OPERATING INSTRUCTIONS FOR VP 418SV2E-1L-CC SpinVessel®

US Patent #11,623,188
European Patent #3887049 (BE, FR, DE, NL, CH, SE, & UK)



SpinVessel® System with Computer Control feature for 1L SpinVessel® Consumable: VP 418SV2E-1L-CC includes a Motor Unit, Spin Base, Controller, and Power Supply. Shown with SpinVessel® VP 830SV-1L-FB, sold separately.

Table of Contents

Components ---------- pg. 3

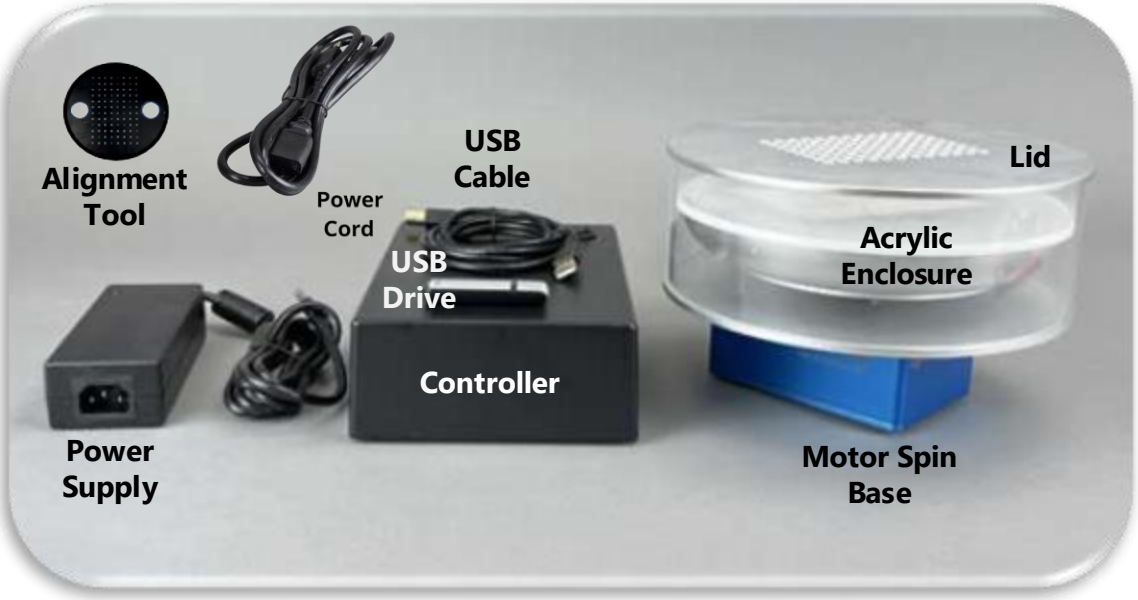
Setup ---------- pg. 4

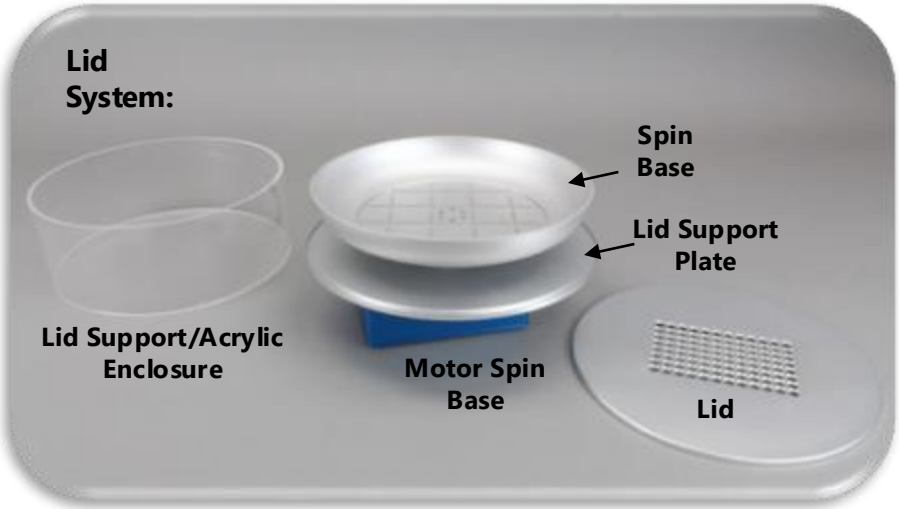
Operation ---------- pg. 6

Product Maintenance ---------- pg. 9

Warranty ---------- pg. 10

Components


Alignment Tool
Power Cord
USB Cable
USB Drive
Controller
Power Supply
Lid
Acrylic Enclosure
Motor Spin Base


Lid System:
Spin Base
Lid Support Plate
Lid Support/Acrylic Enclosure
Motor Spin Base
Lid


Controller:
Power Switch
Power Cord Input
Controller Cable Input
USB Cable Input

CONNECTING PARTS OF THE SpinVessel® SYSTEM



1. Place Motor Unit on a sturdy lab bench, table, or robotic workstation. Note that the Z-height with a seated consumable is 136.42mm (rubber feet not included).
   Warning: Do not use the Spin Base as a handle to move the SpinVessel. Hold the Motor Unit with both hands to position the SpinVessel where desired.
2. Connect the Controller Cable from the Motor Unit to the Controller.
   a) Since the Controller Cable is 6 feet long, the Controller and computer can be placed at a distance from the Motor Unit.
3. Connect the USB Cable to the Controller and to the computer.
4. Connect the Power Cable from the Power Supply to the Controller.
5. Connect the Power Cord from the Power Supply to an outlet.

   WARNING: Do not plug the Controller in while power is on. Ensure that the Power Switch is in the off position ("0" is down). Always have the Controller plugged in before powering up.

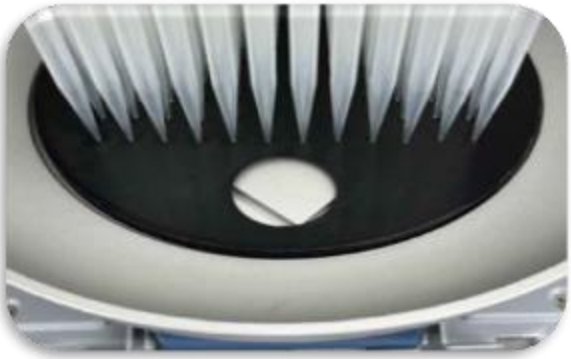
6. Place one VP 830SV-1L-FB SpinVessel® consumable into the Spin Base. Ensure that the consumable is seated securely within the Spin Base.

ALIGNING PIPETTE TIPS TO THE SpinVessel® TUBE



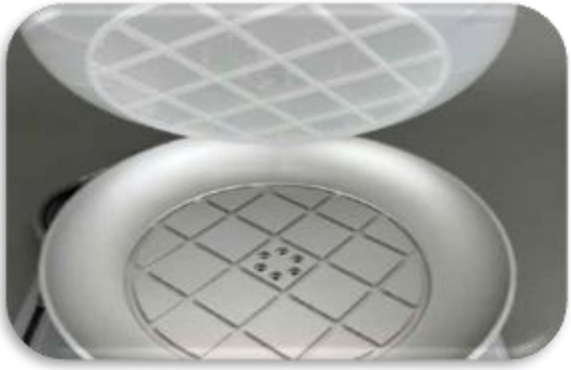
Place the SpinVessel® motor unit in the desired location on an automated liquid handler in a microplate holder. See drawings on the next page to assist in this step.

The motor unit is SLAS format (127.7mm x 85.5mm) which will fit into any SLAS plate locator or carrier.



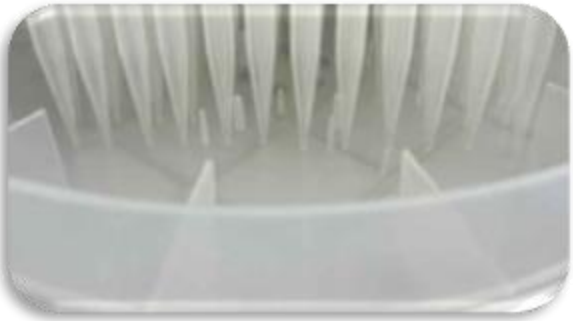
To align pipette tips to the inside of the SpinVessel® consumable, use the alignment tool. Place the tool on top of the spin base. Lower the pipette tips until they lightly touch the disc. Align robot tips to the holes. This registers the pipette head to the SpinVessel® and prevents the pipette tips from hitting the SpinVessel projections.

Adjust Z height with the consumable in place.



Remove the alignment tool and insert the SpinVessel® consumable, VP 830SV-1L-FB, into the SpinVessel® spin base.

Ensure that the SpinVessel® tabs are seated flat and registered to the slots in the aluminum spin base. The SpinVessel® consumable should not rotate freely within the spin base.



With the SpinVessel® consumable in the drive base, check the tip alignment relative to the projections.

Without liquid in the consumable vessel, turn on the SpinVessel® to make sure the tips are not hitting the projections.

POWERING UP THE SpinVessel® SYSTEM

The Power Switch (I/O) is located on the back of the Controller. To power up the Controller, depress the "I" on the switch.

OPERATING THE SpinVessel® With COMPUTER CONTROL

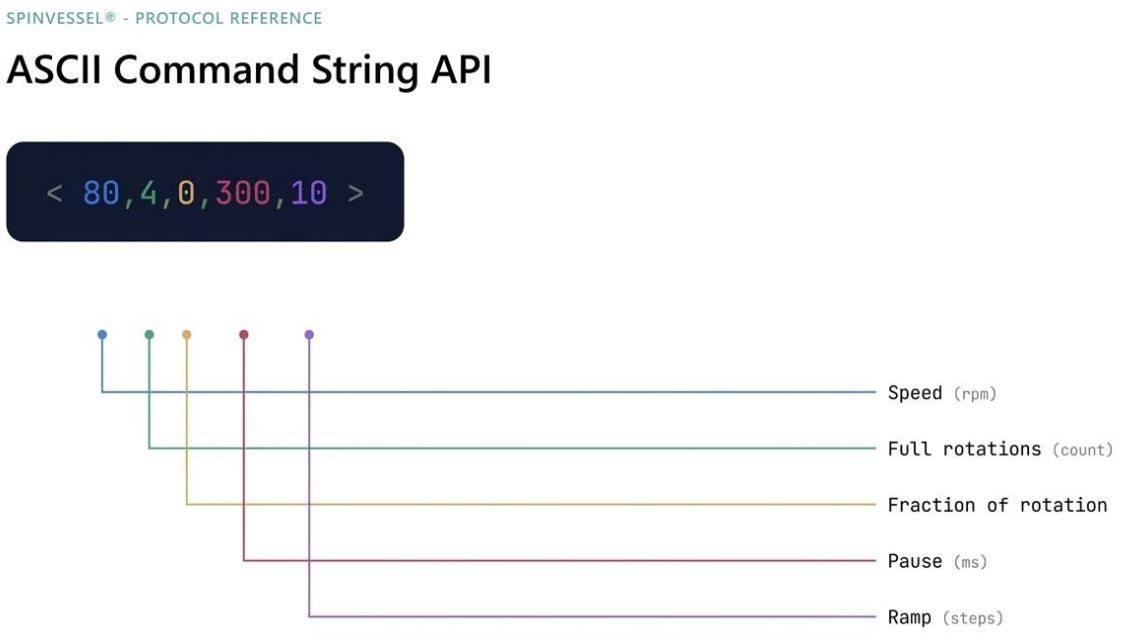
The SpinVessel® Models with "-CC" in the part number are controlled using a computer, **however, V&P Scientific does offer a manual touch screen controller option (VP 418SV-MC) sold separately.** The Controller for the computer-controllable SpinVessel® is connected to a computer via a USB cable. The Controller accepts simple ASCII commands to set the speed of the rotations, the number of rotations (including fractions of a rotation), the duration of the pause before reversing direction, and the degree of ramping to the set speed.

Software details

1. The SpinVessel® Controller uses an internal CH340G USB-to-Serial Converter (set to 9600,8,N,1), which will require driver software. Windows may already have the needed USB driver software installed. If not, download the "CH340 USB DRIVER" from the provided USB flash drive and run "CH341SER.exe" to install it (Windows typically auto-installs once downloaded). If your company policy does not allow the use of the provided USB stick, this driver is also available for download from the internet (contact your IT department for assistance if necessary).
2. The basic command language for this computer-to-stirrer communication is ASCII.
3. Commands can be sent from the computer using a standard terminal program like HyperTerminal or Realterm. Or, if needed, download the V&P Scientific Serial Terminal program from the provided USB flash drive. If your company policy does not allow the use of the provided USB stick, we suggest asking your IT department for a recommendation.
4. Alternatively, the ASCII commands can be sent by an automated liquid handler's software to control the SpinVessel®. Since there are many different automated liquid handlers available, please contact a technical representative from the company that makes the liquid handler.

Connecting and sending commands

1. Set up the system as described in the Setup section of the SpinVessel® Technote with the USB cable connected to the computer to be used.
2. Open the Serial Terminal program (V&P Scientific version or other).
3. Turn on the SpinVessel® instrument as described.
4. Select the appropriate COM port and click CONNECT to establish a line of communication between the instrument and the computer.
5. Create ASCII command strings as outlined in the diagram shown below to control the instrument with the following parameters:
   a. Speed of rotation in revolutions per minute (RPM).
   b. Number of rotations before reversing direction.
   c. Fraction of a rotation (input 0-9 for fractions of a rotation).
   d. Pause, in milliseconds, before reversing direction.
   e. Ramping, 0-100, where 0 is no ramping (rapid acceleration) and 100 is full ramping (slow acceleration)
6. Hit ENTER to send the command and start rotation of the SpinVessel® instrument.
7. To stop, type <0> and hit ENTER.



USING A 1L SpinVessel® SYSTEM

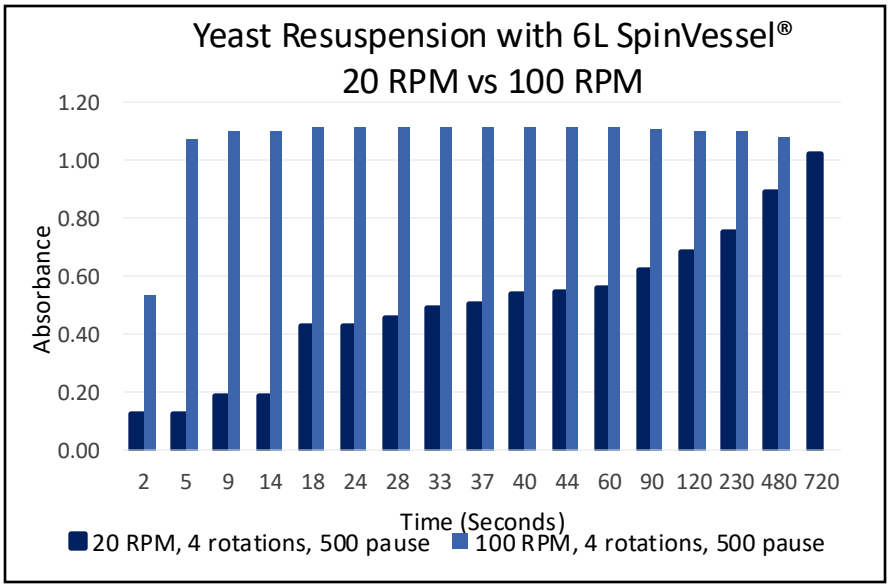
The optimal stirring mode is dependent upon the application and needs to be empirically determined. Factors to consider in determining optimal 1L SpinVessel® operation are the density of the particulates, their size and shape, as well as the volume and viscosity of the liquid. Start with 80 RPM and 4 rotations before reversing direction, then test to determine the appropriate RPMs and number of rotations for the particulate's density, fragility, and solution viscosity. We have found that smaller-circumference SpinVessels® require higher RPMs than larger-circumference SpinVessels, because the critical factor is the linear speed generated at the circumference. See page 501 of our SLAS Technology paper for a discussion of this phenomenon.

The following settings are ones to use when first testing the VP 418SV2E-1L-CC SpinVessel®:

Speed: 80 RPM Rotate: 4 Pause: 300 milliseconds Ramp: 10

The VP 418SV2E-1L-CC SpinVessel® is designed to be used only with a VP 830SV-1L-FB SpinVessels® tube. Please contact V&P Scientific for pricing.

See below for an example of low versus high RPM for a solution of yeast cells in a large circumference 6-liter SpinVessel®. Please also note that the required speed (RPM) for optimal mixing is directly related to the diameter of the SpinVessel tube. The smaller the diameter, the faster the RPMs need to be to effect adequate mixing. Note: When given a longer mixing time, even the slower speed (20 RPM for more gentle mixing) was still able to suspend the yeast cells.



GENERAL PRODUCT CARE

When not in use, turn the power switch off.
Do not place the control unit in chambers with temperatures above 40°C.
To clean the stirrer, wipe down with a cloth and mild detergent, followed by a water wipe.
Do not immerse the SpinVessel® Motor or Controller in liquid.

SAFETY PRECAUTIONS

The use of motor controls, like that of all utilization of concentrated power, is potentially hazardous. The degree of hazard can be greatly reduced by proper design, selection, installation, and use, but all hazards cannot be completely eliminated.

The following safety precautions must be observed during all phases of installation, operation, service, and repair of this motor control product. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the products. V&P Scientific assumes no liability for the customer's failure to comply with safety requirements and practices.

Never reach into the consumable vessel by hand while the unit is running. Only precisely controlled robotic applications have the necessary accuracy to avoid spinning projections. Only do so after the movement has come to a complete stop.

Secure all loose clothing, hair, and jewelry before operating the equipment. Loose items can easily become caught in the rotating mechanism, leading to entanglement injuries.

Disconnect the power supply before performing any maintenance, cleaning, or adjustments. Unplug electric mixers or lock out the power source to prevent the machine from accidentally starting while you are working on it.

WARRANTY

V&P Scientific, Inc. warrants this product to be free from defects in materials and workmanship when used under normal laboratory conditions for one year. This warranty begins from the date of delivery by V&P Scientific.

In the event this product fails under normal laboratory conditions within the specified period of time because of a defect in material or workmanship, V&P Scientific will, at its option, repair or replace the product. Damage to the product caused by user negligence is not covered.

This warranty is made in lieu of other warranties, express or implied, including the warranties of merchantability and fitness for a particular purpose. V&P Scientific shall not be liable for loss or damages arising from the use of these products nor for consequential damages of any kind.

Please keep the special shipping carton in case the unit needs to be shipped back to V&P Scientific. Contact V&P Scientific for return authorization and shipping instructions or for any other assistance at 858-455-0643 or sales@vp-sci.com.