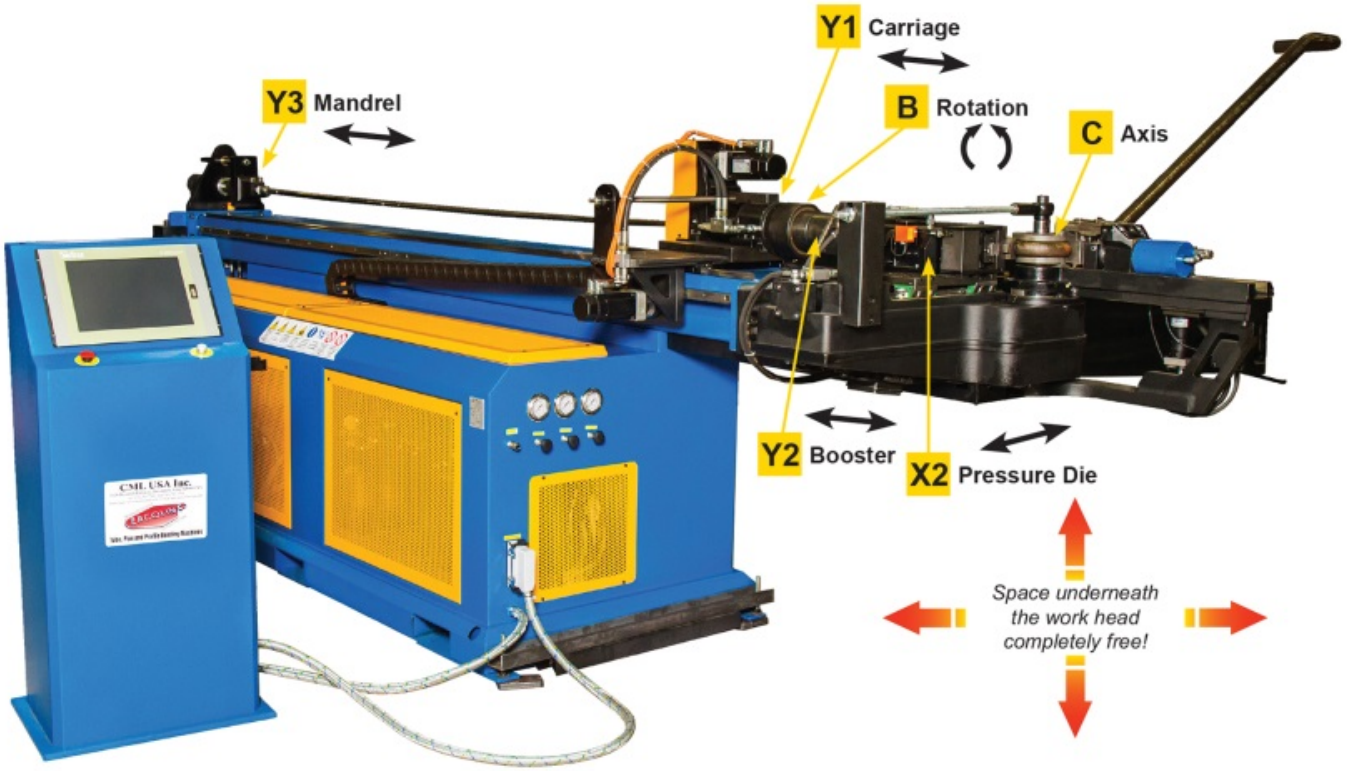
Ercolina Erco-Bender 65/76 Troubleshooting Guide

Machine Axis Identification and Labeling

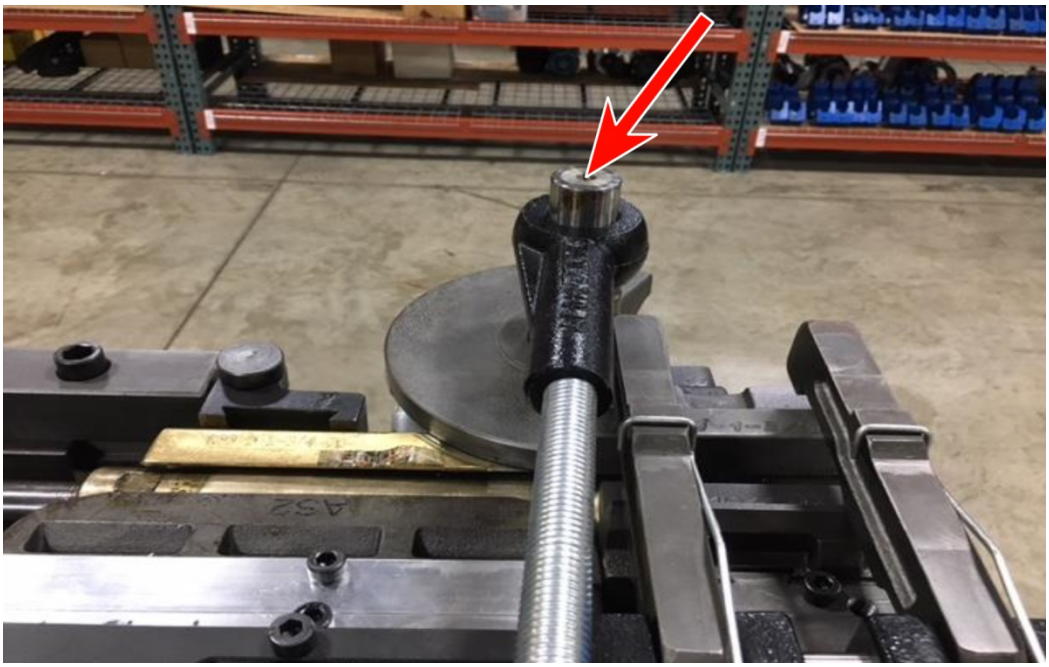
Each axis and function on the ErcoBender has its own distinct label and designation. From the "MANUAL" page each can be controlled by the hand held pendant when selected. This page is extremely useful when initially setting up tooling to determine the "IN" and "OUT" positions of the axis.

- The Y1 axis is the carriage. The linear movement
- The B Axis is for rotation or plane of bend
- The C axis is the bending motion or angle
- The X1 axis is for the bending head linear position. (Not used on the EB65/76 this axis is primarily used on larger machines to shift the head to aid in material loading and unloading.)
- The X2 axis controls the opening and closing of the pressure die.
- The Y2 axis is considered to be the "booster". It pushes material towards the tangent point and regulates the speed of linear travel of the pressure die. (During the bend, the pressure die should travel at the same rate as the C axis during the bend)
- The Y3 axis is the rear mandrel cylinder. It positions the mandrel forward during the bend and extracts it prior to reaching the programmed bend angle.
- Clamp (KST) is an overhead clamping system used on larger CNC models
- Collet is the material holding collet located in the carriage
- Clamp (ARM) operates the finger style clamping system
- Bend Die (ARM) controls the return of the former to home zero
- Open All this function is not operable on the EB65/EB76
- Tube Lub. actuates the internal mandrel lubrication


Y1 Carriage
Y3 Mandrel
B Rotation
C Axis
Y2 Booster
X2 Pressure Die
Space underneath the work head completely free!

Zero Reference Point for all Axes

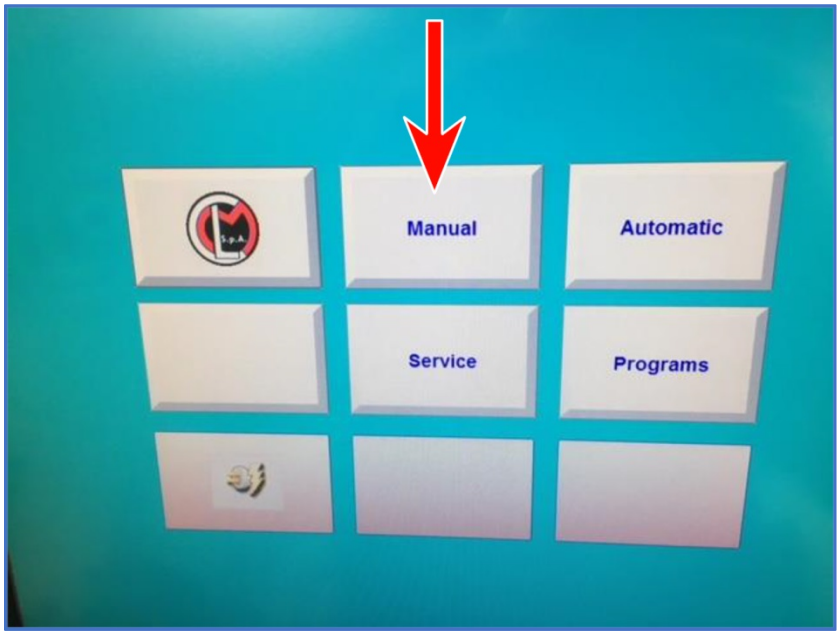
For all reference points, the machine thinks the tooling spindle is “ABSOLUTE” zero. The readings for each axis are measured from this point.



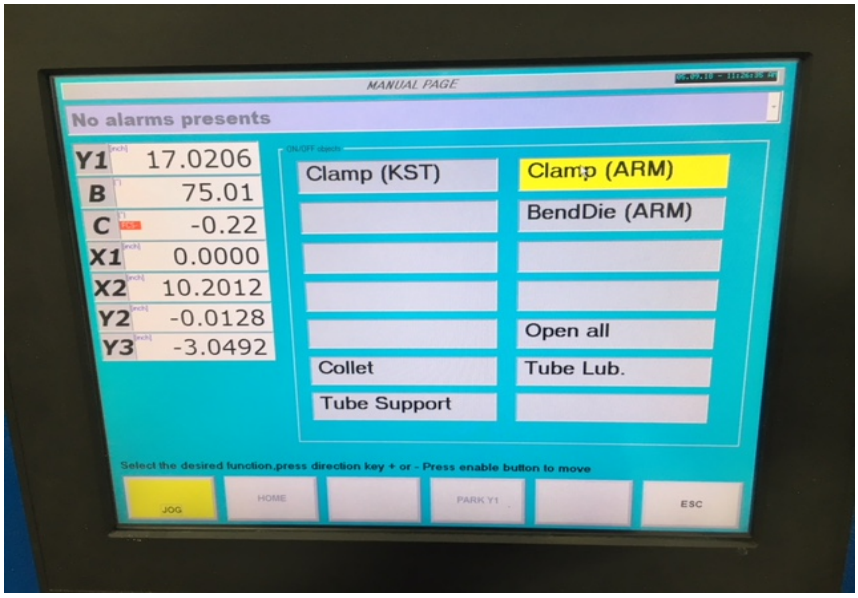
The reference point for all machine axes is the center of the tooling spindle

Manual Page

To access the “MANUAL” page, select the “MANUAL” icon from the home screen.



Use the mouse or touch screen to select



Manual Screen depicted

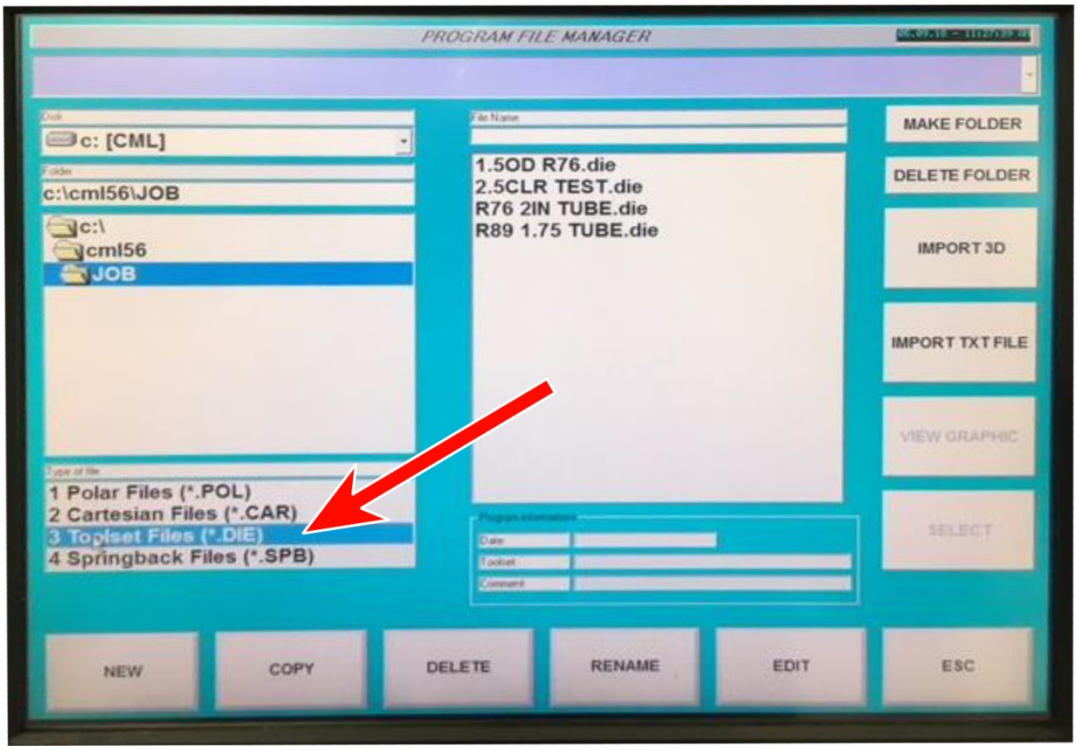
The MANUAL page can be used to move any axis. Highlight the desired axis and use the hand-held pendant to control the movement.

All axes have encoders and the actual position is displayed on the MANUAL page.

Understanding the Tool Set File and Settings

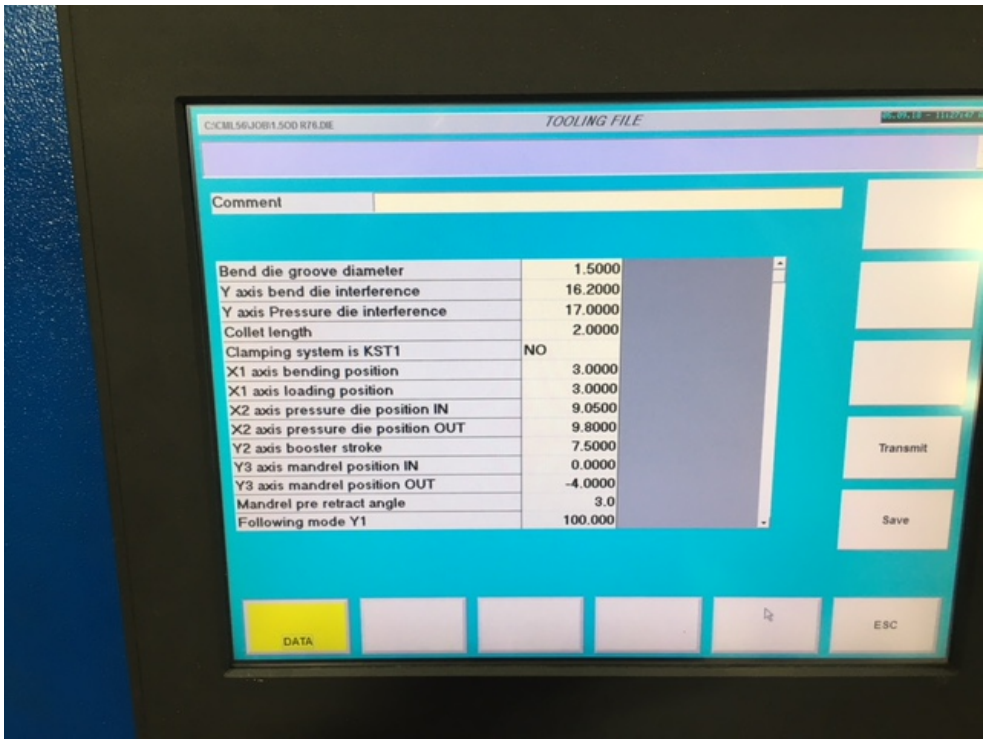
Each machine axis has its own encoder and the positions of the axis are stored for the relative “IN” and “OUT” positions of the axis. This feature makes it quick and simple to change tooling sets since ALL positions are stored and the toolset file is tied to your program or “POLAR” file.

To access the tool set parameters, select “3 Tool Set Files” from the window on the lower left



Then highlight the desired set and push “EDIT”

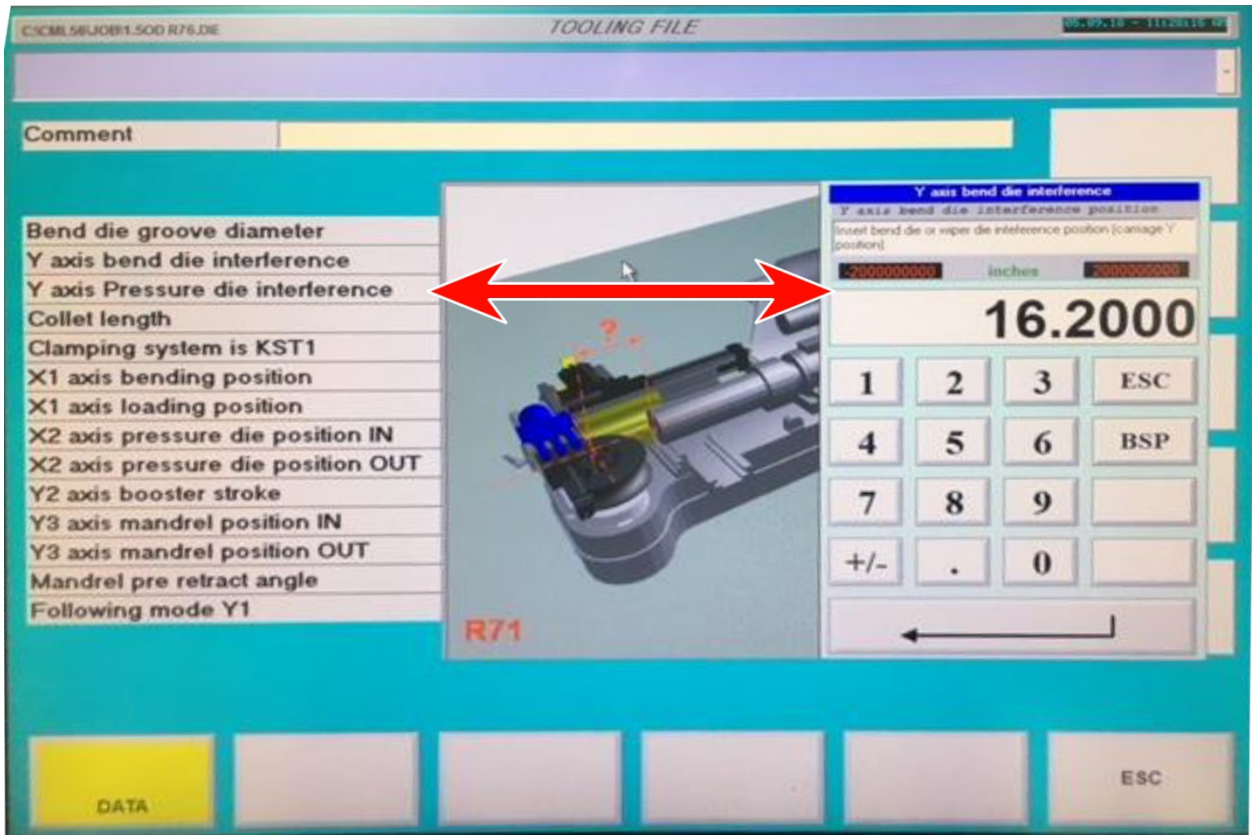
A NEW tool set may also be created by selecting “NEW” and assigning a name to the file using the pop-up keypad.



Toolset file page

Entering Data into a Toolset File

Each line of the tool set file is interactive. Double click the yellow field on the selected line and a pop up graphic will display and tell you what information is required.



Interactive toolset line display

Toolset Terminology

Bend Die Groove Diameter:

The value entered for this should be the actual diameter of the material to be bent.

Y axis bend die interference:

The minimum distance from the tooling spindle at which the carriage would theoretically come into contact with the former or possibly the wiper die bracket.

Y axis Pressure die interference:

The minimum distance from the tooling spindle at which point the carriage would theoretically come into contact with the pressure die or pressure die mounting bracket. This position also becomes the forward “loading” point of the carriage during automatic operation. The carriage will not come past this point and will automatically open the collet and release the material if the written program calls for such a position.

Collet Length:

The length of material held inside the collet during the bending process. A minimum of 2 inches is needed for smaller materials (Under 1-1/2” outside diameter).

Clamping System KST1:

The Sidac control is used on all Ercolina CNC bending machines. KST refers to the clamping system. It is a “clam shell” type clamping system that is utilized on larger machines and materials. It is not used on the Erco Bender series machines.

X1 axis Bending position:

Since the Sidac control is used on larger machines, it is necessary to shift the actual bending head laterally to aid the loading and unloading of larger materials. The EB76/EB65 is not equipped with this option. This value should be set as the CLR of the former mounted.

X1 axis loading position:

(Same as above)

X2 axis pressure die IN:

The position of the pressure die when the pressure die cylinder is extended out and exerting pressure / support of the material to be bent. This value is specific to each toolset file and is saved with the file.

X2 axis pressure die OUT:

The position of the pressure die when the cylinder is retracted and no longer supporting the material. **Note: There must be at least ¾" difference between the IN position and the OUT position of the pressure die.**

Y2 axis booster stroke:

The programmed stroke length of the booster die cylinder. Ideally this value should be greater than the arc length of the programmed bend to properly support the material. If a minimal distance is programmed here, the machine will perform a recapture function until the programmed angle is achieved.

Y3 axis mandrel position IN:

The displayed value of the mandrel cylinder when it is extended forward and the mandrel is positioned for the bend.

Y3 axis mandrel position OUT:

The programmed position of the mandrel cylinder when the mandrel is retracted. **Note: The OUT position should be set so that the spheres of the mandrel are behind the tangent point.**

Mandrel pre retract angle:

An input value in degrees that signals the rear mandrel cylinder (Y3) to extract the mandrel from the bend prior to the programmed angle. Ex: Programmed bend angle of 90 degrees and pre retract set at 3 in the tool set means that at 87 degrees the rear cylinder is signaled to extract the mandrel from the bend.

Following mode Y1:

This is a percentage value and should always be set to 100. The carriage needs to follow the material at all during the c axis bending motion.

Pressure on pressure die:

A setting of YES or NO is required here. With YES, the pressure die will continue to apply forward pressure against the material during the bending cycle. This should be used when bending heavy wall material or high tensile strength material. A YES setting should never be used on thin wall material.

Clamp pressure:

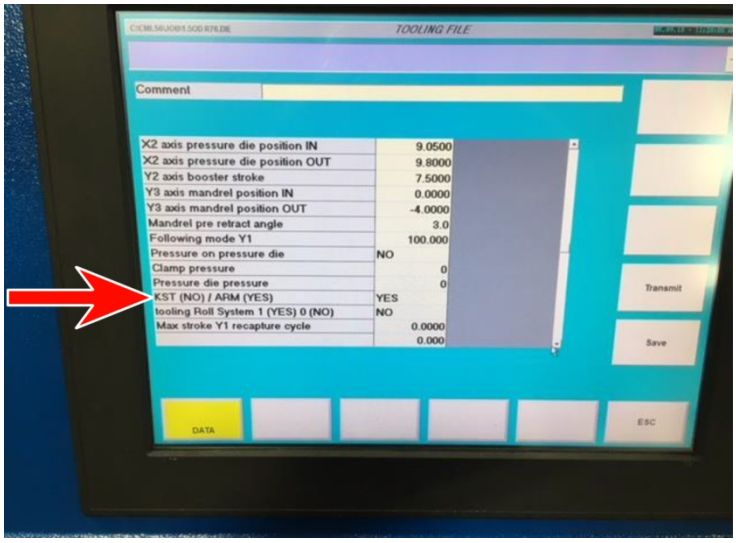
This value is meant for informational purposes only. The value input here **DOES NOT** change the actual clamp die pressure. This must be changed at the gauge located on the face of the machine cabinet.

Pressure die pressure:

This value is meant for informational purposes only. The value input here **DOES NOT** change the actual pressure die pressure. This must be changed at the gauge located on the face of the machine cabinet.

KST (NO) / ARM (YES):

This setting determines the clamping system used and how the machine functions during the automatic cycle. The EB76 and EB65 will not accept the KST clamping system. **This value must be set to YES for the machine to run properly.**



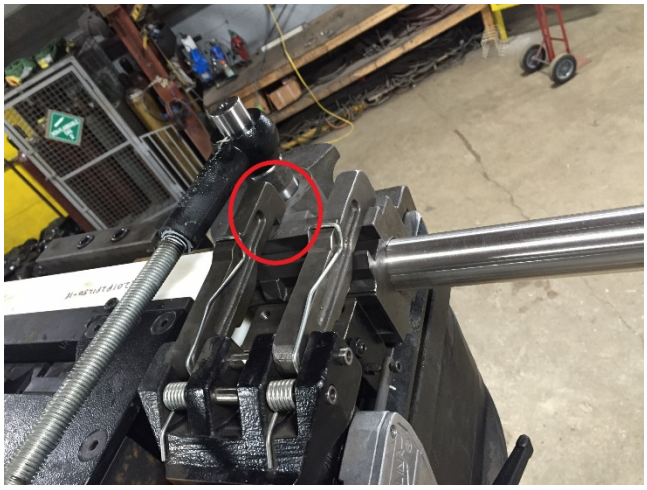
KST/ARM option must be YES

Tooling roll system 1 (YES) 0 (NO):

This option is not utilized on the EB76 or the EB65. This must be set to NO.

Common Set up Issues

1. Clamp Fingers not engaging or missing the former face.

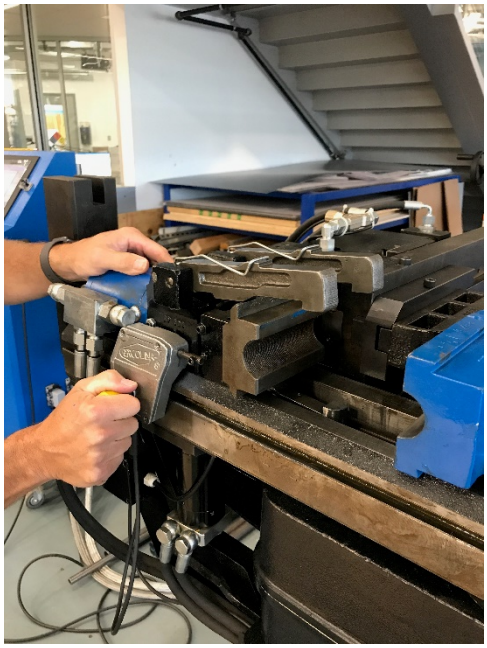


Make sure clamp fingers properly engage the former

First, ensure that the clamp is properly set-up. Using the alignment screw on the back of the bend die, set the bend die position so that it is in line with the clamp die. Release the clamp die switch handle so you can move the clamp freely. Without material loaded into the clamp, move the assembly forward until the clamp fingers are hanging over the bend die clamping point by 3/16”. Do not lock down the clamp yet. Next, close the clamp by going to the “Manual” screen on the machine, selecting “Clamp Arm” and pressing the center button on the controller. With the clamp closed, push the clamp die switch box forward by roughly 1/8” to 3/16” and lock down the clamp using the handle.

To verify that the clamp is functioning properly, remove the 4 Philip’s head screws around the clamp die switch box and open and close the clamp. With the clamp in either the open or closed position it should only be engaging one of the two limit switches at a time. If the clamp is setup correctly and the issue persists, try increasing the bend die’s

return speed by opening its flow control valve. If the problem still occurs, there is likely an issue with the alignment of the machine's carriage.



Loosen the clamp die switch box

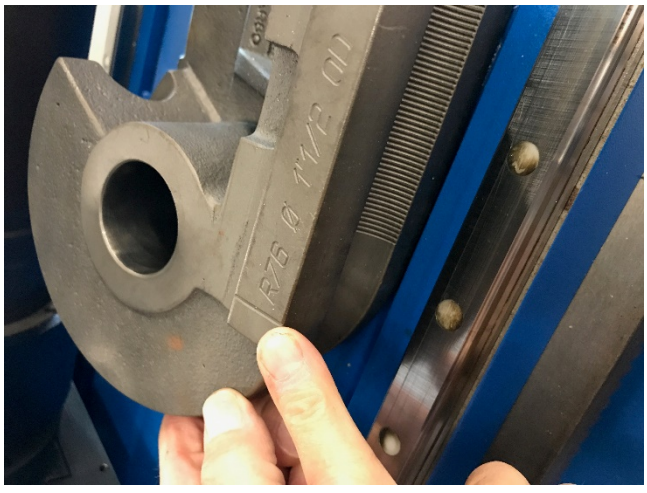
Slide clamp die cylinder forward and make sure the fingers are over the face of the former

Clamp die limit switch box showing micro switches

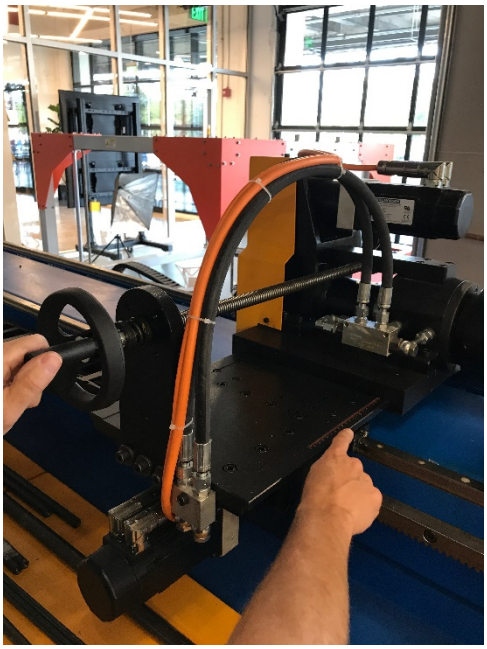
Only one switch can be engaged at a time for proper function

When the carriage is pushing the material more toward the bend die than the pressure die and clamp die, you more likely to experience clamping issues. To get an idea of where the carriage should be positioned, look for a number stamped on top of your bend die. That number represents the die's center-line radius in millimeters. For example, if your bend die is stamped "R76" that means it has a center-line radius of 76mm or 3in. Next, using the carriage adjustment handle, adjust the position of the carriage using the scale as a guide. If you have a 76mm center-line radius, move the carriage to 7.6 on the scale. This method applies to any different die radius.

Another more advanced way to center the carriage is by aligning it with the clamp closed and the pressure die in its in position. This method is more accurate because it allows you to set the alignment according to the position of the material as its being bent. To do this, first insert a length of material into the machine that is long enough to reach the carriage when it's in its home position. Next, from the Manual screen close the clamp and then move X2 forward until its putting firm pressure on the back of the material. From here adjust the position of the carriage and center it with the end of your material using the carriage adjustment handle.



Bend die stamped "R76" to indicate 76mm center-line radius



Adjust the carriage to match the radius of the former referencing the scale

2. Material slipping in the clamp die

Be sure that the clamp area is clean and remove any grease from surfaces.

Clamp pressure needs to be increased. From the “Manual” screen on the machine, open and close the clamp while looking at the gauge on the side of the machine. Increase pressure up to 160 bar by releasing the lock nut and opening or closing the valve as needed. Lower the clamp pressure back down to 75-100 bar when possible.

The clamping pressure / force should be set to hold the material without slippage but not excessive to damage or collapse the material when closed.

3. Material slipping in the collet

   Collet pressure is set too low. It is recommended to keep this setting between 75-100 bar in most cases. To check this setting, go to “Manual” from the home screen on the machine and select “Collet”. Open and close the collet using the controller while looking at the gauge on the side of the machine to get a reading on the pressure. Adjust as needed by first releasing the lock nut and opening or closing the valve

   “Collet length” in your toolset file needs to be increased. In most cases, setting this value at 2” is ideal. However, when experiencing material slippage, we recommend changing this setting to 3in to give the collet more material to hold onto. From the home screen on the machine, select “Programs” and find the toolset file that is associated with the polar file you are working with. Change the “Collet length” setting to 3”.

   Bend rotation speed is set too high. From the home screen on the machine go to “Programs” and select the polar file for the part you are working on. Once inside your polar file, go to the “bends data” tab. This page allows you to control the positioning, rotation, and bending speeds for each individual bend in your part. “Y speed” changes your positioning speed, “B speed” changes your rotation speed, and “C speed” changes your bending speed. Find the corresponding column under “B speed” for the rotation that is causing material slippage in the collet. For example, if it’s the rotation on the third bend causing issues, you would select the third column down below “B speed”. The values in these columns are percentages. It is recommended to lower your rotation speed down to at least 30% when slippage occurs. You do not need to change the value in every column under “B speed”, only the corresponding column for the individual rotation you want to slow down.

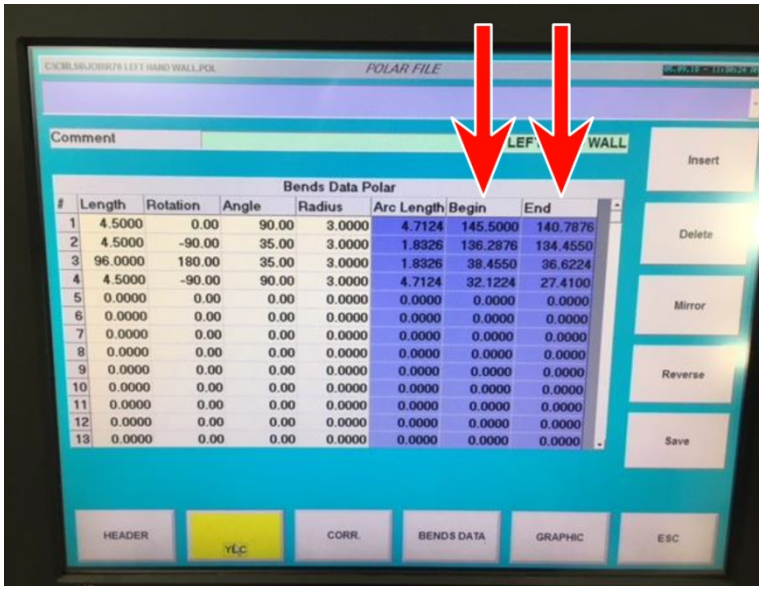
   It is important to note that you should always lower rotation speeds and bending speeds when working with longer lengths of material. It reduces the risk of material slippage and creates a safer working area as the machine is bending.

4. The machine will bend the first few bends in a multi-bend part but will not complete the last bend in the cycle.

   The final bend location is too close to either the “Y-axis bend die interference” or the “Y-axis pressure die interference” parameters set within your toolset file. In your polar file, increase the length at the end of your part to a number higher than what is set within your toolset file.

   Another quick check is to look at the “YBC” page of the polar file and check the arc length begin position of the bend. If this position is smaller or under the setting of the interference position set in the toolset, the carriage will NOT come forward to complete the last bend.

Generally, if the program will completely execute during the simulation mode, it will cycle completely in the automatic mode.



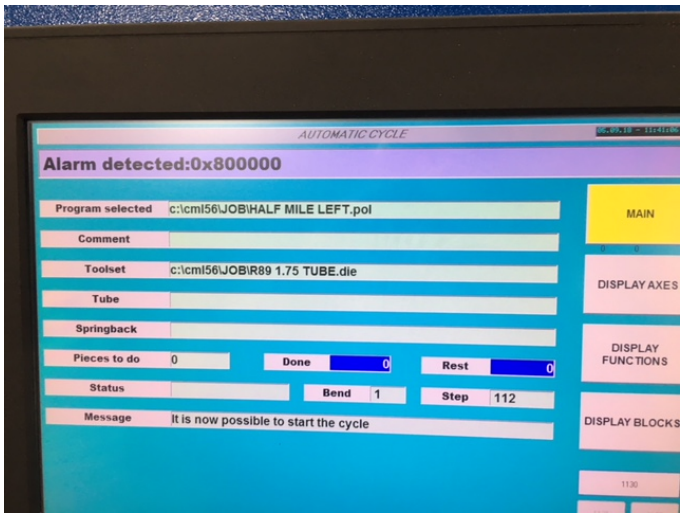
Note the beginning and end of the arc length. The last bend in sequence must not be positioned less than the interference position set in the toolset file

5. Machine will not progress to next bend unless operator releases and reengage main cycle center button on hand held controller or will not start bending.

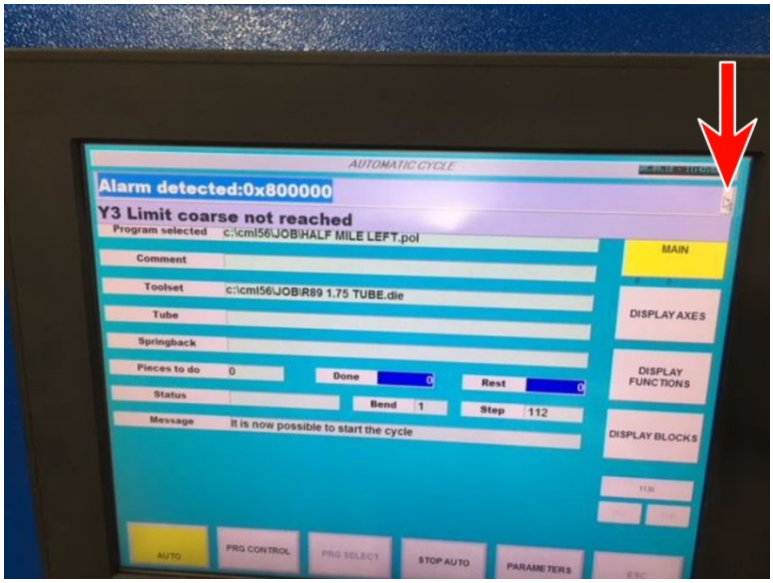
   During the Automatic cycle, the program should progress continuously until it has completed all lines and arrived at the unload carriage position. If it

fails to run in this manner then typically an axis has failed to reach a programmed position according to the settings on the toolset. An alarm will show on the top of the screen and the drop down arrow on the right of this window can be opened to display the fault.

Once determined adjust the settings on the toolset file and run the program again.

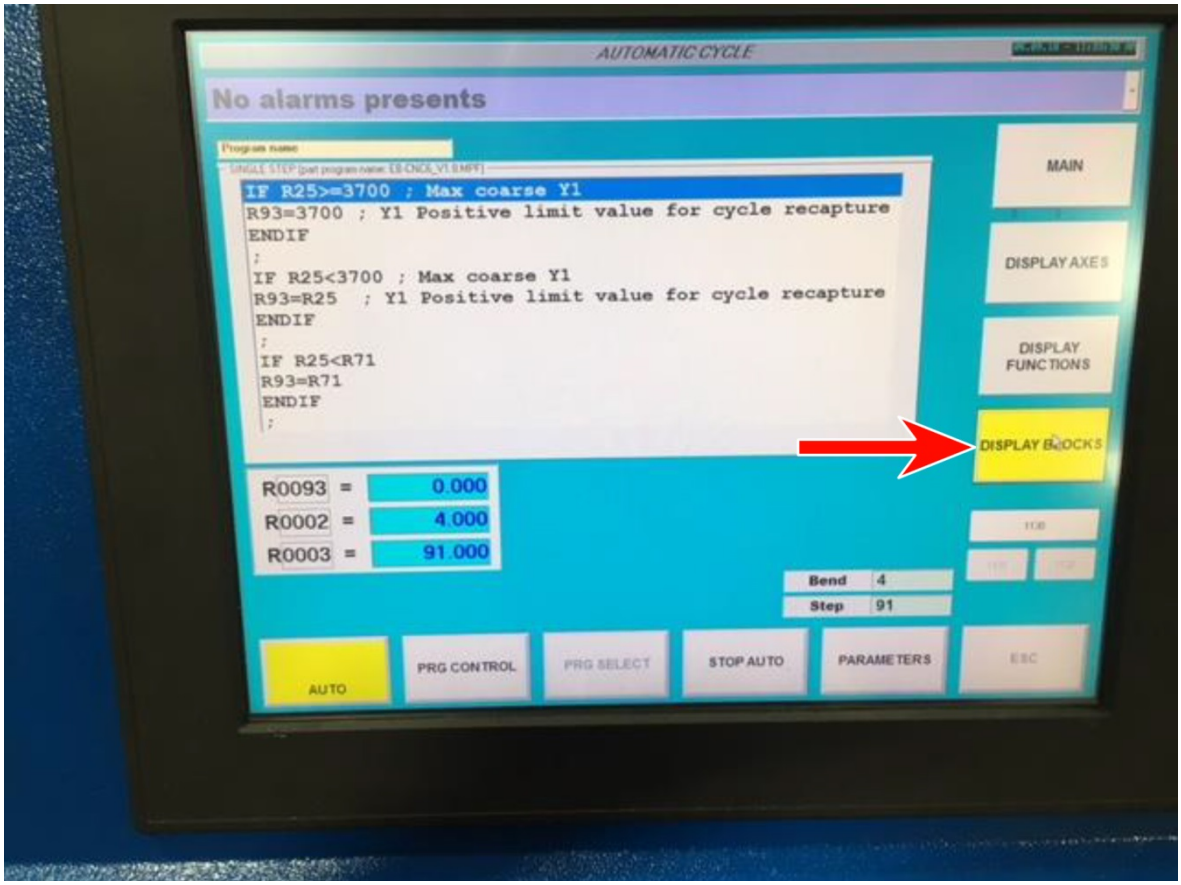


Alarm message displayed during Automatic cycle



Use the dropdown arrow to obtain a full description of the error

In the Automatic cycle, the DISPLAY BLOCKS button can also be depressed to display the exact line by line functions the machine is executing. This can be used to see where a potential error may be as well.

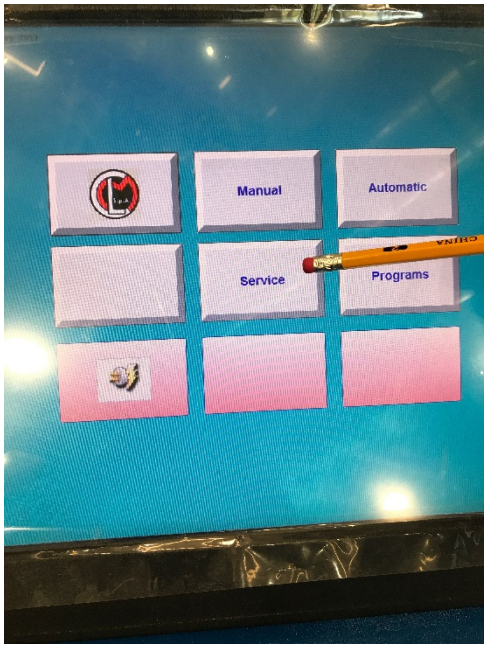


The highlighted line is the process being executed by the program

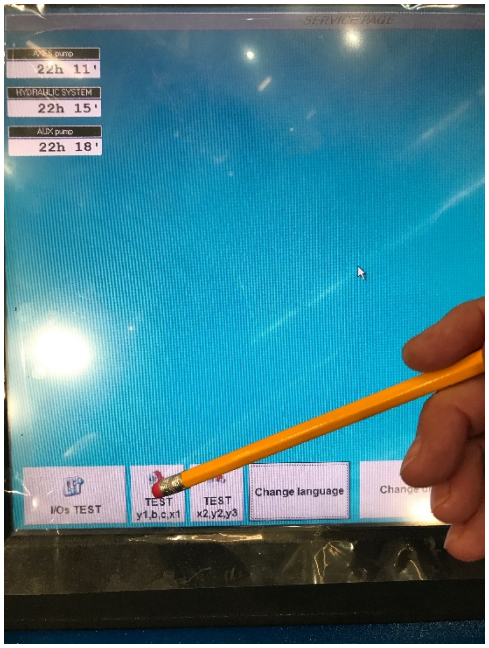
Resetting an Axis Zero / Home position

Always be certain that the axis or cylinder is fully retracted or the axis is at the true home position.

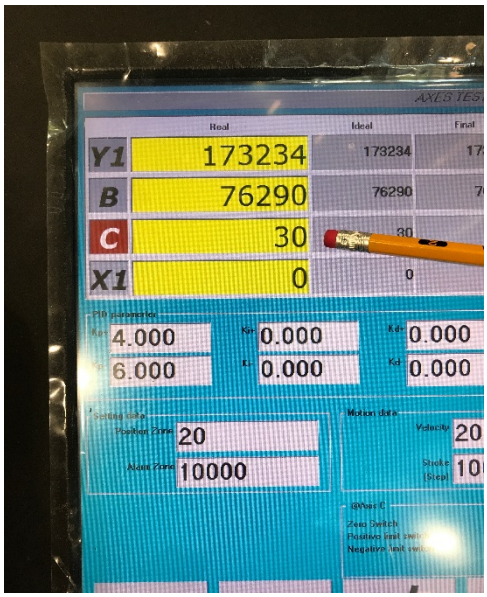
To re-zero the C axis (or any other axis) select “stop auto”, return to the home screen, select “Service”, select “TEST y1, b, c, x1”, select the yellow box labeled “C”, in the pop-up box that appears set the value as “0.0”.



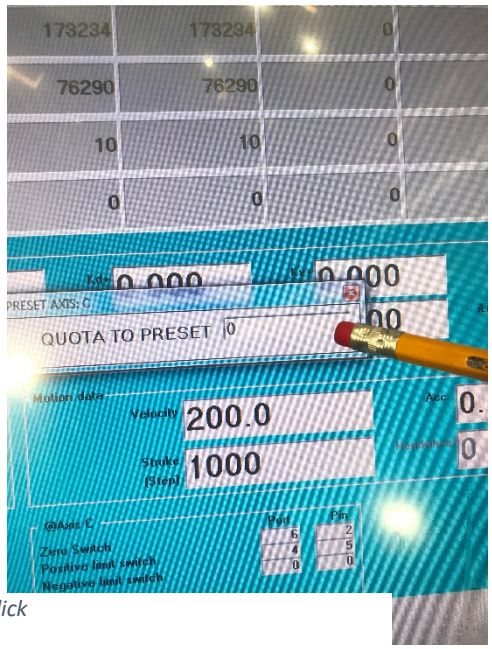
Select Service



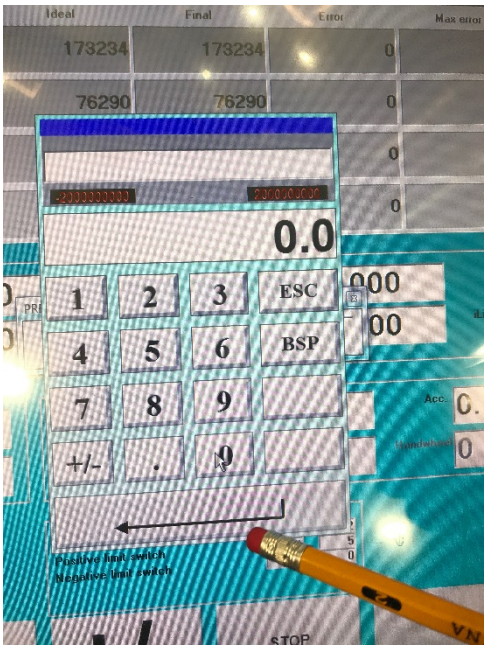
Select the axis to be zeroed



Double click yellow field



Double click


Ideal
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Error
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173234
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000
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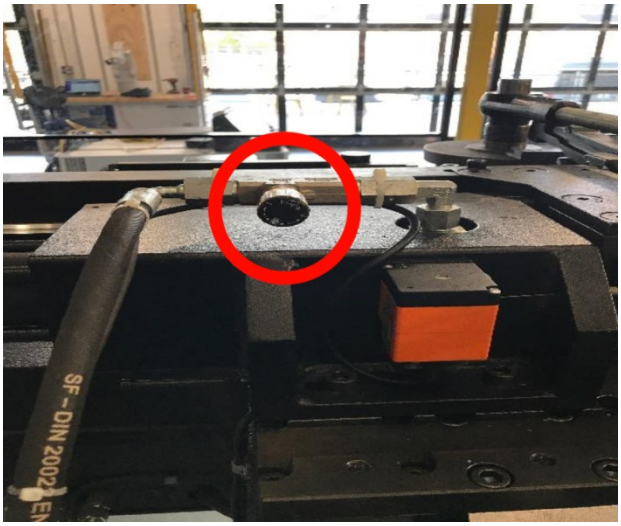
Acc.
0.
0
Positive limit switch
Negative limit switch
STOP

Insert "0"

Helpful Hints

Make sure you are using the proper mandrel for your material. If you are bending stainless material it is crucial that you use a bronze mandrel. Steel mandrels will get stuck or grab on the inside of stainless materials, preventing the mandrel from moving properly.

Bending speed needs to be slowed down and the pressure die booster speed needs to match the bending speed to provide optimal material support. Use the flow control valve on the pressure die assembly to regulate the speed.



Adjust valve to match the speed of the bending arm

Adjusting the Bending Speed

From the home screen on the machine go to “Programs” and select the polar file for the part you are working on. Once inside your polar file, go to the “bends data” tab. This page allows you to control the positioning, rotation, and bending speeds for each individual bend in your part. “Y speed” changes your positioning speed, “B speed” changes your rotation speed, and “C speed” changes your bending speed. Find the corresponding column under “C speed” for each bend on your part. For example, to slow down bends 1-4, select each of the first four columns below “C speed” individually. The values in these columns are percentages. It is recommended to lower your bend speed down to at least 20% when material breakage occurs. You do not need to change the value in every column under “C speed”, only the corresponding column for the individual bend you want to slow down.

With the bending speed slowed down to at least 20%, you now need to adjust the pressure die booster to make it move at the same speed as the bending head. Start an automatic cycle using the polar file you just slowed down the bend speed on. While bending head is moving at 20% speed, open or close the flow-control valve for the booster to the same speed, or as close as you can get it.