

# **Model P-6708D 8" Desk-Top Precision Spin Coating System Operator's Manual**

System Serial Number: \_\_\_\_\_ Date: \_\_\_\_\_

Customer: \_\_\_\_\_

**Make certain that everyone associated with this instrument  
becomes knowledgeable about the material contained in this manual  
before using the equipment**

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**SPECIALTY COATING SYSTEMS™**

7645 WOODLAND DRIVE. - INDIANAPOLIS, IN 46278-2707 - PH. 800-356-8260

MODEL NO.  SERIAL NO.

VOLTS  AMPS  PHASE  HZ

INT. CAPACITY  AMP MFG. DATE

SCHEMATICS



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## SECTION 1 SAFETY

### 1.1 General Hazards



***Improper operation or service of this equipment can result in serious injury or death. Read and understand this manual before operating or servicing this equipment.***

1. The P-6708D series spin coater is equipped with a ground type power plug, which **MUST** be connected to a grounded outlet to prevent electrical shock.
2. **WARNING:** To avoid severe injury, **DO NOT** touch or hold the shaft or chuck while rotating.
3. **DANGER:** **DO NOT** operate without Bowl cover in place to protect operator and others from injury as substrates may fly off the rotating chuck.
4. **WARNING:** To avoid electrical shock or injury, **DO NOT** remove cover or reach through cover, when bowl is removed, while unit is still plugged in. Before servicing the P-6708D, **DISCONNECT** power cord from outlet.
5. **DANGER:** This unit is **not** classified as "Intrinsically Safe." **DO NOT** use the P-6708D series spin coater in the presence of an explosive atmosphere.
6. **IMPORTANT:** If the system is equipped with the drain option, do not operate the spin coater with the drain hose disconnected from the bottom of the bowl. Operating the instrument without the drain hose will cause the material to drain into the instrument and may cause serious damage to the instrument and possible injury to the operator.
7. **CAUTION:** If the system is purchased with a vacuum pump, oil has to be added to the pump. Let the pump sit for six hours with the oil prior to starting the pump. See the pump manual for additional details. Pump seals will burn out if proper instructions are not followed.

#### 1.1.1 LABELS

Written hazard information is provided where appropriate throughout the manual and on labels on the equipment. SCS recognizes three levels of warning that affect personnel safety. In addition, there is a warning that deals with the possibility of damaging equipment or data. Not all manuals define these terms exactly the same way; study the notices below so that you will know the importance of the written warnings as you see them.

**DANGER** (white on red background): Indicates **high** probability of death or severe injury. OSHA: "...immediate danger... special precautions necessary."

**WARNING** (black on orange background): Indicates **some** probability of death or severe injury. ANSA; "...potentially hazardous situation... if not avoided, could result in death or serious injury."

**CAUTION** (yellow on black background): Indicates possibility of moderate or minor injury. OSHA: "...warn against potential hazards or caution against unsafe practices."

**NOTICE or IMPORTANT** (white on blue background): States company policy for the protection of personnel or property. Not for use with a physical hazard. OSHA: "...general instructions relative to safety measures."

## **1.2 Servicing**

Before servicing, remove all power. If it becomes necessary to perform diagnostic service, with certain areas of the instrument powered, use only qualified personnel. Follow all normal industrial safety practices when dealing with electrical components. Review and understand the electrical schematic before attempting any electrical diagnostic service.

## SECTION 2 OVERVIEW

### 2.1 Description

The 6708D is a compact desktop spinner for low production spin coating applications. This model can store up to three product recipes and offers three ramp-up-and-hold steps and one ramp-down step for each recipe. The P-6708D series offers control of these parameters during a cycle:

- Spinning speeds from 100—8000 rpm,
- Ramp-Up times from 1 —30 sec,
- Ramp-Down time from 1 —30 sec,
- Hold time up to 999 sec.

Operation of the spin coater is controlled by a Programmable Logic Controller. The product recipe number, spinning speed, and process time remaining are displayed on a user interface screen.

Acceleration and deceleration rates are calculated by the Programmable Logic Controller (PLC) to provide various ramp profiles.

The unit has provisions to connect a foot pedal to start the process.

Optional equipment available for the P-6708D series can provide precise control of three different coating material dispensing valves. Also available are interchangeable vacuum chucks.

Use of this instrument for anything but its intended purpose may create a safety hazard and void the equipment warranty.

### 2.1 About this Manual

This manual is organized as shown in the Table of Contents. Each section will be numbered and titled; the number and title will be shown on the bottom of each page to help identify where you are at any time.

A Table of Figures follows the Table of Contents to help find a figure even if the section location for the figure is not known.

An index is included at the back of the manual to help locate specific terms and concepts that might not be easily found using the Table of Contents.

These conventions may be used in this manual:

- This symbol (§) means “section.” If there is a instruction to “See §3.2,” that means Section 3.2.
- Special fonts may be used in the manual to mean special things.
  - Words typed **LIKE THIS** in capital letters refer to the name of a control as it is shown on the control panel/instrument, or the setting for the control.  
Example: “Press the **START** button.”
  - Words typed **Like This** normally indicate words that will show up on a display screen.  
Example: “The display will show **Repeating Cycles** as long as the control is set.
  - Words typed **Like this** will usually refer to an entry you must type in.  
Example: “Enter **CCW 100** when the screen asks for rotational speed.”



## SECTION 3 SPECIFICATIONS

Speed	100 - 8000 RPM
Acceleration	1 - 30 Seconds
Deceleration	1 - 30 Seconds
Spin Time (each step)	Up to 999 Seconds
Dispense times	1 - 10 seconds
Dimensions	Depth 17" (43.2cm) Width 13.25" (33.6cm) Height 12" (30.5cm)
Weight	52 Lbs. (23.6kg)
Power Input	120VAC, 60Hz, 8A, 1 Phase 220VAC, 50Hz, 4A, 1 Phase
Vacuum Input† (required)	430 to 635 mm Hg (17" to 25" Hg)
Purge Input† (required)	0.5 cfm - at 2 psi Air or Nitrogen <b>5 psi maximum</b>

### Optional Features:

Exhaust (Hood)	0.5 cfm      0.5" ID Tube
Drain	3/8" OD Teflon Tube
Vacuum Pump	115VAC 60Hz 5.5A 1 Phase 220VAC 50Hz 6.2A 1 Phase

†Note: Vacuum and purge air are **required** for the spin coater to operate.

**†For safety reasons, instrument will not power up with  
purge air pressure of less than 2 psi.**



## SECTION 4 OPERATION

### 4.1 Control Panel

#### START/STOP Buttons:

Starts or Stops the spin cycle.

#### DV1000 User interface:

Monitors the process by displaying the Product number, RPM, and the process time remaining. User can input the product recipe data through the interface keypad.

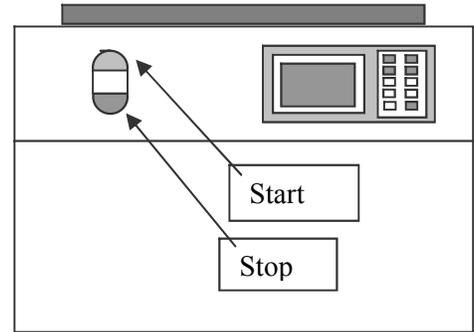


Figure 1: Start & Stop Buttons

### DV-1000 USER INTERFACE

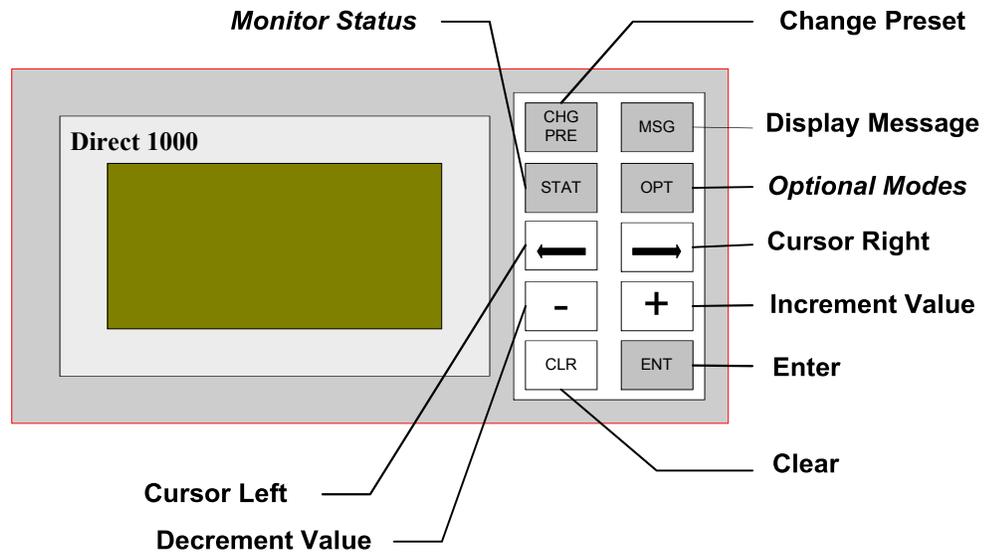


Figure 2: User Interface

#### KEYPAD

The keypad contains ten keys, located along the right side of the DV-1000. The primary keys on the unit have a blue colored background, and are dedicated for changing the operational modes of the display. The secondary keys have a gray colored background, and are multipurpose keys used for cursor movements and incrementing or decrementing values in the display.

#### **CHG PRE (Change Preset Mode)**

Press the Change Preset key to allow you access the product recipe setup parameters or select a different recipe.

**MSG (Message Mode)**

Press the Message key to view the process status. (Default Screen)

**STAT & OPT**

These keys are for diagnostic purposes only.

**CURSOR ← & →**

The Cursor Right and Left keys move the cursor on the numerical portion of the top line.

**Note:** If cursor keys are pressed in "Message Mode," the text "TIMER" and "COUNTER" will be displayed on the screen. They serve no function in the spinning process.

**+ and - Keys**

After you press CHG PRE, the Plus (+) and Minus (-) keys will scroll up and down the settable variables on the display screen. Once a variable is selected (by pressing ENT) the cursor moves to the numerical data and the + and - keys will increment or decrement the setting.

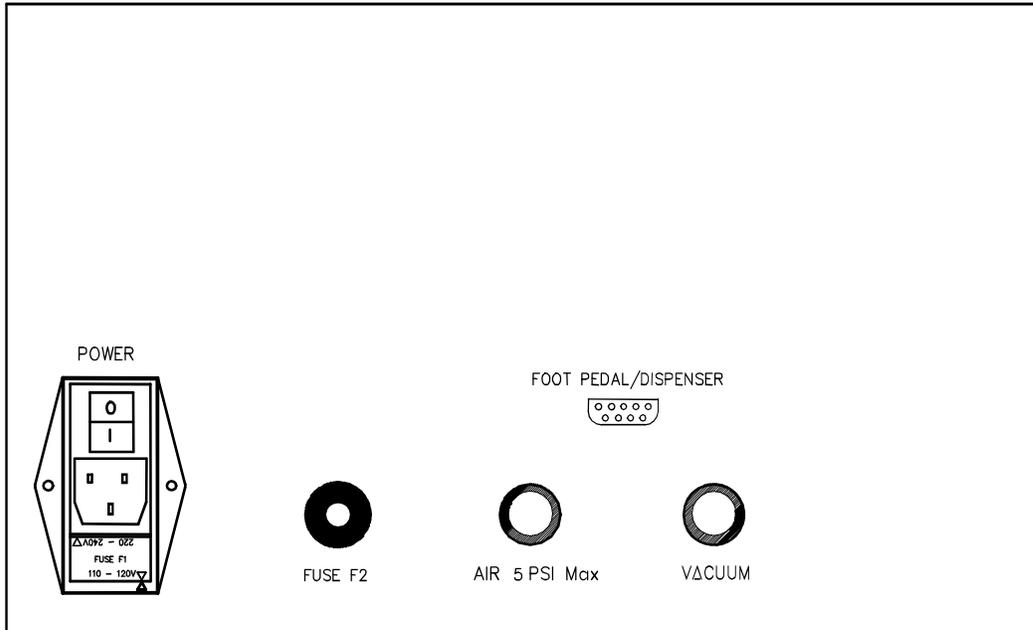
**ENT (Enter)**

The Enter key is active when you are changing settings. It will move the cursor from the left to the right column. When the cursor is in the right column, the key will program/accept the setting and move the cursor into the left column.

**CLR (Clear)**

Pressing CLR will clear the screen after an error message.

## 4.2 Facilities Panel



**Figure 3: Facilities (Back) Panel**

### POWER:

The switch turns the instrument power ON and OFF.

### FUSE F2:

Replace with only an exact electrical equivalent.

### AIR 5 PSI MAX:

This is the connection for supply air or N<sub>2</sub> to maintain positive pressure in the enclosure (0.5 cfm at 2 psi air or nitrogen). The unit *will not operate* without pressure.

### FOOT PEDAL / DISPENSER:

1. Accepts a foot pedal to start the process.
2. Provides signals for a P-6700 material dispensing unit for dispensing up to three different materials.

**Note:** Foot pedal may be connected through the P-6700.

### VACUUM:

The vacuum supply connects here—1/4" OD tube fitting (430 to 635 mm Hg or 17 to 25 inches Hg). The unit will not complete a cycle without vacuum.

### IMPORTANT:



See startup instructions for vacuum pump in the technical section. Improper oil level may damage the pump. After filling the pump with the oil, let it sit for six hours before using the pump.

### 4.3 Vacuum Chuck

The chucks are machined to close tolerances and provide an exceptionally flat, rigid surface for mounting substrates of different sizes, weights, and shapes. The cross scroll pattern distributes the vacuum over the chuck surface to hold the substrate while spinning at high RPM. This pattern also allows rapid vacuum release.

Proper chuck selection should be based upon substrate size and rigidity. The proper chuck diameter is 1/4 to 1 inch (0.6 to 2.5cm) smaller than the substrate diameter. The *entire* substrate should be supported if it is flexible, fragile, or when it is to be wiped or brushed during cleaning.

Proper centering is done manually, but the use of templates and measurements can aid in this operation.

### 4.4 Pre-Start

1. Connect vacuum and air purge supply. (See technical section, and pump operation instructions for starting the vacuum pump.) The unit *will not operate* without these.
2. Attach spin coater (and vacuum pump, if so equipped) power cord to properly grounded outlet.
3. Verify that the vacuum chuck is secure.
4. Turn power ON using the **POWER** switch located on the rear panel.
5. If equipped with exhaust option, attach the exhaust hose to the bowl.

### 4.5 Process Setup

When the instrument is turned on the following message will appear on the screen:

**SPECIALTY  
COATING SYSTEMS  
VERSION 2.0  
MODEL P-6708D**

After five seconds the display will change to:

<b>RECIPE</b>	<b>1</b>	(Current product recipe)
<b>RPM</b>	<b>0000</b>	(Current RPM of the chuck)
<b>TIME</b>	<b>0000</b>	(Time remaining to complete the process)
<b>PRESS START/ TO INITIATE</b>		(To start the process, push the process <b>START</b> pushbutton)

See the following section of this manual for instructions on selecting an existing recipe or entering/revising a recipe.

If the recipes are already stored, the desired product recipe can be selected; a new recipe or a revision can be initiated by pressing the **CHG/PRE** button on the keypad.

## UNDERSTANDING RECIPE PARAMETERS

The following are the parameters you can change. Refer to the figures on the following pages to see where the parameters apply in typical spin cycles.

- **RECIPE #** is the name given to a set of parameters. Selecting a recipe will select all the timing and rpm settings that go with that recipe.
- **RPM1, RPM2, and RPM3** set how fast (revolutions per minute) the chuck spins during each of the three segments of the cycle.
- **TIME1, TIME2, and TIME3** set how long (in seconds) the chuck will hold each speed.
- **RAMP1, RAMP2, and RAMP3** set approximately how long (in seconds) it will take the chuck to reach each speed. **RAMP4** tells how long it will take the chuck to slow down to a complete stop.
- **SOLVENT, N2, and COATING** set how long (in seconds) the cycle will spend to allow dispensing these three materials. (An optional precision dispensing device is available from SCS. It responds to the settings of the spin coater.) If a parameter is set to zero, that operation will be skipped.

**Note:** Before actually setting any recipes, refer to the programming section, which follows this one. There are programming interactions and options that can effect the actual cycle results.

## SETTING THE PARAMETERS

You can set the parameters using the 10 keys next to the display screen. This procedure tells how to change the recipe or its parameters or to view the current settings:

1. *To enter the programming mode*, press **CHG PRE**. This changes the display screen to a parameters display. A flashing cursor will be in the left column, at the word **RECIPE**.

<b>RECIPE</b>	0001
<b>RPM1</b>	0200
<b>RAMP1</b>	0010
<b>TIME1</b>	0030
<b>RPM2</b>	4000
<b>RAMP2</b>	0005
<b>TIME2</b>	0010
<b>RPM3</b>	8000
<b>RAMP3</b>	0020
<b>TIME3</b>	0020
<b>RAMP4</b>	0020
<b>SOLVENT</b>	0001
<b>N2</b>	0005
<b>COATING</b>	0001

**Figure 4: Parameter Display**

2. *To locate a specific parameter line*, press the **+** and **-** keys. This moves up or down to the desired parameter. (But only if the cursor is in the *left* column.)
3. *To access the parameter numbers*, press **ENT**. This moves the cursor to the right column where the numbers are.
4. *To select parameter digit*, use the arrows to move the cursor. (To change an rpm from 2000 to 4000, put the cursor on the “2.”)
5. *To raise or lower a value*, use the **+** or **-** keys. The number will count up or down.
6. *Repeat for other digits in that parameter*. (If necessary to change other numbers.)
7. *To accept the new setting* press **ENT**. The cursor will move back to the left column. (You can only go up and down to other parameters if the cursor is in the left column.)
8. *Move to another parameter* use the **+** and **-** keys OR... (if you are done making changes)
9. *To accept and return to operation mode*, Press **MSG**

When you return to normal operation and the display changes back to Message mode, the system will be set to the Recipe and parameters that were last on the display. If you made changes to Recipe 3 and exited, the system will be set to run Recipe 3; if you modified Recipe 3 but intend to run Recipe 1, then you must set to Recipe 1 before you press **MSG**.

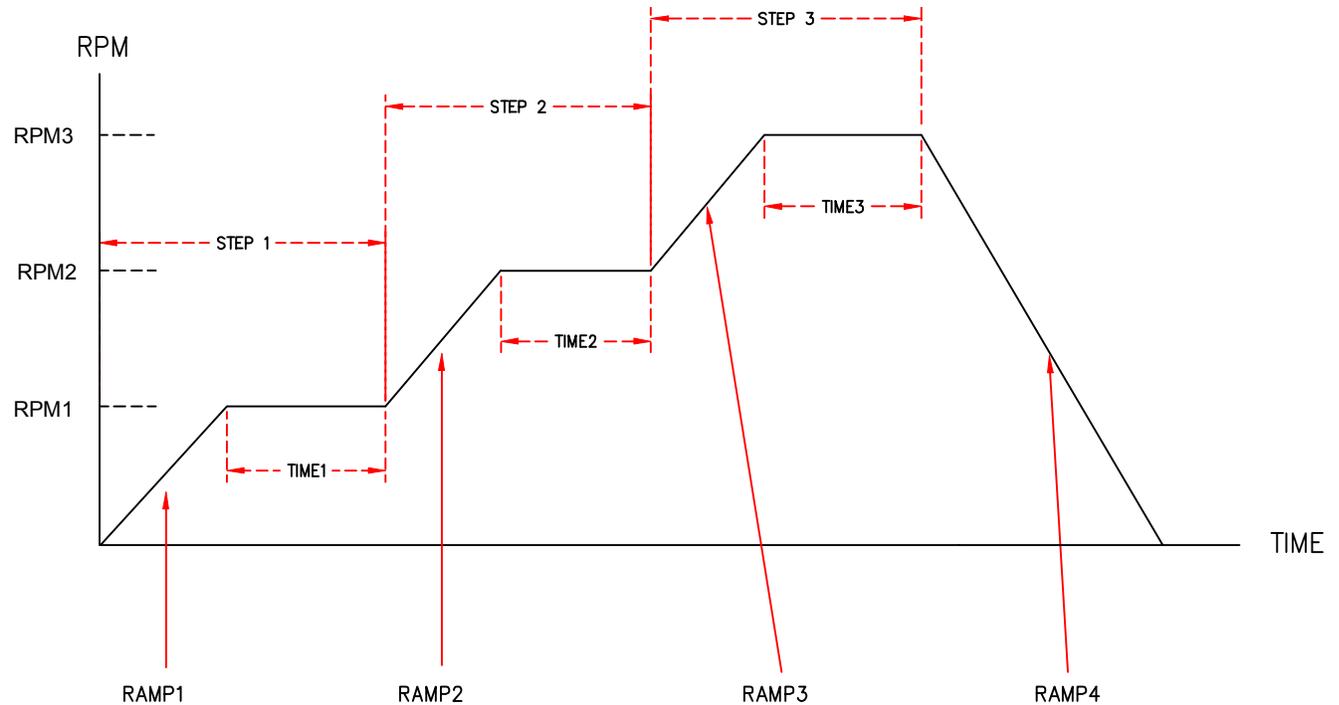
## PROGRAMMING SPINNER CYCLES

The following pages deal with more about how to set (or “program”) instructions into the spin coater, and how the instrument responds under different circumstances.

### Example: Cycle Without Dispensing

If SOLVENT\*, N2\*, and COATING\* are set to zero, the spin coater rotation will follow the simple cycle chart (Figure 5). Each of the labels on the chart is the name of a parameter that you can set by editing/programming the Recipe.

\*Note: The spin coater can control an optional precision dispensing device available from SCS.



**Figure 5: Cycle Without Dispensing**

Note the limits for the different variables. You cannot program numbers that are outside these ranges.

RPM1 must be between 100 and 2000 rpm.

RPM2 must be equal to, or larger than, RPM1, with a maximum of 4000rpm.

RPM3 must be equal to, or larger than RPM2, with a maximum of 8000rpm.

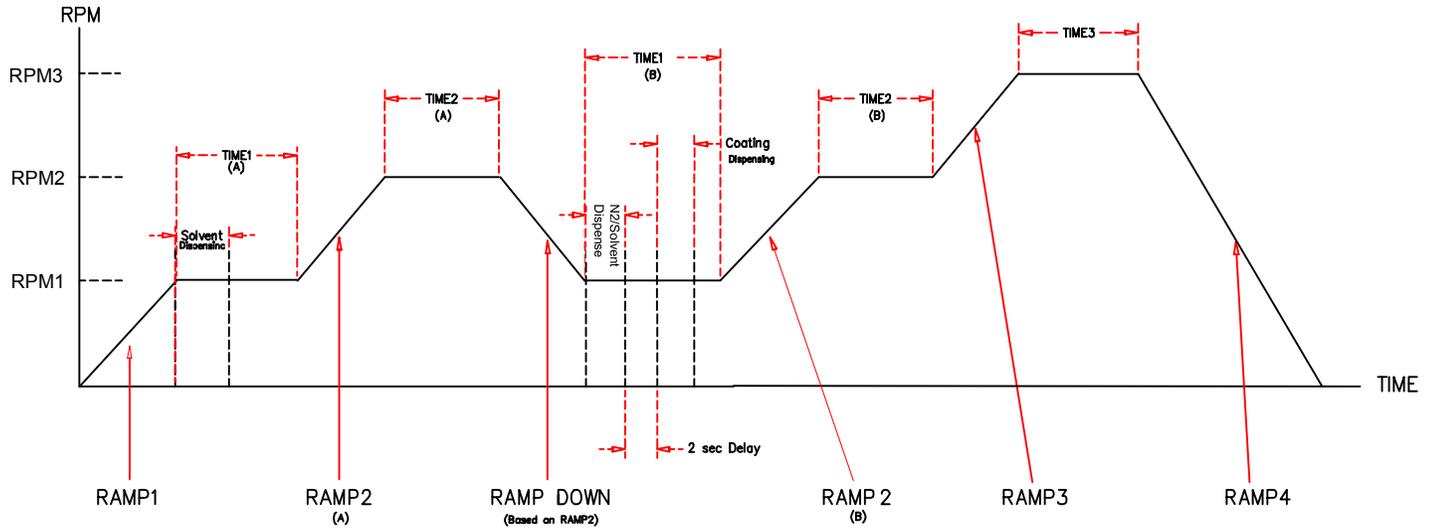
TIME1, TIME2, TIME3 can be set from 1 to 999 seconds.

The RAMP variable settings can be from 1 to 30 seconds to allow the chuck to speed up (or slow down for RAMP4 only) to the next RPM.

### Example: Cycle With Dispensing

If the dispensing equipment is installed, the dispensing options (SOLVENT, N2, and COATING) can be enabled. To enable an option, set it to a number that is not zero (numbers 1 through 10 seconds are acceptable). Figure 6 shows the cycle that would occur if all options were enabled.

Note that the cycle returns to RPM1 a second time [TIME1(B)] for N2 and/or COATING.



**Figure 6: Cycle With Dispensing**

In this configuration, some of the timing of the different parts of the cycle are more complex to figure out.

The “limits” are still true; but in addition, TIME1(A) and TIME1(B) are affected by the settings of the options. Each time must be long enough to allow the Option(s) to run completely. The table shows how the time is determined, and where the selected dispense options occur in the cycle.

Options Enabled	The PLC automatically makes TIME1(A) to be the longer of these two...	The PLC automatically makes TIME1(B) to be the longer of these...
SOLVENT, N2, COATING	SOLVENT or TIME1	(N2 + 2* + COATING) or TIME1
SOLVENT, COATING	SOLVENT or TIME1	COATING or TIME1
SOLVENT, N2	SOLVENT or TIME1	N2 or TIME1
COATING (only)	COATING or TIME1	Not Used**
SOLVENT (only)	SOLVENT or TIME1	Not Used**

\*When N2 and COATING are both enabled, 2 seconds are required between the operations.

\*\*When only using COATING or SOLVENT the chart looks like the first chart (without the “valley”).

In the following cycle example: the TIME settings are all set to 8 seconds; SOLVENT, N2, COATING are all set to 5 seconds; and RAMPS are all set to 4 seconds.

- The first period, TIME1(A), on the chart must be long enough to allow the option time setting. (In this example, TIME1 is set to 8 seconds and SOLVENT is set to 5 seconds, so TIME1(A) will remain at 8 seconds.) If SOLVENT were 10 seconds, TIME1(A) would have to extend to 10.
- The same requirement is true for TIME1(B). It must be long enough to allow the N2, plus two seconds between operations, plus COATING, since both options are chosen. (if N2 is set for 10 seconds and COATING is set for 10 seconds, the total time for TIME1(B) will be at least  $10+2+10=22$  seconds; if TIME1 is set for some number larger than the operation(s) require, it will not be changed.)
- Note that TIME1 is on the chart twice. These may be different, and larger than the TIME1 setting if required. For the first TIME1(A), the system chooses the longer period—either TIME1 or SOLVENT. Similarly, for the second TIME1(B) the system

#### SPECIAL PROGRAMMING NOTES:

1. If a RAMP time is set to “1,” the coater treats it as a “0” (or instant speed change).
2. If RPM1 and RPM2 are set to the *same* speed, RAMP2 will not be needed or used.
3. Selecting only the COATING option (or only SOLVENT) will cause that operation to occur during TIME1(A) and there will be **no** TIME1(B) (“valley”) portion to the cycle.
4. Remember that a TIME1(B) with both N2 and COATING will also require 2 seconds between those two operations. (This is handled automatically.)
5. Do not rely on the time (countdown) display. The controller’s primary job is the control functions; any time display is done “when convenient” and will be inexact.
6. The actual cycle timing is very repeatable. If you decide that you need to lengthen or shorten some part of the cycle, simply edit the variables as needed and retry

#### 4.6 Process Start

1. Locate substrate on the vacuum chuck (substrate must be centered for proper operation).
2. Place cover tightly over bowl.
3. Press **START** (Green light illuminates). The instrument will take a few seconds to check the vacuum. If the vacuum is present, spin coater will start. Spin rate is indicated on the display.
4. When the cycle time is complete, the Start LED will extinguish.

**Note: The process can be stopped at any time by pressing the STOP button.**

5. Remove bowl cover.
6. Remove substrate from vacuum chuck.
7. If process is to be repeated, go to step 1.

#### 4.7 Error Messages

If the display light does not come on after connecting the power and turning on the power switch, check that the purge air is connected and has a pressure of at least 2 psi.

<b>Error Message</b>	<b>Reason</b>	<b>Remedy</b>
CHECK VACUUM Note: don't confuse this message with "Checking Vacuum," a normal message.	Unable to hold vacuum.  No vacuum present.	Make sure substrate is on the chuck. Check the Vacuum line connection. If vacuum is lost during the cycle, instrument will stop immediately.
SHORT CYCLE	Unable to complete the process.	Loss of Vacuum. Stop button is pushed during a cycle.

#### **4.8 Shutdown**

1. Turn power OFF with the **POWER** switch located on the rear panel.
2. Carefully remove vacuum chuck.
3. Clean vacuum chuck and bowl thoroughly using the proper solvents.

## SECTION 5 MAINTENANCE

### 5.1 Cleaning

Clean the lid and the bowl with a solvent compatible with the coating being used.

When using solvents such as N-Methylpyrrolidone (NMP) take care to avoid contact with the painted surfaces. These solvents will damage/remove the paint.

### 5.2 Drain Option

If the spin coater is equipped with drain option, use small amount of solvent to clean the leftover material in the hose.

If the material in the hose has cured, replace the hose. To replace the hose, the top cover must be removed along with the bowl. Make sure to use material-compatible hose to replace the existing hose.

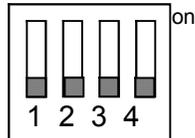


*Never operate the spin coater with the hose disconnected from the bowl. It may cause serious damage to the instrument and possible injury to the operator.*

### 5.3 Servo Amplifier

Dip Switch Setting for normal operation.

SCS setup for SW1 →



For more information, refer to technical manual of the servo amplifier.

### 5.4 Maintenance Schedule

Frequency	Task	Responsibility
Daily	Clean, Check air connections	Operator
Weekly	Check hoses & fittings, electrical connections	Maintenance
As Needed	Refer to vendor literature to maintain associated components	As appropriate



## SECTION 6 TROUBLESHOOTING

### 6.1 Possible Problems & Solutions

Refer to the following for the problem that you have encountered; the Cause/Solution portion will list possible areas that could cause the problem, or possible steps to take to correct the problem. The Problems are arranged beginning with those you would encounter when first powering up, and moving through ones you might encounter later during operation.



**WARNING:** Never work on the electronics of the instrument until you have first disconnected the electrical power.

**Problem:** Instrument will not power up.

**Cause/Solution:** For safety reasons, the instrument will not power up with purge air pressure less than 2 psi.

**Problem:** System does not run cycle after START button is pressed.

**Cause/Solution:** Vacuum must be present or system will not start.

**Problem:** Error message.

**Cause/Solution:** See §4.7 for error messages.

**Problem:** Error message “CHECK VACUUM.”

**Cause/Solution:** Unit will not cycle without vacuum; check vacuum, check vacuum switch VS1.

**Problem:** Time shown on the display is inaccurate

**Cause/Solution:** The display time is only shown as a convenience and is not expected to provide exact information. The system internal timing is accurate however, and the operation timing in each cycle is very repeatable. Use external timers to measure system operation; if you wish to modify any timing in the cycle adjust the recipe to lengthen or shorten parts of the cycle as desired.

**Problem:** Spin motor does not stop completely, or “wanders.”

**Cause/Solution:** Servo driver may need adjustment. See following § 6.2.

**Problem:** Spin Motor does not turn an exact speed.

**Cause/Solution:** Servo driver may need adjustment. See following § 6.2.

**Problem:** Spin Motor does not turn at all.

**Cause/Solution:** Check connections to the motor and tach.

If there are problems with the instrument review the information provided here. If assistance is not found here, contact Customer Service at (317) 244-1200 or (800) 356-8260.

## 6.2 Servo Amp Adjustment

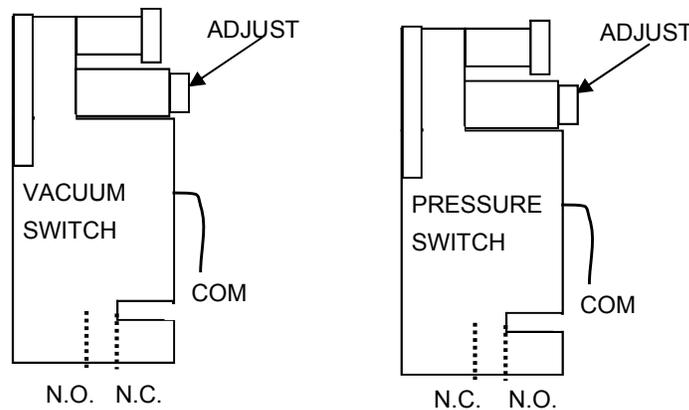
If the spin motor does not stop completely or fails to turn at the correct speed, adjust the servo amp. Use the following procedure to correct for this problem.

**Note:** The servo board may be mounted in a different position (turned) than the one shown in the drawing. Note the position of your servo board and the location of the potentiometers; they may be adjusted from the top or from the end, depending on the position of the board.



**WARNING:** Before beginning, disconnect the electrical power to the spin coater. After step 2 you will reconnect power; those steps **MUST** only be done by qualified personnel.

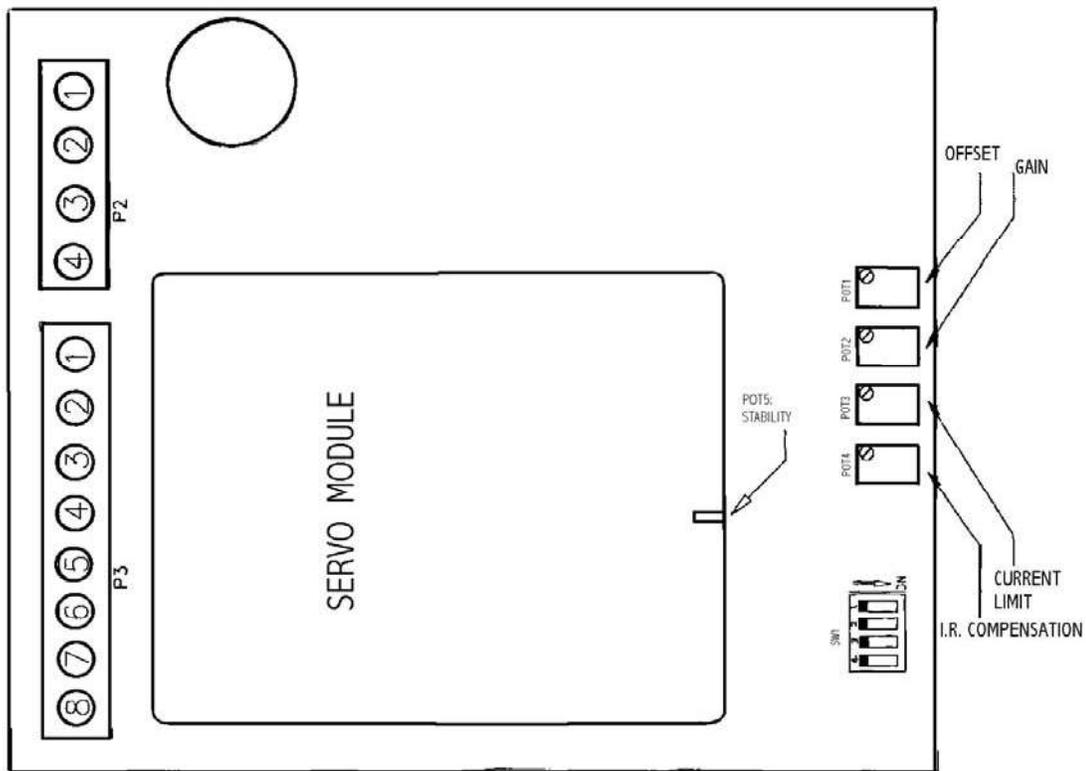
1. Temporarily alter the switch wiring to the Vacuum Switch **VS1** and Pressure Switch **PS1**. On each, change the wire from the normally open (**N.O.**) contact to the normally closed (**N.C.**) contact. This will allow operation with the covers off and without pressure and vacuum. See Figure 7.



**Figure 7: Pressure & Vacuum Switches**

2. Set all the **SW1** dip switches to Off.
3. Turn **POT5** (stability) CW until the motor becomes unstable (oscillates). Then turn **POT5** CCW until the motor stabilizes. Turn the **POT5** another ½ turn CCW.
4. Check to see if the motor shaft is stationary. If not, adjust **POT1** (offset) until the shaft stops completely. Run the motor (4000 – 5000 rpm) for 30 minutes and readjust **POT1** as needed to stop the shaft again.
5. Set for an RPM3 of 8000 rpm and a long run time, and run the cycle. Check the motor speed; if the speed is not 8000 rpm, adjust **POT2** (gain) to get the proper speed.
6. With the motor running, turn **POT3** (current limit) CCW until the motor starts to slow down. Then turn **POT3** CW 2 turns.

7. Recheck the speed at 8000 rpm. If necessary, readjust POT2 to set the speed within  $\pm 25$  rpm.
8. Start a cycle. Push **STOP** while the motor is running. The display should show the "SHORT CYCLE" error message.
9. **WARNING: DISCONNECT POWER.** Then reconnect the VS1 and PS1 wiring to the Normally Open (N.O.) contacts.
10. Return power to the instrument.



**Figure 8: Servo Board**

### 6.3 Switch Adjustment

See Figure 7. The Vacuum switch may need adjustment if the "Check Vacuum" error is displayed but no cause for it is apparent (the vacuum pump is working and the hose & motor shaft hole are not blocked). In that case:

1. Turn the vacuum adjust screw fully CCW and turn on the machine and vacuum.
2. Close the vacuum opening on the motor shaft and push the start button.
3. Adjust the screw CW until the switch is made (input #1 LED on the PLC) then turn an additional  $\frac{1}{4}$  turn.

Verify machine operation.



## SECTION 7 REPLACEMENT PARTS

REPLACEMENT PARTS LIST			
SCS PART#	DESCRIPTION	MANUFACTURER	QTY
269-042	MAIN FUSE 8A (120vac)	BUSSMAN, MDA8	1
9590	MAIN FUSE 4A (220vac)	BUSSMAN, MDA4	1
269-1003	FUSE 3/8A	BUSSMAN, MDA3/8	1
PP-106-1033-0	ON/OFF SWITCH WITH FUSE	PANEL COMPONENT	1
490-043	MOTOR DC PM	DYNETICS, 22083	1
PP-742-1003-0	PRESSURE SWITCH **	DWYER, 17110-0	1**
PP-742-1005-0	PRESSURE SWITCH	AIR LOGIC, F-4100-85W 10A	1
PP742-1008-0	VACUUM SWITCH	AIR LOGIC, V-5100-28-FM-B80	1
PP-780-1001-0	SOLENOID VALVE 24VDC	MAC, 35A-AAA-DDAA-1BA	1
PP-146-1004-0	DC MOTOR DRIVE	DYNETIC, 070701	1
PP-137-1001-0	FREQUENCY TO VOLTAGE CONVERTER	CALEX, F-V8509 20-2K-0-5V	1
PP-563-1031-0	PLC F1-130-DD	PLCDIRECT DL105	
PP-223-1002-0	EMI/RFI FILTER	SCHAFFNER, FN-2060-6-06	
PP-209-1006-0	DIGITAL DISPLAY	PLCDIRECT, DV1000	1
PP-744-1039-0	START/STOP PUSHBUTTON	A-B, 800FP-LU2E BFA	1
PP-744-1040-0	LATCH ASSY W/ LED 24VDC	800F 3GX11	1
447-006	RUBBER FEET	HH SMITH, 2135	4
431-007	PORCELAIN KNOB	PORCELAIN, 70634-30	1
951-650	8" BOWL TEFLON COATED	SCS	1
951-651	8" SPINNER BOWL COVER	SCS	1
837-1001	3/8" OD Teflon Tube	SCS	4 ft
131-010	Delrin Insert for vac. chuck	Headway	1
131-011	Insert Pin	Headway	1
131-024	Skirt, Chuck	Headway	1

\*\* Ref. Only (part was used on older unit)

## OPTIONAL VACUUM CHUCKS

Accessory chucks for SCS Spincoat Systems are available in several materials including stainless steel (standard), hard anodized aluminum, DELRIN, and Teflon. Chuck size is specified by the user according to substrate dimension requirements. Chuck components are machined to close tolerances for flatness and rigidity, and a cross pattern to distribute vacuum across mounting surfaces. A chuck size ¼-inch to 1-inch less than the substrate diameter is recommended. Fragile substrates should be supported across the entire surface.

For formal quotation, delivery, and Conditions of Sale, please contact your SCS Sales representative or call 1-317-244-1200.

<b>TYPE H: O-RING VACUUM HOLDING (H) DESIGN</b>	
Used to hold relatively heavy substrates such as glass, quartz, ceramic and metal. Features O-ring vacuum seal.	
<b>Part Number</b>	<b>Description</b>
131-039	Vacuum Chuck, Type H (SST), 1/4" Diameter
131-053	Vacuum Chuck, Type H (SST), 3/8" Diameter
131-016	Vacuum Chuck, Type H (SST), 1/2" Diameter
131-014	Vacuum Chuck, Type H (SST), 3/4" Diameter
131-019	Vacuum Chuck, Type H (SST), 15/16" Diameter
131-082	Vacuum Chuck, Type H (SST), 1 1/4" Diameter
131-040	Vacuum Chuck, Type H (SST), 1 7/16" Diameter
131-018	Vacuum Chuck, Type H (SST), 1 3/4" Diameter
131-015	Vacuum Chuck, Type H (SST), 2 1/4" Diameter
131-081	Vacuum Chuck, Type H (SST), 2 3/4" Diameter
131-079	Vacuum Chuck, Type H (SST), 3" Diameter
131-020	Vacuum Chuck, Type H (SST), 3 5/16" Diameter
PP-131-1002-0	Vacuum Chuck, Type H (ALUM), 4 1/2" Diameter

<b>TYPE CS: FLAT SURFACE CROSS AND SCROLL (CS) DESIGN</b>	
Used to hold a thin, planar surfaced substrate such as silicon, glass or germanium on a spinning shaft for maximum rotational speed.	
<b>Part Number</b>	<b>Description</b>
131-047	Vacuum Chuck, Type CS (SST), 1/8" Diameter
131-037	Vacuum Chuck, Type CS (SST), 1/4" Diameter
131-077	Vacuum Chuck, Type CS (SST), 5/16" Diameter
131-038	Vacuum Chuck, Type CS (SST), 3/8" Diameter
131-004	Vacuum Chuck, Type CS (SST), 1/2" Diameter
131-008	Vacuum Chuck, Type CS (SST), 3/4" Diameter
131-007	Vacuum Chuck, Type CS (SST), 15/16" Diameter
131-080	Vacuum Chuck, Type CS (SST), 1 1/4" Diameter
131-005	Vacuum Chuck, Type CS (SST), 1 7/16" Diameter
131-001	Vacuum Chuck, Type CS (SST), 1 3/4" Diameter
131-087	Vacuum Chuck, Type CS (SST), 2" Diameter
131-006	Vacuum Chuck, Type CS (SST), 2 1/4" Diameter
131-083	Vacuum Chuck, Type CS (SST), 2 1/2" Diameter
131-002	Vacuum Chuck, Type CS (SST), 2 3/4" Diameter
131-078	Vacuum Chuck, Type CS (SST), 3" Diameter
131-003	Vacuum Chuck, Type CS (SST), 3 5/16" Diameter
PP-131-1001-0	Vacuum Chuck, Type CS (SST), 4" Diameter
131-086	Vacuum Chuck, Type CS (SST), 4 1/2" Diameter
131-060	Vacuum Chuck, Type CS (ALUM), 5 1/2" Diameter
PP-131-1008-0	Vacuum Chuck, Type CS (ALUM), 6" Diameter
PP-131-1007-0	Vacuum Chuck, Type CS (ALUM), 7" Diameter
PP-131-1028-0	Vacuum Chuck, Type CS (ALUM), 10.5" Diameter

**TYPE L: O-RING VACUUM HOLDING CHUCK WITH MECHANICAL LOCATING (L) FINGERS**

Designed for heavy, large or unsymmetrical substrates. Guide fingers assist in positioning and holding substrates. An O-ring seal is also provided.

<b>Part Number</b>	<b>Description</b>
131-013	Vacuum Chuck, Type L (SST), 1 3/4" Diameter, Finger Size "A"
131-058	Vacuum Chuck, Type L (SST), 1 3/4" Diameter, Finger Size "B"
131-032	Vacuum Chuck, Type L (SST), 1 3/4" Diameter, Finger Size "C"
131-026	Vacuum Chuck, Type L (SST), 1 3/4" Diameter, Finger Size "D"
131-069	Vacuum Chuck, Type L (SST), 2 1/2" Diameter, Finger Size "___"
131-030	Vacuum Chuck, Type L (SST), 3 5/16" Diameter, Finger Size "E"
131-022	Vacuum Chuck, Type L (SST), 3 5/16" Diameter, Finger Size "F"
131-021	Vacuum Chuck, Type L (SST), 3 5/16" Diameter, Finger Size "G"
PP-131-1022-0	Vacuum Chuck, Type L (ALUM), 5 1/2" Diameter
131-012	Finger Size "A" to Fit Substrate Size 2" - 2 3/8" For Use with Vacuum Chuck, Type L (SST), 1 3/4" Diameter
131-027	Finger Size "B" to Fit Substrate Size 2 3/8" - 2 3/4" For Use with Vacuum Chuck, Type L (SST), 1 3/4" Diameter
131-028	Finger Size "C" to Fit Substrate Size 2 3/4" - 3 1/8" For Use with Vacuum Chuck, Type L (SST), 1 3/4" Diameter
131-035	Finger Size "D" to Fit Substrate Size 3 1/8" - 3 1/2" For Use with Vacuum Chuck, Type L (SST), 1 3/4" Diameter
131-059	Finger Size "E" to Fit Substrate Size 3 1/2" - 3 7/8" For Use with Vacuum Chuck, Type L (SST), 3 5/16" Diameter
131-036	Finger Size "F" to Fit Substrate Size 3 7/8" - 4 1/4" For Use with Vacuum Chuck, Type L (SST), 3 5/16" Diameter
131-023	Finger Size "G" to Fit Substrate Size 4 1/4" - 6" For Use with Vacuum Chuck, Type L (SST), 3 5/16" Diameter
*Four Fingers Required per Chuck	

## APPENDIX

### *Limited Warranty Policy*

- I. Subject to the limitations hereinafter set forth, SPECIALTY COATING SYSTEMS ("SCS") warrants that all component parts manufactured by SCS are free from defects in materials and workmanship for a period of twelve (12) months from the date of shipment. SCS will replace materials for a period of twelve (12) months from the date of shipment, and provide labor, if required, for a period of six (6) months from the date of shipment to correct warranty defects.
- II. Components such as gauges and meters, controllers, pumps, motors and valves are warranted by their respective manufacturers and these warranties are extended to the end user. Alcohol solutions and D.I. columns are not warranted.
- III. If, within the warranty period, any equipment or components manufactured by SCS shall prove to SCS's satisfaction to be defective, such equipment or parts shall be replaced or repaired, at SCS's option, at SCS's expense. Installation of replacement equipment or parts shall be at the Purchaser's expense.
- IV. The foregoing warranty shall be limited with respect to parts which are subject to wear or chemical reactions or which have a variable life expectancy, including but not specifically limited to, protective coatings, thermocouples, heaters, seals, o-rings, drive belts, relays, lamps and bearings (but not including filters) to a period of ninety (90) days from the date of shipment. Test cells are warranted for six (6) months from the date of shipment.
- V. SCS's obligation hereunder shall be limited to repair or replacement, F.O.B. SCS's factory, and shall be conditioned upon receipt of written notice of such defect within ten (10) days after its discovery. Prior written approval is required, for return shipment of equipment or components to SCS at SCS's expense.
- VI. This warranty shall not apply to equipment or parts which have been repaired or altered by any party other than SCS as, in SCS's judgment, adversely affects the same, or which shall be subject to negligence, accident, damage or circumstances beyond SCS's control (including fire, earthquake, flood or other acts of God), or improper installation, operation, maintenance, or storage, or to other than normal use of service. Improper operation of equipment or any part thereof shall include, without limitation, operation under loads, speeds, pressures or electrical current characteristics, or with supplies not complying with SCS's specifications.
- VII. SCS will not accept responsibility for repairs or the cost of any work done without specific written SCS authorization.
- VIII. This warranty does not apply to used or second-hand equipment, nor does it extend to any person other than the original Purchaser.

- IX. This warranty does not apply to equipment which is broken or damaged in transit. In no event shall SCS be responsible for any liability, loss or damage of such equipment delivered in good order and condition to a carrier or carriers at any point of shipment.
- X. This warranty shall not cover, and SCS shall not be liable for, losses of supplies or time, damages to materials, or consequential damages of any nature, arising from or attributable to equipment sold to the Purchaser by SCS. This warranty is strictly limited to the replacement or repair of the equipment or parts purchased.
- XI. SCS's liability to the Purchaser arising out of the supplying of this equipment or its use, whether based on warranty, contract, or negligence, shall not in any case exceed the cost of correcting defects in the equipment as herein provided, and upon expiration of the applicable warranty period as aforesaid, all such liability shall terminate.
- XII. EXCEPT AS OTHERWISE SET FORTH IN THIS LIMITED WARRANTY, THE EQUIPMENT AND PARTS SOLD BY SCS TO PURCHASER ARE SOLD "AS IS" AND "WHERE IS" AND "WITH ALL FAULTS," AND SCS DOES NOT MAKE AND SHALL NOT BE DEEMED TO HAVE MADE, AND SCS HEREBY DISCLAIMS, ANY REPRESENTATION OR WARRANTY, EXPRESSED OR IMPLIED, REGARDING THE DESIGN, CONSTRUCTION OR CONDITION OF, OR THE QUALITY OF MATERIAL OR WORKMANSHIP IN, THE EQUIPMENT OR PARTS, AND SCS MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS OF THE EQUIPMENT OR PARTS FOR ANY PARTICULAR PURPOSE.

SPECIALTY COATING SYSTEMS

7645 Woodland Drive  
Indianapolis, IN 46278-2707

Telephone: 317-244-1200

Fax: 317-240-2073

## Forms

### TO SAVE YOUR OWN TIME...

... please refer to the following questionnaire before contacting SCS for customer assistance. It tells you what information you will need in order to complete any transactions with SCS. Fill it out even if you intend to communicate by phone; this will enable you to have all the necessary information available to complete the transaction on the first call. REMEMBER you need authorization before attempting a return.

### ABOUT YOU...

Company Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
  
Contact Name \_\_\_\_\_  
Position/Title \_\_\_\_\_  
Phone (\_\_\_\_) \_\_\_\_\_

### ABOUT THE EQUIPMENT...

Equipment Type/Model \_\_\_\_\_  
Serial Number \_\_\_\_\_  
Specialty Coating Systems representative (if known)  
\_\_\_\_\_

### ABOUT US...

Before taking any other steps, call or fax this information to Specialty Coating Systems, Customer Service.

Voice: (317) 244-1200 or (800) 356-8260

SCScustomerservice@SCScoatings.com

FAX (317) 240-2739

Address:

Specialty Coating Systems  
7645 Woodland Drive  
Indianapolis, IN 46278-2707

***Vendor Literature***

SERVO AMPLIFIER  
VACUUM PUMP

DYNETIC 701  
GAST

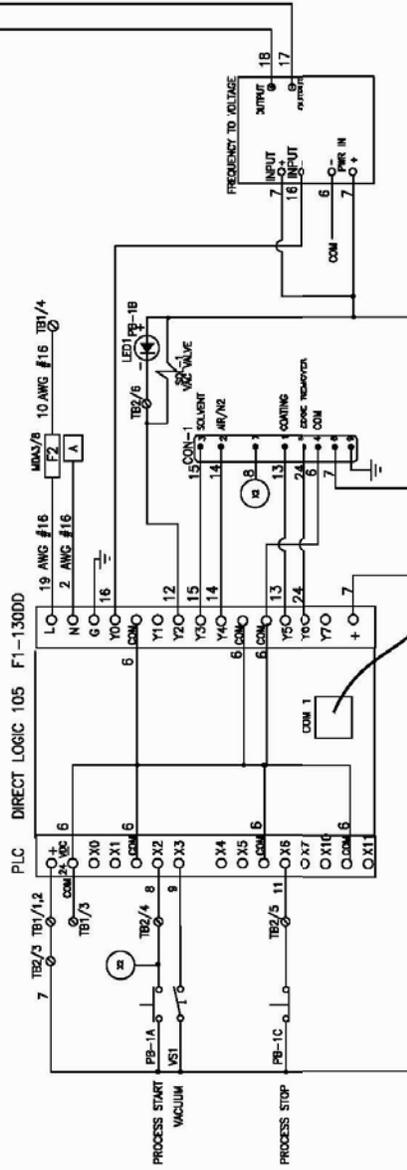
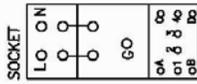
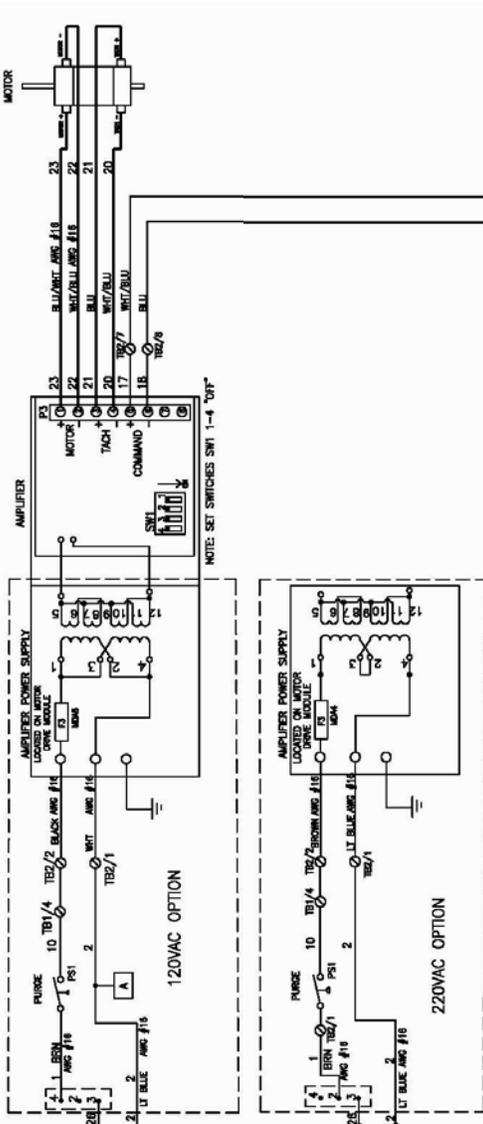
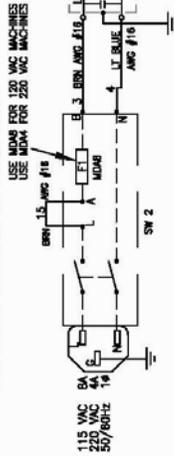
**Drawings**

The following drawings/schematics are provided on the next pages, in the order listed here.

ES-810-1006-3	Schematic 120 VAC/220 VAC
PS-811-1000-1	Pneumatic schematic



- NOTE
1. ALL WIRES #20 AWG/UNLESS NOTED
  2. WIRE MAIN POWER SWITCH AND THE TRANSFORMER FOR 120VAC OR 220VAC AS SHOWN BELOW



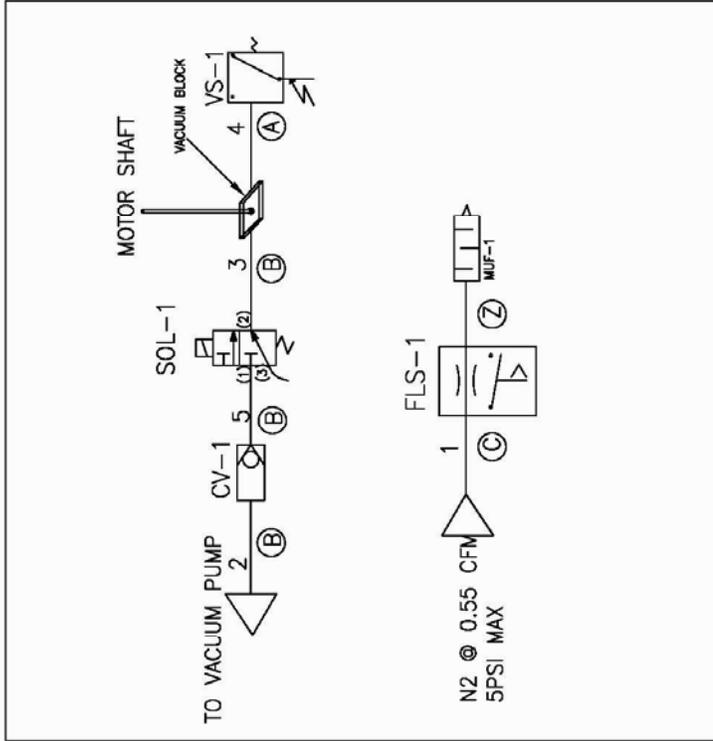
NOTE 1. JUMP ALL COM TERMINALS ON THE PLC TO 24VDC COMMON.

<p>TO BE USED ON NEXT ASSEMBLY SHEET</p> <p>ES-810-1010-1</p> <p>1 OF 1</p>		<p>DATE: 5-17-02</p> <p>DATE: 8/15/02</p>		<p>DRAWN BY: IMFAN</p> <p>CHKD BY: FMK</p>		<p>TITLE: SPINCOATER</p> <p>MODEL 6708D 115/220VAC</p>		<p>REVISION: C</p>	
<p>REV BY: JAP/D</p> <p>DATE: -</p> <p>INITIAL DESCRIPTION: -</p>		<p>DATE: -</p> <p>DATE: -</p>		<p>DATE: -</p> <p>DATE: -</p>		<p>DATE: -</p> <p>DATE: -</p>		<p>DATE: -</p> <p>DATE: -</p>	
<p>REV BY: JAP/D</p> <p>DATE: -</p> <p>INITIAL DESCRIPTION: -</p>		<p>DATE: -</p> <p>DATE: -</p>		<p>DATE: -</p> <p>DATE: -</p>		<p>DATE: -</p> <p>DATE: -</p>		<p>DATE: -</p> <p>DATE: -</p>	

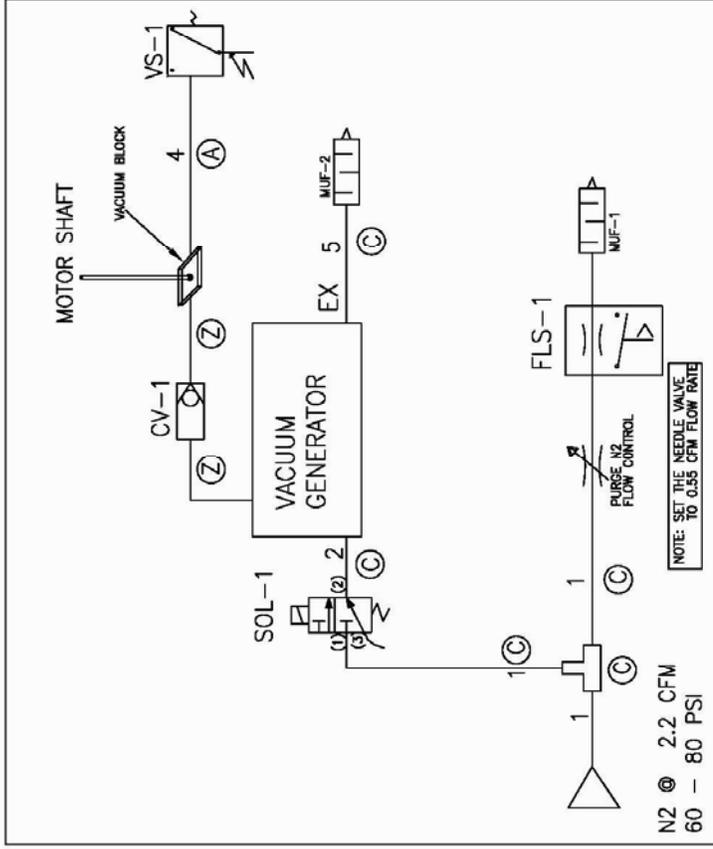
**SPECIALTY COATING SYSTEMS**  
7845 WOODLAND DRIVE, INDIANAPOLIS, IN 46278



MACHINES WITH EXTERNAL VACUUM PUMP



MACHINES WITH INTERNAL VACUUM GENERATOR



TOLERANCE LEGEND

SYM	DESCRIPTION	SSS PART#
(A)	BLACK URETHANE: 1/8"OD	837-001
(B)	BLACK POLYETHYLENE: 1/4"OD	837-012
(C)	RED POLYETHYLENE: 1/4"OD	837-011
(Z)	MECHANICAL CONNECTION	



**SPECIALTY COATING SYSTEMS**  
7645 WOODLAND DRIVE, INDIANAPOLIS, IN 46278

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TOLERANCE UNLESS NOTED  
DIMENSIONS IN INCHES  
ANGLE ± 0.5°  
XX ± 0.1  
XXX ± 0.01  
XXXX ± 0.005

PNEUMATIC SCHEMATIC  
SPINCOATER G3

TO BE USED ON NEXT ASSEMBLY  
SCALE: 1 1 1

REV	BY	DATE	DESCRIPTION
6	IA	11/23/02	FOR NEW REVISED INITIAL DRAWING RELEASE
5	IA	07/25/02	FOR NEW REVISED INITIAL DRAWING RELEASE
4	IA	-	FOR NEW REVISED INITIAL DRAWING RELEASE

PART NUMBER: PS-811-1000-1  
REVISION: C



## INDEX

Please note that the Index is not a substitute for the Table of Contents. Refer to the Table of Contents to locate major sections of the manual. Refer to the Table of Figures (right after the Table of Contents) to locate the pictures and charts used in the manual. Use this Index to locate special words or concepts that may be found throughout the manual.

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