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Warning

This instruction manual is issued for Azimuth's Clinching press series H400 & H600. If you have any others types of press, please call Azimuth Machinery technical support for more information.

Do not operate this machine until you read and understand the following safety precautions. Not complying with these precautions may result death or serious injuries.

- ⚠ Never operate this machine until you've read & understood that this machine is dangerous. Placing your hands or any part of your body in this machine could result in the loss of finger, limbs or even death.**
- ⚠ Never operate this machine without the use of a guard or safety device that will always protect you from injuries.**
- ⚠ Never use a foot switch to operate this machine unless a point of operation guard or device is provided and properly maintained.**
- ⚠ Always use hand tools for feeding or retrieving material from the point of operation.**
- ⚠ Maintenance & die set-up personal.**
- ⚠ Never work on this machine unless power is off and lock.**
- ⚠ If you are working on an Azimuth's Air clutch punch press, remove every source of air coming in the press.**

Warranty plan on GEN II clinching presses models

Years mechanical parts warranty

3

Azimuth machinery warrants to the original purchaser, to repair or, at AZIMUTH MACHINERY'S sole option, replace any major frame failure or WELDMENT failure, Air- & ALL Electrical components (greaser, oiler, motor, main controller, sensors or buttons) after examination by AZIMUTH MACHINERY's properly authorized representative, to be defective in material or workmanship under normal use within three years or, if sooner, **6,000 hours** of running time after the original date of shipment from the AZIMUTH MACHINERY plant.

Does not include labor¹ or diagnostic work. The original purchaser will be responsible for travel costs and expenses.

Years mechanical parts warranty

2

Azimuth machinery warrants to the original purchaser, to repair or, at AZIMUTH MACHINERY'S sole option, replace any parts that are found defective (Ball-screw, pitman(s), crankshaft(s), slide, GIBS, RAM, air-clutch, dual-valve, rotary union or others pneumatics components) after examination by AZIMUTH MACHINERY's properly authorized representative, to be defective in material or workmanship under normal use within three years or, if sooner, **4,000 hours** of running time after the original date of shipment from the AZIMUTH MACHINERY plant.

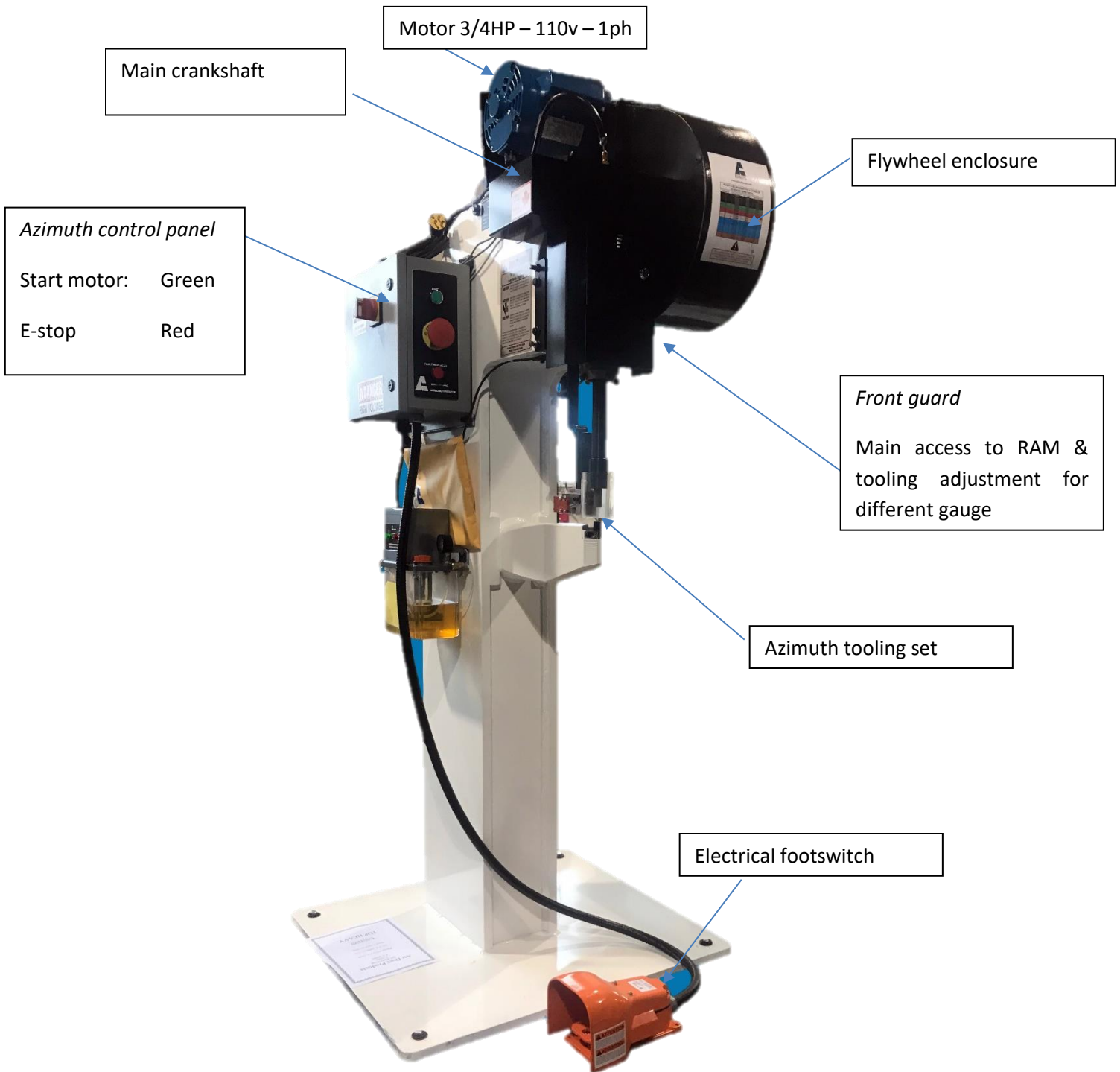
Does not include labor or diagnostic work. The original purchaser will be responsible for travel costs and expenses.

Lifetime support over phone & online videos

Azimuth machinery offers lifetime support to all its end-users. This mean free support over phone & access to online videos for technical support & maintenance tips on new machine.

¹ 150\$/hour + traveling expense.

Clinching press



Picture 1 – Azimuth's H600 clinching press

Start-up

Prior using the machine, make sure the shut height is properly adjusted to your material thickness.

This machine is rated for 110V/60Hz.

Air required is 80PSI (0,6MPA). Do not increase air supply as it may damaged the internal seal of the machine.

Prior using the machine with material, try to cycle it 5 times to make sure nothing has been damaged during transport (flywheel enclosure, pitman enclosure, etc).

Presses with fingersafe guarding system: verify Procedure 5 – Initial start-up of the machine with fingersafe guarding ***for a proper Startup procedure of the fingersafe guarding system.***

1.1.1 Clinching press – Re-adjusting machine for new thickness

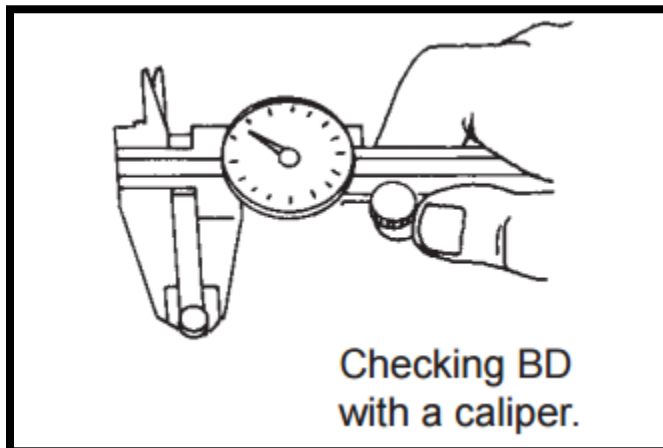
When changing the material thickness, make sure to adjust the machine button diameter on your Azimuth’s clinching press.

Table 1 - Button diameter vs material thickness

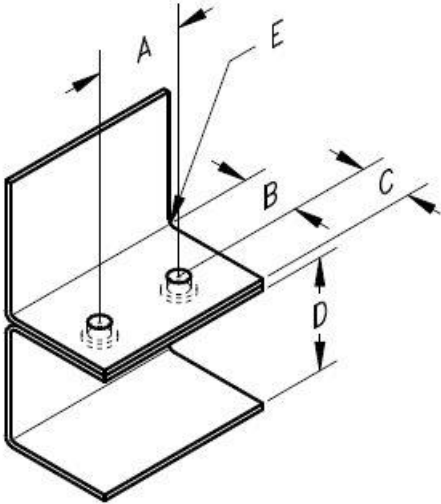
Thickness of 1 part	Button diameter
0.012"	0.240" ± 0.005 "
0.015"	0.250" ± 0.003 "
0.018"	0.260" ± 0.003 "
0.021"	0.270" ± 0.003 "
0.027"	0.275" ± 0.003 "
0.034"	0.285" ± 0.003 "
0.040"	0.285" ± 0.003 "
0.052"	0.290" ± 0.003 "
0.063"	0.295" ± 0.003 "

The button diameter represents the measure of the bottom part of the two metal sheets you are clinching (DIE SIDE).

Joint quality (Strength) is monitored by measurement of the button diameter. Button diameter is controlled by adjusting the ball screw on your Azimuth’s clinching press.



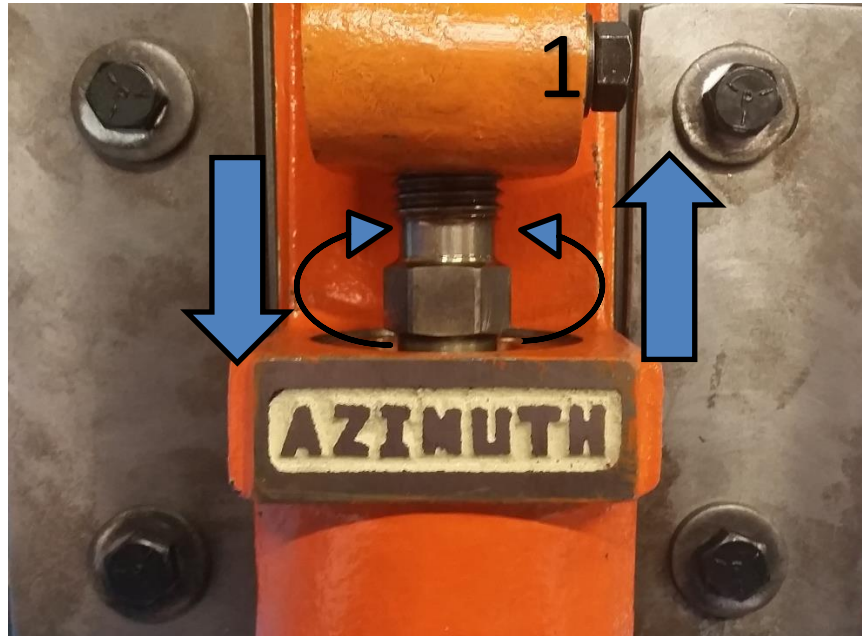
1.1.2 Minimum distance requirement with Azimuth’s tooling



The dimension shown are for reference to get a proper joint size with the Azimuth’s Clinching press.

A	B	C	D	E
0.580'' (14.73mm)	0.320'' (8.1mm)	0.180'' (4.6mm)	Depends of the machine	0.03'' (0.8mm)

The picture below shows how to raise or descend the punch (adjust the shut height of the machine).



Picture 2 – Shut height adjustment

Raising the punch (rotating the ballscrew “Counter-clockwise”) will result in a **smaller button diameter** while descending (rotating the ballscrew “Clockwise”) the punch will result in a **bigger button diameter**.

1. Turn the motor OFF and wait for the inertia wheel has stopped.
2. Remove front guard enclosure of the machine.
3. Loosen bolt (1) on the side of the pitman in the picture above.
4. Rotate the Ball screw (2) with a ¼ turn or less (clockwise for a bigger diameter, counter-clockwise for a smaller diameter)
5. Re-tighten the locking bolt (1) on the side of the pitman.
6. Turn the motor ON & clinch two parts of material together.
7. Verify that “Button diameter” (DIE SIDE) matches the dimension in the Table 1.
8. Continue the procedure 1-6 until you have the good button diameter.

***** ALWAYS BRING THE BALL SCREW TO THE HIGHEST POSITION WHEN YOU ARE CHANGING THICKNESSES OR INSTALLING A NEW PUNCH *****

1.1.3 Azimuth Punch & die requirement

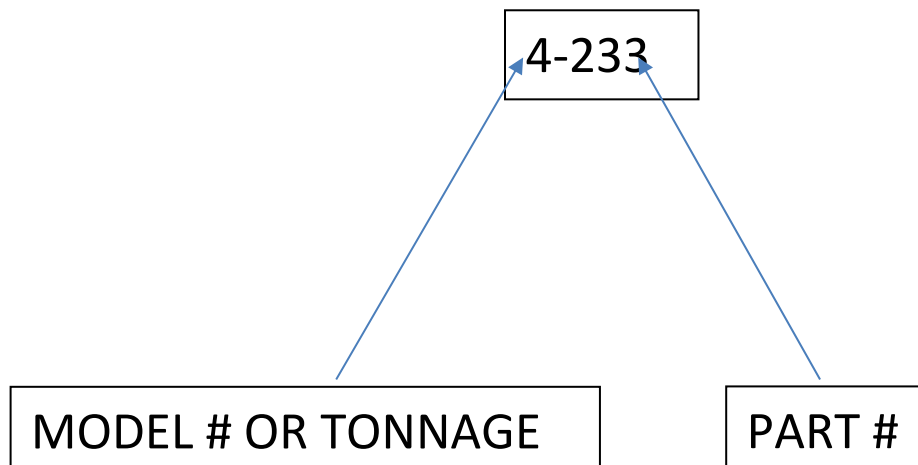
The table listing the punch & the die required for each type of galvanized gauge is in the ANNEXE A – part list at the end of this manual.

Maintenance

Ordering spare parts

Make sure to have tonnage & serial number of the press before ordering spare parts.

First digit represents tonnage of the machine, followed by part's number. (Ex: 6-033, standard crankshaft for 6 tons press)



Mode of operation

Presses with long stroke & fingersafe guarding

Long stroke presses (1,25" up to 2 inches) requires the fingersafe guarding system. The fingersafe guards cycles up & down every time the operator presses the foot-pedal. Once the foot pedal is depressed, the finger safe will remains down for a pre-set amount of time. This timer is configurable within the controller of the machine.

Down timer TT	1,5 sec (default)
---------------	-------------------

Presses with safety shorter stroke

1.1.4 Single stroke mode

Single Mode is a mode of operation where the press will only make a stroke, even if the foot-pedal is maintained.

1.1.5 Automatic mode (optional)

Optional automatic mode is a mode of operation where the operator can either:

- Foot-maintain to continuously cycle the machine
- Single foot-activation to continuously cycle the machine.

Each mode are being monitored by 2 parameters:

1. Timer TT4 : Waiting trigger for when at TDC
2. Counter CC1 : Stroke counter after first initial stroke

Table 2 - Automatic mode Timer & counter

Timer	TT4
Time	00.20S Reducing time will make the press go faster Increasing time will make the press go slower
Stroke counter	CC1
Counter value	Number of strokes to be done after first stroke. 5 (may be changed in the parameter)

1.1.6 Starting automatic mode

To start automatic mode, machine's operator needs to acknowledge the start of the automatic mode with the prior-act button:

- Press the prior act. Button (fault-indicator turns on for 5 seconds).
- Press food-pedal to activate the automatic mode (Activation of automatic mode must be done within 5 seconds to activate automatic mode.)
- Automatic mode will remain activated for 1 minute after last stroke. After 1 minute, machine's operator needs to re-activate the automatic mode.

1.1.7 Automatic mode 1

Automatic mode is a mode of operation where the press will continuously cycle, WHEN FOOD-PEDAL IS PRESSED, with a timer to stop at TDC (top dead center) of the stroke.

The press will automatically stop after a pre-set parameter of strokes.

Timer	TT4
Time	00.20S Reducing time will make the press go faster Increasing time will make the press go slower
Stroke counter	CC1
Counter value	Number of strokes to be done after first stroke. 5 (may be changed in the parameter)

1.1.8 Automatic mode 2

Automatic mode 2 is a mode of operation where the press will continuously cycle, ***WITHOUT FOOT-PEDAL IS PRESSED***, with a timer to stop at TDC (top dead center) of the stroke.

The press will automatically stop after a pre-set parameter of strokes.

Timer	TT4
Time	00.20S Reducing time will make the press go faster Increasing time will make the press go slower
Stroke counter	CC1
Counter value	Number of strokes to be done after first stroke. 5 (may be changed in the parameter)

To activate the ***“Automatic mode 2”***:

- Key selector to “SINGLE”
- Press the emergency stop
- Remove air-supply to the machine (There must be no air going to the machine (zero energy))
- Press the start button five (5) times

******Automatic mode 2 is now activated******

To go back to “Automatic mode 1”, press & hold reset for 5 sec.

Oiling system

Azimuth AIR-CLUTCH presses are equipped with an automatic lubrication centralized system for main bearing, bushing & gibs.

Table 3 - Automatic Oiling parameter

Idling time	800 minutes
Running time	At start-up, 5sec & after idling time
Oil type	SHELL TELLUS S2 M68 or EQUIVALENT

To change the oiling parameter:

- Press & hold the "Set" key
- Running time will appear, in seconds. Change with the arrow, if needed
- Press & hold the "Set" key.
- Idle time will appear, in minutes. Change with the arrow, if needed

To run the oiling system manually, simply press the "SET" Key once.

Oiling pressure while running



To verify the oiling system is working properly, simply press the "SET" key once & make sure the pressure gauge is within green & yellow range.

Picture 3 - Oiling system pressure

Maintenance counter

The maintenance counter is a friendly reminder to verify basic points on the machine. To reset the counter, press & hold the start button for 5 sec.

Resetting the maintenance counter

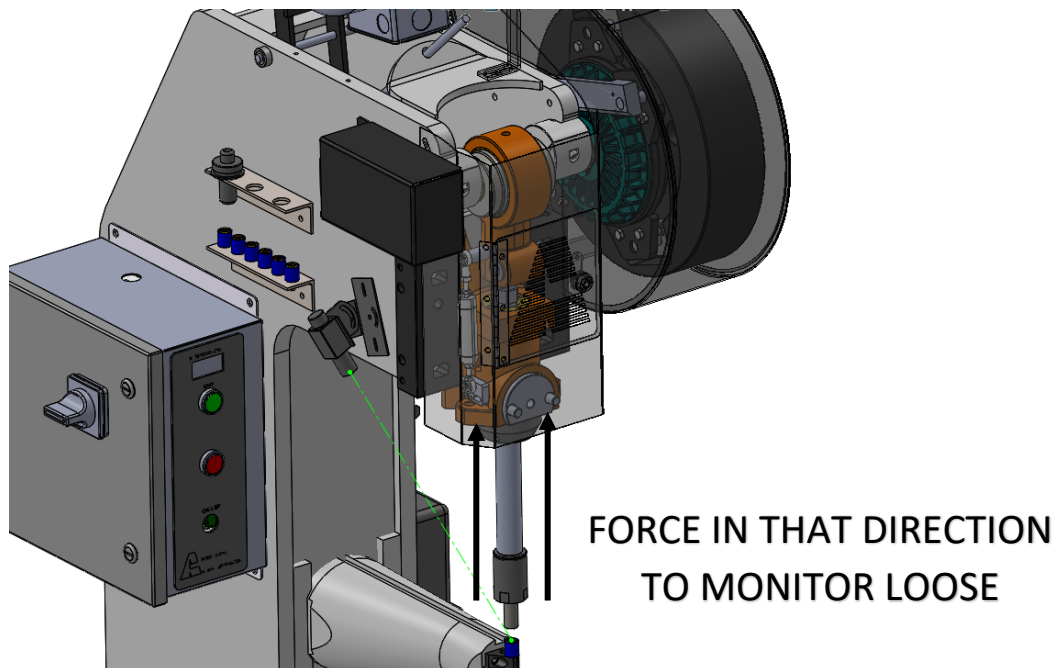
To reset the maintenance counter, press the e-stop & maintain the foot pedal for 8 seconds. This will reset the maintenance counter to the initial counting sequence.

Verifying cup-Ball adjustments

The cup-ball adjustment might get loose after several cycle.

Simply verify the cup-ball adjustment by pushing the RAM up (see picture below). There should not be any loose. If there is some loose, see procedure online to readjust the cup-ball adjustment.

*****Please note that you might need to readjust the machine thickness after readjusting the cup-ball adjustment*****



Changing punch & die

Punch & die are rated for approximately 300,000 cycles under good condition. When a maintenance counter is reached, machine's owner should start thinking changing the punch & die for a proper joint quality.

Please note that punch & die might need to be changed before 300,000 cycles.

Press overall counter

The press counter is the total amount of strokes the machine has done since it left Azimuth's factory. The press counter is multiplied by 1,000.

To verify the exact amount of cycle the machine has done, see calculation below.

$$1000*CC6+CC5 = \text{TOTAL AMOUNT OF STROKE OF THE MACHINE}$$

The press counter cannot be reset. Please contact factory to reset the press counter.

Troubleshooting

Please refer to the troubleshooting guide below in case of any of these problems.

In any case, you might refer to the drawing at the end for more detailed parts.

*****ALWAYS REMOVE EVERY SOURCE OF ENERGY WHEN TROUBLE-SHOOTING THE MACHINE*****

FAULT INDICATOR - Red light “blinking”

FOR A RED-LIGHT BLINKING, PLEASE REFER TO THE TABLE BELOW.

Table 4 - Red light blinking

Blinking type	Possible Problems	Solution
1 flash	The fingersafe guarding didn't reach the safety position when cycling the machine	Make sure nothing is interfering the safeguard on its downstroke
		Verify the magnetic switch located on the air-cylinder
2 flashes	No air to the machine	Verify the air pressure on the pressure gauge.
	Low air to the machine	Make sure there is 0.6Mpa (6 Bar, 85PSI) to the machine
	Defective pressure switch	Contact manufacturer
3 flashes	Safety procedure required on the fingersafe interlock guarding system. Verify procedure	
4 flashes	Braking sensor I3 (left sensor) not working	The sensor either failed or moved. Move the sensor so it is 1/16" from the CAM.
5 flashes	Braking sensor I4 (right sensor) not working	The sensor either failed or moved. Move the sensor so it is 1/16" from the CAM.
6 flashes	Low-lube	Add oil to the oil to the system.
	Defective oiling float	Contact manufacturer
7 flashes	Maintenance counter is expired	Verify section “ Maintenance counter ”

All Air-clutch series are tested & verified before shipment at Azimuth plant. Some possible air variant (CFM, pressure, etc.) might affect the air-clutch working condition. See procedure online.

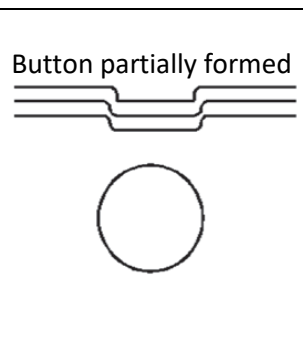
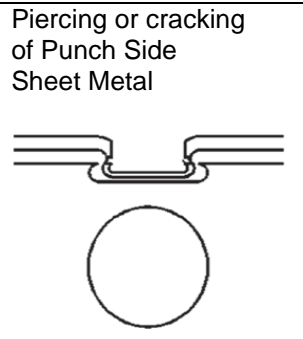
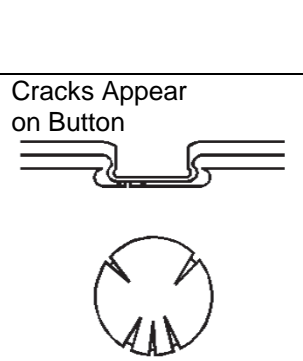
Improper clinching joint

Depending on your material thickness, there is a small adjustment require on the RAM'S.

Possible Problems	Solution
Lower/Higher of the button's Diameter	Change your die assembly to the proper die Readjust the ram when you change thicknesses. (bring the RAM higher for thicker material, lower for thinner material)

The symbol at left represents a properly formed clinching joint, viewed from the "button" (die) side and in section. Clinching tools can commonly produce in excess of 200,000 good joints. Problems can, however, occur. The illustrations below represent possible problem variations of the joint.

Table 5 - Trouble-shooting guide to a bad joint quality

Problem	Cause	Solution
Button partially formed 	Metal not of specified thickness	Use Specified Metals or Change to Appropriate Tooling
	Die Elastomer or Die Spring Broken	Replace Elastomer or Spring
	Incorrect Tooling for Metals	Verify Joint Data / Change Tooling if Necessary
	Incorrect Shut Height	Adjust Shut Height for Correct BD
Piercing or cracking of Punch Side Sheet Metal 	Metals Not of Specified Thickness regarding shut height	Re-adjust shut height
	Incorrect Tooling for Metals	Verify the tooling matches the specified thickness.
	Weak or Broken Stripper Springs	Verify stripper spring inside the tooling assembly
	Punch and Die Not Concentric	Re-adjust the concentricity of the punch & die.
Cracks Appear on Button 	Metals Not of Specified Thickness or Hardness	Verify the punch & die matches the specify thickness.
	BD Too Large, Tooling Over Adjusted	Verify that the
	Incorrect Tooling for Metals	Change tooling
	Punch and Die Not Concentric	See section

Press won't stroke

The clinching press won't stroke if:

Table 6 - Press won't stroke

Possible Problems	Solution
Defective pedal	Verify NO contact inside foot pedal.
Programmable relay defective	Contact Azimuth technical support.
Brake fault is active	Stop the machine & start-it back.

Motor won't start

Table 7 - Motor won't start

Possible Problems	Solution
Low air on machine	Verify that there is sufficient air supply (80PSI) to the machine
Programmable relay defective	Contact Azimuth technical support.
Magnetic contactor defective	Verify contact of the motor or verify the motor overload. Press the reset button on the motor overload.

Motor stops after a stroke

Table 8 - Motor stops after a stroke

Possible Problems	Solution
Defective brake fault (double stroke)	Verify connectivity or sensing of the brake cam (SMALL CAM). Machine will detect a brake fault if the valve is engaged more than 0.380ms.
Motor overload defective	Motor might be overloading. Verify setting of the motor overload. Make sure thickness is not too thick with the anvil.

Press jammed at BDC

Table 9 - Press Jammed at BDC

Possible Problems	Solution
Low air on machine	Every air-clutch should have at least 85PSI
Excessive wear on clutch lining	Change clutch linings. Clutch lining should be changed every 5,000,000 strokes.
Improper height adjustment	Readjust the machine height. The air-clutch will slip if the height of the punch is too low.
Improper Sensor adjustment.	Readjust the distance between the "BRAKE CAM" & the " BRAKE PROXIMITY SWITCH". Distance should be of approximately 1/16".

Procedures

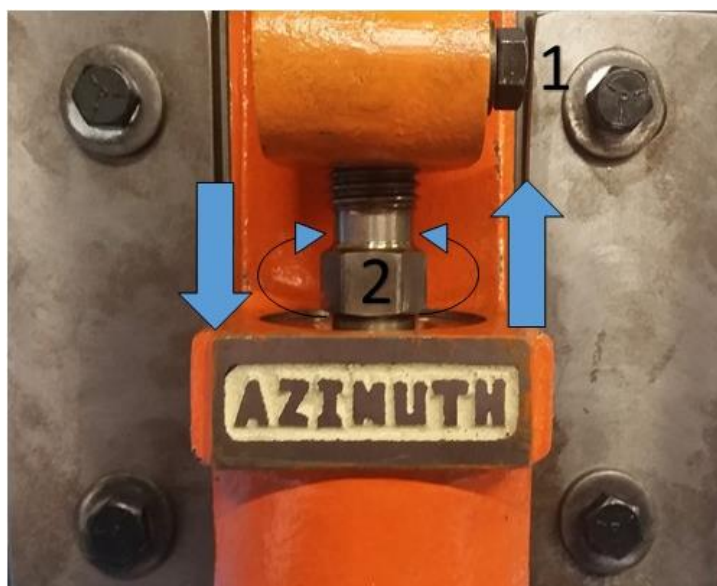
SEE OUR CHANNEL ONLINE FOR MORE DETAILED VIDEOS OF MAINTENANCE & TIPS.

YOUTUBE CHANNEL: AZIMUTH MACHINERY

PROCEDURE 1 - Re-adjusting material thickness (WITHOUT THICKNESS DIGITAL READOUT)

The picture below shows how to raise or descend the punch (adjust the shut height of the machine).

For a more detailed procedure, see our "Youtube" Channel for maintenance tips.



Picture 4 – Shut height adjustment

Raising the punch (rotating the ballscrew "Counter-clockwise") will result in a **smaller button diameter** while descending (rotating the ballscrew "Clockwise") the punch will result in a **bigger button diameter**.

1. Turn the motor OFF and wait for the inertia wheel has stopped.
2. Remove front guard enclosure of the machine.
3. Loosen bolt (1) on the side of the pitman in the picture above.
4. Rotate the Ball screw (2) with a ¼ turn or less (clockwise for a bigger diameter, counter-clockwise for a smaller diameter)
5. Re-tighten the locking bolt (1) on the side of the pitman.
6. Turn the motor ON & clinch two parts of material together.
7. Verify that "Button diameter" (DIE SIDE) matches the dimension in the Table 1.
8. Continue the procedure 1-6 until you have the good button diameter.

***** ALWAYS RAISE THE BALL SCREW TO THE HIGHEST POSITION WHEN YOU ARE CHANGING THICKNESSES OR INSTALLING A NEW PUNCH *****

PROCEDURE 2 - Re-adjusting material thickness (WITH THICKNESS ADJUSTEMENT READOUT)

Step 1 - Raise the punch

From the initial position, raise the punch of 0.250". You should see zero (or approximately) on the digital Thickness readout.

Step 2 - Remove lower die

Remove the lower die by removing the set-screw in front of the die. The die might be stuck a bit, take a pair of vise grip to remove the sleeve, then the 3 blades & the elastomer.

Remove the die with the pair of vise grip.

Step 3 - Change the die or the punch

Loosen the spring holder to change the punch.

Change the die required, if needed.

Step 4 - Readjust the machine to its initial position

Bring the machine 0.015" higher than the initial position on the readout.

(Ex. If the reading was 0.250", bring it to 0.235").

Make a stroke with your material, then measure the button diameter for quality insurance.

If button diameter is too small, readjust the machine 0.001" at a time, & measure button diameter.

When button diameter is reach, lock the pitman back.

PROCEDURE 3 - Readjusting TOP-STOP CAMa

Each Air-clutch machine are equipped with two cams & two proximity switches.

1. Top-stop PROXIMITY SWITCH
2. TOP-STOP CAM
3. BRAKE CAM

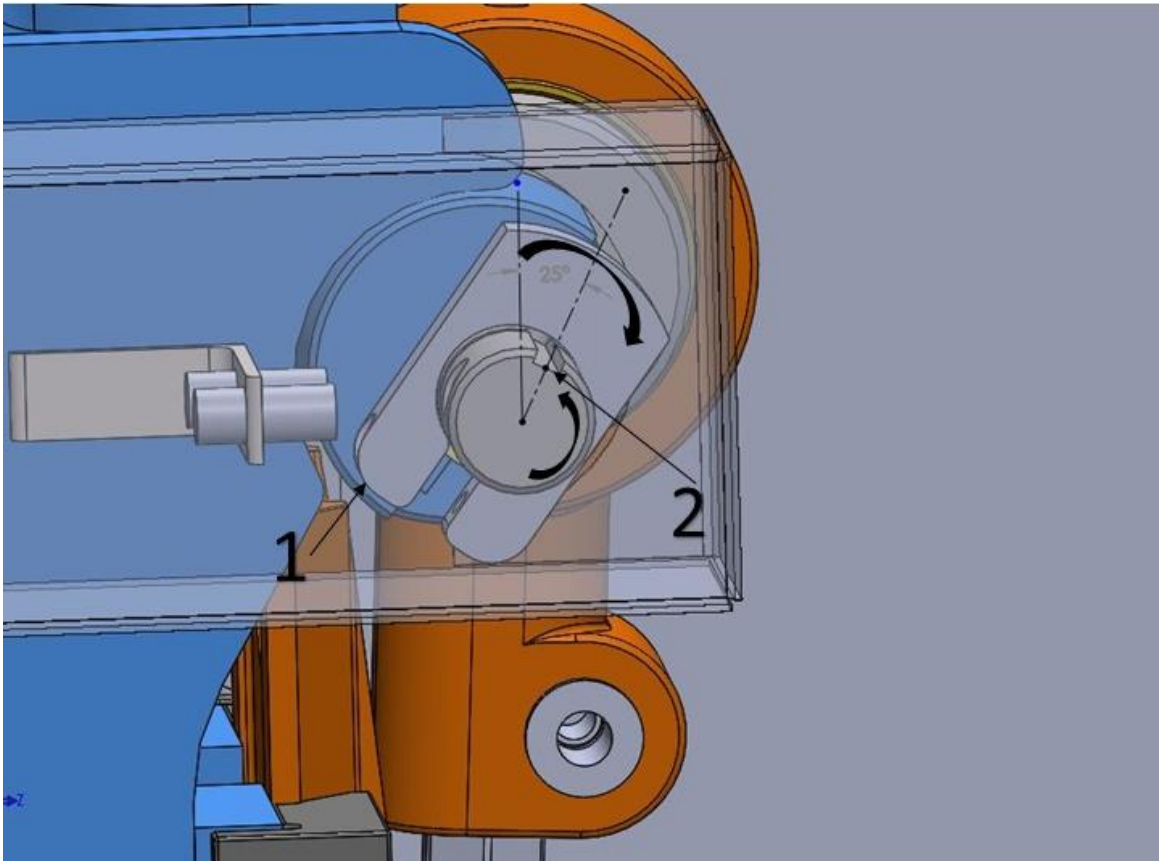
The “BRAKE CAM” controls whether the press stops at TDC or after/before.

The “TOP-STOP CAM” controls whether the press will trigger a brake Fault alarm or not.

In order to have the press stops at TDC, follow the steps below.

Example: press is stopping 25 degrees after TDC.

If the example bellows, the press stops 25 degrees after TDC. In order to bring the press to TDC: follow the steps below:



Picture 5 – Press stopping after TDC

1. Loosen the locking screw of the cam
2. Rotate the “BRAKE CAM” (1) clock-wise of approximately 25 degrees.
3. Tighten the locking screw of the cam
4. Make a stroke & verify that the keyway of the crankshaft is at TDC.

In the event of the press stopping before TDC, step #2 should be counter clockwise.

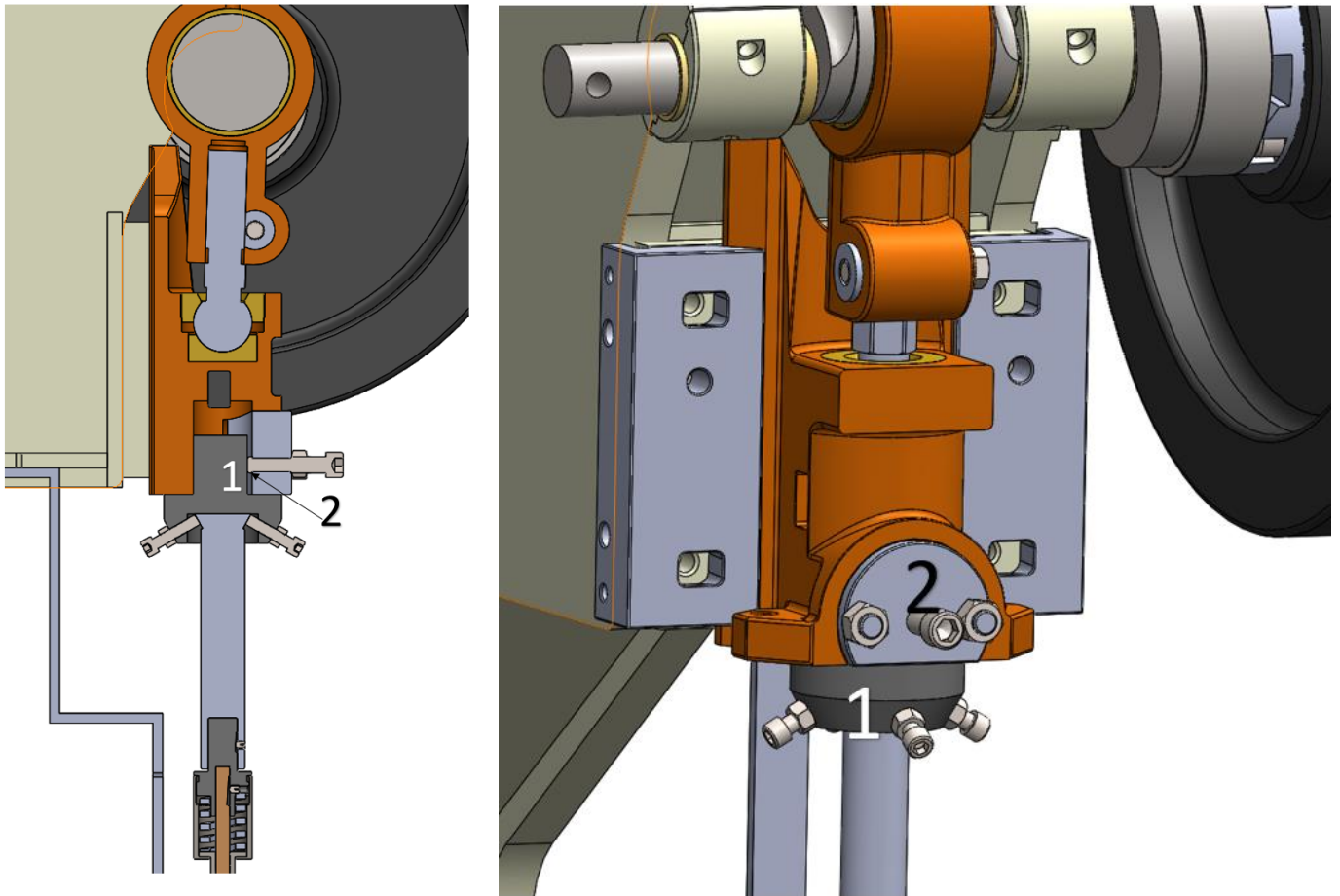
If there are too many brakes fault & the “BRAKE CAM” is properly adjust, rotate the “TOP-STOP CAM” counter clockwise of approximately 10 degrees.

PROCEDURE 4 - Installing Rectangular tooling on existing machine

Remove every source of power (electricity, air) going to the machine before starting installing the tooling.

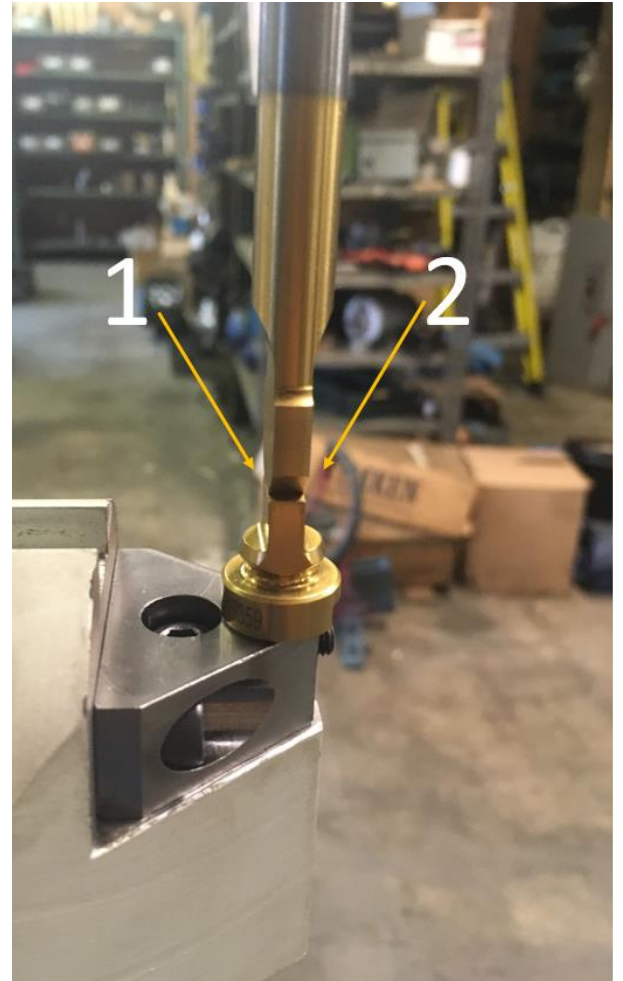
Step 1 - Install tooling adapter (1) inside the shank

Make sure that the set-screw is properly aligned with the flat on the tooling adapter. Tighten the screw so the tooling adapter won't move.



Step 2 – Install Lance-N-Loc Die-Block.

Install the Lance-N-Loc die block (1) with the lance-n-loc die body
It is important to verify that the punch is properly parallel with the die body.



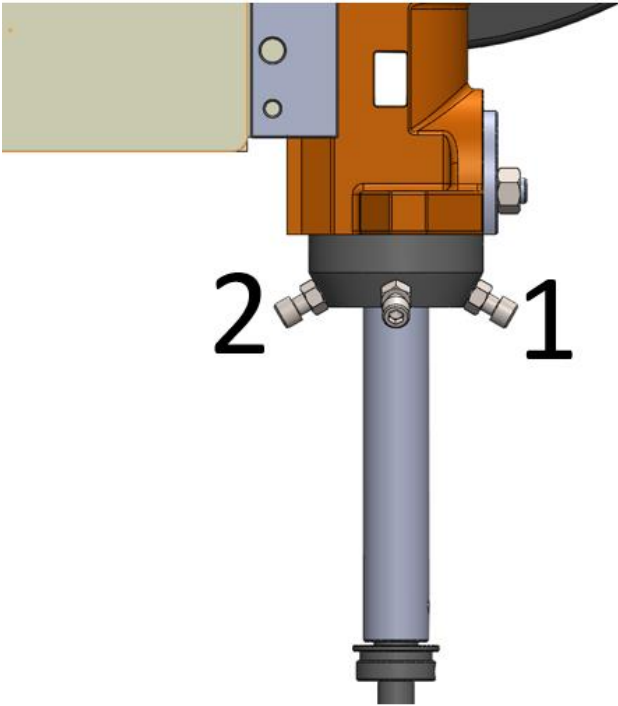
Step 3 – Verify punch alignment & adjustment

Verify that the punch is properly aligned with the die-body. Side #1 & Side #2 must be parallel with the respective face of the die-body.

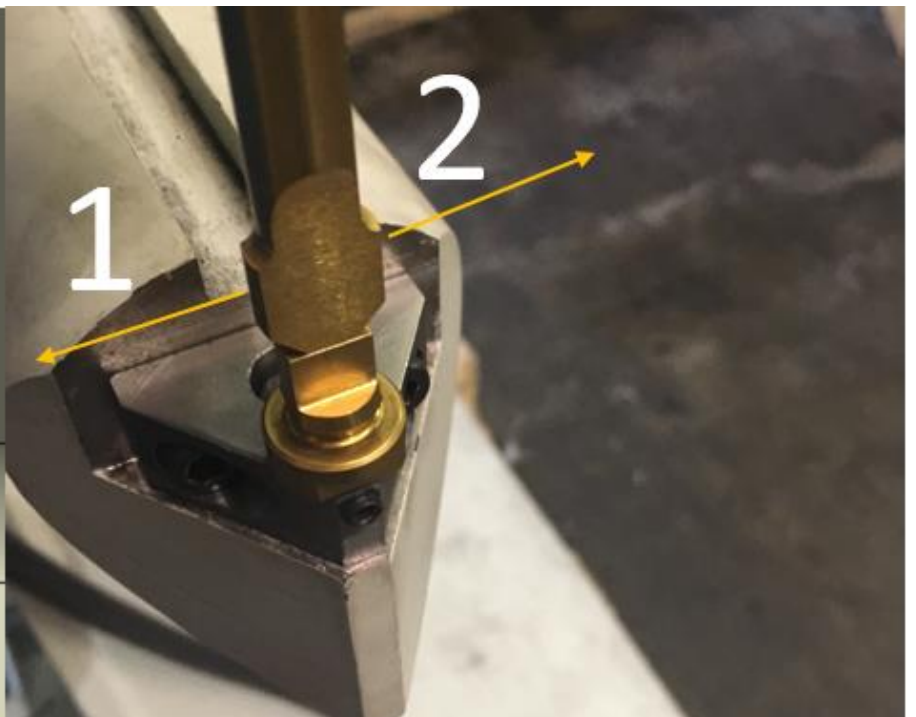
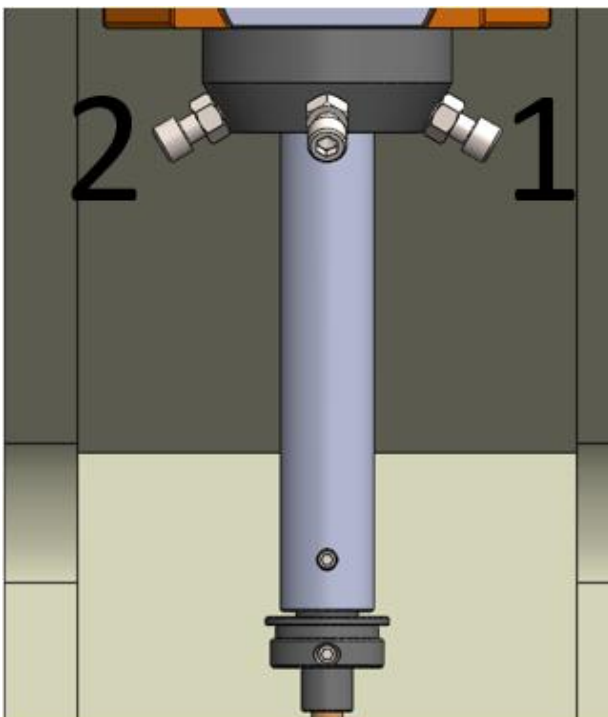
If those faces are not parallel, verify “Step 1 – Install tooling adapter (1) inside the shank”.

If the punch is not properly set (front to back – Left to right) go to step 4.

Step 4 - Punch alignment Front to back - Left to right



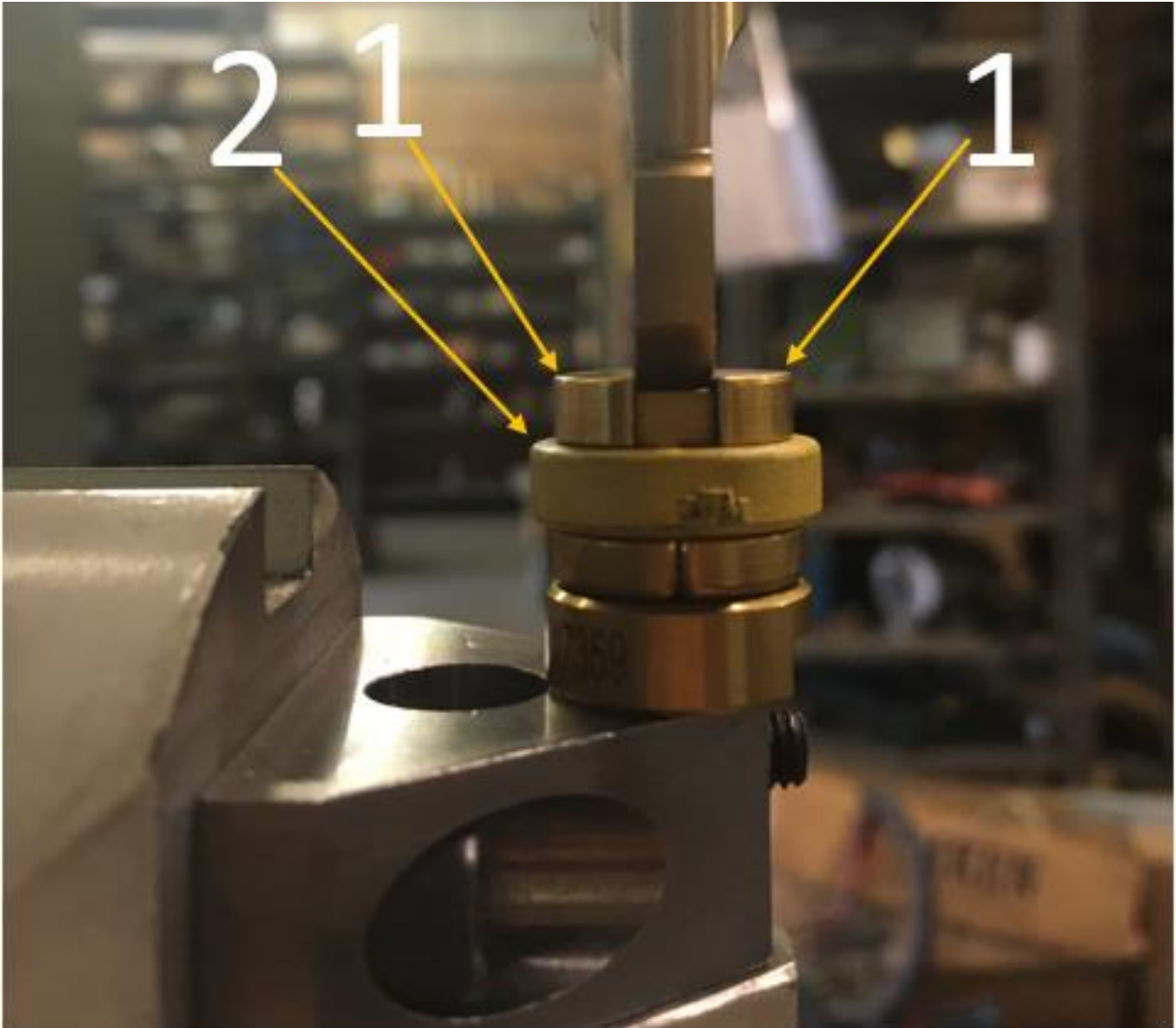
To align the punch perfectly with the Die-body, please refer to the picture above & below. Tightening the screw #1 will move the punch in direction #1 while tightening screw #2 will move the punch in direction #2.



Step 5 - Install the Clinching Blades

Once the punch is properly aligned with the die body, install the clinching blades (2) with the elastomer (1) on the die body & verify that the installation is done properly.

Manually engaged the clutch on the side of the machine & bring the punch down. Verify that the punch does not hit the blades & goes freely inside the anvil depth of the Lance-N-Loc die assembly.



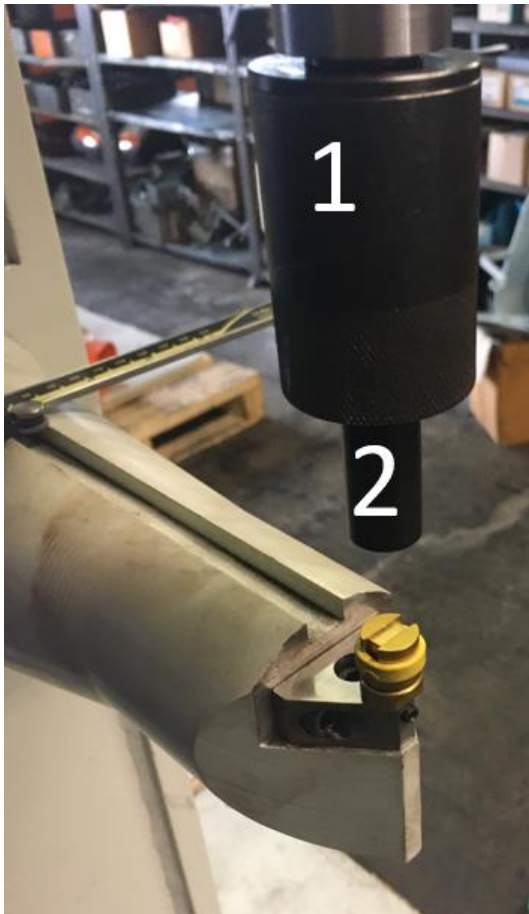
Step 6 - Bring shut height to its highest position & Install the spring, stripper & stripper can.

Bring the shut height of the machine to its highest position to install the Stripper (2), spring (inside the stripper can) & Stripper can (1).

SEE OUR CHANNEL ONLINE FOR MORE DETAILED VIDEOS OF MAINTENANCE & TIPS.

YOUTUBE CHANNEL: AZIMUTH MACHINERY

PROCEDURE 1 - Re-adjusting material thickness to raise the shut height to its highest position.



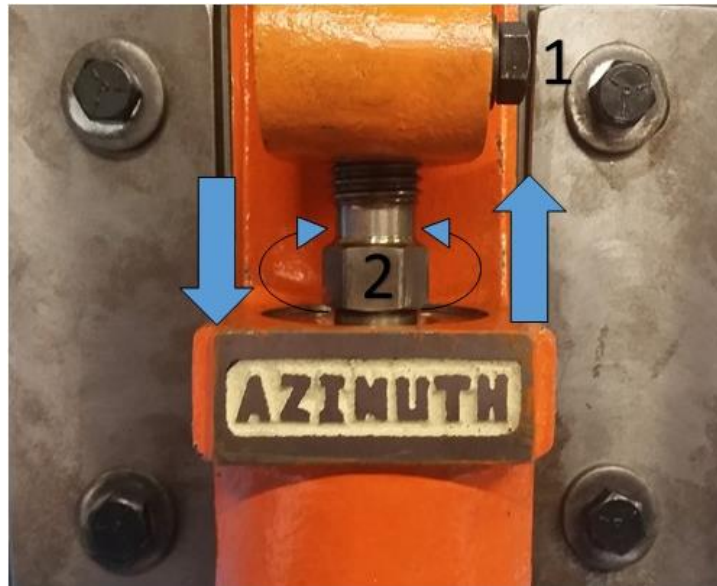
Visually verify stripper alignment with the punch.



Step 7 – Adjusting the button dimension

Once all steps are properly done, bring the shut height to its highest position, start the motor & adjust the shut height to your material thickness.

The picture below shows how to raise or descend the punch (adjust the shut height of the machine).



Picture 6 – Shut height adjustment

Raising the punch (rotating the ballscrew “Counter-clockwise”) will result in a ***smaller button diameter*** while descending (rotating the ballscrew “Clockwise”) the punch will result in a ***bigger button diameter***.

1. Turn the motor OFF and wait for the inertia wheel has stopped.
2. Remove front guard enclosure of the machine.
3. Loosen bolt (1) on the side of the pitman in the picture above.
4. Rotate the Ball screw (2) with a $\frac{1}{4}$ turn or less (clockwise for a bigger diameter, counter-clockwise for a smaller diameter)
5. Re-tighten the locking bolt (1) on the side of the pitman.
6. Turn the motor ON & clinch two parts of material together.
7. Verify that “Button diameter” (DIE SIDE) matches the dimension in the Table 1.
8. Continue the procedure 1-6 until you have the good button diameter.

***** ALWAYS RAISE THE BALL SCREW TO THE HIGHEST POSITION WHEN YOU ARE CHANGING THICKNESSES OR INSTALLING A NEW PUNCH *****

Procedure 5 – Initial start-up of the machine with fingersafe guarding

ANNEXE A – Part list

See drawings

H612-AC – Press overall

4-200AS – Clutch Assembly

6-023AS – Ram Assembly

6-233.1AS – Crankshaft Assembly

6-241AS – Flywheel Assembly

6-369AS – Motor Assembly

Punch & Die requirement

ANNEXE B – Electrical schematic

See drawing

“4-503”