Spin Coater

User Manual

Manual Version: 3.0.C

Product code: L2001A

Product Version: 3.0

Software Version: 3.0

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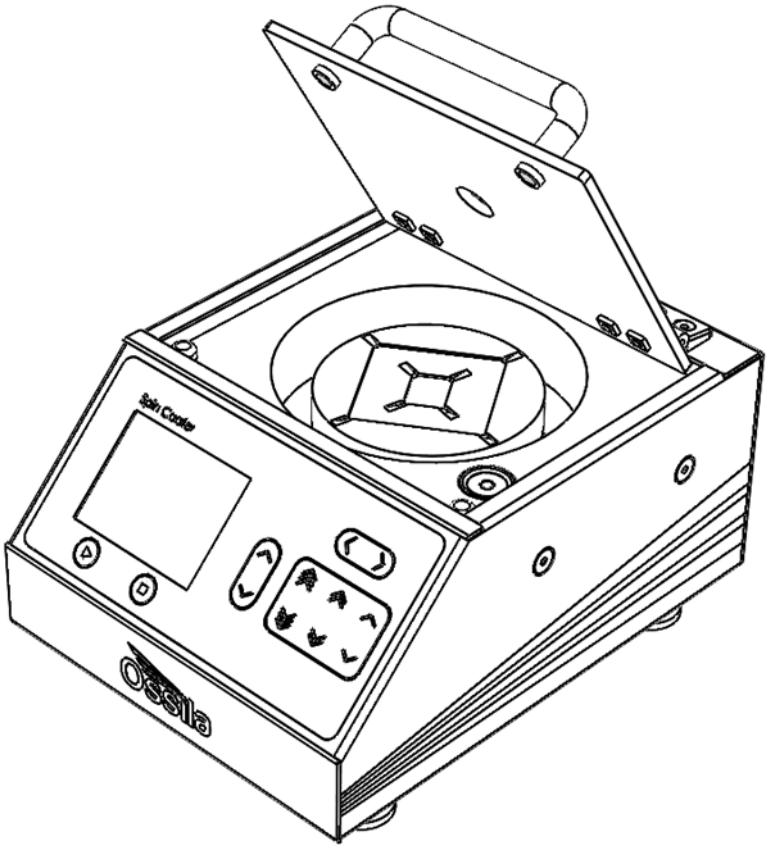
1. Overview

The Ossila Personal Spin Coater system is designed for low production spin coating applications and experimentation. The compact size design offers the ideal solution for a busy lab where space is at a premium. It comes with an easy installation which does not require a vacuum pump or nitrogen line.

The Ossila Personal Spin Coater provides the ability to hold the substrate firmly on the chuck without vacuum and provide a better uniform coating film quality across the substrate.

Operation of the Spin Coater is controlled by a custom-designed controller. During a cycle, the product recipe number, 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.



2. EU Declaration of Conformity (DoC)

We

Company Name: Ossila Limited

Postal Address: Solpro Business Park, Windsor street.

Postcode: S4 7WB

City: Sheffield

Telephone number: +44 (0)114 2999 180

Email Address: info@ossila.com

declare that the DoC is issued under our sole responsibility and belongs to the following product:

Product: L2001A3 / Spin Coater

Serial number: L2001A-3000-3000-3001- xxxx

Object of declaration:

L2001A3 / Spin Coater

The object of declaration described above is in conformity with the relevant Union harmonisation legislation:

Machinery Directive 2006/42/EC

EMC Directive 2014/30/EU

RoHS Directive 2011/65/EU

Signed:

Name: Dr James Kingsley

Place: Sheffield

Date: 01/02/2018

3. Safety

3.1 Warning

Warning

- **Do not leave devices with applied bias or current unattended as a power failure may result in board damage or device damage and potentially hazardous situations.**
- **Only use the unit with the supplied 24 VDC power adapter**
- **Opening the lid will cause the rotating chuck to stop, however, due to inertia it can take a few seconds for the chuck to come to a complete stop**
- **Ensure the substrate is placed in an adequately sized chuck recess as it holds it in place and stops it flying out**
- **Use under an exhaust hood when flammable or toxic substances are being used**

3.2 Use of Equipment

This Spin Coater is designed to be used as instructed, and in the following environmental conditions:

- Indoors in a laboratory environment (pollution degree 2)
- Altitudes up to 2000 m
- Temperatures of 5°C to 40°C; maximum relative humidity of 80% up to 31°C.

The Spin Coater is supplied with a power adapter and a power cord for the country of purchase, in accordance with European Commission regulations and British Standards. Use of any other electrical power cables or adaptors is not recommended.

3.3 Hazard Icons

Please not the following symbols that can be found at points throughout the rest of the manual.

Table 1.1: Hazard warning labels used in this manual.

Symbol	Associated Hazard
	General warning or caution, which accompanying text will explain
	Electrical shock
	Explosion
	Inhalation

3.4 General Hazards

Before installing or operating the Spin Coater, there are several health and safety precautions which must be followed and executed to ensure safe installation and operation.

WARNING: Improper handling when operating or servicing this equipment can result in serious injury. Read this manual before operating or servicing this equipment.

I. DANGER: DO NOT use the Spin Coater in the presence of an explosive atmosphere.

II. WARNING: Emergency Power Disconnect options: Use the power cord as a disconnect method, ensure that the power outlet for this cord is easily accessible by the user.

III. CAUTION: Opening the lid will cause the rotating chuck to stop, however, due to inertia it will take a few seconds for the rotating chuck to come to a complete stop at the highest speeds.

IV. CAUTION: Ensure the substrate is placed into a chuck with an adequate sized recess as it holds it in place and stops it flying around the bowl or even out of the bowl if the lid was opened at the highest speed (see caution III).

V. CAUTION: Use under an exhaust hood when flammable or harmful solvents are being used.

3.5 Servicing

If servicing is required, please return the unit to Ossila Ltd. Any other action will void the warranty.

3.6 Health and Safety – Installation

I. Place the machine on a solid, level surface, free from vibration and temperature extremes. For optimum performance, make sure that the chuck is also level.

II. Refer to the specifications section or to the label on the power adapter for electrical requirements.

III. The machine is not to be used in a hazardous atmosphere.

3.7 Health and Safety – Operation

I. CAUTION: Use under an exhaust hood when flammable or harmful solvents are being used.

II. CAUTION: Opening the lid will cause the rotating chuck to stop, however, due to inertia it will take a few seconds for the rotating chuck to come to a complete stop at the highest speeds. There is a risk of substances flying out of the bowl.

3.8 Health and Safety – Servicing

I. Service or installation work that includes integrating electrical components should only be performed by an Ossila engineer. Never alter the wiring of any purchased equipment. If changes are made, such alterations may damage the equipment, cause injury, or death. At the very least, such alterations will void your equipment's warranty.

4. Unpacking

4.1 Packing List

The standard items included with the Spin Coater are:

- The Spin Coater unit
- Power adapter with a power cord (specific for country of operation)
- Chuck (as specified by the customer)
- User guide manual

4.2 Damage Inspection

Examine the components for evidence of shipping damage. If damage has occurred, please contact Ossila directly for further action.

5. Specifications

The Spin Coater specifications are shown in Table 5.1.

Table 5.1. Spin Coater specifications.

Spin Coater	Specifications
Programs	10 programs with up to 50 steps each
Speed stability	< 2%
Speed	120 RPM to 6000 RPM
Spin time	1 sec- 1000 sec
Power supply	DC 24V 2A
Interlock	Software/hardware interlock
Case dimensions	Width: 170 mm Height: 140 mm Depth: 225 mm
Materials	Central polypropylene unit, steel frame, sides and base, PET display and keypad and tempered glass lid.
Fuses	1 A slow blow
Weight	3 kg

6. System Components

The Spin Coater L2001A comprises of three items: the Ossila spin coater (Figure 6.1), power adapter (Figure 6.2) and the Ossila spin coater chuck (Figure 6.3).

The spin coater is powered from a 24V mains power adapter which does not require a high voltage near safety cabinets. The power supply adapter is supplied with a power plug that is suitable for the country of purchase.

The spin coater chuck recess size is specified by the customer. The chucks are designed with close tolerances and provide a flat, rigid surface for mounting substrates of different sizes, weights and shapes. Proper chuck selection should be based on substrate size. The chuck has a push-fit connection to the motor coupling in the bowl of the spin coater, and is easily removable for cleaning or intechanging with other chucks. The chuck is made from high density copolymer of polypropylene, which has a high degree of chemical resistance. For cleaning, see Section 9.1.

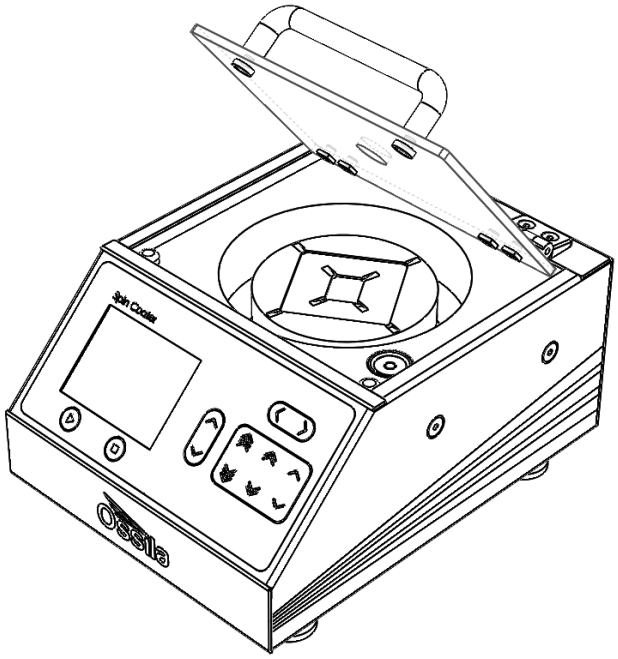


Figure 6.1. The Ossila personal spin coater.

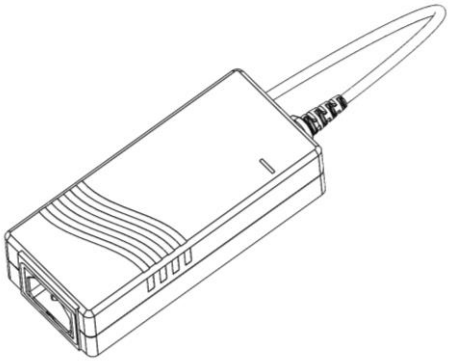


Figure 6.2. The 24 VDC power adapter.

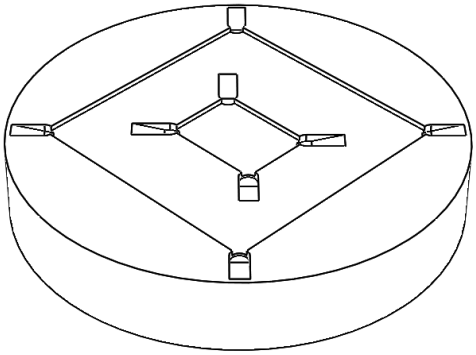


Figure 6.3. The Ossila spin coater chuck.

7. Installation

1. Place the unit on a solid, level surface.
   Ensure the area is free from vibrations, temperature extremes and highly flammable or explosive materials. Make sure the chuck is also level.
2. Before plugging in the spin coater, ensure the power switch on the unit is switched to the ‘0’ position (off).
3. Connect the power adapter to the power jack on the back panel of the spin coater unit, see figure 7.1.
4. Refer to the label on the power adapter for electrical requirements.
5. Switch the spin coater power switch to the ‘I’ position to turn the unit on.

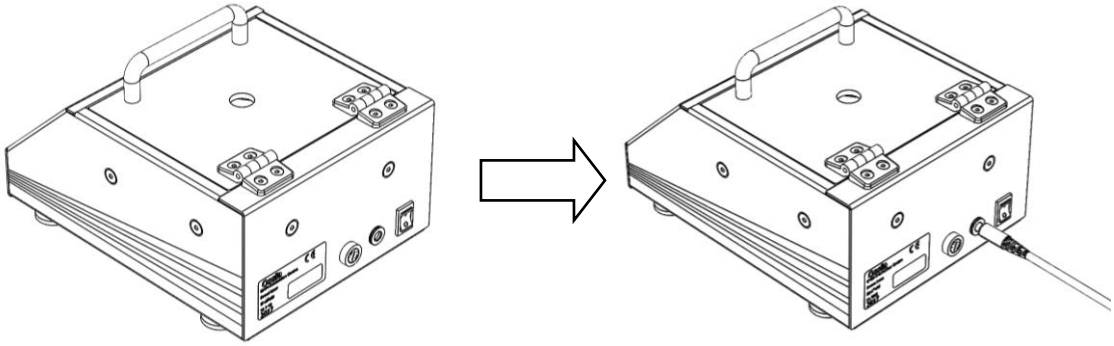


Figure 7.1. Connecting the power adapter to the power jack on the back panel of the unit.

8. Operating the Spin Coater

8.1 Spin Coater overview

A top-down view of the spin coater is shown in figure 8.1 with all the relevant components highlighted.

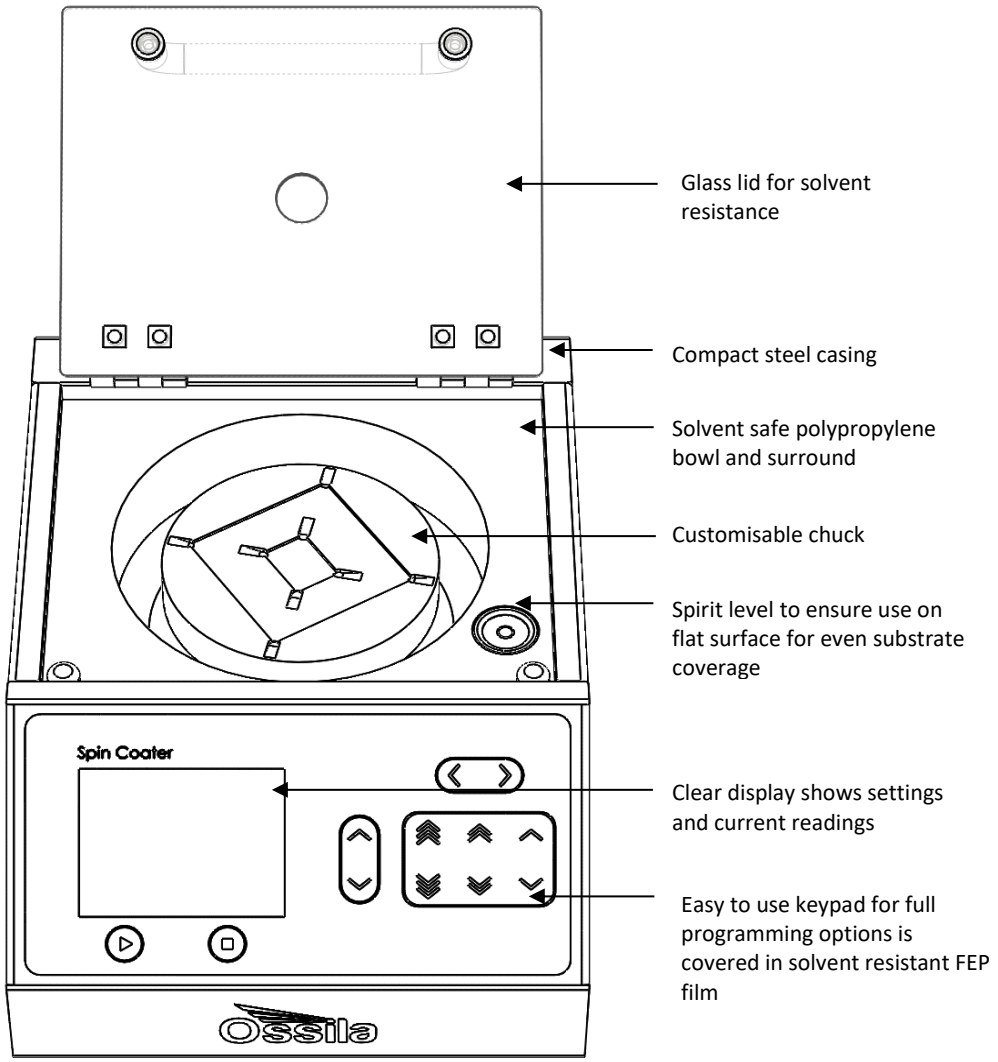


Figure 8.1.Spin Coater top down image.

8.2 Spin Coater User Interface

Figure 8.2 shows the front panel of the spin coater, with a brief explanation of the functionality of each button.

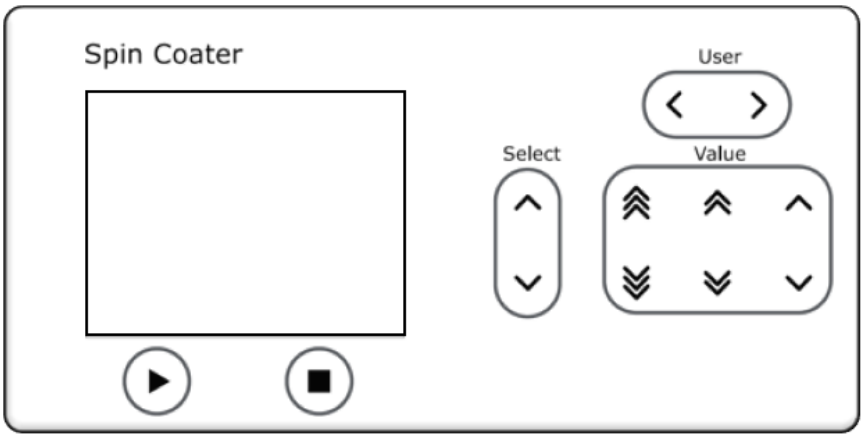


Figure 8.2 Spin coater screen and keypad.

START - This key is used to initiate a programmed sequence. While a program is running the display will show “RUNNING” with the current speed and elapsed time. The “RUNNING” caption will disappear after the program is finished.

STOP - This key is used to terminate the running program. It will reset to the first step of a given program when pressed.

USER - These keys are used to select the user. The key allows the user number to be selected.

CURSOR – These keys are used to navigate between the changeable parameters within a program. While navigating the cursor icon will indicate which parameter is selected.

VALUE – These keys are used to change the values where the cursor is located. The keys are divided into three columns; small increase/decrease (by 1 or 10) , medium increase/decrease (by 10 or 100) and large increase/decrease (by 100 or 1000) shows the increase and decrease values for each button with respect to the profile. See table 8.1 for a description of the function of each button.

Table 8.1. Operational buttons and their associated functions.

Buttons	Program	No. of Step (max 100 steps)	STEP (max 100 steps)	RPM (max 6000 rpm)	TIME (max 999 sec)
^	+1	+1	+1	+10	+1
v	-1	-1	-1	-10	-1
^^		+10	+10	+100	+10
vv		-10	-10	-100	-10
^^^		+10	+10	+1000	+10
vvv		-10	-10	-1000	-10

8.3 Operating the Spin Coater

The Ossila Spin Coater has a pair of pre-set experimental programs.

Table 8.2: Built-in programs for testing.

User no.	Program No.	Step No.	RPM	TIME (sec)
User 01	Program 01	1	2000	30
	Program 02	1	2000	30
		2	5000	5

(I) Modify user

1. Select the User by using the "**User**" buttons.
2. To modify the user, press left or right "User" buttons to increment or decrement the number of user. The maximum number of user is **10 users**.

(II) Modify program

3. Each User has 10 programs. To modify the program number, navigate to the **program line** and press small increment ^ or decrement button v.

4. To modify the program, the user can alter the number of steps for the program by using the following keys ^ v. The maximum number of steps is **50 steps**.

5. Navigate to "**Step:**" line using the cursor to choose which step number is to be modified. The step number can be selected by using the following keys ^ v.

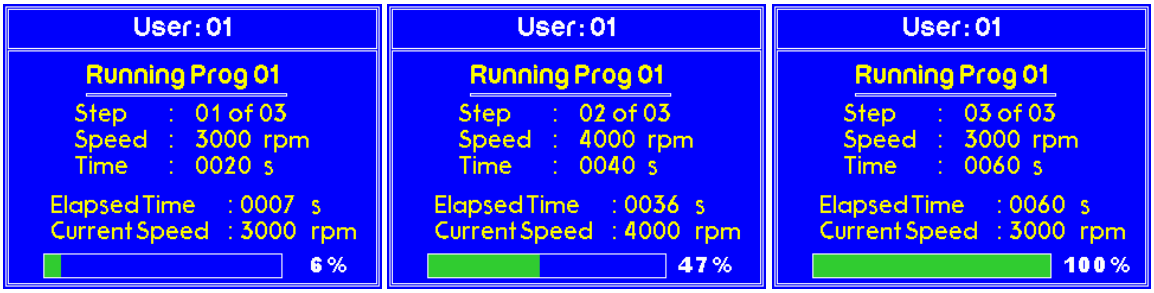
6. Navigate to the "**Speed**" line to change the speed of the current step. Use the "**VALUE**" buttons to increase or decrease the value. The maximum value is 6000 rpm.

7. Navigate to the "**Time**" line to specify the time for the current step. Use the "**VALUE**" buttons to increase or decrease the value. The maximum value is 1000 sec.

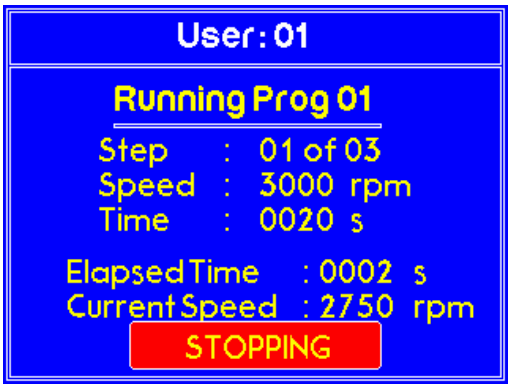
8. Navigate back to "**Step**" line using the cursor then increases the number of the step to set the Speed and Time.

(III) Start program

9. Once everything is set and ready, press "**START**" to run the program. At the bottom of the display the current elapsed time and current speed will be shown.



10. To abort the operation, press the "**STOP**" button.



11. Once the operation is completed, the "stopping" warning will appear to notify the user and will not allow the motor to re-run until it has completely stopped.

12. If the lid is opened, a warning appears on the screen to notify the user. If the lid is opened while the motor is running, the system will force the motor to stop.

9. Maintenance

9.1 Cleaning

• To clean the lid, bowl and chuck use a solvent that is appropriate to dissolve the materials that have been spin coated.

• Use a soft cloth or towel in order to avoid damage to the polypropylene.

• Take care when cleaning around the keypad and display area because organic solvents may damage/remove the label.

9.2 Repair & Service

There are no user-serviceable parts in this unit other than the fuse which is accessible externally. If the unit is faulty, return it to Ossila Limited. Our service department will promptly quote to repair any faults that occur outside the warranty period.

9.3 Storage Conditions

The spin coater should be kept in dry conditions; away from direct sources of heat or sunlight, and in such a manner as to preserve the working life of the instrument.

10. Spin coater Troubleshooting

Problem	Possible cause	Action
Spin coater will not power up	The power supply may not be connected properly, or the switch is in the OFF position.	Check the connection and make sure the power is turned ON.
Cycle will not start	No recipe programmed.	Select/program a recipe.
	Lid open/close not sensed, or lid still open.	Open and close the lid properly.
Cycle starts, but immediately stops	Recipe problem.	Review, edit and re-enter recipe as needed
Display time or RPM appears incorrect	Issue with the program.	Turn OFF the spin coater for 5 seconds and then restart.
Performance irregularities	Customised chuck causing imbalance.	The control program takes into account the chuck weight and moment of inertia). Use a chuck that has been calibrated for your spin coater.
	Spin coater not properly balanced.	Ensure that spin coater and chuck are both level, with the spin coater placed on a flat and sturdy surface.

11. List of Related Products

Compatible substrates

ITO Substrates (e.g. S111)

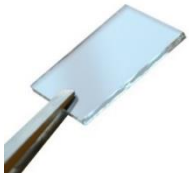
All of our 15 x 20 mm ITO substrates for OPV, OLED and sensing applications.

Pre-patterned ITO OFET Substrates (S161/S162)

The Ossila ITO OFET substrates have been designed to enable fabrication and characterisation without the need for vacuum evaporations or probe stations.

Silicon Oxide OFET Substrates (S146)

Silicon substrates with thermal oxide layer pre-cut to fit the Ossila OFET fabrication systems. Also used for applications including ellipsometry and X-ray measurements.



Synthetic Quartz Coated Substrates (S151)

Flat glass substrates coated with 20 nm of SiO2 to help with surface wetting and prevent ion migration from the glass to the active layer.

Related processing equipment

UV Ozone Cleaner (E511)

For removing contamination on the surface of samples, providing you with ultraclean surfaces within minutes to spin coat onto.

Syringe Pump (L2003S1/ L2003D1)

High-precision, programmable single and dual syringe pumps for the automatic dispensing of solutions, ranging from nanolitres per minute to millilitres per second.

12. Revision History

Rev	Date	Description
A	Nov 2017	Spin coater manual 2017.
B	Feb 2018	Change company's address
C	Aug 2018	Remove Warranty Information