

5.5 PROGRAMMING THE 6800



Figure 5-2: Control Panel

5.5.1 CONTROL PANEL

The 6800 Spin Coater has the following controls:



(Up Arrow): Press the up arrow to increase a selected value or to toggle through the menu.

ENTER: Press the Enter button to make a selection.



(Down Arrow): Press the down arrow to decrease a selected value or to toggle through the menu.

5.5.2 OPERATIONS

5.5.2.1 Understanding Recipe Parameters

The following are changeable recipe parameters:

- **Recipe #:** This selects the recipe the machine will run.
- **Ramp:** This sets the length of time it will take the chuck to reach the set RPM from the current RPM.
- **Dwell:** This sets the length of time the spin coater will run at the selected RPM.
- **RPM:** This sets how fast the chuck will spin.
- **Dsp_Type:** This sets the dispense type. This is also used to set the chuck size in Step 0 only.

The following dispense type options are available for 6808P and 6812P Spin Coaters only:

- **1, 2, 4, or 6**
Note: For use with Step 0 only. Set the chuck size appropriately.
- **Edge**
- **Solv**
- **N2**
- **Coat**
- **None**

Dsp_Time: This sets the length of time the dispense function will turn on.

5.5.2.2 To Run a Recipe:

1. Press ENTER on the Run screen.

5.5.2.3 To Stop a Recipe:

1. Press the down arrow on the Run screen.
The recipe will be reset, the chuck will stop spinning, and the display will show an error.

5.5.2.4 To Select a Different Recipe:

1. Press the up arrow on the Run screen.
The Select Recipe screen will appear.
2. Press the up and down arrows to select a recipe.
3. Press ENTER.
The Select Step screen will appear.
4. Press the down arrow to select Run Recipe.
5. Press ENTER.
The Run screen will appear and the new recipe will be selected.

5.5.2.5 To Edit a Recipe:

1. Press the up arrow on the Run screen.
The Select Recipe screen will appear.
2. Press the up and down arrows to select a recipe to edit.
3. Press ENTER.
The Select Step screen will appear.
4. Use the up and down arrows to select a step to edit.
Note: To clear every step in a recipe, select Clr Recipe and hit ENTER.
5. Press ENTER.
The Edit Step screen will appear.
6. Use the up and down arrows to select an item to edit.
7. Press ENTER.
The value for the item can now be adjusted using the up and down arrows. Once the desired value is selected, press ENTER again.
8. Repeat Steps 6–7 until the recipe step is edited as desired.
9. Repeat Steps 4–8 until the recipe is edited as desired.

5.5.2.6 To Set the Chuck Size:

1. Press the up arrow on the Run screen.
The Select Recipe screen will appear.
2. Press the up and down arrows to select a recipe.
3. Press ENTER.
The Select Step screen will appear.
4. Use the up and down arrows to select Step 0.
5. Press ENTER.
The Edit Step screen will appear.
6. Use the up and down arrows to select Dsp_Type.
7. Press ENTER.
8. Use the up and down arrows to select **1, 2, 4, or 6.**

Designate the chuck size appropriately:

- 1:** Chucks up to 1" diameter
 - 2:** Chucks up to 2" diameter, and greater than 1" diameter
 - 4:** Chucks up to 4" diameter, and greater than 2" diameter
 - 6:** Chucks up to 6" diameter, and greater than 4" diameter
9. Press ENTER.

5.5.3 RECIPE EXAMPLE (FOR PROGRAMMABLE SPIN COATERS)

Great flexibility is available in spin coater recipes. Figure 5-3 shows RPM versus time for a recipe that demonstrates some of the different actions.

- The length of a step is shown across the bottom with an arrow. (Step 1 is 18 seconds, total.)
- Vertical lines and a number (total seconds) mark each event (start or stop of any ramp, dispense, or dwell).
- Heavy lines show the two dispense operations.
- The numbers at the left show the speeds (RPM) used in this recipe.
- Boxes across the top illustrate the recipe entries for the seven steps.

Note some of the special capabilities accomplished by the recipe:

- Long periods of the same function can be accomplished using multiple steps (Steps 3 & 4).
- Sudden speed changes are accomplished by setting Ramp time to zero or a very low number (Step 5). The actual time required is a function of the size of speed change and the amount of weight being spun.
- Pauses at zero RPM can be programmed into the middle of a recipe (Step 5). It is even possible to program a dispense step at zero RPM if desired.
- Dispensing (option): Two dispense options can be employed, one right after the other and at the same RPM (Steps 1 & 2). They could follow more closely if Dwell 1 were set to 4 instead of 10.
- Ramps to different speeds and employing different Accel/Decel rates can be combined (Steps 6 & 7).

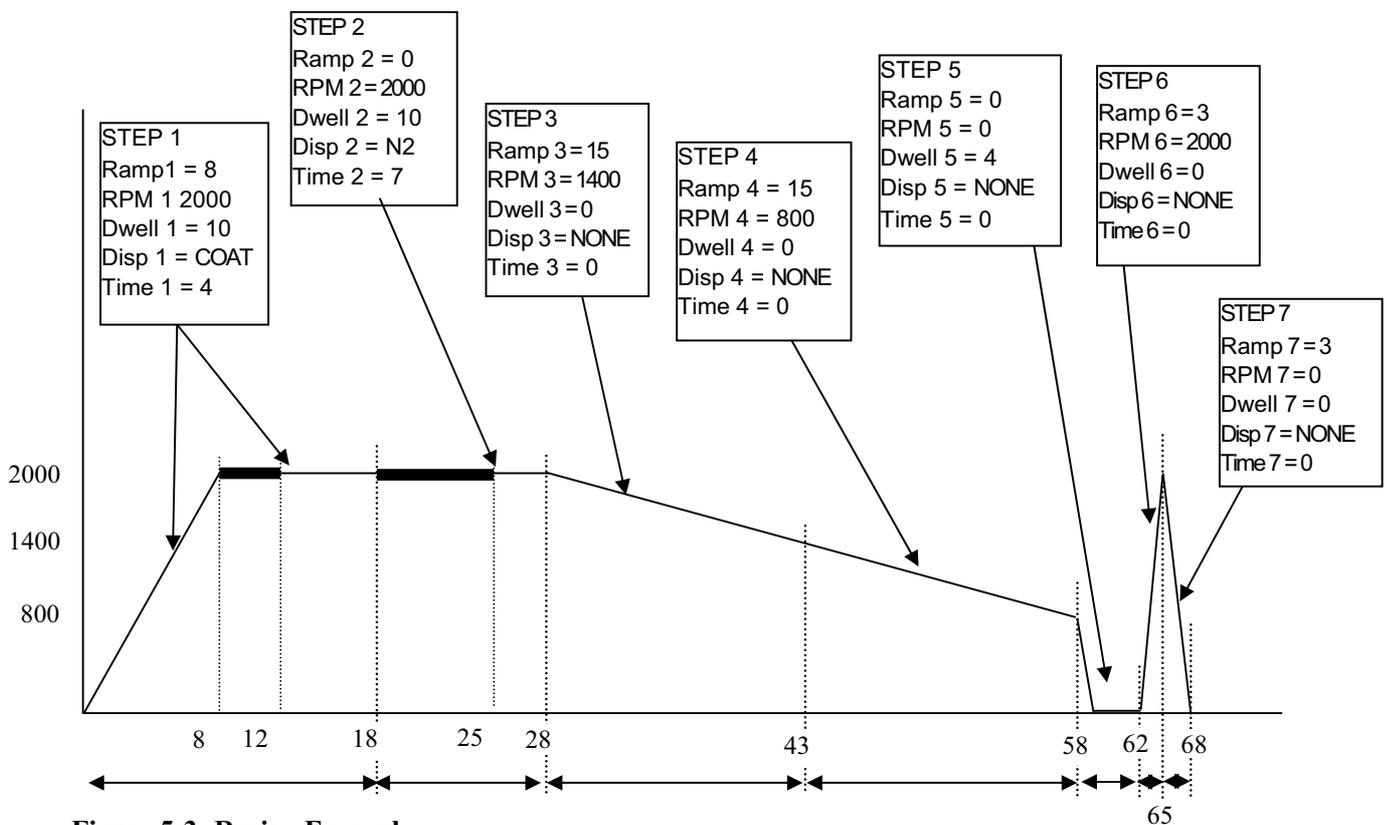


Figure 5-3: Recipe Example

The following is a detailed explanation of each step from the Recipe Example illustrated in Figure 5-3.

Note: Settings are numbered according to the step in which they are being used. For example, the settings in Step1 are called Ramp1, RPM1, Dwell1, etc.

Step 0 is the step that tells the spin coater *how large the vacuum chuck is*. Enter the size in the Disp blank by selecting the number that (most nearly) represents the diameter of the chuck. **Homing:** to stop the chuck from returning to the Home position at the end of the run, set the step 0 Time to some number other than 0.

Step 1 begins with a Ramp1-- 8 seconds up to an RPM1 of 2000. Dwell1 is set to keep the speed at 2000 for 10 seconds. Disp1 is set to COAT; the dispensing always begins as soon as the dwell does. The dispensing Time1 is 4 seconds (as shown by the heavy line), and the dwell continues until its 10 seconds is up.

Step 2 begins at 18 seconds. It has no Ramp2 time and also has the same speed (2000 RPM) so it appears to be a continuation of step 1. Its Dwell2 is set to 10 seconds (combined with step 1 this gives a total dwell of 20 seconds at 2000 RPM). Disp2 is set to N₂ and the Time2 is 7 seconds (of N₂ dispensing).

Step 3 begins at 28 seconds on the figure, and has a 15-second Ramp3 down to an RPM3 of 1400. The Dwell3 is set to 0 seconds and there is no Disp3. NOTE that this is half of a 30-second ramp down to 800. Since a 30 second long ramp is not possible, the programmer used two 15-second ramps.

Step 4 is the continuation of the ramp down. The Ramp4 is 15, and the RPM4 is 800.

Step 5 tries to cause an instant stop, followed by 4 seconds without any spinning. The Ramp5 is 0, and the RPM5 is 0. The Dwell5 is set to 4 seconds. If the motor can stop quickly enough, the cycle will continue—if the momentum is too great and the motor cannot stop quickly enough, there will be a “Motion Error.: See the error messages on following page. To avoid the motion error, set Ramp5 to allow a short amount of time for the ramp down

Steps 6 & 7: consist of two ramps with no dwell time. RPM6 simply goes up to 2000 in the Ramp6 time of 3 seconds and RPM7 takes it back down to 0 in the Ramp7 time of 3 seconds. If necessary, the Ramp could be set to longer times, to avoid the motion error.

5.6 ERROR MESSAGES

If the display light does not come on after connecting the power and turning on the power switch, check that the N₂ or clean, dry air is connected and has a pressure of at least 2 psi. Correct the cause of the error and press the down arrow to ready the machine for operation.

| Error Message | Reason | Remedy |
|---------------------|--|--|
| CHECK VACUUM | Unable to hold vacuum. | Make sure object is on the chuck. |
| | No vacuum present. | Check the vacuum line connection. |
| SHORT CYCLE | Unable to complete the process or the lid was opened during a cycle | To start a new cycle, clear the error, open/close lid. |
| | Loss of vacuum. | Check connections. |
| | Stop button is pushed during a cycle. | To start a new cycle, clear the error and open/close the lid. |
| MOTION ERROR | Motor could not follow the instructions given by the Recipe. | Accel./Decel. time too short; allow more time. |
| | Error in speed sensing circuitry. | Electronic or encoder problem. Machine servicing is necessary. |
| LID OPEN | The lid sensor detected that the lid is open. | Close the lid or fix the switch. |
| REMOVE COATED PARTS | Not an error, but a reminder that the cycle is complete and coated parts need to be removed. | Open lid and remove parts. |

Note 1: When a Motion Error occurs, power to the motor is cut and the chuck coasts to a stop.

Note 2: An interrupted recipe cycle cannot be resumed.

5.7 TROUBLESHOOTING

| PROBLEM | POSSIBLE CAUSE | ACTION |
|--|--|---|
| Spin coater will not power up. | A N ₂ or clean, dry air purge is not present, or inadequate flow. | Verify or provide a N ₂ or clean, dry air purge. Have maintenance check sensor FLS-1. |
| Cycle will not start | Error from previous cycle. | Press the down arrow to clear the error. |
| | No recipe programmed. | Select a recipe. |
| | Vacuum not present. | Verify or provide necessary vacuum. Have maintenance check sensors FLS-1, VS-1. |
| | Lid open/close not sensed, or lid still open. | Open and close lid. Have maintenance check sensor S1. |
| Cycle starts, but immediately stops | Vacuum lost. | Check placement of substrate on chuck, and check vacuum supply. |
| | Recipe problem. | Review, edit, and re-enter recipe as needed. |
| Displayed time or RPM does not seem exact. | The display is an approximation, only updated when the control circuitry has available time. Use it only to verify the correct recipe choice and steps, and as a rough report on time and speed. | For exact timing and speed, use external test equipment and adjust the recipe as needed. Actual performance is very repeatable. |
| Recipe "breaks" when changing speed. | Rapid speed changes are hard with the larger chuck. If the motor cannot keep up with the instructions, a Motion Error occurs. The motor spins freely until it comes to a halt, and the error message is shown. | Change the recipe to allow a more gradual speed change. |

5.8 SHUTDOWN

1. Turn off the power switch (located on the facilities panel).
2. Turn off N₂.
3. Carefully remove the vacuum chuck.
4. Clean the vacuum chuck and bowl thoroughly using the proper solvents.