

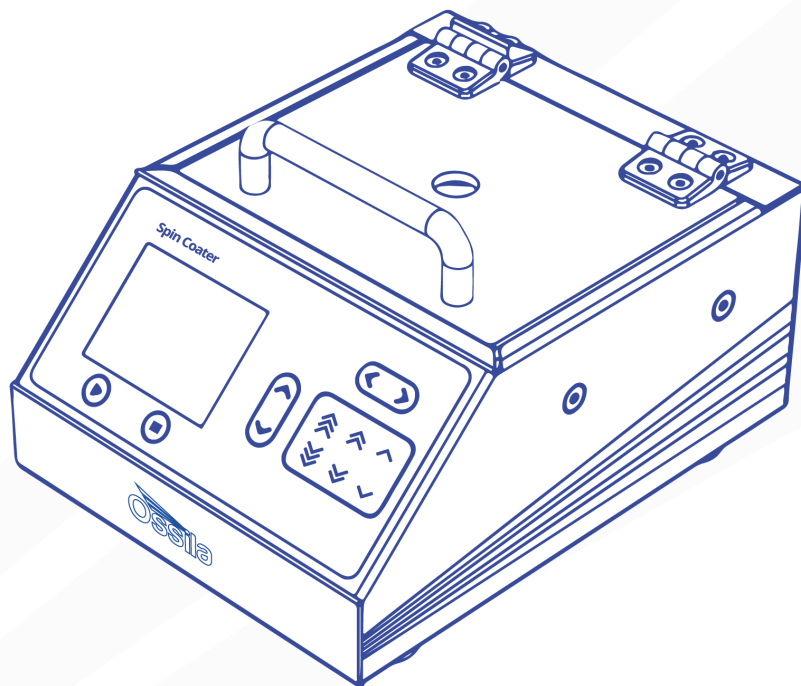
SPIN COATER USER MANUAL

Manual Version: 3.0.K

Product code: L2001A3

Product Version: 3.0

Software Version: 3.0



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1. Overview

The vacuum-free Ossila Spin Coater is part of the Institute of Physics award-winning Solar Cell Prototyping Platform*. Unlike most other models in the market, it does not need a vacuum pump or nitrogen line – therefore requiring less servicing and enabling you to produce high-quality coatings without the problems of substrate warping. Compact and portable, the Spin Coater will help you optimise space in the glovebox or on the workbench without compromising on functionality – making it the ideal solution for busy labs with limited space.

Substrates are held firmly on the chuck without the need for a vacuum. This produces a better uniform thin-film coating across the substrate. The Ossila Spin Coater is operated via a built-in interactive user interface.

During a cycle, the product recipe number, spinning speed, and remaining time are displayed on the full colour display screen – so you do not need an external PC connection.

*The Ossila Solar Cell Prototyping Platform is a complementary collection of substrates, materials, and equipment as part of a high-performance standard photovoltaic reference architecture. This platform enables researchers to produce high-quality, fully functional solar cells which can be used as a reliable baseline.

For more information: ossila.com/pages/solar-cell-prototyping-platform



2. EU Declaration of Conformity (DoC)

We

Company Name: Ossila BV

Postal Address: Biopartner 3 building, Galileiweg 8

Postcode: 2333 BD Leiden

Country: The Netherlands

Telephone number: +31 (0)71 3322992

Email Address: info@ossila.com

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

Product: Spin Coater (L2001A3)

Serial number: L2001A3-xxxx

Object of declaration:

Spin Coater (L2001A3)

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

The following harmonised standards and technical specifications have been applied:

BS EN ISO 12100:2010 Safety of machinery - General principles for design - Risk assessment and risk reduction.

Signed:



Name: Dr James Kingsley

Place: Leiden

Date: 16/11/2021

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Vi intygar härmed att den utrustning som förtecknas överensstämmer med relevanta förordningar gällande EU-harmonisering som finns på föregående sidor i detta dokument.

3. Safety

3.1 Warning

- **Devices with applied bias or current should NOT be left 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.**
- **The unit should be operated under a working exhaust hood when used with flammable or toxic substances.**

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

The following symbols can be found at various points throughout this manual. Note and read each warning before attempting any associated operations associated with it:

Table 3.1 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 or death. 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 used with flammable or harmful solvents.

3.5 Servicing

If servicing is required, please return the unit to Ossila Ltd. The warranty will be invalidated if:

- Modification or service has taken place by anyone other than an Ossila engineer.
- The unit has been subjected to chemical damage through improper use.
- The unit has been operated outside the usage parameters stated in the user documentation associated with the unit.
- The unit has been rendered inoperable through accident, misuse, contamination, improper maintenance, modification, or other external causes.

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: The unit should be operated 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



Servicing should only be performed by an Ossila engineer. Any modification or alteration may damage the equipment, cause injury, or death. It will also void your equipment's warranty.

4. Unpacking

4.1 Packing List

The items included with the Spin Coater are:

- The Spin Coater unit.
- Power adapter with a power cord (specific for country of operating).
- Chuck (as specified by the customer).

4.2 Damage Inspection

Examine the components for any 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	24 VDC / 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 Ossila Spin Coater L2001A comprises three items: the spin coater unit (Figure 6.1), power adapter (Figure 6.2) and spin coater chuck (Figure 6.3).

The Spin Coater is powered from a 24VDC mains power adapter. 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 interchanging with other chucks. The chuck is made from a high-density copolymer of polypropylene, which has a high degree of chemical resistance. For cleaning, see Section 9.1.

Table 6.1. The Ossila Spin Coater

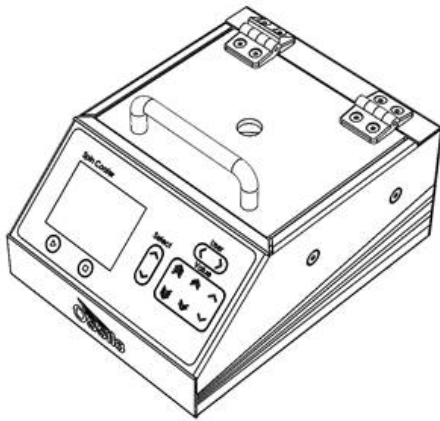


Table 6.2. The 24 VDC power adapter.

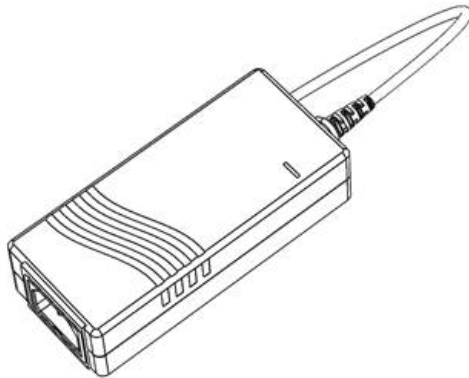
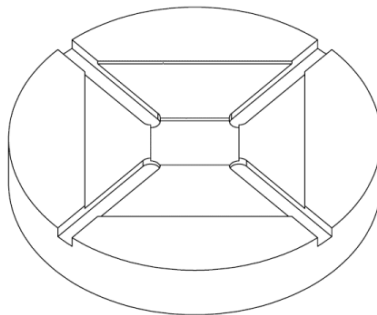


Table 6.3. The Ossila Spin Coater chuck.

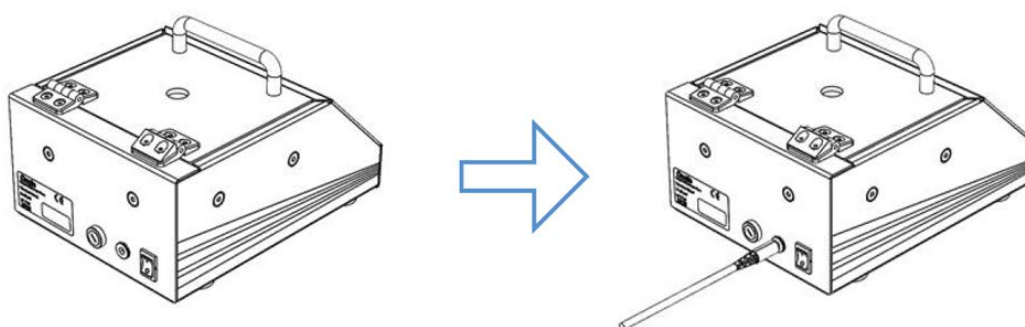


7. Installation

The process for installing the Spin Coater is as follows:

1. Place the unit on a solid, level surface. Ensure the area is free from vibrations, temperature extremes
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.

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

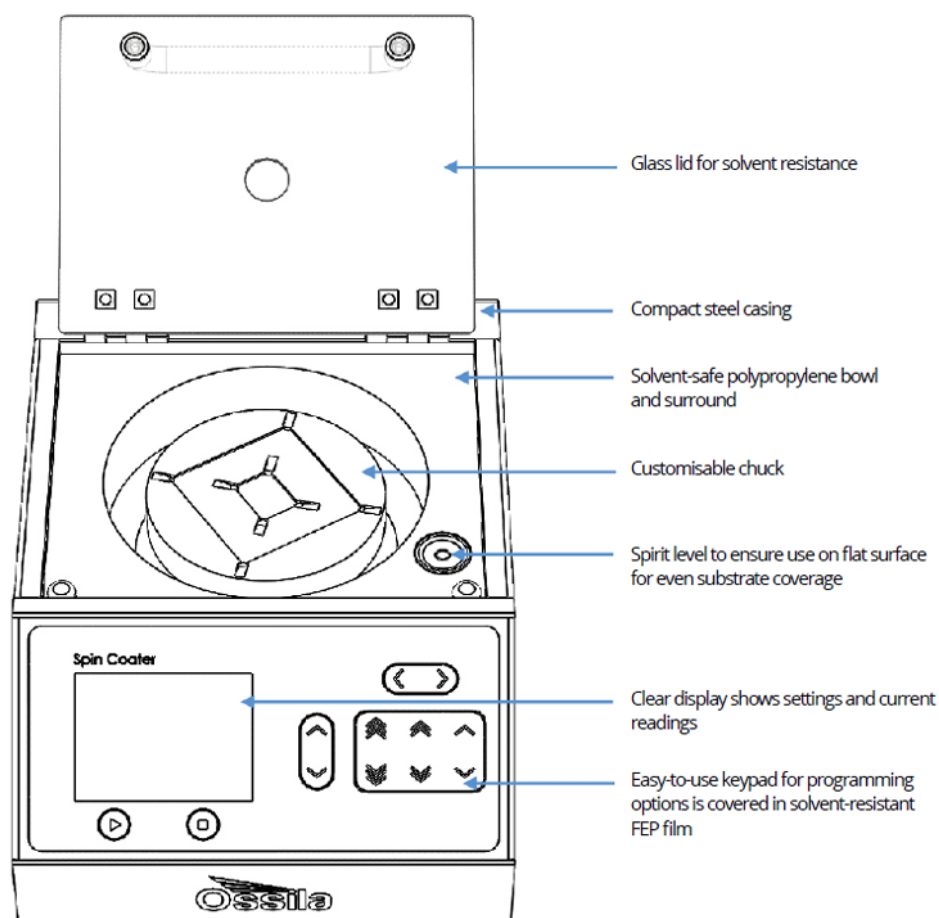


8. Operation

8.1 Overview

A top-down view of the Spin Coater is shown in Figure 8.1, with all the relevant components highlighted.

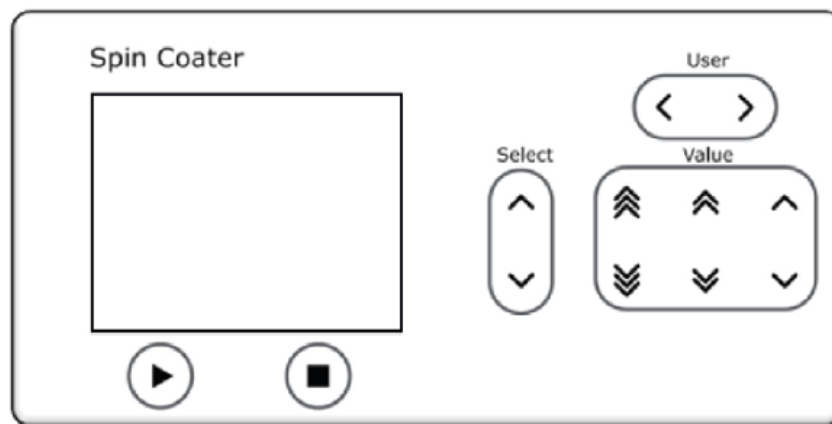
Figure 8.1. Spin Coater top-down image.



8.2 User Interface

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

Figure 8.2. Spin Coater screen and keypad.



The start button is used to initiate a programmed sequence. While a program is running, the display will show the message “RUNNING” with the current speed and elapsed time. The “RUNNING” message will disappear once the program is finished.



The stop button is used to terminate the running program. It will reset to the first step of a given program when pressed.



These buttons are used to navigate between different user profiles.



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

These buttons are used to change the profile values where the cursor is located and are divided into three columns:



Small increase/decrease (by 1 or 10)



Medium increase/decrease (by 10 or 100)



Large increase/decrease (by 100 or 1000)

8.3 Programming and Usage

The Ossila Spin Coater has two pre-set experimental programs to get you started.

Table 8.1. Pre-set programs

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) Selecting a User Profile ("User")

1. To select the user profile of your choice, press either the left or right "User" buttons. The maximum number of user profiles is 10.

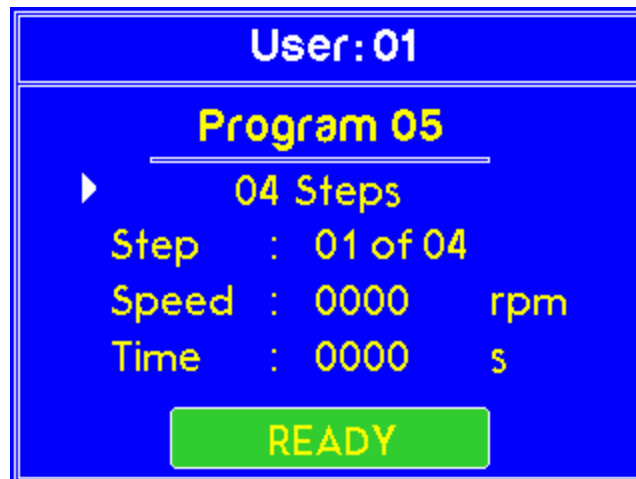


(II) Selecting a Program

2. Each user profile can store up to 10 programs. To choose between program numbers, navigate to the "Program" line and press the up  or down  buttons.



3. To edit the program, you can alter the number of steps in a program by using the following buttons   . The maximum number of steps is 50 steps.



4. Navigate to the "Step" line by using the "Select" keys to choose which step number is to be edited. The step number can be selected by using the following keys:  or  .

User: 01

Program 05

04 Steps

▶ Step : 02 of 04

Speed : 0000 rpm

Time : 0000 s

READY

5. 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.

User: 01

Program 05

04 Steps

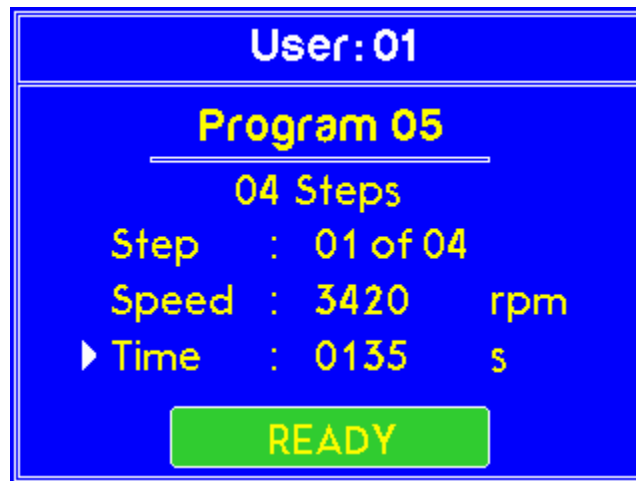
Step : 01 of 04

▶ Speed : 3420 rpm

Time : 0000 s

READY

6. Navigate to the “Time” line to specify the time duration for the current step. Use the “Value” buttons to increase or decrease the value. The maximum time duration is 1000 seconds.

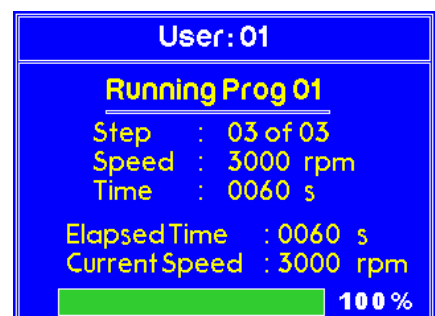
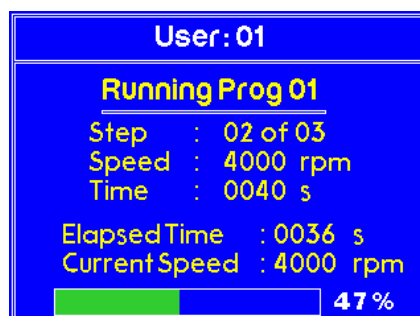


7. Navigate back to the "Step" line using the cursor. Then, increase the number of steps to set the Speed and Time.

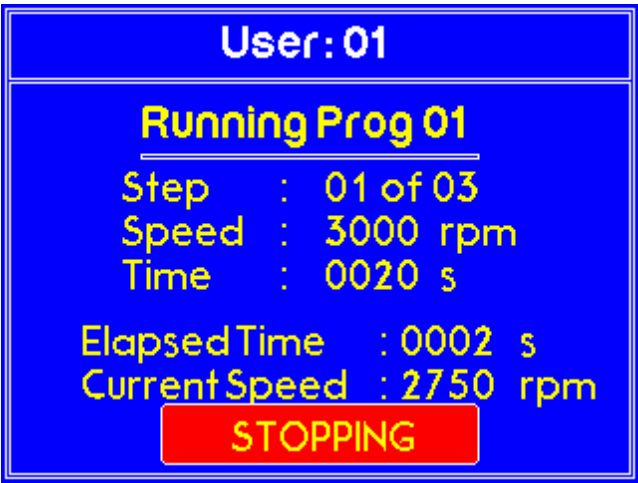


(III) Start Program

8. 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.



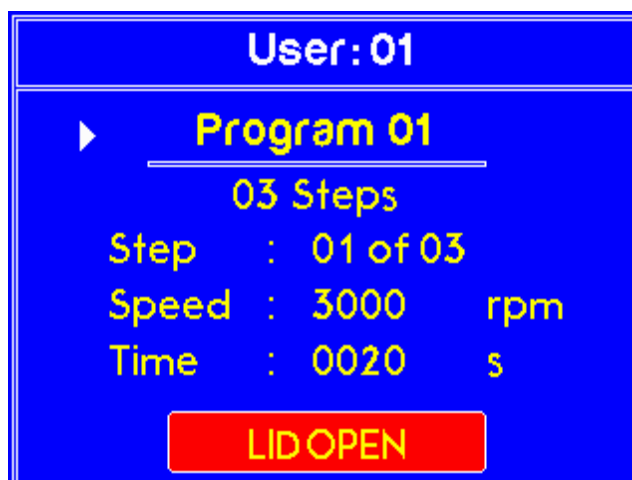
9. To abort the operation, press the “STOP” button.



10. Once the operation is completed, a “STOPPING” warning message will appear to notify the user. When this warning is displayed, the motor cannot re-run until it has completely stopped.



11. 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 and Service

The only user-serviceable part in this unit is the fuse (accessible externally). If the unit is faulty, please return it to Ossila. We will promptly quote to repair any faults that occur outside the 2-year warranty period. Parts subject to normal wear and tear (Spin Coater chucks) are not covered by the warranty.

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. Troubleshooting

Table 10.1. Troubleshooting guidelines for the Ossila Spin Coater

Problem	Possible cause	Action
Spin Coater will not power up	a. The power supply may not be connected properly, or the switch is in the OFF position	a. Check the connection and make sure the power is turned ON
Cycle will not start	a. No recipe programmed b. Lid open/close not detected, or lid still open	a. Select/program a recipe b. Open and close the lid properly
Cycle starts, but immediately stops	a. Recipe problem	a. Review, edit and re-enter recipe as needed
Display time or RPM appears incorrect	a. Issue with the program	a. Turn OFF the Spin Coater for 5 seconds, and then restart
Coating issues	a. If the chuck is removed (for cleaning etc), it may not have been re-inserted properly causing an imbalance	a. Ensure the chuck is pushed in thoroughly so that the two metallic headers are inserted all the way and flush with the top of the chuck
	b. The Spin Coater is not level	b. Place the Spin Coater on a flat and sturdy surface and use the in-built spirit level
	c. If the above does not solve the issue	c. Contact Ossila