

K & S Dicing Saw Operation Instructions

This tool is to be operated by Authorized MFC Staff only.

Gloves must be worn when operating the saw. Record all necessary information in the log book for each use.

Turning on the saw:

- I. There are three utilities which must be turned on before the saw is powered on. The utilities are CDA, vacuum, and water. All three utilities are located behind the saw along the clean room wall.
- II. Turn on the CDA; this is the copper line with the blue filter/regulator (left most utility). This line is tagged CDA. The line pressure should be at 80 psi.
- III. Turn on the water; this is the rightmost Halar line with the blue shut off valve. This line is marked DI Return.
- IV. Turn on the vacuum pump; the vacuum pump is located on the floor. The Red power switch is located on the power cord.
- V. Once all three utilities are “ON” then the power to the saw can be cycled on.
- VI. Pull the Red power button located on the top front of the saw. Once the power is cycled “ON”, the saw must be ‘initialized’.
- VII. Initialization must be confirmed by pressing the square red button located at the top left of the key board. The saw will run through a diagnostic check. The diagnostic check will consist of screen flashes, and movement of the X, Y, Z, and Theta axis. The diagnostic check will then stop at a date confirmation screen, there is no need to change the date, press <Enter> to complete the initialization and diagnostic configuration of the saw.
- VIII. The screen will now display “EDIT” screen. From this screen you can edit the dicing parameters i.e. substrate thickness, cut depth, index, cut count, feed rate, spindle speed.

Blade change, height calibration

1. The height needs to be calibrated. At this point the spindle will be “off”. This is when you will change the blade if needed. Check log book to determine which type of substrate was diced last. If last substrate diced is different than what you will be dicing, then blade change is required. Caution must be taken when changing the blade.
 - a. Make sure spindle is off! Locate spindle nut removal tool, blade to be installed, the case for removed blade to be placed into, flange spacer.
 - b. While the spindle is off, remove the large black acrylic hood (under the key board)

- c. Remove the blade guard by unscrewing the knob to the right of the guard. Slide blade guard out toward user. Do not tilt or rotate blade guard when removing.
 - d. Remove old blade by grabbing the flange lip and pulling the blade straight out off of the spindle. Be careful not to touch the blade itself! Do not grab the edge of the blade, as it is very thin and will break. IPA might be required as lubricant if blade is difficult to remove.
 - e. Place old blade into case.
 - f. Grab new blade. Be careful not to touch the blade itself! Do not grab the edge of the blade, as it is very thin and will break.
 - g. Slide new blade into the spindle, push blade completely back into the spindle.
 - h. Slide the flange spacer into against the blade, attach the retaining nut and tighten. Be careful NOT to cross thread the retaining nut! Be careful not to over tighten the retaining nut.
 - i. Replace blade guard.
 - j. Replace acrylic hood.
 - k. Make sure to keep spindle nut removal tool and flange spacer in a secure location
2. Press the <Teach> key. The teach screen now displays the teach options. Press the key for height. The spindle spins up and moves to the center of the ceramic chuck. Use the arrow keys to move the camera to the outer edge of the ceramic and select a location on the metal ring. Press enter once a suitable location on the metal ring has been chosen. The height calibration takes about five to ten minutes.
 3. Once the height calibration is complete, the saw will prompt a selection of “New blade” or “Old blade”. Make the proper selection for the type of blade by pressing the respective key selection. If the blade was changed before teaching the height, then the selection should be “New blade”. If the blade was not changed out and is the same blade which was on the spindle before teaching the height, then the selection is “Old blade”. **The height must be taught each time a blade is changed out or when the saw power is cycled ON. **
 4. Get back to the Edit screen by pressing <Manual><Display><Display>. You can always press <Manual><Display><Display> to return to the edit menu. **wait a few seconds after pressing <Manual> for the saw to home in the z direction.**

Editing dicing parameters

5. The screen will now display “EDIT” screen. From this screen you can edit the dicing parameters i.e. substrate thickness, cut depth, index, cut count, feed rate, spindle speed.
 - 5.1. The directory has substrate specific dicing parameters i.e. 000000 is for Quartz, 000002 is for Silicon, 0000033 is for Sapphire.
 - 5.2. The difference between the recipes is the spindle rpm, entry rate and feed rate.

6. While in the Edit mode, select proper dicing recipe for the substrate which you will be dicing. Move the cursor using the arrow keys until cursor is over/on “Directory”; press <Enter> for your selection.
 - 6.1. Select the proper recipe using the arrow keys, press <Enter> to select recipe, and press <Enter> to go back to the edit screen.
7. To edit the dicing parameters, press the <Enter> key while the cursor is blinking over/on “Edit”. Input proper dicing parameters i.e. substrate thickness, cut depth, index, cut count, cut length. ****cut depth = substrate thickness – 5.5 mils ****
 - 7.1. Use the arrow keys to move cursor to the parameter which you will edit.
 - 7.2. You will need to edit each block for the dicing parameters. Move back and forth from block 1 to block 2 by using the up/down keys to toggle through the bottom of block 1 or through the top of block two.
 - 7.3. ****The parameters above the blocks i.e. Substrate thickness, spindle speed, blade exposure are “Global” parameters and will be changed on all blocks. The parameters within the blocks are “Local” and will need to be changed for each individual block.**
8. Save the new parameters by pressing <Enter>. The cursor now moves to the bottom of the screen. Use the right arrow key to move the cursor over Save, press <Enter> to save. If the program saved properly, then “Overwrite” will display at the top right corner of the screen.

Alignment and Dicing

1. Press the <Auto> key, the saw prompts you to “teach and cut” or to “cut”. If the height has already been taught from previous steps, then press <Enter> to put the saw into cut mode.
 - a. By pressing <Auto> <Enter> the stage will shift to the left most position. This left most position is the loading position.
 - b. Once the stage is in the loading position, you can carefully load the dicing ring with the mounted wafer.
 - c. Care must be taken when loading the dicing ring onto the stage, the spindle will be rotating. If the ring comes into contact with the spinning blade, then blade damage will occur.
2. Once the dicing ring is loaded onto the stage, press <Enter>. The stage will then shift to the alignment position.
 - a. The stage will be located under the camera. The center of cross hairs on the screen represent the center of the camera view.
 - b. Alignment can now be performed. Shift the substrate by using the arrow keys.

- c. Select a street which will be used for aligning the substrate. Only one street can be used.
 - d. Select a spot on the street, press the <Enter> key. The stage then shifts to the right (left with respect to the wafer). Shift the substrate up or down to the appropriate position on the street. Press the <Enter> key. The stage now shifts left (right with respect to the wafer), shift the substrate up or down to the appropriate position on the street. Press <Enter>. Scan the substrate alignment by shifting the substrate right or left. If the street is scans along the horizontal cross hair then the substrate is aligned. Press <Shift> <Enter>.
 3. Once the alignment is complete, the start cut position and the start index position must be determined and set.
 - a. Shift the substrate to the desired location of the first cut. (If dicing a patterned wafer, then index should be verified by pressing the index key and indexing up the wafer using the up arrow key. Make any changes to the index parameter by going to the edit screen.).
 - b. The cross hair represents the blade. Place the cross hair on the location of the substrate where the first cut will occur.
 - c. From that location the offset must be set. Zero out the Y counter by pressing <Shift> <. > press the up arrow key then <Enter> to exit.
 - d. Use the down arrow key to set the offset to the correct offset value for the blade which is being used. i.e. 0.104
 - e. Once the offset is set, the start cut location must be set. Shift the substrate to the left until the camera (crosshairs) is located on the wafer approximately half inch from the rightmost portion of the wafer. The saw will begin the cut one inch to the right from this location.
 - f. Press <Shift> <Enter> to complete the start cut set up. The chuck will rotate to the degrees specified in the next block, typically 90 degrees.
 - g. Repeat steps 2a through 3f for the second block.
 4. Once step 3f has been completed for the second block, the saw will begin the dicing process. If the substrate being diced is patterned, special attention must be taken to assure all alignments, indexes, and start cut positions are set correctly. If any doubts...start over.