INTRODUCTION TO SPINNER

GENERAL: Spin Processor (Spinner) is designed to coat thin organic films on various substrates.

LID INTERLOCK: A lid interlock is provided to disable the spin processor's motor operation when the lid in the open position. If the lid is opened while running a program, the program will be interrupted and the chuck ration will slowly stop. This condition is noted by a flashing "LID" indicator on the second line of the LCD display. The program can be continued from the point at which it stopped by closing the lid and pressing the RUN/STOP key.

VACUUM INTERLOCK: The vacuum condition must be met to allow the operation of spinner. If this condition has not been met, a blinking "VACUUM" indicator will appear on the first line of the LCD display. Press the VACUUM button on the keypad to turn on/off the vacuum valve. Also, the vacuum interlock ensures that adequate vacuum is applied to the substrate for proper holding force and to prevent chemicals from being pulled into the vacuum system. NOTE: A blinking value (measured in inches of Hg) of the vacuum applied to the substrate is an indication that this requirement has not been met. Without proper vacuum, a process cannot be started.

LCD DISPLAY:

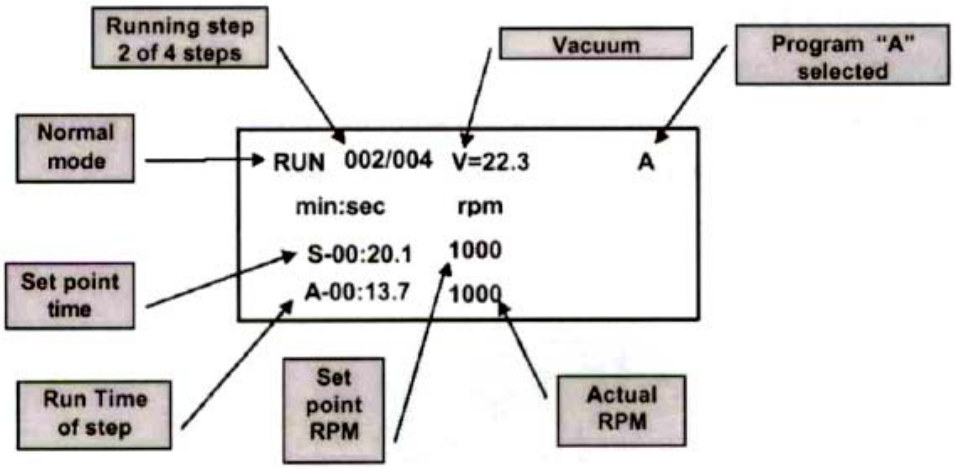

Figure 1. LCD Display in Run Mode

LINE 1 OF THE LCD DISPLAY:

- MODE: Displays either RUN, OFF, or END, in the upper left corner during normal operation. It will display PGM during "programming" mode. "Run" mode is entered when the RUN/STOP key is pressed and all interlocks are satisfied. Pressing the F1 key while the indicator displays OFF or END will allow changing between the "program" and "run" modes. The "program" mode is used to modify or display the information for each step in a program.
- STEP: Displays the present step number and the total number of steps in the selected program (e.g., 001/003). Currently up to fifty-one steps can be entered for each of the twenty programs.

- V: Indicates the vacuum on the wafer in inches of Hg "VACUUM" will flash if the vacuum valve is off. The vacuum interlocks must be satisfied for the spinner to operate. If insufficient vacuum is detected, the value will be flashing. Pressing the VACUUM key will toggle the vacuum valve from "off" to "on."
- PROGRAM SELECTED: The present program is shown in the upper right corner of the display. The program is indicated with the letters A – T.

LINE 2 OF LCD DISPLAY: The second line of the display has headings for information displayed on the third and fourth lines. In normal operation, the headings are **min:sec** for the time of each step, **rpm** for spin speed in revolutions per minute. Additionally, error messages or conditions will be displayed at the end of this line. An error example would be when spinner's lid is left open – the messaged LID will blink here.

LINE 3 OF LCD DISPLAY: The third line of the LCD display indicates the "set" data programmed for TIME and RPM for each step in a program.

- **S**: Indicates set point values.
- **min:sec**: Displays the set point time in minutes and seconds for each step in a program.
- **rpm**: displays the set point RPM for each step in a program.

LINE 4 OF LCD DISPLAY: The fourth line of the LCD display indicates the "actual" data for TIME and RPM foe each step in a program.

- **A**: Indicates actual values.
- **min:sec**: Displays the run time in minutes and seconds for each step in a program.
- **rpm**: Displays the actual RPM during each step in a program.

KEYPAD:

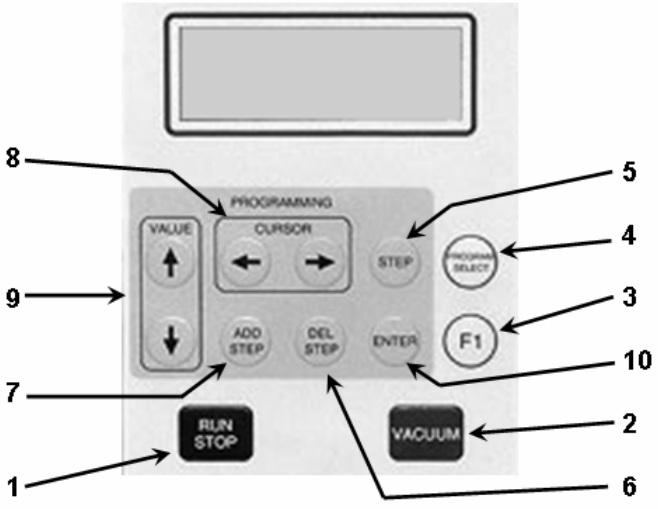

Figure 2. Keypad

1. **RUN/STOP:** This key is used to initiate or terminate a programmed sequence. While a program is running, the mode display will indicate RUN. Note: END indicates that a complete program has run one time and will persist until the lid is opened or another program selection is made.

2. **VACUUM:** This key toggles the vacuum on and off.

3. **F1:** This special function key is used to select other modes. Pressing the F1 key will place the spin processor in the "programming" mode (PGM will be displayed).

4. **PROGRAM SELECT:** This key is used to select the desired program to be run or modified and is disabled while a program is running. Pressing this key ascends or descends to the next program selection. The selection is controlled by using the up and down direction keys, ↑ for A, B, C, and ↓ for C, B, A.

5. **STEP:** (active in PGM mode only): This key is used to advance a program sequentially through its steps. STEP is used during the programming cycle to enter and view set values for each step. This key is always active when in the "program" mode.

6. **DEL STEP:** This key is only activated in the "program" mode and is used to delete a step from the program indicated in the **PROGRAM SELECT** area of the display. When pressed, a flashing *delstep* message will appear in the "actual time" area of the display. If the **ENTER** key is pressed within 5 seconds to acknowledge the command, the last step of the selected program will be deleted from the program, otherwise it will not be deleted.

7. **ADD STEP:** This key is only activated in the "program" mode and is used to add a step to the program indicated in the **PROGRAM SELECT** area of the display. The step area of the display will be updated to the new number of steps in the program. Pressing the **STEP** key will advance to allow programming of the new step.

8. **Cursor ← (left) and → (right):** The cursor arrow keys are used to position a blinking cursor over set point data to be changed (i.e., TIME, RPM, and ACCELERATION).

9. **Value ↑ (up) and ↓ (down):** During "program" mode or "setup" mode these keys are used to change values highlighted by the blinking cursor. Limits are placed on certain parameters that match the performance of the system. Motor speeds (RPMs) that exceed the capability of the installed motor cannot be programmed. In the "run" mode these keys are used to select the method of counting of the "run time" indicator and direction of the **PROGRAM SELECT** key. The ↑ key selects the elapsed time mode while the ↓ key selects the time remaining mode.

10. **ENTER:** When deleting a step, it is used in conjunction with the **DEL STEP** key to acknowledge the command.

PROCEDURE FOR SPINNER

RUN PROGRAM:

1. Select the program letter (A – T) to be run using **PROGRAM SELECT** key (see figure 2).
2. Make sure the speed, acceleration, time, and number of steps are correctly entered.
3. Center wafer on the vacuum chuck of the spinner.
4. Turn on vacuum by pressing **VACUUM** key (see figure 2).
5. Spin manually – if eccentric spinning, continue until wafer is centered.
6. Close lid.
7. Apply resist/HMDS onto centered wafer.
8. Press **RUN/STOP** key

PROGRAMMING:

1. Select a program letter (A – T) to be modified by pressing **PROGRAM SELECT** key.
2. Make sure no one is using this program.
3. Press **F1** key to go to "programming" mode.
4. Use **ADD STEP** and **DEL STEP** keys to select the number of steps necessary in the program.
5. Use **Cursor ← (left) and → (right)** keys to position the cursor over the value to be changed.
6. Use **Value ↑ (up) and ↓ (down)** keys to change set point values.
7. Repeat steps 5 and 6 until all parameters for a given step have been entered.
8. Use **STEP** key to advance to the next step.
9. Repeat steps 5, 6, and 8 until all steps have been entered.
10. Use **STEP** key to step through the program and verify correctness of all values.
11. Press **F1** key to return to "run" mode.

Note: The location of the speed and acceleration are shown below.

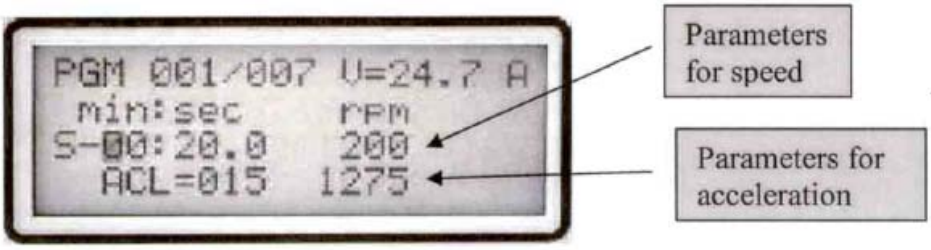

Figure 3. LCD Display in Programming Mode