

# **6800 Spin Coater Series Model 6808, 6808P, and 6812P Spin Coater Operator's Manual**

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

Prepared for: \_\_\_\_\_



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

7645 Woodland Drive, Indianapolis, IN 46278-2707

Customer Service: P 317. 244.1200 F 317.240.2073

E [SCScustomerservice@SCScoatings.com](mailto:SCScustomerservice@SCScoatings.com)

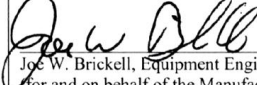
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MODEL NO	<input type="text"/>	SERIAL NO.	<input type="text"/>
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LARGEST LOAD	<input type="text"/>	AMPS	

# Specialty Coating Systems



## DECLARATION OF CONFORMITY

<b>Manufacturer:</b>	Specialty Coating Systems 7645 Woodland Drive, Indianapolis IN 46278, USA
<b>Authorized Representative: (regulatory inquiries only)</b>	Alura Group BV P.O. Box 18626 2502 EP The Hague The Netherlands
<b>Product:</b>	<b>G3-XX, G3P-XX, 68XX &amp; 68XXP Series Spincoaters</b>
<b>Start of Manufacturing:</b>	March 1, 2003
<b>Directives &amp; Standards</b>	
<b>Machinery Directive &amp; Standards:</b>	
<b>Low Voltage Directive &amp; Standards</b>	DIRECTIVE 2006/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits (codified version)  BS EN 61010-1:2001 IEC 61010-1:2001 - Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements
<b>Electromagnetic Compatibility Directive &amp; Standards:</b>	DIRECTIVE 2004/108/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC  EN 61326-1:2006 Electrical equipment for measurement, control and laboratory use — EMC requirements — Part 1: General requirements (IEC 61326-1:2005)
<b>Signature:</b>	Specialty Coating Systems  Joe W. Brickell, Equipment Engineering Manager (for and on behalf of the Manufacturer)
<b>Date:</b>	05/27/10



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## SECTION 1 SAFETY

### 1.1 STANDARDS STATEMENT

This machine has been designed to be used as described in this manual. Operator safety and safe reliable product coating were key elements in the design. The machine complies with all applicable sections of the NFPA article 79, of the National Electric Code (NEC). All commercially standard components used in this machine have a minimum UL and/or CSA ratings. Components built to CE standards have been used wherever possible. Any local or regional certifications required above and beyond the aforementioned are the responsibility of the customer.

### 1.2 GENERAL HAZARDS



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

- **DANGER:** Do not use a 6800 spin coater in the presence of an explosive atmosphere. These machines are not classified as Intrinsically Safe.
- **DANGER:** Use this machine only under an exhaust hood.
- **WARNING:** Do not touch or hold the shaft or chuck while any machine component is in motion.
- **WARNING:** Purging with N<sub>2</sub> or clean, dry air is required as a safety factor to fill the interior of the machine and exclude dangerous gasses.
- **WARNING:** If a Motion Error occurs, machine components will not stop if the lid is lifted. Do not remove the lid until the chuck has stopped spinning.
- **WARNING:** Do not operate this machine if the lid is not in place.
- **WARNING:** Do not attempt to access any internal parts if the power cord is connected. Disconnect the power cord from the outlet and wait 10 minutes before servicing this machine to avoid any high voltage that may exist for a period of time after the power is removed.
- **CAUTION:** Connect the power plug to a grounded outlet only.
- **CAUTION:** Review Material Safety Data Sheets for information about any chemicals used with this machine and the possible toxicity or reaction with the spin coater bowl or drain.
- **IMPORTANT:** The external vacuum pump periodically requires additional oil. 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.

### 1.2.1 HAZARD ICONS

The following symbols may occur at points throughout the rest of the manual. Note and read each warning before attempting any operations associated with it.



- This symbol warns of the potential for an ELECTRICAL SHOCK.



- This symbol signifies a GENERAL WARNING, which accompanying text will explain.

### 1.3 POWER CORD (SHOCK) SAFETY



**Emergency Power Disconnect options:** Use the power cord as a disconnecting device.

To facilitate disconnect, make sure the power outlet for this cord is readily accessible to the operator.

**Note for international users:** Select the plug that is rated for the supply circuit voltage that is available. The supply circuit must be overcurrent protected at a value not exceeding 6 amps.

### 1.4 SERVICING

Before servicing, remove all power.



**Note:** High voltage may still be present after shutdown and disconnecting line power. Allow unit to set without power for 10 minutes before servicing. If it becomes necessary to perform diagnostic service while certain areas of the machine still have power, 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 6800 Spin Coater Series is a family of compact spin coaters for low production spin coating applications and experimentation.

The 6800 Spin Coater Series provides the ability to hold a product with a vacuum chuck and spin that chuck at precise speeds and for controlled periods of time. Operations are extremely repeatable and are settable to 0.1 second. The chuck is indexed back to its initial position at the end of each cycle, so that each wafer may be oriented the same way on the chuck. See the Specifications Section for more information.

Operation of the spin coater is controlled by a user-friendly keypad. During a cycle, the spinning speed and remaining time are displayed on a user interface screen. The acceleration and deceleration rates are calculated by the controller to provide various ramp profiles. A recipe contains cycle information such as speed, ramp up time, ramp down time, and dwell time at speed.

The 6800 Spin Coater Series is available in 8 inch and 12 inch bowls.

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



## SECTION 3 SPECIFICATIONS

The 6808 Spin Coater can store one recipe with a maximum of 4 steps. The 6808P and 6812P Spin Coater can store up to 3 recipes, with a maximum of 8 steps in each recipe.

Speed	0–9,999 RPM
Acceleration/ Deceleration	0.1–30.0 Seconds (in 0.1 Sec. Increments)
Dwell (Spin Time) each step	Up to 999 Seconds (in 1.0 Sec. Increments)
Dimensions	Depth 18.0" (45.72 cm) Width 13.25" (33.66 cm) Height 10.8" (27.43 cm)
Weight	41 lbs. (18.6 kg)
Power Input	120/240VAC, 1 Phase, 300VA
Vacuum Input (required)	430 to 635 mm Hg (17" to 25" Hg)
Purge Input (required)	0.55 cfm at 5 psi (N <sub>2</sub> or clean, dry air)

**Comment [RBT1]:** Shouldn't we have fuse specs??

### Optional Features:

- External Vacuum Pump (external) 115VAC 60Hz / 230VAC 50 Hz  
5.5A 1 Phase
- Software for external programming and program storage.
- Dispense unit with four dispense needles and two material tanks.

### Additional Specifications:

- It is recommended that a shut-off valve be installed upstream of the unit on the N<sub>2</sub> or clean, dry air supply. SCS does not supply a shut-off valve.
- Purging (using N<sub>2</sub> or clean, dry air) to fill the interior of the machine with inert N<sub>2</sub> or clean, dry air and exclude dangerous gasses is required as a safety factor.
- For safety reasons, the machine will not power up without a purge flow of at least 0.55 cfm of N<sub>2</sub> or clean, dry air.
- The spin coater will not operate without vacuum.
- For safety reasons, the machine will shut off if the lid is removed.



## SECTION 4    INSTALLATION

**Note for international applications:** The spin coater is provided to international users with an unterminated power cord so that the appropriate power plug (non-locking 250V, 10A), may be attached. The plug must meet the requirements of IEC227 or IEC245.

**Note:** The supply circuit must be overcurrent protected at a value not exceeding 6 amps.

Do not apply power until all connections have been made.

1. Place the unit on a solid, level surface, free from vibration and temperature extremes. For optimum performance, make sure the chuck is level.
2. Refer to the Specifications section or to the nameplate on the machine for electrical requirements.
3. The machine will not operate without purging N<sub>2</sub> or clean, dry air (0.55 cfm) connected to the "N<sub>2</sub>" port in the back of the machine. Purge N<sub>2</sub> or clean, dry air is required as a safety factor to fill the interior of the console unit and exclude dangerous gasses.
4. External vacuum is also required for the machine to operate. Connect external vacuum to the "Vacuum" port on the Utility Panel, or use the optional pneumatic-powered vacuum pump.
5. Install and connect any additional options (such as a footswitch or dispenser) before connecting the spin coater power.

**Note:** The 6800 Spin Coater is not for use in a hazardous atmosphere.



## SECTION 5 OPERATION

This machine is designed for use in a normal laboratory or manufacturing working environment; avoid temperature extremes and vibration.

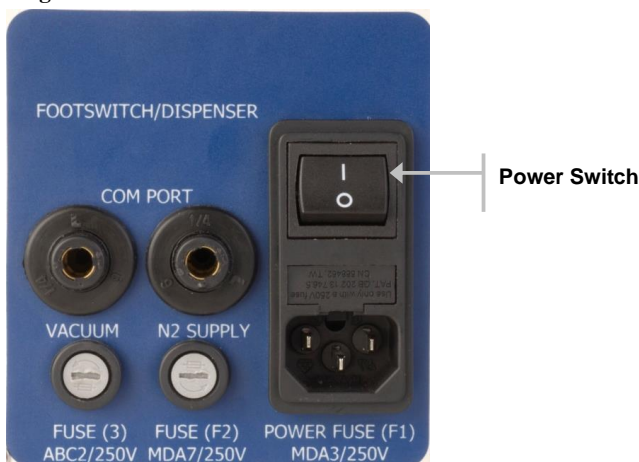
### 5.1 PRE-START

1. Connect the N<sub>2</sub> or clean, dry air purge supply and vacuum.  
**NOTE:** The unit will not operate without the vacuum and N<sub>2</sub> or clean, dry air purge.
2. Attach the spin coater and external vacuum pump power cords to a properly grounded outlet. (See the pump operation instructions in the technical literature section to start the vacuum pump.)
3. Verify that the vacuum chuck is secure. ← **Pry Slot to Access F1**
4. Turn the power switch on (located on the facilities panel).

Remember that the unit will not run unless programmed, and that the lid must be opened and closed before each cycle (indicating that material has been placed in the spin coater).

### 5.2 FACILITIES PANEL

**Figure 5-1: Facilities Panel**



#### FOOTSWITCH/DISPENSER (Optional)

This is the connection port for a footswitch or dispenser.

#### COM PORT (Optional)

This is the connection port for a computer.

#### FUSES

Replace fuses with an exact electrical equivalent only. See schematic and panel for ratings.

Replacement instructions are in the Maintenance section.

#### POWER SWITCH

This switch turns the machine power on and off.

## VACUUM

This is the external vacuum supply connection. using 1/4" OD tube fitting (430 to 635 mm Hg or 17 to 25 inches Hg).

**Note:** The unit will not complete a cycle without a vacuum.

## N2 SUPPLY

This is the connection for the N<sub>2</sub> or clean, dry air supply to maintain positive pressure in the enclosure (0.55 cfm at 2 psi nitrogen or clean, dry air).

**Note:** The machine will not operate without N<sub>2</sub> or clean, dry air.

### 5.3 VACUUM CHUCK

Chucks are machined to close tolerances and provide an exceptionally flat, rigid surface for mounting objects of different sizes, weights, and shapes. The cross scroll pattern on a chuck distributes vacuum over the surface and enables rapid vacuum release. The vacuum created holds objects to the chuck while spinning.

Chuck selection should be based on object size and rigidity. The proper chuck diameter is 1/4 to 1 inch (0.6 to 2.5cm) *smaller* than an object's diameter. The *entire* object should be supported if it is flexible, fragile, or if it is to be wiped or brushed during cleaning.

Centering is done manually; use templates and measurements for further assistance when centering.

Use Step 0 in a recipe to set the chuck size. 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

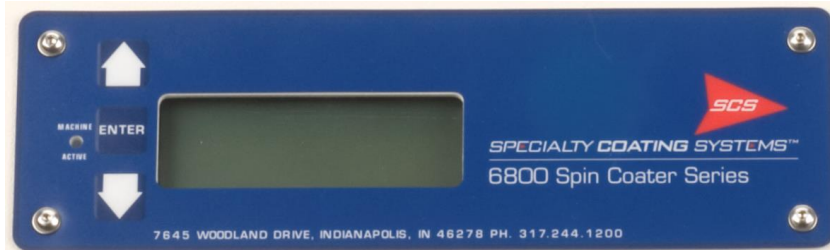
### 5.4 LID

For safety reasons, the machine will not operate without the lid in place. In addition, the lid must be removed after each cycle is completed (to avoid accidentally dispensing twice on the same object). If the lid is removed during a cycle, the machine will stop.

**Note:** In rare instances (heavy chuck, high rotation speed), a Motion Error may occur. Power to the motor will be cut and the chuck will coast to a stop. This will not damage the machine.



## 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 operations 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).

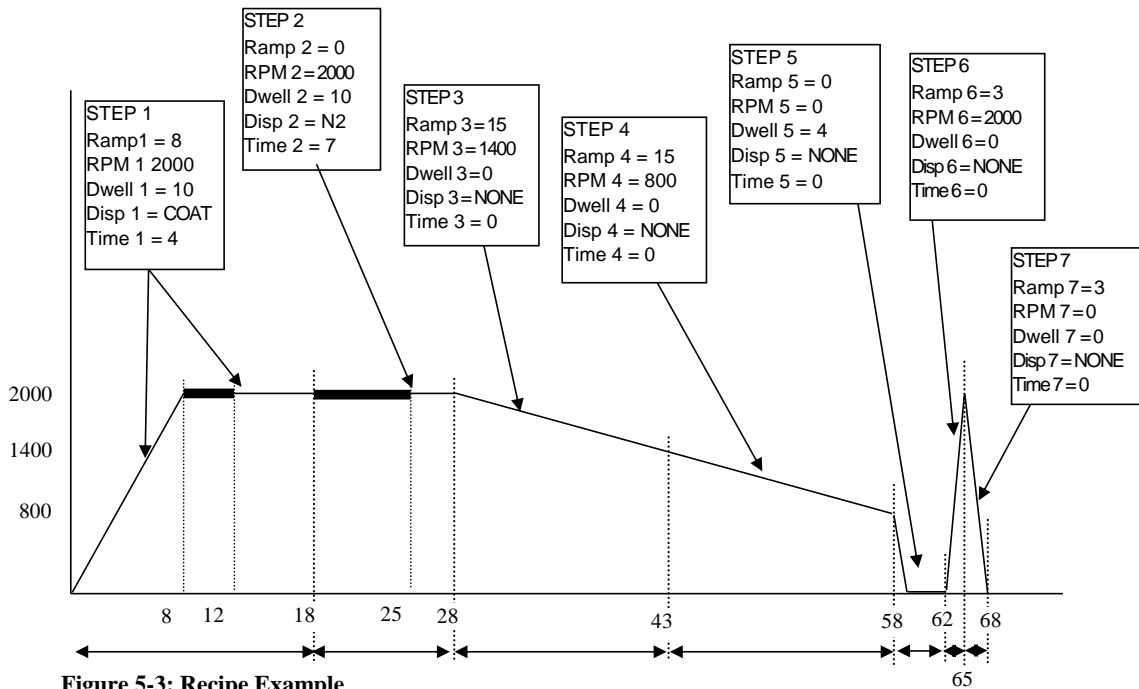


Figure 5-3: Recipe Example

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 N<sub>2</sub> and the Time2 is 7 seconds (of N<sub>2</sub> 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 N<sub>2</sub> 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 <sub>2</sub> or clean, dry air purge is not present, or inadequate flow.	Verify or provide a N <sub>2</sub> 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 N<sub>2</sub>.
3. Carefully remove the vacuum chuck.
4. Clean the vacuum chuck and bowl thoroughly using the proper solvents.





## SECTION 6 MAINTENANCE

### 6.1 CLEANING

Use an appropriate solvent to clean the bowl and lid.

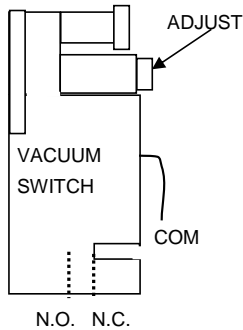
Avoid contact with painted surfaces when using solvents such as N-Methylpyrrolidone (NMP). These solvents will damage/remove paint.

### 6.2 MAINTENANCE SCHEDULE

Frequency	Task	Responsibility
As needed	Clean out bowl	Operator
Daily	Clean Check N <sub>2</sub> or clean, dry air connections	Operator
Weekly	Check hoses and fittings Check electrical connections	Maintenance
Periodically	Refer to vendor literature to maintain associated components	As appropriate

### 6.3 VACUUM SWITCH ADJUSTMENT

See Figure 6-1. 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:



**Figure 6-1: Vacuum Switch Adjustment**

1. Turn the vacuum adjust screw fully clockwise and turn on the machine and vacuum.
2. Push the **START** button.
3. While the cycle is running, slowly turn the vacuum adjust counterclockwise until the unit stops and the "CHECK VACUUM" messages is displayed.
4. Turn back ¼ turn (clockwise).

Verify machine operation.

### 6.4 FLOW SWITCH ADJUSTMENT

The flow switch is properly adjusted before the spin coater is shipped; if something should make readjustment necessary follow the appropriate procedure.

#### Units with internal vacuum pump:

1. Turn power off, remove pressure.
2. Remove the muffler from the top of the flow switch and connect a flow meter.
3. Set the incoming pressure to 60-80 psi.
4. Adjust the needle valve (at the bottom of the flow switch) to give 0.55 cfm.
5. Remove air pressure, then remove the flow meter and replace the muffler.
6. The procedure is complete. Verify machine operation

#### Units without internal vacuum pump:

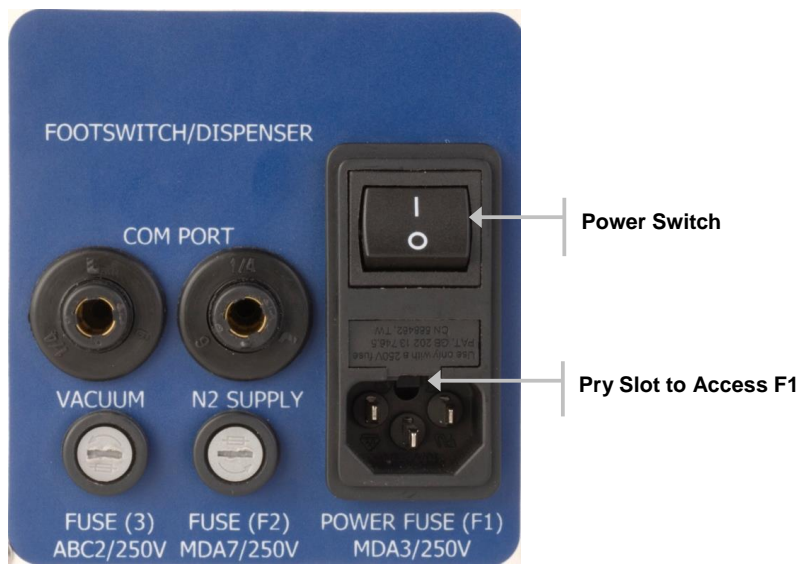
1. With machine turned On, adjust flow with incoming pressure regulator up from zero until flow switch actuates (characters will appear on machine display).
2. Verify actual flow of at least .55cfm using an external gauge.
3. The procedure is complete. Verify machine operation.

## 6.5 CHANGING THE FUSES

**Fuses F2 and F3** are in commonly used fuse carriers. Turn the cap with a small flat-blade screwdriver and pull out the fuse and carrier. Replace with only with an exact electrical equivalent.

**Fuse F1** is in the main power cord/switch assembly. *Note that the correct voltage (115V or 230V) shows through the voltage display window near the top of the assembly.*

1. Above the voltage indication window are two notches. Use a small flat blade screwdriver to pry open the hinged cover.
2. Inside, is the fuse carrier. Space at the sides will allow you to pry the carrier out. *Note which side of the carrier has the fuse in it.*
3. Replace the fuse with an exact electrical equivalent. *Make sure the fuse is in the proper side of the carrier.*
4. Return the carrier and press it fully into its holder. *Make sure the writing for the correct voltage will show through the window when the cover is snapped back into place.*
5. Press the cover into place (it will snap closed if the fuse carrier is properly seated), and *check to see that the proper voltage number shows through the window.*



**Figure 6-2: Fuse Replacement**



## SECTION 7 REPLACEMENT PARTS

Drawings showing major assemblies for the spin coater are included in this manual. To help you identify items, we have numbered them on the drawings and in the left-most column of the bill of material listing on the drawing.

### 7.1 OPTIONAL VACUUM CHUCKS

Accessory chucks for SCS Spin Coaters 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 1/4-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

<b>TYPE L: O-RING VACUUM HOLDING CHUCK WITH MECHANICAL LOCATING (L) FINGERS</b>	
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	





## SECTION 8 LIMITED WARRANTY POLICY

**Comment [RBT2]:** Updated to include items from Instruments warranty. 1-6-2003

- 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

## SECTION 9 NEED ASSISTANCE?



### TO EXPEDITE YOUR SERVICE REQUEST:

Please complete the following questionnaire, and have it readily available, before contacting SCS for customer assistance. Providing all of the requested information will help to ensure the most rapid response to a request for service when contacting us.

**PLEASE NOTE: SCS requires all returns are accompanied by a Return Material Authorization (RMA).** Equipment:

Equipment Type/Model \_\_\_\_\_ Serial Number \_\_\_\_\_

Specialty Coating Systems representative (if known)

\_\_\_\_\_.

### IF FAXING A REQUEST, PLEASE INCLUDE THE FOLLOWING INFORMATION:

Company Name: \_\_\_\_\_

Contact Name: \_\_\_\_\_

Position/Title: \_\_\_\_\_

Phone: \_\_\_\_\_

Email: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

### CONTACT US:

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

FAX: FAX (317) 240-2073

EMAIL: [SCScustomerservice@SCScoatings.com](mailto:SCScustomerservice@SCScoatings.com)

MAIL: Specialty Coating Systems

7645 Woodland Drive

Indianapolis, IN 46278-2707

NOTE: We hope that this manual meets all of your needs. If, however, you notice an error, typo, omission, or organizational problem, please send e-mail to

[SCStechwriter@SCScoatings.com](mailto:SCStechwriter@SCScoatings.com)



## **SECTION 10 TECHNICAL LITERATURE**


TIMER

NAIS PM5S

VACUUM PUMP

GAST Series 23

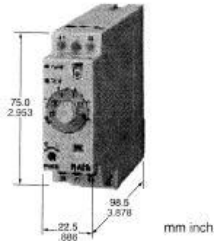




**DIN24 SIZE  
MULTI-RANGE ANALOG TIMER**

PM5S-A/S/M

**PM5S-A  
PM5S-S  
PM5S-M**



C-UL File No.: E59504 (Vol. 3)



**Features**

- 24-240V AC/DC free-voltage input
- Built-in Screw terminals
- 6 different operation modes: (PM5S-A)
- Multiple time ranges — 1 s to 500 h (Max.)
- Slim body — DIN 22.5 mm .886 inch
- 0 setting instantaneous output operation
- UL/C-UL/CE approval

**Product types**

Type	Operation mode	Contact arrangement	Time range	Protective construction	Rated operating voltage	Part number
PM5S-A	6 operation modes • Pulse ON-delay • Pulse Flicker • Pulse ON-flicker • Signal OFF-delay • Pulse One-shot • Pulse One-cycle	Relay Timed-out 2 Form C	16 selectable ranges 1s to 500h	IP40	24 to 240V AC/DC	PM5S-A-24-240V
PM5S-S	Power ON-delay	Relay Timed-out 2 Form C				PM5S-S-24-240V
PM5S-M	6 operation modes (With instantaneous contact) • Pulse ON-delay • Pulse Flicker • Pulse ON-flicker • Signal OFF-delay • Pulse One-shot • Pulse One-cycle	Relay Timed-out 1 Form C Instantaneous 1 Form C				PM5S-M-24-240V

**Time range**

Scale	Time unit			
	sec	min	hrs	10h
1	0.1s to 1s	0.1 min to 1 min	0.1h to 1h	1.0h to 10h
5	0.5s to 5s	0.5 min to 5 min	0.5h to 5h	5h to 50h
10	1.0s to 10s	1.0 min to 10 min	1.0h to 10h	10h to 100h
50	5s to 50s	5 min to 50 min	5h to 50h	50h to 500h

PM5S-A/PM5S-S/PM5S-M  
All types of PM5S timer have multi-time range.  
16 time ranges are selectable.  
1s to 500h (Max. range) is controlled.

Note: 0 setting is for instantaneous output operation.

PM5S-A/S/M

CHARACTERISTICS

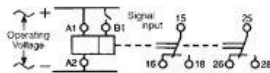
Item	Type	PM5S-A	PM5S-S	PM5S-M
Rating	Rated operating voltage	24 to 240V AC/DC		
	Rated frequency	50/60Hz common		
	Rated power consumption	2.6 VA (AC), 1.4 W (DC)		
	Output rating	5A 250V AC (resistive load)		
	Operating mode	Pulse ON-delay Pulse Flicker Pulse ON-Flicker Signal OFF-delay Pulse One-shot Pulse One-cycle	Power ON-delay	Pulse ON-delay Pulse Flicker Pulse ON-Flicker Signal OFF-delay Pulse One-shot Pulse One-cycle (with instantaneous contact)
Time accuracy Note: 1)	Time range	1s to 500h (Max.) 18 time ranges switchable		
	Operating time fluctuation	±0.3% (power off time change at the range of 0.1s to 1h)		
	Setting error	±10% (Full-scale value)		
	Voltage error	±0.5% (at the operating voltage changes between 85 to 110%)		
Contact	Temperature error	±2% (at 20°C ambient temp. at the range of -10 to +55°C +14 to +131°F)		
	Contact arrangement	Timed-out 2 Form C		Timed-out 1 Form C Instantaneous 1 Form C
	Contact resistance (Initial value)	Max. 100mΩ (at 1A 8V DC)		
	Contact material	Silver alloy		Au flash on Silver alloy
Life	Mechanical (contact)	2×10 <sup>7</sup>		1×10 <sup>7</sup>
	Electrical (contact)	10 <sup>7</sup> (at rated control capacity)		
Electrical function	Allowable operating voltage range	85 to 110% of rated operating voltage (at 20°C coil temp.)		
	Insulation resistance (Initial value)	Min. 100MΩ Between live and dead metal parts Between input and output Between contacts of different poles Between contacts of same pole (At 500V DC)		
	Breakdown voltage (Initial value)	2,000Vrms for 1 min Between live and dead metal parts 2,000Vrms for 1 min Between input and output 2,000Vrms for 1 min Between contacts of different poles 1,000Vrms for 1 min Between contacts of same pole		
	Min. power off time	100ms		
	Max. temperature rise	55°C 131°F		65°C 149°F
Mechanical function	Shock resistance	Functional	Min. 98m/s <sup>2</sup> (4 times on 3 axes)	
		Destructive	Min. 980m/s <sup>2</sup> (5 times on 3 axes)	
	Vibration resistance	Functional	10 to 55Hz: 1 cycle/min Single amplitude of 0.35mm (10min on 3 axes)	
		Destructive	10 to 55Hz: 1 cycle/min Single amplitude of 0.75mm (1h on 3 axes)	
Operating condition	Ambient temperature	-10 to +55°C +14 to +131°F		
	Ambient humidity	Max. 85%RH		
	Atmospheric pressure	860 to 1,060hPa		
	Ripple factor (DC)	20%		
Others	Protective construction	IP40		
	Weight	120g 4.233 oz		

Note: 1) Unless otherwise specified, the measurement conditions at the maximum scale time standard are specified to be the rated operating voltage (within 5% ripple factor for DC), 20°C 68°F ambient temperature, and 1s power off time.  
2) For the 1s range, the tolerance for each specification becomes ±10ms.

WIRING DIAGRAMS

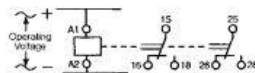
PM5S-A

- Timed-out 2 Form C



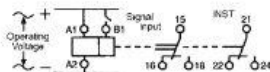
PM5S-S

- Timed-out 2 Form C

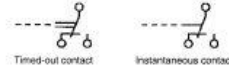


PM5S-M

- Timed-out 1 Form C
- Instantaneous 1 Form C



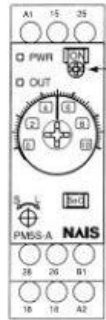
Contact





PM5S-A/S/M

**MODE SELECTION**  
PM5S-A/M type

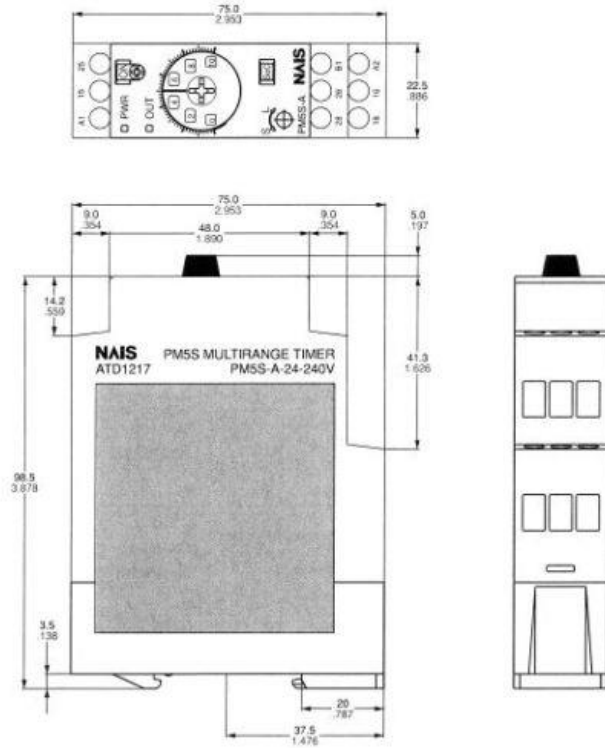


Operation mode indicator  
Selectable from 8 operation modes  
ON: ON-delay  
FL: Flicker  
FO: ON-flicker  
SF: Signal OFF-delay  
OS: Pulse One-shot  
OC: Pulse One-cycle

The 6 operation modes of PM5S-A and PM5S-M can be selected by the operation mode selector switch. In the next pages the different modes will be explained.

**DIMENSIONS**  
PM5S-□

mm inch



PM5S-A/S/M

OPERATION MODE

PM5S-A/M

\* LED lighting \* LED flickering  
T: Setting time  $t_1, t_2 < T$

Operation mode	Operation	Time chart
<p><b>ON-delay</b></p> <p>ON</p>	<p>Turn the operation selector to <b>ON</b>.</p> <p>Timing operation starts when terminals A1 – B1 are connected while power is on. Control output is turned on after the set time regardless of duration of operation signal</p>	
<p><b>Flicker</b></p> <p>FL</p>	<p>Turn the operation selector to <b>FL</b>.</p> <p>Timing operation starts when terminals A1 – B1 are connected while power is on. Control output repeatedly turn OFF and ON regardless of operation signal input time.</p>	
<p><b>ON-flicker</b></p> <p>FO</p>	<p>Turn the operation selector to <b>FO</b>.</p> <p>Timing operation starts when terminals A1 – B1 are connected while power is on. Control output repeatedly turns ON and OFF regardless of operation signal input time.</p>	
<p><b>Signal OFF-delay</b></p> <p>SF</p>	<p>Turn the operation selector to <b>SF</b>.</p> <p>Timing operation starts when terminals A1 – B1 are opened while power is on. Control output is turned off after the set time. If the signal input turns OFF during timing operation, the timing operation starts at that point again.</p>	
<p><b>One-shot</b></p> <p>OS</p>	<p>Turn the operation selector to <b>OS</b>.</p> <p>Timing operation starts when terminals A1 – B1 are connected while power is ON. Control output continues ON state while timing operation.</p>	

Note: Keep 0.1s or more for power off time.  
Keep 0.05s or more for signal, input time.

PM5S-A/S/M

Operation mode	Operation	Time chart
<p><b>One-cycle</b></p> <p>OC</p>	<p>Turn the operation selector to OC.</p> <p>Timing operation starts when terminals A1 – B1 are connected while power is ON.</p> <p>Control output is turned on after the set time, the pulse is 0.5 to 1.0 s.</p>	

Note: Keep 0.1s or more for power off time.  
Keep 0.05s or more for signal, input time.

**OPERATION MODE**

**PM5S-S**

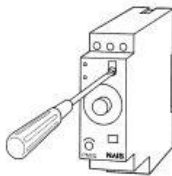
(\* LED lighting \* LED flickering)  
T: Setting time

Operation mode	Operation	Time chart
<p><b>Power ON-delay</b></p>	<p>When power is applied continuously, the time cycle begins. The output contacts change state after the time delay is completed.</p>	

**MODES & TIME SETTING**

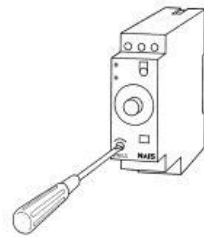
**1) Operation mode setting [PM4H-A]**

6 operation modes are selectable with operation mode selector.  
Turn the operation mode selector with screw driver.  
Operation mode is shown up through the window above the mode selector. The marks are [0], [R], [C], [F], [S], [OC]. Turn the mode selector to the mark until you can check by clicking sound.  
Confirm the mode selector position if it is correct.  
If the position is not stable, the timer might mis-operate.



**2) Time setting [common]**

16 time ranges are selectable between 1s to 500h.  
Turn the time range selector with the screw driver.  
Clockwise turning increases the time range, and Counter-clockwise turning decrease the time range.  
Confirm the range selector position if it is correct.



**3) Time setting [common]**

To set the time, turn the set dial to a desired time within the range.  
Instantaneous output will be on when the dial is set to "0".  
When the instantaneous output is used, the dial should be set under "0" range. (Instantaneous output area)  
When power supply is on, the time range, setting time and operation mode cannot be changed.  
Turn off the power supply is applied to set the new operation mode.  
To set the time in the range, turn the dial to a desired time scale. Do not turn the dial beyond the stopper.

**• Cautions for Time setting/Operating mode setting**

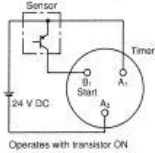
- 1) Time chart
  - T shots setting time, t1 and t2 means the time in setting time. (t1, t2 < T)
  - When the output relay is turned on, NO contact is closed and NC contact is opened.
  - LED indication \* shows "Turn ON"
- 2) Timing operation starts when power is applied to terminals A1 – B1  
Input signal time should be taken over 0.05 sec.  
Short-circuited condition: Max. 1kΩ  
Open-circuited condition: Min. 100kΩ

**PM5S-A/S/M**

**INPUT CONNECTIONS**

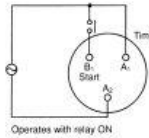
The inputs of the PM5S-A/M are voltage (voltage imposition or open) inputs.

No-contact input  
(Connection to PNP output sensor.)



Operates with transistor ON

Contact input



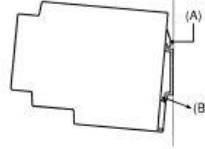
Operates with relay ON

**Voltage Input Signal Levels**

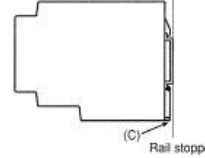
No-contact input	1. Transistor ON Residual voltage: 1 V max. (Voltage between terminals B <sub>1</sub> and A <sub>2</sub> must be more than the rated "H-level" voltage (20.4 V DC min..))
	2. Transistor OFF Leakage current: 0.01 mA max. (Voltage between terminals B <sub>1</sub> and A <sub>2</sub> must be less than the rated "L-level" voltage (2.5 V DC max..))
Contact input	Use contacts that can adequately switch 0.1 mA at each voltage to be imposed. (When the contacts are ON or OFF, voltage between terminals B <sub>1</sub> and A <sub>2</sub> must be within the following ranges. When contacts are ON: 20.4 to 264 V AC/DC When contacts are OFF: 0 to 2.5 V AC/DC

**MOUNTING AND DISMOUNTING**

The PM5S should be mounted as horizontally as possible. When mounting the PM5S on a socket mounting track, hook portion (A) of the Timer to an edge of the track first, and then depress the Timer in the direction of (B).



When dismantling the PM5S pull out portion (C) with a flat-blade screwdriver and remove the Timer from the mounting track.



**CAUTIONS FOR USE**

**Cautions**

1) Prevent using the timer in such places where flammable or corrosive gas is generated, a lot of dust exists, oil is splashed or considerable shock and vibration occur.

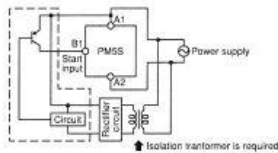
2) Since the body cover is consisted of polycarbonate resin, prevent from contact with organic solvents such as methyl alcohol, benzine and thinner, or strong alkali materials such as ammonia and caustic soda.

**POWER SUPPLIES**

The PM5S Series is provided with a transformerless power supply system. An electric shock may be received if the input terminal or the output type selector switch is touched while power is being supplied.

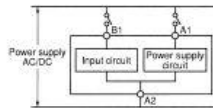
Use the bar terminal for wiring the PM5S. Using a stranded-wire terminal may cause a short-circuit due to a stray wire entering into the Timer.

For the power supply of the input device, use a single-phase or double-phase insulated power transformer. The second-phase side must not be grounded.



Isolation transformer is required.

- Input and Power supply circuit (PM5-A/M)
- Since input circuit and power supply circuit is independent, it is possible to switch ON and OFF for input circuit regardless power ON and OFF.



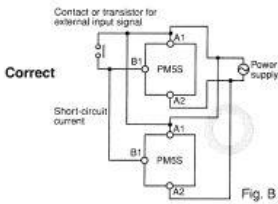
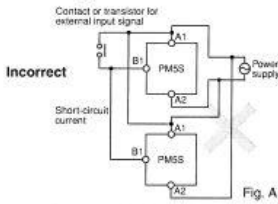
Note that the contact of input circuit is given same voltage as power voltage.

PM5S-A/S/M

**TERMINAL CONNECTIONS**

- Refer to the terminal layout and wiring diagram and securely connect the terminals accordingly.
- Do not allow control output to exceed rated control capacity.

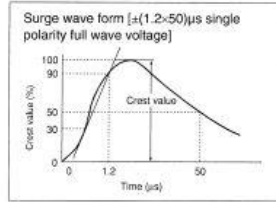
1. When one input signal is simultaneously applied to more than one timer, be sure to avoid the wiring shown in Fig. A. Otherwise, the short-circuit current will flow and cause damage. Be sure to align the polarity of the power supply as shown in Fig. B.



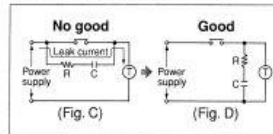
The PM5S series is provided with a transformer less power supply system.

2. External surge protection may be required if the following values are exceeded. Otherwise, the internal circuit will be damaged.

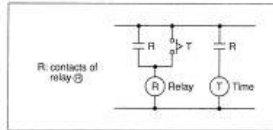
Operating voltage	24 to 240 V AC
Surge voltage	4,000 V



3. For connecting and disconnecting operating voltage to the timer, a circuit should be used to prevent the flow of leakage current. For example, a circuit for contact protection as shown in Fig. C will permit leakage current to flow through R and C, causing erroneous operation of the timer. Instead, the circuit shown in Fig. D should be used.



4. In order to maintain the characteristics of the timer, long continuous current flow through the timer, causing generation of heat internally should be avoided because of the degradation it can cause. For such long continuous operation, the circuit shown below should be used.





PART NO. 70 - 6850 G496PL (REV-D)

## 74R & 75R SERIES ROCKING PISTON OIL-LESS PUMPS OPERATION & MAINTENANCE MANUAL



Model 74R Shown



Model 75R6 Shown

Thank you for purchasing this Gast product. It is manufactured to the highest standards using quality materials. Please follow all recommended maintenance, operational and safety instructions and you will receive years of trouble free service.

**IMPORTANT: PLEASE READ THIS MANUAL AND SAVE FOR FUTURE REFERENCE.**

#### Product Use Criteria:

- Pump only clean, dry air.
- Operate at 32°F - 104°F (0°C - 40°C).
- Protect unit from dirt & moisture.
- Do not pump flammable or explosive gases or use in an atmosphere that contains such gases.
- Protect all surrounding items from exhaust air. This exhaust air can become very hot.
- Corrosive gases and particulate material will damage unit. Water vapor, oil-based contaminants or other liquids must be filtered out.
- Consult your Gast Distributor/Representative before using at high altitudes.
- This pump is oil-less and requires NO lubrication.




ISO 9001 &amp; 14001 CERTIFIED

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**Your safety and the safety of others is extremely important.**

We have provided many important safety messages in this manual and on your product. Always read and obey all safety messages.

 This is the safety alert symbol. This symbol alerts you to hazards that can kill or hurt you and others. The safety alert symbol and the words "DANGER" and "WARNING" will precede all safety messages. These words mean:

** DANGER**

You **will** be killed or seriously injured if you don't follow instructions.

** WARNING**

You **can** be killed or seriously injured if you don't follow instructions.

All safety messages will identify the hazard, tell you how to reduce the chance of injury, and tell you what can happen if the safety instructions are not followed.

**INSTALLATION**

** WARNING**



**Electrical Shock Hazard**

Disconnect electrical power at the circuit breaker or fuse box before installing this product.

Install this product where it will not come into contact with water or other liquids.

Install this product where it will be weather protected.

Electrically ground this product.

Failure to follow these instructions can result in death, fire or electrical shock.

Correct installation is your responsibility. Make sure you have the proper installation conditions and that installation clearances do not block air flow.

Blocking air flow over the product in any way can cause the product to overheat.

**Mounting**

This product can be installed in any orientation. Mounting the product to a stable, rigid operating surface and using shock mounts will reduce noise and vibration.

**Plumbing**

Remove plugs from the IN and OUT ports. Connect with pipe and fittings that are the same size or larger than the product's threaded ports. Be sure to connect the intake and exhaust plumbing to the correct inlet and outlet ports. Ports will not support plumbing.

**Accessories**

The product's external intake and exhaust muffler will provide adequate filtration in most applications. Check filters periodically and replace when necessary. Consult your Gast Distributor/Representative for additional filter recommendations.

Install relief valves and gauges at inlet or outlet or both, to monitor performance. Check valves may be required to prevent back streaming through the pump.

**Motor Control**

It is your responsibility to contact a qualified electrician and assure that the electrical installation is adequate and in conformance with all national and local codes and ordinances. The metal capacitor must be grounded.

Determine the correct overload setting required to protect the motor (see motor starter manufacturer's recommendations). Select fuses, motor protective switches or thermal protective switches to provide protection. Fuses act as short circuit protection for the motor, not as protection against overload. Incoming line fuses must be able to withstand the motor's starting current. Motor starters with thermal magnetic overload or circuit breakers protect motor from overload or reduced voltage conditions.

The wiring diagram supplied with the product provides required electrical information. Check that power source is correct to properly operate the dual-voltage motors.

**Electrical Connection**

** WARNING**



**Electrical Shock Hazard**

This product must be properly grounded.

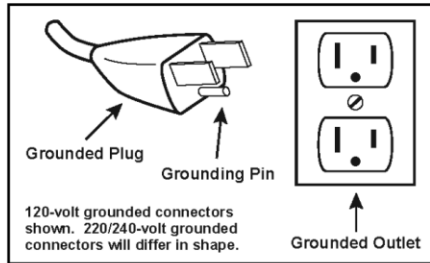
Do not modify the plug provided. If it will not fit the outlet, have the proper outlet installed by a qualified electrician.

If repair or replacement of the cord or plug is necessary, do not connect the grounding wire to either flat blade terminal. The wire with insulation that is green or green with yellow stripes is the grounding wire.

Check the condition of the power supply wiring. Do not permanently connect this product to wiring that is not in good condition or is inadequate for the requirements of this product.

Failure to follow these instructions can result in death, fire or electrical shock.





**Model with a power supply cord:**

This product must be grounded. For either 120-volt or 220/240-volt circuits connect power supply cord grounding plug to a matching grounded outlet. Do not use an adapter. (See above diagram.)

In the event of an electrical short circuit, grounding reduces the risk of electric shock by providing an escape wire for the electric current. This product may be equipped with a power supply cord having a grounding wire with an appropriate grounding plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.

Check with a qualified electrician or serviceman if the grounding instructions are not completely understood, or if you are not sure whether the product is properly grounded. Do not modify the plug provided. If it will not fit the outlet, have the proper outlet installed by a qualified electrician.

**Model that is permanently wired:**

This product must be connected to a grounded, metallic, permanent wiring system, or an equipment grounding terminal or lead on the product.

Power supply wiring must conform to all required safety codes and be installed by a qualified person. Check that supply voltage agrees with that listed on product nameplate.

**Extension cords:**

Use only a 3-wire extension cord that has a 3-blade grounding plug. Connect extension cord plug to a matching 3-slot receptacle. Do not use an adapter. Make sure your extension cord is in good condition. Check that the gage wire of the extension cord is the correct size wire to carry the current this product will draw.

An undersized cord is a potential fire hazard, and will cause a drop in line voltage resulting in loss of power causing the product to overheat. The following table indicates the correct size cord for length required and the ampere rating listed on the product nameplate. **If in doubt, use the next heavier gage cord. The smaller the gage number, the heavier the wire gage.**

Amps	Volts	Length of cord in feet												
		25	50	100	150	200	250	300	400	500				
	120v													
	240v	50	100	200	300	400	500	600	800	1000				
0-2		18	18	18	16	16	14	14	12	12				
2-3		18	18	16	14	14	12	12	10	10				
3-4		18	18	16	14	12	12	10	10	8				
4-5		18	18	14	12	12	10	10	8	8				
5-6		18	16	14	12	10	10	8	8	8				
6-8		18	16	12	10	10	8	8	6	6				
8-10		18	14	12	10	8	8	6	6	4				
10-12		16	14	10	8	8	6	6	4	4				
12-14		16	12	10	8	6	6	6	4	2				
14-16		16	12	10	8	6	6	4	4	2				
16-18		14	12	8	8	6	4	4	2	2				
18-20		14	12	8	6	6	4	4	2	2				

**OPERATION**

**! WARNING**

**Injury Hazard**

Install proper safety guards as needed. Keep fingers and objects away from openings and rotating parts. When provided, motor terminal covers must be in place for safe operation. Product surfaces become very hot during operation, allow product surfaces to cool before handling. Air stream from product may contain solid or liquid material that can result in eye or skin damage, wear proper eye protection. Wear hearing protection. Sound level from motor may exceed 70 dBA. Failure to follow these instructions can result in burns, eye injury or other serious injury.

It is your responsibility to operate this product at recommended pressures or vacuum duties and room ambient temperatures. Do not start against a vacuum or pressure load.

**Start Up**  
If motor fails to start or slows down significantly under load, shut off and disconnect from power supply. Check that the voltage is correct for motor and that motor is turning in the proper direction. Check the plug, cord and switch for damage. If so equipped, the thermal protection switch has tripped, the motor can restart after cooling.

**MAINTENANCE****! WARNING****Electrical Shock Hazard**

Disconnect electrical power supply cord before performing maintenance on this product.

If product is hard wired into system, disconnect electrical power at the circuit breaker or fuse box before performing maintenance on this product.

Failure to follow these instructions can result in death, fire or electrical shock.

**! WARNING****Injury Hazard**

Product surfaces become very hot during operation, allow product surfaces to cool before handling.

Air stream from product may contain solid or liquid material that can result in eye or skin damage, wear proper eye protection.

Clean this product in a well ventilated area.

Failure to follow these instructions can result in burns, eye injury or other serious injury.

It is your responsibility to:

- Regularly inspect and make necessary repairs to product in order to maintain proper operation.
- Make sure that pressure is released from product before starting maintenance.

Check intake and exhaust filters after first 500 hours of operation. Clean filters and determine how frequently filters should be checked during future operation. This one procedure will help to assure the product's performance and service life.

1. Disconnect electrical power supply to unit.
2. Vent all air lines.
3. Remove filter cover.
4. Check filter felt. Replace felt if it is covered with contamination or shows signs of increasing differential pressure.
5. Reinstall felt and filter cover.

Check that all external accessories such as relief valves and gauges are attached to cover and are not damaged before re-operating product.

**SHUTDOWN PROCEDURES**

It is your responsibility to follow proper shutdown procedures to prevent product damage.  
**NEVER ADD OIL TO THIS OIL-LESS PUMP.**

Proper shutdown procedures must be followed to prevent pump damage. Failure to do so may result in premature pump failure. Gast Manufacturing Rocking Piston Oil-Less Pumps are constructed of ferrous metals or aluminum which are subject to rust and corrosion when pumping condensable vapors such as water. Follow the steps below to assure correct storage and shutdown between operating periods.

1. Disconnect plumbing.
2. Operate product for at least 5 minutes without plumbing.
3. Run at maximum vacuum for 10 to 15 minutes.
4. Repeat step 2.
5. Disconnect power supply.
6. Plug open ports to prevent dirt or other contaminants from entering product.

**SERVICE KIT INSTALLATION****! WARNING****Electrical Shock Hazard**

Disconnect electrical power supply cord before installing Service Kit.

If product is hard wired into system, disconnect electrical power at the circuit breaker or fuse box before installing Service Kit.

Vent all air lines to release pressure or vacuum.

Failure to follow these instructions can result in death, fire or electrical shock.

**Gast will NOT guarantee field-rebuilt product performance. For performance guarantee, the product must be returned to a Gast Authorized Service Facility.**

Service Kit contents vary. Most contain gasket and filter parts.

1. Disconnect electrical power to pump.
2. Disconnect air supply and vent all air lines to release pressure or vacuum.
3. Mark the orientation of the ports so cover will be reinstalled correctly.
4. Remove screws from the head of the pump. Remove the head of the pump.
5. Mark orientation of valve plate(s). Remove valve plate(s).
6. Remove and discard old cups(s), retainer screws, cylinder O-ring(s), head O-ring(s), valves and valve retainers.
7. Install new cup(s) on rod(s) facing up.
8. Reinstall retainer plates.
9. Apply a thread locking compound (Loctite 222) to retainer screws. Torque screws to 34-38 in. lbs.
10. Carefully install cylinder(s) over cup(s) at an angle to avoid damaging cup(s).
11. Clean valve plates with water based solvent. Take care to not scratch valve seats.
12. Install valves and valve retainers. Check that the orientation with the ports is correct.
13. Apply a thread locking compound (Loctite 222) to retainer screws. Torque screws to 10-13 in. lbs.
14. Install cylinder O-ring(s) in the bottom of valve plate(s).
15. Check that the orientation of valve plate(s) with the ports is correct.
16. Install head O-rings in the O-ring grooves on top of valve plate.
17. Reinstall head over valve plate(s) checking that orientation with ports is correct.
18. Torque screws to 50 in. lbs.

**Check that all external accessories such as relief valves and gauges are not damaged before re-operating product.**

If pump still does not produce proper vacuum or pressure, send unit to a Gast Authorized Service Facility for repair.

## WARRANTY

Gast finished products, when properly installed and operated under normal conditions of use, are warranted by Gast to be free from defects in material and workmanship for a period of twelve (12) months from the date of purchase from Gast or an authorized Gast Representative or Distributor. In order to obtain performance under this warranty, the buyer must promptly (in no event later than thirty (30) days after discovery of the defect) give written notice of the defect to Gast Manufacturing Incorporated, PO Box 97, Benton Harbor Michigan USA 49023-0097 or an authorized Service Center (unless specifically agreed upon in writing signed by both parties or specified in writing as part of a Gast OEM Quotation). Buyer is responsible for freight charges both to and from Gast in all cases.

This warranty does not apply to electric motors, electrical controls, and gasoline engines not supplied by Gast. Gast's warranties also do not extend to any goods or parts which have been subjected to misuse, lack of maintenance, neglect, damage by accident or transit damage.

THIS EXPRESS WARRANTY EXCLUDES ALL OTHER WARRANTIES OR REPRESENTATIONS EXPRESSED OR IMPLIED BY ANY LITERATURE, DATA, OR PERSON. GAST'S MAXIMUM LIABILITY UNDER THIS EXCLUSIVE REMEDY SHALL NEVER EXCEED THE COST OF THE SUBJECT PRODUCT AND GAST RESERVES THE RIGHT, AT ITS SOLE DISCRETION, TO REFUND THE PURCHASE PRICE IN LIEU OF REPAIR OR REPLACEMENT.

GAST WILL NOT BE RESPONSIBLE OR LIABLE FOR INDIRECT OR CONSEQUENTIAL DAMAGES OF ANY KIND, however arising, including but not limited to those for use of any products, loss of time, inconvenience, lost profit, labor charges, or other incidental or consequential damages with respect to persons, business, or property, whether as a result of breach of warranty, negligence or otherwise. Notwithstanding any other provision of this warranty, BUYER'S REMEDY AGAINST GAST FOR GOODS SUPPLIED OR FOR NON-DELIVERED GOODS OR FAILURE TO FURNISH GOODS, WHETHER OR NOT BASED ON NEGLIGENCE, STRICT LIABILITY OR BREACH OF EXPRESS OR IMPLIED WARRANTY IS LIMITED SOLELY, AT GAST'S OPTION, TO REPLACEMENT OF OR CURE OF SUCH NONCONFORMING OR NON-DELIVERED GOODS OR RETURN OF THE PURCHASE PRICE FOR SUCH GOODS AND IN NO EVENT SHALL EXCEED THE PRICE OR CHARGE FOR SUCH GOODS. GAST EXPRESSLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE WITH RESPECT TO THE GOODS SOLD. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTIONS SET FORTH IN THIS WARRANTY, notwithstanding any knowledge of Gast regarding the use or uses intended to be made of goods, proposed changes or additions to goods, or any assistance or suggestions that may have been made by Gast personnel.

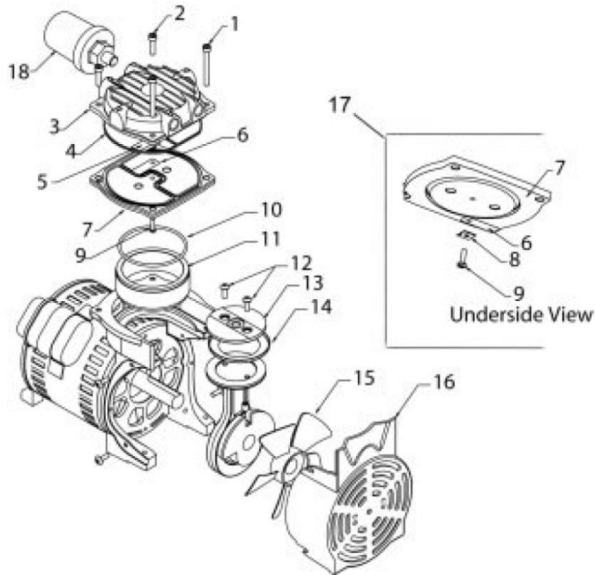
Unauthorized extensions of warranties by the customer shall remain the customer's responsibility.

CUSTOMER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF GAST PRODUCTS FOR CUSTOMER'S USE OR RESALE, OR FOR INCORPORATING THEM INTO OBJECTS OR APPLICATIONS WHICH CUSTOMER DESIGNS, ASSEMBLES, CONSTRUCTS OR MANUFACTURES.

This warranty can be modified only by authorized Gast personnel by signing a specific, written description of any modifications.

**EXPLODED PRODUCT VIEW, PARTS & ORDERING INFORMATION**

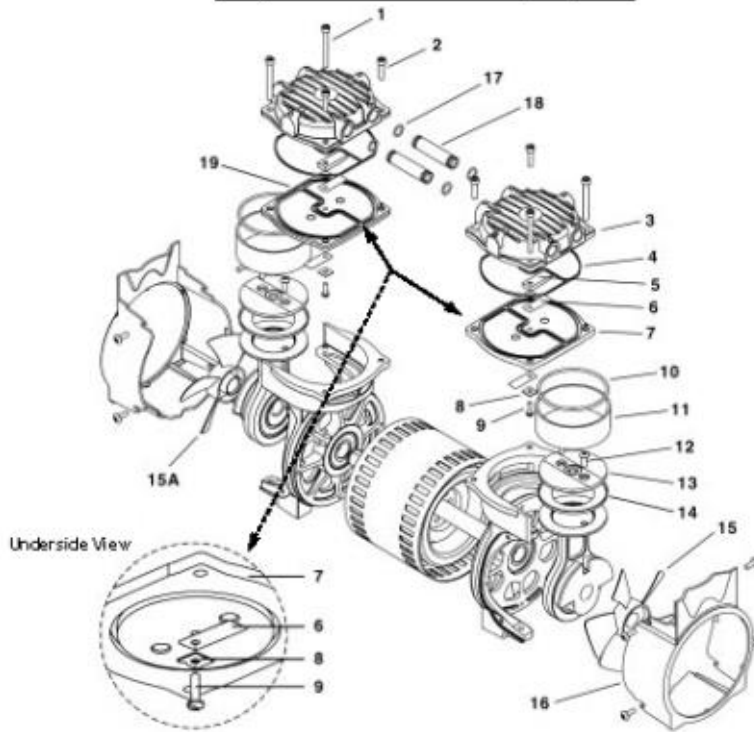
REF	DESCRIPTION	QTY	74R1	75R1
1	CAP SCREWS	2	BB570	BB570
2	CAP SCREWS	2	BB516C	BB516C
3	HEAD	1	AP200E	AP200E
4 Δ	HEAD O-RING	1	AP109	AP109
5	VALVE LIMITER	1	AP110	AP110
6 Δ	LEAF VALVES	2	AF817	AF817
7	VALVE PLATE	1	AP101A	AP101A
8	VALVE RETAINER	1	AF819A	AF819A
9	VALVE SCREW	1	BB330A	BB330A
10 Δ	CYLINDER O-RING	1	AT276	AT276
11	CYLINDER	1	AP119	AT275
12 Δ	RETAINER SCREWS	2	AT283	AT283
13	RETAINER PLATE	1	AT715	AT566A
14 Δ	PISTON CUP	1	AT329	AT280
15	FAN	1	AP108A	AP108A
16	GRILLE SHROUD	1	AP107A	AP107A
17	VALVE PLATE ASSEMBLY	1	AP102A	AP102A
18	FILTER	1	B300A	B300A
***	SERVICE KIT	1	K806	K806



\* 74R shown.  
 \*\*\* Item not shown.  
 Δ Denotes parts included in the Service Kit.  
 Parts listed are for stock models. For specific OEM models, please consult the factory.  
 When corresponding or ordering parts, please give complete model and serial numbers.

**EXPLODED PRODUCT VIEW, PARTS & ORDERING INFORMATION**

REF	DESCRIPTION	QTY	76 RB
1	CAP SCREW	4	BB740
2	CAP SCREW	4	BB180
3	HEAD	1	AP000A
			AP001A
4 Δ	HEAD O-RING	2	AP009
6	VALVE LIMITER	2	AP110
6 Δ	LEAF VALVE	4	AP017
7	VALVE PLATE	2	AP010A
8	VALVE RETAINER	2	AP019A
9	VALVE SCREW	2	BB000A
10 Δ	CYLINDER O-RING	2	AT278
11	CYLINDER	2	AT276
12 Δ	RETAINER SCREW	4	AT252
13	RETAINER PLATE	2	AT000A
14 Δ	RSTO CUP	2	AT252
15	FAN	1	AP000A
15A	FAN - LEAD END	1	AP000
16	ORILL SHROUD	1	AP007
17 Δ	O-RING	4	AP048
18	TUBE	2	AP026A
19	VALVE PLATE ASSEMBLY	2	AP002A
**	SERVICE KIT	1	K787



\* 75R shown.  
 \*\* Item not shown.  
 Δ Denotes parts included in the Service Kit.  
 Parts listed are for stock models. For specific OEM models, please consult the factory.  
 When corresponding or ordering parts, please give complete model and serial numbers.

**PART NO. 70 - 6850 G496PL (REV-D)****TROUBLESHOOTING CHART**

Low		High		Pump Overheat	Won't Start	Excess Noise	Reason and remedy for problem.
Vacuum	Pressure	Vacuum	Pressure				
*	*	*		*	*		Filter dirty. Clean or replace.
*	*		*	*	*		Muffler dirty. Clean or replace.
*	*						Valves dirty or valves bent. Clean or replace.
*	*						Worn cup. Repair or replace.
			*	*	*		Relief valve set too high. Inspect and adjust.
*	*						Relief valve set too low. Inspect and adjust.
*	*	*	*	*	*		Plugged vacuum/pressure line. Inspect and repair.
*		*					Collapsed vacuum line. Inspect and repair.
				*	*		Low voltage, won't start. Check power source.
				*	*	*	Voltage wrong. Check power source.
*	*					*	Worn cup/piston hitting cylinder. Replace.
				*		*	Cylinder misadjustment. Realign.
*	*				*		Leaky hose or check valve. Replace.
*	*			*	*	*	Dirt or liquid on top of piston. Inspect and clean.
*	*			*	*	*	Motor not wired correctly. Check wiring diagram/vline voltage.
*	*					*	Blown head gasket. Replace.

World Headquarters  
P.O. Box 97  
2590 Meadowbrook Rd.  
Beaumont Harbor, MI  
49023-0097  
Ph: 269-926-6171  
FAX: 269-926-8288  
www.gastmfg.com

Gast Hong Kong  
Unit 12, 21/F, Block B  
New Trade Plaza  
6, On Ping Street,  
Shekai  
N. T. Hong Kong  
Ph: (852) 2690 1008  
Fax: (852) 2690 1012  
www.gasthk.com



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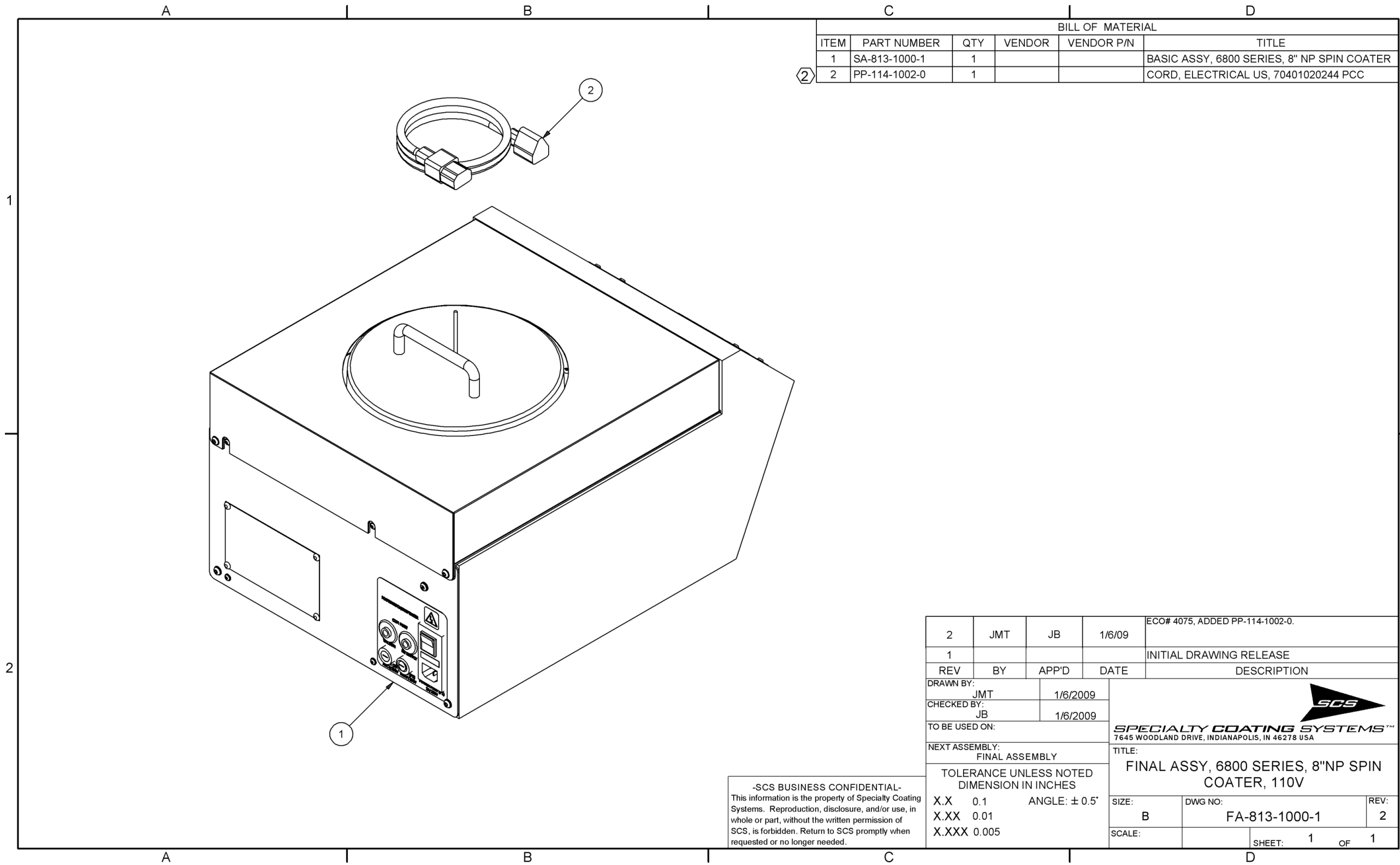
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## SECTION 11 DRAWINGS


FA-813-1000-1	Final Assembly 8" Non Programmable 110 Volts
FA-813-1001-1	Final Assembly 12" Programmable 110 Volts
FA-813-1003-1	Final Assembly 8" Non Programmable 220 Volts
FA-813-1004-1	Final Assembly 8" Programmable 110 Volts
FA-813-1005-1	Final Assembly 8" Programmable 220 Volts
FA-813-1006-1	Final Assembly 12" Programmable 220 Volts
AD-813-1000-1	Basic Assembly 8" Non Programmable
AD-813-1001-1	Basic Assembly 12" Programmable
AD-813-1004-1	Basic Assembly 8" Programmable
AD-046-1022-1	8" Bowl Assembly
AD-046-1024-1	12" Bowl Assembly
AD-385-1081-1	Housing Assembly 8"
AD-385-1087-1	Housing Assembly 12"
AD-089-1035-1	Capacitor Assembly
AD-662-1012-1	Resistor Assembly
AD-490-1042-1	Motor Assembly
AD-503-1006-1	Timer Assembly
AD-833-1028-1	Transformer Assembly
AD-017-1040-1	Lid Closed Switch Assembly
AD-550-1468-1	Facilities Panel Assembly
AD-225-1216-1	Detached Spinner Controls
ES-813-1000-1	Electrical Schematic
PS-812-1000-1	Pneumatic Schematic





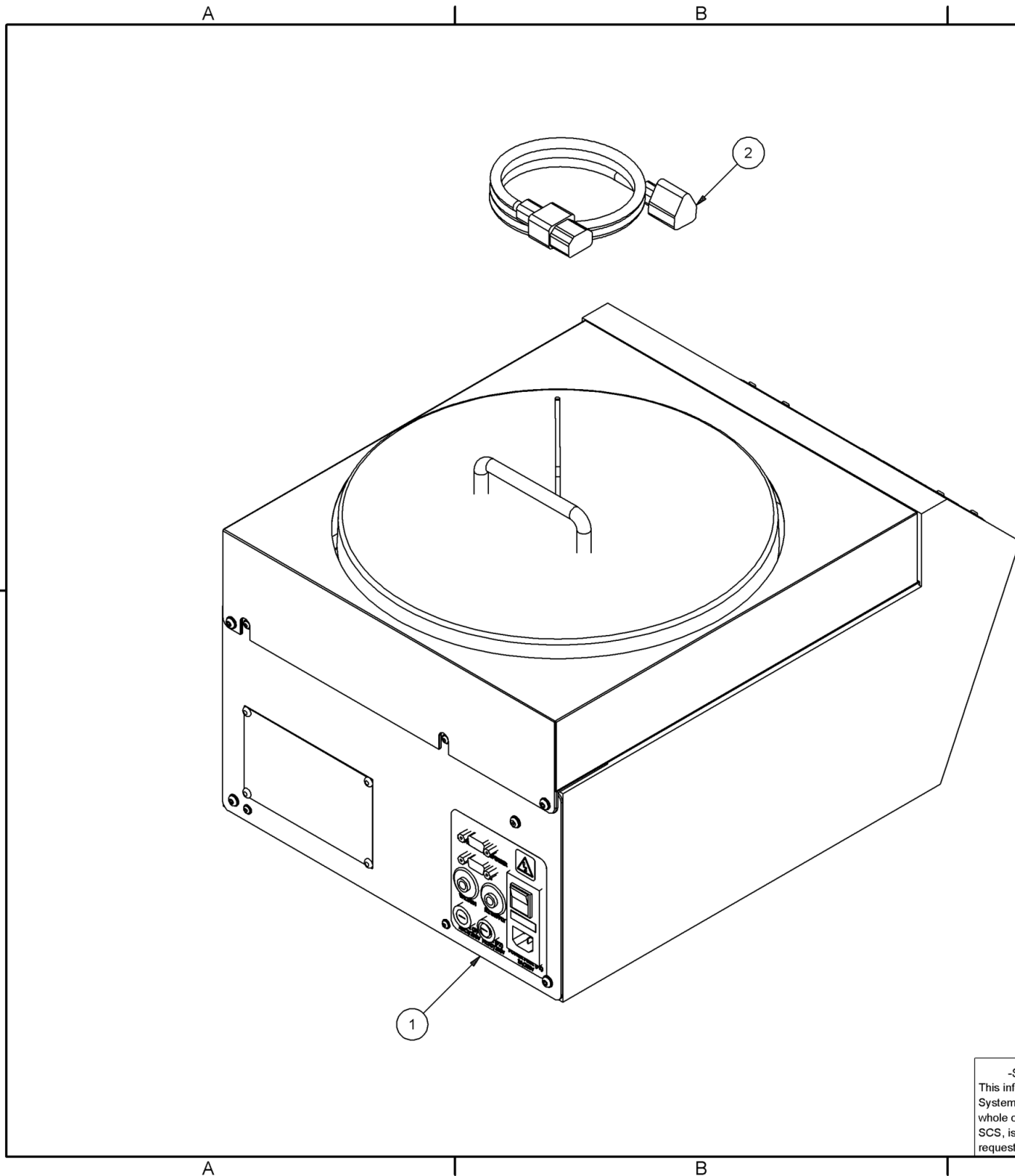


BILL OF MATERIAL					
ITEM	PART NUMBER	QTY	VENDOR	VENDOR P/N	TITLE
1	SA-813-1000-1	1			BASIC ASSY, 6800 SERIES, 8" NP SPIN COATER
2	PP-114-1002-0	1			CORD, ELECTRICAL US, 70401020244 PCC


2	JMT	JB	1/6/09	ECO# 4075, ADDED PP-114-1002-0.
1				INITIAL DRAWING RELEASE
REV	BY	APP'D	DATE	DESCRIPTION
DRAWN BY:				 <b>SPECIALTY COATING SYSTEMS™</b> 7645 WOODLAND DRIVE, INDIANAPOLIS, IN 46278 USA
JMT		1/6/2009		
CHECKED BY:		1/6/2009		
TO BE USED ON:				TITLE:
NEXT ASSEMBLY:				FINAL ASSY, 6800 SERIES, 8"NP SPIN COATER, 110V
FINAL ASSEMBLY				SIZE: B
TOLERANCE UNLESS NOTED DIMENSION IN INCHES				DWG NO: FA-813-1000-1
X.X	0.1	ANGLE: ± 0.5°		REV: 2
X.XX	0.01			
X.XXX	0.005	SCALE:		
				SHEET: 1 OF 1

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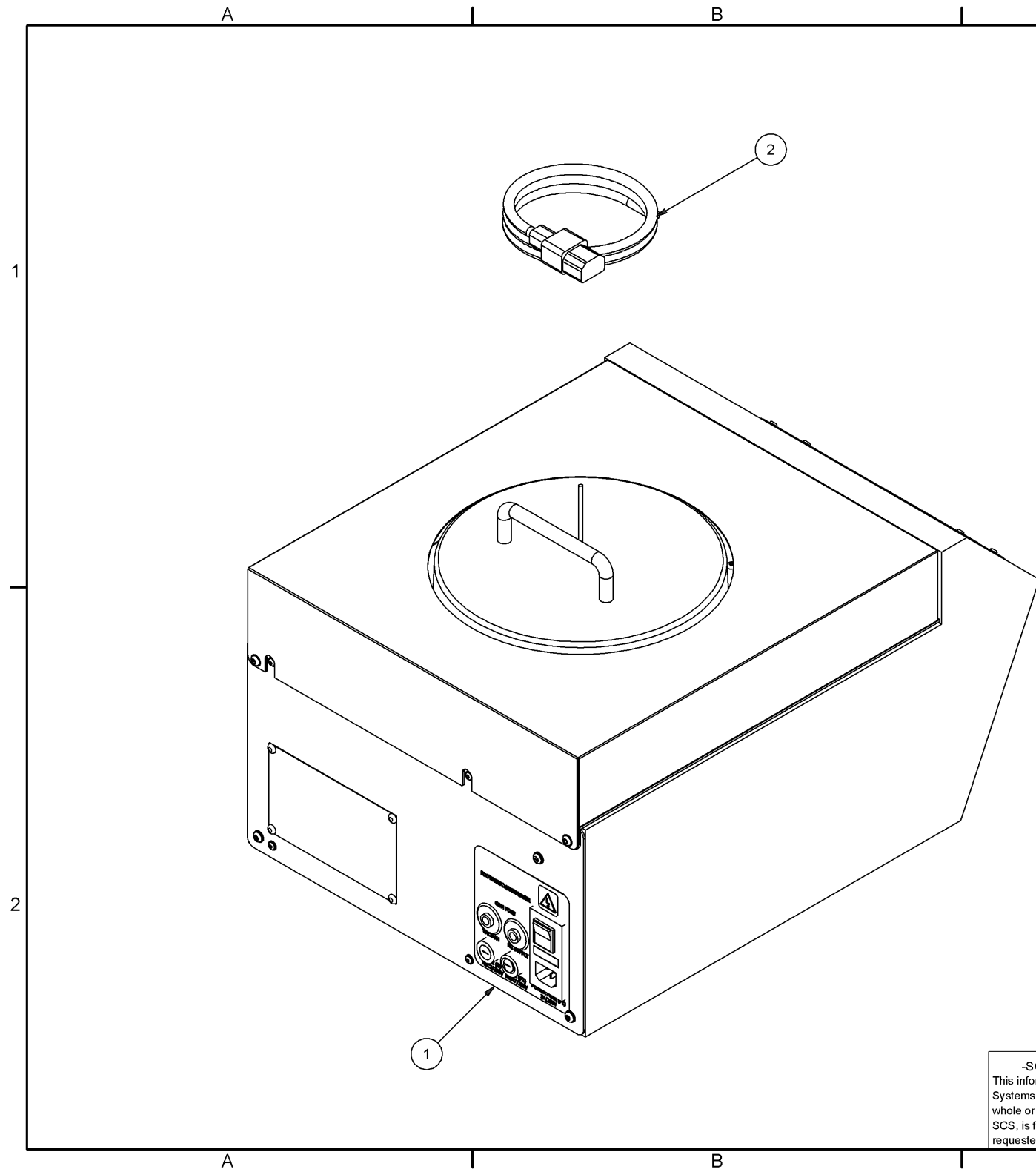


BILL OF MATERIAL					
ITEM	PART NUMBER	QTY	VENDOR	VENDOR P/N	TITLE
1	SA-813-1001-1	1			BASIC ASSY, 6800 SERIES, 12" P, SPIN COATER
2	PP-114-1002-0	1			CORD, ELECTRICAL US, 70401020244 PCC


1				INITIAL DRAWING RELEASE
REV	BY	APP'D	DATE	DESCRIPTION
DRAWN BY:		1/7/2009		 <b>SPECIALTY COATING SYSTEMS™</b> 7645 WOODLAND DRIVE, INDIANAPOLIS, IN 46278 USA
CHECKED BY:				
TO BE USED ON:				TITLE:
NEXT ASSEMBLY:				FINAL ASSY, 6800 SERIES, 12" P, SPIN COATER, 110V
FINAL ASSEMBLY				SIZE: B
TOLERANCE UNLESS NOTED DIMENSION IN INCHES				DWG NO: FA-813-1001-1
X.X	0.1	ANGLE: ± 0.5°		REV: 1
X.XX	0.01			
X.XXX	0.005	SCALE:		
				SHEET: 1 OF 1

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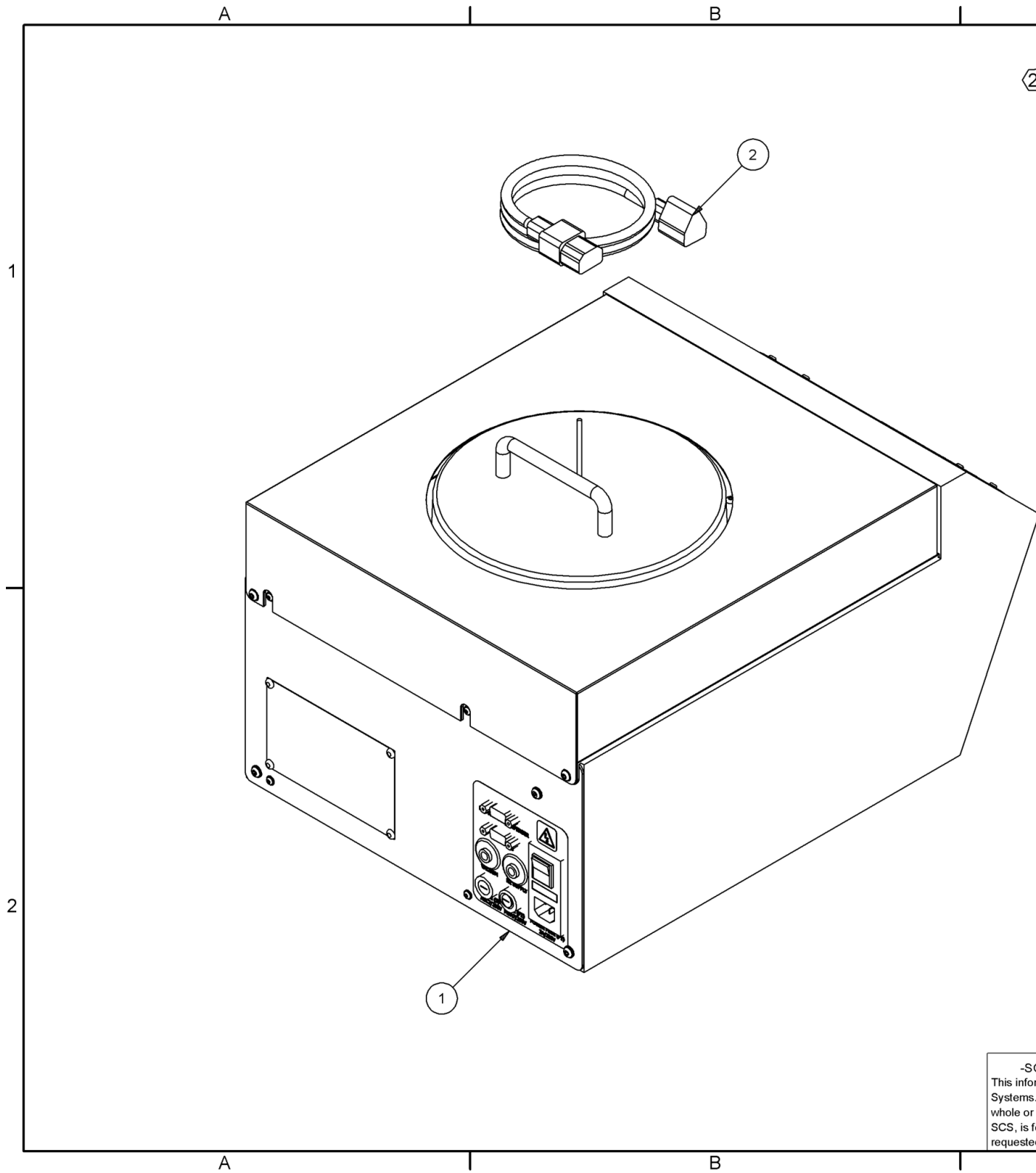


BILL OF MATERIAL					
ITEM	PART NUMBER	QTY	VENDOR	VENDOR P/N	TITLE
1	SA-813-1000-1	1			BASIC ASSY, 6800 SERIES, 8" NP SPIN COATER
2	PP-114-1012-0	1			CORD,ELEC W/O PLUG PCC 70006020300


1				INITIAL DRAWING RELEASE
REV	BY	APP'D	DATE	DESCRIPTION
DRAWN BY: JMT		1/7/2009		 <b>SPECIALTY COATING SYSTEMS™</b> 7645 WOODLAND DRIVE, INDIANAPOLIS, IN 46278 USA
CHECKED BY:				
TO BE USED ON:				
NEXT ASSEMBLY: FINAL ASSEMBLY				
TOLERANCE UNLESS NOTED DIMENSION IN INCHES				TITLE: FINAL ASSY, 6800 SERIES, 8"NP SPIN COATER, 220V
X.X	0.1	ANGLE: ± 0.5°		SIZE: B
X.XX	0.01			DWG NO: FA-813-1003-1
X.XXX	0.005			REV: 1
SCALE:				SHEET: 1 OF 1

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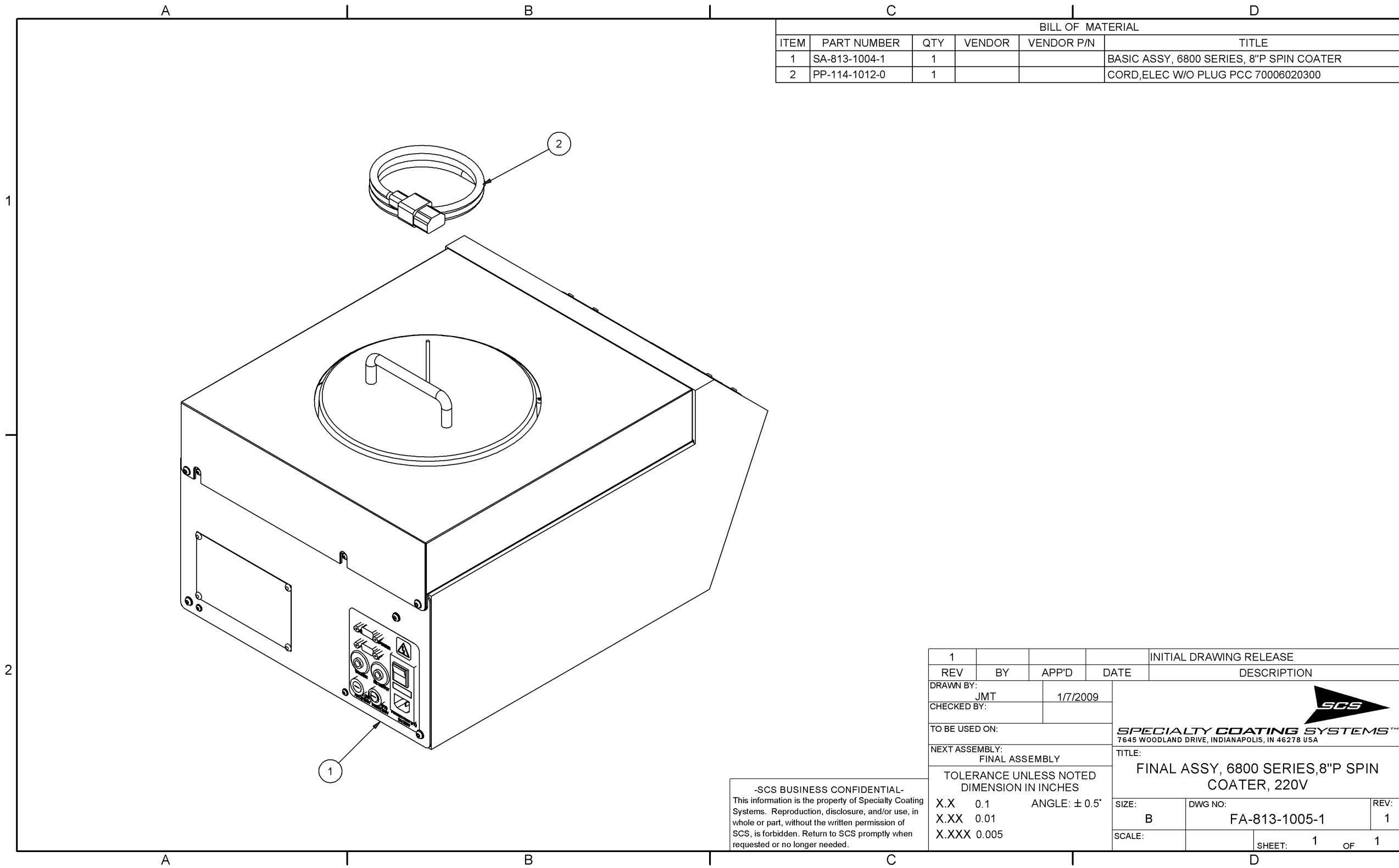
BILL OF MATERIAL					
ITEM	PART NUMBER	QTY	VENDOR	VENDOR P/N	TITLE
② 1	SA-813-1004-1	1			BASIC ASSY, 6800 SERIES, 8" P SPIN COATER
2	PP-114-1002-0	1			CORD, ELECTRICAL US, 70401020244 PCC

2	JMT	JB	2/26/09	ECO# 4133, REMOVED SA-813-1000-1, 106-1009, PP-106-1039-0 & PP-106-1099-0, ADDED SA-813-1004-1.
1				INITIAL DRAWING RELEASE
REV	BY	APP'D	DATE	DESCRIPTION
DRAWN BY: JMT				 <b>SPECIALTY COATING SYSTEMS™</b> 7645 WOODLAND DRIVE, INDIANAPOLIS, IN 46278 USA
CHECKED BY: 1/7/2009				
TO BE USED ON:				TITLE:
NEXT ASSEMBLY: FINAL ASSEMBLY				FINAL ASSY, 6800 SERIES, 8" P SPIN COATER, 110V
TOLERANCE UNLESS NOTED DIMENSION IN INCHES				SIZE: B
X.X	0.1	ANGLE: ± 0.5°		DWG NO: FA-813-1004-1
X.XX	0.01			REV: 2
X.XXX	0.005			SCALE:
				SHEET: 1 OF 1


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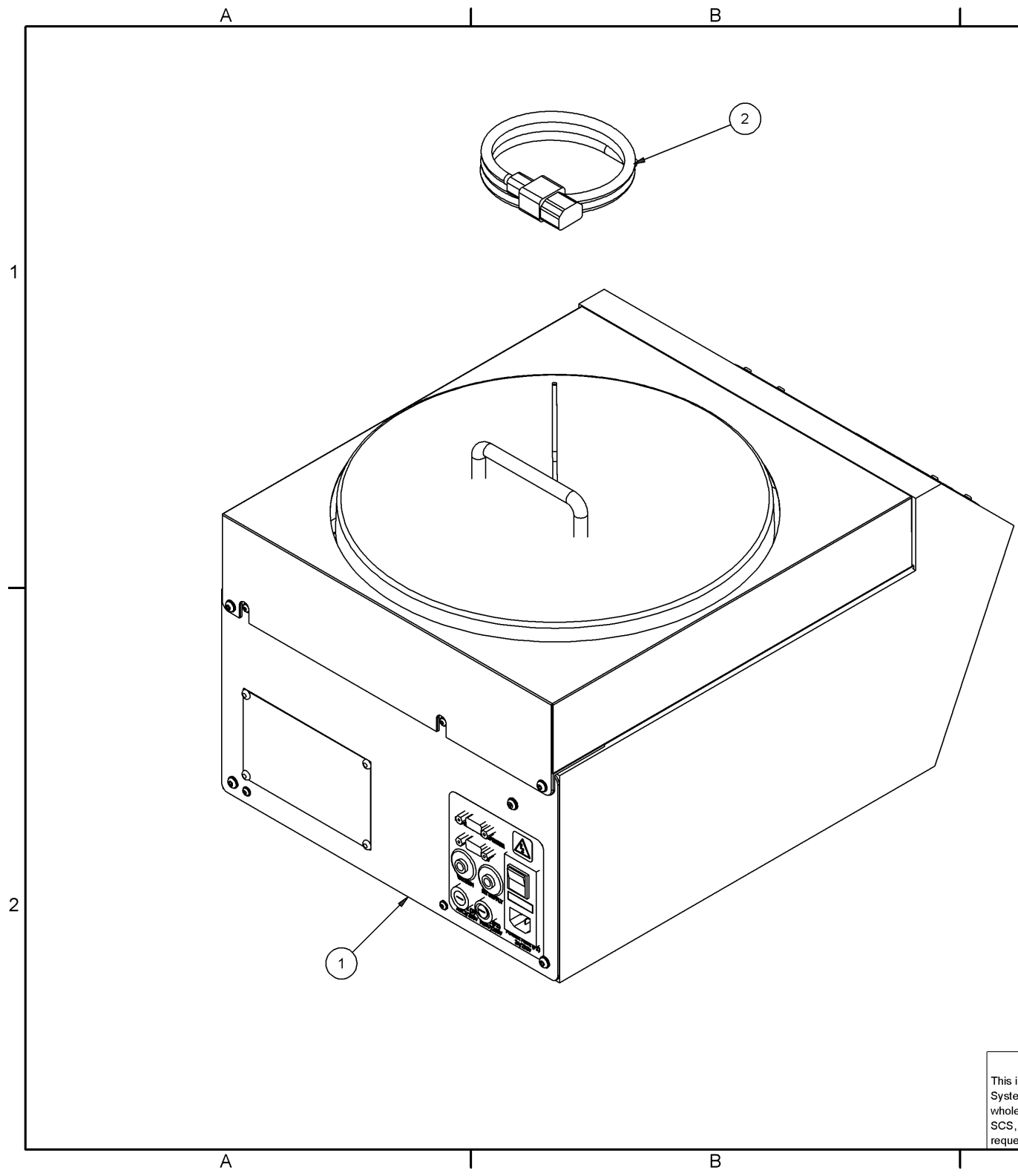


BILL OF MATERIAL					
ITEM	PART NUMBER	QTY	VENDOR	VENDOR P/N	TITLE
1	SA-813-1004-1	1			BASIC ASSY, 6800 SERIES, 8"P SPIN COATER
2	PP-114-1012-0	1			CORD,ELEC W/O PLUG PCC 70006020300

1				INITIAL DRAWING RELEASE
REV	BY	APP'D	DATE	DESCRIPTION
	JMT		1/7/2009	
DRAWN BY:				 <b>SPECIALTY COATING SYSTEMS™</b> 7645 WOODLAND DRIVE, INDIANAPOLIS, IN 46278 USA
CHECKED BY:				
TO BE USED ON:				TITLE:
NEXT ASSEMBLY:				FINAL ASSY, 6800 SERIES, 8"P SPIN COATER, 220V
TOLERANCE UNLESS NOTED DIMENSION IN INCHES				SIZE: B
X.X 0.1 ANGLE: ± 0.5°				DWG NO: FA-813-1005-1
X.XX 0.01				REV: 1
X.XXX 0.005				SCALE: SHEET: 1 OF 1


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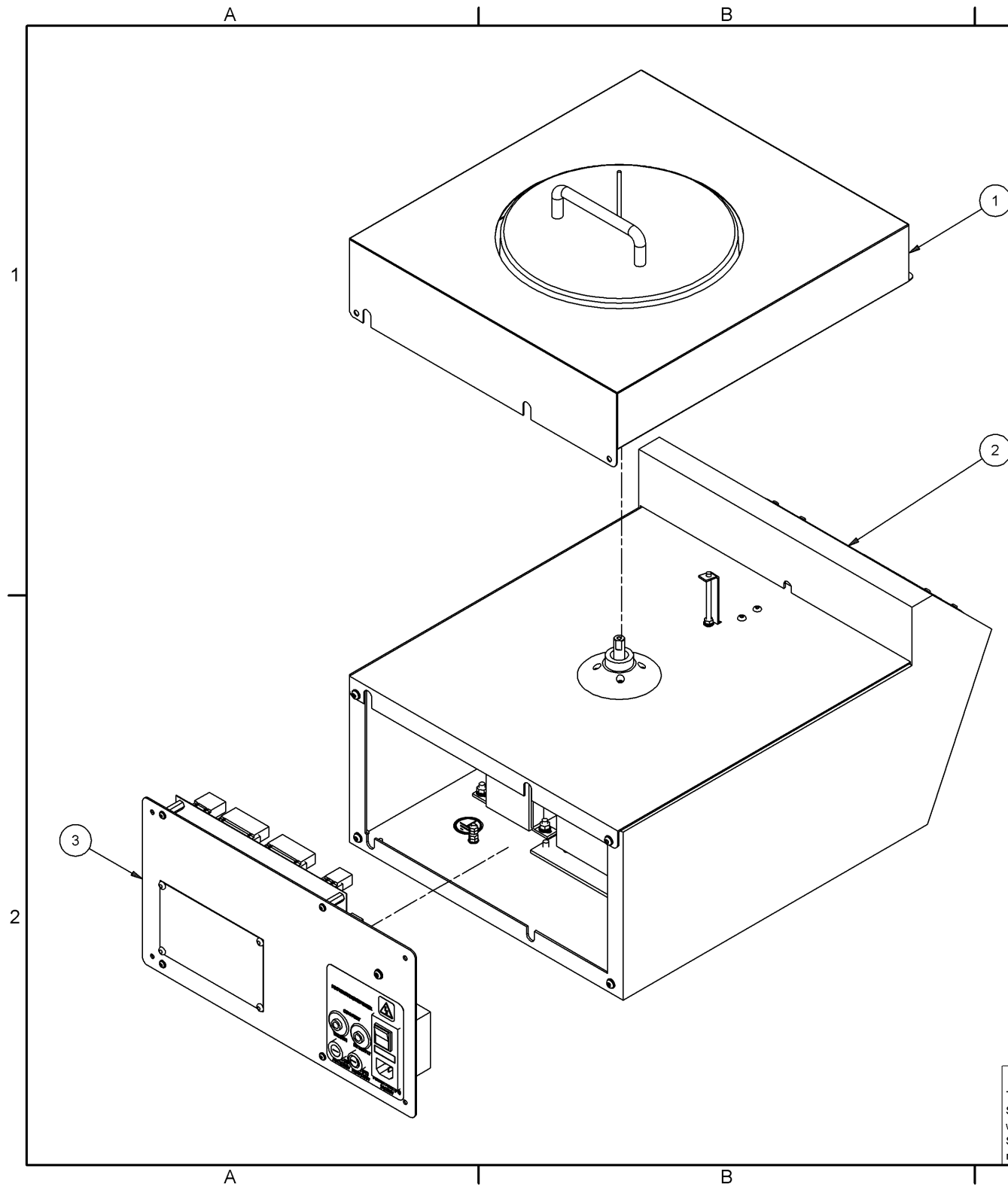


BILL OF MATERIAL					
ITEM	PART NUMBER	QTY	VENDOR	VENDOR P/N	TITLE
1	SA-813-1001-1	1			BASIC ASSY, 6800 SERIES, 12"P, SPIN COATER
2	PP-114-1012-0	1			CORD,ELEC W/O PLUG PCC 70006020300

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1				INITIAL DRAWING RELEASE
REV	BY	APP'D	DATE	DESCRIPTION
	JMT		1/7/2009	
DRAWN BY:				 <b>SPECIALTY COATING SYSTEMS™</b> 7645 WOODLAND DRIVE, INDIANAPOLIS, IN 46278 USA
CHECKED BY:				
TO BE USED ON:				TITLE:
NEXT ASSEMBLY:				FINAL ASSY, 6800 SERIES, 12"P, SPIN COATER, 220V
TOLERANCE UNLESS NOTED DIMENSION IN INCHES				SIZE: B
X.X	0.1	ANGLE: ± 0.5°		DWG NO: FA-813-1006-1
X.XX	0.01			REV: 1
X.XXX	0.005			SCALE:
				SHEET: 1 OF 1





BILL OF MATERIAL					
ITEM	PART NUMBER	QTY	VENDOR	VENDOR P/N	DESCRIPTION
1	SA-046-1022-1	1			8" BOWL, ASSY., 6800 SERIES, SPIN COATER
2	SA-385-1081-1	1			HOUSING, ASSY., 6800 SERIES SPIN COATER
3	SA-550-1468-1	1			FACILITIES PANEL, ASSY., 6800 SERIES, SPIN COATER

REV	BY	APP'D	DATE	DESCRIPTION
3	JMT	JB	1/6/09	ECO# 4075, REMOVED PP-070-1000-0, PP-114-1002-0, PP-738-1000-1 & M0412SHCS.
2	RES	JMS	11/7/8	ECO#3977, REMOVE SA-724-1090-1
1				INITIAL DRAWING RELEASE

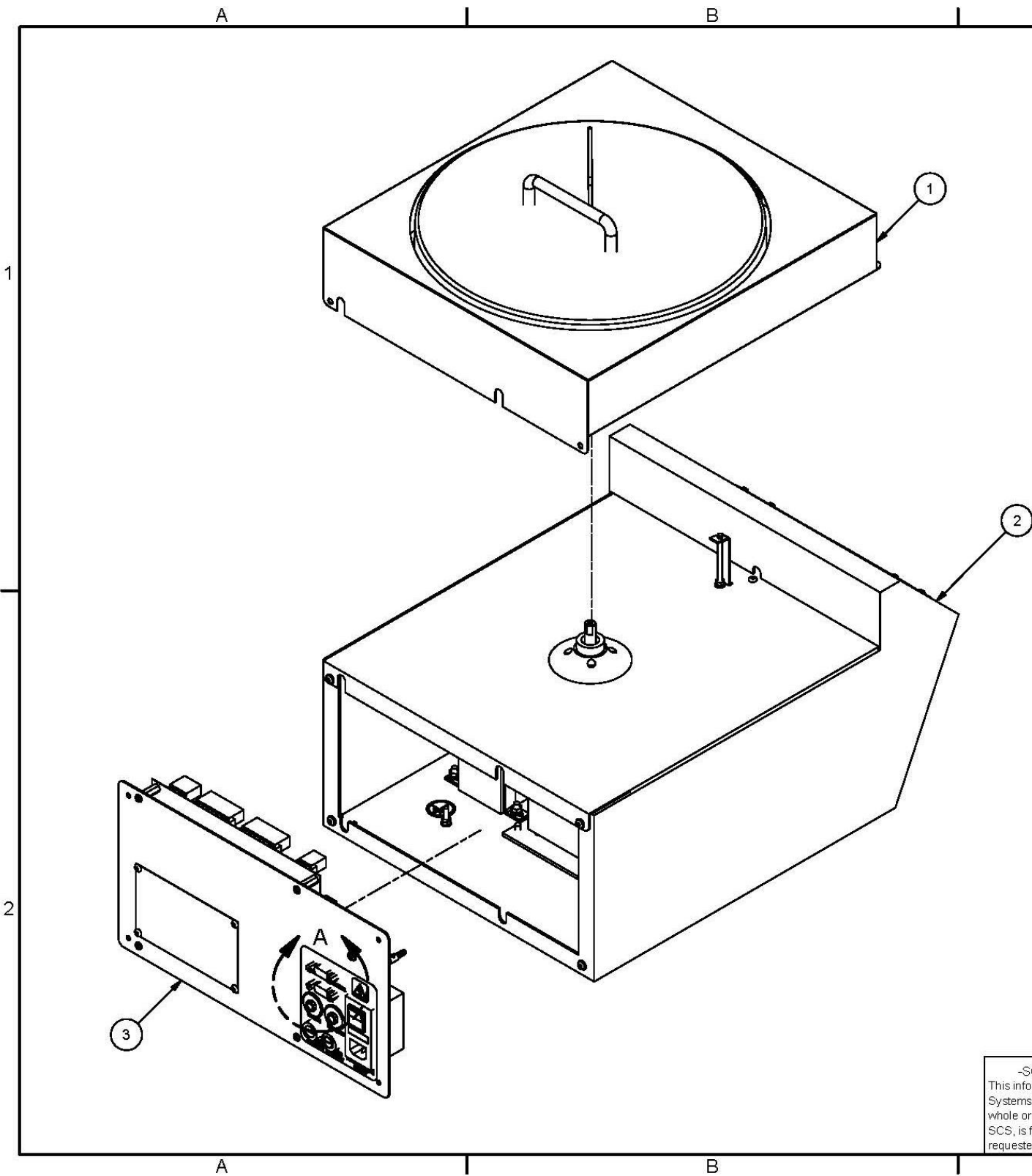
DRAWN BY: SEMMLER 5/27/2008  
 CHECKED BY: SEMMLER 5/28/2008  
 TO BE USED ON:  
 NEXT ASSEMBLY: FA-813-1000-1 & FA-813-1003-1  
 TOLERANCE UNLESS NOTED  
 DIMENSION IN INCHES  
 ANGLE: ± 0.5°

**SCS**  
**SPECIALTY COATING SYSTEMS™**  
 7645 WOODLAND DRIVE, INDIANAPOLIS, IN 46278 USA

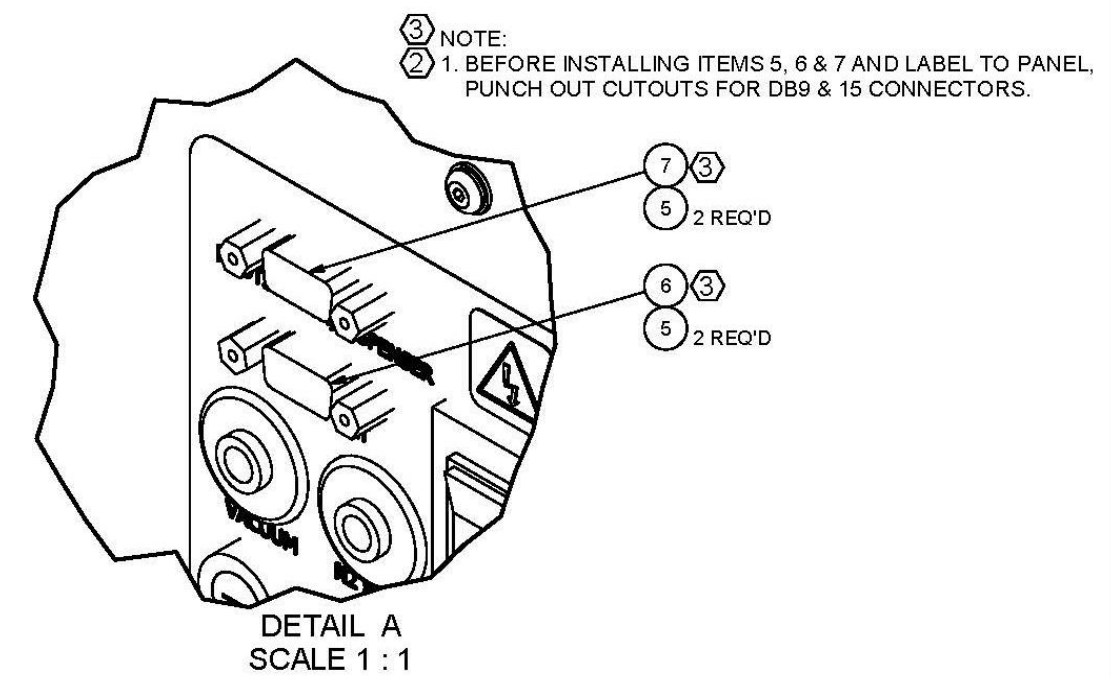
TITLE: BASIC ASSY, 6800 SERIES, 8" NP SPIN COATER  
 SIZE: B DWG NO: AD-813-1000-1 REV: 3  
 SCALE: SHEET: 1 OF 1

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BILL OF MATERIAL						
ITEM	PART NUMBER	QTY	VENDOR	VENDOR P/N	TITLE	
1	SA-046-1024-1	1			ASSY, 12" BOWL, 6800 SERIES SPIN COATER	
2	SA-385-1087-1	1			HOUSING, ASSY., 12" 6800 SERIES SPIN COATER	
3	SA-550-1468-1	1			FACILITIES PANEL, ASSY., 6800 SERIES, SPIN COATER	
5	PP-106-1039-0	4			CONNECTOR HARDWARE, DSUB 510-2507 ALLIED	
6	SA-086-1094-2	1			ASSY, RS232 COMMUNICATION CABLE SPINCOAT G3	
7	SA-086-1099-1	1			ASSY, DB9 TO CONTROLLER CABLE, SPINCOATER G3	



REV	BY	APP'D	DATE	DESCRIPTION
3	JMT	RH	04/24/13	ECN#1168, REMOVED 106-1009 (2). ADDED SA-086-1094-2 (1) & SA-086-1099-1 (1). UPDATED NOTE 1 (ITEM NUMBERS).
2	JMT	RH	05/07/12	ECN#724, REPLACED PP-106-1099-0 W/ 106-1009. UPDATED NOTE 1 (4 & 5 WAS 5 & 6).
1				INITIAL DRAWING RELEASE

DRAWN BY: JMT 1/7/2009  
 CHECKED BY:  
 TO BE USED ON:  
 NEXT ASSEMBLY: FA-813-1001-1 & FA-813-1006-1

**TOLERANCE UNLESS NOTED DIMENSION IN INCHES**  
 X.X 0.1 ANGLE: ± 0.5°  
 X.XX 0.01  
 X.XXX 0.005

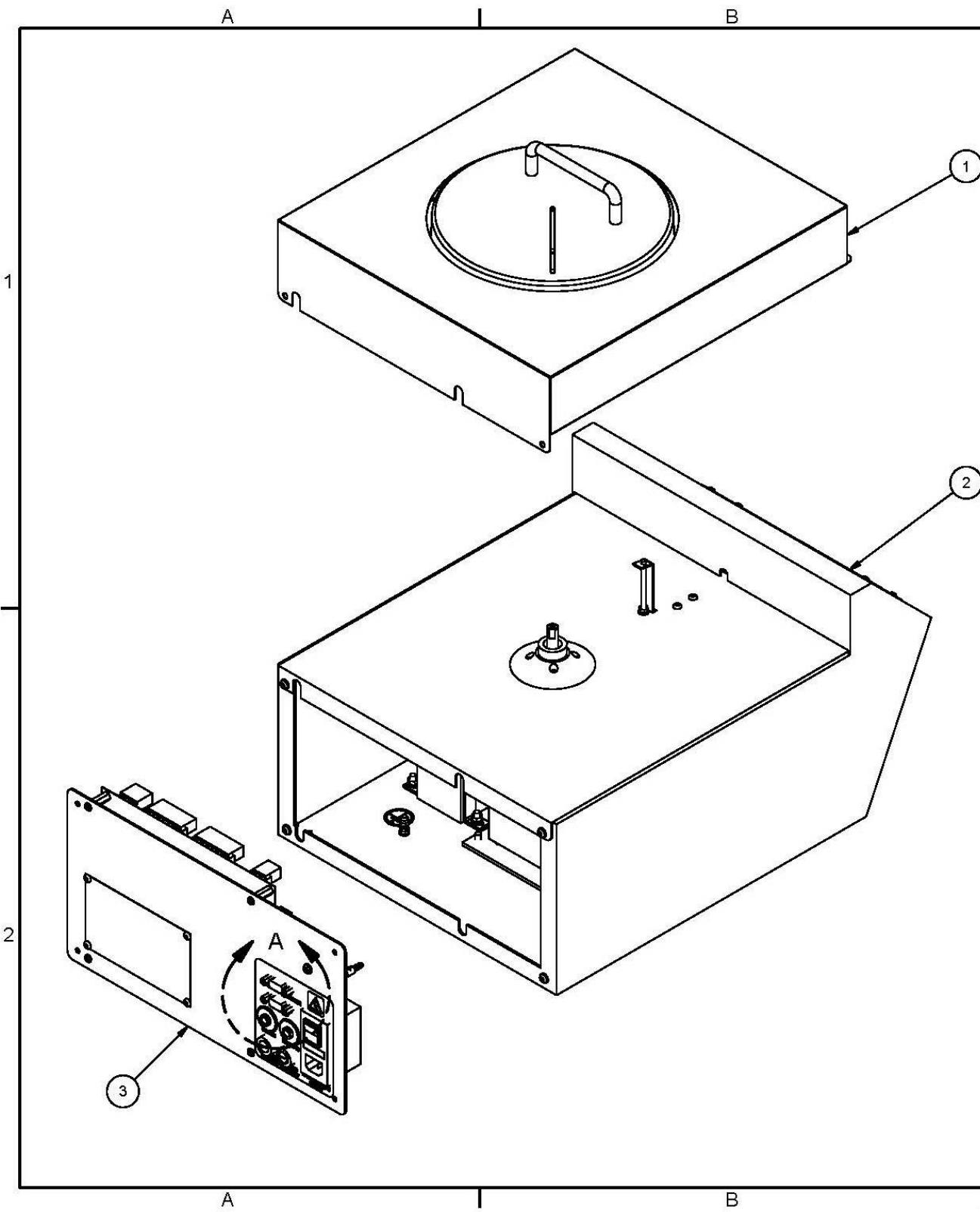
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**SPECIALTY COATING SYSTEMS™**  
 7645 WOODLAND DRIVE, INDIANAPOLIS, IN 46278 USA

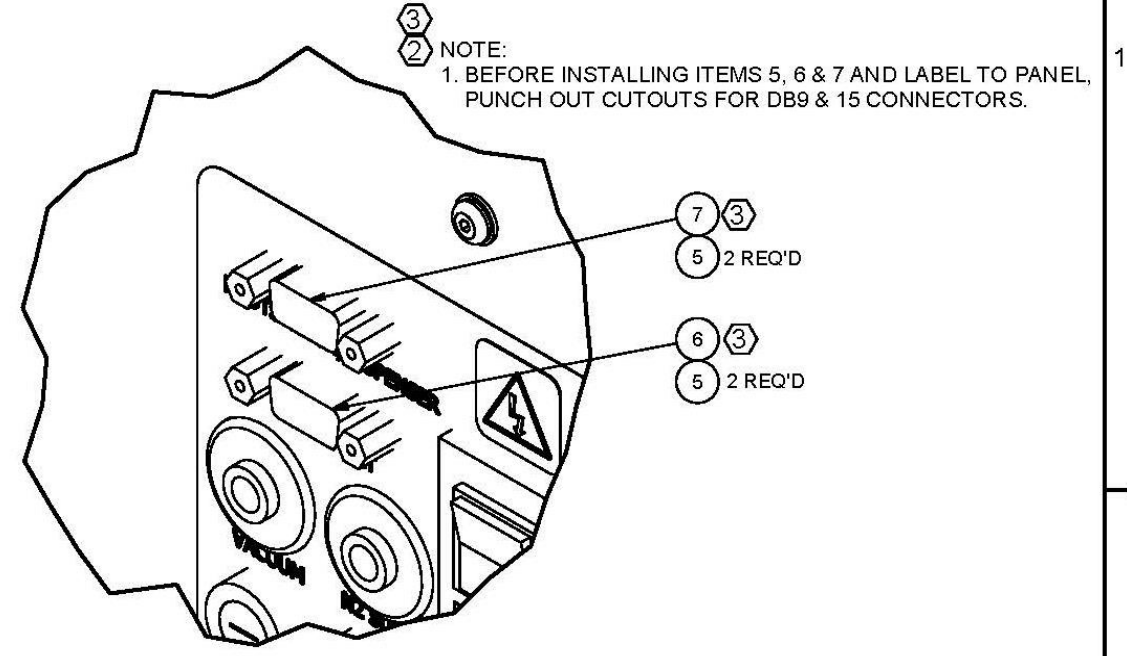
TITLE: BASIC ASSY, 6800 SERIES, 12" P, SPIN COATER  
 SIZE: B DWG NO: AD-813-1001-1 REV: 3  
 SCALE: SHEET: 1 OF 1







BILL OF MATERIAL						
ITEM	PART NUMBER	QTY	VENDOR	VENDOR P/N	TITLE	
1	SA-046-1022-1	1			8" BOWL, ASSY., 6800 SERIES, SPIN COATER	
2	SA-385-1081-1	1			HOUSING, ASSY., 6800 SERIES SPIN COATER	
3	SA-550-1468-1	1			FACILITIES PANEL, ASSY., 6800 SERIES, SPIN COATER	
5	PP-106-1039-0	4			CONNECTOR HARDWARE, DSUB 510-2507 ALLIED	
6	SA-086-1094-2	1			ASSY, RS232 COMMUNICATION CABLE SPINCOAT G3	
7	SA-086-1099-1	1			ASSY, DB9 TO CONTROLLER CABLE, SPINCOATER G3	



DETAIL A  
SCALE 1 : 1

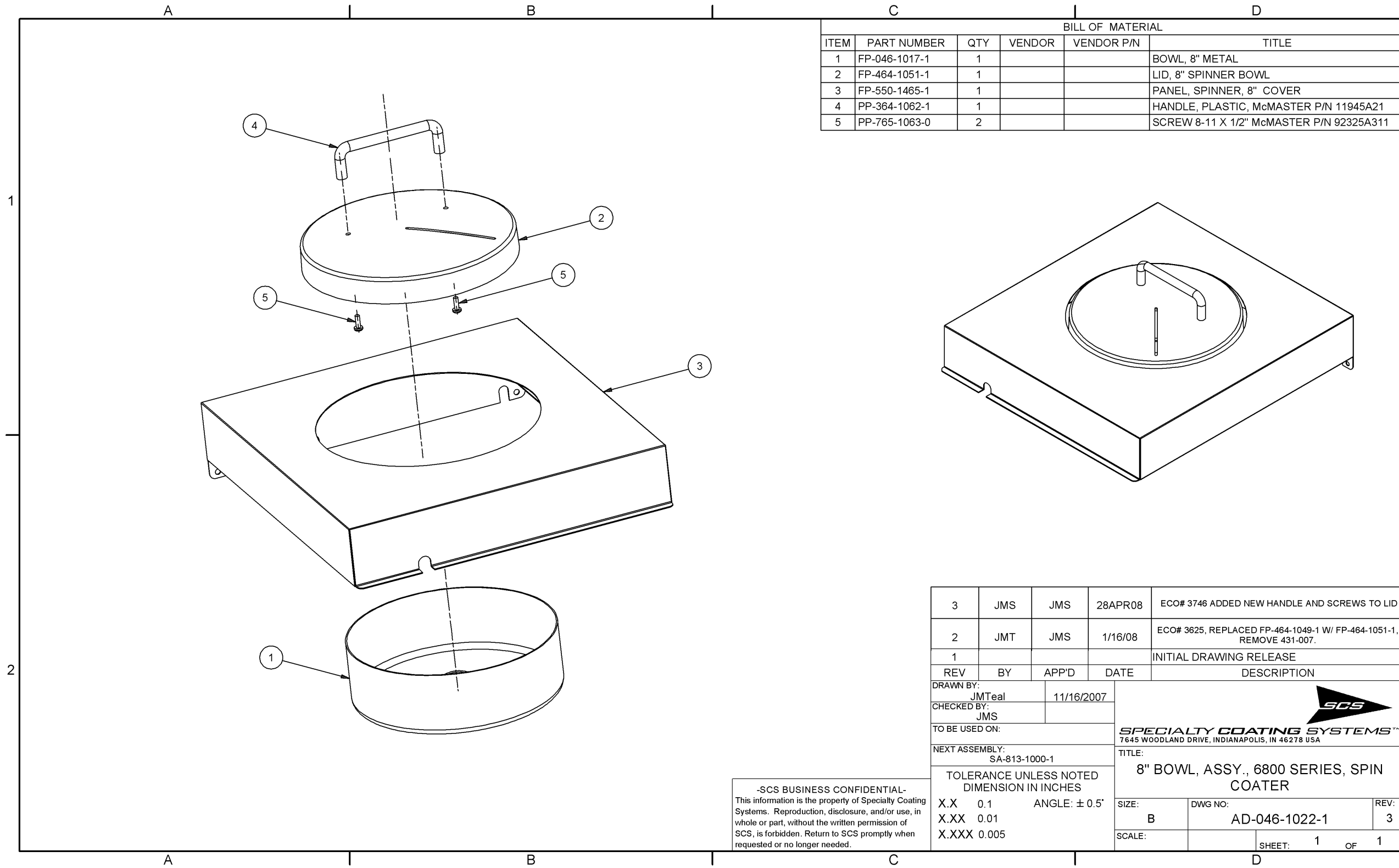
REV	BY	APP'D	DATE	DESCRIPTION
3	JMT	RH	04/24/13	ECN#1168, REMOVED 106-1009 (2). ADDED SA-086-1094-2 (1) & SA-086-1099-1 (1). UPDATED NOTE 1 (ITEM NUMBERS).
2	JMT	RH	05/07/12	ECN#724, REPLACED PP-106-1099-0 W/ 106-1009. UPDATED NOTE 1 (ITEMS 4 & 5 WAS 5 & 6).
1				INITIAL DRAWING RELEASE

DRAWN BY: JMT 2/26/2009  
 CHECKED BY:  
 TO BE USED ON: 6800 SERIES 8" P  
 NEXT ASSEMBLY: FA-813-1004-1 & FA-813-1005-1  
 TOLERANCE UNLESS NOTED DIMENSION IN INCHES  
 X.X 0.1 ANGLE: b 0.5φ  
 X.XX 0.01  
 X.XXX 0.005

SPECIALTY COATING SYSTEMS™  
 7645 WOODLAND DRIVE, INDIANAPOLIS, IN 46278 USA  
 TITLE: BASIC ASSY, 6800 SERIES, 8" P SPIN COATER  
 SIZE: B DWG NO: AD-813-1004-1 REV: 3  
 SCALE: SHEET: 1 OF 1

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BILL OF MATERIAL					
ITEM	PART NUMBER	QTY	VENDOR	VENDOR P/N	TITLE
1	FP-046-1017-1	1			BOWL, 8" METAL
2	FP-464-1051-1	1			LID, 8" SPINNER BOWL
3	FP-550-1465-1	1			PANEL, SPINNER, 8" COVER
4	PP-364-1062-1	1			HANDLE, PLASTIC, McMASTER P/N 11945A21
5	PP-765-1063-0	2			SCREW 8-11 X 1/2" McMASTER P/N 92325A311

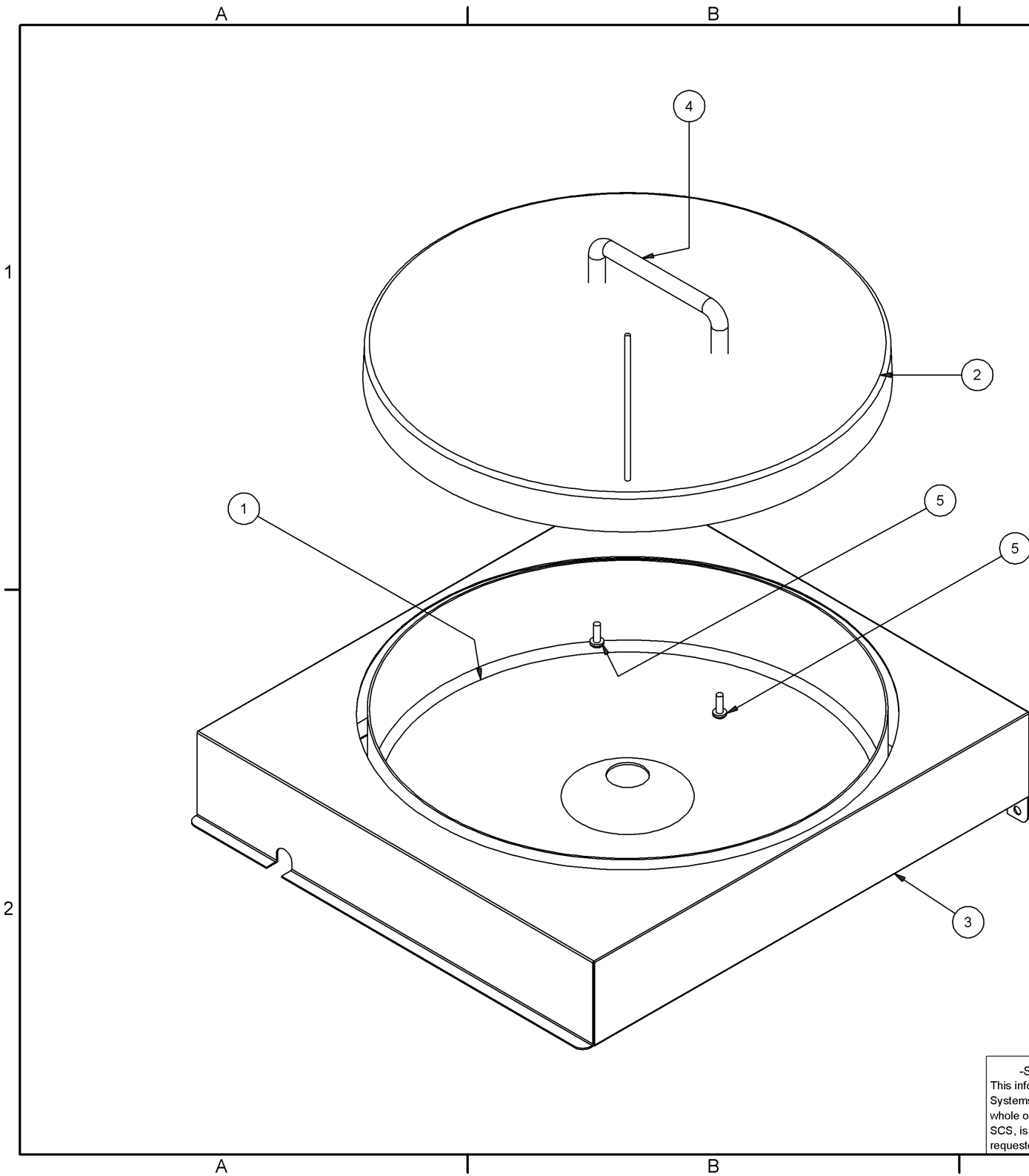
REV	BY	APP'D	DATE	DESCRIPTION
3	JMS	JMS	28APR08	ECO# 3746 ADDED NEW HANDLE AND SCREWS TO LID
2	JMT	JMS	1/16/08	ECO# 3625, REPLACED FP-464-1049-1 W/ FP-464-1051-1, REMOVE 431-007.
1				INITIAL DRAWING RELEASE

DRAWN BY: JMTeal 11/16/2007  
 CHECKED BY: JMS  
 TO BE USED ON:  
 NEXT ASSEMBLY: SA-813-1000-1  
 TOLERANCE UNLESS NOTED DIMENSION IN INCHES  
 X.X 0.1 ANGLE: ± 0.5°  
 X.XX 0.01  
 X.XXX 0.005


**SCS**  
**SPECIALTY COATING SYSTEMS™**  
 7645 WOODLAND DRIVE, INDIANAPOLIS, IN 46278 USA  
 TITLE: 8" BOWL, ASSY., 6800 SERIES, SPIN COATER  
 SIZE: B DWG NO: AD-046-1022-1 REV: 3  
 SCALE: SHEET: 1 OF 1

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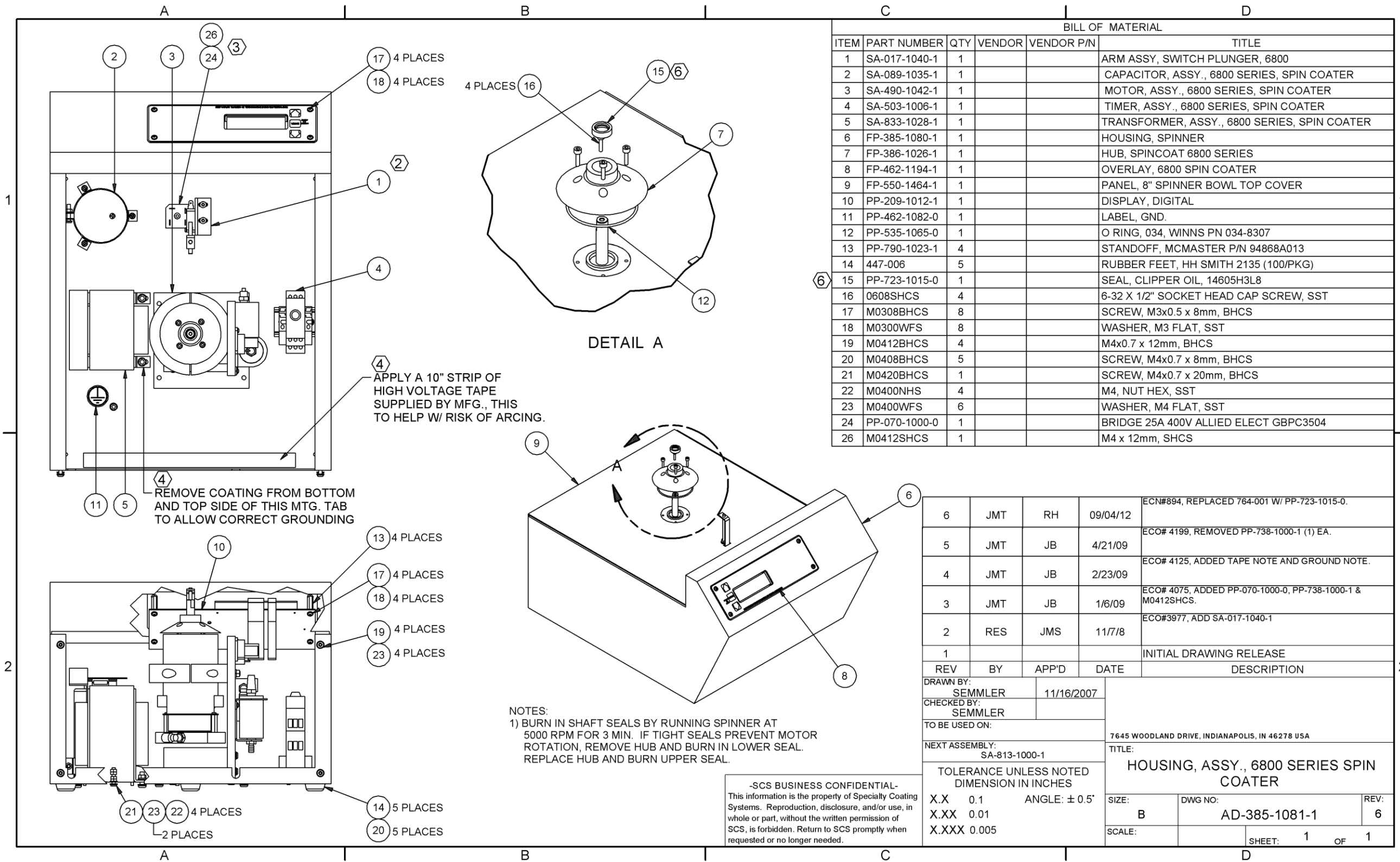


BILL OF MATERIAL					
ITEM	PART NUMBER	QTY	VENDOR	VENDOR P/N	TITLE
1	FP-046-1023-1	1			BOWL, 12" METAL
2	FP-464-1052-1	1			LID, 12" SPINNER BOWL
3	FP-550-1482-1	1			PANEL, SPINNER, 12" COVER
4	PP-364-1062-1	1			HANDLE, PLASTIC, McMASTER P/N 11945A21
5	PP-765-1063-0	2			SCREW 8-11 X 1/2" McMASTER P/N 92325A311

1				INITIAL DRAWING RELEASE
REV	BY	APP'D	DATE	DESCRIPTION
DRAWN BY:		RES	5/28/2008	 <b>SPECIALTY COATING SYSTEMS™</b> 7645 WOODLAND DRIVE, INDIANAPOLIS, IN 46278 USA
CHECKED BY:		JS	5/28/2008	
TO BE USED ON:				TITLE:
SPINCOATER				
NEXT ASSEMBLY:				ASSY, 12" BOWL, 6800 SERIES SPIN COATER
TOLERANCE UNLESS NOTED DIMENSION IN INCHES				SIZE:
X.X	0.1	ANGLE: ± 0.5°		DWG NO:
X.XX	0.01			AD-046-1024-1
X.XXX	0.005			REV:
				1
SCALE:			SHEET:	1 OF 1

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BILL OF MATERIAL					
ITEM	PART NUMBER	QTY	VENDOR	VENDOR P/N	TITLE
1	SA-017-1040-1	1			ARM ASSY, SWITCH PLUNGER, 6800
2	SA-089-1035-1	1			CAPACITOR, ASSY., 6800 SERIES, SPIN COATER
3	SA-490-1042-1	1			MOTOR, ASSY., 6800 SERIES, SPIN COATER
4	SA-503-1006-1	1			TIMER, ASSY., 6800 SERIES, SPIN COATER
5	SA-833-1028-1	1			TRANSFORMER, ASSY., 6800 SERIES, SPIN COATER
6	FP-385-1080-1	1			HOUSING, SPINNER
7	FP-386-1026-1	1			HUB, SPINCOAT 6800 SERIES
8	FP-462-1194-1	1			OVERLAY, 6800 SPIN COATER
9	FP-550-1464-1	1			PANEL, 8" SPINNER BOWL TOP COVER
10	PP-209-1012-1	1			DISPLAY, DIGITAL
11	PP-462-1082-0	1			LABEL, GND.
12	PP-535-1065-0	1			O RING, 034, WINNS PN 034-8307
13	PP-790-1023-1	4			STANDOFF, MCMaster P/N 94868A013
14	447-006	5			RUBBER FEET, HH SMITH 2135 (100/PKG)
15	PP-723-1015-0	1			SEAL, CLIPPER OIL, 14605H3L8
16	0608SHCS	4			6-32 X 1/2" SOCKET HEAD CAP SCREW, SST
17	M0308BHCS	8			SCREW, M3x0.5 x 8mm, BHCS
18	M0300WFS	8			WASHER, M3 FLAT, SST
19	M0412BHCS	4			M4x0.7 x 12mm, BHCS
20	M0408BHCS	5			SCREW, M4x0.7 x 8mm, BHCS
21	M0420BHCS	1			SCREW, M4x0.7 x 20mm, BHCS
22	M0400NHS	4			M4, NUT HEX, SST
23	M0400WFS	6			WASHER, M4 FLAT, SST
24	PP-070-1000-0	1			BRIDGE 25A 400V ALLIED ELECT GBPC3504
26	M0412SHCS	1			M4 x 12mm, SHCS

REV	BY	APP'D	DATE	DESCRIPTION
6	JMT	RH	09/04/12	ECN#894, REPLACED 764-001 W/ PP-723-1015-0.
5	JMT	JB	4/21/09	ECO# 4199, REMOVED PP-738-1000-1 (1) EA.
4	JMT	JB	2/23/09	ECO# 4125, ADDED TAPE NOTE AND GROUND NOTE.
3	JMT	JB	1/6/09	ECO# 4075, ADDED PP-070-1000-0, PP-738-1000-1 & M0412SHCS.
2	RES	JMS	11/7/8	ECO#3977, ADD SA-017-1040-1
1				INITIAL DRAWING RELEASE

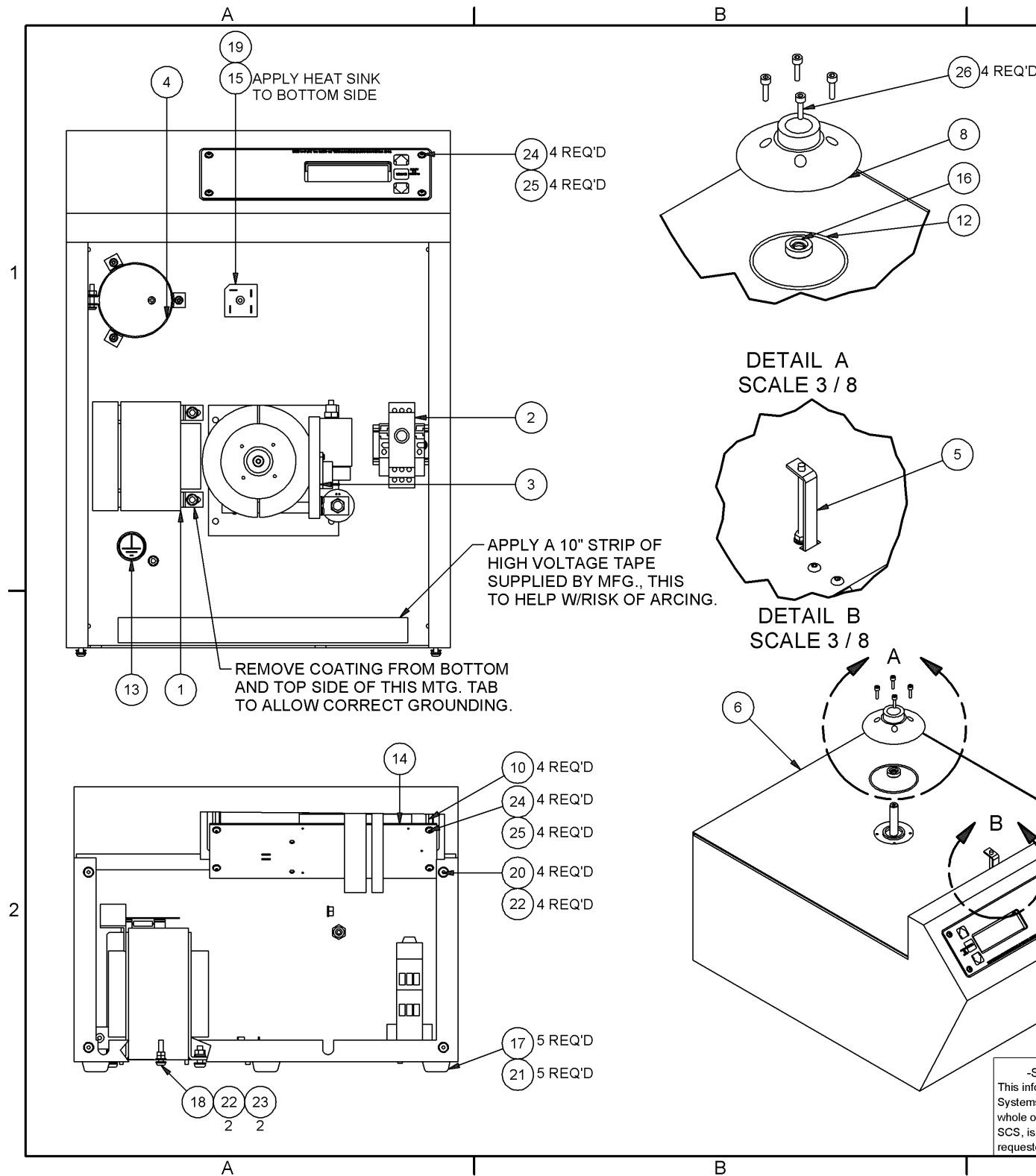
DRAWN BY: SEMMLER		11/16/2007	
CHECKED BY: SEMMLER			
TO BE USED ON:			
NEXT ASSEMBLY: SA-813-1000-1		7645 WOODLAND DRIVE, INDIANAPOLIS, IN 46278 USA	
TOLERANCE UNLESS NOTED DIMENSION IN INCHES			
X.X	0.1	ANGLE: ± 0.5°	
X.XX	0.01		
X.XXX	0.005		
TITLE: HOUSING, ASSY., 6800 SERIES SPIN COATER		SIZE: B	DWG NO: AD-385-1081-1
SCALE:		REV: 6	
SHEET: 1 OF 1			

NOTES:  
1) BURN IN SHAFT SEALS BY RUNNING SPINNER AT 5000 RPM FOR 3 MIN. IF TIGHT SEALS PREVENT MOTOR ROTATION, REMOVE HUB AND BURN IN LOWER SEAL. REPLACE HUB AND BURN UPPER SEAL.

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BILL OF MATERIAL					
ITEM	PART NUMBER	QTY	VENDOR	VENDOR P/N	TITLE
1	SA-833-1028-1	1			TRANSFORMER, ASSY., 6800 SERIES, SPIN COATER
2	SA-503-1006-1	1			TIMER, ASSY., 6800 SERIES, SPIN COATER
3	SA-490-1042-1	1			MOTOR, ASSY., 6800 SERIES, SPIN COATER
4	SA-089-1035-1	1			CAPACITOR, ASSY., 6800 SERIES, SPIN COATER
5	SA-017-1040-1	1			ARM ASSY, SWITCH PLUNGER, 6800
6	FP-550-1507-1	1			PANEL, 12" SPINNER BOWL TOP COVER
7	FP-462-1194-1	1			OVERLAY, 6800 SPIN COATER
8	FP-386-1026-1	1			HUB, SPINCOAT 6800 SERIES
9	FP-385-1080-1	1			HOUSING, SPINNER
10	PP-790-1023-1	4			STANDOFF, MCMMASTER P/N 94868A013
12	PP-535-1065-0	1			O RING, 034, WINNS PN 034-8307
13	PP-462-1082-0	1			LABEL, GND.
14	PP-209-1012-1	1			DISPLAY, DIGITAL
15	PP-070-1000-0	1			BRIDGE 25A 400V ALLIED ELECT GBPC3504
16	764-001	1			SEAL, SHAFT 0025-04839 MANVILLE
17	447-006	5			RUBBER FEET, HH SMITH 2135 (100/PKG)
18	M0420BHCS	1			SCREW, M4x0.7 x 20mm, BHCS
19	M0412SHCS	1			M4 x 12mm, SHCS
20	M0412BHCS	4			M4x0.7 x 12mm, BHCS
21	M0408BHCS	5			SCREW, M4x0.7 x 8mm, BHCS
22	M0400WFS	6			WASHER, M4 FLAT, SST
23	M0400NHS	2			M4, NUT HEX, SST
24	M0308BHCS	8			SCREW, M3x0.5 x 8mm, BHCS
25	M0300WFS	8			WASHER, M3 FLAT, SST
26	0608SHCS	4			6-32 X 1/2" SOCKET HEAD CAP SCREW, SST

NOTES:  
 1) BURN IN SHAFT SEALS BY RUNNING SPINNER AT 5000 RPM FOR 3 MIN. IF TIGHT SEALS PREVENT MOTOR ROTATION, REMOVE HUB AND BURN IN LOWER SEAL. REPLACE HUB AND BURN UPPER SEAL.

2	JMT	JB	4/21/09	ECO# 4199, REMOVED PP-738-1000-1 (1) EA.
1				INITIAL DRAWING RELEASE
REV	BY	APP'D	DATE	DESCRIPTION
DRAWN BY: JMT				1/16/2009
CHECKED BY:				
TO BE USED ON:				
NEXT ASSEMBLY: SA-813-1001-1				
TOLERANCE UNLESS NOTED DIMENSION IN INCHES				
X.X	0.1	ANGLE: ± 0.5'		
X.XX	0.01			
X.XXX	0.005			



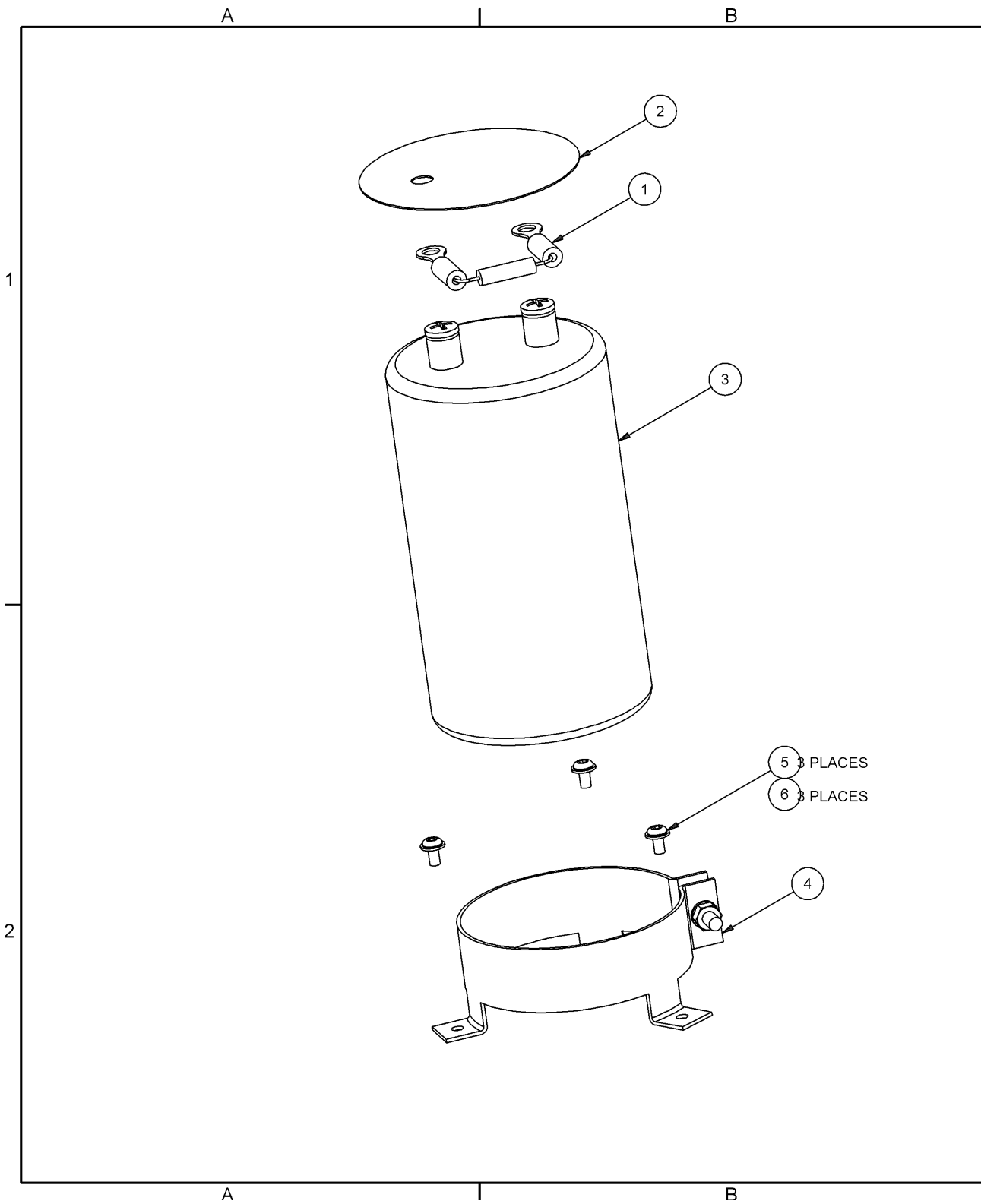
**SPECIALTY COATING SYSTEMS™**  
 7645 WOODLAND DRIVE, INDIANAPOLIS, IN 46278 USA

TITLE:  
**HOUSING, ASSY., 12" 6800 SERIES SPIN COATER**


SIZE: B	DWG NO: AD-385-1087-1	REV: 2
SCALE:	SHEET: 1 OF 1	

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BILL OF MATERIAL					
ITEM	PART NUMBER	QTY	VENDOR	VENDOR P/N	TITLE
1	SA-662-1012-1	1			RESISTOR, ASSY.
2	FP-731-1024-1	1			SHIELD, CAP COVER
3	PP-089-1015-0	1			CAP 10000uF EXOX RIFA PEH169PO5100QU2
4	PP-089-1016-0	1			CAPACITOR BRACKET ALLIED ELECT 852-7538
5	M0306BHCS	3			SCREW, M3x0.5 x 6mm, BHCS
6	M0300WFS	3			WASHER, M3 FLAT, SST

1				INITIAL DRAWING RELEASE
REV	BY	APP'D	DATE	DESCRIPTION
DRAWN BY:		11/16/2007		 <b>SPECIALTY COATING SYSTEMS™</b> 7645 WOODLAND DRIVE, INDIANAPOLIS, IN 46278 USA
CHECKED BY:				
TO BE USED ON:				TITLE:
NEXT ASSEMBLY:				CAPACITOR, ASSY., 6800 SERIES, SPIN COATER
SA-385-1081-1				SIZE: B
TOLERANCE UNLESS NOTED DIMENSION IN INCHES				DWG NO: AD-089-1035-1
X.X 0.1 ANGLE: ± 0.5°				REV: 1
X.XX 0.01				SCALE: B
X.XXX 0.005				SHEET: 1 OF 1

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BILL OF MATERIAL					
ITEM	PART NUMBER	QTY	VENDOR	VENDOR P/N	TITLE
1	PP-662-1054-0	1			RESISTOR, 5K 3W
2	PP-862-1011-0	2			TERM,RING,16-14gaX#10 WIRE SUP. B539-10

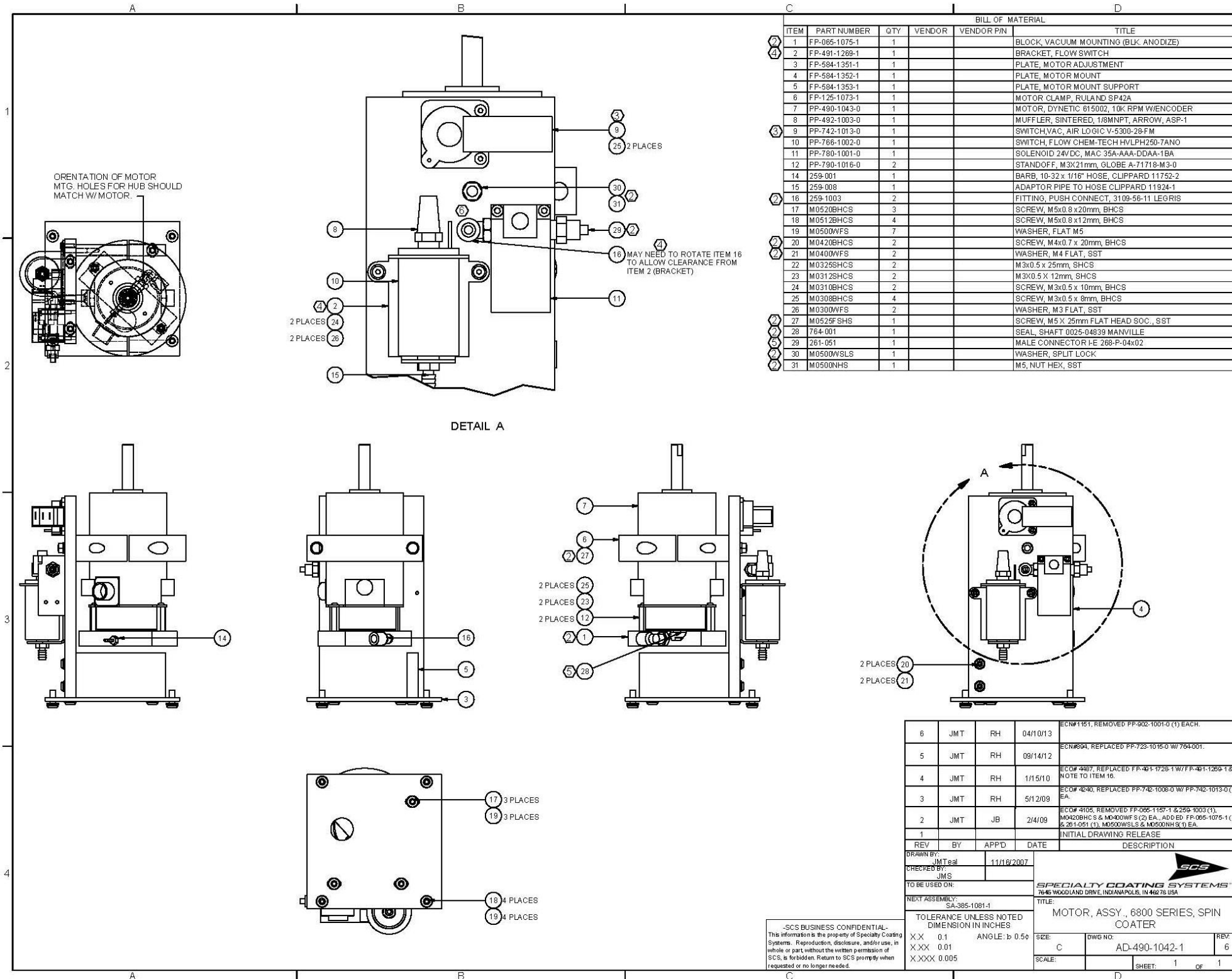
  
  

2	RES	RRH	4/03/09	ECO#4185, REPLACE PP-662-1012-0 WITH PP-66-1054-0 QTY (1)
1				INITIAL DRAWING RELEASE
REV	BY	APP'D	DATE	DESCRIPTION
DRAWN BY:		11/12/2004		 <b>SPECIALTY COATING SYSTEMS™</b> 7645 WOODLAND DRIVE, INDIANAPOLIS, IN 46278 USA
CHECKED BY:		11/12/2004		
TO BE USED ON:				
SPINCOAT				TITLE:  <div style="text-align: center; font-weight: bold; font-size: 1.2em;">RESISTOR, ASSY.</div>
NEXT ASSEMBLY:				
SA-026-1038-1				SIZE: A      DWG NO: AD-662-1012-1      REV: 2
TOLERANCE UNLESS NOTED DIMENSION IN INCHES X.X    0.1      ANGLE: ± 0.5° X.XX   0.01 X.XXX 0.005				SCALE:      SHEET: 1 OF 1

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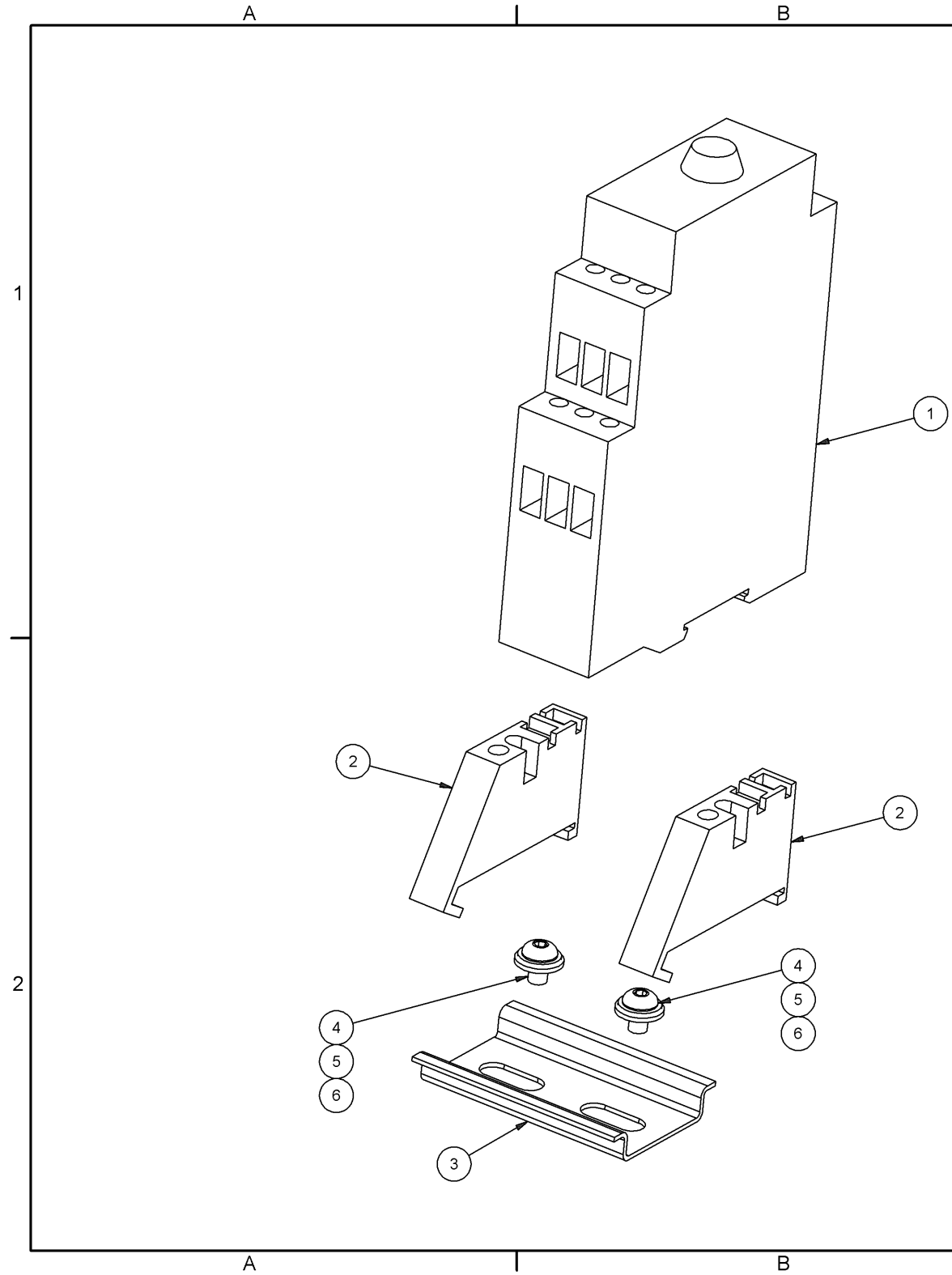









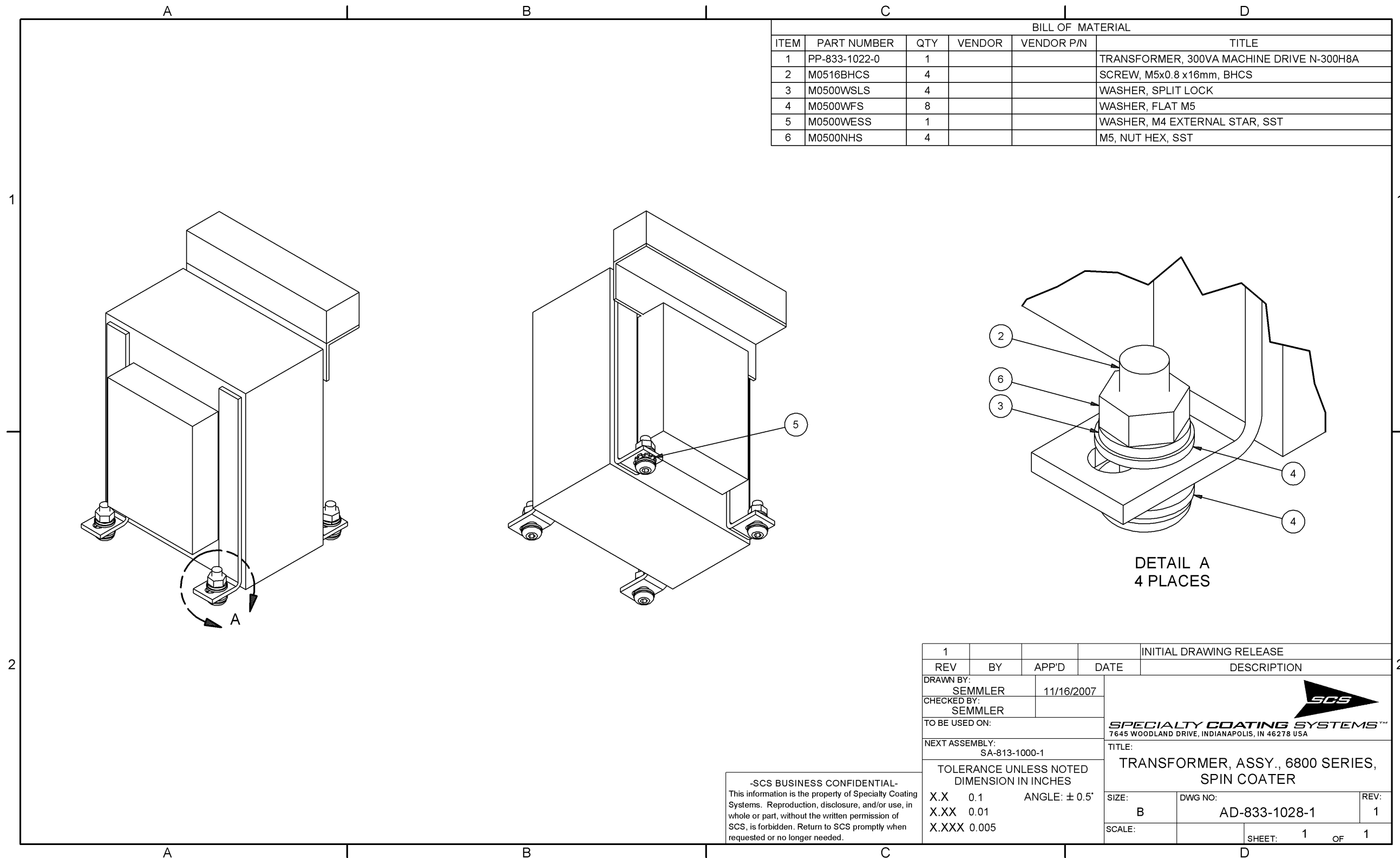
BILL OF MATERIAL					
ITEM	PART NUMBER	QTY	VENDOR	VENDOR P/N	TITLE
1	PP-503-1004-0	1			TIMER, ON DELAY, AROMAT PM-S-24-240V
2	PP-842-1011-0	2			END BRACKET TERM BLOCK
3	120-1001	1			DIN RAIL MTG, 2.0" LG
4	M0406BHCS	2			SCREW, M4x0.7 x 6mm, BHCS
5	M0400WFS	2			WASHER, M4 FLAT, SST
6	M0500WFS	2			WASHER, FLAT M5



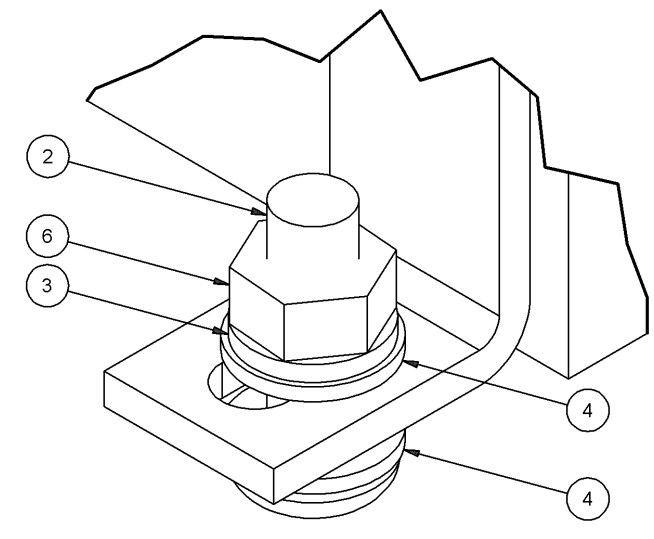
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1				INITIAL DRAWING RELEASE
REV	BY	APP'D	DATE	DESCRIPTION
DRAWN BY: JMTeal 11/16/2007				 <b>SPECIALTY COATING SYSTEMS™</b> 7645 WOODLAND DRIVE, INDIANAPOLIS, IN 46278 USA
CHECKED BY: JMS				
TO BE USED ON:				
NEXT ASSEMBLY: SA-385-1081-1				TITLE:
TOLERANCE UNLESS NOTED DIMENSION IN INCHES				TIMER, ASSY., 6800 SERIES, SPIN COATER
X.X	0.1	ANGLE: ± 0.5°		SIZE: B
X.XX	0.01			DWG NO: AD-503-1006-1
X.XXX	0.005			REV: 1
SCALE:				SHEET: 1 OF 1






BILL OF MATERIAL					
ITEM	PART NUMBER	QTY	VENDOR	VENDOR P/N	TITLE
1	PP-833-1022-0	1			TRANSFORMER, 300VA MACHINE DRIVE N-300H8A
2	M0516BHCS	4			SCREW, M5x0.8 x16mm, BHCS
3	M0500WLS	4			WASHER, SPLIT LOCK
4	M0500WFS	8			WASHER, FLAT M5
5	M0500WESS	1			WASHER, M4 EXTERNAL STAR, SST
6	M0500NHS	4			M5, NUT HEX, SST

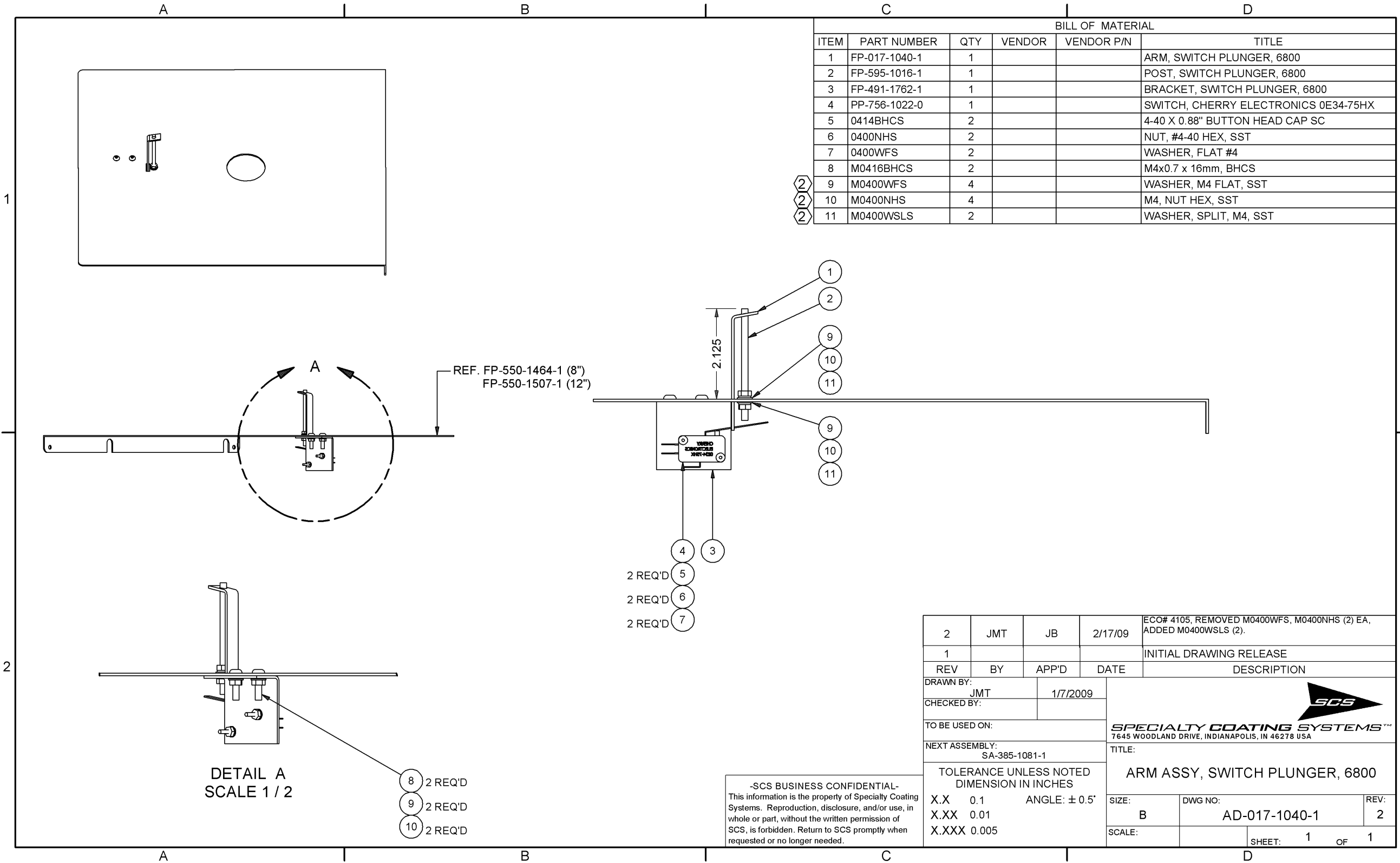


DETAIL A  
4 PLACES


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1				INITIAL DRAWING RELEASE
REV	BY	APP'D	DATE	DESCRIPTION
DRAWN BY:		11/16/2007		 <b>SPECIALTY COATING SYSTEMS™</b> 7645 WOODLAND DRIVE, INDIANAPOLIS, IN 46278 USA
CHECKED BY:				
TO BE USED ON:				TITLE:
NEXT ASSEMBLY:				TRANSFORMER, ASSY., 6800 SERIES, SPIN COATER
SA-813-1000-1				SIZE: B
TOLERANCE UNLESS NOTED DIMENSION IN INCHES				DWG NO: AD-833-1028-1
X.X	0.1	ANGLE: ± 0.5°		REV: 1
X.XX	0.01			
X.XXX	0.005			
SCALE:				SHEET: 1 OF 1



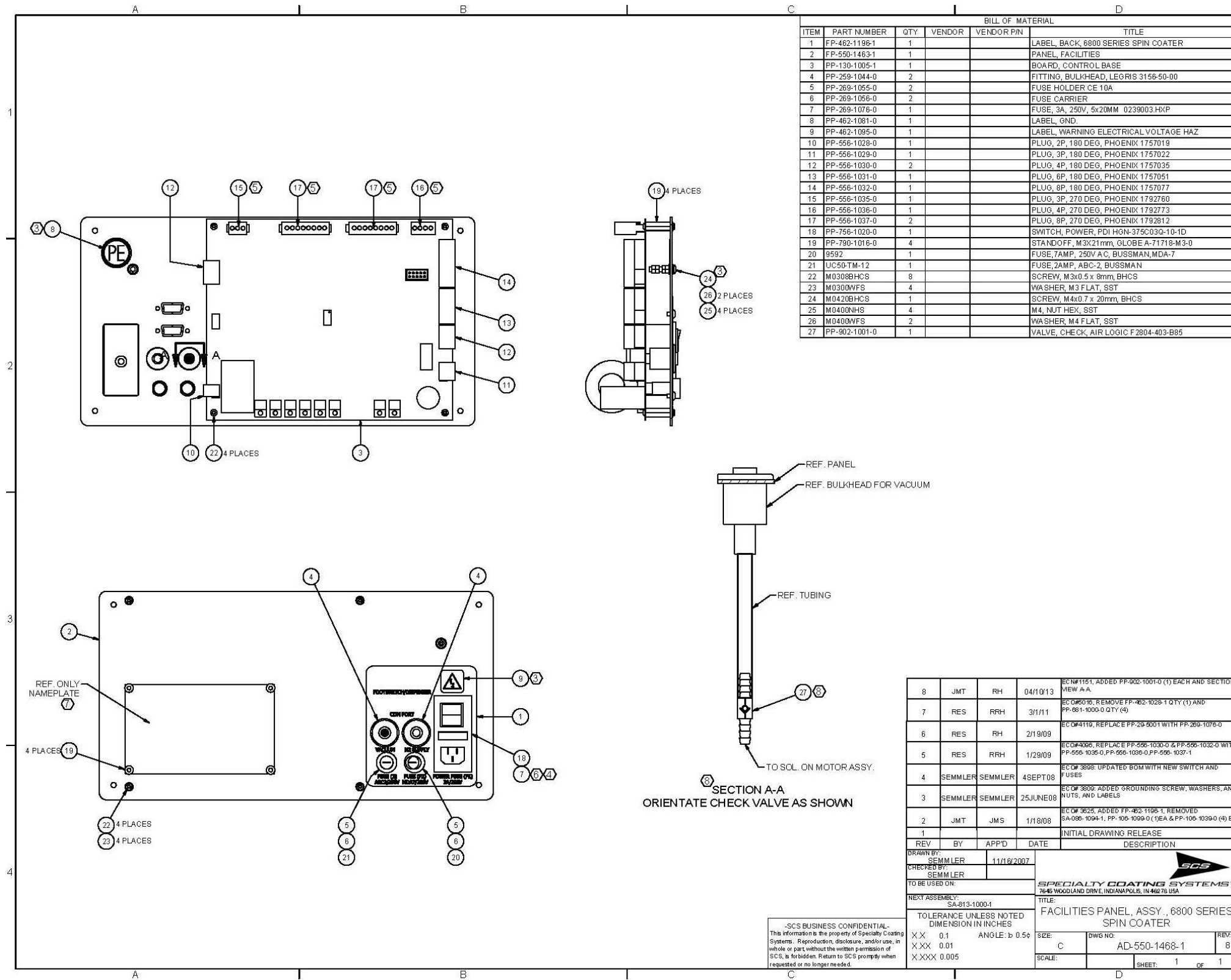


BILL OF MATERIAL					
ITEM	PART NUMBER	QTY	VENDOR	VENDOR P/N	TITLE
1	FP-017-1040-1	1			ARM, SWITCH PLUNGER, 6800
2	FP-595-1016-1	1			POST, SWITCH PLUNGER, 6800
3	FP-491-1762-1	1			BRACKET, SWITCH PLUNGER, 6800
4	PP-756-1022-0	1			SWITCH, CHERRY ELECTRONICS 0E34-75HX
5	0414BHCS	2			4-40 X 0.88" BUTTON HEAD CAP SC
6	0400NHS	2			NUT, #4-40 HEX, SST
7	0400WFS	2			WASHER, FLAT #4
8	M0416BHCS	2			M4x0.7 x 16mm, BHCS
9	M0400WFS	4			WASHER, M4 FLAT, SST
10	M0400NHS	4			M4, NUT HEX, SST
11	M0400WSLS	2			WASHER, SPLIT, M4, SST

2	JMT	JB	2/17/09	ECO# 4105, REMOVED M0400WFS, M0400NHS (2) EA, ADDED M0400WSLS (2).
1				INITIAL DRAWING RELEASE
REV	BY	APP'D	DATE	DESCRIPTION
DRAWN BY: JMT			1/7/2009	 <b>SPECIALTY COATING SYSTEMS™</b> 7645 WOODLAND DRIVE, INDIANAPOLIS, IN 46278 USA
CHECKED BY:				
TO BE USED ON:				TITLE:
NEXT ASSEMBLY: SA-385-1081-1				ARM ASSY, SWITCH PLUNGER, 6800
TOLERANCE UNLESS NOTED DIMENSION IN INCHES				SIZE: B
X.X 0.1 ANGLE: ± 0.5'				DWG NO: AD-017-1040-1
X.XX 0.01				REV: 2
X.XXX 0.005				SCALE: SHEET: 1 OF 1

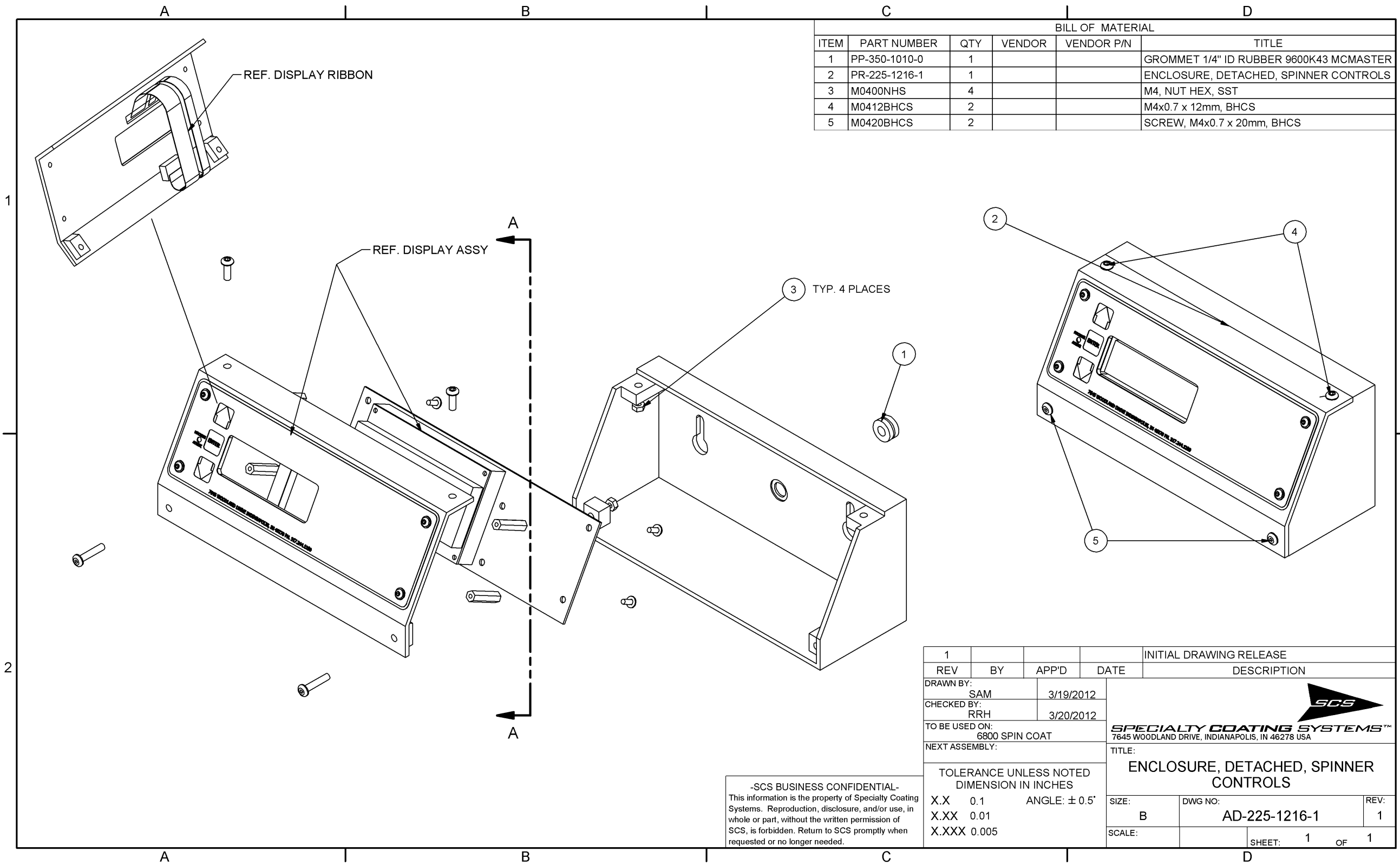
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BILL OF MATERIAL					
ITEM	PART NUMBER	QTY	VENDOR	VENDOR P/N	TITLE
1	PP-350-1010-0	1			GROMMET 1/4" ID RUBBER 9600K43 MCMASTER
2	PR-225-1216-1	1			ENCLOSURE, DETACHED, SPINNER CONTROLS
3	M0400NHS	4			M4, NUT HEX, SST
4	M0412BHCS	2			M4x0.7 x 12mm, BHCS
5	M0420BHCS	2			SCREW, M4x0.7 x 20mm, BHCS

1				INITIAL DRAWING RELEASE
REV	BY	APP'D	DATE	DESCRIPTION
DRAWN BY:		3/19/2012		 <b>SPECIALTY COATING SYSTEMS™</b> 7645 WOODLAND DRIVE, INDIANAPOLIS, IN 46278 USA
CHECKED BY:		3/20/2012		
TO BE USED ON:				TITLE:
6800 SPIN COAT				ENCLOSURE, DETACHED, SPINNER CONTROLS
NEXT ASSEMBLY:				SIZE: B
TOLERANCE UNLESS NOTED DIMENSION IN INCHES				DWG NO: AD-225-1216-1
X.X	0.1	ANGLE: ± 0.5°		REV: 1
X.XX	0.01			SCALE:
X.XXX	0.005			SHEET: 1 OF 1

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