Technician Name: _____ Date: _____

Technician Name: _____ Date: _____

Customer Name: _____ Serial Number: _____

Y-Axis Stall

Issue Explanation and Background

Each drive motor on the machine (the x, y and z axes motors) has a sensor called an encoder that tracks how many times the motor rotates which in turn tells you how far it has traveled. The on-board computer commands each motor to move a certain distance over a certain interval of time for each operation and then compares the actual distance traveled by the motor (by reading the encoder) to the distance it was commanded to go.

A y-axis stall is caused when the difference between the commanded distance becomes much more than the actual distance over the allotted time interval. An easy example of this would be putting your hand on the cutting truck and preventing it from moving during an operation. The computer is commanding it (and expecting it to move a certain distance in a given time interval) but your hand is preventing it from moving; or stalling the movement. A stall does not have to be a physical obstacle to movement. For instance if a power lead to the motor was broken then the motor would not move when commanded and the computer would record a stall.

Diagnosis Procedure

Verify the Firmware Version – Have the customer read the firmware version directly from card via the Options menu and record _____.

Make sure that the memory card is inserted and the machine is ON. Navigate to the Configurations Menu from the *CarveWright Main Menu* by using the **up/down arrows** or pressing the "**0**" (**Options**) key on the keypad. Scroll down to *2) Version* and press **ENTER** (or simply press the "**2**" key on the keypad).

If the version is anything other than the latest release have the customer update the software and retry the project.

Setup for Troubleshooting - Turn the machine OFF

Question 1: Does the machine have a B-series serial number OR an A-series serial number higher than 500,000?

- ❒ YES: Proceed to Question 3.
- ❒ NO: Proceed to Question 2.

Question 2: Has the machine had been in for service after September 2007 or has the machine had the 907 package installed? If customer is unsure check their Supertux file.

❒ YES: Proceed to Question 3.

❒ NO: **Send customer the A907 package and installation instructions**. The 907 package is a functional replacement for an electronics suit (and cable) that is no longer produced. Tell the customer that you will proceed with the diagnosis but that they may need to install the 907 package in order to resolve this issue. Continue to Question 3.

Question 3: Are you running other machinery on the same circuit or running the unit on a very long power cord?

❒ YES: Many times cycling ON other machines (even a refrigerator) can instantaneously draw down the voltage supplied to the machine enough to cause an axis to stall. Have the customer isolate the machine from other machinery and retry the project. If this does not resolve the issue proceed to Question 4.

❒ NO: Proceed to Question 4.

Question 4: Does the machine sometimes report an X, Y or Z-axis stall (as opposed to always reporting a y-axis stall)?

❒ YES: Likely causes are: the bit is not spinning during cutting or intermittent voltage from the power supply electronics board. Proceed to the troubleshooting document titled ***Random X, Y and Z Axis Stalls***.

❒ NO: Proceed to Question 5.

Question 5: Does the machine reboot or power OFF after a y-axis stall?

❒ YES: Likely cause is intermittent voltage from the power supply electronics board. **Send customer a new power supply board (A2038). Close ticket.**

❒ NO: Proceed to Question 6.

Question 6: Turn the machine ON and initiate the same project. Does the y-axis stall happen right away (right as it starts to move)?

❒ YES: Likely causes are: the y-truck is physically stuck in place, the y-drive motor is not getting power, or the y-drive motor encoder is not reading. Proceed to Cause 1.

❒ NO: Proceed to Question 7.

Question 7: Does the stall happen immediately when the machine starts cutting OR within the first few cutting passes?

❒ YES: Likely cause is an AC cut motor issue where the bit is not spinning fast enough to remove the material. Proceed to Cause 5.

❒ NO: Proceed to Question 8.

Question 8: Turn the machine ON and initiate the same project. Does the y-axis stall happen at the same position or spot in the carving every time it runs?

❒ YES: Likely cause is a physical obstruction that is limiting the travel of the y-truck. Proceed to Cause 7.

❒ NO: Proceed to Question 9.

Question 9: Does the edge of the carving shift in as the project proceeds?

❒ YES: Likely cause is that the y-motor is losing track of its position. Proceed to Cause 8.

❒ NO: **Elevate this issue ticket to the next level of Technical Support**.

Y - Axis Stall Causes

Cause 1: The y-drive motor does not perform the commanded motion.

A. The y-motor pack is binding. If the y-motor pack is not assembled correctly it is possible that the belt pulley is dragging on the casting around it. Has the y-motor pack been recently replaced?

❒ YES: Likely cause is that the y-motor pack is not correctly seated and the drive motor shaft is binding. Loosen and reseat the y-motor pack.

❒ NO: Proceed to Cause 1/B.

B. The y-truck is stuck in position. Reach into the machine and attempt to move the y-truck back and forth (with the power OFF). Is the y-truck seized in place?

❒ YES: Likely cause is that there is a mechanical problem that is preventing the y-truck from moving freely. Proceed to Cause 2.

❒ NO: Proceed to Cause 1/C.

C. The y-truck moves but moves very roughly. Reach into the machine and attempt to move the y-truck back and forth (with the power OFF). Does it move but move in a very rough way?

❒ YES: Likely cause is a stripped gear in the y-motor pack. Proceed to Cause 2.

❒ NO: Proceed to Cause 1/D.

D. The y-motor is not getting power. Move the y-truck back and forth across the machine several times with the power OFF. Notice the amount of force needed to move the y-truck back and forth. Turn the machine ON (with the memory card inserted and the machine plugged in) and again notice the force needed for movement. Is the force more when the machine is ON than when it is OFF?

❒ YES: The y-drive motor is getting power. Proceed to Cause 1/E.

❒ NO: The y-drive motor is NOT getting power. Proceed to Cause 3.

E. The y-motor encoder is not reading. Enter the sensor check menu through the keypad and scroll down to Y Position item. Move the y-truck back and forth and observe the values shown on the LCD screen. Does the value shown change and the y-truck moves?

❒ YES: **Elevate this issue ticket to the next level of Technical Support.**

❒ NO: Proceed to Cause 4.

Cause 2: There is a mechanical problem that prevents the y-truck from moving freely. We will want to remove the top cover and remove the y-drive motor pack to perform this diagnosis. Removing the y-truck releases all tension on the belt. Send the customer the document describing the removal of the head cover and y-drive motor pack along with the document on further diagnosing this issue. Have them call back if the steps provided do not resolve the issue.

A. The y-rails are caked with dust or pitch preventing movement. Once the y-drive pack is removed, again attempt to move the y-truck back and forth. Check that all 4 of the plastic wipers that keep dust from accumulating on the y-rail are in place and not binding the rollers. Is the y-truck still stuck in place?

- ❒ YES: Likely cause is dust or pitch on the y-rails. Clean and retest. If the y-truck is still stuck, **elevate this issue ticket to the next level of Technical Support.**
- ❒ NO: Proceed to Cause 2/B.

B. The y-belt tensioner pulley is bound with dust. Reach into the machine try to turn the y-belt pulley (on the y-belt tension plate at the far right of the belt). Is the pulley free to rotate?

- ❒ YES: Proceed to Cause 2/C
- ❒ NO: Cause is dust in the pulley bushing. **Blow the pulley bushing with air and lubricate with light oil until it rotates freely. Close ticket.**

C. The y-motor pack gears are stripped, worn or out of adjustment. Turn the pulley protruding from the loose y-drive motor pack. Does the pulley rotate freely?

- ❒ YES: **Elevate this issue ticket to the next level of Technical Support.**
- ❒ NO: Likely cause is a stripped gear in the y-motor pack. **Send customer a new y-drive motor pack (A2052). Close ticket.**

Cause 3: No voltage to the y-motor.

A. The cable from the y-drive motor pack is disconnected. Verify that the power to the machine if OFF. Locate, unplug, and reseat the 8-pin y-drive motor pack connector at the head termination board (make sure that the connector is orientated correctly before re-plugging). Move the y-truck back and forth across the machine several times with the power OFF. Notice the amount of force needed to move the y-truck back and forth. Turn the machine ON (with the memory card inserted and the machine plugged in) and again notice the force needed for movement. Is the force more when the machine is ON than when it is OFF?

- ❒ YES: Cause is a loose connector. **Close ticket.**
- ❒ NO: Proceed to Cause 3/B.

B. Bad solder joint on the head termination electronics board. We will want to remove the top cover and remove the y-drive motor pack to perform this diagnosis. Again,

verify that the power to the machine if OFF. Unplug the 8-pin connector from the z-motor pack (only disconnect the cable, DO NOT remove the z-motor pack). Now plug the loose y-motor pack into the z-motor pack connector (make sure that the connector is orientated correctly before re-plugging). Rotate the pulley on the loose y-motor pack with your fingers with the power OFF. Notice the amount of force needed to rotate the pulley. Turn the machine ON (with the memory card inserted and the machine plugged in) and again notice the force needed to rotate the pulley. Is the force more when the machine is ON than when it is OFF?

❒ YES: There is now power to the y-motor. Cause is a bad head termination electronics board. **Send customer a new head termination electronics board (A2060). Close ticket.**

❒ NO: Likely cause is a bad y-drive motor pack. **Send customer a new y-drive motor pack (A2052). Close ticket.**

Cause 4: The y-drive motor encoder is getting NO reading.

A. The cable from the y-drive motor pack is disconnected. Verify that the power to the machine is OFF. Locate, unplug, and reseat the 8-pin y-drive motor pack connector at the head termination board (make sure that the connector is orientated correctly before re-plugging). Enter the sensor check menu through the keypad and scroll down to Y Position item. Move the y-truck back and forth and observe the values shown on the LCD screen. Does the value shown change and the y-truck moves?

❒ YES: Cause is a loose connector. **Close ticket.**

❒ NO: Proceed to Cause 4/B.

B. Bad solder joint on the head termination electronics board. We will want to remove the top cover and remove the y-drive motor pack to perform this diagnosis. Again, verify that the power to the machine if OFF. Unplug the 8-pin connector from the z-motor pack (only disconnect the cable, DO NOT remove the z-motor pack). Now plug the loose y-motor pack into the z-motor pack connector (make sure that the connector is orientated correctly before re-plugging). Enter the sensor check menu on the side of the machine and scroll down to Z Position item. Rotate the pulley on the loose y-drive motor pack and watch the values displayed on the LCD screen. Do the values shown for Z Position change?

❒ YES: There is now a signal from the y-motor pack. Cause is a bad head termination electronics board. **Send customer a new head termination electronics board (A2060). Close ticket.**

❒ NO: Likely cause is a bad y-drive motor pack. **Send customer a new y-drive motor pack (A2052). Close ticket.**

Cause 5: The cutting spindle not spinning fast enough to cut wood.

A. The cutting motor does not turn ON prior to cutting. The cutting motor will come ON just prior to the first cutting pass. Set up and start a project. Does the motor turn ON before the bit touches the wood on the first cutting pass?

- ❒ YES: Proceed to Cause 5/B.
- ❒ NO: Likely cause is a problem with the AC safety switch, the control electronics or the AC motor. Proceed to Cause 6.

B. The cutting bit does not spin when it is supposed to be cutting. When the machine begins its carving, does the bit begin spinning before it touches the wood?

- ❒ YES: Proceed to Cause 5/C.
- ❒ NO: Proceed to Cause 5/D.

C. The flexshaft is damaged. Disconnect the flexshaft sheath from the z-truck and remove the flexshaft core. Is there visible damage to, or metal shavings on, any part of the flexshaft?

- ❒ YES: Likely cause is a damaged flexshaft. **Send customer a flexshaft core (P1044).** Also check for damage to the square in the spindle shaft. If there are shavings or visible damage the z-truck (A2015) will also need to be replaced.
- ❒ NO: **Elevate this issue ticket to the next level of Technical Support.**

D. The flexshaft core is broken. Disconnect the flexshaft sheath from the z-truck and remove the flexshaft core. Is the core broken?

- ❒ YES: Cause is a broken flexshaft. **Send customer a flexshaft core (P1044).** Check along the length of the flexshaft sheath and make sure that is has not been damaged. Many times the sheath will be damaged by excessive heating.
- ❒ NO: Proceed to Cause 5/E.

E. The flexshaft core is disengaged. Make sure to correctly reseat the flexshaft core on both the cut motor and the spindle shaft sides. Does the y-axis stall still occur after reseating the flexshaft?

- ❒ YES: Proceed to Cause 5/F.
- ❒ NO: Cause is an improperly seated flexshaft. **Close ticket.**

F. The flexshaft sheath is separated from its end termination. In some rare cases the flexshaft sheath can separate from its plastic terminations. Follow the flexshaft sheath with your hand to make sure that it is unbroken. Is the flexshaft sheath separated at either end from its terminations?

- ❒ YES: Cause is a broken flexshaft sheath. **Send customer a flexshaft assembly (A2045). Close ticket.**
- ❒ NO: Proceed to Cause 5/G.

G. The flexshaft sheath on the AC cut motor side is disengaged. In some rare cases the flexshaft sheath can separate from its connection to the AC motor or the spindle. Follow the flexshaft sheath with your hand to make sure that it is securely fastened into the AC cut motor. Is the flexshaft disconnected from the AC cut motor?

❒ YES: Cause is a disconnected flexshaft assembly. **Send customer directions to reassembly flexshaft assembly. Close ticket.**

❒ NO: **Elevate this issue ticket to the next level of Technical Support**.

Cause 6: The AC cut motor is not getting power through the AC motor safety switch. The machine has two safety switches on the front cover that are mounted underneath the front lip of the black plastic head cover. These switches are triggered when the clear front cover is lifted. Facing the machine, the switch to the left is the controller safety switch and the switch to the right is the AC motor safety switch (which we are concerned about in the following diagnosis). **Before initiating this diagnosis please have the customer UNPLUG the machine.**

A. Service has been done on the machine recently and something is disconnected. Has the top cover or bottom panel been removed recently for service?

❒ YES: Likely cause is a disconnected cable to one of the serviced components. Have the customer check and reseat all of the serviced connections. Focus on the connectors at the back end of the AC cut motor if the top cover has been removed and the connectors on the X-termination board if the bottom panel has been removed. If checking and reseating all of the affected connectors does not resolve the error proceed to Cause 6/B.

❒ NO: Proceed to Cause 6/B**.**

B. The AC motor safety switch is not being depressed far enough. The AC motor safety switch cuts power to the AC cut motor when the clear cover is lifted. Open and close the front clear safety cover. You should hear two distinct clicks from the switches but we are only concerned with the right switch here. Can you hear the right switch click as the cover comes down?

❒ YES: Proceed to Cause 6/E.

❒ NO: Proceed to Cause 6/C**.**

C. The AC motor safety switch is bad. Open the clear safety cover and using a small flathead screwdriver, depress the switch button. Can you hear the switch click as you depress the button with the screwdriver?

❒ YES: Likely cause is that the cover is not depressing the switch button far enough. Proceed to Cause 6/D.

❒ NO: Cause is a bad AC switch. **Send the customer a new AC switch (P007-00007). Close ticket.**

D. The front cover is loose or out of position. Open the clear safety cover and do the following:
   - Use compressed air to clean around the switch button.
   - Wiggle to clear cover to see if there is any slop at the corner pivots. Tighten if there is.
   - Loosen the top cover screws and push the black cover toward the front of the machine before retightening.
   - Add a small piece(s) of tape to the end of the "finger" on the clear cover to make it longer.

   Do these suggestions allow the cover to "click" the switch when the cover is down?

   ❒ YES: Cause was that the cover is not depressing the switch button far enough. **Close Ticket.**

   ❒ NO: **Elevate this issue ticket to the next level of Technical Support**.

E. Does the customer have access to a Voltmeter?

   ❒ YES: Proceed to Cause 6/F.

   ❒ NO: Proceed to Cause 6/G.

F. Checking the switch with a voltmeter. Verify that the machine is unplugged. Drop the AC safety switch by removing the two small screws securing the plastic guard over the switch. Place the probe tips on each of the switch terminals and check for continuity between them when the switch is depressed. Is there continuity between the terminals?

   ❒ YES: Likely cause is a bad X-termination electronics board. **Send customer an X-termination electronics board (A2074).**

   ❒ NO: Cause is a bad AC switch. **Send the customer a new AC switch (P007-00007).**

G. The switch is damaged. Verify that the machine is unplugged. Drop the AC safety switch by removing the two small screws securing the plastic guard over the switch. Does the switch or cable near the switch appear to be damaged or have a "burnt" smell?

   ❒ YES: Cause is a bad AC switch. **Send the customer a new AC switch (P007-00007). Close ticket.**

   ❒ NO: **Elevate this issue ticket to the next level of Technical Support**.

Cause 7: There is a physical impediment to the y-truck moving back and forth.

A. The y-truck is dragging or hitting something on its rails. Move the y-truck back and forth across the length of the machine. Look for obstacles to free and smooth movement. Were any physical obstacles encountered?

   ❒ YES: **Identify and remove the obstacle. Close ticket.**

❒ NO: Proceed to Cause 7/B.

B. The gears in the y-drive motor pack are full of dust or they are damaged. Move the y-truck back and forth across the length of the machine. "Feel" for sticky spots, rough spots or in the motion. Were any rough spots that were spaced evenly along the length of travel??

❒ YES: Likely cause is a bad y-drive motor pack. Proceed to Cause 2.

❒ NO: Proceed to Cause 7/C.

C. The carving depth makes it difficult for the cut. In some cases the depth of cut, the material hardness, and condition of the bit combine to stall the motor because material cannot be removed fast enough. Inspect the sharpness and condition of the bit. Also look at the depth of the carving where the machine stalls. What is the depth of the project as shown in the Designer software _____. Also record depth of the cut at the point where the machine stalls_____. Replace dull bits and lessen the depth of the carving. Have these suggestions cleared the y-axis stall?

❒ YES: Cause was a dull bit or deep carving. Make adjustments in the design and dispose of damaged or dull bits. **Close ticket.**

❒ NO: **Elevate this issue ticket to the next level of Technical Support.**

Cause 8: The y-encoder is losing track of its position.

A. The y-motor encoder is reading intermittently. Move the y-truck to the far left position. Turn the machine ON, enter the sensor check menu through the keypad and scroll down to Y Position item. Move the y-truck from the far left to the far right and record the values on the LCD screen. The encoder reading should start at 0.0 and read between 15.5 and 15.7 inches all the way to the right. Repeat this side to side exercise several times. The reading should return to 0.0 (within a tolerance of +/- .005) at the far left side of the machine. If encoder reading is significantly outside these values at the right side of the machine, OR does not return to 0 (within a tolerance of +/- .005) at the left side then the encoder is not reading correctly. Remove the head cover and remove the plastic cap covering the back end of the y-motor. Check for and remove sawdust in the encoder sensor. Does the y-encoder now read within specifications?

❒ YES: **Reassemble the machine making sure that the seal on the y-encoder is in place. Close ticket.**

❒ NO: Proceed to Cause 8/B.

B. The Y-Belt is loose. If there is not enough tension on the y-belt it can skip teeth on the drive pulley causing the machine to lose track of the y-truck position. Many times a loose belt will announce itself with a ratcheting sound as the belt skips pulley teeth under load. Loosen the screw holding the y-belt tensioner. Push the tensioner plate to the right by hand and retighten. Does this resolve the stall?

❒ YES: Cause is a loose y-belt. **Close ticket.**

❒ NO: **Elevate this issue ticket to the next level of Technical Support.**