SAWATEC

Spinner Unit LSM-200

User Manual

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Product description

Spinner Unit LSM-200

The Spinner Unit LSM-200 is designed for application in the semiconductor industry, in particular to apply photo resist on wafers.

Main features

- Chuck for substrates of 1" - 6" (25 … 150 mm)
- 1 … 6000 rpm
- Controller for 10 recipes with 24 steps each

Main parts

The figure below shows the main parts of the Spinner Unit LSM-200:

1 Cabinet (stainless steel, electro polished)

2 Spinner bowl with chuck (anodized aluminum)

3 Dosing arm with protective cover

4 Control panel

5 Main switch (inside cabinet).

6 Emergency switch

7 Integrated Start / Stop buttons work in parallel to touch panel

8 Gauge for chuck vacuum

Connectors and appliances

Connectors are located at the bottom of the rear cabinet. Use the supplied 8mm key to open and close the rear cabinet.

1 Compressed air intake. Connects to P1 (**1**) at the gauges panel.

2 Commpessed air intake connecting to P2 (**2**) and dosing air (**3**) at the gauges panel.

3 Vacuum intake for the chuck vacuum

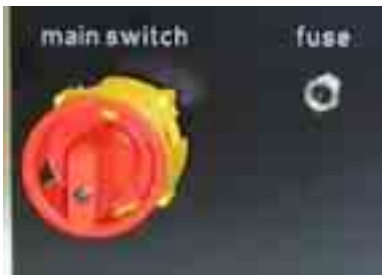
4 Vacuum intake for dosing pump. Connects to (4) at the gauges panel.

5 Exhaust

6 Mains intake 230 VAC

Main switch and fuse

The main switch and the fuse is located to the bottom of the right part of the front cabinet.



A blown fuse pops out. Before pressing the fuse button to activate it again, the reason for the short circuit must be removed!

To switch on turn the main switch to the right.

Gauges panel

Pressure control and gauges are located in the right part of the front cabinet.

The control valve is to the left, the gauge to the right:

1 Compressed air for dosing arm rotation and lifting of the spash guard ring

2 Compressed air for ancillary use

3 Compressed air for the dosing pump

4 Vacuum for the dosing pump

Technical data

Operational characteristics

Property	Nominal value	Tolerance / specification
Chuck size	1…6" (25…150 mm)	
Speed range	1…6000 rpm	

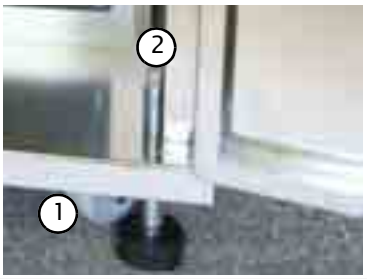
Physical properties and environment

Property	Nominal value	Specification
Width/depth/height	85 / 75 / 90 cm	
Control panel height	30cm	above working surface
Weight	110 kg	
Electrical power	230 VAC, 50/60Hz 15 A	Socket for 3-pin plug C12
Control power	24 VDC, 5A	
Vacuum	-0.8 bar ±0.1 bar	Fitting for hose Ø 4/6 mm
Compressed air	> 4 bar	Fitting for hose Ø 4/6 mm
Exhaust	20-50 m^3/h	Fitting for hose inner Ø 76 mm

When positioning the Spinner Unit LSM-200 sufficient space for the operator must be provided at the front side.To access the rear te unit may be moved on its rollers.

For proper operation the Spinner Unit LSM-200 must be levelled with screws near the bottom rollers.

Levelling screws



To move the spinner unit on the rollers (**1**) the levelling screws (**2**) must give clearance of at least 5mm

Standards

The Spinner Unit LSM-200 uses only DIN-CE certified elements or DIN-CE certified materials.

Controlling the process

Controller interface

The user interface of the controller comprises a touch panel which both displays information and allows for user input.

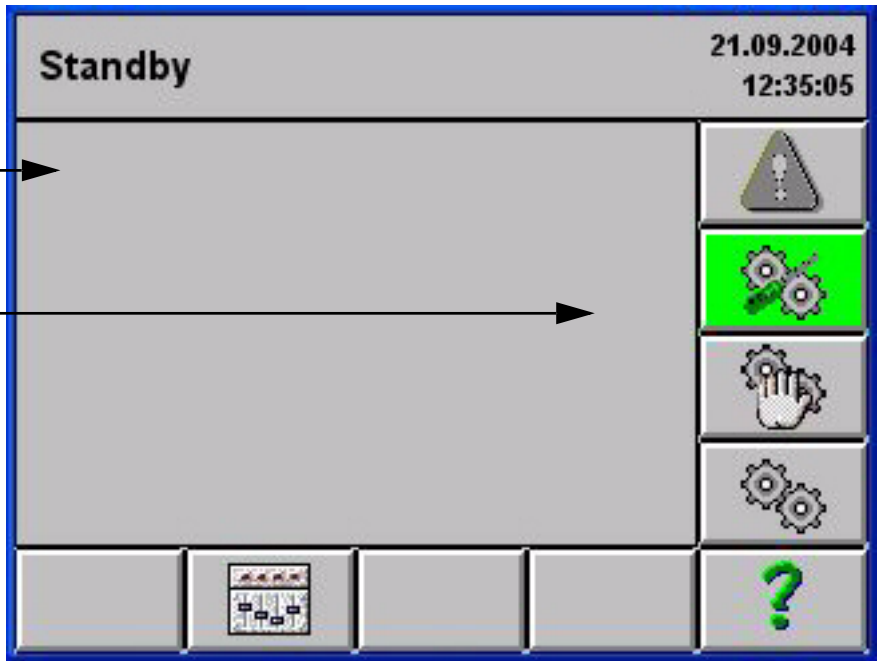
Using the touch panel

Do not press on the touch panel, just touch the surface gently with your finger.

Although the panel reacts to a pointing finger also in some distance, it is good practice to really touch the panel to have tactile feedback.

Display area

The area of the display is divided into four sections:



User types

Three levels of actions are defined by passwords:

User	Can run processes both manually and automatically.
Setup	Can define processes (receipts) and perform all **User** actions.
Master	Can set passwords, machine parameters and perform all **Setup** actions. Of course, all **User** actions can also be performed.

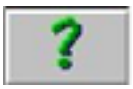
Popup boxes

Depending on selected functions pop-up boxes are displayed which are smaller than the entire screen.

These popup boxes disappear after 5 seconds, if no input is provided or no button touched.

General buttons and controls

The following buttons and controls are used in various dialogues

Button	Function
	Exit any display with this button. In a menu hierarchy you walk one step up (back).
	Alarm is active. Touch the button to open the Alarm display.
	Cancel: Leave the current dialogue without setting any values
	OK: Accept the provided (changed) input values of the current dialogue.
	Acknowledge: Confirm a message with this button.
	Help: Display help about the controller menus. This function is currently supported only rudimentary.
	Increment (upper button) or decrement (lower button) the value displayed between the two buttons. The increment normally is 1, but not necessarily.
	Scroll bars to the right of lists. Touch the lower button to scroll forward in the list Touch the upper button to scroll backward in the list. For a quick location you may drag the slider button (touch and move the button).

Numeric data entry

To change the value in a field (such as the turning speed of the spinner):

- Touch the field on the display.
- In the appearing pop-up enter the desired value and leave the pop-up with the **Exit** button  .

The maximum and minimum value which may be entered is displayed on top. The middle line displays the current entry.

Remove the last entered figure

Reset value to 0, clear the entry

Accept the input value. The panel is not left.

Alphanumeric data entry

To change the text in a field (such as the name of a process):

- Touch the field on the display.
- In the appearing pop-up enter the desired text and leave the pop-up with the **Exit** button  .

Entered text

Accept the input value with **Enter**.

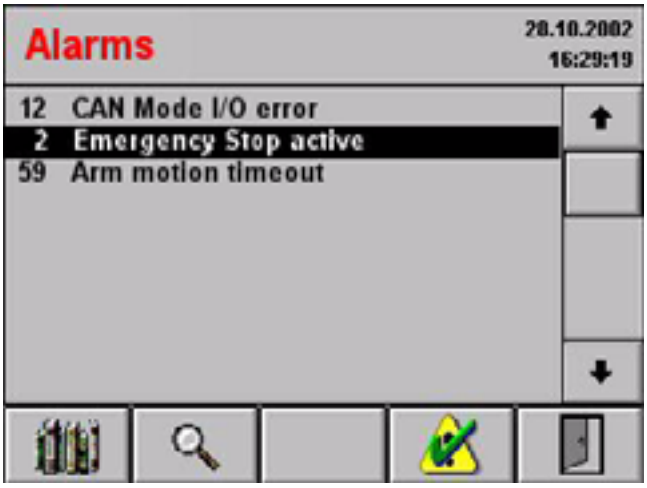
Remove the last entered character

Status Messages

During a process the central area of the display shows status messages. These do not require any user action.

Alarm handling

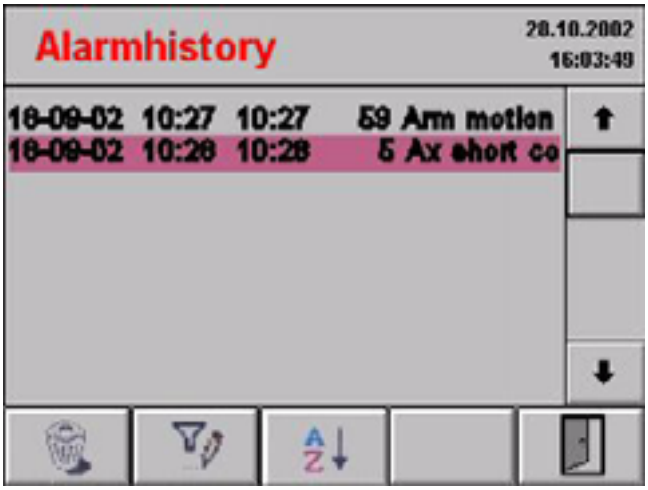
If user intervention becomes necessary, the alarm button flashes red  . The alarm message is displayed after touching the alarm button.



To get the details of the alarm, select it and touch the details button  . A pop-up window appears:

Alarm history

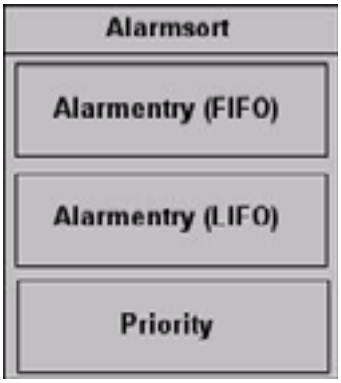
The alarm history contains all confirmed and not confirmed alarms. It is entered from the Alarm display with the history button 



Possible actions

Function	Touch button	
Delete the complete history Attention: You are not prompted to confirm the action	Waste bin	
Filter display of messages: a popup window will appear	Filter	
Sort messages: a popup window will appear	A to Z	

Filter alarm display

Filter - popup	Sort - popup
	
To select the desired filter, touch the appropriate button.	To sort according to your desire touch the appropriate button.

Setting up the Spinner Unit

Before operating the Spinner Unit LSM-200 it must be set up as follows:

Level the Spinner Unit

The Spinner Unit must be levelled for proper operation, using a level and the levelling screws near the transport rollers at the bottom.

Note: *The levelling screws can eliminate unevenness of about ± 5mm.*

Secure location

The Spinner Unit may vibrate during operation and hence must be secured to stay in its location. The level screws act as stoppers also.

Connect piping and mains

1 Connect the exhaust hose to the outlet in the rear.

2 Connect the vacuum to the corresponding intake.

3 Connect the compressed air to the corresponding intake

4 Supply electric power

Switching on and off

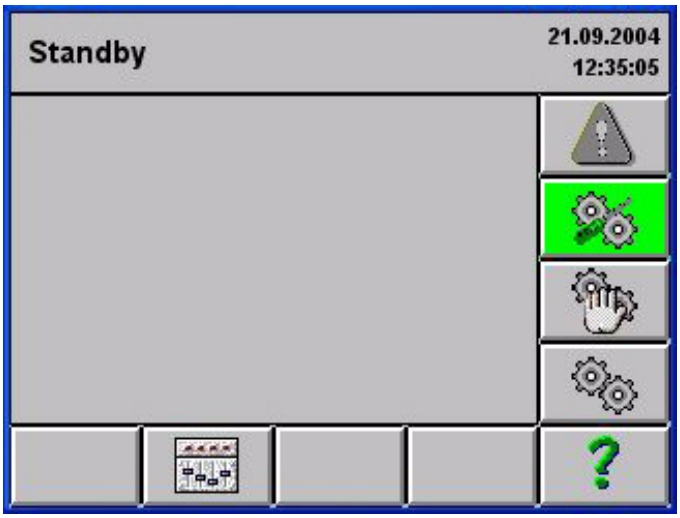
Switching on

1 Assure proper function of electricity, compressed air and vacuum.

2 Switch on the device with the main switch. Location and appearance of this switch depends on the integration (see *Main switch and fuse* on page 5).

The control initialises.

3 After about 10 sec the **Stand by** panel displays:



How to come here

This panel can be reached from any process/recipe panel with the **Exit** button  .

Possible actions

For buttons not explained here see *General buttons and controls* on page 13.

Function	Touch button	
Display alarm (alarm button is red)	Alarm	
Enter stand by mode	Stand by	
Start manual mode	Manual	
Start automatic mode	Auto	
Set parameters (system, process/recipe etc.)	Settings	

Operation with the integrated Start/Stop buttons

In Automatic Mode (see *Automatic mode* on page 16) the touch screen buttons Start and Stop can be substituted by the integrated Start and Stop buttons in front of the spinner unit.

Switching off

1 Leave all menus by pressing the **Exit** button  repeatedly until the **Stand by** panel appears.

2 Switch off the unit with the main switch. Location and appearance of the main switch depend on the integration. See *Main switch and fuse* on page 5.

Internal checks

Chuck vacuum

The spinner does not start if the chuck vacuum is lower than 0.4 bar. This situation is signalled by an alarm message on the touch panel.

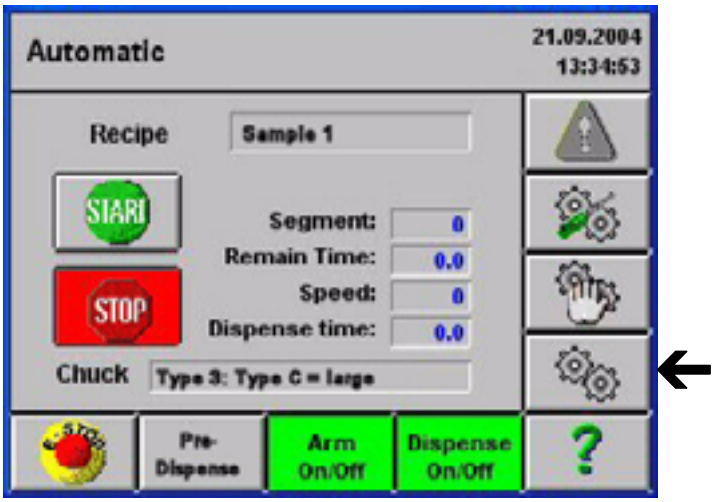
Processing

Automatic mode

Panel **Automatic** is the standard display during normal operation. In this mode the process/recipe is started either by a handling device or the integrated Start/Stop buttons.

How to come here

This panel can be reached from any **Stand by** panel with the **Automatic** button  .



Output display

Last process/recipe and last selected chuck; parameters of selected process/recipe

Possible actions

For buttons not explained here see *General buttons and controls* on page 13

Function	Touch button
Select a process/recipe to be run	Touch the field next to the label Recipe
Select the chuck	Touch the field next to the label Chuck
Start selected process	Start 
Stop current process	Stop 
Start manual mode	Manual 

Display while running a process/recipe

The parameters of the process/recipe are continually displayed. For example the Segment number loops through the recipe steps.

Additional functions during the process

During the automatic mode the buttons **Pre-Dispense**, **Arm on/off** and **Dispense on/off** can be touched to perform the corresponding action.

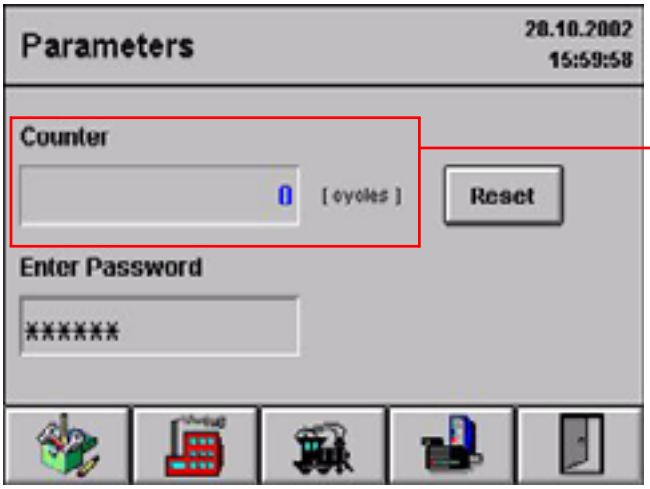
Emergency stop

Pushing the **Emergency Switch** holds the vacuum until the motor has stopped. Current state of the machine is kept, until the alarm has been cleared. Then the machine enters the initial state again.

Setting parameters

How to come here

In the **Stand by** panel touch the **Setting** button  .



Number of cycles run so far with the currently active recipe.

Enter password

Touch the password field. An alphanumeric key pad appears to enter the desired password. You confirm with the **ENTER** button (see*Set passwords* on page 27).

Note:

A valid password lasts for 15 minutes. After this time it must be re-entered to access the parameter functions.
To block access immediately against unauthorised use, enter an invalid password.

Wrong password

If the password is wrong, then all function buttons will be greyed

Possible actions

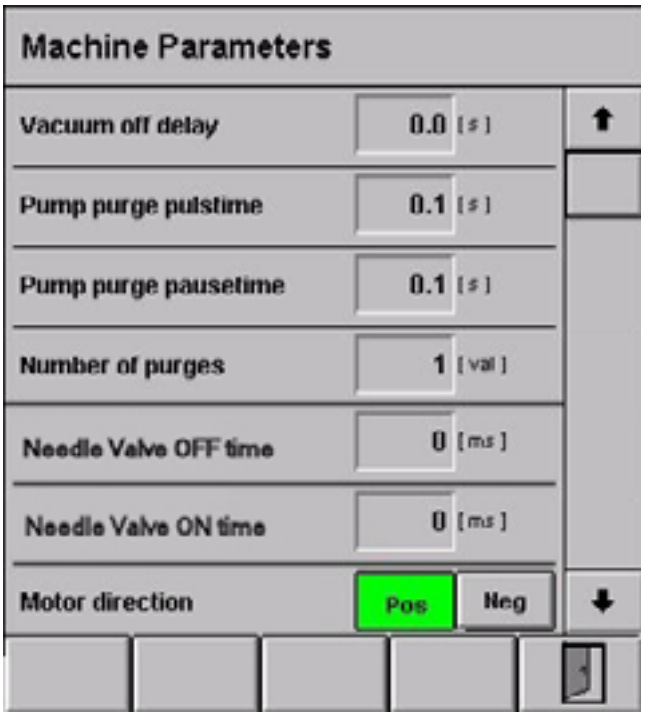
Function	Touch button	
Reset counter of current process	Reset	
Set system parameters (see *System settings* on page 26). Can not be set with the User password (button greyed out)	System	
Set machine parameters (see *Machine parameters* on page 22)	Machine	
Set process/recipe parameters (see *Process/recipe parameters* on page 24)	Process/recipe	
Set Drive parameters (see *Drive functions spinner* on page 19)	Drive	

Machine parameters

How to come here

In the **Parameter** panel touch the **Machine** button  .

Note: *These parameters can only be set with the* **Setup password**.



To set a value

Touch the value field. In the pop-up numeric key pad enter the desired value and accept the value with the confirm button  .

Possible settings

Value	minimum	maximum	typical
Vacuum off delay	0 s	10 s	1.5 s
Pump purge pulse time	0.1 s	20 s	0.3 s
Pump purge pause time	0.1 s	20 s	2.0 s
Number of purges	1	999	1
Needle Valve on time	-200 ms	+ 200 ms	133 ms
Needle Valve off time	-200 ms	+ 200 ms	155 ms
Motor direction (spinner)	Positive	Negative	Positive

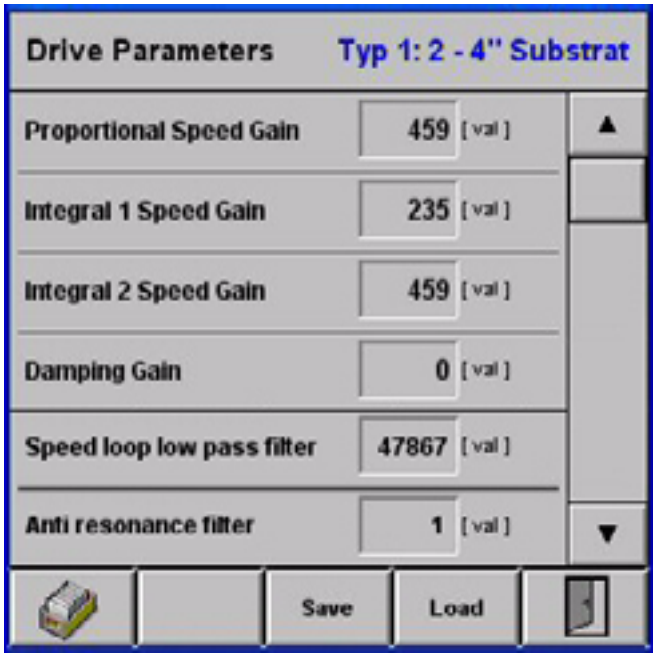
Note: **Needle Valve on time** *and* **Needle Valve off time** *are two parameters to be selected for the dispensing pump SPV-15.*

Drive parameters

How to come here

In the **Parameter** panel touch the **Drive** button  .

Note: *These parameters can only be set with the* **master password** *according to the values of the drive motor.*



To set a value

Touch the value field. In the pop-up numeric key pad enter the desired value and accept the value with the confirm button  .

Possible settings

Value	minimum	maximum	typical
Proportional Speed Gain	0	30000	460
Integral 1 Speed Gain	0	65535	235
Integral 2 Speed Gain	0	65535	460
Damping Gain	0	65535	0
Speed low pass filter	0	65535	47800
Anti-resonance filter	0	65535	1

Possible actions

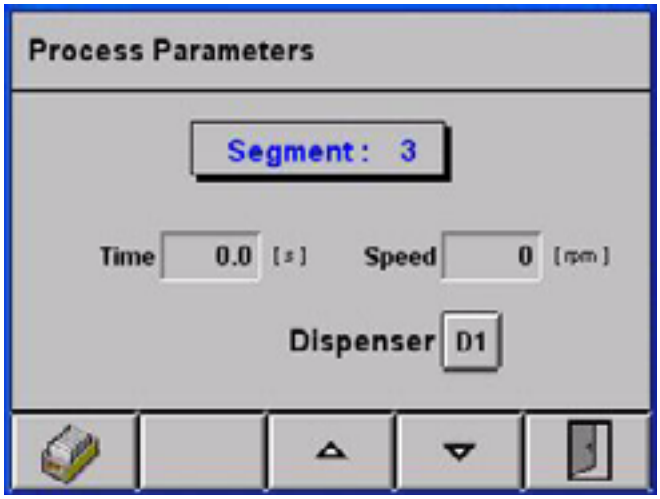
Function	Touch button	
Save changed values with new drive name	Files	
Save changed values of current drive	Save	
Load values of current drive	Load	

Process/recipe parameters

How to come here

In the **Parameters** panel touch the **Process/recipe** button  .

For the Spinner Unit LSM-200 a process/recipe may have 24 steps or segments.



Output display

Current segment number.

Set up a process/recipe

See *Set up a process/recipe* on page 30 for an example process/recipe.

For each segment of the process/recipe specify time, speed and whether dispensing is active or not:

Time	Touch the field and enter a numeric value in seconds
Speed	Touch the field and enter a numeric value in rpm
Dispenser	Press button **D1** to activate the dispenser during this segment.

The values of all segments are kept in storage and hence You may freely change between the segments:

Next segment	Touch the up arrow 
Previous segment	Touch the down arrow 

Clear unneeded entries

Delete/obliterate unneeded segments by entering zero (use the **DEL** button in the numeric key pad).

Store current process/ recipe

Touch the **Files** button  . This opens the **Parameter files** panel (see *Save/load parameter files* on page 25). After entering a name and description, touch the **Save** button.

Start work with a sample process/recipe

Touch the **Files** button and select an appropriate process/recipe. With the **Load** button you read the parameters.

Leave panel

Leaving the panel without saving the process/recipe parameters keeps them only available for the current processing. Leave any panel with the **Exit** button  .

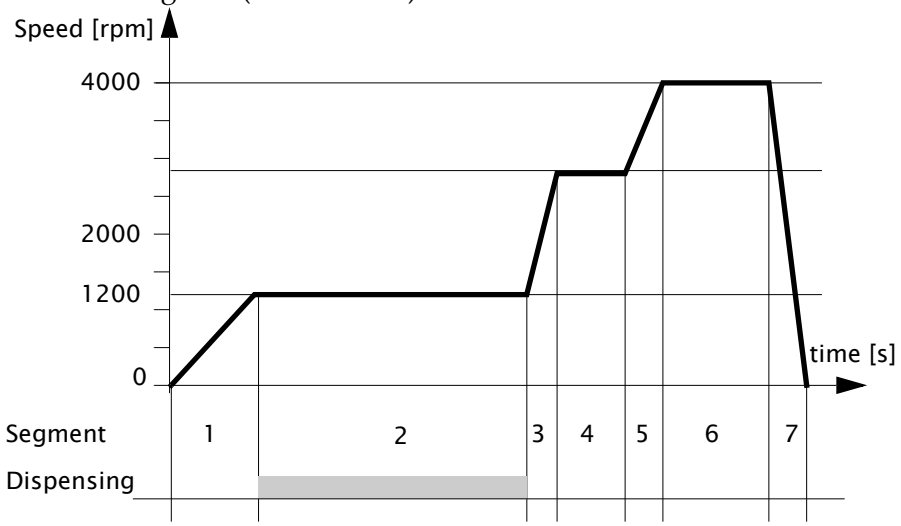
Set up a process/recipe

A process/recipe consists of

- up to 24 segments of speed/duration/dispense values
- Machine parameters (the general settings for all recipes)

Example process/recipe

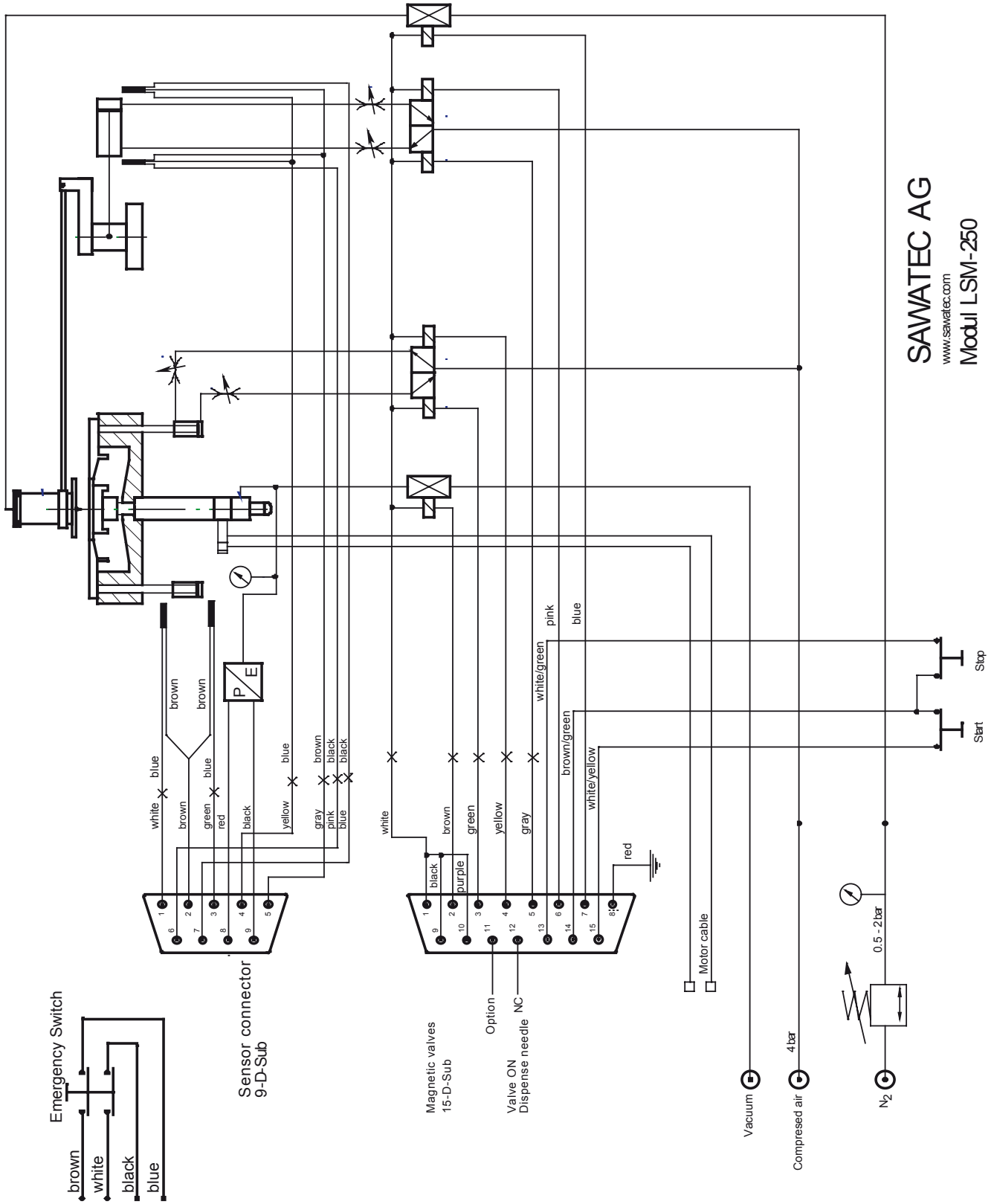
Process diagram (not to scale).



This process/recipe has seven segments:

Segment	Segment Time [s]	Process time [s]	Speed at end of segment [rpm]	Dispense
1	1.2	1.2	1200	D1 off
2	3.8	5.0	1200	D1 **on**
3	0.5	5.5	2800	D1 off
4	1.0	6.5	2800	D1 off
5	0.5	7.0	4000	D1 off
6	1.5	8.5	4000	D1 off
7	0.4	8.9	0.0	D1 off

Functional scheme



Maintenance

The Spinner Unit does not need special maintenance besides cleaning of spinner, dosing system and (optional) dispensing pump.

Update firmware

The controller firmware is stored on a memory element placed in the housing of the touch panel. To exchange the firmware, follow these steps:

1 Get access to the top of the touch panel housing

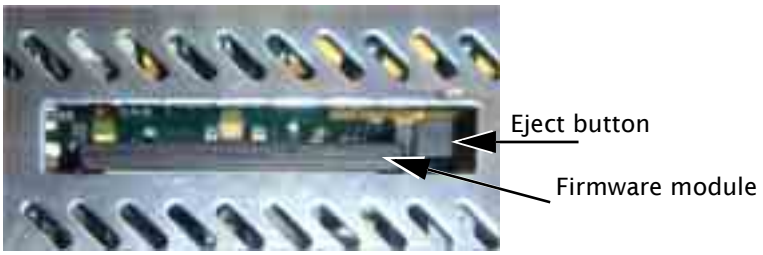
2 Open the Philips screw fixing cover lid

3 Lift the cover lid at the right about 10 mm (1/2 inch) and slightly pull the lid to the right

4 Press the small button firmly to eject the firmware module

5 Insert the new firmware module with the labelled side away from the touch panel display (press it in firmly)

6 Insert the cover lid and fix it with the Philips screw



Cleaning

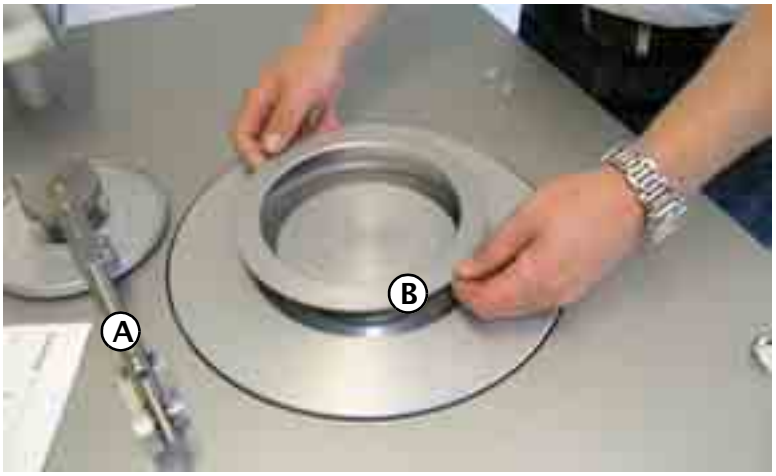
Danger!
Always switch off the Spinner Unit and unplug it from mains before cleaning!

Spinner

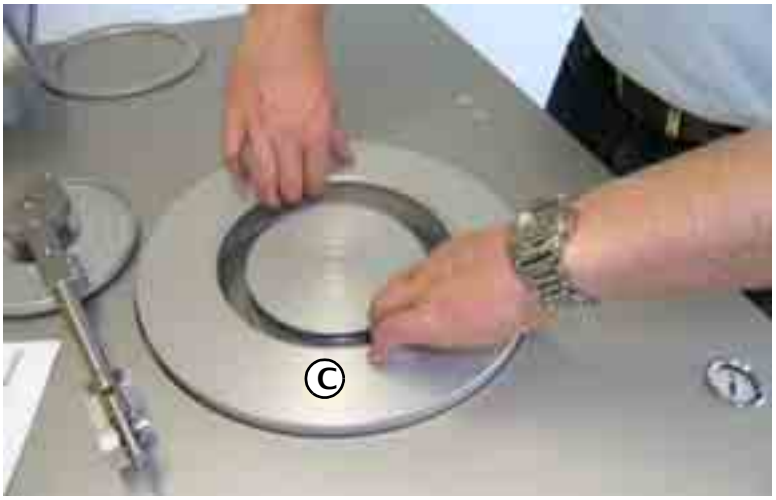
To clean the rings, chuck and the bowl, the rings and chuck must be removed. You do not need any tools for this procedure. Follow these steps:

1 Assure the dosing arm (**A**) is at home position.

2 Remove the adapter ring (**B**)

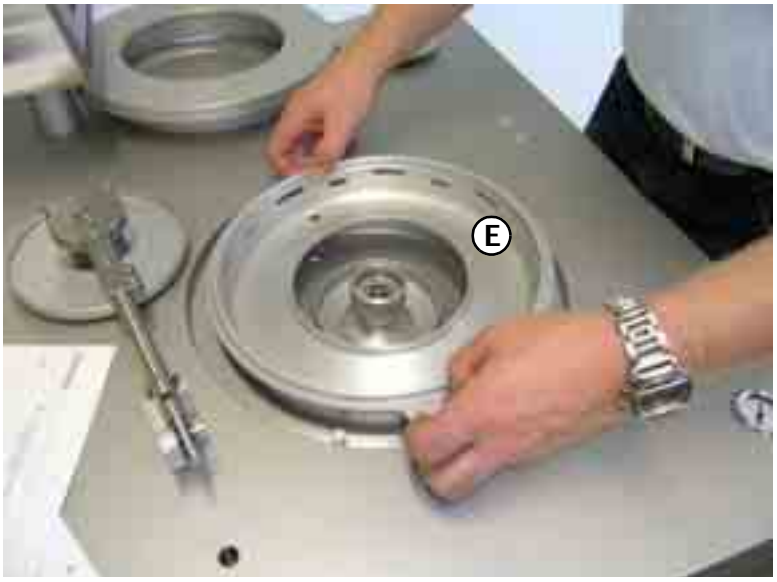


3 Remove the splash guard ring (**C**)



4 Lift the chuck (**D**) vertically with slight back and forth turning movements out of the snap mechanism.

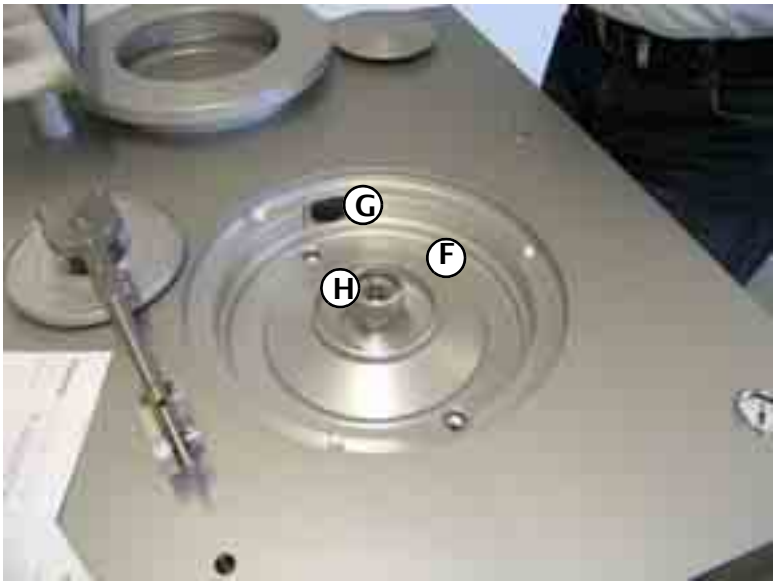
5 Remove the collector ring (**E**).



6 Clean the parts with proper solvent.

7 Clean the bowl (**F**) with gentle splashes of solvent.

Be careful not to spill solvent into the exhaust tubes (**G**) and the chuck clamp (**H**).



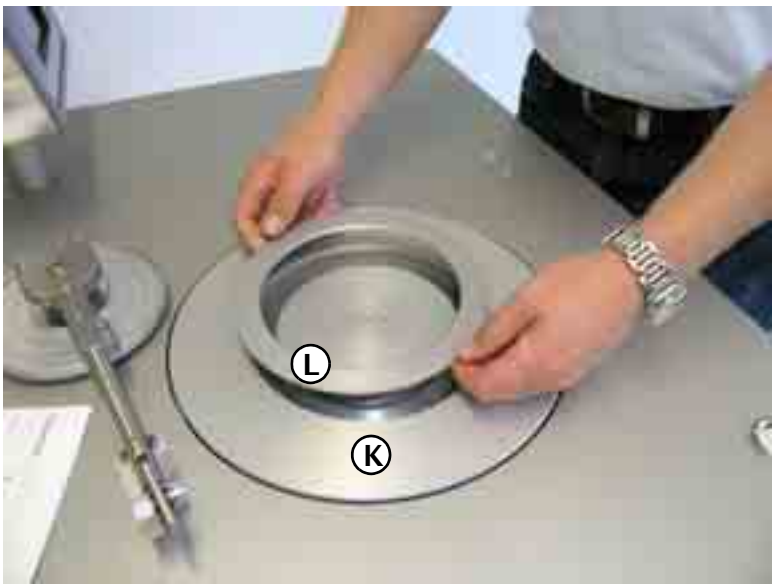
8 After cleaning insert the collector ring.

9 When placing the chuck, watch the index holes (**I**) and bolts (**J**)

10 Insert the chuck vertically into its clamp.

11 Pess the chuck firmly into the clamp – it must snap in!

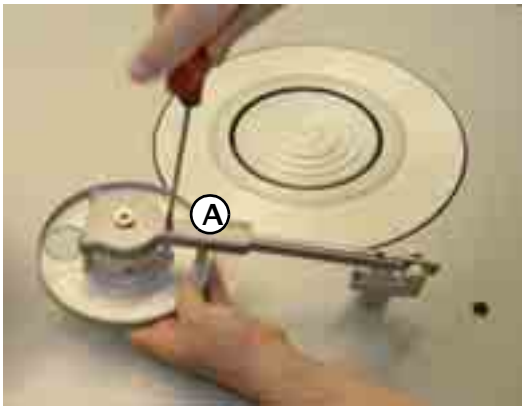
12 Add the splash guard ring (**K**) and the adapter ring (**L**) to complete the assembly of the spinner bowl.



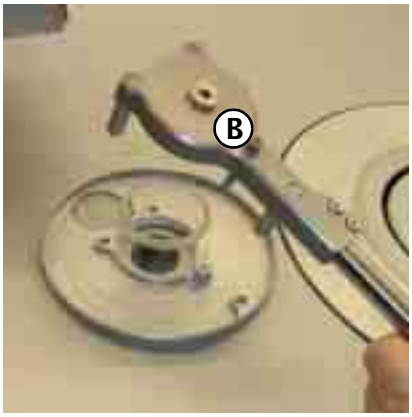
Protective cover

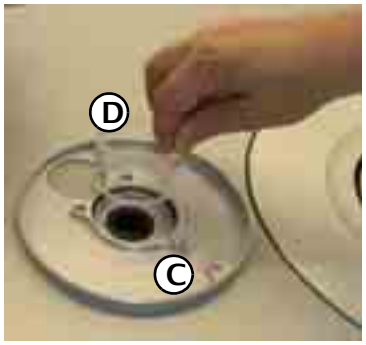
To clean the protective cover, disassemble it it into its main parts and clean the plate and the glass.

1 Open the screw (**A**) with a 5mm hex screw driver.



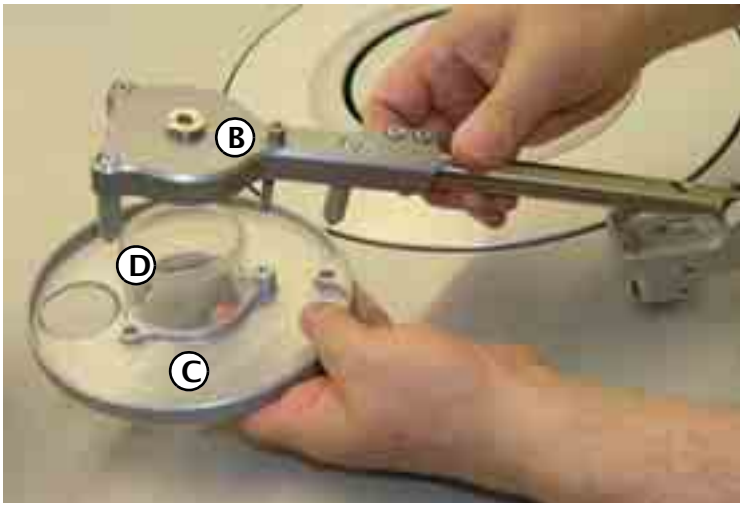
2 Lift the arm (**B**) off the plate (**C**) and the glass (**D**)



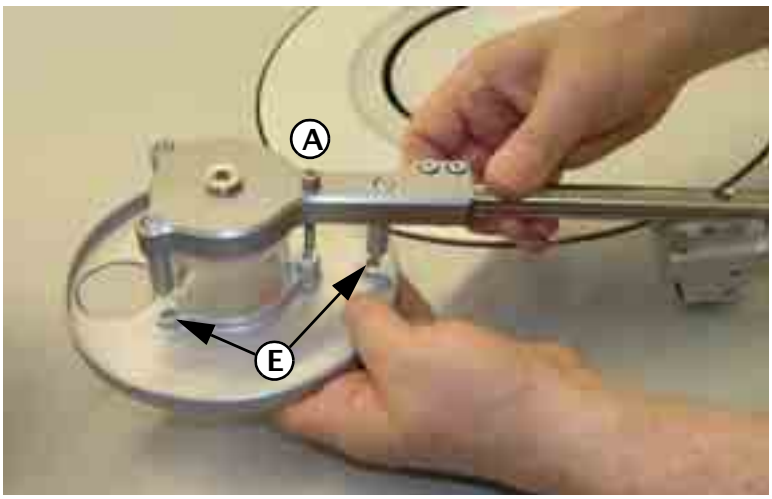


3 Clean and dry the plate and the glass.

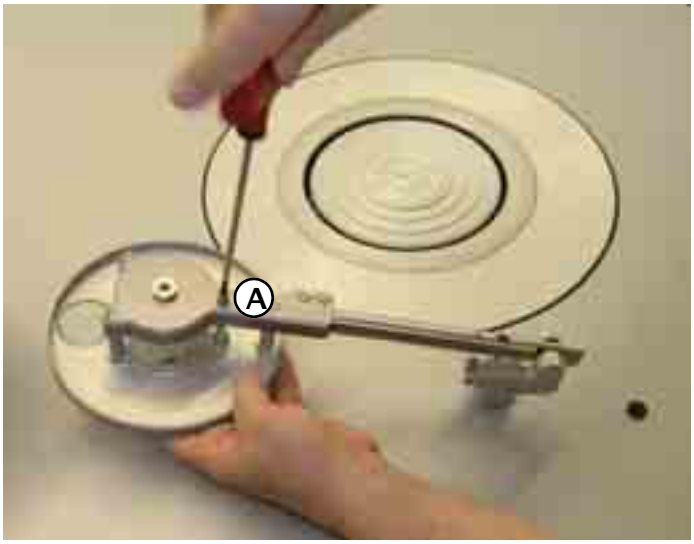
4 For re-assembly place the glass (**D**) in the center of the plate (**C**) and position it under the arm (**B**).



5 To re-assemble watch the notches (**E**) and screw (**A**)

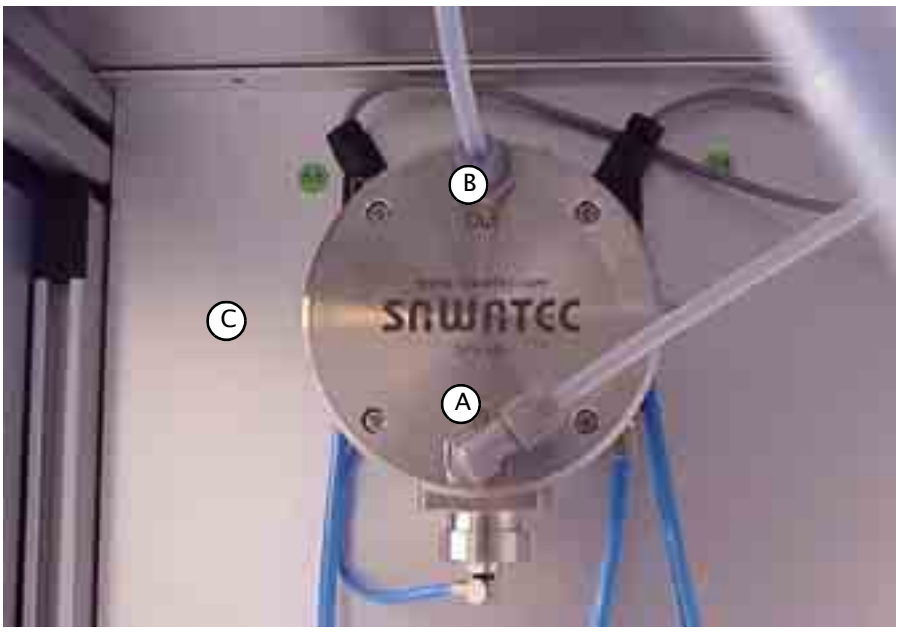


6 Tighten the screw (**A**) firmly



Remove the dosing pump

Note: *Various types of dosing pumps can be integrated with the Spinner Unit LSM-200. The following procedure applies to the SPV-15 dosing pump.*

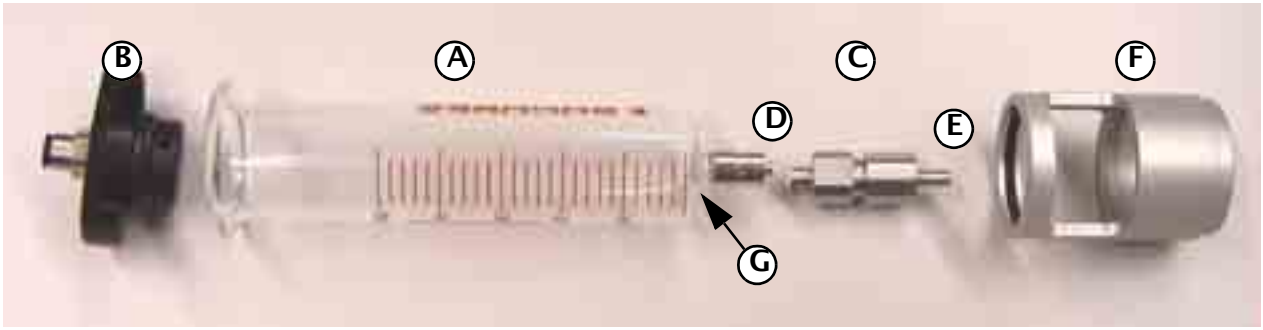


To remove the dosing pump

1 Remove the intake (A) and outlet (B) tubes from the pump
2 Unscrew the 2 Allen screws from the rear side of panel (C)
3 Move the pump downwards to untangle it from its support.
4 Clean the pump according to the procedure in the manual of the pump (SVP-15).

Cartridge dispensing system

The optional cartridge dispensing system comprises the following parts:



A Glass syringe 50 ml

B Cap with pressure tube connector R 1/8”

C Rebound suck back valve with LUER lock (**D**) and needle connector (**E**)

F Syringe holder (to be inserted into the dispense arm cup)

⚠ When handling the cartridge take care of the concave moulding (**G**) with the glass-steel combination. Avoid any bending to the syringe and always hold the syringe vertical.

Removing the syringe from the mount

When removing the syringe from the holder (gentle turning and pulling), do not hold the syringe at the cap, but at the glass body itself. When holding the cap you might accidentally remove the cap from the glass body.

Removing and applying cap

The bulge of the glass syringe has a flat portion (**A**). To remove the cap from the syringe, turn it gentle until the open portion of the cap (B) matches the flat portion of the syringe bulge (**A**). Then pull the cap from the syringe.