

TITAN 25T CNC PRESS BRAKE

Quick Start Operating Manual - 6/26/24 DRAFT

I. Introduction:

Welcome to the Quick Start Operating Manual for the Titan 25T CNC Press Brake and BendControl software. This manual is designed to help you quickly set up and operate the Titan 25T, ensuring you can start performing programming and bending operations efficiently.

The Titan 25T is a versatile CNC press brake that features conversational programming via the BendControl software. BendControl provides an intuitive interface for creating and managing bending operations, as well as controlling and monitoring real-time actions from the machine and its peripherals during the bending process. This manual covers safety guidelines, installation, initial configuration, and an overview of the software interface. You'll also find detailed explanations of each tab in BendControl, including creating punches, dies, and materials. Additionally, there's **a step-by-step guide to creating your first bend in BendControl, and how to execute this bend using the controller software.**

By following this manual, you'll quickly become familiar with both the Titan 25T and BendControl, making it an essential resource for new users and a handy reference for experienced operators.

II. Titan 25T Support:

Langmuir Systems offers robust support for the Titan 25T CNC Press Brake and all of our other CNC Machines. This support can most efficiently be accessed via our support portal where you can narrow down your request to ensure a quick response. The community-maintained Langmuir Systems Forum is another great resource to find answers to your Titan 25T questions quickly.

<https://langmuirsystems.com/support/titan>

<https://forum.langmuirsystems.com>

Your Titan 25T purchase includes access to our dedicated Titan 25T support team. Consultations with a Titan 25T tech support specialist can be booked through the customer support portal or via contacting the Langmuir Systems support team via email at support@langmuirsystems.com

III. Titan 25T Safety Notice:

When used correctly, the Titan 25T CNC Press Brake will offer you years of safe operation. However, like all other automated and industrial machinery, there are important safety considerations and precautions that must be followed in order to avoid injury. Study these safety warnings carefully before operating your machine.

GENERAL SAFETY:

*****BEFORE USING THE MACHINE, ENSURE THAT YOU HAVE READ AND FULLY UNDERSTAND THE FOLLOWING SAFETY PRECAUTION*****

NEVER

- Use the Titan 25T until you've undergone adequate training and comprehending all the provided operating guidelines.
- Position any portion of your body into the punch and die space.
- Run the Titan 25T absent of a point-of-operation safety feature designed to prevent injuries.
- Begin work on the Titan 25T without ensuring the power is disconnected and all electrical and hydraulic systems are fully deactivated.

ALWAYS

- Use extreme caution during operation of the Titan 25T and ensure that all safety checks have been performed prior to beginning.



PINCH AND CRUSH POINTS:

This machine can create pinch points while in motion during normal operations. To avoid injury, always adhere to the following precautions:

- Do not touch any part of the machine when it is moving under power.
- Be aware of all areas of the machine that could potentially be a pinching hazard, such as bearings, the table, tooling, and bent materials.
- Never make repairs to the machine when the unit is powered on.
- Remove loose-fitting clothing, neckties, gloves, and jewelry as well as tying up or otherwise securing long hair.



CUT HAZARD/CLOSING RAM AND DIE:

Moving components of the Titan can cause crushing, dismemberment, and even death. Never put your hands or any portion of your body within the equipment during operation. To avoid injury, always adhere to the following precautions:

- Verify all machine motion is completely stopped before handling or changing tooling/parts.
- Exercise caution in handling any tooling or removing any pieces from the machine.



ELECTRIC SHOCK:

Electric shock can cause serious injury or death. Cables, points, and connections in the electronics enclosure contain high voltages. To avoid injury, adhere to the following precautions:

- Never touch bare wires/buses/connections or components that are carrying electricity.
- Even after the machine is powered off, the electronics enclosure may retain dangerous electrical voltages.

- Repair or replace all worn or damaged components. Turn-off power to the machine when making repairs.
- Install and maintain equipment in accordance with the National Electrical Code (NEC).
- If you have limited electrical knowledge/experience, hire a certified electrician to perform all electrical work.



MATERIAL EJECTION:

Sheet metal forming utilizes intense loading to accomplish bends that can eject material and cause eye injuries. As well, damaged or poorly maintained tooling can shatter and become projectiles during the bend process. To avoid injury, always wear appropriate PPE and adhere to the following precautions:

- Always wear suitable eye protection when operating the machine. Eye protection should follow the guidelines established by ANSI Z87.1
- Ensure that all bystanders in the immediate vicinity are wearing suitable eye protection.
- Verify you have appropriately secured all components before operating the machine.
- Properly store and maintain any and all tooling for your machine. Broken/damaged tooling should be replaced immediately and should not be utilized under any circumstance.

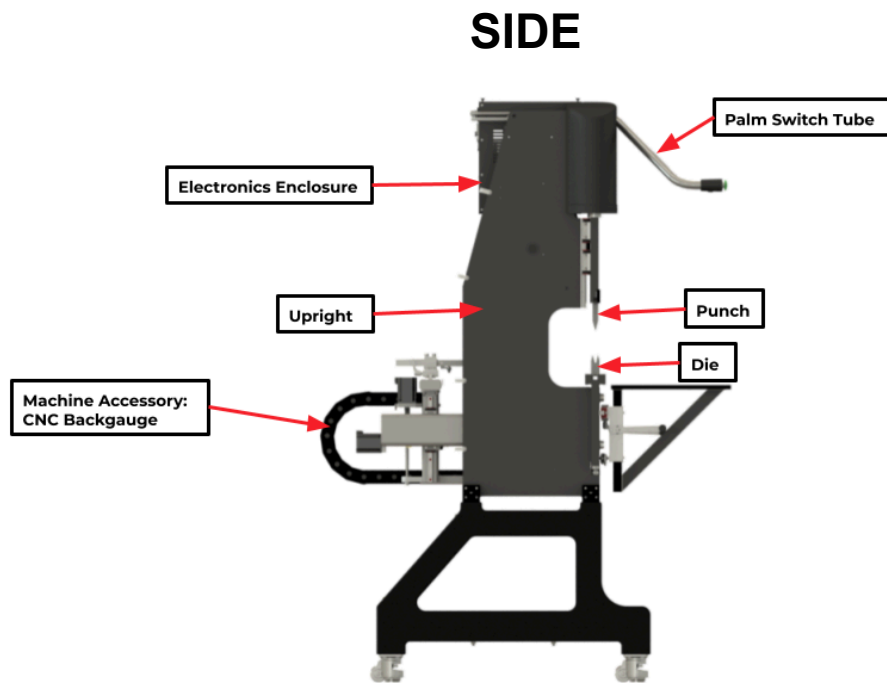
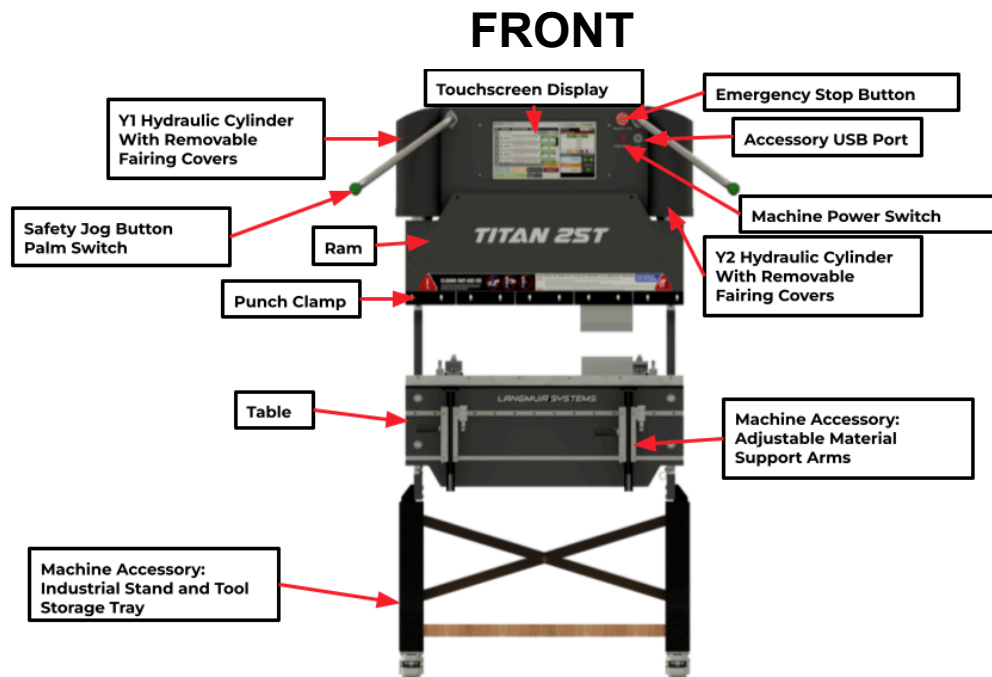


FIRE AND EXPLOSION:

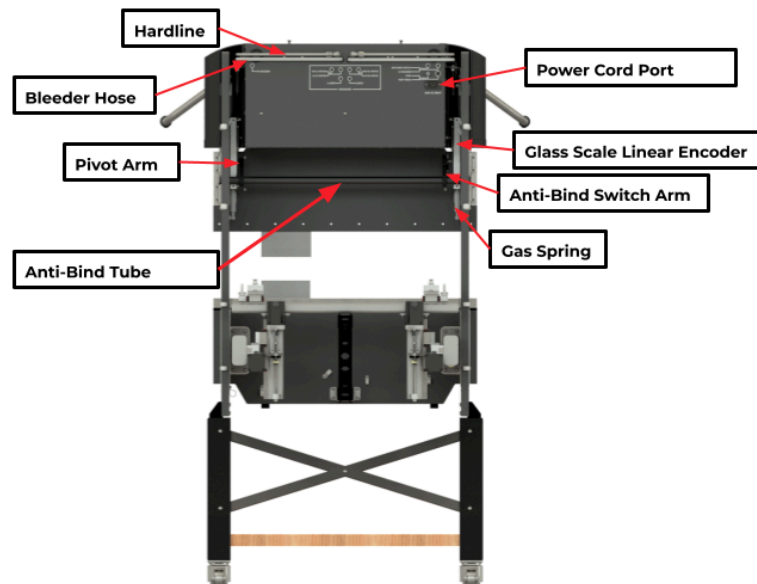
The Titan 25T is not designed to protect or contain explosions or fires. Electrical fires can be caused if the machine is used incorrectly or hydraulic fluid comes in contact with an open flame or ignition source. To avoid injury, always adhere to the following precautions.

- Never operate the machine in the vicinity of flammable materials or where there are volatile and combustible fumes in the air.
- Never operate the machine without the cylinder fairings in place over the hydraulic cylinders.
- Always keep a fire extinguisher nearby in case of emergency.
- Ensure hydraulic hardlines are in good condition before operation of the machine. Ejected hydraulic fluid is flammable and may ignite should it come in contact with an ignition source.
- Do not operate the machine with a known hydraulic leak. Power down the machine and ensure proper repairs are made before attempting to operate the Titan.
- Never operate the machine in a poorly ventilated area.
- Be sure to read and understand all MSDS safety data for any materials and fluids used in operating the Titan 25T

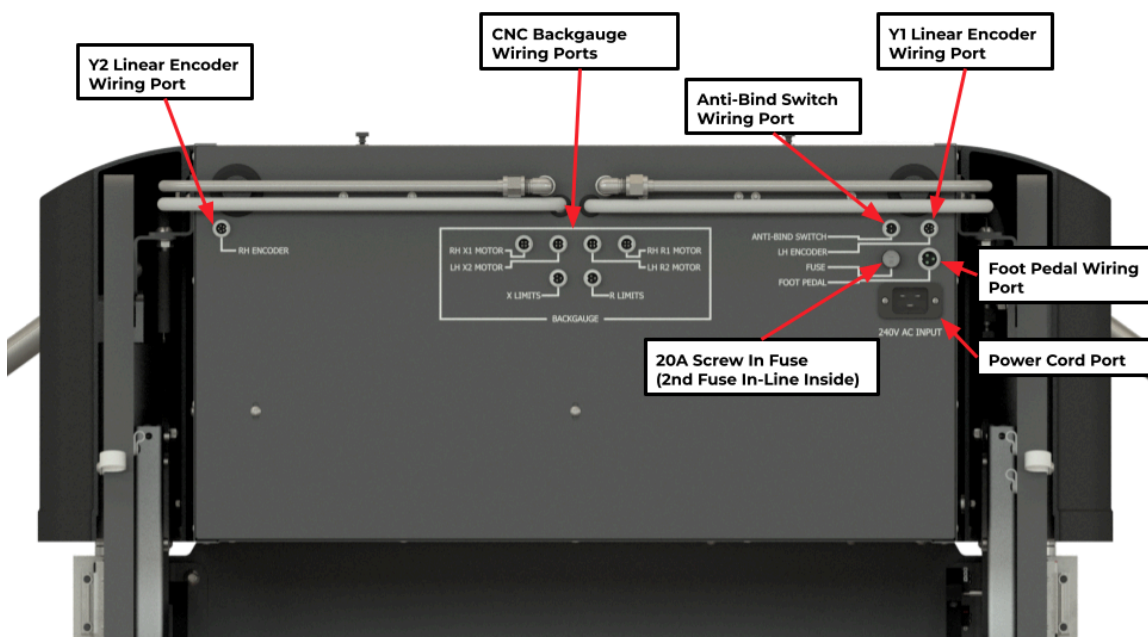
IV. Machine Overview:



BACK



ELECTRONICS PANEL



V. Assembly of Machine Accessories:

If you have purchased accessories for your machine, please refer to the assembly instructions below for the CNC Backgauge, Industrial Stand & Tool Storage Tray, and Adjustable Material Support Arms before continuing with machine operation.

- [CNC Backgauge Assembly Manual](#)
- [Industrial Stand & Tool Storage Tray Assembly Manual](#)
- [Adjustable Material Support Arms Assembly Manual](#)

VI. Titan 25T Specifications:

Item	Details
Input Power	240VAC, 50/60Hz Single Ph., 20A (Fused)
Weight	1100 lb, Fully Optioned
Tonnage Capacity (Max.)	25 Tons
Hydraulic Pressure (Max.)	3000 PSI
Hydraulic Oil Capacity (Max.)	1 Gallon
Recommended Hydraulic Oil	ISO Grade 32
Bend Width (Max.)	33 in
Distance Between Frames	29 in
Ram Stroke Speed (Max.)	15 in/min
Ram-to-Table Opening (Max.)	8.5 in (adj., nominal)
Backgauge Travel Limits	17 in (X-axis), 4.8 in (R-Axis)
Table Width	2.4 in
Floor Space Required (Min.)	36 in (W) x 40 in (D)
Hydraulic Pressure Transducer	Piezoresistive Ceramic, Each Cylinder
Ram Positional Feedback	Glass Scale Linear Encoder, Each Cylinder
Ram Positional Resolution	0.0002 in
Ram Positional Repeatability	0.0006 in
Tool Mounting	American Style (0.5" Tang Width)
Ram Stroke Limit (Max.)	4 in
Backgauge Positional Resolution	0.0005 in
Backgauge Positional Repeatability	0.001 in
Backgauge Travel Speed (Max.)	100 in/min

VII. Powering Machine and Initial Startup:

1. Power Requirements and Wiring:

A. Input Power Requirements:

The Titan 25T CNC Press Brake requires a stable and sufficient power source to operate correctly. Ensure that your power source meets the following specifications. If you have any doubts or require further assistance, consult a qualified electrician.

- **Supply Voltage:** 208 to 240 VAC
- **Supply Voltage Frequency:** 50/60Hz
- **Supply Breaker:** Minimum 15A

B. Power Cord:

The Titan 25T comes equipped with a 3-prong power cord featuring a NEMA 6-50P plug. Ensure that your facility's power outlet is compatible with this plug type

C. Steps for Proper Wiring:

1. Inspect the Power Cord: Ensure the power cord is in good condition with no visible damage.
2. Verify Outlet Compatibility: Confirm that the outlet matches the NEMA 6-50R configuration.
3. Connect the Power Cord: Make sure that the main Power Switch at the front of the machine is OFF. Insert the rectangular end of the NEMA 6-50P power cord into the socket at the back of the machine labeled **240V AC Input**. Insert the power cord's plug end into the outlet firmly to ensure a secure connection.

D. Using the Optional 120V/240V Step-Up Transformer

If a 208 to 240 VAC power source is unavailable, the Titan 25T can also run on a 120VAC 15A socket using the supplied step-up transformer. The transformer includes a built-in NEMA 6-50R plug to accept the power cord that is supplied with the Titan 25T.

1. Set AC Input Selection: Ensure the AC Input Selection switch on the back of the transformer is properly set to 110V.
2. Connect Transformer to 110VAC Outlet: Flip the switch at the front of the transformer box to OFF. Plug the transformer's power cord into a 110VAC 15A socket.
3. Connect Titan 25T to Transformer: Insert the Titan 25T's power cord into the transformer's NEMA 6-50R outlet.

By following these guidelines, you ensure that your Titan 25T CNC Press Brake is properly connected and ready for operation. If you have any doubts or require further assistance, consult a qualified electrician.

2. Powering ON Machine:

Before turning on the machine, it's important to check that the Emergency Stop Switch, located at the front right of the machine, is disengaged. To disengage the Emergency Stop Switch, turn the head of the red mushroom switch counter-clockwise about 1/4 turn. If the switch was engaged, it will now pop out into the disengaged position.

Locate the power rocker switch, labeled POWER ON/OFF, at the front right of the machine control. Flip this switch to the ON position. The on board computer will boot up, indicating a loading screen. Please allow 1-2 minutes for the system to start up completely. The startup process is complete when the BendControl application is running on the screen.

At the top right of the software screen is the connections Menu. If everything is powered up and connected properly, you will find a solid green bar for Machine and Backgauge (optional add-on product) indicating that both of these devices are connected and communicating with the software.



VIII. Homing the Machine:

Everytime the machine is first powered up (or reset from an error state), it needs to be Homed in order to properly calibrate the Ram position. You will notice that the Machine Status in the top-right display is set to **STARTUP HOMING REQUIRED**. You will also notice that the **HOME MACHINE** button has a white glow around anytime that the machine needs to be homed in order to continue. Click the **HOME MACHINE** button to initiate the Homing sequence.

If the Homing Operation has been performed successfully, the Machine Status will indicate **IDLE**. You will also notice that the CURRENT ram position in the DRO is at -0.050", which is the Home Position of the Titan 25T.

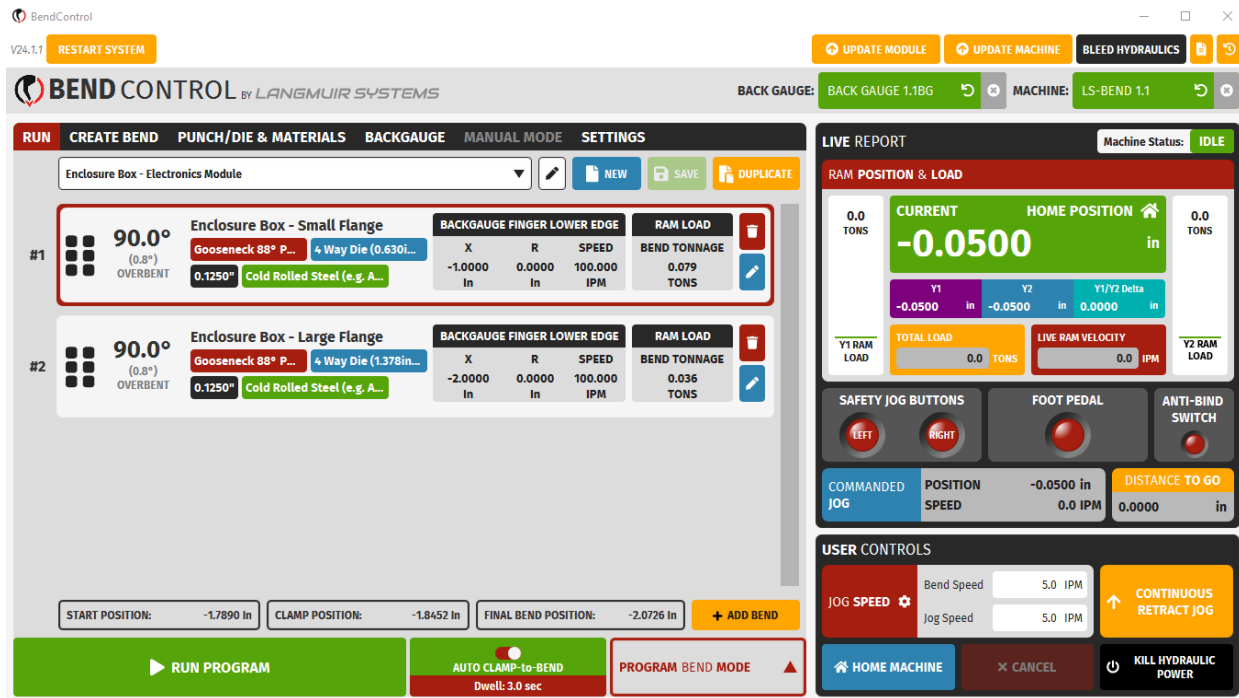
If you are encountering repeated Homing failures, please refer to the latest section of this guide titled **Bleed Hydraulics Mode** to ensure all the air has been removed from your hydraulic system.



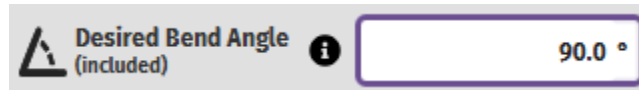
IX. BendControl Software Overview:

The below section is a brief overview of the different sections and tabs that make up the BendControl software. For more detailed information about how to use these different sections, please refer to the relevant sections of this Quick Start manual.

Note: The following Overview section is just a brief description of the various parts of the BendControl software. For more detailed information for using the software, please refer to the relevant sections later in the operating manual.

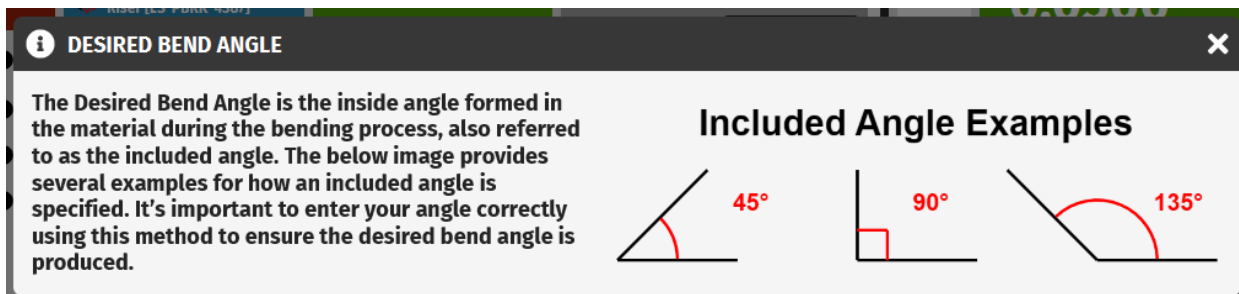


1. Information ‘i’ Icons in BendControl:



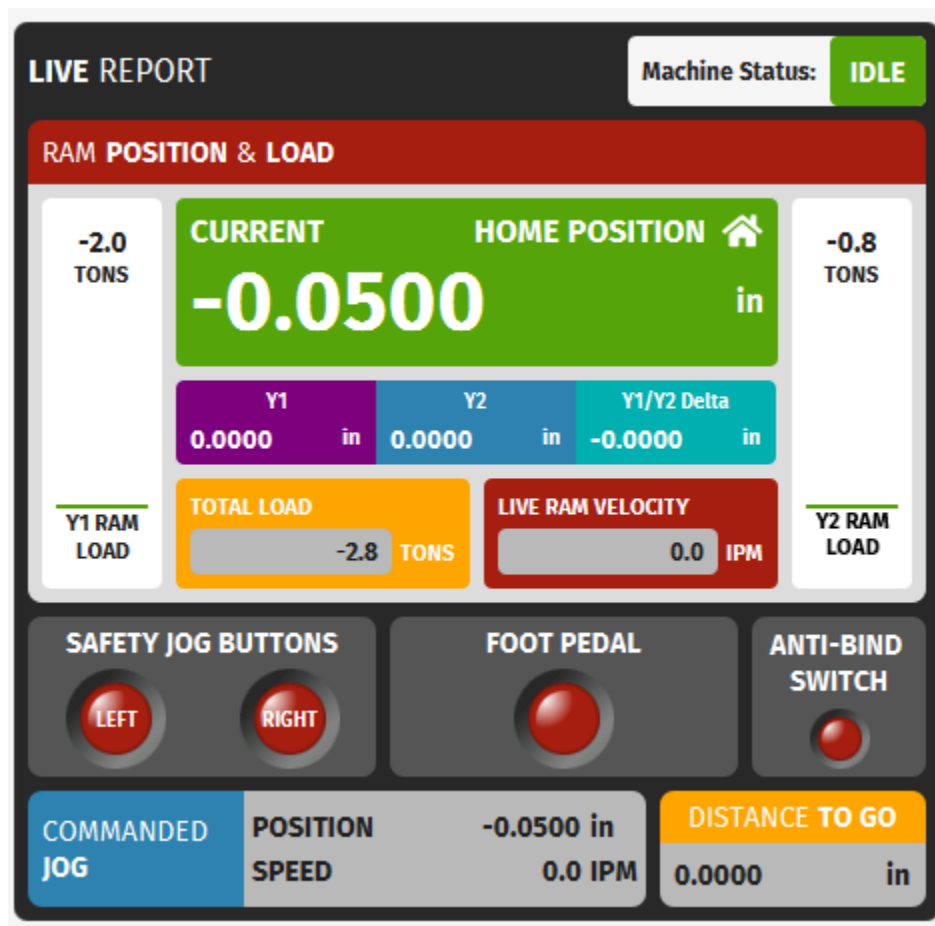
BendControl features several clickable information icons (‘i’) next to many settings and parameters, providing users with detailed explanations directly within the software. These icons are designed to offer immediate context and guidance, ensuring that users understand the purpose and correct usage of each value. By clicking these icons, operators can access helpful descriptions, usage tips, and relevant details, enhancing their ability to set up and operate the Titan 25T CNC Press Brake accurately and efficiently. This built-in resource promotes better-informed decisions and smoother operation workflows.

Below is an example of one of these information pop-ups in the BendControl software.



2. Live Report Menu:

The Live Report Menu within BendControl provides real-time data and control options essential for monitoring and operating the Titan 25T CNC Press Brake. This panel is divided into several key sections described below.

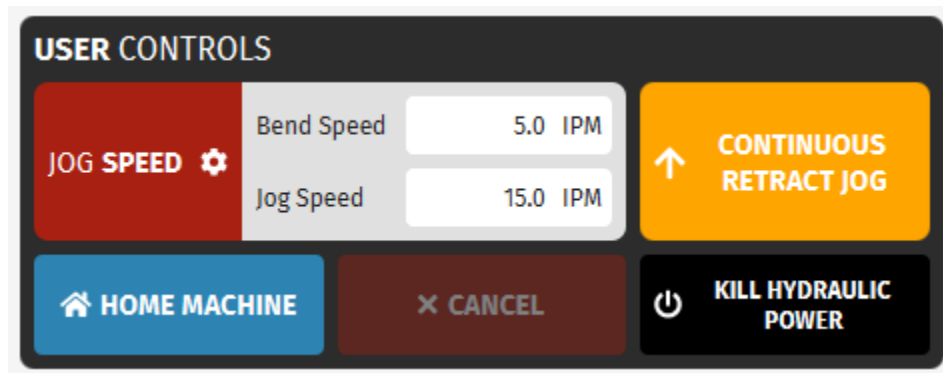


- **Machine Status:** This indicates the live state of the machine controller at any given time.
- **Current Position:** Displays the current commanded position of the ram in inches.
- **Home Position:** Indicates the default home position, if the current position is at the home position of -0.050in.
- **Y1 and Y2 Positions:** Shows the individual live positions of the Y1 and Y2 hydraulic cylinders, expressed as the live readout from the linear glass scales encoders on each side of the ram.
- **Y1/Y2 Delta:** Displays the live positional difference between Y1 and Y2 cylinders.
- **Y1 and Y2 RAM Load:** Shows the live load in Tons on each Ram. As tonnage increases, the bars will increase in height accordingly, up to a maximum of 12.5 tons for each ram.
- **Total Load:** Indicates the combined load being applied by summing up the live Y1 and Y2 loads.
- **Live Ram Velocity:** Shows the actual live speed of the ram movement in inches per minute (IPM).
- **Safety Jog Buttons LEDs:** Shows the live state of the Safety Jog Button Palm Switches for the left and right sides. When these buttons are depressed, the lights will turn green.
- **Foot Pedal LED:** Shows the live state of the foot pedal. When the foot pedal is depressed, the light will turn green.
- **Anti-Bind Switch:** Shows the live state of the Anti-Bind Switch. When either of the Anti-Bind limit switches are tripped, the status light will turn green.

- **Commanded Jog:** Shows the currently commanded Jog Position and Jog Speed of the machine in inches.
- **Distance to Go:** This signifies the linear distance that the ram has to travel from its current position in order to complete the commanded jog move. It is a very useful feature to monitor during bending operations as a sanity check to make sure that the ram is going to move where you expect it to move.

3. User Controls Menu:




Below the Live Report menu is the User Controls Menu. These are actionable buttons that can be operated by the user during normal Programmatic Bending operations. This panel is divided into several key sections described below.



- **Jog Speed:** When the machine is at IDLE, the user can adjust the desired Bend Speed and Jog Speed for the commanded jog moves. The Jog Speed will adjust the ram speed during any Safety Jog and Retract Jog moves. The Bend Speed will adjust the ram speed during any Clamp Jog and Bend Jog moves. The acceptable ranges for Bend Speed and Jog Speed are 0.5 to 15 inches per minute (IPM).
- **Continuous Retract Jog:** This button is used to execute a continuous Retract Jog of the ram by touching and holding the button down. When the button is released, the ram will decelerate to a stop.
- **Home Machine:** This button is used to execute a homing sequence (please refer to section above for more information about machine Homing).
- **Cancel (or Stop):** The Cancel (or Stop) button is used to either cancel a commanded jog type after it has been armed, or to stop a currently running operation or program from executing. The state of this button will change depending on what it can be used for.
- **Kill Hydraulic Power:** This button can be used at any time to shut down operation of the hydraulic power pack inside the unit. After this button has been pressed, the Machine Status will indicate HYDRAULIC SHUTDOWN. To return the machine to normal operation, the machine must be properly Homed to continue.

4. PUNCH/DIE & MATERIALS Tab:

The PUNCH/DIE & MATERIALS tab is where the operator creates and saves punch, die and material entities for later usage in bending operations.

RUN			CREATE BEND			PUNCH/DIE & MATERIALS			BACKGAUGE			MANUAL MODE			SETTINGS		
PUNCH						DIE						MATERIALS					
<div>  <div> Acute 30° Punch [LS-PBRK-9302] </div> </div>						<div>  <div> Acute 26mm 30° Die [LS-PBRK-9355] </div> </div>						<div>  <div> Cold Rolled Steel (e.g. A1008) </div> </div>					
Punch Height ⓘ <input type="text" value="4.610 in"/>						Die Height ⓘ <input type="text" value="1.862 in"/>						Material Tensile Strength <input type="text" value="45000 PSI"/>					
						V-Die Opening ⓘ <input type="text" value="1.024 in"/>						Inside Bend Radius Percentage ⓘ <input type="text" value="15 %"/>					
												Material Springback ⓘ <input type="text" value="0.7 °"/>					
<div> NEW SAVE DUPLICATE </div>						<div> NEW SAVE DUPLICATE </div>						<div> NEW SAVE DUPLICATE </div>					

5. CREATE BEND Tab:

The CREATE BEND tab is used by the operator to set up bending operations for a part. Utilizing the punches, dies, and materials defined in the previous tab, this section allows you to specify additional parameters for the desired bend such as Desired Bend Angle, Material Thickness, and Angle Compensation.

RUN

CREATE BEND

PUNCH/DIE & MATERIALS

BACKGAUGE

MANUAL MODE

SETTINGS

Enclosure Box - Back Panel - Large Flange

Punch

Die

Material Type

Gooseneck 88° Punch [LS-PBRK-8392]

4 Way Die (1.378in) + Riser [LS-PBRK-4387]

Cold Rolled Steel (e.g. A1008)

Desired Bend Angle (included)

90.0 °

Material Thickness

0.125 in

Angle Compensation

UNDERBENT

0.8 °

Bend Width

0.1 in

Punch-to-Material Clearance (Start)

0.050 in

Add Backgauge Move

Additional Retract After Bend

0.000 in

Override Final Bend Position

Reference Edge Stop

BACKGAUGE FINGER LOWER EDGE

X Position

-2.000 in

R Position

0.000 in

Jog Speed

100 IPM

NEW BEND MOVE

SAVE

DUPLICATE

RESET

LOAD BEND INTO PROGRAM

OPEN VERTICAL POSITION DIAGRAM

Start Safety Clearance Position

-1.789 in

Bend Clamp Position

-1.845 in

Final Bend Position

-2.425 in

Retract After Bend Position

-1.789 in

Total Bend Stroke

0.586 in

Calculated Bend Tonnage

0.036 TONS

Predicted Inside Bend Radius

0.155 in

BACKGAUGE ZERO ORIGIN NOTES

X-AXIS

Zero is on Centerline of Table.

R-AXIS

Zero is on Top Surface of Die.

GENERAL BEND NOTES

Use material labeled A1008 from material rack.

6. RUN Tab:

The RUN tab is where the user will create and execute bending programs (or just single bends if multiple bends are not required).

RUN

CREATE BEND

PUNCH/DIE & MATERIALS

BACKGAUGE

MANUAL MODE

SETTINGS

Enclosure Box - Electronics Module

NEW

SAVE

DUPLICATE

#1

90.0°

(0.8°)

OVERBENT

Enclosure Box - Small Flange

Gooseneck 88° P...

4 Way Die (0.630i...

0.1250"

Cold Rolled Steel (e.g. A...

BACKGAUGE FINGER LOWER EDGE

X	R	SPEED
-1.0000	0.0000	100.000
In	In	IPM

RAM LOAD

BEND TONNAGE
0.079
TONS

#2

90.0°

(0.8°)

OVERBENT

Enclosure Box - Large Flange

Gooseneck 88° P...

4 Way Die (1.378in...

0.1250"

Cold Rolled Steel (e.g. A...

BACKGAUGE FINGER LOWER EDGE

X	R	SPEED
-2.0000	0.0000	100.000
In	In	IPM

RAM LOAD

BEND TONNAGE
0.036
TONS

START POSITION: -1.7890 In

CLAMP POSITION: -1.8452 In

FINAL BEND POSITION: -2.0726 In

+ ADD BEND

RUN PROGRAM

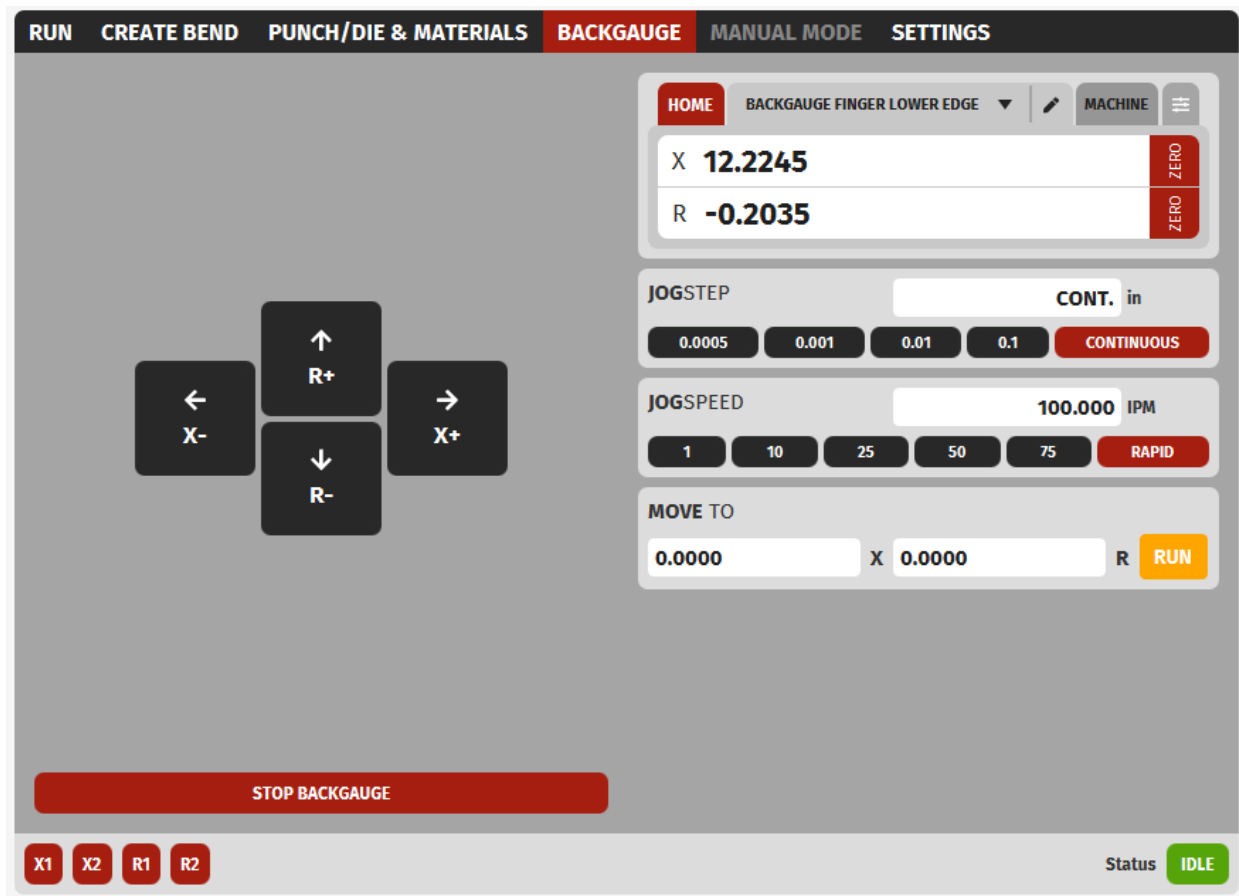
AUTO CLAMP-to-BEND

Dwell: 3.0 sec

PROGRAM BEND MODE

7. BACKGAUGE Tab:

If the Langmuir Systems 2-axis backgauge is connected, the Backgauge tab can be used to Home, Jog, and Zero the backgauge for use during Bending operations.



8. MANUAL MODE Tab:

When entering the MANUAL MODE tab, the machine is switched to manual operation. Here the operator can run Manual Stroke Operations, perform Continuous and Step Jog moves, perform Move To Position moves, and temporarily override the Max Tonnage rating.

RUN

CREATE BEND

PUNCH/DIE & MATERIALS

BACKGAUGE

MANUAL MODE

SETTINGS

SET TEMPORARY TONNAGE LIMIT

Max Tonnage Per Ram

7.0 TONS

MANUAL STROKE OPERATION
(Pedal Operated)

Safety Plane Clearance
(distance above Start Pos.)

0.0500 in

Start Ram Position
(Machine Coordinate)

-1.0000 in

Ending Ram Position
(Machine Coordinate)

-1.0001 in

Stroke Distance
(from Start to End)

0.0001 in

Repeat

⚡ RUN MANUAL STROKE OPERATION

MANUAL JOG STEP
(Safety Button Operated)

0.1000 in

0.0005

0.001

0.01

0.1

↑

+Y (Ram Up)

Repeat

↓

-Y (Ram Down)

MOVE TO (Safety Button Operated)

Y-axis Ram Position
(Machine Coordinate)

-2.0000 in

RUN

Manual Mode State:

ENABLED

↓ MANUAL CONTINUOUS JOG

9. SETTINGS Tab:

The Settings Tab contains the Application Settings, as well as the controller settings. Please refer to the later section **SETTINGS MENU OVERVIEW** for more information.

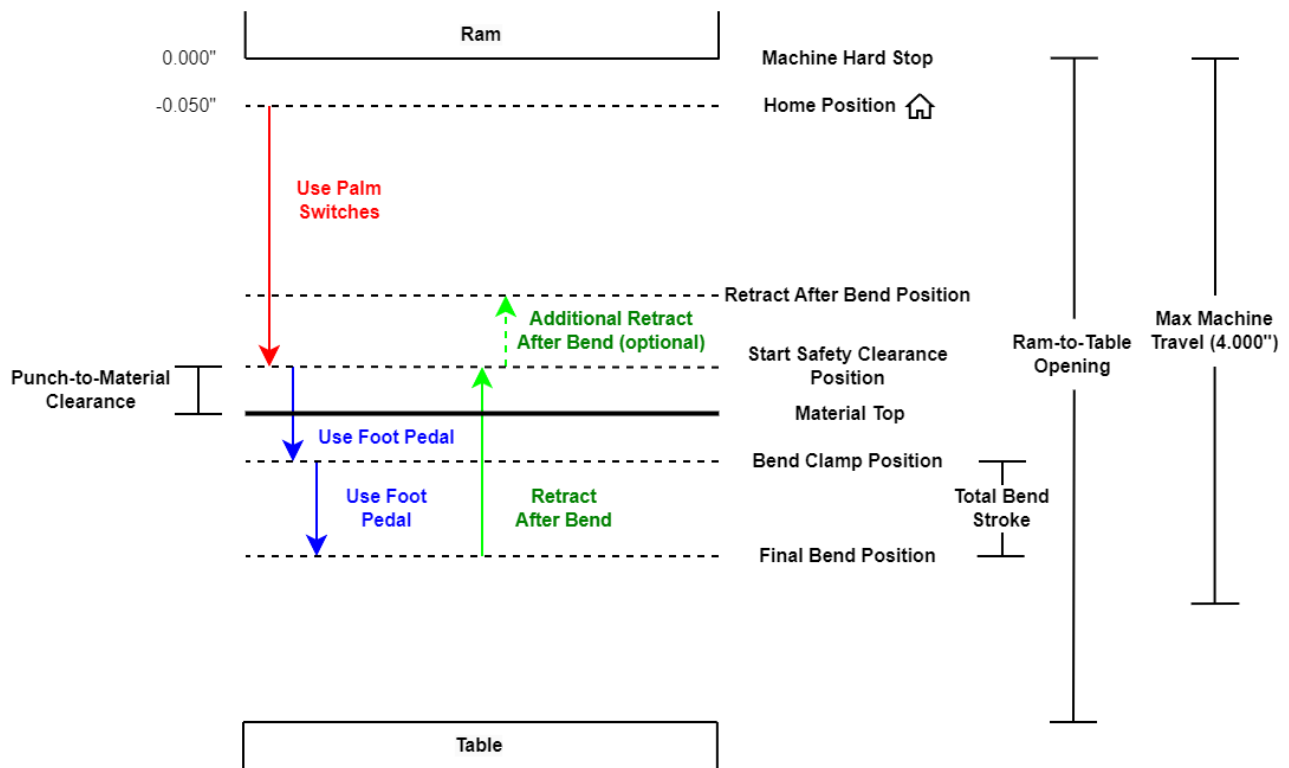
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X. Overview of Vertical Positions (Y-axis):

The below diagram represents the vertical height positions that are used on the Titan 25T and in the BendControl software. All vertical positions fall along the Y-axis, which is the axis that the ram strokes up and down on to achieve bending motion. When the Ram is all the way at its top-most hardstop, this is considered Y(0.000"). **All subsequent positions from this hardstop are expressed in the negative direction.** The maximum travel of the machine is Y(-4.000"). The Home position is at Y(-0.050"). This allows the machine to bump off the hardstops slightly in order to maintain a constant priming to the hydraulic gear pumps.

During subsequent sections, these vertical positions along the Y axis will be explained in greater detail as it relates to running a program. This Graphic can also be opened in BendControl by navigating to the Create Bend tab and clicking on the button

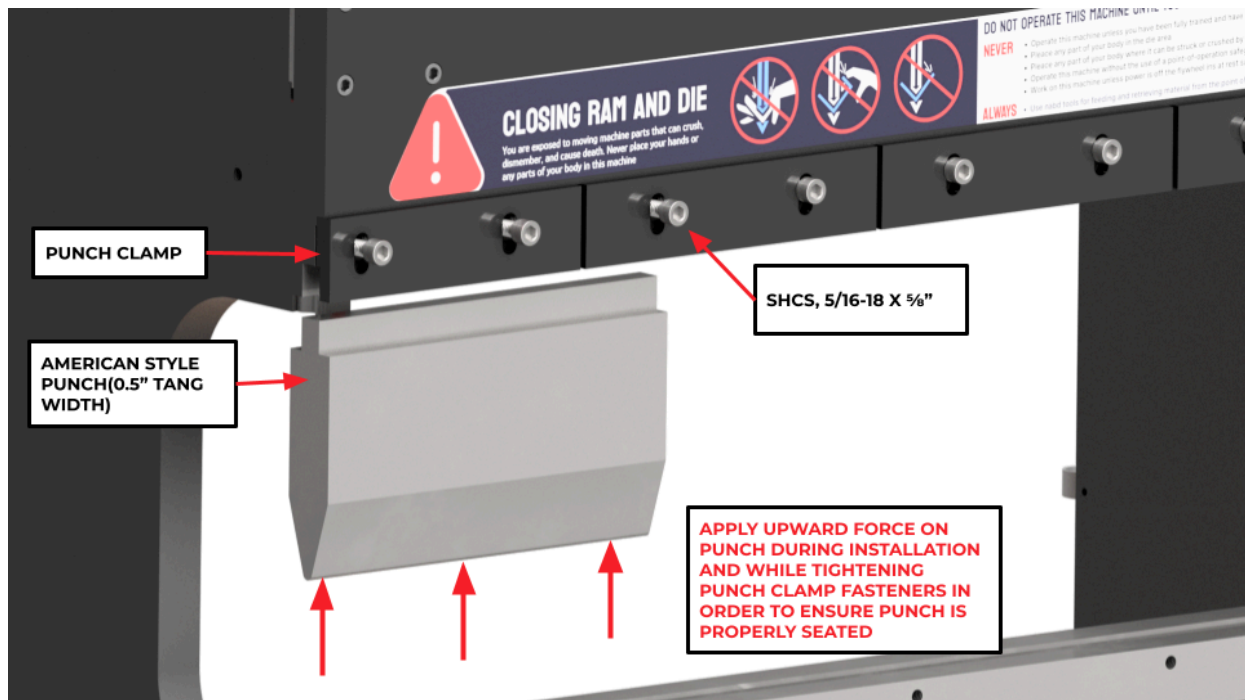
OPEN VERTICAL POSITION DIAGRAM



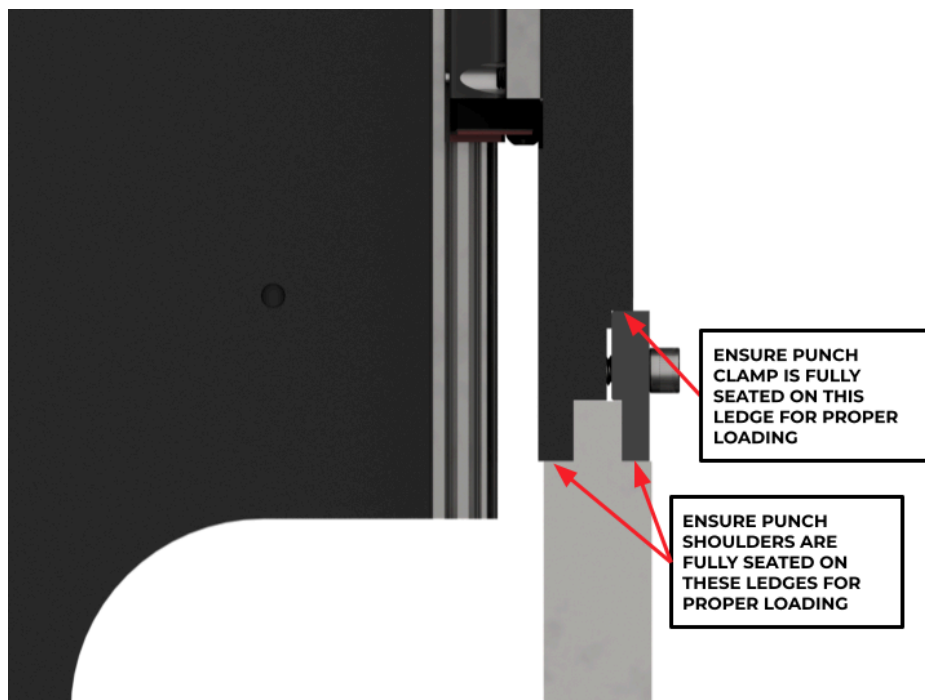
XI. Loading a Punch and Die into the Machine:

1. Loading a Punch

The Titan 25T CNC Press Brake is designed for use with American Style tooling, which has a 0.5" tang centered in the punch/die. Punches are loaded into the channel formed by the Ram and Punch Clamp.

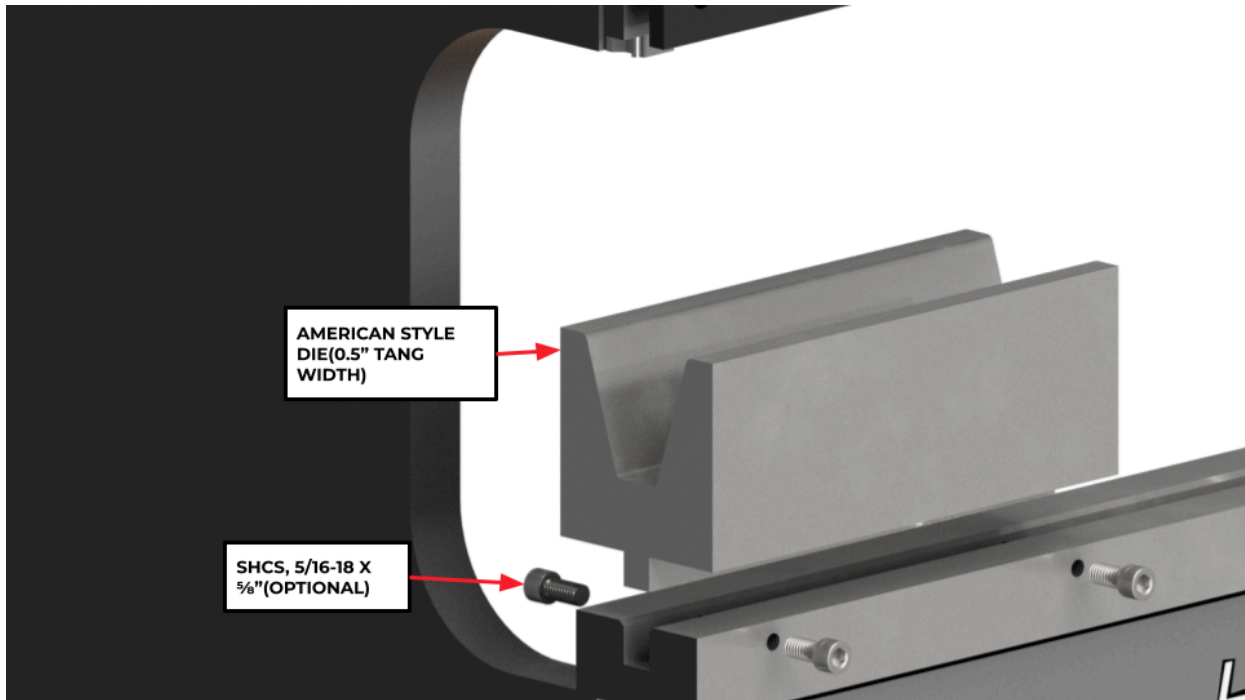


To install a punch, loosen the 5/16-18 Punch Clamp screws on all sections of the punch clamp that will be used to hold the punch. Then, slide the tang of the punch clamp up and into the channel formed by the Ram and Punch Clamp. While applying upward force, tighten the Punch Clamp Screws to secure the punch in place. Pushing up while installing the punch clamp ensures contact at all critical loading points such that both shoulders of the punch are evenly loaded during bending.

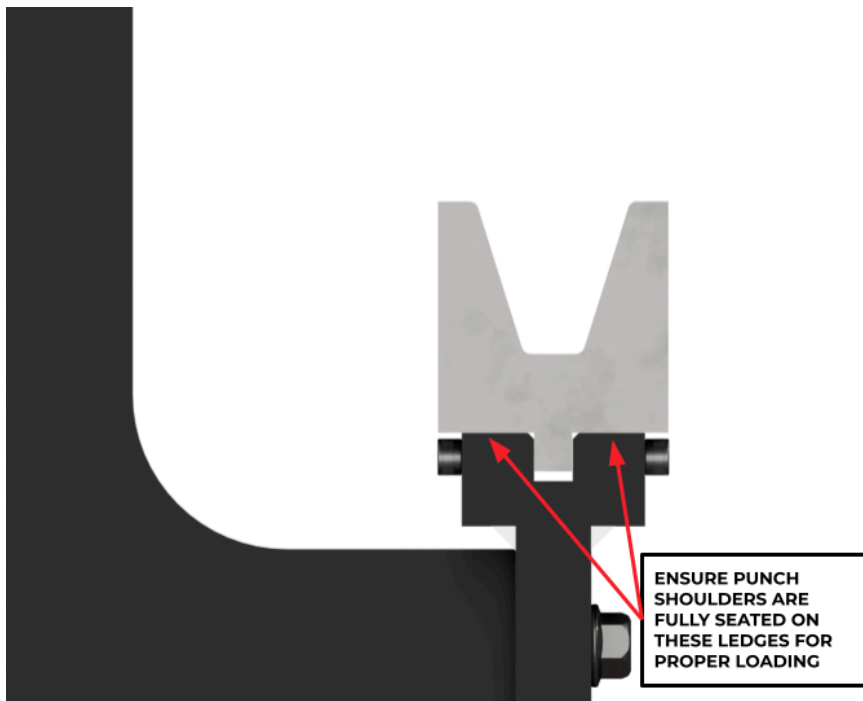


2. Loading A Die

The Titan 25T CNC Press Brake is designed for use with American Style tooling, which has a 0.5" tang centered in the punch/die. Dies are loaded into the slot of the table.

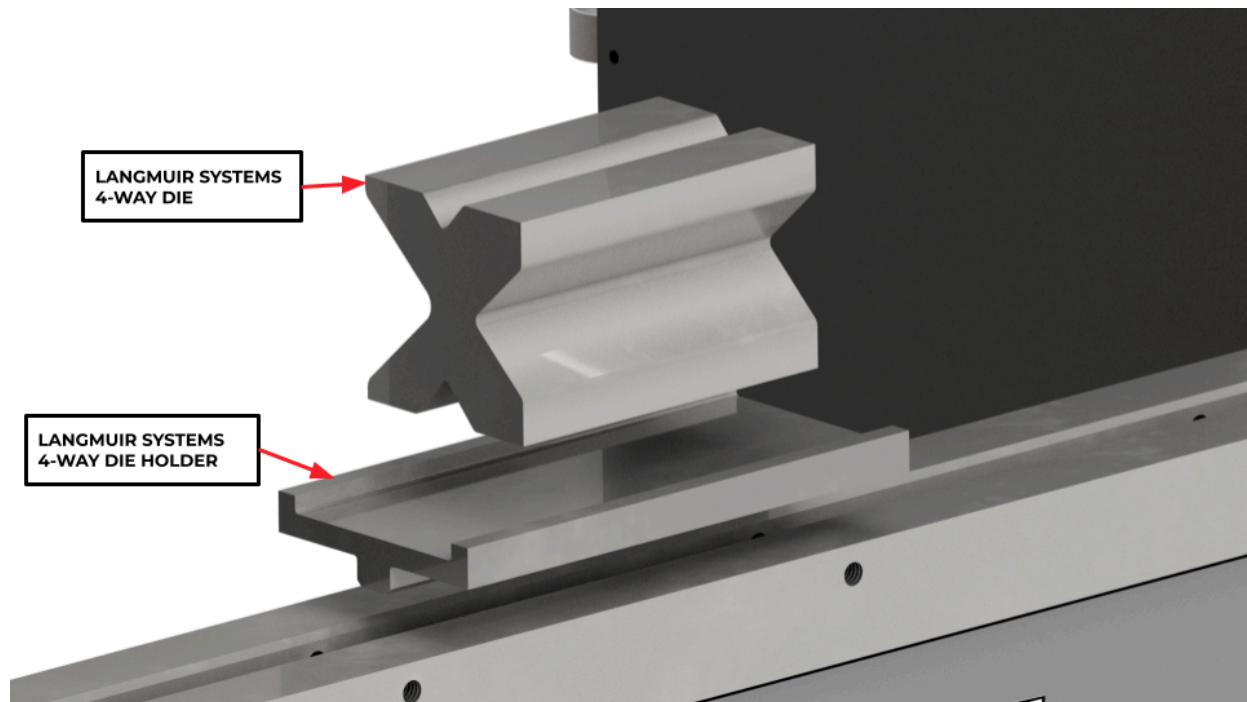


To Install a die, load the tang of the die into the slot of the table. Dies can be secured in place by using optional 5/16-18 screws to clamp the front or back of the tang. Both shoulders of the die should make complete contact with the top face of the table when installed to ensure even loading during bending.



3. Dies Without Tangs

Dies Without Tangs can be used by visually centering the die, but for best alignment a die holder, such as the Langmuir Systems 4-Way Die Holder, is recommended. The Langmuir Systems 4-Way Die Holder is compatible with the Langmuir Systems 4-Way Die and any other die with a width of 2.363" (60mm). To center the 4-Way Die using the 4-Way Die Holder, install the tang of the holder into the slot of the table and place the 4-Way Die onto the flat surface of the holder. The outer walls of the Die Holder will constrain the die such that it is well centered for bending.

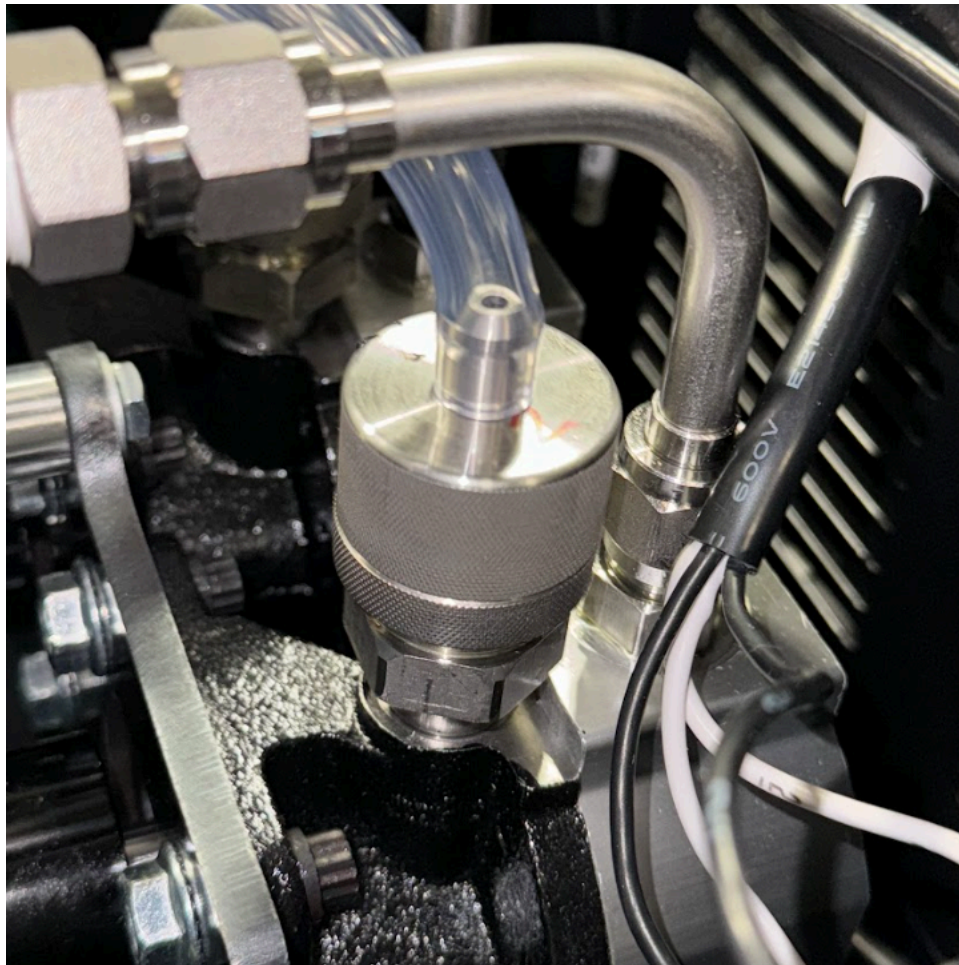


4. Multiple Punches and Dies

Multiple Punches and Die segments can be loaded into the Titan 25T CNC Press Brake at once to reduce setup between operations. It is important when more than one punch and die are installed in the machine, to ensure that no punch or die will make contact with each other or the machine, during any operation.



XII. Pressure Relief Valves:



The Titan 25T CNC Press Brake is equipped with custom-made pressure relief valves on both the Y1 and Y2 hydraulic pressure systems. These valves are conveniently located at the tops of their respective gear pumps. During assembly, they are calibrated in our warehouse to activate at a pressure equivalent to 12.5 tons for each cylinder. The outflow from these pressure relief valves when they are triggered recirculates back into the hydraulic reservoir tank via the low pressure lines, often accompanied by a loud tapping or clicking sound.

1. Function and Purpose:

The primary function of these pressure relief valves is to safeguard the hydraulic system from excessive pressure that could potentially cause damage to the gear pumps, hardlines, machine frame and hydraulic cylinders. When the system reaches the maximum tonnage capacity of 12.5 tons on either the Y1 or Y2 side, the relief valves will open to release the excess pressure. This mechanism ensures that the hydraulic cylinders and other components are not subjected to forces beyond their design limits.

2. Operational Considerations:

During normal operation, it is possible to hear the pressure relief valves pop or repeatedly bang. This auditory indication occurs when the press brake achieves its maximum tonnage capacity. Such sounds are a normal aspect of the machine's operation and signify that the pressure relief valves are functioning correctly to maintain safe operating conditions.

3. Adjustment:

If you are finding that your machine is not capable of reaching the full 12.5 Tons per hydraulic cylinder before the pressure relief valves pop, an adjustment can be made by turning the top adjustment cap of the pressure relief valve.

First, move the machine to the Hard Stop position by clicking HOME. When the machine reaches the upper hard stops, indicated by the motors momentarily stopping and the DRO displaying 0.0000 inches, click CANCEL to interrupt the homing routine before it completes. Next, switch the machine power to OFF, unplug the power cord from the box, wait 3 minutes and then remove the top cover. Next, loosen the lower knurled jam nut several turns. Next, you will need to turn the top knurled cap **clockwise to increase the relief pressure point**, or counterclockwise to decrease it. We recommend first starting out with small corrections and testing on the machine for the actual change to peak pressure. **As a rule of thumb, one rotation of the body will result in a relief pressure change of approximately 0.75 Tons.** Please remember to retighten the lower jam nut when adjustments are finished.

XIII. Checking Ram-to-Table Opening Setting & Machine Level (Optional):

During assembly in our factory, each Titan 25T machine has the Ram leveled to the table within 0.0075", and the Ram-to-Table opening measurement for the machine is stored in the Settings Menu of BendControl. Below is an optional method to measure the Ram-to-Table opening on your machine using a standard of known size (alternatively a Large caliper can also be used to measure the Ram-to-Table opening and to inspect the machine level on both sides).

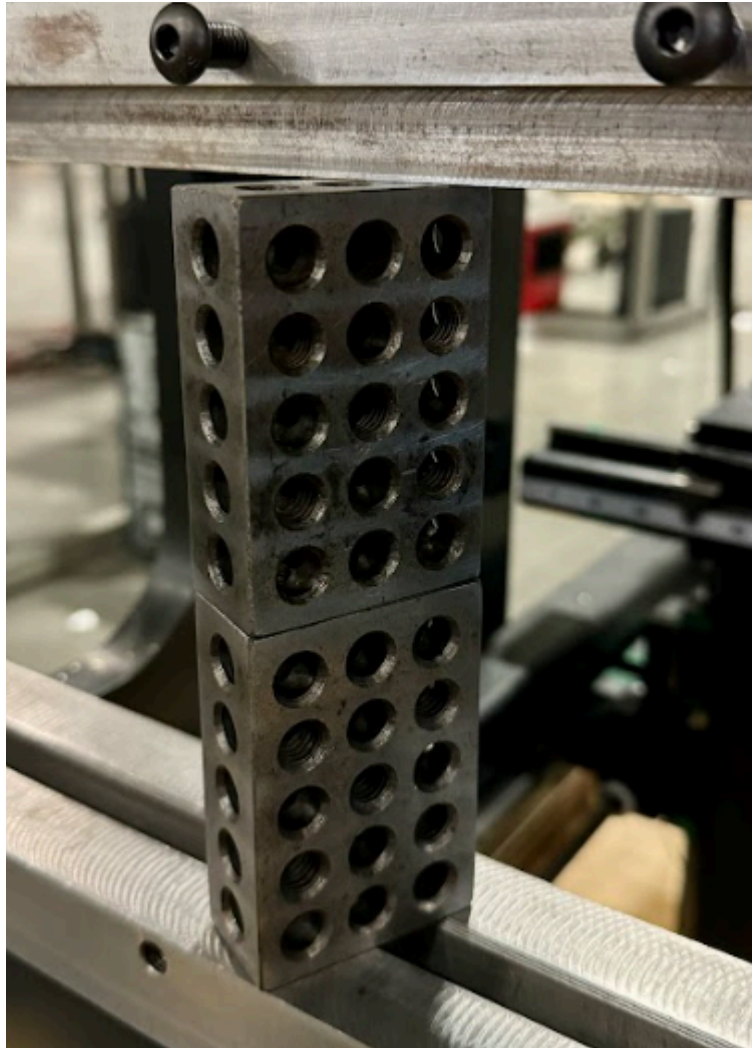
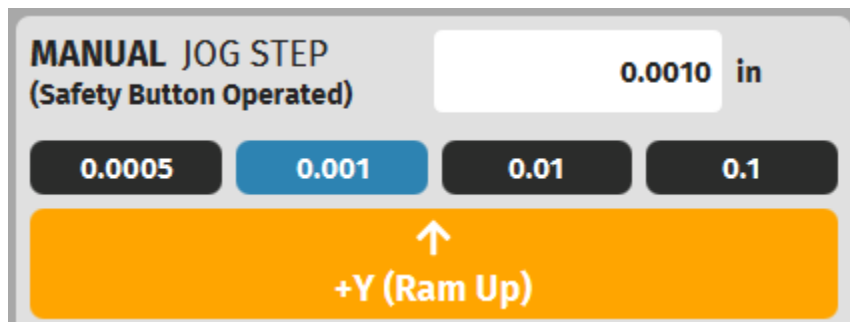
1. Remove all Punches from the Ram, and any Dies installed into the Table. Remove the Right-most and Left-most Punch Clamps from the Ram. Home the Machine.
2. Navigate to the Settings tab, read the value for Ram-to-Table Opening. Grab a known length standard that is between 5 to 7", such as two 1-2-3 blocks stacked on each other or a single 2-3-6 block.
3. Subtract the length of your standard from the already stored Ram-to-Table Opening value, and then add an additional 0.010in. For this example, we are going to use two 1-2-3 blocks stacked on top of each other for a total of 6 inches. Our Ram-to-Table opening value is 8.3900in. Our calculation would be **$8.3900 - 6.000 + 0.0100 = 2.4000$** in.
4. Next, enter the Manual Mode tab. Change the Max Tonnage Per Ram setting to 0.5 Tons for safety. Enter the value calculated in step 3 into the Move To module, and make it a negative value. Below is what it would look like for this example.



MOVE TO (Safety Button Operated)

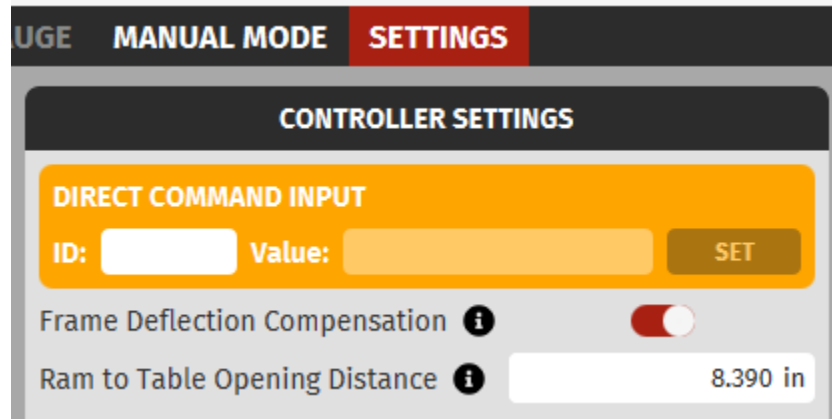
Y-axis Ram Position (Machine Coordinate) in RUN

5. Double check that everything is removed from the table and ram. Click the RUN button, and use the Safety Jog Buttons to bring the Ram down to complete the jog to position move.
6. Go to the left-most side of the machine table. With your length standard resting on the table, slide it backwards towards the Ram. It should now be hitting the lower surface of the Ram, preventing the length standard from sliding between the Ram and Table (this is because of the 0.010" that we added in step 3).
7. Next, set the Manual Jog Step to 0.001" increments. Click the +Y(RAM UP) button. This will move the Ram up by 0.001". Slide the length standard back and see if it now fits between the Ram and Table. If it doesn't, keep jogging the machine up 0.001in increments until the length standard just slides in. Note the Current Position in the green box DRO, and write this value down.



8. Remove the length standard from the table. Jog to machine back to the starting position by following the directions in step 7 above. Move the length standard to the right side of the table, and repeat the steps in Step 7 above.
9. Now that we have measurements for both sides, we can add back our length standard to get our Ram to Table opening. For this example, we obtained a position of 2.392" on the left, and 2.388" on the right. Next, we add back our length standard to both values to obtain Left and Right side Ram-to-Table opening values of 8.392" and 8.388" respectively. We note that the ram is level to within the 0.0075" threshold. Next, we average these two numbers, and enter this value into the Ram-to-Table opening setting on the Settings Menu. Click the SAVE icon to complete the process. *Note: The Ram-to-Table Opening Distance is saved in the storage memory of the Titan controller*

PCB board. This allows the value to survive any software updates that might happen in the future without changing this value.



XIV. Programming a Part:

1. Introduction:

BendControl simplifies the process of creating bending operations on the Titan 25T press brake through an intuitive, conversational approach. The process begins with defining the essential components for a bend: Punches, Dies, and Materials. Each component is created by filling in relevant details such as punch height, die height, V-die opening, material tensile strength, and material springback.

Once the basic components are defined, these elements are utilized to create specific bend operations. For each bend, you will specify detailed parameters such as the Desired Bend Angle, Material Thickness, Punch-to-Material Clearance, and any necessary Angle Compensation.

After creating a bend operation, you can load it, along with any additional bends, into the RUN tab. This tab is designed for executing the bends on the machine through various operating modes, while providing real-time updates and controls to ensure precise and efficient bending operations. BendControl's user-friendly interface and logical workflow make it easy to manage and execute complex bending sequences with confidence.

2. Creating a Punch:

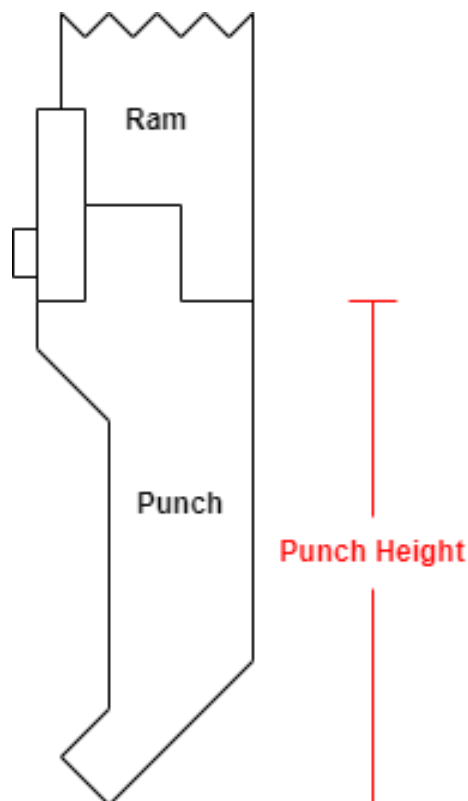
The first step in the Bend creation process is measuring and creating your Punch in BendControl. Punches come in all different shapes and sizes, including but not limited to Acute, Standard, Gooseneck, and Extreme Gooseneck. While this guide covers important considerations for punch and die selection, it does not encompass all factors necessary for determining the best tooling setup for your specific bend. Many variables influence this decision, so it is recommended to consult with a punch/die manufacturer for expert advice tailored to your specific bending needs.

A. Measuring Punch Height:

Once your punch has been selected for a given bend, the first step is to create the Punch entity in BendControl by giving it a descriptive name. Next, we need to grab Calipers or a Micrometer and measure the Punch Height. ***Note: It's important that this measurement is taken accurately as any inaccuracies in this measurement can cause inaccurate results when bending.*** If you purchased your Punch from a reputable manufacturer, it's also possible to obtain this punch height directly from the supplier.

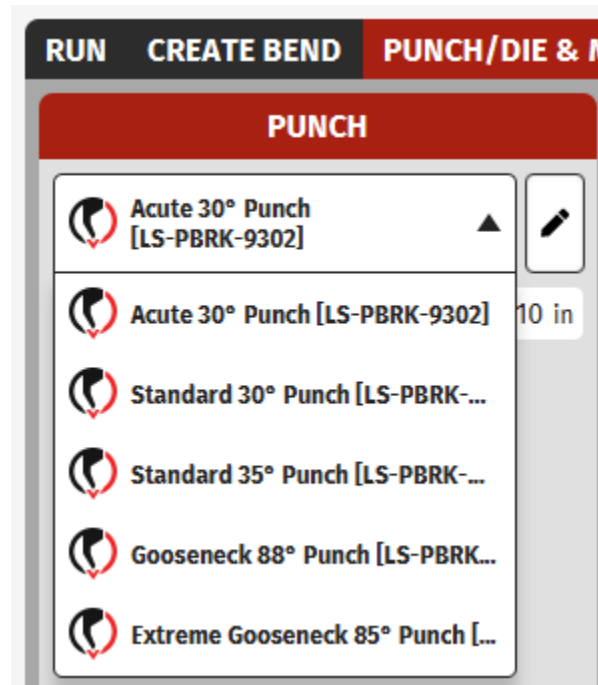
Punch Height refers to the vertical dimension of the punch from its tip to its shoulders (see image below). This parameter is crucial for ensuring accurate bending operations, making it essential that each punch is precisely measured for its height. Accurate measurement of Punch Height is vital for achieving consistent and precise bends.

After all information is entered, be sure to **SAVE** the Punch for later use.



B. Langmuir Systems Pre-loaded Punch Library:

In the PUNCH drop-down menu, you may notice that some items are already populated in the software by default. These are the list of Punches that are manufactured and sold by Langmuir Systems for use with the Titan 25T machine. The Punch Height values listed here are nominal; it is highly recommended that you use measurement tools such as calipers or micrometers to accurately measure your Punches and edit any values so that they match what you have on hand.



3. Creating a Die:

The second step in the bend creation process is measuring and defining your die in BendControl. Dies come in various shapes and sizes, including V-dies, U-dies, and specialty dies. **By far the most common and useful die when bending on a CNC Press Brake is the 4-way Die.** This Die features 4 different Die Widths that can be used by simply rotating the Die to a desired bend width.

While this guide covers important considerations for die selection, it does not encompass all factors necessary for determining the best tooling setup for your specific bend. Many variables influence this decision, so it is recommended to consult with a die manufacturer for expert advice tailored to your specific bending needs.

Note: BendControl was designed for standard Air Bending using dies with small corner radiuses. If you are using a Die with large corner radiuses, such as a Double Round Bar Die, you will need to empirically determine your desired Bend Depth, and then manually enter this value in the Bend Creation tab (see later sections).

DIE	
Acute 26mm 30° Die [LS-PBRK-9355]	
Die Height	1.862 in
V-Die Opening	1.024 in

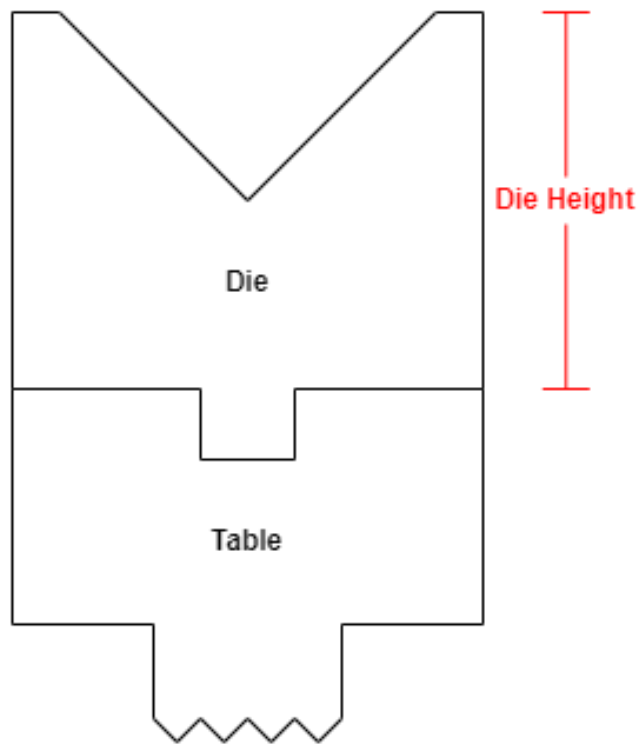
A. “The 8x Rule”:

When selecting a die, a common guideline to follow is the 8x rule. This rule states that the minimum V-die opening should be approximately eight times the thickness of the material being bent. For example, if you are bending a material with a thickness of 1/8 inch, the V-die opening should be at least 1 inch. This rule helps ensure proper bending without damaging the material or the tooling and aids in achieving a consistent bend radius. The 8x rule provides a good starting point for die selection, but other factors such as material type and bend angle may also need to be considered for optimal results.

B. Die Height:

Once your die has been selected for a given bend, the first step is to create the Die entity in BendControl by giving it a descriptive name. Next, we need to grab Calipers or a Micrometer and measure the Die Height. ***Note: It's important that this measurement is taken accurately as any inaccuracies in this measurement can cause inaccurate results when bending.*** If you purchased your Die from a reputable manufacturer, it's also possible to obtain this punch height directly from the supplier.

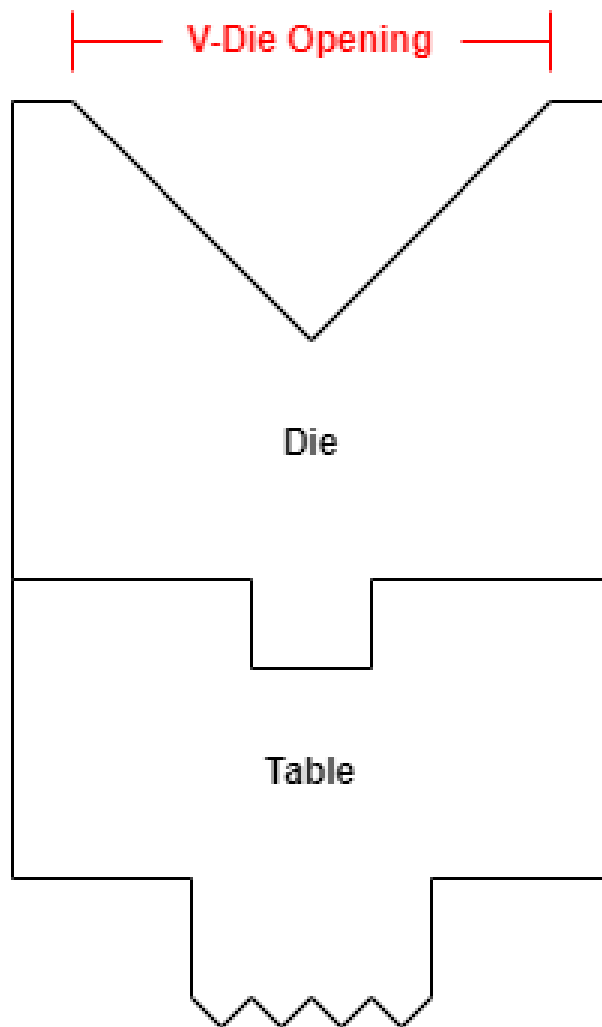
Die Height is the vertical measurement from the bottom of the die (the surface that rests on the table) to the top surface where the material rests (see image below). This parameter is crucial for ensuring accurate bending operations, making it essential that each die is precisely measured for its height. Accurate Die Height measurement ensures consistency and precision in the bending process.



C. V-Die Opening:

The next step is to either obtain or measure the V-die opening of your die. Since many die's have a radiused corner where the angled die surface meets the top of the die, it's best to consult the Die manufacturer for the exact V-die opening to use, as the opening is placed somewhere along this radius.

V-Die Opening is the width of the gap at the top of the V-shaped die. This parameter is critical in determining the formed bend radius of the bend, the amount of force required, and the material thickness that can be effectively bent. Proper selection of the V-die opening ensures accurate bends and prevents material damage. A general rule of thumb is that the minimum V-die opening should be approximately 8 times the material thickness. For example, if you are bending 1/8" material, the smallest die that you should use would have a V-die opening of approximately 1".

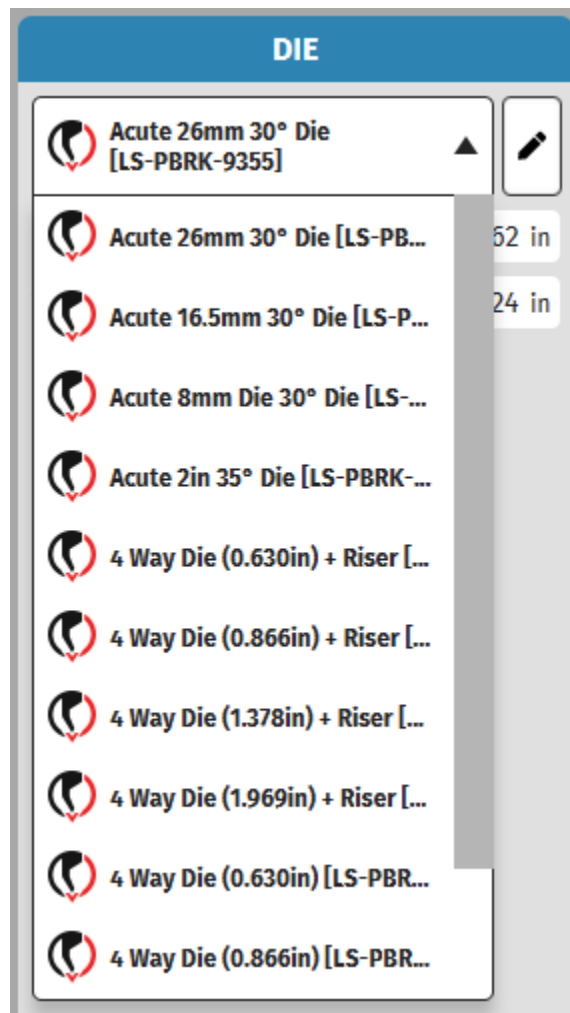


After all information is entered, be sure to **SAVE** the Punch for later use.

D. Langmuir Systems Pre-loaded Die Library:

In the DIE drop-down menu, you may notice that some items are already populated in the software by default. These are the list of Dies that are manufactured and sold by Langmuir Systems for use with the Titan 25T machine. *Note: the Die Height values listed here are nominal; it is highly recommended that you use measurement tools such as calipers or micrometers to accurately measure your Dies and edit any values so that they match what you have on hand.*

You will also notice that the 4-way die values are listed twice; this is so that a user can select this entity if they are using our optional 4-Way Die Holder which adds an additional thickness to the Die Height.



4. Creating a Material:

The next step in the process is to create the Material that you will be bending. In many cases, it will be simplest to start with one of the pre-populated metal entities that are already in BendControl, and then duplicate and edit the values to suit your specific needs. The pre-populated materials include Cold Rolled Steel (e.g. A1008), Hot Rolled Steel (e.g. A36), Stainless Steel (e.g. 304), and Soft Aluminum (e.g. 3003 H14). The below list is the required properties that need to be defined when creating a new Material.

A. Material Tensile Strength:

The Material Tensile Strength is the maximum stress (in PSI) that a material can withstand while being pulled in tension before breaking. It's best to obtain the Mill Test Report for the material you plan to bend to get the most accurate results. If you do not have this information available, start by using the lower end of the range that can be found for your specific alloy, and compensate the Bends accordingly.

B. Inside Bend Radius Percentage:

In air bending, the inside radius that forms is expressed as a percentage of the die opening and material alloy. Sometimes this is referred to as the "20% rule". Below is a general rule of thumb for common alloy types, but please consult the relevant standards for exact values.

- Cold Rolled Steel (e.g. A1008): 15-17%
- Hot Rolled Steel (e.g. A36): 14-16%
- Stainless Steel (e.g. 304): 20-22%
- Soft Aluminum (e.g. H-series): 13-15%

C. Material Springback:

Material springback refers to the elastic recovery of metal after it has been bent on a press brake, causing the metal to partially return to its original shape. This can result in a part that appears underbent. To compensate, we can assign a fixed springback value in degrees for a given material type. While the exact amount of springback will depend on several variables, the springback value can be approximated for certain material types. Below is a generalized list of springback rates when the relationship between material thickness and inside radius is close to 1:1.

- Cold Rolled Steel (e.g. A1008): 0.75 - 1 degree
- Hot Rolled Steel (e.g. A36): 0.5 - 1 degree
- Stainless Steel (e.g. 304): 2 - 3 degrees
- Soft Aluminum (e.g. H-Series): 1.5 - 2 degrees
- Copper and Brass: 0 - 0.5 degrees"

5. Creating a Bend:

The next step in our process is to create each bend for our part. Here we specify all the relevant data that defines our bend such as the Punch/Die/Materials that we are going to use, as well as our Desired Bend Angle and our Material Thickness. Since we are also going to use the backgauge to position the material for our bend line, we can specify this information here as well. The following sections provide more detailed information for each parameter on the Create Bend screen.

The screenshot shows the 'CREATE BEND' tab of a software interface. At the top, there are tabs: RUN, CREATE BEND (active), PUNCH/DIE & MATERIALS, BACKGAUGE, MANUAL MODE, and SETTINGS. Below the tabs, a dropdown menu shows 'Enclosure Box - Back Panel - Large Flange'. The main area is divided into three columns: Punch, Die, and Material Type. Under Punch, there's a dropdown for 'Gooseneck 88° Punch [LS-PBRK-8392]'. Under Die, there's a dropdown for '4 Way Die (1.378in) + Riser [LS-PBRK-4387]'. Under Material Type, there's a dropdown for 'Cold Rolled Steel (e.g. A1008)'. Below these, there are input fields for 'Desired Bend Angle (included)' (90.0°), 'Angle Compensation' (UNDERBENT, 0.8°), 'Punch-to-Material Clearance (Start)' (0.050 in), 'Additional Retract After Bend' (0.000 in), 'Material Thickness' (0.125 in), 'Bend Width' (0.1 in), 'Add Backgauge Move' (toggle on), and 'Override Final Bend Position' (toggle off). On the right side, there's a section 'OPEN VERTICAL POSITION DIAGRAM' with various position values: Start Safety Clearance Position (-1.789 in), Bend Clamp Position (-1.845 in), Final Bend Position (-2.425 in), Retract After Bend Position (-1.789 in), Total Bend Stroke (0.586 in), Calculated Bend Tonnage (0.036 TONS), and Predicted Inside Bend Radius (0.155 in). Below this is a 'BACKGAUGE ZERO ORIGIN NOTES' section with X-AXIS (Zero is on Centerline of Table) and R-AXIS (Zero is on Top Surface of Die). At the bottom, there's a 'GENERAL BEND NOTES' section with the text 'Use material labeled A1008 from material rack.' At the very bottom, there are buttons: NEW BEND MOVE, SAVE, DUPLICATE, RESET, and LOAD BEND INTO PROGRAM.

A. Selecting Punch/Die/Material:

The first step to creating our bend is to select the Punch/Die/Material combo that we want to use for our bend. Simply select the desired item from each drop-down menu as shown below. These selections can be changed at any time, and any changes to these entities on the Punch/Die & Materials tab will propagate back to the Create Bend tab as well.

This close-up screenshot shows the 'Punch', 'Die', and 'Material Type' selection area. The 'Punch' dropdown is set to 'Gooseneck 88° Punch [LS-PBRK-8392]'. The 'Die' dropdown is set to '4 Way Die (1.378in) + Riser [LS-PBRK-4387]'. The 'Material Type' dropdown is set to 'Cold Rolled Steel (e.g. A1008)'.

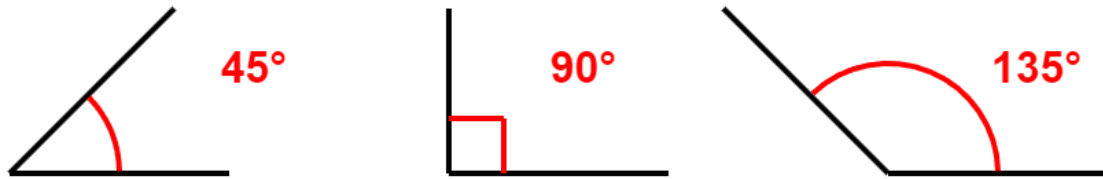
B. Desired Bend Angle (Included):

This close-up screenshot shows the 'Desired Bend Angle (included)' input field. The value entered is 135.0°.

Next, we enter our Desired Bend Angle in degrees. The Desired Bend Angle is the inside angle formed in the material during the bending process, also referred to as the included angle. The below image provides several examples for how an included angle is specified. It's

important to enter your angle correctly using this method to ensure the desired bend angle is produced.

Included Angle Examples



C. Material Thickness:

This value is the thickness of your material in inches. It is very important to get an accurate measurement of your material thickness, because inaccurate values can lead to large inaccuracies in finished bend angles. **We highly recommend using a caliper or micrometer to measure your material thickness when creating a bend.**

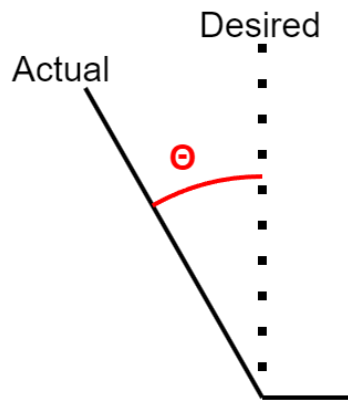
An accurate material thickness measurement becomes even more important when you are bending thin material on a die with a narrow V-die opening.

D. Angle Compensation:



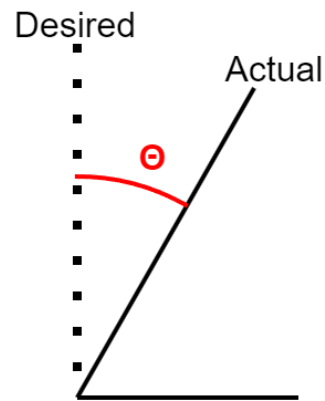
Angle Compensation allows the operator to make an angular correction to a programmed Bend. The user can make a bend, measure the difference when compared to the desired bend angle, then enter this correction value allowing the machine to compensate for the error on the next bend. Angles that are **OVERBENT** are bent past their desired angle (e.g. desired 90° but bent to 85° is 5° **OVERBENT**). Angles that are **UNDERBENT** are not bent enough when compared to their desired angle (e.g. desired 90° but bent to 95° is 5° **UNDERBENT**). Clicking the **OVERBENT/UNDERBENT** button will toggle between these two settings.

UNDERBENT



Θ = Angle

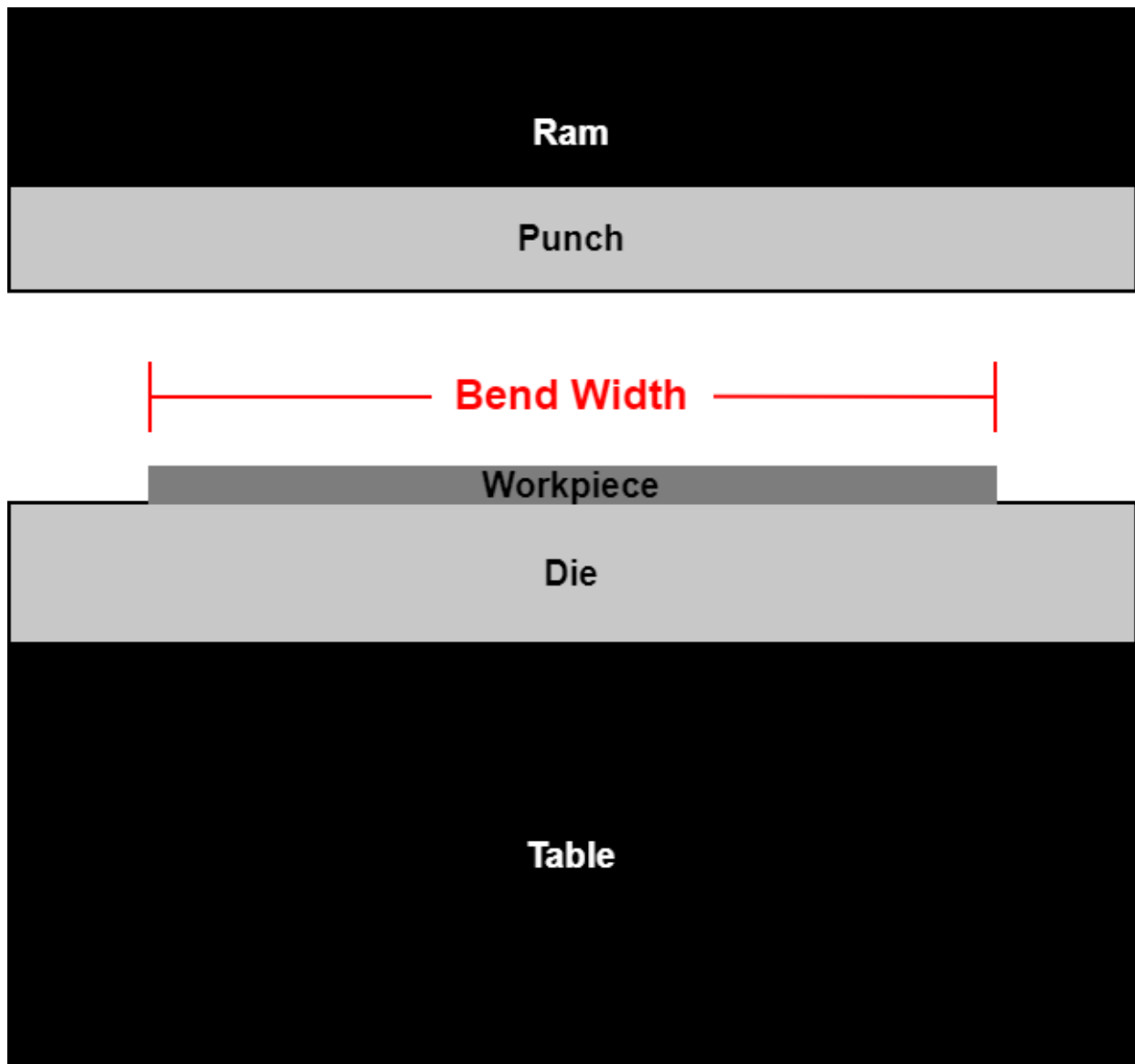
OVERBENT



Θ = Angle

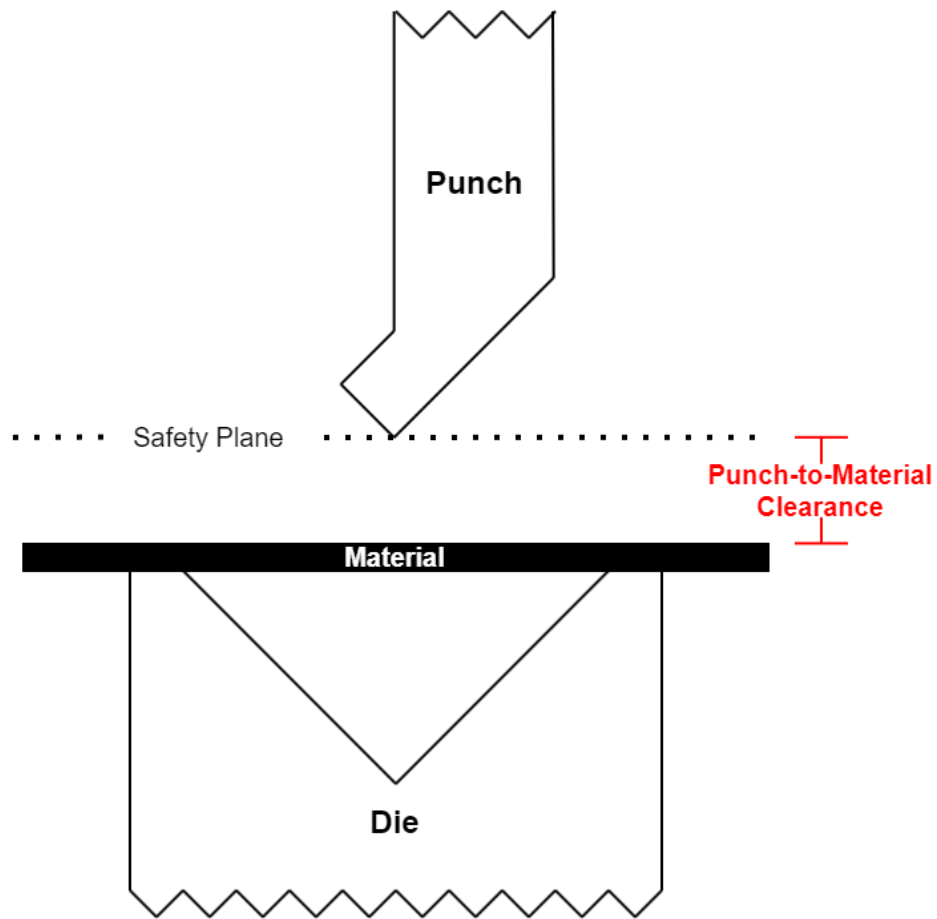
E. Bend Width:

Bend Width is a measurement of the width of the workpiece across the table. The wider the workpiece is, the more tonnage is required to make the bend. BendControl uses the bending parameters for each bend to make a calculated estimate of the needed Tonnage for each bend, so it's important that you accurately measure your bend width to get a more accurate Calculated Bend Tonnage value in BendControl for each bend.



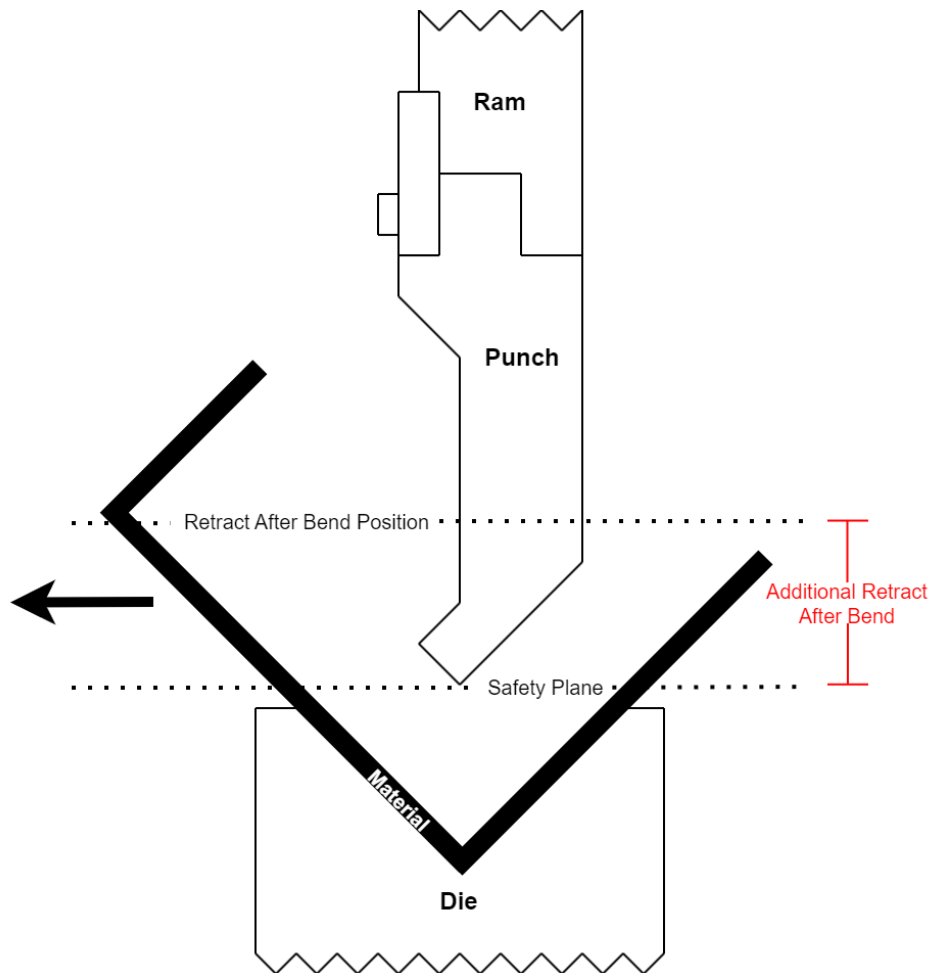
F. Punch-to-Material Clearance (Start):

Punch-to-Material Clearance is the vertical distance between the Safety Jog Plane and the top surface of the material before clamping or making a bend. This distance must be large enough to freely adjust the workpiece between the Punch and Die, but small enough to ensure a finger could not fit between the Punch and the material for safety reasons. BendControl will issue a Warning if the Punch-to-Material Clearance value is greater than 0.3 inches.



G. Additional Retract After Bend:

Additional Retract After Bend allows the ram to retract upwards past the original Safety Jog Plane (a.k.a the Punch-to-Material Clearance Position) once a bend is completed. This adds additional retraction enabling the user to remove their workpiece after a bend is complete, if necessary depending on the finished part geometry. The below image depicts a part geometry that would require this additional clearance distance in order to properly remove the material from the front of the machine.



H. Setting up a BACKGAUGE move (Optional):

Add Backgauge Move



An optional step when creating a Bend is adding a backgauge move. This requires the operator to have purchased the optional 2-axis CNC backgauge. A backgauge is designed to accurately position a workpiece in place for bending, ensuring precision and consistency in the bend line position. Essentially it is the backgauge's job to automatically move its finger stops into position for each programmed bend so that the operator can use this as a 'backstop' to push the material against before bending.

To enable a backgauge move, toggle the 'Add Backgauge Move' to the ON position. You will see the below panel pop-up at the bottom of the Create Bend screen.

Reference Edge Stop

BACKGAUGE FINGER LOWER EDGE

X Position	R Position	Jog Speed
-2.000 in	0.125 in	100 IPM

The first step to defining a Backgauge move is to specify the Reference Edge Stop that you will be using on the backgauge. Generally this will be either the Finger Lower Edge, or the Finger Upper Edge, but it's possible that you have replaced your fingers with some other custom feature (such as an angled finger for locating an angled part feature) and this can be selected here if this Reference was defined on the backgauge Tab of BendControl. See OPERATING THE BACKGAUGE section below for more information on how to define reference edges on the backgauge Tab.

Next, you will specify the X and the R backgauge coordinate positions for your required bend. This tells the backgauge where to move before the bend process occurs so that the operator can snub the material up to the Reference edge hard stop for making the required bend. A user can also specify the Jog Speed that they want the backgauge to move during a program.

As a simple example, let's say that we wanted to create a 2" Flange in 1/8" steel. From our CAD model, we see that given the inside bend radius (which can be taken from the Create Tab in BendControl and substituted into the CAD model for more accurate positioning), the Bend Line Location is 1.967" from the edge of our material. If you don't have access to 3D modeling software to extract the Bend Line Location, we recommend consulting an online reference or calculator for how to calculate the Bend Deduction for your specific bend in order to position the Bend Line Location for your desired Flange dimensions.

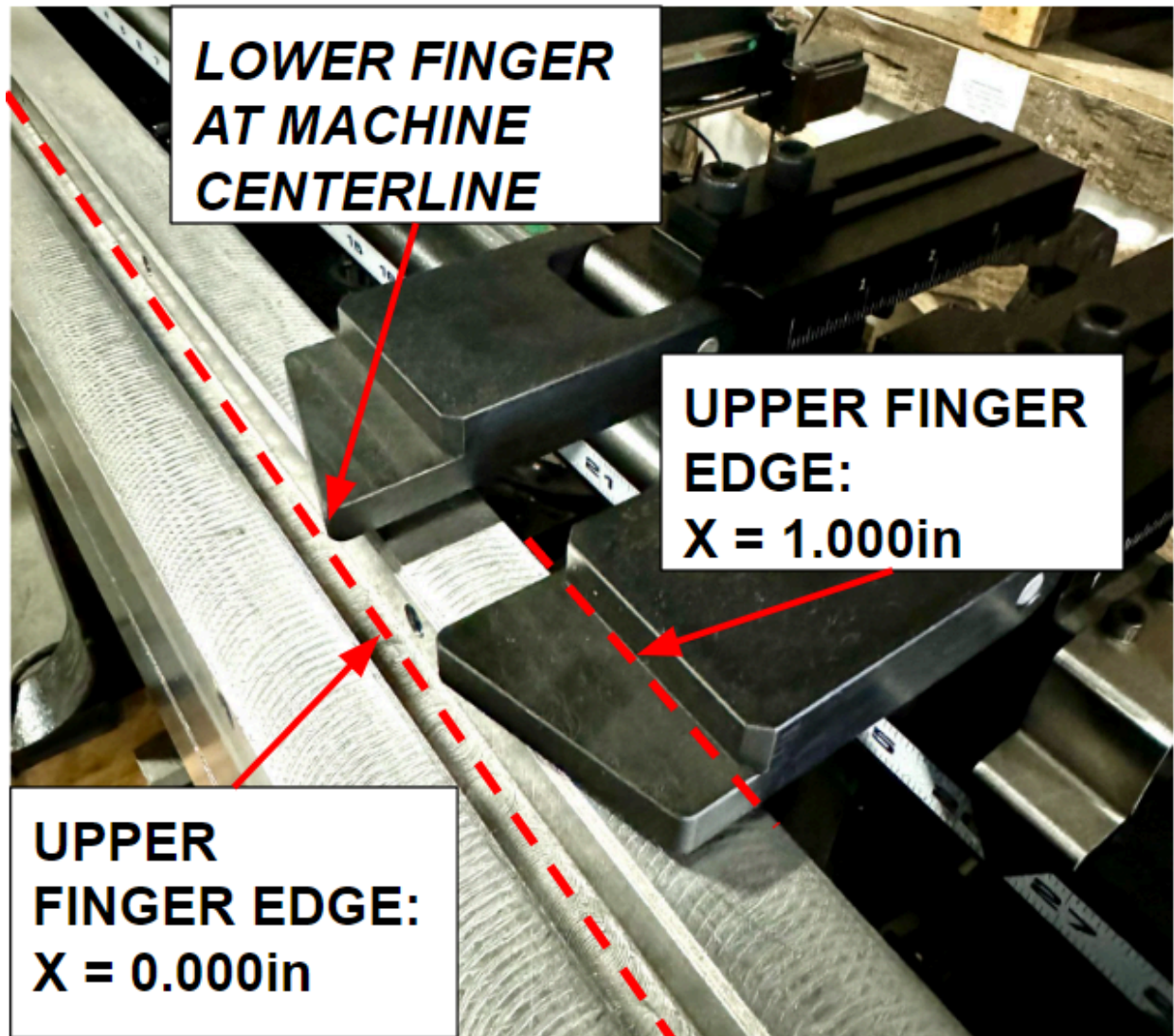
Let's assume that we are using the backgauge finger Upper Edge as our reference edge to snub the material against. Let's also assume that we zeroed the Upper Edge stop to the Centerline of our machine in the X Position, and we zeroed the R position so that the finger surface was flush to our top Die surface where the material rests (see pictures of this setup on the Machine below as an example). *Then, we would program the backgauge move as shown in the image below. We have also typed in Backgauge Zero Origin Notes to save with our bend and remind us next time we run this program how to zero the backgauge finger stops before starting the bend again.*

<div>Reference Edge Stop</div> <div>BACKGAUGE FINGER UPPER EDGE</div> <div> <div>X Position</div> <div>1.967 in</div> </div> <div> <div>R Position</div> <div>0.000 in</div> </div> <div> <div>Jog Speed</div> <div>100 IPM</div> </div>			BACKGAUGE ZERO ORIGIN NOTES	
			X-AXIS	ZEROED TO CENTERLINE OF MACHINE.
			R-AXIS	FINGER RESTING SURFACE IS FLUSH TO DIE SURFACE AT ZERO.
			GENERAL BEND NOTES	
Here you can write some notes about this				

a. Setting our X-axis ZERO Position on the Machine:

In the previous example, we have shown how to enter in this backgauge position for creating a Bend. Now let's look at how we actually establish these Zero positions for our desired reference edges on the machine itself. **Note: You must HOME your backgauge before continuing here (see later section OPERATING THE BACKGAUGE for more information on how to run the backgauge and Home it).**

As we saw earlier, we are going to use the Upper Finger Edge for this bend. In addition, we want the Zero position of our X-axis to be located at the Centerline of the machine table. Unfortunately, the backgauge fingers are not able to jog to the Upper Finger Edge all the way to centerline, but we can jog the Lower Finger Edge to the centerline. Since we know that the Upper Edge is exactly 1.000in set back from the Lower Edge in the positive X-axis direction, we can enter this offset when we Zero the X axis.

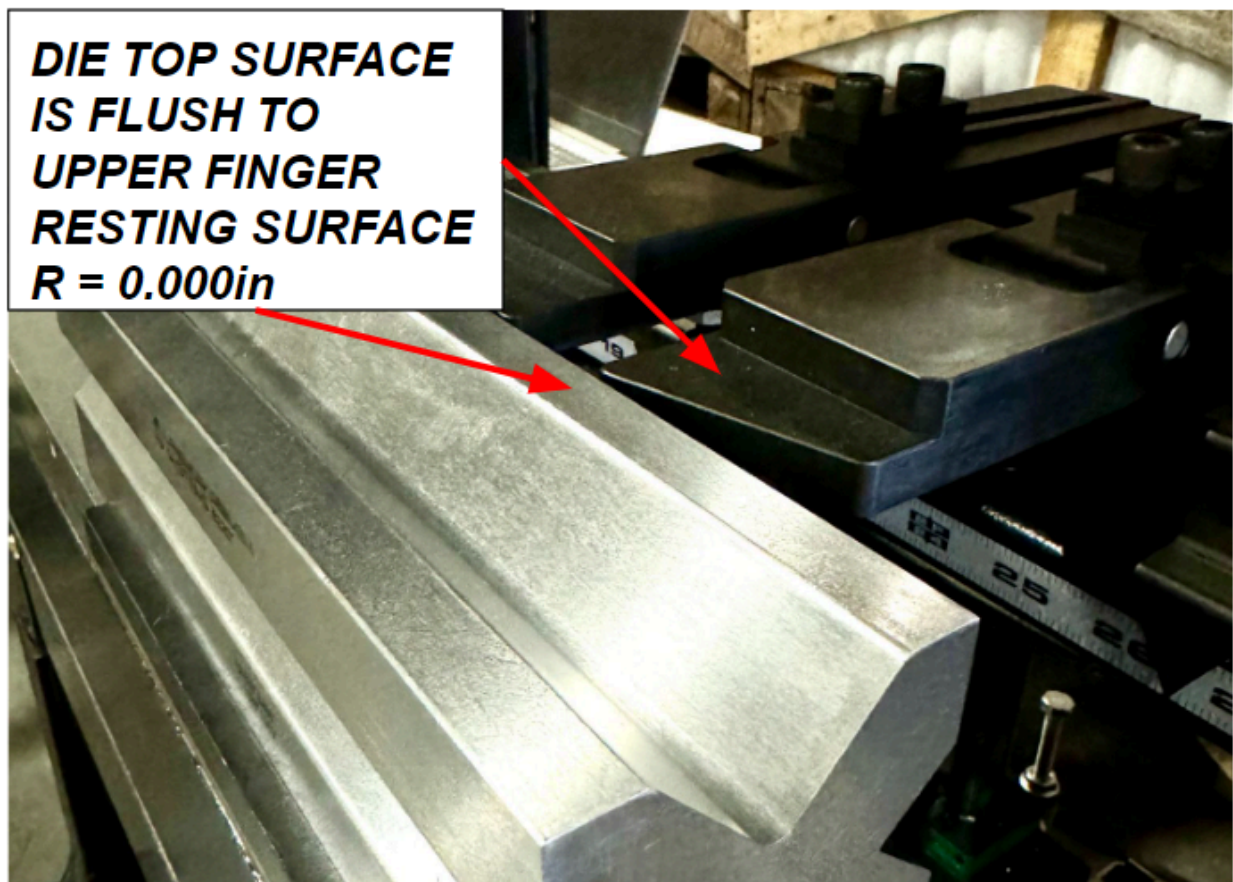


Now with the Lower Fingers sitting at the Machine Centerline, let's navigate to the Backgauge tab to set our X-axis zero position. Since we know that the Upper Finger edge is set back in the positive X direction by exactly 1.000", we can just type in 1.000" into the Digital Read Out (DRO) for the X-axis and we are done. If we had enough clearance and could jog the Upper Edge so that it was in-line with the Machine Centerline, we would find that the position for the X-axis would read 0.000", just like we want it to. It will look something like below in BendControl when you are finished. **Remember to make sure that you have selected BACKGAUGE FINGER UPPER EDGE from the drop-down menu above the Digital Read Out for X and R-axis positions.**

<div> <div>HOME</div> <div>BACKGAUGE FINGER UPPER EDGE</div> <div>MACHINE</div> </div>		
X	1.0000	ZERO
R	-2.0730	ZERO

b. Setting our R-axis ZERO Position on the Machine:

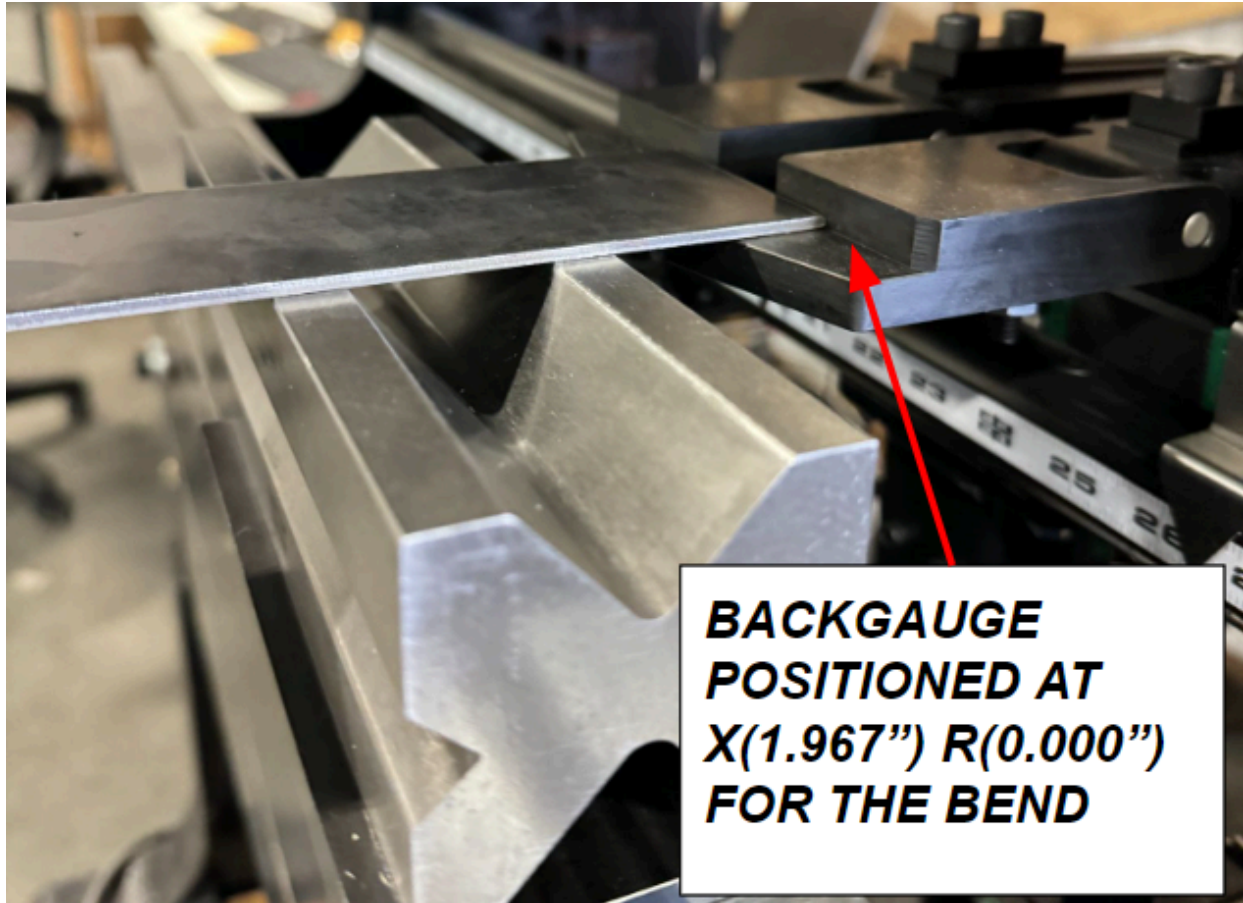
Next, we are going to do the same thing but this time for the R-axis zero position. To do this, we just need to jog the R-axis until the material resting surface is flush to the top surface of the Die, and then we can just click the ZERO button next to the R-axis DRO position in BendControl. When done correctly, it will look like the image below.



<div> <div>HOME</div> <div>BACKGAUGE FINGER UPPER EDGE</div> <div>MACHINE</div> </div>		
X	2.2500	ZERO
R	0.0000	ZERO

c. Demonstrating Backgauge Positioning During Bending Process:

Now that we have our X and R-axis Zero positions set correctly, and we've entered our backgauge bend line coordinate positions into the Create Bend screen for our desired bend, we can take a look at where the machine will move automatically when we actually run the bend process. As shown below, the backgauge is now positioned so that the material can be loaded, snubbed up to the hard stop of the backgauge Upper Reference Edge, and bent to our desired 2" flange. This same procedure can be followed for zeroing and entering backgauge coordinates for any desired bend.



I. Override Final Bend Position (Optional):

BendControl allows the user to override the Final Bend Position, as long as it is between the clamp position and the maximum machine travel distance. Sometimes this can be useful if the calculated values are not producing the desired bend, and you want to use a bend depth value that you have empirically determined works well for the bend that you are making.

PROCEED WITH CAUTION ON ANY OVERRIDDEN BEND TO MAKE SURE THAT YOU DON'T CRASH YOUR PUNCH INTO THE DIE.

We have found that the best way to determine an Overridden Final Bend Position is to run some test pieces using Manual Mode. This will allow you to incrementally creep up on your

desired Bend, and then you can use this empirically determined value to create the Bend for running in a program once you have it dialed in. Below is an example of a Bend that has been overridden.

Die	Hot Rolled Steel (e.g. A36)	Final Bend Position OVERRIDDEN	-2.130 in
Material Thickness	0.125 in	Retract After Bend Position	-1.673 in
Bend Width	0.1 in	Total Bend Stroke	0.407 in
Add Backgauge Move	<input type="checkbox"/>	Calculated Bend Tonnage	0.065 TONS
Override Final Bend Position	<input checked="" type="checkbox"/>	Predicted Inside Bend Radius	0.143 in
⚠ OVERRIDDEN BEND DEPTH		BACKGAUGE ZERO ORIGIN NOTES	

J. Calculated Bend Tonnage:

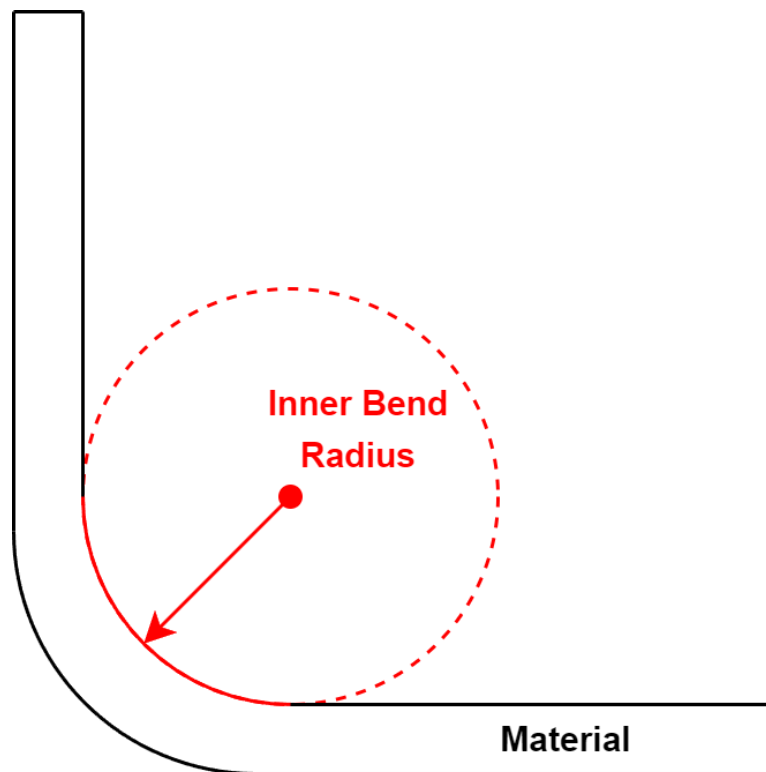
Calculated Bend Tonnage	3.620 TONS
-------------------------	------------

Calculated Bend Tonnage is the calculated total tonnage required to perform a bend, and it is displayed on the right side of the Create Bend tab. If the Calculated Bend Tonnage is greater than 12.5 tons (the maximum allowable tonnage for each hydraulic cylinder), then the workpiece must be centered to distribute the load between the rams evenly.

K. Predicted Inside Bend Radius:

The Predicted Inside Bend Radius is an estimated calculation of the inner radius formed by a bend, based on the relevant parameters entered into BendControl. This value is particularly useful as it can be directly applied to a part's CAD model, ensuring a more accurate determination of the bend line within the CAD design.

Predicted Inside Bend Radius	0.155 in
------------------------------	----------



L. Bend Warning Labels:

When creating bends on the Create Bend tab, BendControl will perform checks of the entered parameters to make sure that there are no issues with the bend. BendControl employs two different warning labels to alert operators to potential issues with their bends, ensuring both safety and precision during operations. These warnings are displayed in the Create Bend Tab and are categorized by color to indicate their severity and impact on the bending process.

Yellow Warning Labels: These labels, such as "Unsafe Clearance Plane" and "Overridden Bend Depth," alert the operator to specific issues that require attention but do not prevent the bend from being executed. The yellow warnings serve as advisories, allowing the bend to proceed while highlighting potential risks or deviations from standard parameters. Operators should carefully review these warnings and take appropriate actions to mitigate any identified risks.

Red Warning Labels: These labels, such as "Tonnage Rating Exceeded" and "Upper Travel Limit Exceeded," indicate critical issues that prevent the bend from being executed on the machine. Red warnings highlight problems that pose significant risks to the machine or the bending process, necessitating immediate resolution before the operation can continue. These labels ensure that operations are halted to avoid damage or unsafe conditions, protecting both the equipment and the operator.

By paying close attention to these warning labels, operators can ensure safe and efficient bending operations, addressing potential issues proactively and maintaining the

integrity of the bending process. Below is an example of the warning labels issued for a given Bend.

Test Bend

Punch

Acute 30° Punch
[LS-PBRK-9302]

Die

Acute 16.5mm 30° Die
[LS-PBRK-9858]

Material Type

Cold Rolled Steel (e.g. A1008)

Desired Bend Angle
(included)

90.0 °

Angle Compensation

OVERBENT 0.0 °

Punch-to-Material
Clearance (Start)

3.000 in

Additional Retract
After Bend

0.000 in

Material Thickness

0.125 in

Bend Width

33.0 in

Add Back Gauge Move

Override Final Bend
Position

UNSAFE CLEARANCE PLANE

OVERRIDDEN BEND DEPTH

TONNAGE RATING EXCEEDED

BEND DEPTH NOT IN RANGE

UPPER TRAVEL LIMIT EXCEEDED

OPEN VERTICAL POSITION DIAGRAM

Start Safety
Clearance Position

1.277 in

Bend Clamp Position

-1.732 in

Final Bend Position
OVERRIDDEN

-1.730 in

Retract After Bend
Position

-0.050 in

Total Bend Stroke

0.007 in

Calculated Bend
Tonnage

25.325 TONS

Predicted Inside
Bend Radius

0.073 in

BACK GAUGE ZERO ORIGIN NOTES

X-AXIS

Example: Back Gauge
Reference Edge was zeroed
at center of the table

R-AXIS

Example: Finger zeroed on
top of table

GENERAL BEND NOTES

Here you can write some note about this
specific bend move

NEW BEND ...

SAVE

DUPLICATE

RESET

LOAD BEND...

M. Reviewing Bend Positions and Saving:

Start Safety Clearance Position	-1.673 in
Bend Clamp Position	-1.732 in
Final Bend Position	-1.968 in
Retract After Bend Position	-0.673 in
Total Bend Stroke	0.245 in

In the Create Bend tab of BendControl, operators can review the calculated positional information for each bend on the right hand side. This includes several critical parameters displayed in a clear, accessible format:

Start Safety Clearance Position (Machine Coordinate): This is the vertical position where the ram will stop before clamping the material, ensuring enough clearance for positioning the workpiece.

Bend Clamp Position (Machine Coordinate): The position where the ram will clamp the material securely before initiating the bend.

Final Bend Position (Machine Coordinate): The target depth the ram will achieve to form the bend.

Retract After Bend Position (Machine Coordinate): The position to which the ram will retract after the bend is completed, allowing safe removal of the workpiece, and convenient positioning to start the next bend.

Total Bend Stroke: The total vertical movement of the ram during the bending process.



Once all parameters are confirmed, remember to click the  icon to continue.

6. Creating a Bend Program:


The RUN tab is the central hub for creating, managing, and executing bend programs in BendControl. This interface allows operators to create and add new bends to a program, review detailed information for each bend, edit or delete bends, and save the program for future use. The intuitive design ensures that all necessary information and controls are easily accessible, facilitating efficient and precise bending operations.

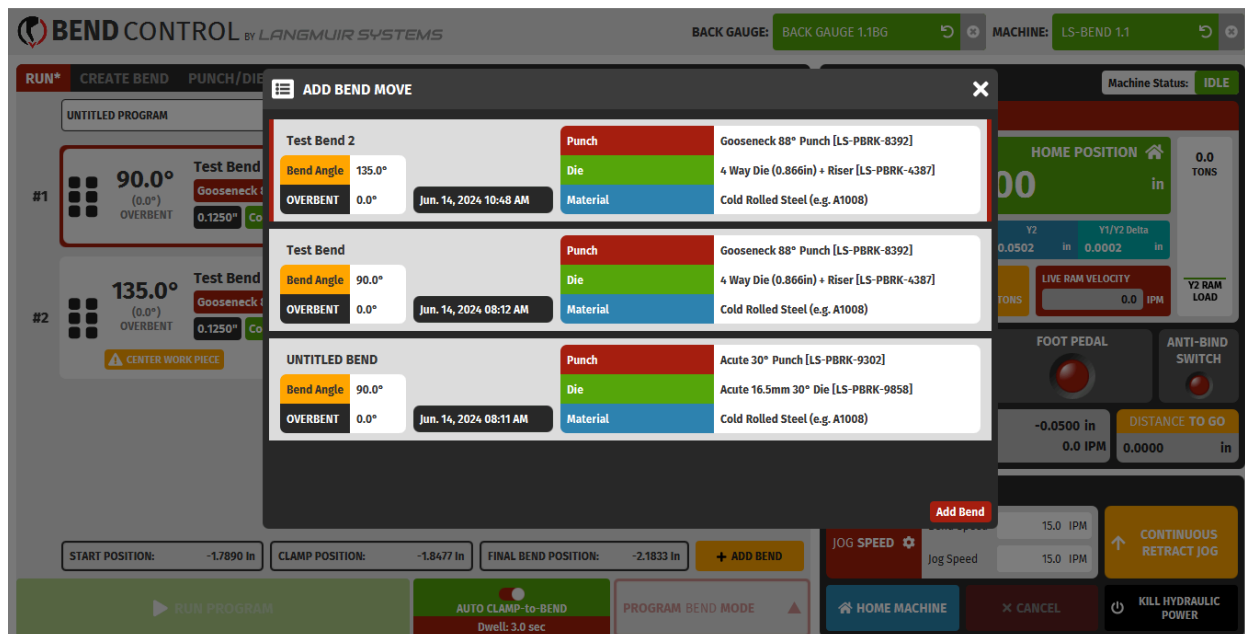
A. Adding a Bend to a New Program:



First click the  button to create a new Bend program. Next, to add a bend to a



new program, click the  button located at the bottom right of the screen. This will open the Add Bend Move window, where you can select any of your created bends from the Create Bend tab. Simply select the Bend you want from the list, and click Add Bend to add it to your program.



B. Rearrange Bends in a Program:

In the RUN tab, operators can quickly change the order of bends within a program using the touch screen interface. To rearrange a bend, touch and hold the six-dot symbol (also known as the handle icon) next to the desired bend, drag it to the new position, and release it. This action updates the program sequence instantly (don't forget to SAVE), allowing for quick adjustments to the bending process on the fly. Below is an example of a Bend that is in the process of being rearranged.

The screenshot displays the 'RUN' tab of a bending machine control interface. It shows a sequence of three bends:

- #1:** 90.0° (0.0°) bend. Parameters: Gooseneck 88° P..., 4 Way Die (0.866i...), X: 1.9670, R: 0.0000, SPEED: 100.000, BEND TONNAGE: 0.058.
- #2:** 90.0° (0.0°) OVERBENT bend. Parameters: Gooseneck 88° P..., Acute 8mm Die 30..., 0.5000", Cold Rolled Steel (e.g. A...). A red warning box states 'BEND DEPTH NOT IN RANGE'. Backgauge reference: X: 1.9670 In, R: 0.0000 In, SPEED: 100.000 IPM, BEND TONNAGE: 2.534 TONS.
- #3:** 90.0° (0.0°) OVERBENT bend. Parameters: Gooseneck 88° P..., Acute 8mm Die 30..., 0.1250", Cold Rolled Steel (e.g. A...). Backgauge reference: X: 1.9670 In, R: 0.0000 In, SPEED: 100.000 IPM, BEND TONNAGE: 0.158 TONS.

At the bottom, the interface shows position fields: START POSITION: -2.1640 In, CLAMP POSITION: -2.2490 In, FINAL BEND POSITION: -2.1470 In, and an '+ ADD BEND' button.

C. Bend Information Display:

The program display allows a user to verify information for each loaded bend. This is a handy reference to make sure that all of your bends and bend information looks correct before proceeding. Some of this information includes Start Position, Clamp Position, Punch, Die, Material, Thickness, Desired Bend Angle, Angle compensation, Backgauge move information, and expected Bend Tonnage.

D. Editing or Deleting a Loaded Bend:

To delete or edit a bend, use the icons next to each bend entry:

Delete Bend: Click the red trash icon to remove the bend from the program. This action will prompt a confirmation to ensure that the bend is not deleted accidentally.

Edit Bend: Click the blue pencil icon to open the selected bend in the Create Bend tab. This allows for quick modifications to the bend without having to recreate the bend from scratch. Any changes saved here will propagate to the program automatically.

E. Reviewing and Saving:

After configuring all the bends in the program, it is crucial to review the entire sequence to ensure accuracy and safety. Verify that each bend has the correct parameters and that the sequence order is appropriate. Once satisfied, click the "SAVE" button at the top right of the screen to store the program.

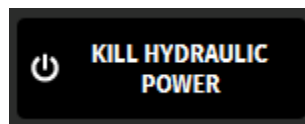
XV. Running a Bend Program:

Now that we have created our Bend program, it's time to actually run it on the Titan 25T machine. This will involve interacting with the machine and its peripherals in order to create our desired part. Before running a program, it's important to understand the entire process to make sure that everything runs smoothly. Once you become more familiar with the machine and the bending process, the operator can focus on how to optimize programs for making quicker and more efficient bends.

1. EMERGENCY STOP Switch:

The EMERGENCY STOP switch is a critical safety feature located at the top right of the machine, next to the touch screen. **Operators should always be aware of its location and keep a mental eye on it while running programs.** In case of an unexpected event, pressing the EMERGENCY STOP switch will immediately kill all power to the entire machine, ensuring a swift and safe shutdown.

2. KILL HYDRAULIC POWER Button:



The KILL HYDRAULIC POWER button is another essential safety feature, located in the bottom right corner of the BendControl software interface. Clicking this button at any time will stop the hydraulic power pack from running, providing an additional layer of safety if something unexpected happens while running a program. This feature allows operators to quickly halt hydraulic operations without affecting the rest of the machine's functions.

3. CANCEL (or STOP) Button:

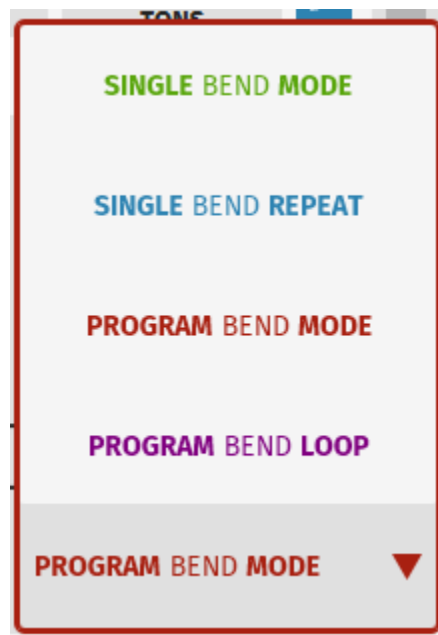


The 'Cancel' button, located at the bottom right corner of BendControl, serves multiple purposes. When a program is paused at a HOLD state, clicking the 'Cancel' button will cancel the program. This is a soft reset, and the operator can continue to start the program again without needing to Home the machine again. During active motion, this button changes to 'Stop.'

Pressing it while the machine is moving will stop all motion and cancel the program instantly, providing an immediate response to halt operations if necessary.

4. Bending Modes:

At the bottom right of the RUN tab, the user will find the Bend Mode Drop-down menu. This allows a user to select a desired Mode for a given bend or program (multiple bends). Below is a description of each mode and how it operates when running the program.



A. SINGLE BEND MODE:

In Single Bend Mode, the BendControl software executes the selected bend operation once and then finishes the program. This mode is available when the active program contains only one bend or when a specific bend is highlighted in a multi-bend program. It is ideal for verifying individual bends before proceeding with additional operations.

B. SINGLE BEND REPEAT:

Single Bend Repeat mode allows the operator to continuously repeat the selected bend operation after it has been successfully completed. This mode is also available when the active program contains only one bend or when a specific bend is highlighted in a multi-bend program. The operator is provided with a clear warning in the RUN PROGRAM pop-up indicating that the bend will be repeated, ensuring they are aware of the continuous operation.

C. PROGRAM BEND MODE:

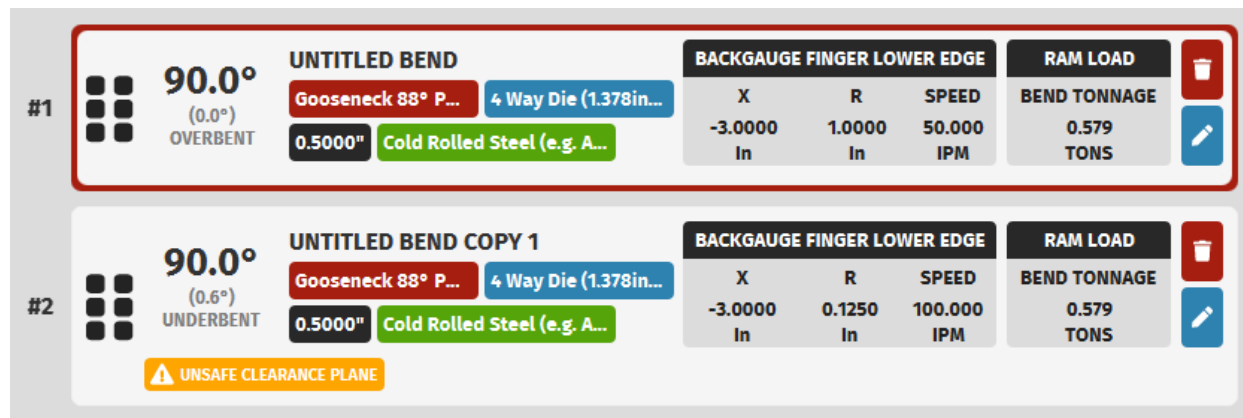
Program Bend Mode enables the execution of a sequence of bends starting from the currently highlighted bend and proceeding to the last bend in the active program.

This mode is accessible when the active program has more than one bend. If the selected bend is not the first bend in the program, the RUN PROGRAM pop-up includes a warning to inform the operator that the sequence will start from the highlighted bend and not from the beginning.

D. PROGRAM BEND LOOP:

In Program Bend Loop mode, the BendControl software runs the entire sequence of bends from the first to the last bend in the program, regardless of the currently selected bend, and then repeats the sequence continuously. This mode is suitable for high-volume production runs requiring repeated application of the same sequence of bends. The RUN PROGRAM pop-up provides a warning to clearly inform the operator that the program will repeat, ensuring awareness of the continuous operation.

5. Actively Selecting a Bend:

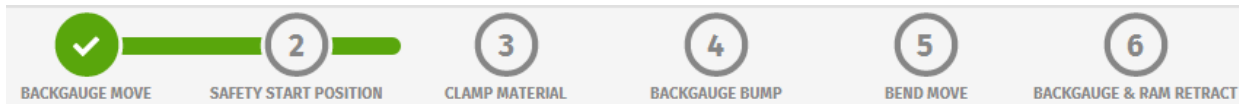


In BendControl, actively selecting a bend is crucial for utilizing the various Bend Modes effectively, and to ensure that your machine runs how you expect it to when starting a program. To select a bend, simply tap on the desired bend in the program list on the RUN tab. **The selected bend will be highlighted by a Red bounding box, indicating it is the active bend.** This selection determines the starting point for the operation modes as below:

- **Single Bend Mode:** Executes the currently highlighted bend once and then finishes.
- **Single Bend Repeat:** Repeats the actively selected bend continuously after each successful completion, with a clear warning in the RUN PROGRAM pop-up at the start.
- **Program Bend Mode:** Begins the sequence from the actively selected bend and proceeds to the last bend in the program. If the selected bend is not the first in the program, a warning will be displayed in the RUN PROGRAM pop-up to inform the operator.
- **Program Bend Loop:** Starts from the first bend in the program, regardless of which bend is currently selected, and repeats the entire sequence continuously, with a warning in the RUN PROGRAM pop-up indicating the looped execution.

By actively selecting a bend, operators can control the starting point and behavior of the bending process, ensuring flexibility and precision in their operations.

6. Sequence of Bending Operations:



When the operator clicks the RUN button to start a bend program, a linear progress bar appears in BendControl at the bottom of the screen which illustrates the chronological sequence of steps that the machine will follow. This progress bar provides real-time feedback, showing which step the machine is currently executing and advancing to as each step is completed. The Sequence of Bending Operations is designed to ensure a precise and efficient bending process, from initial positioning to the final bend and retraction. Below is a detailed description of each step in the sequence.

A. Step 1 - Backgauge Move (optional):

In this optional step, the backgauge moves to the predefined position to correctly position the material for the bend. This ensures that the material is accurately aligned with the punch and die setup. The backgauge settings, including the X and R coordinates, are specified in the program to match the desired bend line location.

B. Step 2 - Safety Start Position:

This step moves the ram down the Safety Start Position, so that we can feed our material between the Punch and Die to start the bending process. The ram is moved during this step using the Safety Palm Switches.

C. Step 3 - Clamp Material:

In this step, the ram moves down further to clamp the material securely between the punch and die. Clamping the material ensures that it remains in the correct position to start the bending process, and the operator can then remove their hands from holding the material to safely make the bend. The ram is moved during this step using the Foot Pedal Switch.

D. Step 4 - Backgauge Bump (optional):

The Backgauge Bump is an optional step that involves a slight movement of the backgauge backwards (+X direction) after the material is clamped. This helps to clear the backgauge fingers from the material before the bending process is started.

E. Step 5 - Bend Move:

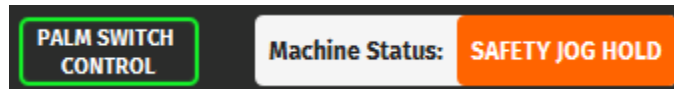
The Bend Move is the core step where the actual bending operation occurs. The ram continues to move downwards, applying force to bend the material to the specified angle between the Punch and Die. The ram is moved during this step using the Foot Pedal Switch. Note: If the AUTO CLAMP-to-BEND toggle is ON (see more information in section below), the

foot pedal can remain down from the Clamp Material step in order to continue making the Bend move.

F. Step 6 - Backgauge (optional) & Ram Retract:

In the final step, the ram retracts automatically to the Retract After Bend Position, ensuring safe clearance for the removal of the bent workpiece. If a backgauge move was involved, the backgauge will simultaneously retract backwards in the +X direction by a predefined amount (set in the Settings tab).

7. Operating Safety Palm Switches:



The Safety Palm Switches are an essential safety feature of the Titan 25T CNC Press Brake, designed to ensure that the operator's hands are clear of the machine during critical movements. ***These switches must be actuated simultaneously to bring the ram down to the Safety Clearance Plane before executing a bend.*** This dual-hand operation prevents the operator's hands or arms from being in the machine's danger zone during movement.

Whenever the machine is armed with a safety jog move and is in the SAFETY JOG HOLD state, the Safety Palm Switches need to be engaged to initiate the move. The operator can release and re-engage the switches as needed to incrementally move the ram, allowing for periodic checks of the machine's status and position. This incremental control is particularly useful for precise adjustments and ensuring that the setup is correct before proceeding with the bend.

To prevent misuse, the Safety Palm Switches cannot be bypassed with tape or other means. BendControl includes a safety mechanism that verifies the switches are released before a safety jog move can be armed. This ensures that the palm switches are operated correctly, maintaining a high level of safety during machine operation.

By adhering to these safety procedures, operators can confidently perform bending operations while minimizing the risk of injury.

8. Operating the Foot Pedal:



The Foot Pedal on the Titan 25T CNC Press Brake is used to perform the clamping and bending strokes. **To enhance safety and prevent accidental activation, the foot pedal must be "double-tapped" to start a move. This means the pedal should be quickly depressed and released, then depressed again and held down to complete the clamp or bend stroke.** This mechanism ensures that the operator is intentionally engaging the pedal to execute a move, and doesn't inadvertently step on it by accident.

Once a clamp or bend move is armed, the operator can use the foot pedal to initiate the action. For added safety, the foot pedal must be released before a new clamp or bend move can

be armed. If the foot pedal is released at any time during a clamp or bend move, the program is immediately canceled, and the ram automatically retracts to the Safety Clearance Plane. This feature acts as an additional safety measure, instantly stopping the program if the operator releases the pedal.

Additionally, there is an optional feature called AUTO CLAMP-to-BEND that can be toggled on. When this feature is enabled, the operator can keep the pedal depressed between the clamping and bending moves, allowing for a seamless transition during the bending operation. This streamlines the process and improves efficiency while maintaining safety protocols.

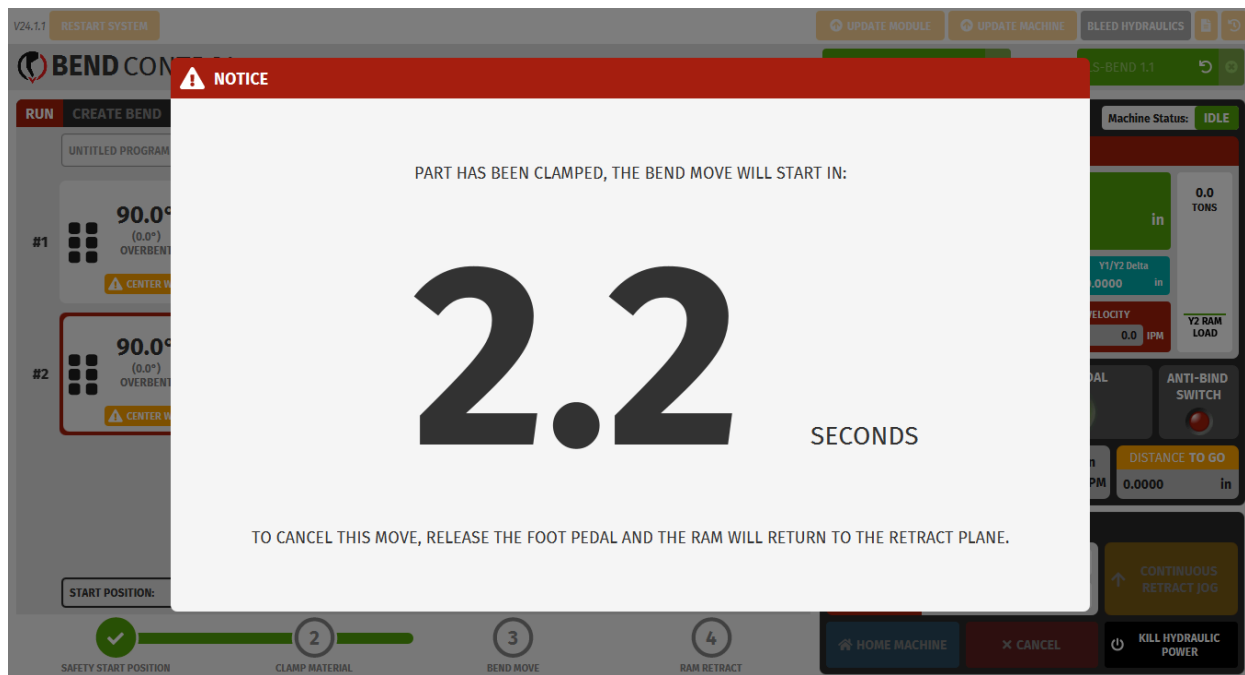
By following these procedures, operators can ensure safe and efficient operation of the foot pedal, minimizing the risk of accidental activation and maintaining control over the bending process.

9. AUTO CLAMP-to-BEND Toggle:



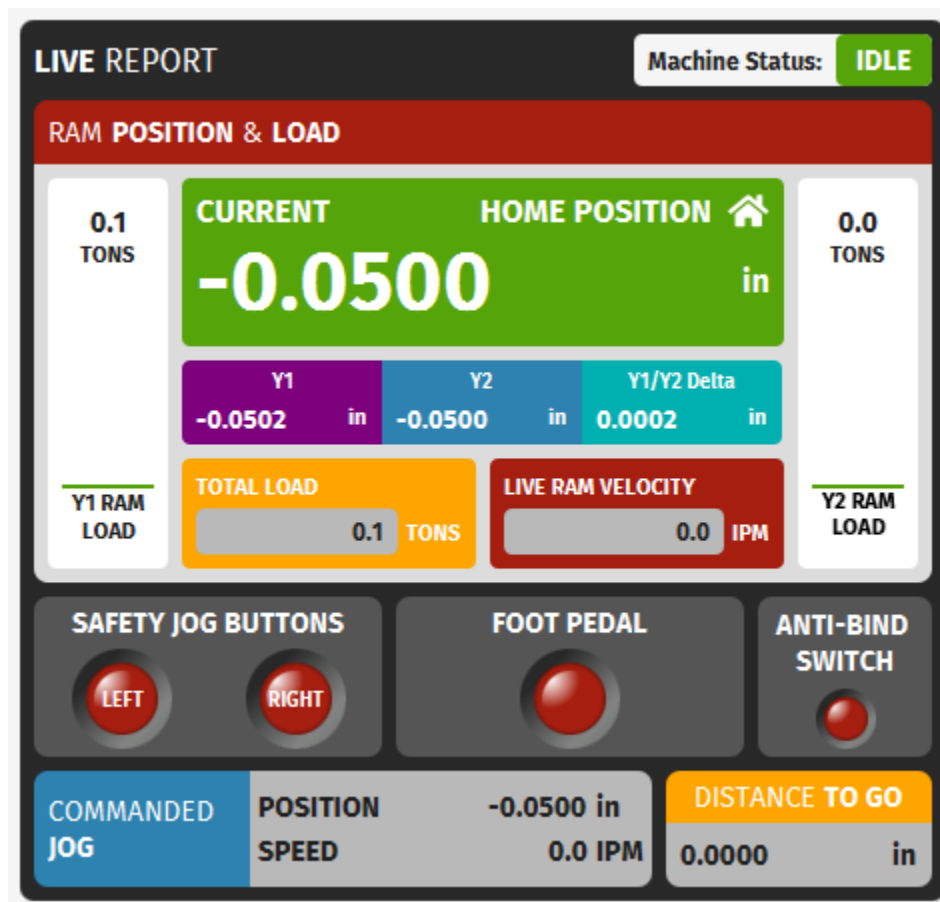
At the bottom of the RUN tab is a toggle button labeled AUTO CLAMP-to-BEND. When this toggle is ON, the AUTO CLAMP-to-BEND feature is enabled when running a program, and the Dwell time is also listed in the button for easy reference. When this feature is enabled, the operator is able to leave the Foot Pedal depressed after a CLAMP move has been completed, and the machine will automatically start the BEND move after the dwell period has been completed.

For those that are new to operating the machine, this Dwell feature is a great added safety step to give the operator time to make sure everything went according to plan during the Clamp phase, and before the Bend operation begins. If the operator lifts the foot pedal during this dwell period, the ram will retract back to the Safety Start Position and the program will be canceled. Below is the pop-up that is shown to a user during the dwell period when the timer is counting down. If you want the AUTO CLAMP-to-BEND feature enabled, but don't want any dwell period, you can simply set this value to 0 seconds in the settings menu.



10. Monitoring the Live Report Menu While Bending:

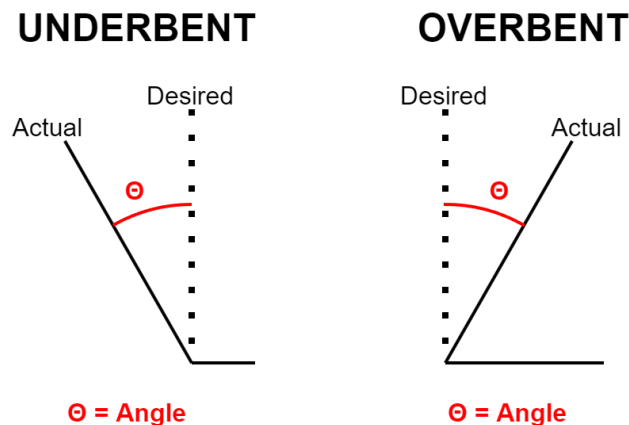
The Live Report Menu within BendControl provides real-time data and control options essential for monitoring and operating the Titan 25T CNC Press Brake. This panel is divided into several key sections described below. It is highly recommended to familiarize yourself with all the data that is contained in this reporting menu so that you are in a position to make better decisions while operating the machine.



- A. **Machine Status:** This indicates the live state of the machine controller at any given time.
- B. **Current Position:** Displays the current commanded position of the ram in inches.
- C. **Home Position:** Indicates the default home position, if the current position is at the home position of -0.050in.
- D. **Y1 and Y2 Positions:** Shows the individual live positions of the Y1 and Y2 hydraulic cylinders, expressed as the live readout from the linear glass scales encoders on each side of the ram.
- E. **Y1/Y2 Delta:** Displays the live positional difference between Y1 and Y2 cylinders.
- F. **Y1 and Y2 RAM Load:** Shows the live load in Tons on each Ram. As tonnage increases, the bars will increase in height accordingly, up to a maximum of 12.5 tons for each ram.
- G. **Total Load:** Indicates the combined load being applied by summing up the live Y1 and Y2 loads.
- H. **Live Ram Velocity:** Shows the actual live speed of the ram movement in inches per minute (IPM).
- I. **Safety Jog Buttons LEDs:** Shows the live state of the Safety Jog Button Palm Switches for the left and right sides. When these buttons are depressed, the lights will turn green.
- J. **Foot Pedal LED:** Shows the live state of the foot pedal. When the foot pedal is depressed, the light will turn green.
- K. **Anti-Bind Switch:** Shows the live state of the Anti-Bind Switch. When either of the Anti-Bind limit switches are tripped, the status light will turn green.

- L. **Commanded Jog:** Shows the currently commanded Jog Position and Jog Speed of the machine in inches.
- M. **Distance to Go:** This signifies the linear distance that the ram has to travel from its current position in order to complete the commanded jog move. It is a very useful feature to monitor during bending operations as a sanity check to make sure that the ram is going to move where you expect it to move.

11. Measuring and 'Comping' a Bend:



The last step when making a part on the machine is to measure and compensate for the bend angle, if needed. Generally the operator will first execute a bend, and then use a protractor to measure the actual angle that was made. Then, the operator can figure out the difference between the measured angle and the desired angle to arrive at the compensation that is needed (either OVERBENT or UNDERBENT). Angles that are OVERBENT are bent past their desired angle (e.g. desired 90° but bent to 85° is 5° OVERBENT). Angles that are UNDERBENT are not bent enough when compared to their desired angle (e.g. desired 90° but bent to 95° is 5° UNDERBENT). Clicking the OVERBENT/UNDERBENT button will toggle between these two settings.

The example part below was bent on Titan to 90.6 degrees. This indicates that it was UNDERBENT by 0.6 degrees, since our Desired Bend Angle was 90 degrees. We simply type 0.6 and toggle the Angle Compensation to UNDERBENT, and we can make the bend again.





NOTE: If you are making several parts in a row, comping the bend is a worthwhile process. But if you are just making a one-off part and the part is overbent, there is no way to bend it back. That is why it's advisable to enter a larger angle then what you need, then you can iteratively creep up on the desired angle by rebending and checking again. For example, if you wanted a 90 degree bend, you might try to input an OVERBENT value of 2 degrees. Then you can measure and check the bend, and adjust the compensation as needed.

XVI. Manual Mode Operation

Manual Mode is a special menu that can be accessed by clicking the MANUAL MODE tab. **Due to the increased risk for injury in Manual Mode, the user will be greeted with a Safety disclosure each time that Manual Mode is entered.**

Manual Mode is a great way to operate the machine like a regular hydraulic press, but with all the numerically controlled features of a CNC machine. Manual Mode features three different operating modes which include MANUAL STROKE OPERATION, MANUAL JOG STEP, MANUAL CONTINUOUS JOG, and MOVE TO POSITION. In addition, when in Manual Mode, the user can temporarily decrease the Max Tonnage Per Ram setting to a lesser value than the maximum 12.5 Tons. This can be important when a user might want to limit the max tonnage of the machine, such as when pressing a bearing into a bore, or other assembly and bending tasks where it is important to control the maximum load. **The below sections go into greater detail on how to operate each of these Modes.**

1. Extreme Caution in Manual Mode:

Please exercise Extreme Caution when operating in Manual Mode. Several of the parametric safety checks that are present in normal program bending operations are not present in Manual Mode, the risk of injury due to incorrect operation is much greater.

Responsibility: You assume full responsibility for ensuring all operations conducted in Manual Mode comply with the established operating guidelines and safety protocols.

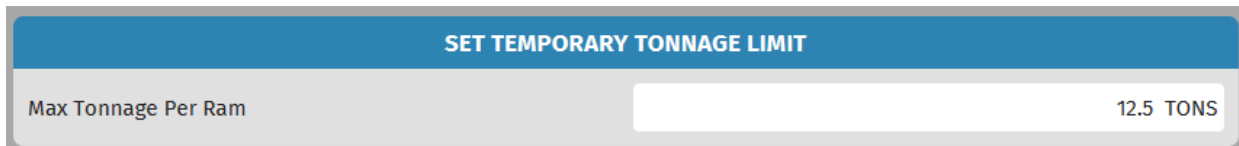
Parameter Verification: It is imperative that you double-check all parameters you input manually to confirm they are correct and suitable for the intended operation. Incorrect parameters can lead to machine malfunction, damage, or failure, posing serious risks.

Safety First: Always prioritize personal and workplace safety. Ensure you are fully versed in emergency stop procedures and safety equipment usage before initiating Manual Mode.

Training and Competence: You confirm that you are adequately trained and competent in operating the CNC Press Brake, particularly in Manual Mode, and understand the risks involved.

Injury Risk: Be aware that incorrect usage of Manual Mode can lead to serious injury. Always follow best practices and never bypass safety features.

2. Set Temporary Tonnage Limit:



SET TEMPORARY TONNAGE LIMIT	
Max Tonnage Per Ram	12.5 TONS

The "Set Temporary Tonnage Limit" feature allows operators to temporarily reduce the maximum Ram tonnage capacity of the Titan 25T when in Manual Mode. By decreasing this value, the machine will enter into the Maximum Tonnage Error state at this new setting value. This is particularly useful for delicate tasks that require lower force to, such as pressing bearings into bores or working with thin materials during assembly tasks. By setting a lower tonnage limit, operators can prevent overloading and potential damage to the workpiece or machine, ensuring precise and safe operation.

3. Manual Stroke Operation:

MANUAL STROKE OPERATION
(Pedal Operated)

Safety Plane Clearance (distance above Start Pos.)	0.0500 in
Start Ram Position (Machine Coordinate)	-1.0000 in
Ending Ram Position (Machine Coordinate)	-1.0001 in
Stroke Distance (from Start to End)	0.0001 in

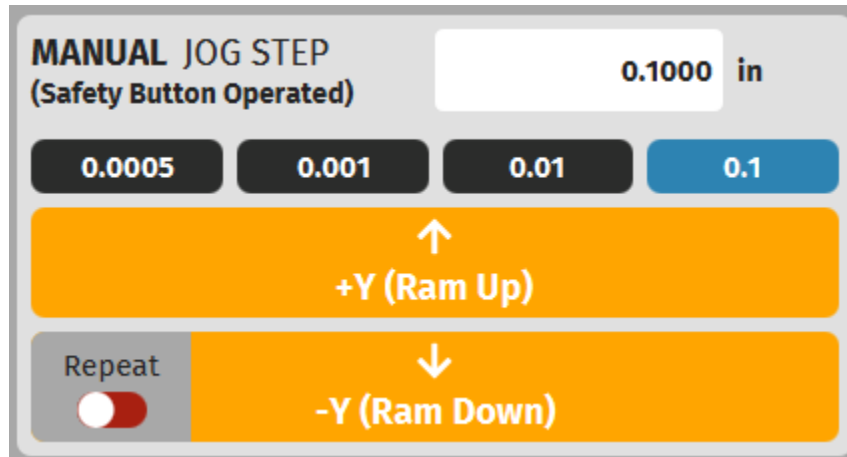
Repeat ☐

⚡ RUN MANUAL STROKE OPERATION

The Manual Stroke Operation provides direct control over the Ram's movement, allowing operators to manually set the start and end positions of the ram stroke to create a mini-program to run. This feature can be very useful if you want to bend parts on the machine manually, by specifying a starting and end point in Machine coordinates. Once a start and end point has been entered, the program will calculate the total stroke distance and display this value as well. In addition, a Safety Plane Clearance value can also be added, which places additional clearance above the start position in order to have room to load material before the stroke operation begins. The feature also has a 'Repeat' toggle which will allow the program to run continuously on repeat until the user cancels it. This can be very valuable if you need to make several copies of the same part, or if you are performing the same assembly task over and over again with the press. The Safety Plane move is operated by the Safety Palm Switches, and the manual stroke operation is Foot Pedal Operated.

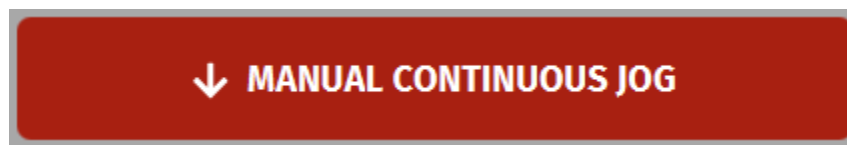
Another great use for this Manual Stroke Operation is when you want to operate the machine like a regular Press, but with numeric controls built in. For example, let's say that you want to press fit a 20mm tall bearing into a tight bore. You could set the Start Ram Position for your setup, and then set your Ending Ram Position so that it strokes the needed 20mm to press the bearing into the bore. Then you could enter a Clearance value that lets you slide the bearing into position, and then you can run the program. It can also be valuable to reduce the Max Tonnage Per Ram setting if you want to protect your parts from the full 25 Tons of the machine when doing more delicate work.

4. Manual Jog Step:



The Manual Jog Step panel in BendControl allows precise control over the ram's position by allowing it to move in small, incremental jog steps. Operators can select a jog step size from the available options (0.0005", 0.001", 0.01", or 0.1", or a custom value entry) and then use the +Y (Ram Up) and -Y (Ram Down) buttons to adjust the ram position accordingly. This feature is operated via the Safety Palm Switches to ensure safe jogging movement of the Ram. Additionally, the Repeat toggle allows continuous movement in the Down direction, facilitating efficient ram positioning during setup and adjustments.

5. Manual Continuous Jog:



Manual Continuous Jog enables the operator to move the ram down continuously so long as the Safety Jog Buttons are still depressed. This feature is useful for quickly positioning the ram to a desired location without needing to enter specific coordinates. It provides a convenient way to make larger adjustments to the ram position, facilitating efficient setup and adjustments during the bending process.

6. Manual Move To Position:



The Move To Position panel in Manual Mode allows operators to command the ram to move directly to a specified position along the Y-axis. By entering the desired Y-axis ram position (in machine coordinates), and pressing the RUN button, the ram will move precisely to

the specified location once the Safety Palm Switches are operated. This feature is operated via the safety button to ensure secure handling. The Move To function is essential for setting up exact positions for bending operations, ensuring accurate and repeatable results during the bending process.


XVII. Operating the Backgauge:

In this section we will review the features of the Backgauge Tab in BendControl. **This section assumes that you have already assembled, squared, and Homed your backgauge successfully using the Backgauge Assembly Guide.** If you have not done so already, please refer to this section of the guide before continuing.

1. Homing the Backgauge

Homing the backgauge is the first step to ensure accurate positioning during bending operations. The CNC backgauge includes automatic dual-axis squaring on both the X and R-axes. This ensures that if a crash happens on the machine, the backgauge can be simply homed to resquare itself to the machine frame.

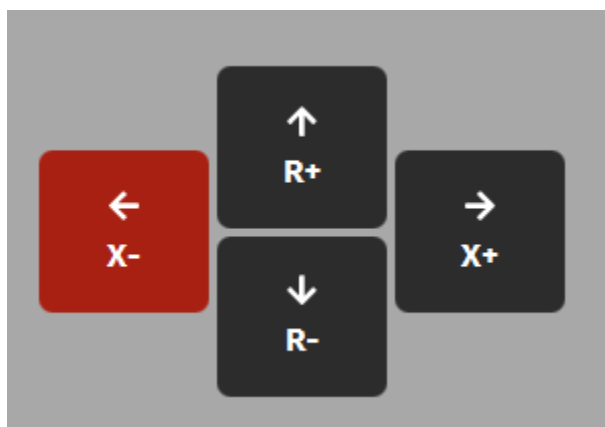
To home the backgauge, click the "HOME" button located at the top left of the Backgauge tab. This will initiate the homing sequence, calibrating the X and R axes to their default positions. The status indicator at the bottom right will display "IDLE" once the homing process is complete, indicating that the backgauge is ready for use. The Homing button will also

change to include a check mark  , indicating that the machine is homed.

2. Jogging the Backgauge:

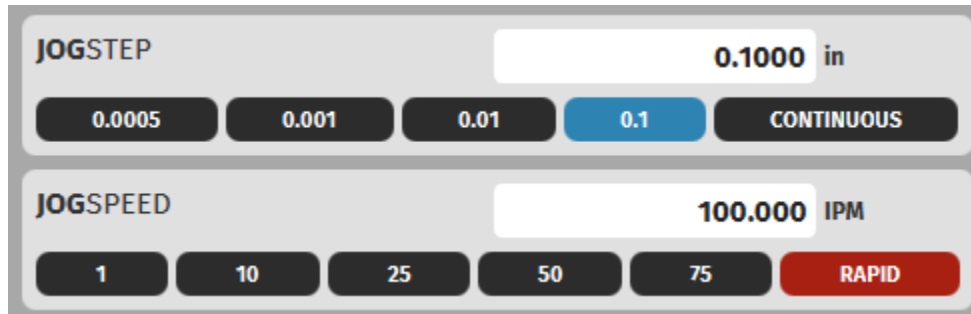
Jogging the backgauge allows for precise manual adjustments to the backgauge position. This can be done using the Jog Arrow D-Pad via touchscreen input, or with an optional wireless Jog Pendant.

A. Jog Arrow D-Pad:



The Jog Arrow D-Pad is located on the left side of the Backgauge tab and provides directional control over the backgauge. Press the arrows to move the backgauge in the desired direction: X- (left), X+ (right), R- (down), or R+ (up). This allows for fine-tuning the position of the backgauge to align with the workpiece accurately.

B. Jog Step Mode:



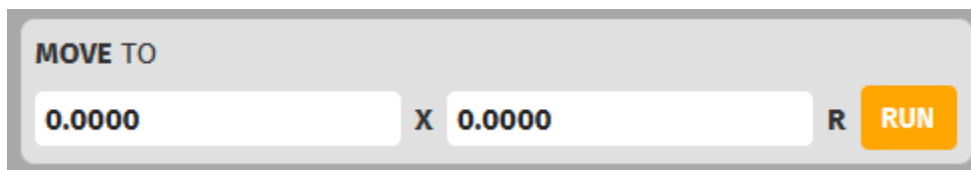
The Jog Step Mode interface consists of two main sections. The top section, labeled 'JOGSTEP', features a digital display showing '0.1000 in'. Below the display are five buttons: '0.0005', '0.001', '0.01', '0.1' (which is highlighted in blue), and 'CONTINUOUS'. The bottom section, labeled 'JOGSPEED', features a digital display showing '100.000 IPM'. Below the display are six buttons: '1', '10', '25', '50', '75', and 'RAPID' (which is highlighted in red).

Jog Step Mode allows for incremental adjustments to the backgauge position. Select the desired step size (0.0005", 0.001", 0.01", 0.1", or custom input) from the Jog Step options. Use the Jog Arrow D-Pad to move the backgauge in precise increments, enabling fine control over the positioning.

C. Continuous Jog Mode:

In Continuous Jog Mode, the operator can click and hold down a directional arrow on the Jog Arrow D-Pad to move the backgauge continuously in the selected direction. The backgauge will keep moving as long as the button is held down, and it will stop immediately when the button is released. This mode is useful for making larger adjustments quickly and efficiently. If you are using the optional wireless Jog Pendant, the left/right/up/down arrows on the keyboard can be used to jog the backgauge.

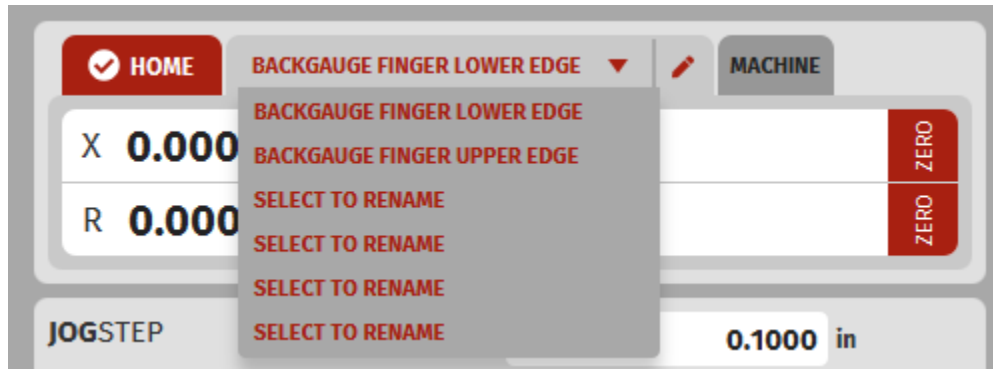
3. Move To Position:



The Move To Position interface is a single-line control. It starts with the label 'MOVE TO'. This is followed by a text input field containing '0.0000', then the letter 'X', another text input field containing '0.0000', then the letter 'R', and finally a yellow button labeled 'RUN'.

The Move To Position feature allows the operator to command the backgauge to move directly to a specified X and R coordinate. Enter the desired coordinates in the "MOVE TO" fields and click the "RUN" button. The backgauge will automatically move to the specified position, ensuring accurate and efficient setup for bending operations.

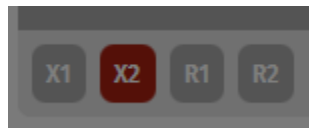
4. Reference Edge Drop-Down:



The Reference Edge Drop-Down menu, located at the top right of the Backgauge tab, allows operators to select the reference edge for the backgauge. By default, the menu includes pre-loaded options BACKGAUGE FINGER LOWER EDGE and BACKGAUGE FINGER UPPER EDGE. These options refer to the lower and upper edges of the backgauge finger, respectively.

Additionally, the drop-down menu provides the flexibility for users to customize their reference edges. Users can select any of the "SELECT TO RENAME" options to define and rename a custom reference edge. This feature is particularly useful if the operator is using a custom-made stop on the backgauge fingers. By accurately naming these custom reference edges, operators can ensure precise positioning and repeatability for their specific bending requirements.

5. Limit Switch State LEDs:



The Limit Switch State LEDs provide visual indicators of the four limit switch states on the backgauge (red means triggered, gray means closed). These LEDs can be useful when trying to track down issues with limit switches or homing.

6. Example of Using the Backgauge for a Bend:

To see an example of how a backgauge position is set for a desired operation, visit the above section titled: **Setting up a BACKGAUGE move (Optional)**.

XVIII. Settings Menu Overview:

The screenshot displays the 'SETTINGS' menu of a machine control system. The top navigation bar includes 'RUN', 'CREATE BEND', 'PUNCH/DIE & MATERIALS', 'BACK GAUGE', 'MANUAL MODE', and 'SETTINGS' (highlighted in red). The main interface is divided into two panels: 'APPLICATION SETTINGS' on the left and 'CONTROLLER SETTINGS' on the right.

APPLICATION SETTINGS:

- On Screen Keyboard: Off (dropdown menu)
- Material Clamp Rate *i*: 5.0 %
- Automatic Clamp-to-Bend Dwell *i*: 3.0 Sec
- Back Gauge Retract Between Bends *i*: 2.000 in
- Back Gauge Bump Off Distance *i*: 0.250 in

At the bottom of the Application Settings panel, there are two sections for updates:

- Update software from USB disk with an 'UPDATE SOFTWARE' button.
- Update firmware from USB disk with 'FLASH MODULE FIRMWARE' and 'FLASH MACHINE FIRMWARE' buttons.

A status message at the bottom left states: 'Application settings are saved automatically'. A 'RESET' button is located at the bottom right of the Application Settings panel.

CONTROLLER SETTINGS:

The top of the Controller Settings panel features a 'DIRECT COMMAND INPUT' section with fields for 'ID:' and 'Value:', and a 'SET' button.

Below this, there are two settings:

- Frame Deflection Compensation *i*: A toggle switch currently turned off.
- Ram to Table Opening Distance *i*: 8.320 in

At the bottom of the Controller Settings panel, there are three buttons: 'RESTORE FACTORY DEFAULTS', 'CANCEL', and 'SAVE'.

1. Material Clamp Rate:

Material Clamp Rate is a percentage of the material thickness. This is the distance the ram will stroke down to when the material is clamped during a programmed bend (e.g. a 1/8" thick material with a 10% Material Clamp Rate would cause the ram to stroke down 0.012" to clamp the workpiece between the Punch and Die before the bend stroke starts).

2. Automatic Clamp-to-Bend Dwell:

Automatic Clamp-to-Bend Dwell refers to the time interval between the end of clamping and the start of a bend during a programmed bend cycle when the Auto-Clamp-to-Bend feature is enabled. Once the material is clamped, the user simply keeps the pedal pressed, and the program will automatically proceed to the bend stroke after the dwell period has elapsed. If the user releases the pedal during the dwell period, the program is canceled, and the ram will retract to the Safety Plane.

3. Backgauge Retract Between Bends:

Backgauge Retract Between Bends is an optional parameter that enhances part clearance. After a bend is completed and the ram begins retracting to the Safety Retract Plane, the backgauge simultaneously retracts towards the back of the machine. This movement provides additional space for removing the part before starting the next bend sequence.

4. Backgauge Bump Off Distance:

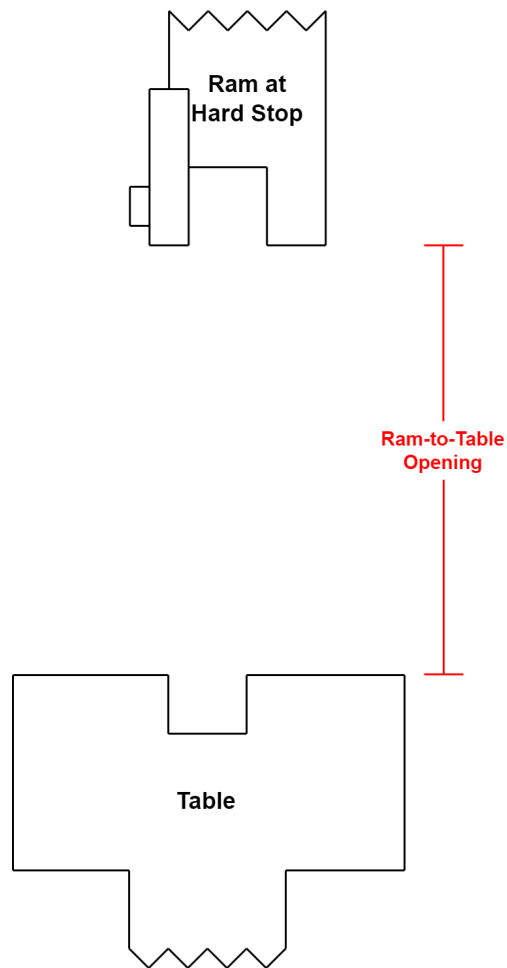
Backgauge Bump Off Distance is an optional parameter that ensures precise part positioning before a bend sequence. After the part is clamped, the backgauge moves back in the X direction by the specified distance just before the bend sequence begins. This movement helps to prevent any potential interference between the backgauge and the part, ensuring a smooth and accurate bending process.

5. Frame Deflection Compensation:

Frame Deflection Compensation is a parameter designed to ensure precision in the bending process by accounting for frame deflection. By monitoring the tonnage on the Y1 and Y2 rams, the system calculates and compensates for any lost motion due to frame deflection. This is achieved by stroking an additional distance, ensuring the bend is accurate and consistent despite the deflection of the machine's frame.

6. Ram to Table Opening Distance:

Ram to Table Opening Distance is the measurement from the bottom surface of the ram to the top surface of the table. This parameter is crucial for defining all strokes on the machine. Accurate measurement of this distance is essential, as any discrepancies can lead to inaccurate bends.



7. Update Machine/Backgauge FW and Software From USB Drive:

In the settings menu, we can also update our Machine/Backgauge firmware, as well as update the BendControl application. **See the below section titled Flashing Firmware/Software Updates from USB Thumb Drive (if no internet access available) for more information.**

XIX. Bleed Hydraulics Procedure:

BendControl has a built-in Bleed Wizard for bleeding and priming the Y1 and Y2 hydraulic

systems. To access the Bleed Wizard, click on the

BLEED HYDRAULICS

button located in the top right Header menu in the software.

A. Preparing to Bleed Hydraulic Cylinders:

The following procedure can be used to bleed the air out of the hydraulic system for both the Y1 and Y2 cylinders. This process allows manual operation of both hydraulic cylinders separately (by using the corresponding Safety Palm Switches), enabling the bleeder screws to be opened to circulate hydraulic fluid back into the reservoir until all air bubbles are removed.

Remove All Punches & Dies: Ensure all punches and dies are removed from the machine. The ram can still move downward under pressure during the bleeding procedure. For safety, do not place any part of the body between the ram and the table of your machine.

Remove Fairing Covers: Take off the fairing covers from the left and right hydraulic cylinders to locate the bleeder screw/hose assembly.

Obtain a Wrench: Use a 9/16" open-end wrench to perform the bleeding procedure.

Next click the

CONTINUE TO BLEED PROCEDURE

to continue.

B. Bleeding Hydraulic Cylinders

Once Priming Mode is enabled, the following steps can be used to bleed air and prime both Y1 and Y2 hydraulic systems. Follow the steps below to bleed each hydraulic ram separately until both are completed.

Warning

In order to continue, you will need to remove all punches and dies from your machine. While the movement might be slow, the ram is still capable of moving downward under pressure during the bleeding procedure. For your safety, do not place any part of the body between the ram and the table of your machine.

Procedure Steps

1. Y2 Hydraulic Ram (Right-hand Side)

- Press and hold down the right-hand palm safety switch.
- Once the right-hand servo motor is heard spinning, with the palm switch still pressed down, unscrew the bleeder screw at least 1/4 turn. Hydraulic fluid should flow through the bleeder hose and back into the tank.
- A mixture of hydraulic fluid and air bubbles should travel through the bleeder hose into the reservoir tank.

2. Tighten Bleeder Screw


- Once all air bubbles have stopped flowing, with the palm switch still pressed down, tighten the bleeder screw.
- Once tightened, release the palm switch and re-attach the right-hand fairing cover.

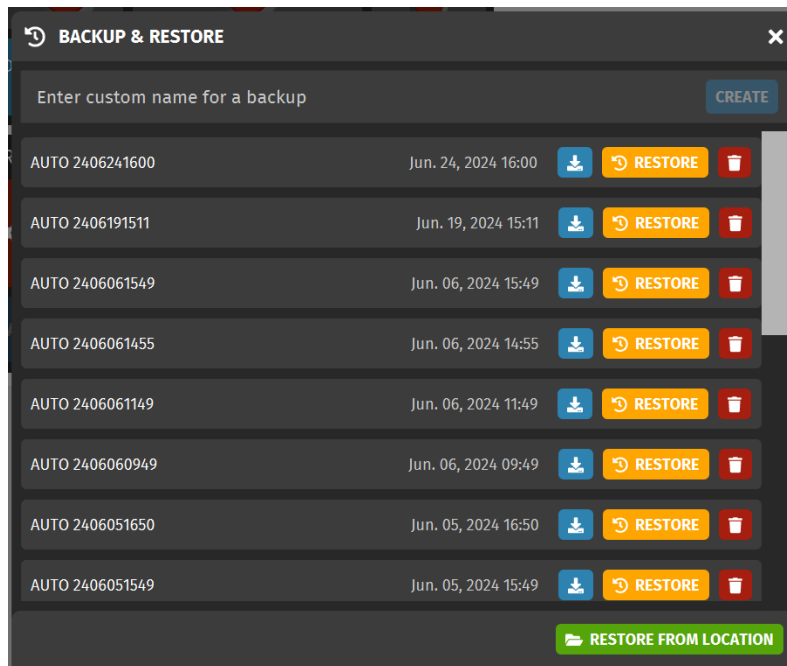
3. Y1 Hydraulic Ram (Left-hand Side)

- Repeat the above procedure for the left-hand hydraulic ram.

- After completion, exit the wizard and home the machine to continue normal operation.

XX. Backup & Restore Menu:

The Backup & Restore menu can be accessed by selecting the  icon in the top right corner of the Header Menu. This allows you to create a save point that you can restore to at any point. This will save any punches, dies, materials, bends, and programs that you have configured in BendControl. It is highly recommended that you create a backup file of our system and save it to a USB drive prior to making any software updates to your machine in the event that something goes unexpectedly. The Backup & Restore menu can be seen below.



A. Automatic Backups


An automatic backup is generated every 1 hour automatically. These files will be titled beginning with “AUTO”, followed by a value representing the year, month, day, and time of the automatic backup.


B. User Generated Backups

The user may also create a restore point at any time. In the Backup & Restore menu the user can enter the title of the save point in the text box labeled “Enter custom name for a backup”

and save it by selecting the  button.

C. Save Restore Points to USB Drive

A backup can be saved to a USB drive in the Backup & Restore menu. By selecting the  icon, a menu will open allowing you to choose your USB drive to save your restore point. Additionally, you can later restore to a backup file previously saved to a USB drive by selecting

the  **RESTORE FROM LOCATION** button and selecting the correct file. It is recommended that you create a backup file and save it to a USB drive prior to making any software updates to your machine in case something goes wrong.

XXI. Machine States - Normal Operation:

The below table is a list and brief description of the Normal Operating machine statuses, which excludes Alarm states (see section below for Alarm states).

Machine Status	Description
<i>STARTUP HOMING REQUIRED</i>	The machine requires homing after startup to ensure the Ram is positioned to the correct starting position.
<i>HOMING</i>	The machine is currently performing the homing routine to calibrate and reset its position.
<i>HOMING-BUMP</i>	The machine is performing a homing bump operation to push off the hard stops to -0.050in, the <i>Home Position</i> .
<i>SAFETY JOG</i>	The machine is currently moving during a Safety Jog type move, allowing movement down to the Safety Clearance Plane using the Left and Right Safety Palm Switches together.
<i>SAFETY JOG HOLD</i>	The machine is in safety jog hold mode, waiting for the Safety Palm Switches to be actuated to move.
<i>CLAMP JOG</i>	The machine is currently performing a clamp move to clamp the material between the punch and die.
<i>CLAMP JOG HOLD</i>	The machine is in clamp jog hold mode, waiting for the operation of the Foot Pedal to execute the armed move.
<i>BEND JOG</i>	The machine is performing a bend jog type move during a program when bending a part.
<i>BEND JOG HOLD</i>	The machine is in bend jog hold mode, with the move armed and waiting for foot pedal actuation to make the move.
<i>RETRACT JOG</i>	The machine is moving the ram upward during a retract move, which doesn't require the palm safety switches or the bend pedal.
<i>RELEASE LOAD RETRACT</i>	The machine encountered a Max Tonnage condition and is automatically retracting until the load is released.
<i>IDLE</i>	The machine is idle and awaiting further commands.
<i>PRIMING MODE</i>	The machine is in priming mode, allowing each cylinder to be bled by actuating the corresponding Safety Switch.
<i>UNKNOWN</i>	The machine status is unknown, indicating a potential error

	or unrecognized state.
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XXII. Alarm States:

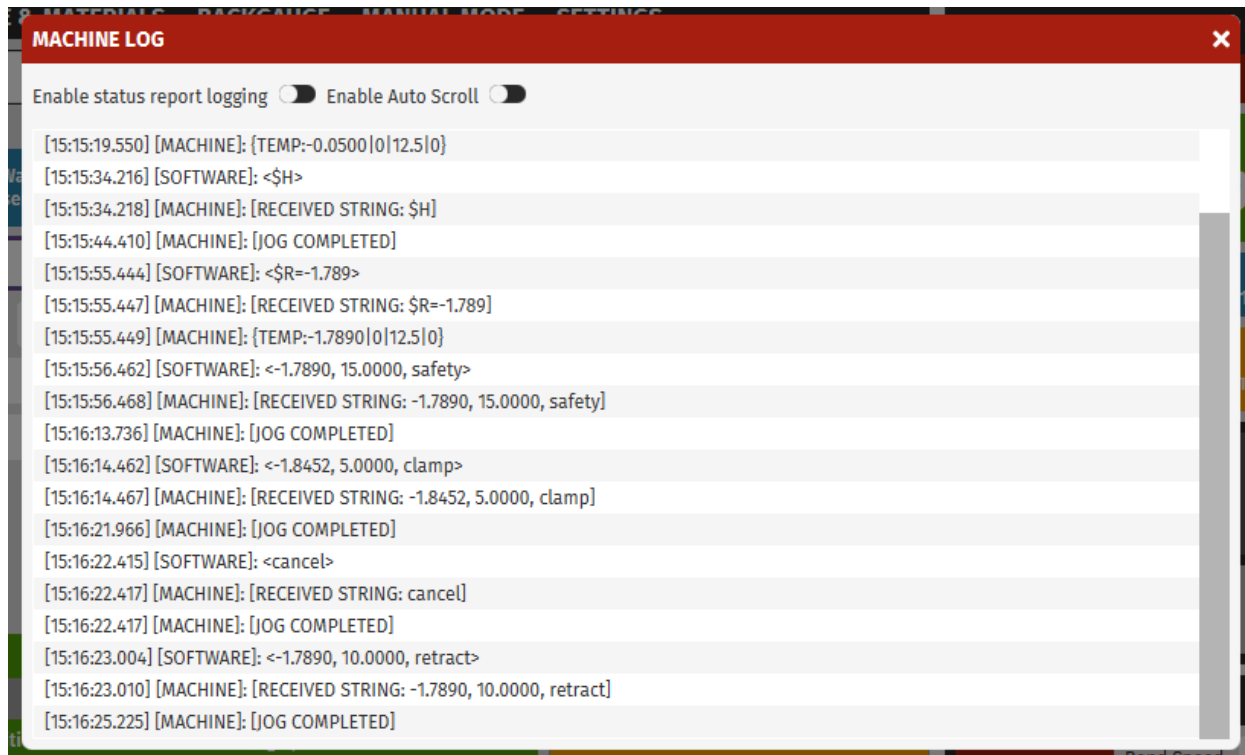
The Titan 25T machine controller has many built-in alarm states for when issues arise. The below table is a list of Alarm Codes that you might encounter when running the machine. For further troubleshooting, please be sure to contact support@langmuirsystems.com and reference any Alarm codes that you are receiving when operating your machine.

Alarm Title	Alarm Code	Description
<i>ANTIBIND TRIGGERED</i>	1	The Anti-Bind Switch on your machine was triggered. The anti-bind bar switch is a safety device that protects your machine from getting out of alignment during operation. Please troubleshoot your alignment issues before continuing.
<i>ENCODER SYNC ERROR</i>	2	The encoder positions of the Y1 and Y2 ram have become out of sync. Troubleshoot this sync error before continuing operation of your machine.
<i>Y1 TONNAGE CALIB. FAIL</i>	3	The Y1 Pressure Sensor of your machine registered an out of spec reading during the homing routine. For the safety of the machine, the machine cannot be operated until a working pressure sensor is detected during homing calibration.
<i>Y2 TONNAGE CALIB. FAIL</i>	4	The Y2 Pressure Sensor of your machine registered an out of spec reading during the homing routine. For the safety of the machine, the machine cannot be operated until a working pressure sensor is detected during homing calibration.
<i>Y1/Y2 TONNAGE CALIB. FAIL</i>	5	The Y1 & Y2 Pressure Sensors of your machine registered an out of spec reading during the homing routine. For the safety of the machine, the machine cannot be operated until a working pressure sensor on both rams is detected during homing calibration.
<i>Y1 NEGATIVE TONNAGE FAIL</i>	6	The machine experienced an unexpected negative pressure reading on the Y1 Ram during operation. For the safety of the machine, the machine cannot be operated until a working pressure sensor is detected.
<i>Y2 NEGATIVE TONNAGE FAIL</i>	7	The machine experienced an unexpected negative pressure reading on the Y2 Ram during operation. For the safety of the machine, the machine cannot be operated until a working pressure sensor is detected.


<i>Y1/Y2 NEGATIVE TONNAGE FAIL</i>	8	The machine experienced an unexpected negative pressure reading on the Y1 and Y2 Rams during operation. For the safety of the machine, the machine cannot be operated until working pressure sensors are detected.
<i>STEADY-STATE MOTION</i>	9	The machine experienced unexpected motion when it was expected to be stationary. The system has been shut down to protect the machine. Please Home the Machine to Continue operation.
<i>MACHINE TRACKING ERROR</i>	10	The machine experienced a tracking error. This happens when the Y1 or Y2 encoder (or both) fails to stay in sync to the commanded machine position. Troubleshoot this tracking error before continuing to operate the machine.
<i>MAX TONNAGE ERROR</i>	11	The machine experienced tonnage that exceeded the maximum allowable tonnage of the machine (or an overridden value if one was set in Manual Mode or the Global Settings Menu). Please Home the Machine to Continue operation.
<i>STATIONARY LOAD TIMEOUT</i>	12	The machine was left at idle under load for too long and has been shut down to protect the hydraulic system from failure. Please Home the Machine to Continue operation.
<i>HYDRAULIC SHUTDOWN</i>	13	The Machine was forced into Hydraulic Shutdown Mode. Please Home the Machine to continue.
<i>Y1 HOMING PRIMING FAIL</i>	14	During the Homing operation, the Y1 cylinder did not advance properly. Please try Homing the machine again. If the issue persists, enter the Bleed Wizard in order to properly prime the Y1 cylinder, and remove air from the system if needed.
<i>Y2 HOMING PRIMING FAIL</i>	15	During the Homing operation, the Y2 cylinder did not advance properly. Please try Homing the machine again. If the issue persists, enter the Bleed Wizard in order to properly prime the Y2 cylinder, and remove air from the system if needed.
<i>Y1/Y2 HOMING PRIMING FAIL</i>	16	During the Homing operation, the Y1 & Y2 cylinders did not advance properly. Please try Homing the machine again. If the issue persists, enter the Bleed Wizard in order to properly prime the Y1 & Y2 cylinders, and remove air from the system if needed.

XXIII. Accessing the Machine Log:

The Machine Log can be accessed by clicking the  icon located in the top right corner of the Header Menu. This log can be useful for troubleshooting issues as they arise, and you may be asked by our support techs to share this log information when errors occur so that our team can better pinpoint the issue.



XXIV. WiFi Connection and Software/Firmware Updates

In the Wifi Connection menu you can connect to your network, allowing you to update your machine's firmware over the internet. The menu can be accessed by selecting the  icon in the top right corner of the Header Menu. If the icon appears green then the device has successfully connected to Wifi. Otherwise, if the icon is grayed with a red outline then the machine is not connected.






Disconnected

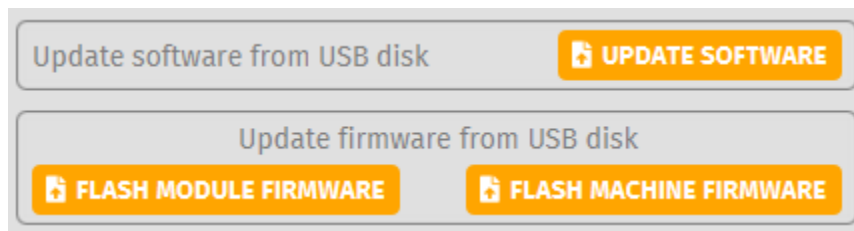


Connected

A. Automatic Software and Firmware Updates

If an update is available you will see the , the , or the  icon in the Header Menu. Select the popup and follow the onscreen commands to update your software or firmware. Additionally, it may be necessary to remove the top cover from your machine allowing for a stronger Wifi connection. If you are unable to successfully update software or firmware via Wifi, then refer to the section below to flash firmware and software from a USB thumb drive instead.

XXV. Flashing Firmware/Software Updates from USB Thumb Drive (if no internet access available)



Generally, any available updates to firmware (for machine and backgauge) or BendControl software will be done via WiFi. In the event that the machine is placed in an area without WiFi, the firmware and software can be manually updated on the machine from a USB drive. To access this menu, please go to the Settings Tab, and look at the bottom of the Application Settings module.

Please obtain these files directly from Langmuir Systems for loading into your machine. The below file formats are the only acceptable formats for each entity type.

- **Machine Firmware:** .bin File
- **Backgauge Firmware:** .hex File
- **BendControl Software:** .jar File

XXVI. Titan 25T FAQ

What is the thickest part that I can bend on the Titan 25T?

The maximum material thickness that can be bent on Titan entirely depends on the material grade, the lower die width opening, and the thickness and width of material. To determine if a bend can be made on the Titan 25T, it is best to consult a Press Brake Tonnage Chart which provides an estimated tonnage needed per foot of material given the desired bend parameters.

A general rule of thumb to follow when air bending is that the lower die opening should be, at a minimum, 8 times the material thickness to get a nice tight bend radius. So for example, for achieving a

tight bend radius in 1/8" steel, you would use a 1" lower die opening. If your calculated bend tonnage exceeds the maximum 25T rating for your bend, you can select a lower die that has a wider opening which will lower the required force to make the bend.

For a quick reference, below are some examples of bends that can be made on the Titan 25T.

- 22 Tons: 33" long bend in 1/8" Mild Steel using a 1" Lower Die Opening
- 25 Tons: 20" long bend in 1/4" Mild Steel using a 2" Lower Die Opening
- 25 Tons: 15" long bend in 3/8" Mild Steel using a 3.5" Lower Die Opening
- 10 Tons: 33" long bend in 1/16" Mild Steel using a 0.5" Lower Die Opening
- 25 Tons: 9" long bend in 1/2" Mild Steel using a 4" Lower Die Opening
- 25 Tons: 30" long bend in 1/8" Stainless Steel using a 1" Lower Die Opening
- 18 Tons: 33" long bend in 1/8" Aluminum using a 1" Lower Die Opening

What types of material can be bent with the Titan 25T?

The Titan 25T can bend a variety of metals including but not limited to carbon steel, stainless steel, aluminum, brass, copper, titanium, etc.

What is a CNC Backgauge and does the Titan 25T come with one?

A CNC Backgauge is an advanced positioning system used in press brake machines, including CNC press brakes like the Titan 25T. It is designed to accurately position a workpiece in place for bending, ensuring precision and consistency in the bend line position. Essentially it is the backgauge's job to automatically move its finger stops into position for each programmed bend so that the operator can use this as a 'backstop' to push the material against before bending.

As for the Titan 25T CNC Press Brake, it does not come standard with a CNC Backgauge. However, as an available add-on option, customers can purchase a purpose built 2-axis CNC Backgauge for an additional \$995. This add-on significantly enhances the capabilities of the Titan 25T, allowing for more precise control and efficient operation, especially beneficial for complex and repetitive bending tasks. The integration of this Backgauge makes the Titan 25T even more versatile and suitable for a wider range of metal forming applications. Here is a good [Video](#) showing the coordination between the backgauge and the bending operation on the Titan 25T.

Let's say the operator wants to create a 1.25" flange bent to 90 degrees; once the bend is programmed, the backgauge will automatically move into the exact position to create this flange. All the operator needs to do is slide the material up against the finger stops, and push the foot pedal down to make the bend. The punch will first come down to Clamp the material in place, then the operator can physically let go of the part. After the clamp, the backgauge will automatically bump backwards to clear the material, and the punch will stroke downward to make the bend. If you have another bend that is programmed for your part, the backgauge will move into position to make the next bend.

Do I have to Bend my part right in the middle of the table?

No! Thanks to the glass scale linear encoders on each hydraulic ram, the ram can stroke perfectly synchronized, even under load. This provides a huge advantage so that you can set up different punches and dies at various positions across the ram.

Does the Machine monitor real-time Hydraulic Pressure?

Yes! Both sides of the ram are equipped with a Piezoresistive Ceramic Pressure Transducer that is always monitoring real-time bend tonnage at each hydraulic cylinder, and this tonnage load is displayed in

BendControl. This allows the machine to never exceed its nameplate rating of 25 Tons, and to also not exceed 12.5 tons on any one cylinder.

How accurate and repeatable is the ram positioning on Titan 25T?

Thanks to Glass Scale Linear Encoders on each ram, the positional accuracy and repeatability of the Titan 25T is industrial-grade. The ram positional resolution is 0.0002 in, and the positional repeatability is 0.0006 in. In addition, the system constantly monitors and works to ensure that both sides of the ram are stroked perfectly evenly so that full tonnage bends can be done nearly anywhere on the table.

What safety features are available on the Titan 25T?

Safety is paramount on the Titan 25T. As with any hydraulic press, it is extremely important that all safety precautions are followed by the user to ensure that dangerous pinch points are avoided. The Titan 25T uses two main safety peripherals to control the movement of the hydraulic ram. The first are the palm switches that are mounted on arms that extend out of each side of the machine. These palm switches must be activated by the synchronized motion of both hands in order to get the ram to stroke downward. Once the ram is in a position that a hand can't be placed between the punch and die set, the operator can stroke the ram downward using the foot pedal to make the bend move. In addition, BendControl has an integrated safety chime system that uses an audio alert to notify the operator any time that the ram is in a downward motion. The Titan 25T also moves the ram at much slower speeds when compared to large scale CNC Press Brakes which makes it safer for the operator to avoid a potentially harmful situation.

How much floor space do I need to operate this machine?

The Titan 25T was designed to be compact and utilize minimal floor space. We recommend clearing at least a 4ft x 4ft area to operate the machine.

Can the Titan 25T be used for batch production?

Yes, the Titan 25T is well-suited for batch production. Once a bending program is set up, the machine can produce consistent bends across multiple pieces with minimal manual intervention, making it efficient for batch and repetitive production tasks. Furthermore, the Titan 25T has clamp-style mounting brackets that permit the use of multiple punches along the ram length in the event that a given part uses multiple different punches/dies. The sweet spot for the Titan 25T is versatile prototyping capabilities, one-off part manufacturing, and small batch production runs.

What if I need to bend something longer than the 33" bend width?

One method that can be used is to create a splice every 33" where the future flange will be. Then each section can be bent using the full 33" width. After bending, the seam can be welded together.

How can I purchase replacement parts for this machine?

Langmuir Systems will keep an inventory of all replacement parts that go into a Titan 25T. Any necessary replacement parts will be shipped to you free of charge while your machine is still under factory warranty. After the warranty expires, simply email support@langmuirsystems.com for current pricing on replacement items.