sided Convex Rectangle



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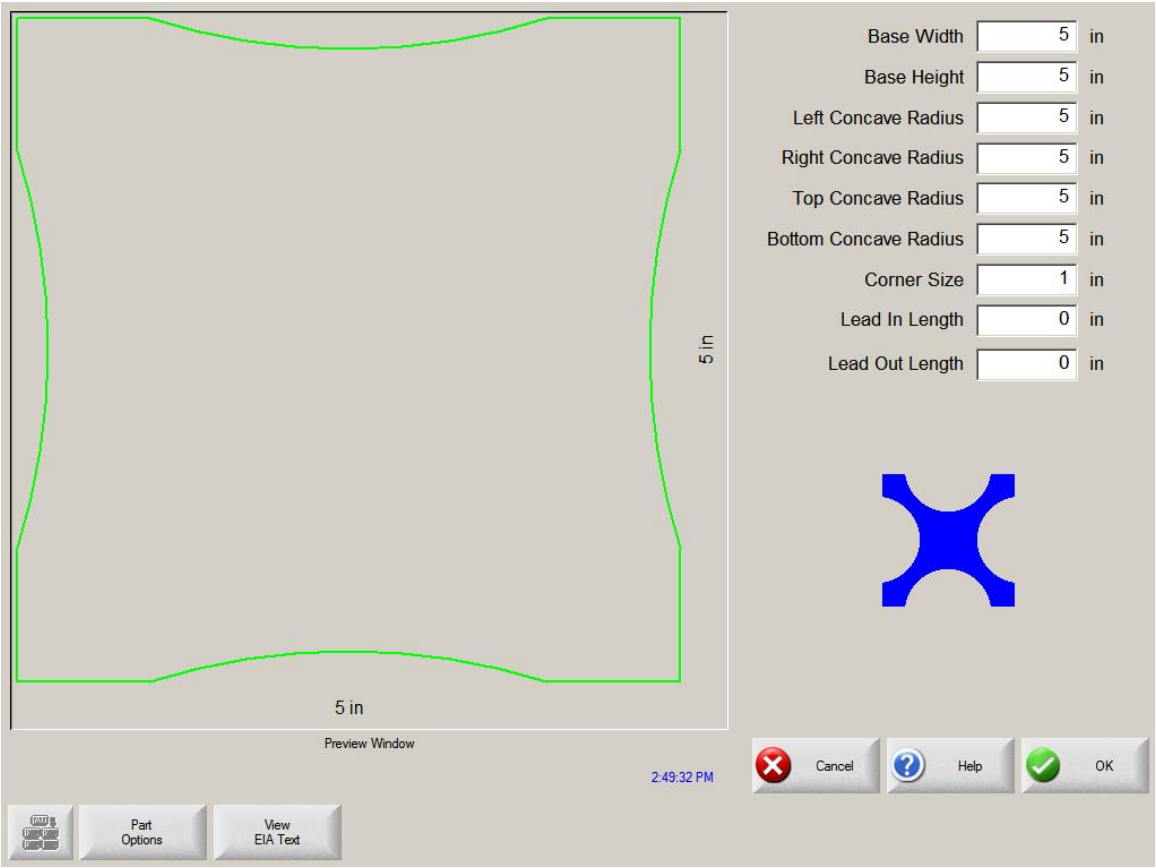
Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the rectangular base of the part.
Base Height	Enter the height of the rectangular portion of the part.
Left Convex Radius	Enter the length of the radius of the left convex side of the part.
Right Convex Radius	Enter the length of the radius of the right convex side of the part.
Top Convex Radius	Enter the length of the radius of the top convex side of the part.
Bottom Convex Radius	Enter the length of the radius of the right convex side of the part.
Corner Size	Enter the length and height of the corners of the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.

4 Sided Concave Rectangle



Library Shape Setup

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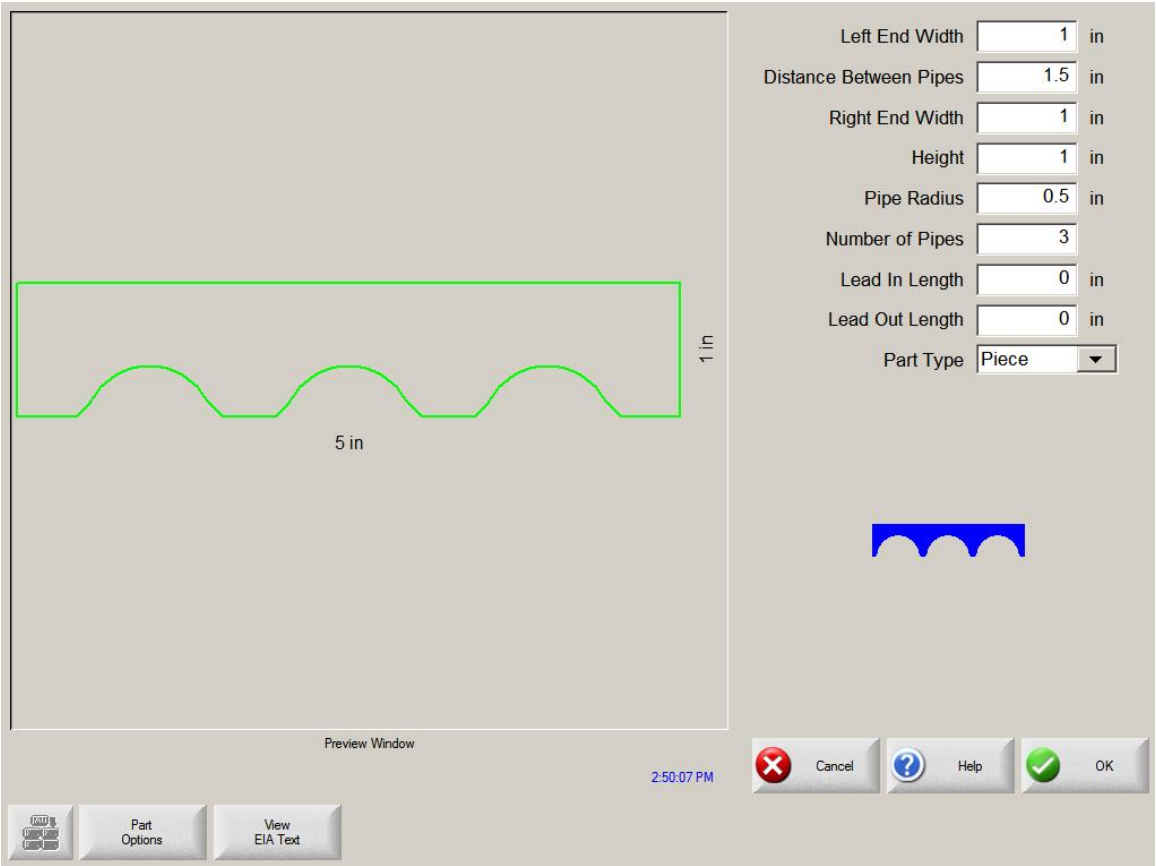
Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Base Height	Enter the height of the part from the base to the top.
Left Concave Radius	Enter the length of the radius of the left concave side of the part.
Right Concave Radius	Enter the length of the radius of the right concave side of the part.
Top Concave Radius	Enter the length of the radius of the top concave side of the part.
Bottom Concave Radius	Enter the length of the radius of the bottom concave side of the part.
Corner Size	Enter the length and height of the corners of the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.

Pipe Mount



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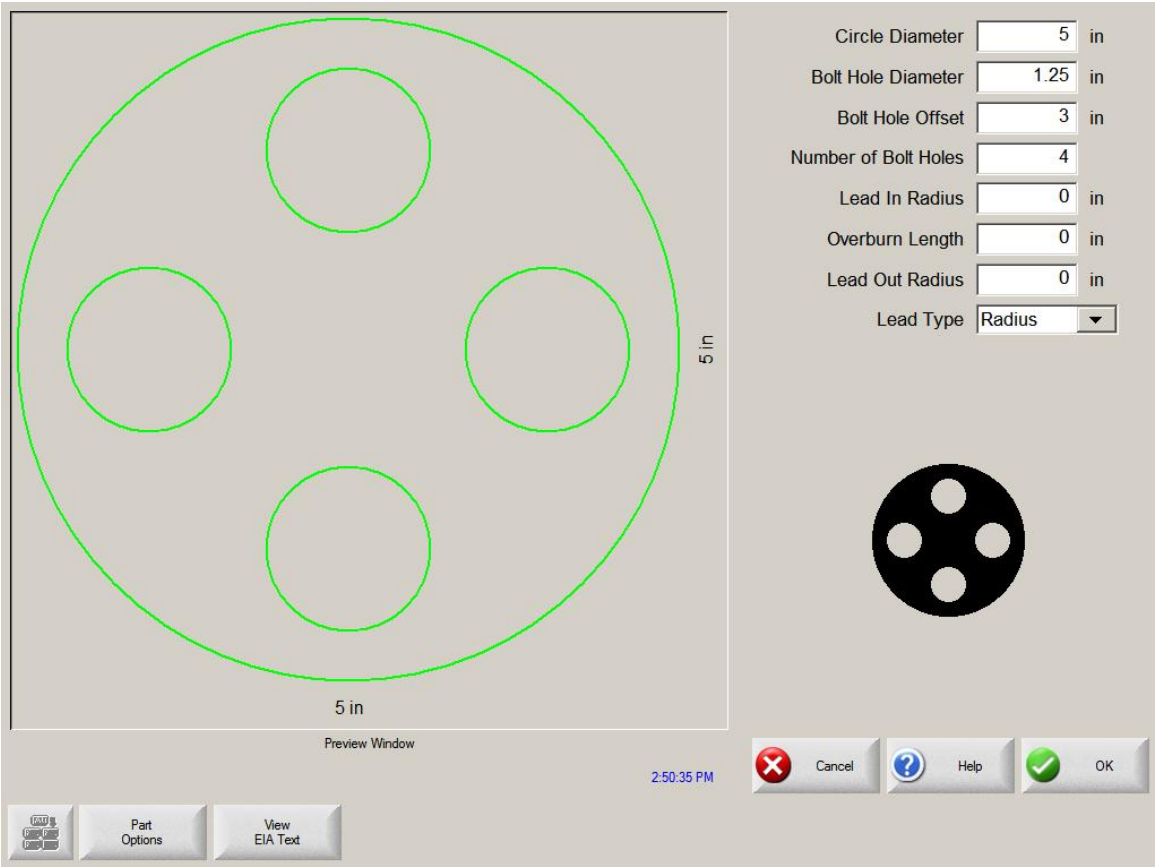
Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Left End Width	Enter the distance between the left side and the center of the left pipe.
Distance Between Pipes	Enter the distance between the center of the pipes.
Right End Width	Enter the distance between the right side and the center of the right pipe.
Height	Enter the height of the part.
Pipe Radius	Enter the radius (measured vertically) of the pipes.
Number of Pipes	Enter the number of pipes in the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

Bolt Hole Circle



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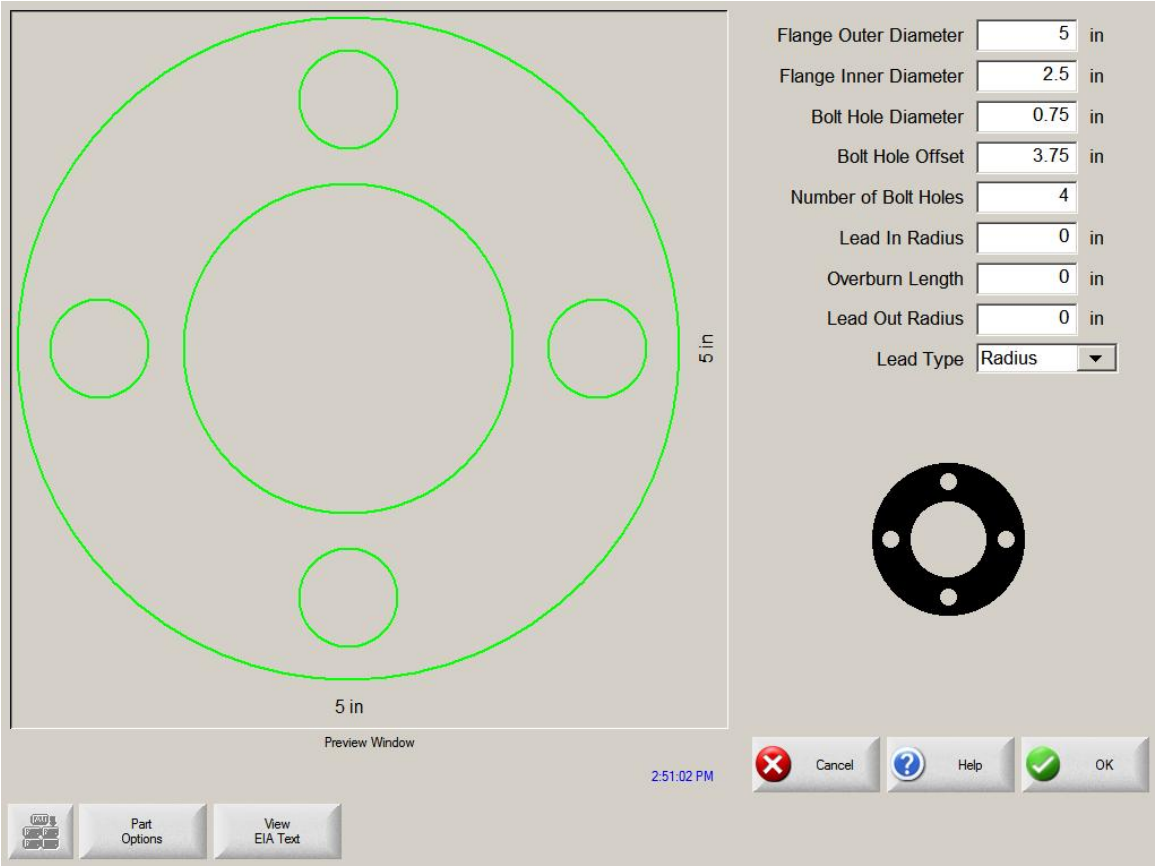
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Circle Diameter	Enter the length of the diameter of the part.
Bolt Hole Diameter	Enter the length of the diameter of the bolt holes.
Bolt Hole Offset	Enter the distance between the centers of the bolt holes .
Number of Bolt Holes	Enter the number of bolt holes within the part.
Lead In Radius	Enter the radius of the lead-in arc.
Overburn Length	Parts that contain a circular element use overburn. Overburn specifies the arc length that the torch will travel past the circle closure point. The dimension entered is the chord length of the overburn-arc. In some cases it is desirable to have an underburn length. For these conditions, enter a negative number for the overburn length.
Lead Out Radius	Enter the radius of the lead-out arc.
Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Bolt Hole Flange



Library Shape Setup

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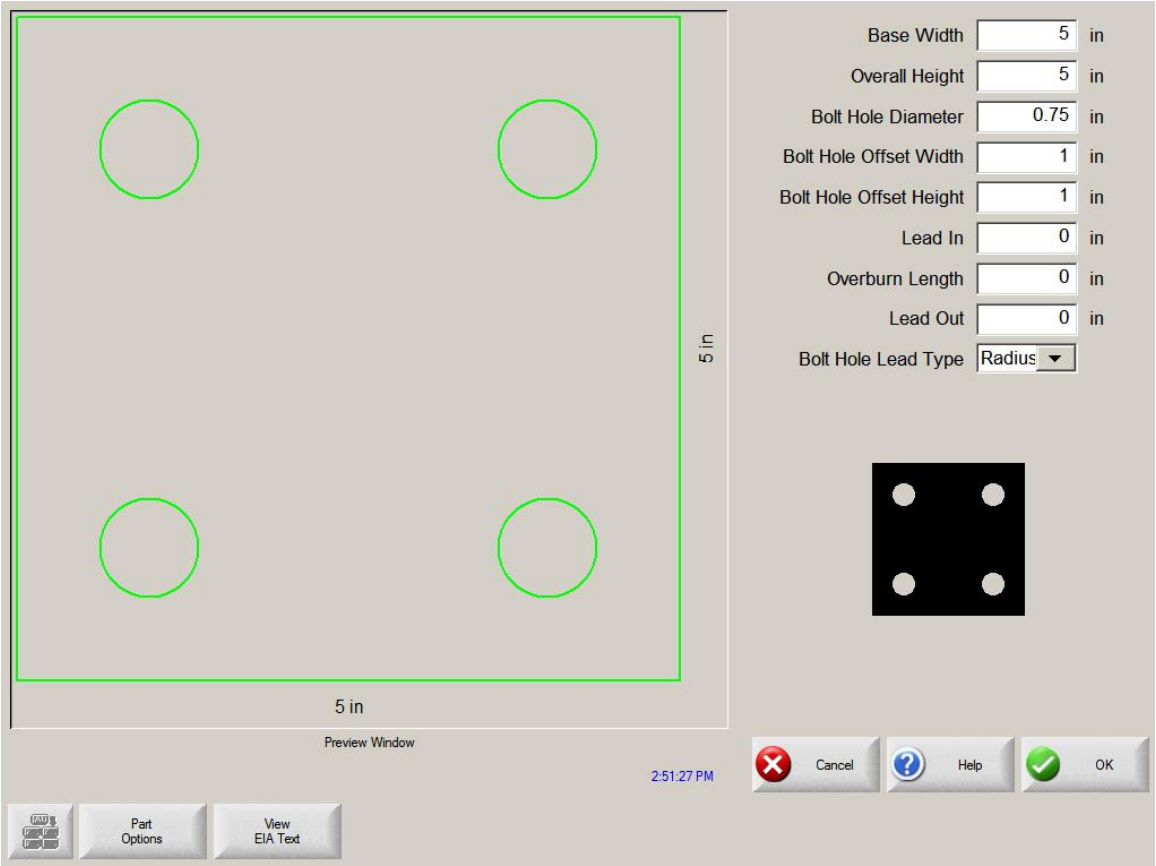
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Flange Outer Diameter	Enter the length of the diameter of the outer edge of the part.
Flange Inner Diameter	Enter the length of the diameter of the circle at the center of the part.
Bolt Hole Diameter	Enter the length of the diameter of the bolt holes.
Bolt Hole Offset	Enter the distance between the centers of the bolt holes .
Number of Bolt Holes	Enter the number of bolt holes within the part.
Lead In Radius	Enter the radius of the lead-in arc.
Overburn Length	Parts that contain a circular element use overburn. Overburn specifies the arc length that the torch will travel past the circle closure point. The dimension entered is the chord length of the overburn-arc. In some cases it is desirable to have an underburn length. For these conditions, enter a negative number for the overburn length.
Lead Out Radius	Enter the radius of the lead-out arc.
Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Bolt Hole Rectangle



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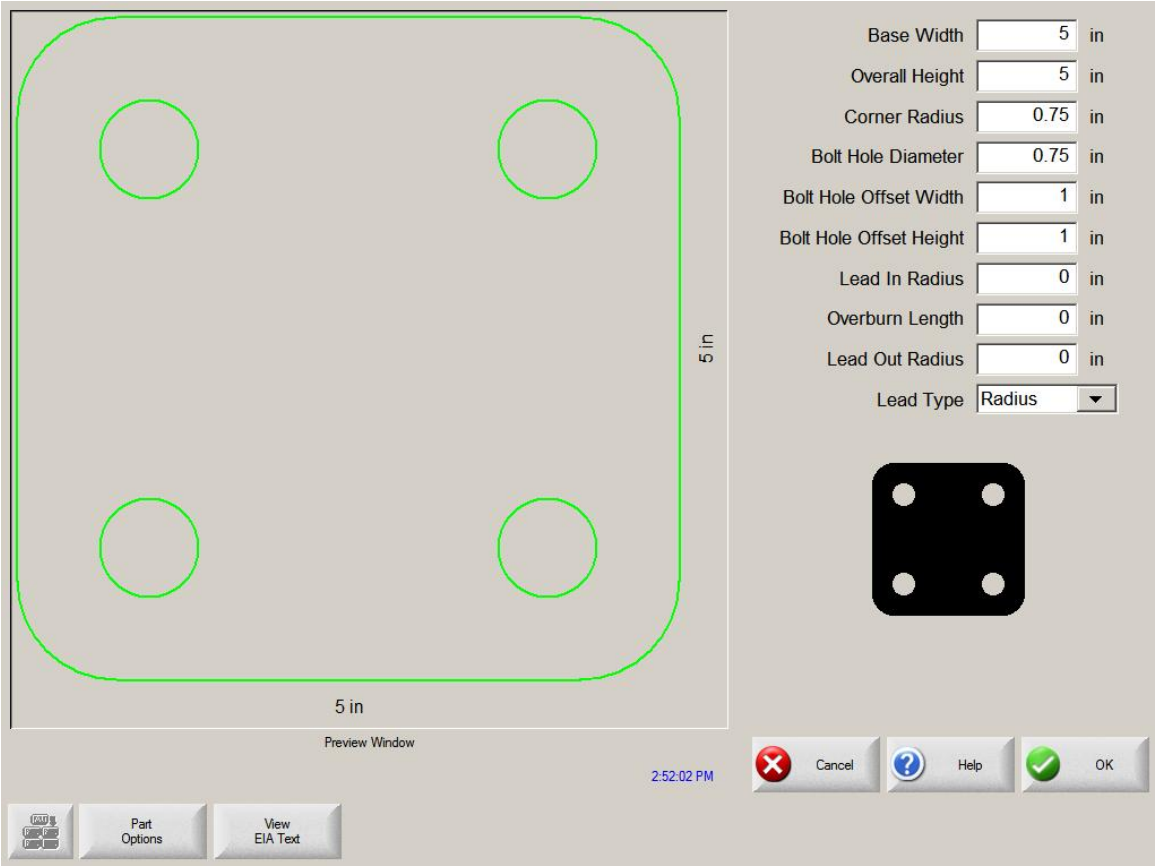
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Overall Height	Enter the height of the part from the base to the top.
Bolt Hole Diameter	Enter the length of the diameter of the bolt holes.
Bolt Hole Offset Width	Enter the distance between the center of the bolt holes and the side of the part.
Bolt Hole Offset Height	Enter the distance between the center of the bolt holes and the top or bottom of the part.
Lead In	Enter the radius of the lead-out arc.
Overburn Length	Parts that contain a circular element use overburn. Overburn specifies the arc length that the torch will travel past the circle closure point. The dimension entered is the chord length of the overburn-arc. In some cases it is desirable to have an underburn length. For these conditions, enter a negative number for the overburn length.
Lead Out	Enter the radius of the lead-out arc.
Bolt Hole Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Bolt Hole Rectangle with Convex Corners



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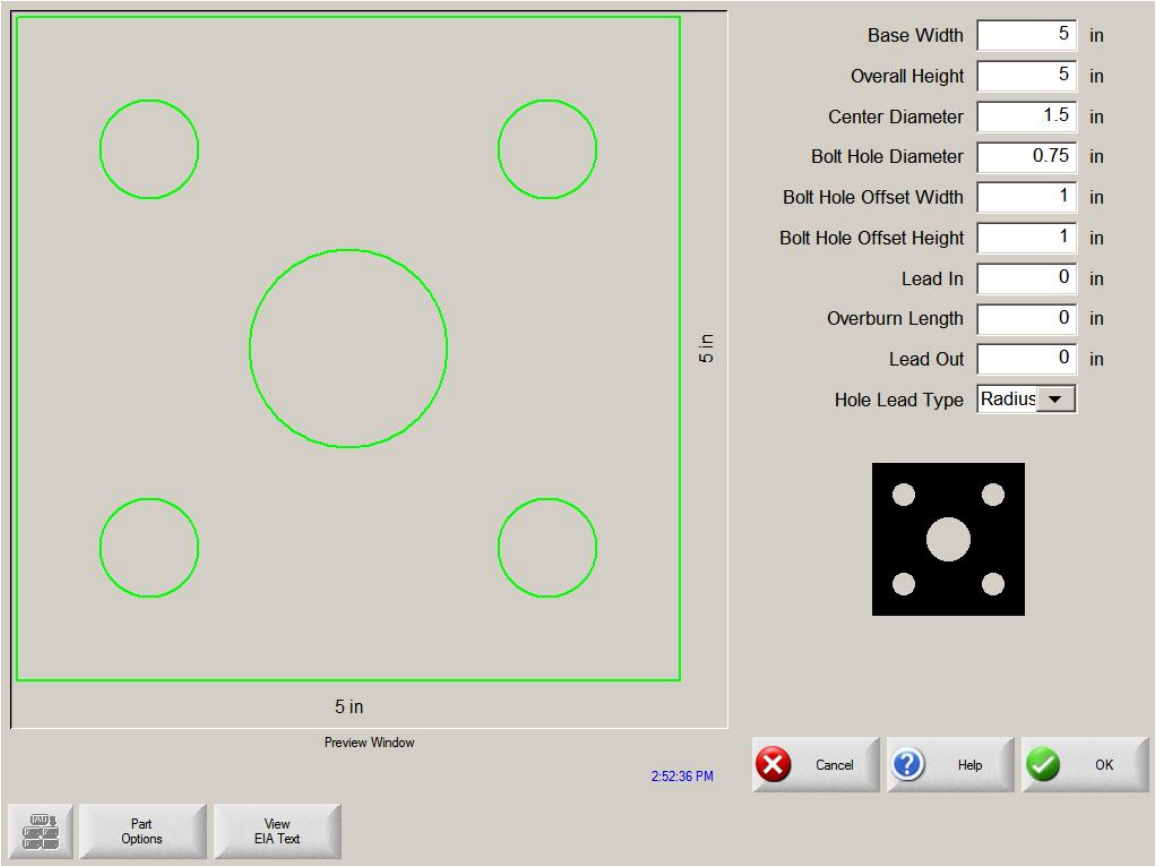
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Overall Hieght	Enter the height of the part from the base to the top.
Corner Radius	Enter the length of the radius of the convex corners.
Bolt Hole Diameter	Enter the length of the diameter of the bolt holes.
Bolt Hole Offset Width	Enter the distance between the center of the bolt holes and the side of the part.
Bolt Hole Offset Height	Enter the distance between the center of the bolt holes and the top or bottom of the part.
Lead In Radius	Enter the radius of the lead-in arc.
Overburn Length	Parts that contain a circular element use overburn. Overburn specifies the arc length that the torch will travel past the circle closure point. The dimension entered is the chord length of the overburn-arc. In some cases it is desirable to have an underburn length. For these conditions, enter a negative number for the overburn length.
Lead Out Radius	Enter the radius of the lead-out arc.
Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Bolt Hole Rectangle with Center Hole



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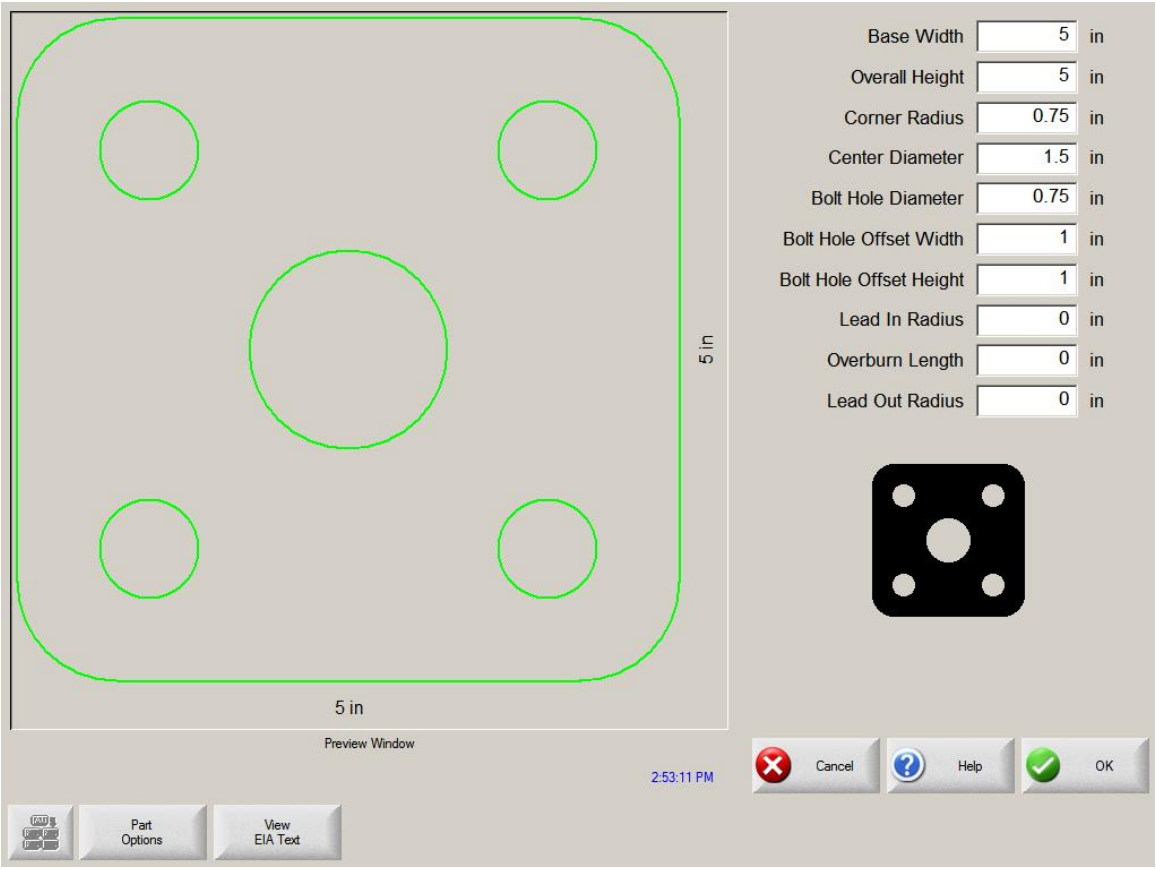
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Overall Height	Enter the height of the part from the base to the top.
Center Diameter	Enter the length of the diameter of the central hole.
Bolt Hole Diameter	Enter the length of the diameter of the bolt holes.
Bolt Hole Offset Width	Enter the distance between the center of the bolt holes and the side of the part.
Bolt Hole Offset Height	Enter the distance between the center of the bolt holes and the top or bottom of the part.
Lead-In/ Lead-Out	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Overburn Length	Parts that contain a circular element use overburn. Overburn specifies the arc length that the torch will travel past the circle closure point. The dimension entered is the chord length of the overburn-arc. In some cases it is desirable to have an underburn length. For these conditions, enter a negative number for the overburn length.
Hole Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Bolt Hole Rectangle with Center Hole and Convex Corners



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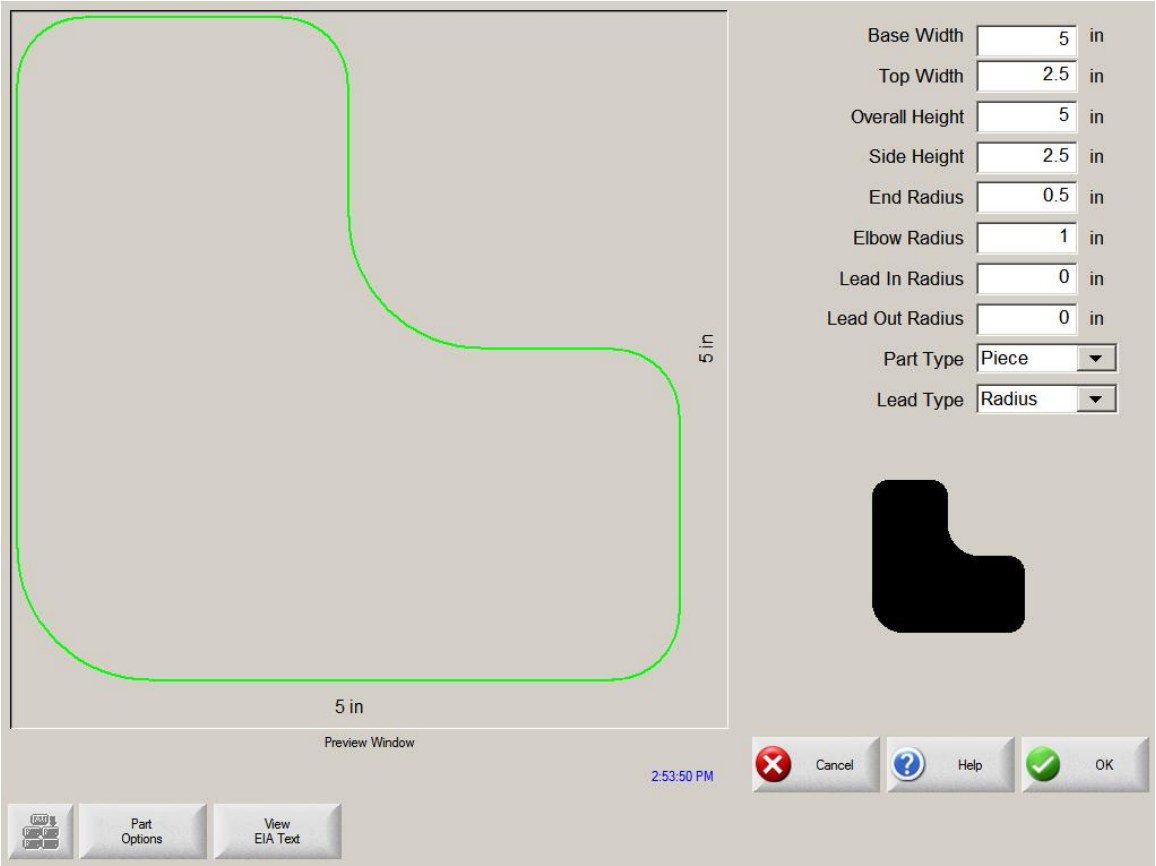
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Overall Height	Enter the height of the part from the base to the top.
Corner Radius	Enter the radius of the convex corners.
Center Diameter	Enter the diameter of the central hole.
Bolt Hole Diameter	Enter the diameter of the bolt holes.
Bolt Hole Offset Width	Enter the distance between the center of the bolt holes and the side of the part.
Bolt Hole Offset Height	Enter the distance between the center of the bolt holes and the top or bottom of the part.
Lead In Radius	Enter the radius of the lead-in arc.
Overburn Length	Parts that contain a circular element use overburn. Overburn specifies the arc length that the torch will travel past the circle closure point. The dimension entered is the chord length of the overburn-arc. In some cases it is desirable to have an underburn length. For these conditions, enter a negative number for the overburn length.
Lead Out Radius	Enter the radius of the lead-out arc.

Rounded L-Bracket



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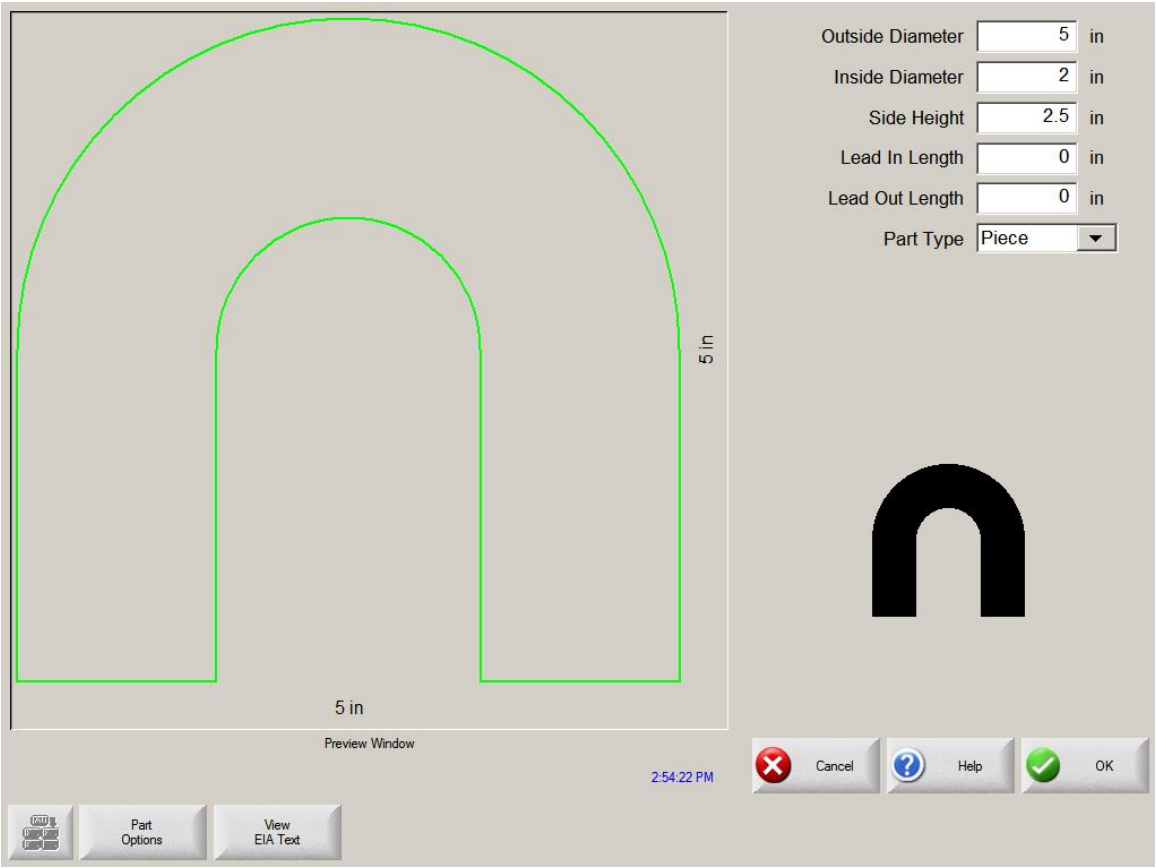
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Top Width	Enter the width of the top of the part.
Overall Height	Enter the height of the part from the base to the top.
Side Height	Enter the height of the right side.
End Radius	Enter the length of the radius of the curve at the corners of the part.
Elbow Radius	Enter the length of the radius of the curve at the elbow of the part.
Lead In Radius	Enter the radius of the lead-in arc.
Lead Out Radius	Enter the radius of the lead-out arc.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.
Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Horseshoe



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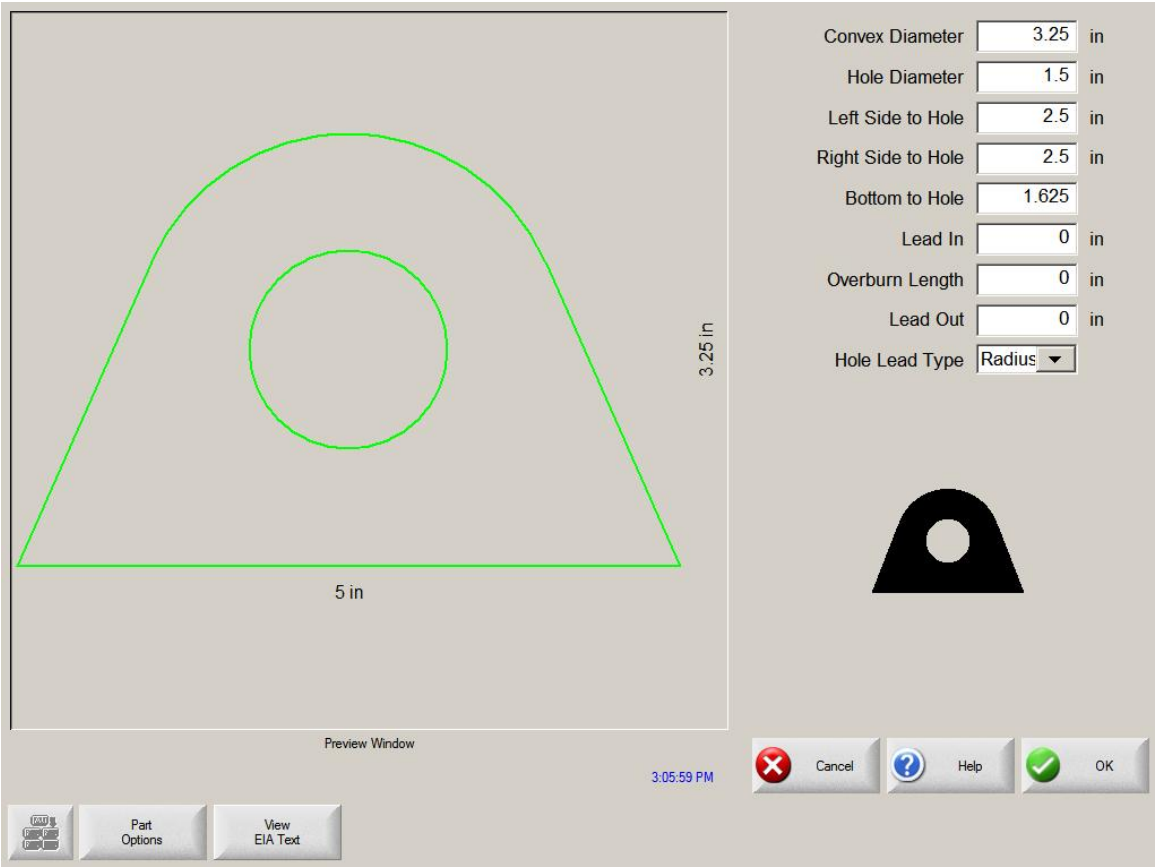
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Outside Diameter	Enter the diameter of the outside curved portion of the part.
Inside Diameter	Enter the diameter of the inside curved portion of the part.
Side Height	Enter the height of the straight sides of the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Part Type	Indicate whether you want to cut the part as a separate piece (Piece) or as a hole in a larger part (Hole). The Chain option is available for simple shapes that have external cut paths.

Convex Roof Trapezoid with Hole



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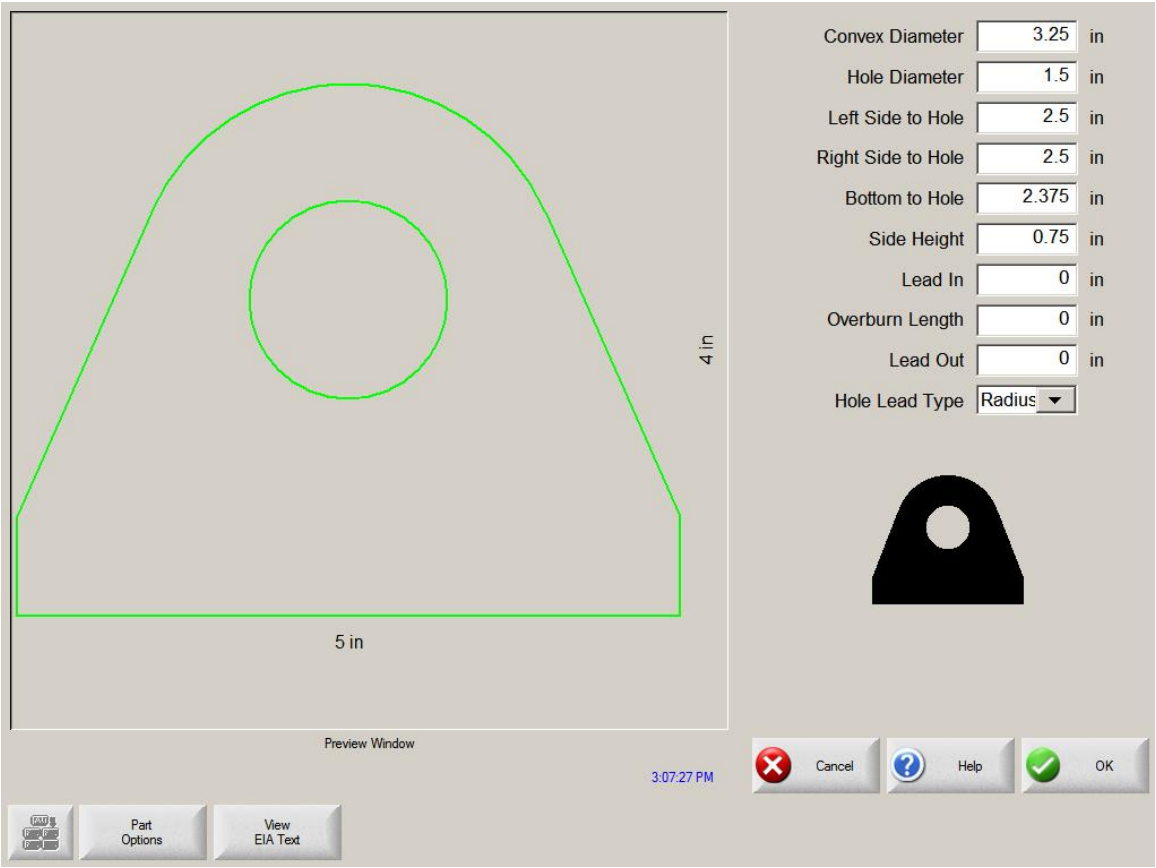
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Convex Diameter	Enter the diameter of the convex portion of the part.
Hole Diameter	Enter the diameter of the hole within the part.
Left Side to Hole	Enter the distance between the left corner of the base to the center of the circle.
Right Side to Hole	Enter the distance between the right corner of the base to the center of the circle.
Bottom to Hole	Enter the distance between the base and the center of the circle.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Overburn Length	Parts that contain a circular element use overburn. Overburn specifies the arc length that the torch will travel past the circle closure point. The dimension entered is the chord length of the overburn-arc. In some cases it is desirable to have an underburn length. For these conditions, enter a negative number for the overburn length.
Hole Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Convex Roof Polygon with Hole



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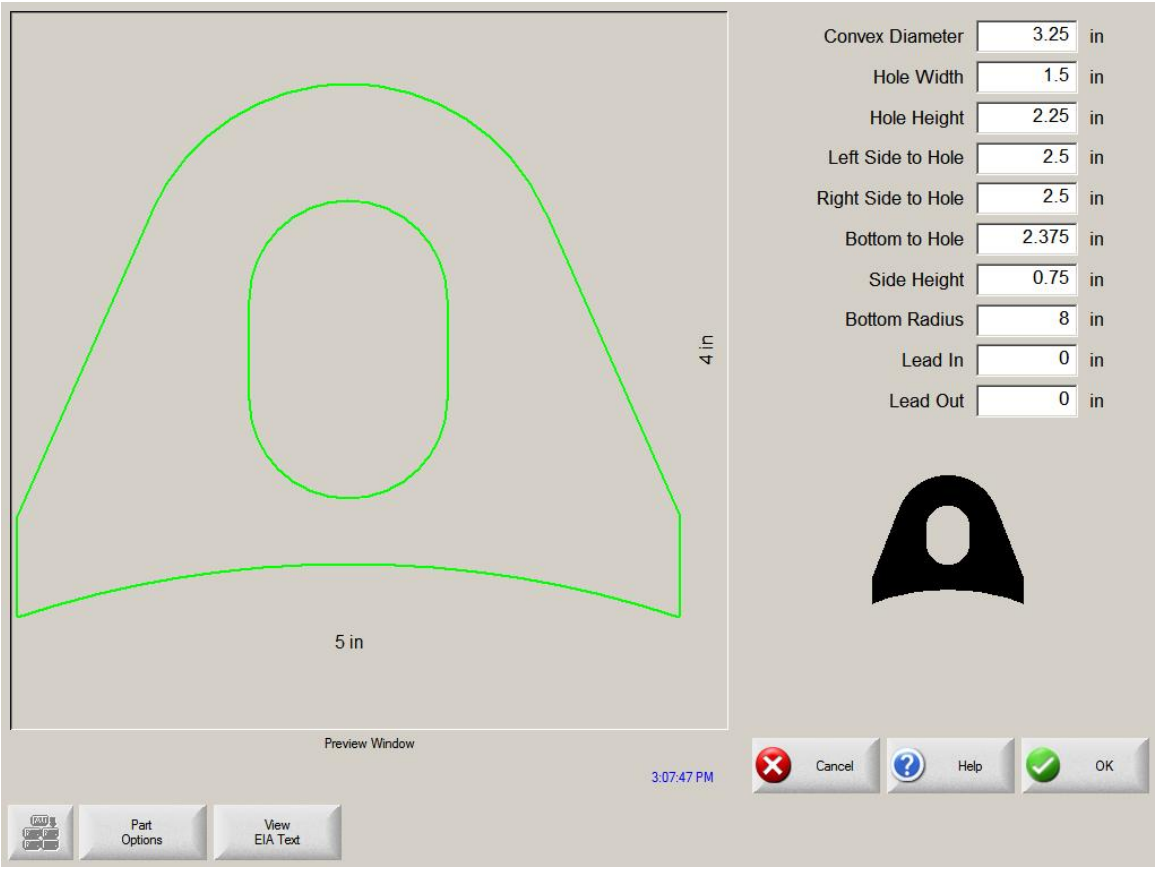
Note: The system does not check for all incorrect geometries and it is possible to enter a part that does not make geometric sense.

As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Convex Diameter	Enter the diameter of the convex portion of the part.
Hole Diameter	Enter the diameter of the hole within the part.
Left Side to Hole	Enter the distance between the left corner of the base to the center of the circle.
Right Side to Hole	Enter the distance between the right corner of the base to the center of the circle.
Bottom to Hole	Enter the distance between the base and the center of the circle.
Side Height	Enter the height of the straight sides of the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.
Overburn Length	Parts that contain a circular element use overburn. Overburn specifies the arc length that the torch will travel past the circle closure point. The dimension entered is the chord length of the overburn-arc. In some cases it is desirable to have an underburn length. For these conditions, enter a negative number for the overburn length.
Hole Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Convex Roof Polygon with Oval Hole and Concave Bottom



Library Shape Setup

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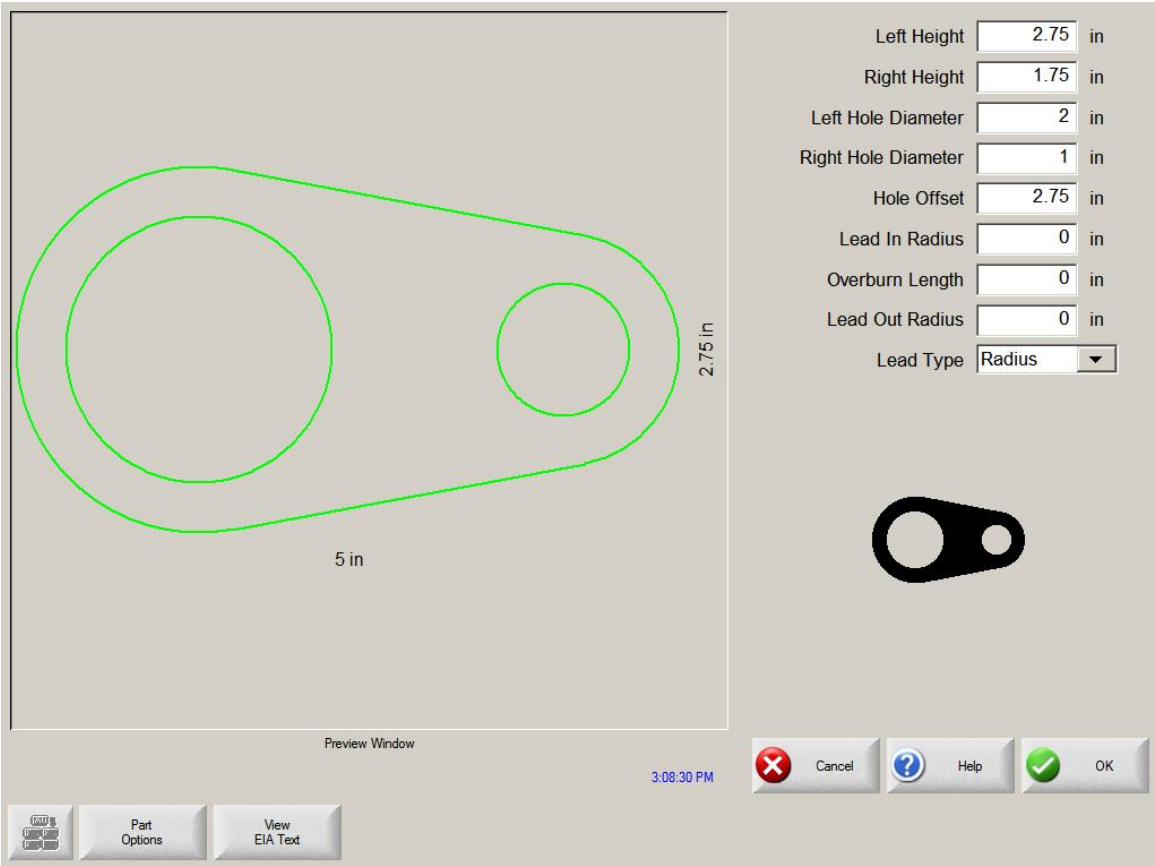
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Convex Diameter	Enter the diameter of the convex portion of the part.
Hole Width	Enter the width of the hole within the part.
Hole Height	Enter the height of the hole within the part.
Left Side to Hole	Enter the distance between the left corner of the base to the center of the hole.
Right Side to Hole	Enter the distance between the right corner of the base to the center of the hole.
Bottom to Hole	Enter the distance between the base and the center of the hole.
Side Height	Enter the height of the straight sides of the part.
Bottom Radius	Enter the radius of the curve on the bottom of the part.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.

Pulley Cover



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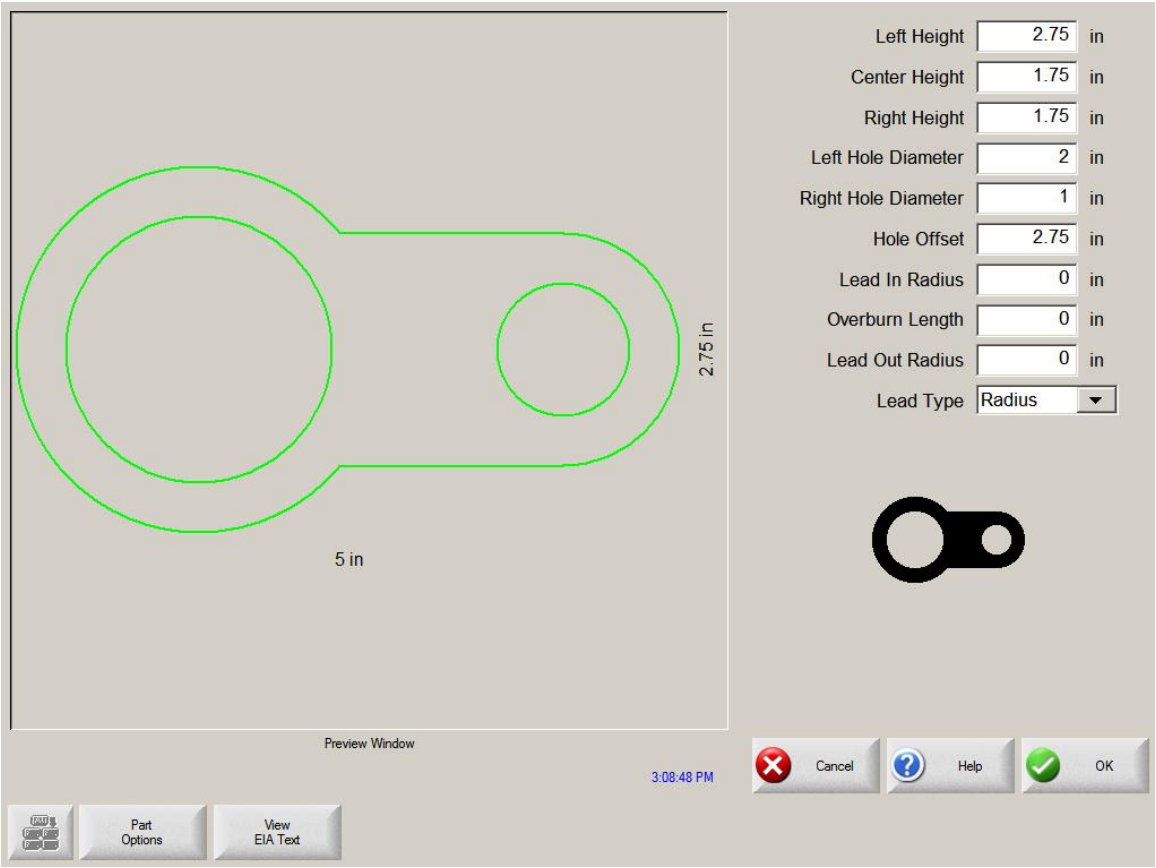
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Left Height	Enter the diameter of the outside, left edge.
Right Height	Enter the diameter of the outside, right edge.
Left Hole Diameter	Enter the diameter of the left hole within the part.
Right Hole Diameter	Enter the diameter of the right hole within the part.
Hole Offset	Enter the distance between the centers of the two holes.
Lead In Radius	Enter the radius of the lead-in arc.
Overburn Length	Parts that contain a circular element use overburn. Overburn specifies the arc length that the torch will travel past the circle closure point. The dimension entered is the chord length of the overburn-arc. In some cases it is desirable to have an underburn length. For these conditions, enter a negative number for the overburn length.
Lead Out Radius	Enter the radius of the lead-out arc.
Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Paddle Blind



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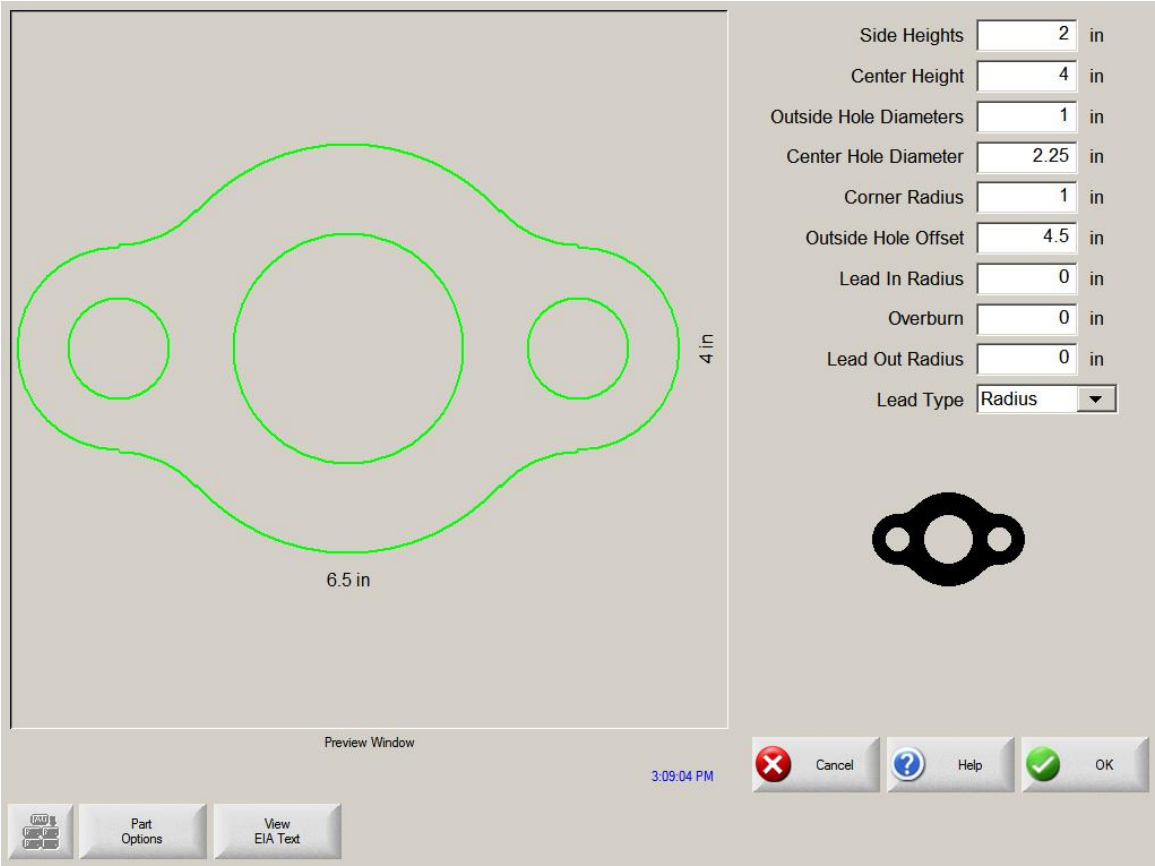
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Left Height	Enter the diameter of the outside, left edge.
Center Height	Enter the height of the center of the part.
Right Height	Enter the diameter of the outside, right edge.
Left Hole Diameter	Enter the diameter of the left hole within the part.
Right Hole Diameter	Enter the diameter of the right hole within the part.
Hole Offset	Enter the distance between the centers of the two holes.
Lead In Radius	Enter the radius of the lead-in arc.
Overburn Length	Parts that contain a circular element use overburn. Overburn specifies the arc length that the torch will travel past the circle closure point. The dimension entered is the chord length of the overburn-arc. In some cases it is desirable to have an underburn length. For these conditions, enter a negative number for the overburn length.
Lead Out Radius	Enter the radius of the lead-out arc.
Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Water Pump Gasket



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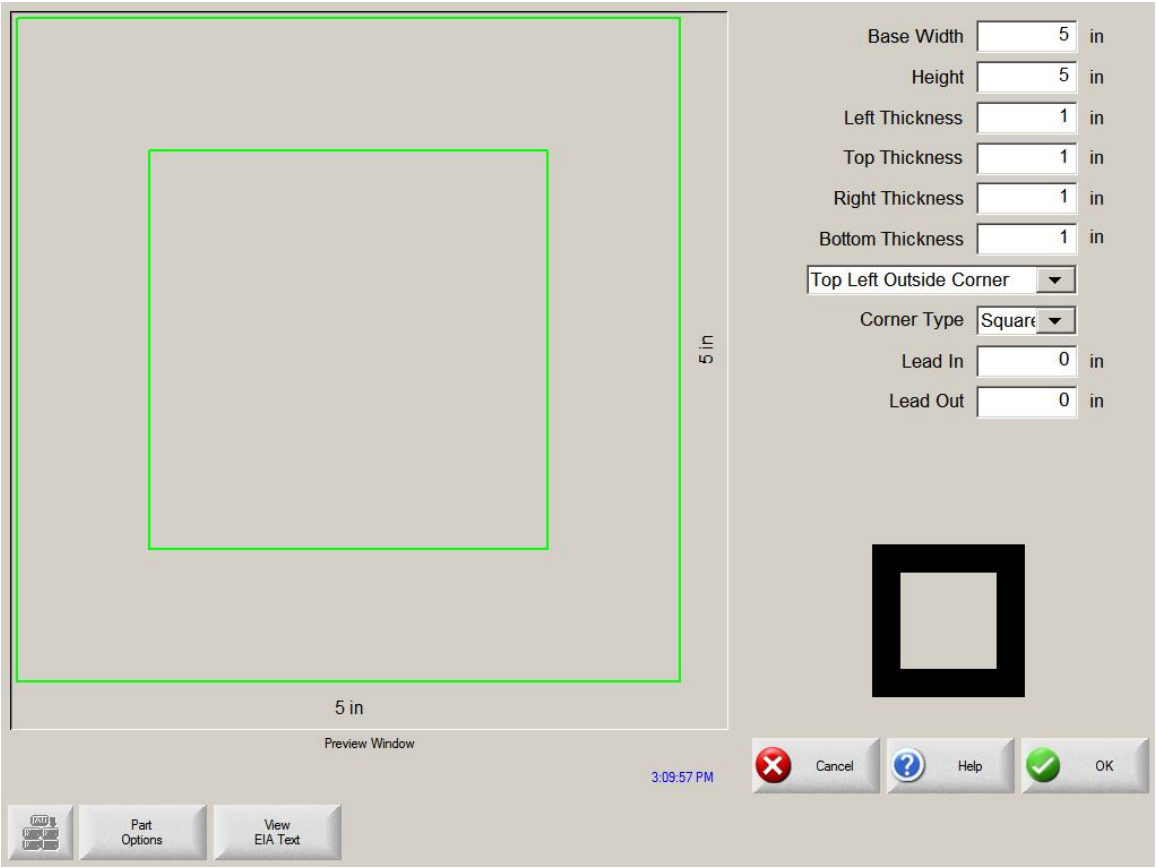
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Side Heights	Enter the diameter of the outside edges of the sides of the part.
Center Height	Enter the diameter of the outside, center edge of the part.
Outside Hole diameters	Enter the diameters of the outside holes within the part.
Center Hole Diameter	Enter the diameter of the center hole.
Corner Radius	Enter the radius of the curve in the corners of the part.
Outside Hole Offset	Enter the distance between the centers of the outside holes.
Lead In Radius	Enter the radius of the lead-in arc.
Overburn	Parts that contain a circular element use overburn. Overburn specifies the arc length that the torch will travel past the circle closure point. The dimension entered is the chord length of the overburn-arc. In some cases it is desirable to have an underburn length. For these conditions, enter a negative number for the overburn length.
Lead Out Radius	Enter the radius of the lead-out arc.
Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Frame



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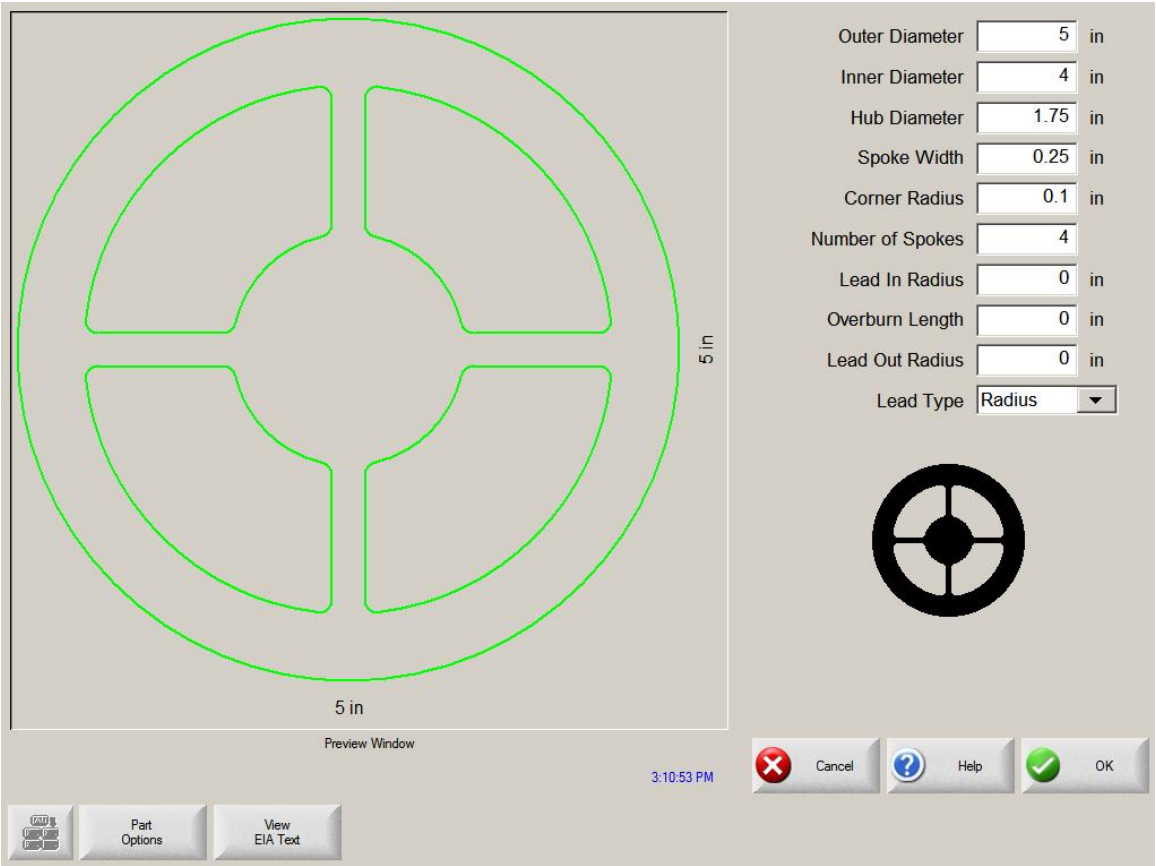
As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base Width	Enter the width of the base of the part.
Height	Enter the height of the part.
Left Thickness	Enter the distance between the inner and outer edges on the left side of the part.
Top Thickness	Enter the distance between the inner and outer edges on the top of the part.
Right Thickness	Enter the distance between the inner and outer edges on the right side of the part.
Bottom Thickness	Enter the distance between the inner and outer edges on the bottom of the part.
Corner Selection	Use the dropdown list to select a corner of the part. Use the remaining fields to specify the style of that corner. Repeat your selections for up to three corners.
Corner Type	Use the dropdown list to select a square, bevel, or round corner. • If you select a bevel corner, use the Corner Width and Corner Height fields to enter the dimensions of the bevel. • If you select a round corner, use the Corner Radius field to enter the radius of the corner.
Lead-In/ Lead-Out Length	Enter the appropriate value to ensure proper piercing (lead-in) and gas bleed-off (lead-out) to obtain optimum cut quality. The location for the lead-in and lead-out is fixed, but can be changed by using the ShapeWizard and then saving the new shape to disk.

Pulley



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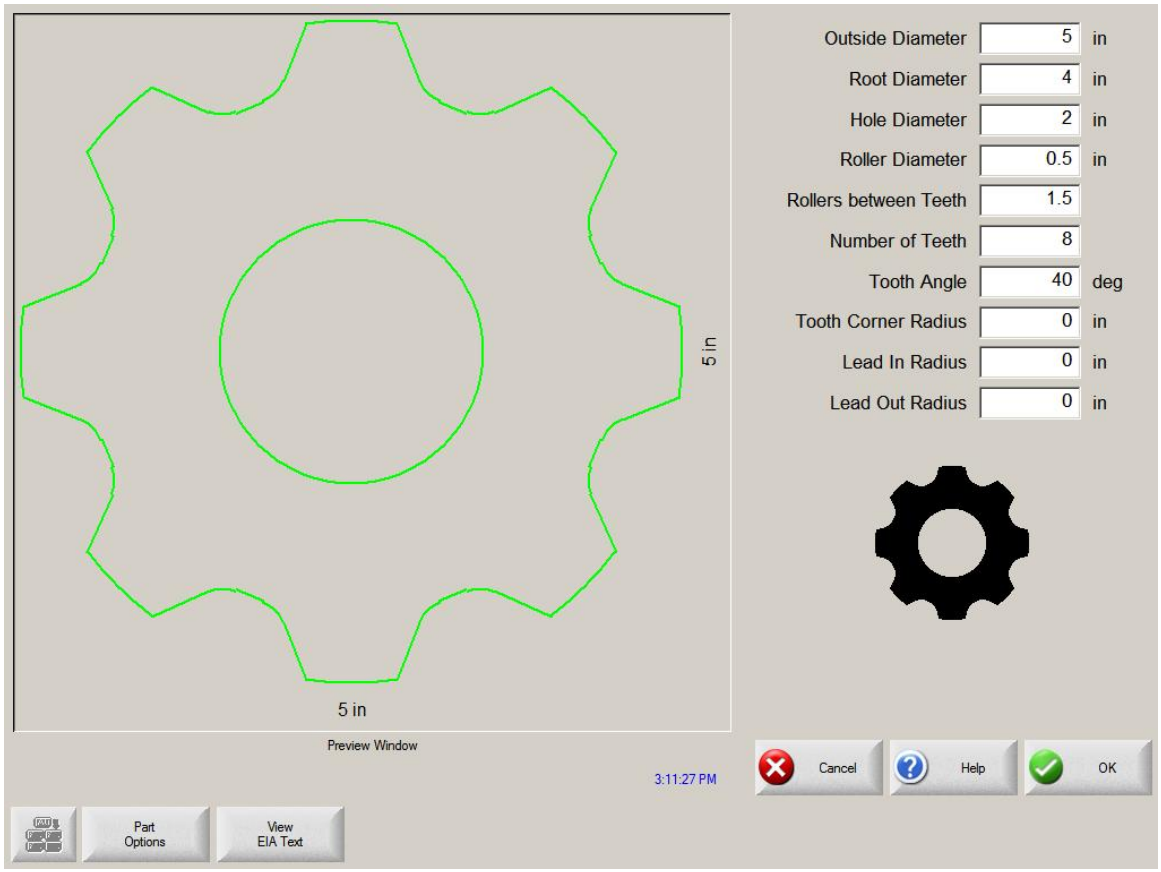
Outer Diameter	Enter the diameter of the outside edge of the part.
Inner Diameter	Enter the diameter of the inside edge of the part.
Hub Diameter	Enter the diameter of the hub in the center of the part.
Spoke Width	Enter the width of the spokes of the part.
Corner Radius	Enter the radius of the curve in the corners of the part.
Number of Spokes	Enter the number of spokes in the part.
Lead In Radius	Enter the radius of the lead-in arc.
Overburn Length	Parts that contain a circular element use overburn. Overburn specifies the arc length that the torch will travel past the circle closure point. The dimension entered is the chord length of the overburn-arc. In some cases it is desirable to have an underburn length. For these conditions, enter a negative number for the overburn length.
Lead Out Radius	Enter the radius of the lead-out arc.
Lead Type	Depending on the shape you select, the style of the lead in/ lead out can be selected as radius, lock or straight line. The lock style lead-in creates greater stability for the part and is only available if the part type is set to piece. Lead-in selection is only available if the part type is set to piece or hole. **Note:** Some shapes offer drop down fields to increase options with additional parameters.

Sprocket



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As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Outside Diameter	Enter the diameter of the outside edges of the teeth on the sprocket.
Root Diameter	Enter the diameter of the part at the root of the curves between the teeth of the sprocket.
Hole Diameter	Enter the diameter of the hole in the center of the part.
Roller Diameter	Enter the diameter of the roller that defines the curve at the corners of the roots of the tooth.
Rollers between Teeth	Enter the number of rollers that fit between the root corners of the teeth.
Number of Teeth	Enter the number of teeth on the sprocket.
Tooth Angle	Enter the number of degrees of the angle of the straight side of the tooth.
Tooth Corner Radius	Enter the radius of the curve at the corner of the teeth.
Lead In Radius	Enter the radius of the lead-in arc.
Lead Out Radius	Enter the radius of the lead-out arc.

Text

Library Shape Setup

Enter the correct dimensions to create the part you require. There is a small Help icon in the lower right hand corner of the display to indicate which parameter the control is looking for. The current parameter is highlighted with a yellow arrow.

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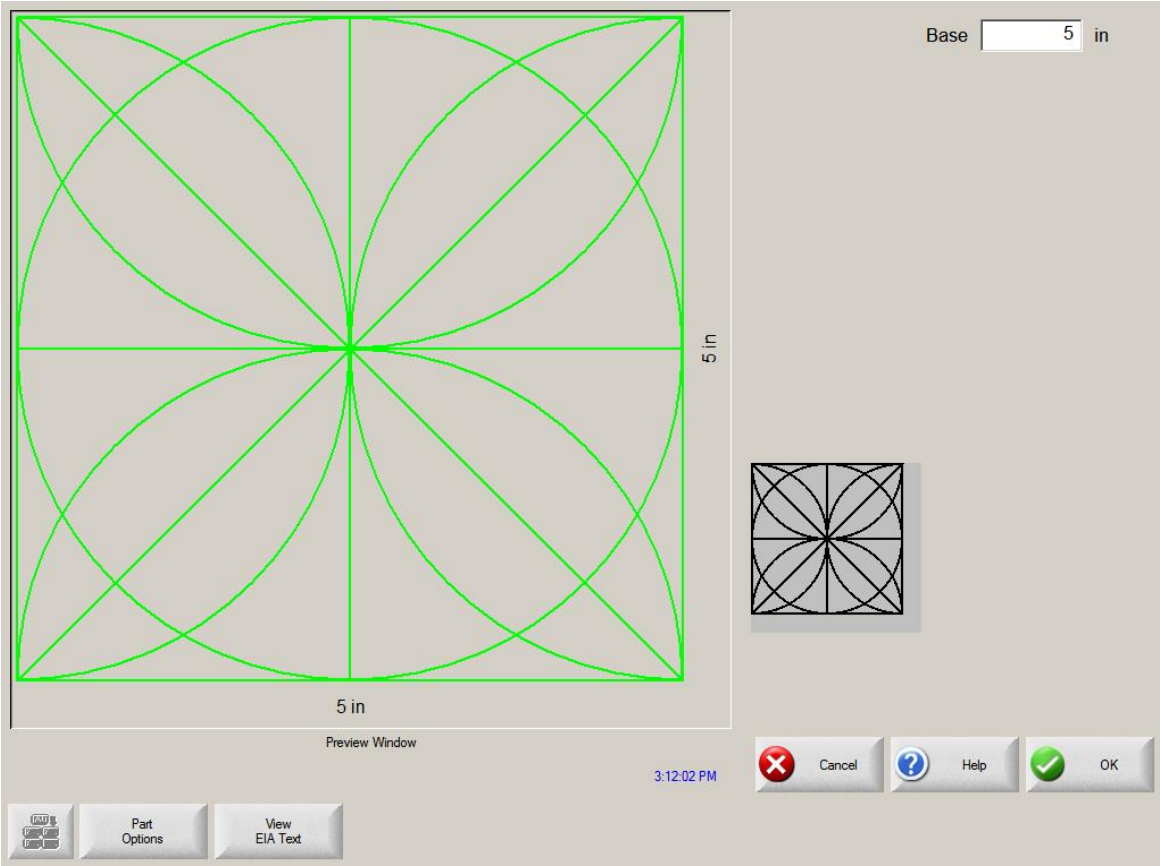
Character Height	Enter the height of the characters in the text.
Text	Use the radio buttons to select whether the text will be cut or marked. If you select Marked, use the dropdown lists to select the marker and the offset.
Text	Enter the text you want to cut or mark.

Test Pattern



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As you enter dimensional parameters, the control automatically draws the new shape with the values you enter. This is extremely useful in providing a visual check of the shape that has been entered.

Base	Enter the width of the base of the part.

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