GENERAL PROCESS AND OPERATION SPECIFICATION

Dicing Saw Model 1100A

I. SCOPE
   a. The purpose of this document is to describe requirements and basic operating instructions for the Assembly Technologies Model 1100 Dicing Saw. It also includes basic instruction in preparation of samples or wafers using tape and tape rings, which allows 100% through-cuts on samples without damage to the wafer chuck.

II. SAFETY
   a. Be sure that you are trained and signed off to use this equipment.
   b. Be sure to keep all doors and protective shields in place before operating this equipment.
   c. Be sure to wear safety glasses at all times when operating this equipment.
   d. When you receive an “F” error code (ex. F201, F202, etc.), reset the saw, turn the spindle off, and resolve the “F” code before restarting the spindle drive.
   e. If you are unsure about any procedure or indication while operating this equipment be sure to contact a staff member or trainer for assistance.

III. APPLICABLE DOCUMENTS, MATERIALS AND REQUIREMENTS
   a. For more information about the detailed operation of this tool refer to the Model 1100 Wafer Dicing Saw Operation Manual – available near the tool in hard copy binder, or the file: Model 1100 Wafer Dicing Saw Operational Manual.pdf.
   b. For assistance with changing a worn or broken blade, please contact a staff member.
   c. Appendix A: Program parameters and descriptions

IV. OPERATION
   a. Preparation.
      i. Select pair of saw mount rings.
      ii. Cover the inner ring using blue tape with the sticky side facing up.
      iii. Place the outer ring around the white ring so the blue tape goes between the rings.
      iv. Secure the sample to the blue tape and remove air bubbles between blue tape and sample using a Q-tip or tweezers.
      v. Cut excess tape using scissors. See Figure 1.
      vi. Verify that the blade is installed and not broken by removing the plastic blade cage. Upon inspection, remount the cage back in place.
   b. Turn on the dicing saw’s utilities and power.
      i. Water - open the water valve behind the dicing saw.
      ii. Air - open the ¼-turn valve behind the saw.
      iii. Vacuum – turn on the switch under the dicing saw frame.
      iv. Main power – press the red power button on the right-hand panel.
      v. Monitor – turn on the power on the bottom left of the monitor.

   vi. Spindle/blade controller – no action required. Unlike the dicing saw A5, the spindle is controlled by the spindle on/off switch.

c. Prepare the saw for use.
   i. Press "RESET" on the saw panel and wait for the lights to initialize.
   ii. Press "PROG", then "ENG/MET" to set up the program parameters in metric units.
   iii. See Appendix A for information about the program parameters. See Figure 2 for a picture of the program screen.
   iv. Press "PROG" again to finish programming.
   v. Place the gage block towards the operator-side of the chuck and press "WAFER LOCK" to secure it. See Figure 3 for correct placement of the gage block.
   vi. Press the "ON SPINDLE OFF" button and wait until the spindle is at full speed.
   vii. Press "CHUCK ZERO" to zero the chuck, then press "CHUCK ZERO" again to verify that the gage block is being used.
   viii. Once the chuck is zeroed, press "WAFER RELEASE" and remove gage block.

d. Load and align substrate and perform the cut.
   i. Place substrate with blue tape over the chuck and press "WAFER LOCK". The substrate should not move rotationally.
   ii. Press "ALIGN" to bring the camera over the substrate.
   iii. Use the directional buttons (forward, back, left, right, CW, CCW) on the right panel to align the cut reticle to the cut location on the substrate.
   iv. Once properly aligned, press "SINGLE CUT" to make a cut of length "DIM 1" or "AUTOCUT" to make multiple cuts as set up in the program parameters.

e. Unload substrate and power off saw and utilities.
   i. Once all cuts are complete, turn the spindle off press "STOP/RESET" on the spindle controller. Once the spindle has stopped, press "ON SPINDLE OFF". Wait until the red light stops blinking.
   ii. Turn off the spindle controller.
   iii. Press "RESET".
   iv. Press "WAFER RELEASE" and remove substrate and blue tape.
   v. Turn off monitor, saw power, vacuum, air, and water (in that order) the same way they turn on.

V. SIGNATURES AND REVISION HISTORY

a. Author of this document: Ethan Morse
b. Author Title or Role: Student Technician
c. Date: 14 August 2018
d. Revision: D

Approvals:

Technical Manager Signature:____

Date: ____

Revision History:

Revision	Author	Date
Original Issue	L. Rehn	7/24/2015
Rev A	L. Rehn	9/1/2015
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Rev E	J. Woo	03/17/2020
Rev F	J. Woo	03/08/2021

Figures

Figure 1: A wafer placed on the blue tape with excess tape cut off.

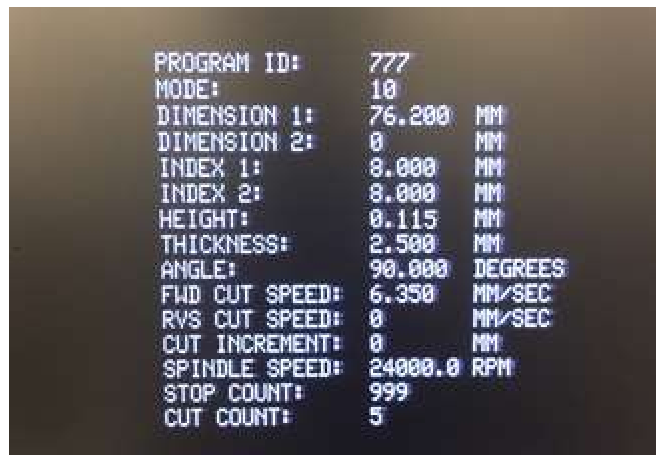

Figure 2: The program screen using metric units

Figure 3: Correct placement of gauge block for chuck zeroing.

Appendix A: Program parameters and descriptions

The default program is Program 300 and works well for silicon or glass samples. The cut dimensions (DIM 1 and DIM 2) will provide an extra 10 microns to the x- and y- dimensions of the desired sample.

Program: 300

MODE: 30

CUT SPEED = **TBD USER**. 2 mm/s works well for silicon and glass, while harder materials, such as sapphire, require cutting speeds as low as 0.127 mm/s

1st Index = **TBD USER** (Pass 1 cut spacing, if using auto cut. Enter “8” if single cut will be used.)

2nd Index = **TBD USER** (Pass 2 cut spacing, if using auto cut. Enter “8” if single cut will be used.)

ANGLE: 0-90°

CUT INC (Cut increment): 0 mm (For thick or hard samples. It is an incremental depth when making multiple cuts per street. Utilizing this function significantly lowers the stress on the spindle, allowing cuts on thick or hard samples without damaging the blade.)

STOP COUNT = 999 CUT COUNT = XXX

HEIGHT = 0.115 mm (Distance between bottom of cut and the chuck. 0.115 mm is enough to cut through the sample and into the blue tape without risk to cut through the tape and into the chuck.) If you want to just score the sample, choose a larger value.

THICKNESS (of your sample or wafer plus the blue tape) = actual sample thickness + 0.5 mm, for example: 1.5 mm for 1 mm sample or 1.0 mm for 0.5 mm. This is the distance above the sample at which the alignment step takes place.

DIM 1 & DIM 2 = **TBD USER**, Sample length, or Wafer size + 10 mm (for example 25.4 mm + 10 mm = 35.4 mm for 1 inch sample)

SPL SPEED (spindle speed) = For Si, 20,000 rpm is recommended. Use lower speed for harder samples. Do not exceed 24,000 rpm.

See the Model 1100 Operating Manual for more detailed programming instructions.