
Cee[®] 300X Precision Spin Coater



Operator/User Manual

New users: Read this manual in its entirety before operating the equipment.

© 2017 Cost Effective Equipment LLC



1. Machines Covered

This manual covers the Cee™ Model 300X series machines. It is to be used to install, operate, and troubleshoot this model Spin Coater.

2. Table of Contents

1. Machines Covered	2
2. Table of Contents	2
3. Introduction to the Model 300X	4
3.1 Dimensions	4
3.2 Programmability	4
3.3 Precision	4
3.4 Reliability	4
3.5 Bowl Design	5
3.6 Utilities	5
4. Equipment Description	6
4.1 System Specifications	6
4.2 Model and Revisions	7
4.3 Safety Hazards/Precautions	7
4.3.1 Overview of Equipment-Specific Hazards	7
4.3.2 Electrical	7
4.3.3 Mechanical	7
4.3.4 Chemical	8
4.3.5 Lockout/Tagout Procedures and Information	8
4.3.6 Intended Use of Machine	8
4.4 Installation	9
4.4.1 Facilities Requirements	9
4.4.2 Environment	9
4.4.3 Unpacking/Inspection	9
4.4.4 System Installation and Setup	9
5 Software	10
5.1 Run Screen	10
5.1.1 Startup with Passwords Enabled	10
5.1 Run Screen	11
5.2 Spin process Page	12
5.2.1 Field definitions:	12
5.4 Centering a Substrate	15
5.5 Starting the Process	16
5.6 Aborting a Process	16
5.7 Process Complete	17
5.8 Running Multiple Iterations	17
5.9 Edit Screen	18



5.10	Writing a Spin Recipe	20
5.10.1	Entering data	20
5.10.2	Recipe Management.....	22
5.10.3	Recipe Backup.....	22
5.10.4	Desktop Recipe Editing.....	23
5.11	DiagScreen	24
5.11.1	Spin Diagnostics Screen.....	25
5.11.2	Configuration Screen	27
5.11.3	Spin Configuration Screen	28
5.11.4	Naming Dispenses on the Spin Config Screen	29
5.11.5	Selecting Empty Sensors on the Spin Config Screen	30
5.11.6	Password Configuration Screen	30
5.11.6	Password Configuration Screen	31
6	Navigation Bar	32
6.1	Run	32
6.2	Edit.....	32
6.3	Diag	32
6.4	Config	32
6.5	Help	32
6.6	Back.....	32
7	LIVE Update feature.....	33
7.1	Limitations of LIVE Update Mode.....	35
8.	Service & Maintenance	36
8.1	Maintenance – Vacuum Liquid Trap	37
8.2	Spin Chuck Replacement.....	37
8.3	Troubleshooting Chart	38



3. Introduction to the Model 300X

3.1 Dimensions

- 27.75" (70.5 cm) W x 34.75" (88.3 cm) L x 20.25" (51.5 cm) H
- Machine weight: 115 lb (52.2 kg)
- Shipping weight: 250 lb (113.4 kg)

3.2 Programmability

- PC-controlled
- PC-based touch screen interface and display
- Full-color alphanumeric-capable graphical user interface (GUI)
- 250,000 process recipe programs on board
- A virtually unlimited number of user-defined recipe program steps
- 0.1-second resolution for step times (9,999.9 seconds max step time)
- Spin speed: 0 to 6,000 rpm (3,000 rpm option/no charge)
- Spin speed acceleration:
 - 0 to 30,000 rpm/s unloaded
 - 0 to 23,000 rpm/s 200-mm substrate
 - 0 to 3,000 rpm/s 6" x 6" x 0.250" photomask recessed chuck
- Connectivity: USB/ethernet port for communications for uploading/downloading process parameters with offline firmware standard (offline recipe number and steps unlimited)
- System capable of controlling third-party host software of high-end IDI / Cybor / Mykrolis positive displacement pumps
- Simultaneous dual automated dispense capability
- Bi-directional speed control/oscillating chuck
- Iteration software (recipe looping)
- Dispense or component outputs: 50
- Security: Password protection option available at no charge
- In process/dynamic speed/acceleration control

3.3 Precision

- Spin speed repeatability: < 0.2 rpm
- Spin speed resolution: < 0.2 rpm
- Substrate sizes: < 1 cm to 450 mm round; 14" x 14" square

3.4 Reliability

- Indirect drive system protects the spin motor from contact with process chemicals and solvents
- Vacuum and lid interlock standard
- Industry-leading reliability and uptime
- 1-year full warranty on parts and labor
- Free remote technical support (phone, email, fax) for the life of the product
- Application process assistance for life of the product



3.5 Bowl Design

- Stainless steel bowl (for all stainless steel construction)
- Optional polyethylene splash ring
- Closed and optional open lid designs for process flexibility
- Drain and exhaust ports located in the bottom of bowl
- Optional nitrogen purge for an inert spin environment

3.6 Utilities

- Voltage ranges: 208-240 VAC, 50/60 Hz
- Power requirements: 655 watts
- Drain port: 3/4" OD
- Exhaust port: 1" OD
- Vacuum: 25" Hg
- Exhaust: 50 cfm at 0.2" water
- Nitrogen or CDA (for automated dispenses): 70 psi



4. Equipment Description

The Cee® 300X precision spin coater delivers track-quality performance, with revolutionary interface capabilities and the utmost in chemical compatibility, in an efficient, space-saving design.

Fully programmable and user-friendly, the Cee® 300X precision spin coater features the accuracy and repeatability needed to eliminate processing variability from critical experiments. With its convenient compact footprint, wide array of chemical compatibility, and durability, this easy-to-use benchtop system will provide years of high-performance operation, making the Cee® 300X purchase a smart and cost-effective decision.

4.1 System Specifications

Maximum Spin Speed	(3000)(4000)(6000)	RPM/s
Maximum Ramp	30000	RPM/s
Speed Accuracy	<0.2 RPM	RPM/s
Maximum Substrate that will fit in the bowl	450	mm
Recipe Storage	Virtually Unlimited	Recipes
Power	220	Volts AC- Single Phase
Weight	115	Pounds



4.2 Model and Revisions

The model and serial number information for the Cee™ 300X are located on the rear panel near the power inlet. Software version information can be found on the Main screen. See [Software](#) for screen shots and a detailed explanation of the system software.

4.3 Safety Hazards/Precautions



Read this manual in its entirety before operating the machine.

4.3.1 Overview of Equipment-Specific Hazards

The unit is very heavy and proper precautions should be taken when handling the machine to minimize risk of injury. Labels are placed on the machine to identify areas where caution is needed during operation.

4.3.2 Electrical



General Hazard



Pinch Point Warning



Notes



High voltage is present in the machine. Disconnect the power before servicing.



Stored electrical energy is present in the machine. Before servicing allow sufficient time for discharge. The servo amp has a charge light; do not service the machine until this light has gone out.

4.3.3 Mechanical



This machine uses compressed gasses, which can provide motive force for components and can expand violently upon decompression. Disconnect N2 or CDA before removing any panels.



The machine is capable of very high-speed rotation. Ensure all lids and panels are in place before rotating these devices.



Ensure that all panels are on and in their correct locations before powering up or operating.



When opening the lid be aware of the pinch point at the hinge cover. Open the lid only by using the handle on the lid.



The unit is very heavy and proper precautions should be taken when handling or moving the machine to minimize risk of injury.



4.3.4 Chemical

-  Ensure chemical compatibility of all chemicals and materials being used inside the machine. This includes all wetted parts of the storage, supply, dispense, and waste systems.
-  Ensure chemical compatibility of all chemicals with each other. All dispensed materials are held in one common waste storage tank. Check for reactions between chemicals before use.
-  Flammable Chemicals. No open flames/sparks.
-  Relieve pressure before opening canisters, tanks, cartridges, or syringes to refill.
-  Relieve pressure and shut off chemical valves before servicing supply lines, dispense valves or other components.
-  Relieve pressure and shut off chemical valves before removing spin lid or changing BSR tubes, EBR tubes, or any other dispense nozzle or spray tip.
-  Flush tubing and valves with an appropriate solvent and drain system before servicing.
-  When draining waste tank, use appropriate containers and connection methods.
-  Ensure proper ventilation/exhaust is used at all times.
-  Always wear the proper Personal Protective Equipment for the job. This includes safety glasses, gloves and other equipment as needed to protect from mechanical and chemical hazards.

4.3.5 Lockout/Tagout Procedures and Information

Before servicing, turn off the machine and remove the power inlet cord by disconnecting the plug where it enters the machine.

4.3.6 Intended Use of Machine

The Cee™ Model 300X is intended for use as a Semiconductor/Optical application spin coating machine. It is primarily intended for substrates up to the maximum size.

The Model 300X is not intended for use in food or medical applications or for use in hazardous locations.

The Cee™ Model 300X is intended for use only by properly trained personnel wearing the proper personal protective equipment. Anyone not trained in the proper use of the Model 300X and have not fully read this manual should not operate the equipment. The Cee™ Model 300X is intended for use in a cleanroom environment to provide the proper processing conditions for the substrates. If it is used outside of a cleanroom environment, the substrate cleanliness may be compromised.

The Cee™ Model 300X is not intended for use in a hazardous or explosive environment.



4.4 Installation

4.4.1 Facilities Requirements

The Cee™ 300X requires the following utilities for operation.

- Single Phase 208-240V AC at 15 Amps
- Vacuum Supply at 20 in Hg
- Nitrogen Supply at 45psi to 55psi (Auto Dispense and Bake Proximity)
- Exhaust Port 1 Inch OD
- Drain Port 3/4 Inch OD

4.4.2 Environment

The Cee™ 300X should be operated in a clean, low humidity environment.

4.4.3 Unpacking/Inspection

Thoroughly check machine for shipping damage. If physical damage is seen, **DO NOT APPLY POWER!** Contact Cee™ immediately.

The following items should be included with the shipment.

- (1) Cee™ 300X
- (1) Power Cord with female power connector
- (1) Anodized Aluminum Stylus
- (1) User & Installation Manual

Optionally included items:

- Spin Chucks with Screws
- Dispense Controllers
- Dispense Valves
- Dispense Nozzles
- Dispense Hubs

4.4.4 System Installation and Setup

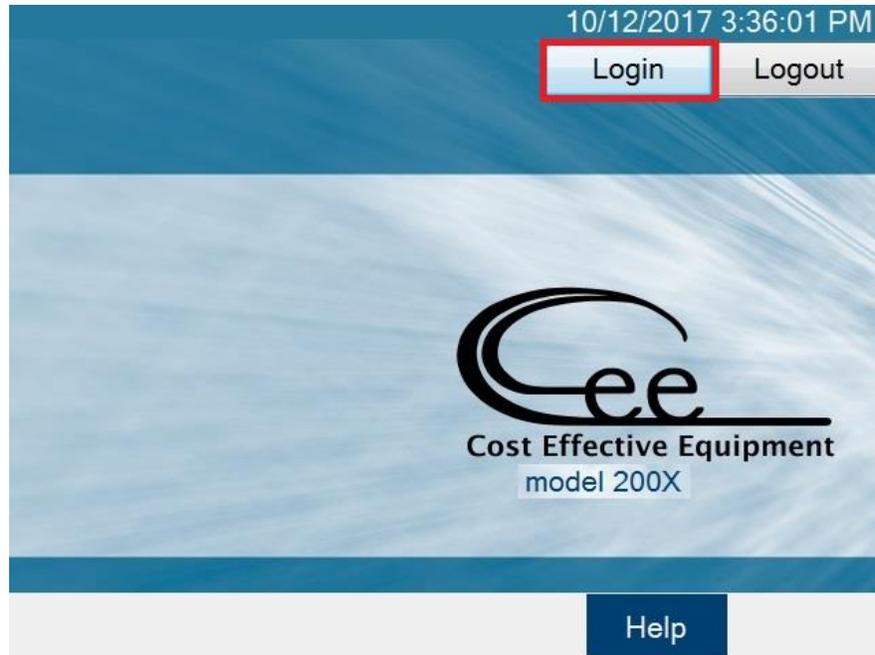
- (1) Lift the unit out of the packing crate by grasping the bottom only. **Do not** lift the by any of the top covers or protrusions. **Do not** roll or turn the unit on its side or ends.
- (2) Remove plastic wrap and packing foam.
- (3) Place Cee™ Model 300X on a table of proper height and strength so that the controls and spin chuck are at the proper ergonomic height.
- (4) Level the machine using the feet so that the spin chuck is level front-to-back and side-to-side.
- (5) Thoroughly clean the spin bowl and spin chuck.
- (6) Connect vacuum, N2, drain, and exhaust lines.
- (7) Plug in the machine.
- (8) Once plugged in, only the cooling fan should be powered, not the display or bake plate.
- (9) Switch ON the ON/OFF Power Switch.
- (10) Display should momentarily show boot screen and then show main screen. Please be patient for booting process to complete.



5 Software

5.1 Run Screen

5.1.1 Startup with Passwords Enabled



The Run Screen is the first screen that you will see when you start the software. If the 300X unit has passwords enabled, the beginning screen will be blank with login and logout buttons.

To login, press the Login button in the upper right of the touch-screen and this will bring up the keyboard to enter your password. By default, the passwords for a 300X are:

Super User Level:	CEE
User Level:	200X
Maintenance:	DIAG



5.1 Run Screen

Once logged in, or if passwords are not enabled, this is how the Run Screen looks.



From here you can get the Spin Processing Screen by pressing the large buttons in the left-center of the screen. It is also possible to navigate to other windows by using the navigation Bar.



5.2 Spin process Page

This is the page where Spin processes are run and monitored on the 300X Model software.



The controls and indicators from the Spin Process page are listed here, for instructions on how to run a spin process go to the next page.

5.2.1 Field definitions:

1. **Recipe Name:** The name of the currently loaded recipe.
2. **Live Update:** This button allows the user to update the process currently running. The button is only active during an active process. More info on Live Update is available on the ToDo LIVE Update section. (Live update is not available on all models.)
3. **Load:** This button brings up the TODO Recipe Select Screen to select for processing.
4. **Edit Recipe:** This button will navigate to the Spin Process Editor if a recipe is loaded. If a recipe is not loaded, it will go to the TODO Recipe Select Screen.
5. **Lid Closed:** A lamp showing the state of the Lid Closed sensor.
6. **Substrate Present Indicator:** A lamp showing the state of the Spin Chuck Vacuum sensor.
7. **Step Indicator:** Shows the current step of the process.
8. **Time Indicator:** Shows the time remaining on the current step.
9. **Speed indicator:** Shows the current speed of the spindle
10. **Exhaust Indicator:** Shows the current setting of the programmable exhaust. (Programmable Exhaust not available on all models)
11. **Dispense indicators:** Illuminated button shows which dispenses are currently activated.
12. **Iteration Setting:** This setting allows the currently selected process to run consecutively the entered number of time without stopping. (Iteration processing not available on all models)

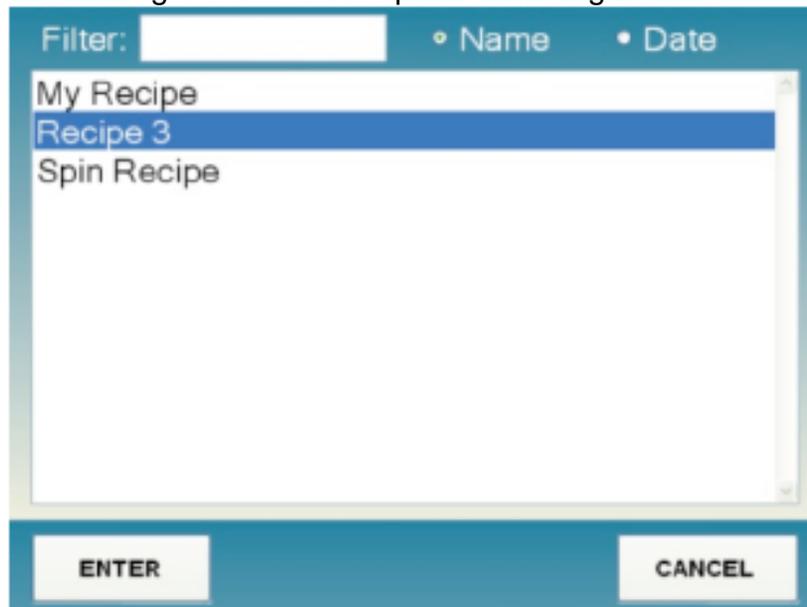


-
13. **Process Button:** The process button has four modes;
- a. **Start Centering:** This mode starts the wafer spinning very slowly to check for centering on the Spin Chuck.
 - b. **Start Process:** This mode starts the selected process.
 - c. **Abort:** This mode aborts a currently running process.
 - d. **OK:** This mode turns off the process complete buzzer.
14. **Vacuum Hold / Release button:** this button allows the user to actuate the vacuum of the spin chuck as they center the substrate.





To run a substrate, first a recipe must be loaded. Pressing the Load button will bring up the Recipe Selection Screen. A recipe may be selected by double clicking on the desired recipe or selecting the desired recipe and clicking Enter.



5.4 Centering a Substrate

The Cee 300X has 2 methods of centering a substrate. The Centering Time parameter set on the Spin Config screen determines the method used.



The screenshot shows the 'User Spinner Configuration' interface. The top bar displays the date and time: '2/24/2010 3:07:56 PM'. The interface is divided into two main sections: 'Dispense Config' and 'Config'. The 'Dispense Config' section contains a table with 7 rows, each representing a dispense station. The 'Config' section contains several parameters for centering: 'Centering Speed' (20 rpm), 'Centering Time' (2 sec), 'Idle Exhaust' (100%), and a checkbox for 'Enable Vacuum Chuck'. At the bottom of the screen, there are navigation buttons: 'Run', 'Edit', 'Diag', 'Config', 'Help', and 'Back'. Additionally, there are 'Revert' and 'Save' buttons located below the 'Config' section.

Num	Name	Has Empty
1	Dispense 1	None
2	Dispense 2	None
3	Dispense 3	None
4	Dispense 4	None
5	Dispense 5	None
6	Dispense 6	None
7	Dispense 7	None

Config

Centering Speed: 20 rpm

Centering Time: 2 sec

Idle Exhaust: 100%

Enable Vacuum Chuck

Revert Save

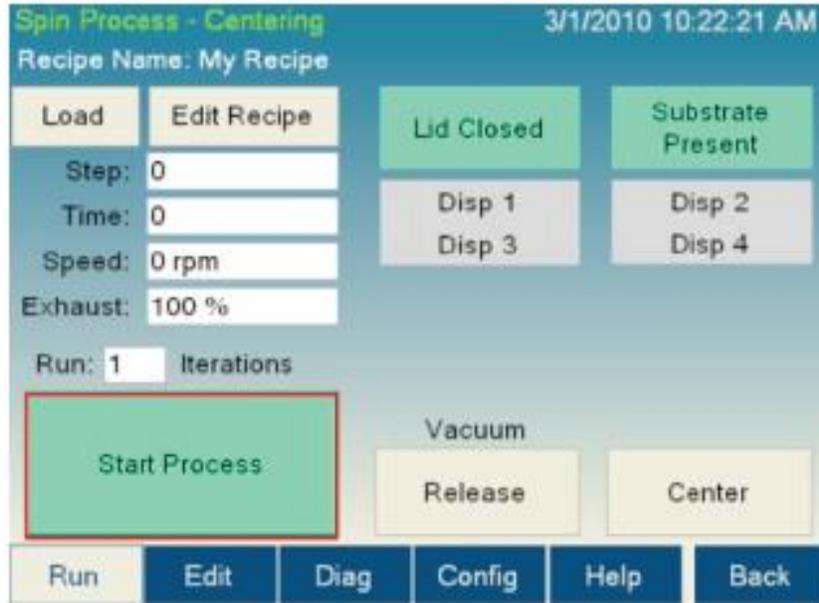
Run Edit Diag Config Help Back

If the Centering Time parameter (3) is set to 0 seconds, pressing the Start Centering button will start the Spin Chuck spinning. The Chuck will continue to spin as long as the lid is closed, if the lid is opened the Chuck will stop spinning. The lid can be lifted to adjust centering as many times as needed.

If the Centering Time parameter (3) is set to a non- zero value, pressing Start Centering button will start the Spin Chuck spinning for the Centering Time value. This method has no regard for the lid position. Once completed, pressing the Center button will restart the centering process.



5.5 Starting the Process



Once the substrate is on the Spin Chuck at a desired position, pressing the Start Process button will begin the process. For the duration of the process, the lid must remain closed.

5.6 Aborting a Process



Once the process is started, the Abort button can be used to abort the process. This put the machine into a safe position for the user to recover the substrate.



5.7 Process Complete

The screenshot displays the 'Spin Process - Process Finished' interface. At the top, it shows the date and time '3/1/2010 10:25:45 AM' and the recipe name 'My Recipe'. A 'LIVE Update' button is located in the top right. The interface is divided into several sections: a left sidebar with 'Load' and 'Edit Recipe' buttons; a central area with status indicators 'Lid Closed' and 'Substrate Present' (both in green), and four display units 'Disp 1', 'Disp 2', 'Disp 3', and 'Disp 4' (all in grey). Below these are input fields for 'Step: 0', 'Time: 0', 'Speed: 0 rpm', and 'Exhaust: 100 %'. A 'Run: 1 Iterations' field is also present. A large green 'OK' button is highlighted with a red border, and a yellow 'Hold' button is below it. At the bottom, a navigation bar contains 'Run', 'Edit', 'Diag', 'Config', 'Help', and 'Back' buttons.

Once the Process is completed, the 300X will sound an audible alarm. Pressing the OK button will silence the alarm. The 300X is now ready to Center another substrate.

5.8 Running Multiple Iterations

It is possible to run a process multiple times consecutively. By entering a value greater than 1 in the Iterations field will cause the process to run the specified number of times. The tool will give a slight alarm between runs, and the processes may be aborted in normal fashion. (Iterations not available on all models)





From here you can get the Spin Recipe Edit Screen by pressing the large buttons in the left-center of the screen.

5.9 Edit Screen

This is the page where Spin Recipes are edited on the 300X.



The controls and indicators from the Spin Recipe Edit page are listed here, for instructions on how to edit a spin process go to the next page.

- (1) **Recipe Name:** The name of the currently loaded recipe.
- (2) **Load button:** This button opens the dialog to load a recipe into the editor.
- (3) **Save button:** This button opens the save dialog for saving the current recipe.
- (4) **Delete button:** This button opens the delete dialog for deleting the recipes off the 300X.
- (5) **Velocity Column:** This box is where Velocity data is entered for each step in



-
- RPM's.
- (6) **Ramp Column:** This box is where Ramp data is entered for each step in RPM/sec.
 - (7) **Time Column:** This box is where the length of each step is entered in seconds.
 - (8) **Dispenses Column:** This box opens the dialog which allows you to select which dispenses are active for each step.
 - (9) **Exhaust:** This box is where the exhaust is selected in percentage. (Programmable exhaust not available on all models).
 - (10) **Oscillation:** This box is where the time between oscillations is entered in seconds. (Oscillation mode not available on all models)
 - (11) **Insert button:** This button inserts a blank step in front of the currently highlighted step.
 - (12) **Delete button:** This button deletes the currently selected step.
 - (13) **Clear All button:** this button clears all the data loaded in the editor.
 - (14) **Scroll Up button:** This control steps the recipe up one step.
 - (15) **Scroll Down button:** This control steps the recipe down one step.
 - (16) **Highlighted Step:** The currently highlighted step is demonstrated by a darker grey color.



5.10 Writing a Spin Recipe

The Spin Edit Screen is where Spin Recipes are written.



Recipe Manager 2/22/2010 1:37:15 PM

RECIPE Recipe Name: My Recipe

STEP	Velocity (RPM)	Ramp (RPM)	Time (sec)	Disposes	Exhaust (%)	Oscillation (sec)
1	1000	3000	10	none	100	0
2	2000	3000	10	2	0	0
3	3000	3000	10	4	25	0
4	4000	3000	10	none	100	0
5	5000	3000	10	none	100	0

Buttons: Run, Edit, Diag, Config, Help, Back

5.10.1 Entering data

By clicking on the Velocity (5), Ramp (6), Time (7), Exhaust (9), or Oscillation (10) boxes a numeric pad will appear.



Valid range: 0 to 6000

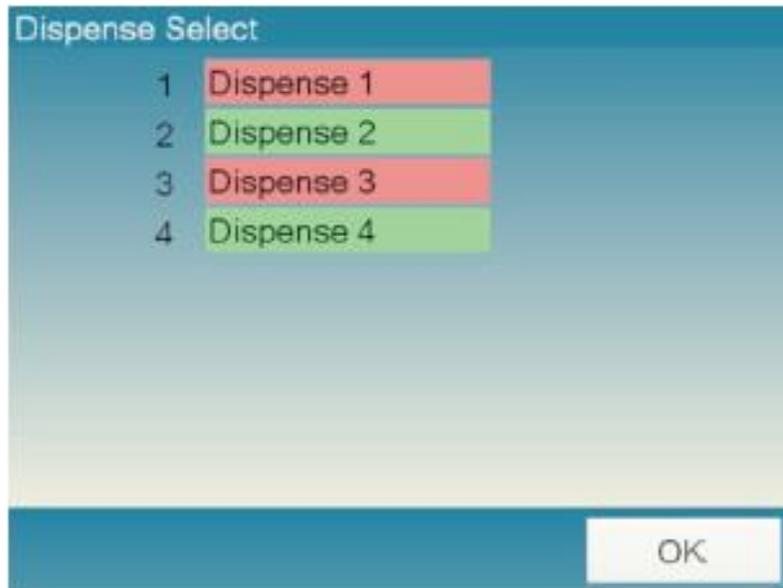
1000

7	8	9	BACKSPACE
4	5	6	DELETE
1	2	3	ENTER
-	0	.	

Using the Numeric Pad, you can now enter the parameter for the selected step. The Numeric Pad will indicate the valid range for at the top of the window. Once the desired value is entered, pressing the ENTER key will close the Numeric Pad and go back to the Spin Edit Screen with the selected value updated.



By clicking on the Dispenses box (8), a Dispense Select screen will appear.



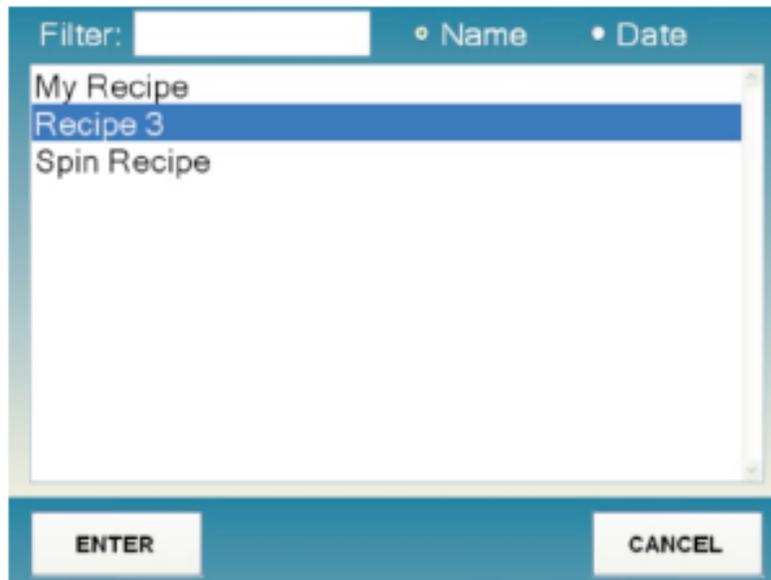
The Dispense Select screen will show all the installed dispenses on the tool. Dispenses are selected to turn on by clicking on the dispense name, clicking again will deselect the dispense. The dispenses name can be configured on the TODO Config Screen. Dispenses that will be turned on during the step will be highlighted as green, dispenses that will remain off will be highlighted in red. There is no limit to the number of dispense enabled per step. Clicking OK will return to the Spin Edit Screen, updating the dispenses box.

Spin recipes have a limit of 100 steps. Steps that have values entered will be saved, steps with no values will not be saved. If a step has partial data entered, default values will be entered into the blank boxes. Recipes should be examined prior to running the ensure the default values are acceptable. If data is entered in non-consecutive steps, steps of all zeroes will be entered in between the steps containing data.



5.10.2 Recipe Management

Recipes are managed by the Load (2), Save (3), and Delete (4) buttons. To load a saved recipe, press the Load button this will bring up the Recipe Select Screen.



After clicking a recipe name and then clicking enter, or by double-clicking a recipe name. The recipe will be loaded into the editor.

To delete a saved recipe, press the Delete button this will also bring up the Spin Recipe Selector. After clicking a recipe name and then clicking enter, or by double-clicking a recipe. The recipe will be deleted from the 300X.

To save a recipe, press the Save button this will also bring up the On-Screen Keyboard for entering the recipe name. Enter the desired name using the keyboard and then press the Enter key. This will save the recipe with the desired name.

5.10.3 Recipe Backup

Recipes are saved in Comma Separated Value (.csv) format. The Model X system uses a Windows Operating system. The Spin Recipes are saved in the c:\Cee\Spin folder in the Windows File System. To backup recipes you can simply copy to a storage device via the front USB port. Alternatively, they can be stored via the ethernet port on the back of the Model X. By default, the Model X is setup as IP Address 192.168.1.1 and the Spin Recipe folder is shared as Spin as a network store.



5.10.4 Desktop Recipe Editing

Since the recipes are stored in a simple Comma Separated Value (.csv) format, they are easily editable on a PC. Each step is stored as a line of data. It looks like this:

Velocity, Ramp, Time, Dispenses, EX, Exhaust, Oscillation, EX, EX, EX, EX, EX,

For example:

1000,3000,100,1.2.3,0,100,50,0,0,0,0,0

where Velocity is 1000, Ramp is 3000, Time is 10 seconds (tenths are stored in the last place), Dispenses 1,2,3 are enabled, EXTRA, Exhaust is 100 %, Oscillation Time is 5 seconds (tenths are stored in the last place), then 5 EXTRA values. The files will auto-load into Microsoft Excel or Open-Office.



5.11 Diag Screen



The Diagnostic Screen allows manual operation of most of the hardware of the Model X.

1. Diagnostic Module Buttons: This button will take you to the Spin Diagnostics Screen.
2. Digital Inputs / Outputs: These panels show the current state for all the digital I/O for the entire system.
3. Show Desktop Button: This button will minimize the Model 300X control software taking you to the Windows desktop.
4. Exit Button: This button will exit the Model X software.
5. Serial Write: These controls allow for hardware writes to the serial ports of the Model X control system. This is intended for use by Cee personnel only.



5.11.1 Spin Diagnostics Screen



The Diagnostic Screen allows manual operation of most of the hardware of the Model 300X.

1. Spin Velocity Display: Current spin chuck velocity is displayed here.
2. Spin Velocity: Clicking this box will bring up a numeric pad allowing entry of a desired velocity.
3. Spin Acceleration: Clicking this box will bring up a numeric pad allowing entry of a desired acceleration.
4. Spin Button: This button will start the spindle spinning using the entered velocity and acceleration.
5. Stop Button: This button will stop the spindle.
6. Dispense Selector: Clicking the desired dispense name will highlight it, selecting it for use with the On / Off buttons.
7. Dispense On Button: This button will turn on the selected dispense.
8. Dispense Off Button: This button will turn off the selected dispense.
9. Lid Closed Display: This checkbox will display the status of the lid closed sensor.
10. Chuck Vacuum On Button: This button will turn on vacuum at the spin chuck.
11. Chuck Vacuum Off Button: This button will turn off vacuum at the spin chuck.
12. Exhaust Position: Clicking this box will bring up a numeric pad for entry of a desired exhaust position. (Exhaust not available on all Models)
13. Exhaust Set Button: This button will move the exhaust to entered position. (Exhaust not available on all Models)
14. Exhaust Home Button: This button will cause the exhaust to re-initialize to its



home sensor. (Exhaust not available on all Models)



5.11.2 Configuration Screen

The Configuration Screen allows for the setting of parameters for Model X operation. Not all parameters are available to all user levels.



1. Spin Configuration Button: This button navigates to the Spin Configuration Screen.
2. Password Configuration Button: This button navigates to the Password Configuration Screen.
3. Beep On Screen Press Check Box: If this setting is checked, the screen will give a slight beep whenever a control is pressed. This is to give feedback while using the Model X.
4. Alarm on Process Complete Check Box: If this setting is checked, the tool will provide an alarm when a process is completed.
5. Enable Passwords: If this setting is checked, the tool will require a password to start. Using passwords also allows different level of users to access limited portions of the Model X software. If passwords are not enabled, the Model X auto logs in as a Super User. For information on logging in to the Model X software see Run Screen.
6. Revert Button: If changes have been made to the settings on this screen, but are not desired, pressing this button will revert back to saved settings.
7. Save Button: Pressing this button will save all parameters on the screen.



5.11.3 Spin Configuration Screen

The Spin Configuration Screen allows for the setting of parameters for Model X



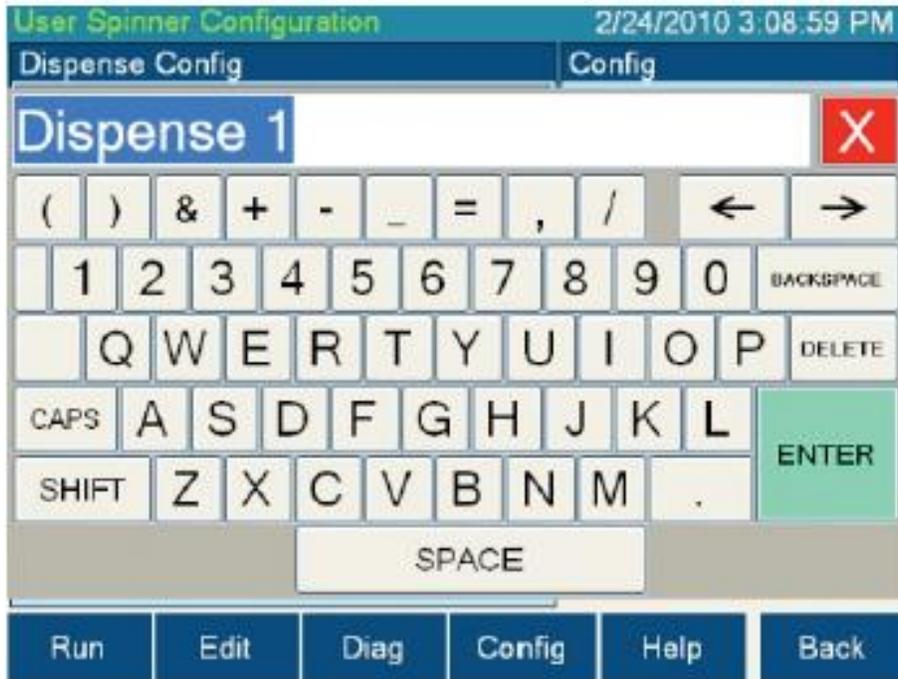
operation, specific to the spin module. Not all parameters are available to all user levels.

1. Dispense Name Column: This column allows the user to label each dispense with a unique name to reflect the material dispensed.
2. Has Empty Column: This column allows the user to specify which empty sensor is tied to which dispense. Usually this is configured before leaving the factory and needs no adjustment.
3. Centering Speed: Clicking this box will bring up a numeric pad allowing entry of a desired velocity for centering.
4. Centering Time: Clicking this box will bring up a numeric pad allowing entry of a desired time for the substrate to spin during the centering process. For more information on how this parameter effects operation go to Centering a wafer.
5. Idle Exhaust: Clicking this box will bring up a numeric pad allowing entry of the Idle Exhaust parameter. This is the position that the exhaust will go to after a spin process is complete. (Programmable exhaust not available on all models)
6. Enable Vacuum Chuck Check Box: If this box is not checked, it allows the Model X to run spin processes without the vacuum sensor being active.
7. Revert Button: If changes have been made to the settings on this screen, but are not desired, pressing this button will revert back to saved settings.
8. Save Button: Pressing this button will save all parameters on the screen.



5.11.4 Naming Dispenses on the Spin Config Screen

The dispenses may be named to reflect the material in each dispense. This name is then displayed on the TODO Spin Diagnostics screen and the TODO Dispense Selector



screen used while writing a recipe. To name a dispense, click on the desired dispense in the Dispense Name Column.

Clicking the dispense in the Dispense Name Column will bring up an On-Screen Keyboard for name entry. Once the desired name is entered press the ENTER key to close the keyboard and store the name in the Dispense Name Column. To save the new name press the Save button (8). To undo the name change, press the Revert button (7).

5.11.5 Selecting Empty Sensors on the Spin Config Screen

A sensor may be used to indicate when dispense material has run out. The sensor number tied to each dispense is displayed on the Spin Configuration screen. These are usually set at the factory and need no adjustment. However, if the material containers need to be switched or you no longer wish to use a sensor for a dispense, the Empty Sensors can be set here.

Simply press the desired dispense location in the Has Empty column. A drop-down box will show the available sensors and a "None" position. Select the new sensor that you want to use. To save the new Empty Sensor press the Save button (8). To undo the change press the Revert button (7).



5.11.6 Password Configuration Screen

The Password Configuration screen allows the user to change passwords.

The screenshot shows a window titled "Password Configuration" with a timestamp "2/24/2010 4:46:12 PM". The window contains a table with three columns: "User Level", "New Password", and "Confirm New Password". There are three rows for "User", "Super User", and "Maintenance". Each row has two text input fields and an "Update" button. Below the table is a navigation bar with buttons for "Run", "Edit", "Diag", "Config", "Help", and "Back".

User Level	New Password	Confirm New Password	
User	<input type="text"/>	<input type="text"/>	Update
Super User	<input type="text"/>	<input type="text"/>	Update
Maintenance	<input type="text"/>	<input type="text"/>	Update

The default passwords are:

Super User Level: CEE
User Level: 200X
Maintenance: DIAG

To change a password, click into the New Password box for the desired User Level, an On-Screen Keyboard will appear allowing the user to enter a new password. The On-Screen Keyboard will not display the password. Do the same for the Confirm New Password Box. To save, click Update. If the New Password box and the Confirm New Password box match the new password will be stored.

User Level Access

The users access to the following:

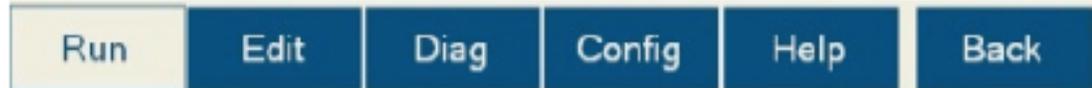
Super User Level: Everything
User Level: Run Screen
Maintenance: Run Screen, Diag Screen, Config Screen

By de-selecting the Enable Passwords option on the TODO Config Screen, the Model X software will auto-login as a Super User



6 Navigation Bar

The Navigation Bar enables Quick navigation of the X Model Software. The currently selected page is highlighted in white.



6.1 Run

The Run button navigates to the Run screen. This is where processes are run and monitored on the X Model.

6.2 Edit

The Edit button navigates to the Edit screen. This is where processes are created, edited and deleted on the X Model.

6.3 Diag

The Diag button navigates to the Diagnostics screen. From here, the X Model can be operated manually allowing maintenance and diagnostics to be performed.

6.4 Config

The Config button navigates the Configuration screen. All the user configurable settings for the X Model can be viewed or edited here.

6.5 Help

This browses to the Help page which contains the User Manual.

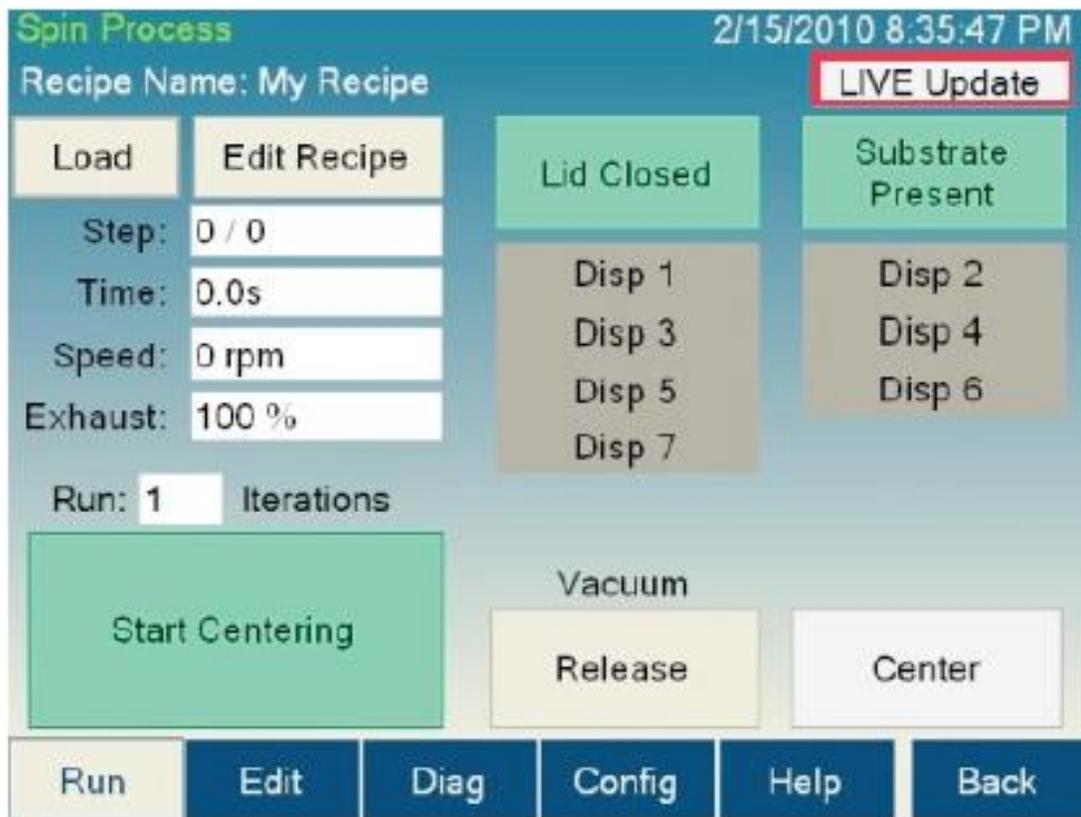
6.6 Back

The Back button returns to the previous screen.



7 LIVE Update feature

The LIVE Update feature of the Model X software allows the user to update the running



recipe while its running. The LIVE Update feature is not available on all models.
Figure 7.1 Spin Process Page with LIVE Update button highlighted

The LIVE update button appears once a process has started. Pressing the button will bring up a special Spin Recipe Editor page.



Spin Process - Running Step: 1 2/25/2010 1:40:59 PM

RECIPE Recipe Name: My Recipe ✖

Update	Step	Velocity (RPM)	Ramp (RPM/s)	Time (sec)	Dispenses	Exhaust (%)	Oscillation (Hz)
Update and Save	1	1000	3000	30	none	100	0
Save...	2	2000	3000	30	none	100	0
STEP	3	3000	3000	30	none	100	0
Insert	4	4000	3000	30	none	100	0
Delete	5	5000	3000	30	none	100	0
Clear All							

Run Edit Diag Config Help Back

The editor will load with the currently running recipe. This editor will function just as the normal process editor functions. You can edit current steps, add steps, and delete steps.

Some buttons have different functions in LIVE Update mode:

Update button: This button loads the recipe currently in the editor into the spinner module, but does not save it to the hard drive.

Update and Save button: This button loads the recipe currently in the editor to the spinner module AND saves it to the hard drive.

Save button: This button saves the recipe currently loaded in the editor to the hard drive, but does NOT affect the process currently running.

Cancel button: The X button in the upper right corner of the editor returns the process page making no changes.



7.1 Limitations of LIVE Update Mode

Changes made to the recipe will not be reflected in the process module until the next step starts on the process module.

Deleting a step that has already started will result in a step being skipped.

Inserting a step before the current step being processed will result in a step being repeated.

Save and Update and Save do not give an option of saving to another name. LIVE Update is only intended for use on the currently processing recipe.



8. Service & Maintenance

This maintenance manual provides personnel with procedure and guidelines for maintaining a Cee® 300X Spin Coater. Below is a chart of recommend maintenance scheduling.

Maintenance Section	Maintenance Schedule
Safety Checks	Before daily tool use
Cleaning	After daily tool use
Mechanical Checklist	See Section 5.2 for Details
Utility Checks	See Section 5.3 For Details

8.1. Safety Checks

Inspect spin coater lid for the following defects:

- (a) Loose assemblies
- (b) Improper closure
- (c) Improper bowl ring placement

8.2. Mechanical Checklist

1. **Spin chuck cleanliness:** If any material has built up on the spin chuck, it can be wiped clean with most organic solvents isopropyl alcohol, or acetone. For major buildup of material, a glass slide can be used to gently scrap the material away. Follow by wiping clean. A dirty spin chuck could cause vacuum errors. See section 2.1 on detailed cleaning instructions. **Daily**
2. **Spin chuck flatness:** This can be seen visually with a straight edge. Small uniformity issues such as a burr can be gently removed with a razor blade or a glass slide. Larger deformations such as a damaged area from dropping can be removed with fine sandpaper. A non-uniform spin chuck can cause vacuum errors. **Quarterly**
3. **Bearing wear:** Rotate the spindle shaft by hand. The shaft should easily spin with little noise. If not bearing should be replaced. If grinding noise is heard during a process, bearing should be replaced. Bad bearings can cause erratic spin speed and acceleration. **Quarterly**
4. **Vacuum liquid trap:** There should be no material in the vacuum trap. Material in the vacuum trap will cause vacuum issues. **Quarterly**
5. **Axial spindle shaft play:** There should be no axial play in the shaft. Axial play will cause excess bearing wear and possible vacuum error. **Bi-annually**

8.3. Utility Checks

1. Check all pressures for ranges specified in tool manual. **Daily**
2. Verify that there is a proper drain facility. **Daily**
3. Verify that the exhaust is functioning. **Daily**
4. Inspect all connections for proper installation. **Bi-Annually**
5. Verify that the AC power is of the proper voltage, and is connected. **Bi-Annually**



8.4. Cleaning

For cleaning, it is good practice to use the mildest solvent possible. The machine cabinet may be cleaned using most organic solvents, acetone, isopropyl alcohol, or N-methylpyrrolidinone (NMP). Caustic acids or bases should not be used. The spin bowl lid may be cleaned with isopropyl alcohol, acetone, or water based cleaners.

Keep solvent from getting into the vacuum system. When cleaning the spin bowl, a small substrate should be on the spin chuck to keep solvent from getting into the vacuum system. Spin the wafer at approximately 200 RPM, and use solvent in a wash bottle to flush out the spin bowl. Keep solvent from going down the spin shaft or the spin shaft tube. Shields and seals will protect the bearings from a small amount of solvent, but they will not be able to handle large doses. Do not direct the solvent stream down the shaft or tube.

Avoid getting solvent of any kind on the small yellow "Hot Surface" labels. Use only water-based cleaner on the labels on the rear of the machine. Use only isopropyl or water based cleaner on the "power on-off", Cee® logo, the yellow "Caution ... Eye Protection", and the "Cee® model/serial number" labels. The display may be cleaned with glass cleaner, water, or isopropyl alcohol.

8.5. Maintenance – Vacuum Liquid Trap

The Cee™ Model 300X is relatively maintenance free. The only part that needs attention is the vacuum liquid trap. Its purpose is to trap any liquids that go down the spindle vacuum hole and prevent them from contaminating down stream components. It is recommended that the user avoid getting any liquids down the spindle vacuum hole by not spraying any cleaners or solvents directly on the center of the spin chuck and by not dispensing without a substrate on the spin chuck. However, since this may inadvertently occur, the trap will need to be emptied on occasion. Follow the steps below to empty the vacuum liquid trap.

- (1) Turn off the machine by pressing the ON/OFF Power Switch
- (2) Disconnect power by removing the plug from the rear of the machine. Use appropriate Lockout/Tagout procedures.
- (3) Shut off the vacuum supply at the facility supply port.
- (4) Remove the rear sheet metal cover from the machine. Removing any dispense tubes or valves as needed.
- (5) Inside the tool, mounted on the large aluminum block, is the vacuum liquid trap. It is a translucent white canister with a conical lid. Remove the vacuum liquid trap from the clips that attach it to the block.
- (6) Unscrew the canister from the lid, being careful not to spill any liquid into the machine.
- (7) Dispose of the liquid and any solids that have accumulated in the vacuum liquid trap. Follow all hazardous waste disposal procedures as necessary.
- (8) Clean the canister and the metal wool inside it with an appropriate solvent. Dispose of the solvent following all hazardous waste disposal procedures.
- (9) Screw the canister back on the lid. The tube protruding down from the lid



-
- should be pushed through the metal wool.
 - (10) Snap the vacuum liquid trap back on to the clips. Take care to ensure that no tubes are kinked.
 - (11) Replace the rear sheet metal cover, replacing any dispense tubes or valves that were removed.
 - (12) Reconnect the power cord.
 - (13) Turn on the machine by pressing the ON/OFF Power Switch.
 - (14) The Cee™ Model 300X is now ready to use.

8.6. Spin Chuck Replacement

The Cee™ Model 300X is capable of processing many different sizes of substrates. It may be necessary to change spin chucks to run different sizes of substrates, depending on the spin chuck design.

Follow the steps below to change a spin chuck.

- (1) Open the spin bowl lid and leave it open.
- (2) Turn off the machine by pressing the ON/OFF Power Switch.
- (3) Disconnect power by removing the plug from the rear of the machine. Use appropriate Lockout/Tagout procedures.
- (4) Shut off the vacuum supply at the facility supply port.
- (5) Hold the existing spin chuck in one hand and remove the #8 FHCS vented spin chuck screw in the center of the spin chuck using a 3/32" hex wrench.
- (6) Pull the spin chuck straight up. It should lift straight off the spindle.
- (7) If it is stuck, wiggling it slightly should free it. If the spin chuck was stuck, clean any residue that remains on the spindle or the bore of the spin chuck. Inspect the spindle and check for any damage.
- (8) Place the new spin chuck on the spindle. Note that the spin chuck has a notch that the drive pin on the spindle fits in. When placing the spin chuck on the spindle align this notch with the drive pin and push the spin chuck all the way down so that the pin is in the notch.
- (9) Replace the vented spin chuck screw and tighten it using the hex wrench.

Spin the chuck by hand and verify that it is not wobbling. If it is, loosen the screw and reposition the spin chuck. Retighten the screw and verify it by spinning the spin chuck by hand.



8.7. Troubleshooting Chart

The following chart gives alarm messages that may appear on the touch screen and how to resolve them. It also gives other conditions that may cause problems and their potential solutions.

Alarm or Indication	Potential Problem	Resolution
System dead, no display on touch screen	Blown fuses Machine not plugged in/power not connected	Replace fuse Plug in machine/connect power
Spin vacuum error	Vacuum lost during spin process Spindle vacuum seal worn out	Check utility connections Verify incoming vacuum is more than 25 in. Hg Call Cee™ Customer Support
Lid close error	Lid not closed fully Lid opened during spin process	Close lid before spinning substrate
Process runs without speed change	Servo motion error	Cycle power on machine If this error reoccurs, change speed or acceleration parameters and try again Call Cee™ Customer Support
Grinding sound	Bearings going bad	Call Cee™ Customer Support
Vibration	Loose belt or mechanical damage	Call Cee™ Customer Support
Oscillation	Loose belt	Call Cee™ Customer Support

