# MagWash® 1x8 Series Operation

European Patent #3887049, U.S. patent Pending

VP 418MW2L-1X8H-50

VP 418MW2L-1X8TE-50

VP 418MW2H-1X8H-50

VP 418MW2H-1X8TE-50

## Contents

## Applicable Models

| Model No. | Description |
|---|---|
| VP 418MW2L-1X8H-50 | MagWash® System, for Eight, 25mL/50mL Tubes, Four NdFeB Magnets, 52 MGO, Placed at the Cone of each Tube to Produce Four Pellets 10mm in Diameter, 3.5mm Above the Bottom of the SpinVessel® for Safe Pipetting, Designed for Low-Volume Separation (less than 25mL) Fits on Hamilton Star and Vantage Liquid Handlers, Computer Controlled via ASCII Commands, 100/240 Volts, 50/60 Hz, CE Compliant, US Patent Pending, European Patent #3887049 |
| VP 418MW2L-1X8TE-50 | MagWash® System, for Eight, 25mL/50mL Tubes, Four NdFeB Magnets, 52 MGO, Placed at the Cone of each Tube to Produce Four Pellets 10mm in Diameter, 3.5mm Above the Bottom of the SpinVessel® for Safe Pipetting, Designed for Low-Volume Separation (less than 25mL), Fits on Tecan Evo Liquid Handler, Tecan Fluent Requires Adapter, Computer Controlled via ASCII Commands, 100/240 Volts, 50/60 Hz, CE Compliant, US Patent Pending, European Patent #3887049 |
| VP 418MW2H-1X8H-50 | MagWash® System for Eight, 25mL or 50mL Conical Bottom SpinVessel® (in a 1×8 array), to Produce a 50mm by 10.5mm Pellet Along One Side of the SpinVessel® that is 9.8mm Above the Bottom of the SpinVessel® for Safe Pipetting, Designed for High-Volume Separation (up to 50mL), The Array is Made to Fit on Hamilton Star and Vantage Liquid Handlers, Computer Controlled via ASCII Commands, 100/240 Volts, 50/60 Hz, CE Compliant, US Patent Pending, European Patent #3887049 |
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## Warnings/Precautions

# WARNING

MagWash® products contain strong magnets whose magnet fields are significant up to 24" from the magnet

- Persons with Pacemakers should maintain a 24" distance from the device
- Remove all items magnetically sensitive items away from the immediate area. This may include:
  - ✓ Large, Unbound, Metal Items & Tools
  - ✓ Electronic Devices

  - ❑ Watches
  - ❑ Cell Phones
  - ❑ Credit Cards

- Do not operate MagWash® next to other magnetic objects as the magnetic fields may interact with one another producing undesired results.
- Immediately wipe up spills. The SpinVessel® and MagWash® product lines are not waterproof.

## Warranty

V&P Scientific, Inc. warrants this product to be free from defects in material 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.

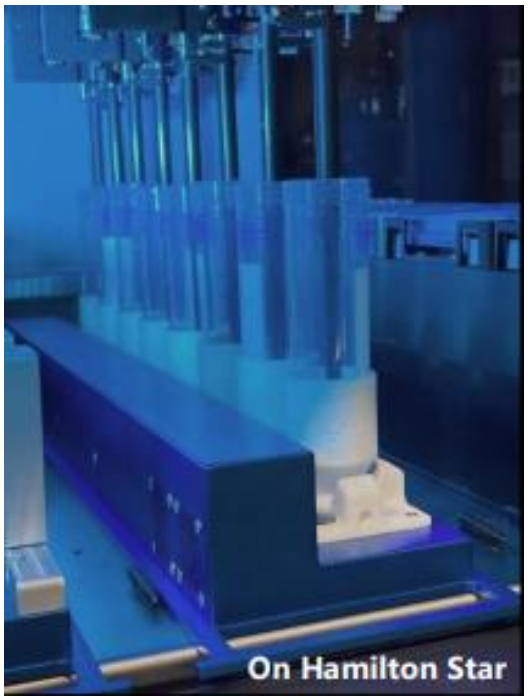
This warranty is made in lieu of other warranties expressed or implied including the warranties of merchantability and fitness for a particular purpose. V&P Scientific shall not be liable for loss or damages arising from the use of these products nor for consequential damages of any kind.

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.

## Deck Setup - Hamilton

The undersides of the Hamilton MagWash® systems are the same width as Hamilton labware so that it may easily be placed using the locating features on the deck.

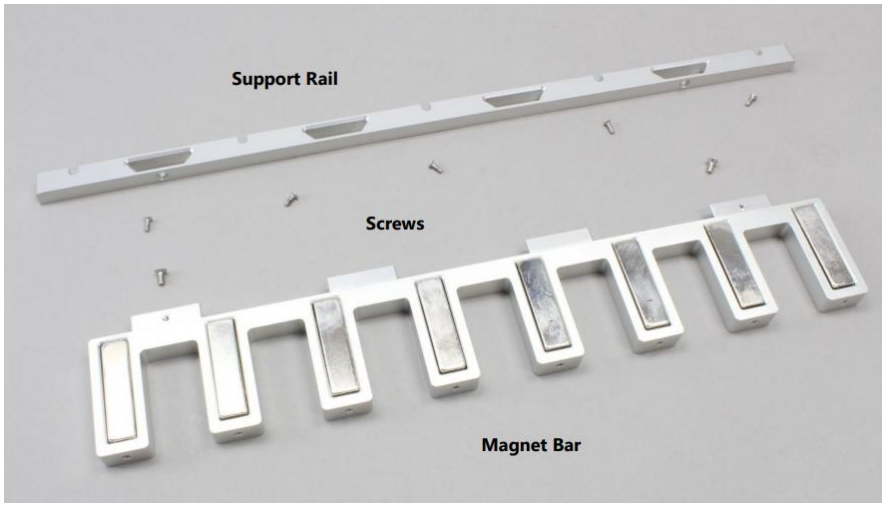

A total of 8 torpedoes must be removed from the Hamilton deck; 4 front & 4 rear to accommodate the MagWash®.

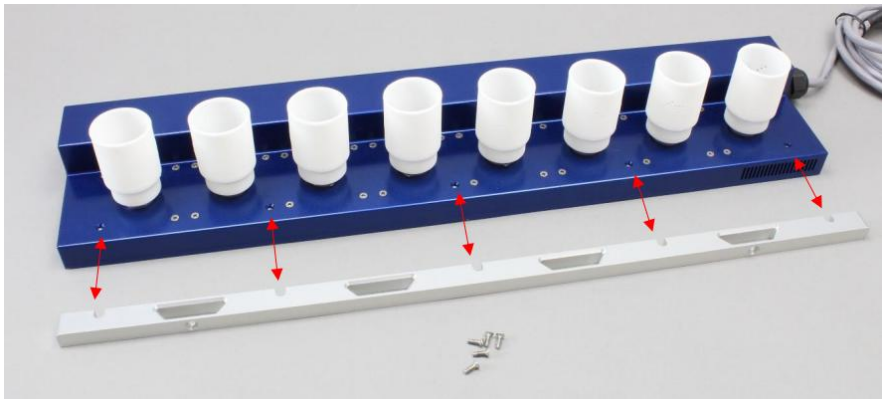


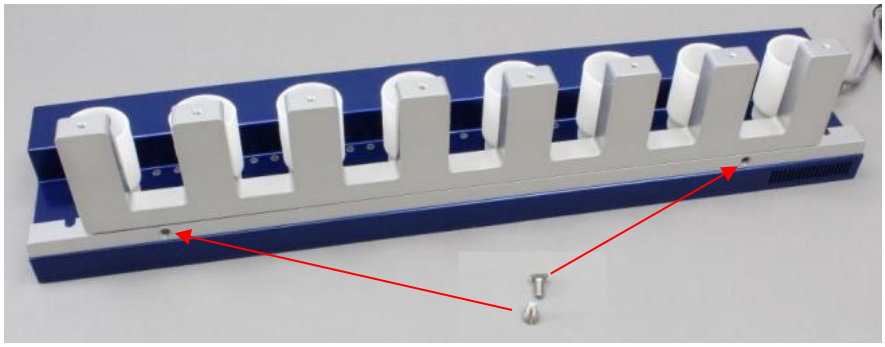

The controller cable is 6ft long allowing users to route it safely to the nearest computer.

## Magnet Bar Installation

If you are working with the "H" version of the Hamilton 1x8, you may need to assemble the magnet bar and support rail. This is done using 5 screws to fix the support rail to the motor base, and then an additional 2 screws to attach the magnet bar to the support rail.



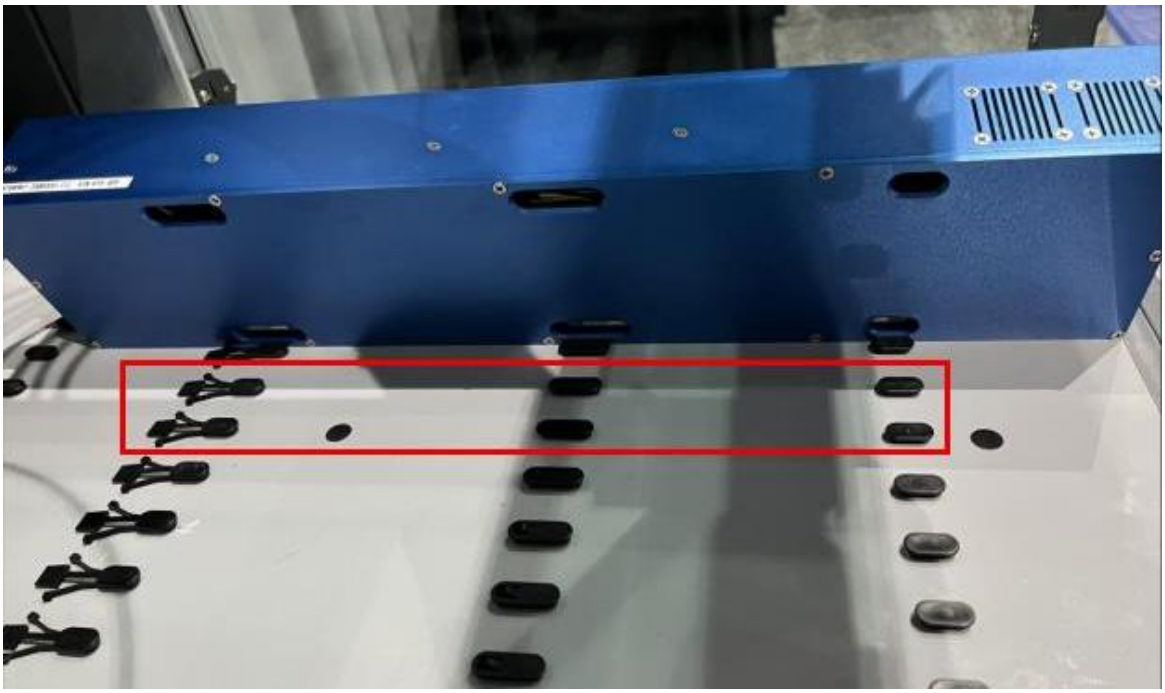





## Deck Setup - Tecan

The undersides of the MagWash® systems intended for Tecan liquid handlers are slotted to fit the locating features found on their decks.

The unit will occupy 4 sets of the locating features. The inner two feature must be removed, allowing the outer two to interface with the slots.



Tecan Fluent locating features are slightly smaller than those on the Evo. Please contact V&P for adapters.

## Setup - Components

Each MagWash® will come with the following components included with the equipment

Power Supply + Power Cable

Control Box

Front

Back

USB Cable + USB Drive

The components should be connected as shown below

Please contact V&P Scientific if any clarification during setup is needed.

Connect the MagWash® to a functional power outlet and set the switch on the control box to the ON position "I".

## Software Information

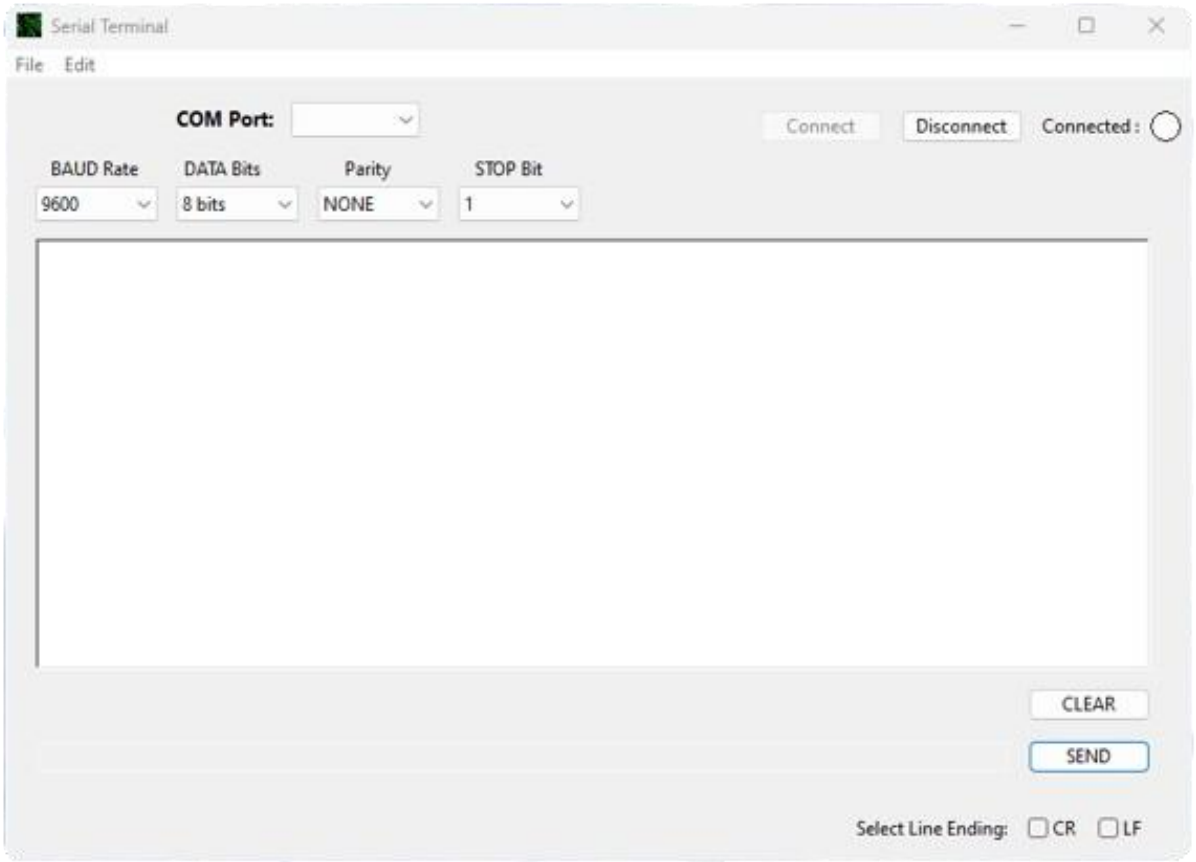
The Controller uses an internal CH340G USB to Serial Converter (set to 9600,8,N,1) which will require driver software. Windows may already have the needed USB driver software installed. If not, download the "CH340 USB DRIVER" from the provided USB flash drive and run "CH341SER.exe" to install it (Windows 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).

The basic command language for this computer-to-stirrer communication is ASCII. Commands can be sent from the computer using a standard terminal program like HyperTerminal or Realterm. If needed, download the V&P Scientific Serial Terminal program from the provided USB flash drive. V&P also provides operating software on the landing pages of each product under the "Downloads" tab.

Alternatively, the ASCII commands can be sent by an automated liquid handler's software to control the MagWash®. Since there are many different automated liquid handlers available, please contact a technical representative from the company that makes the liquid handler

## Serial Terminal

The Serial Terminal Program consists of the following window:



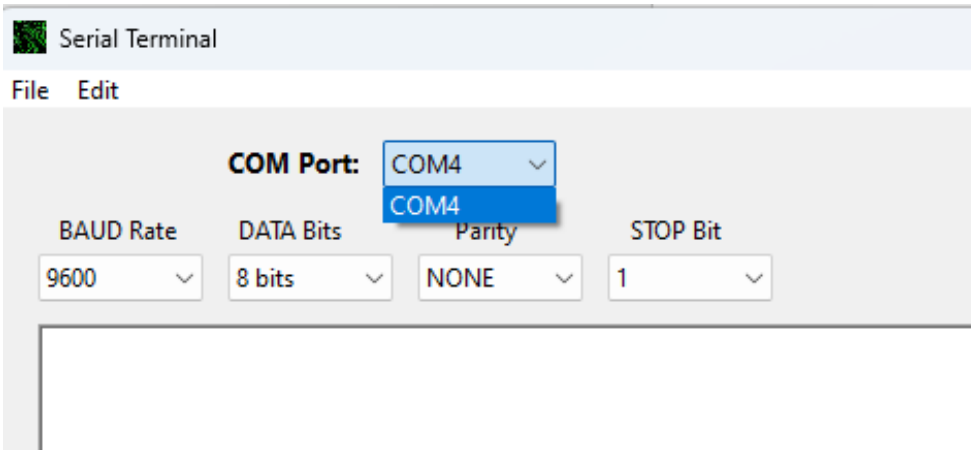

- COM Port
  - User must select which computer port the control box USB is connected to

- Connect & Disconnect Buttons
  - Creates and breaks connection to control box

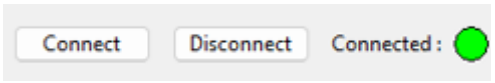
- Clear & Send Buttons
  - Clear button erases all information present in the Feedback Window
  - Send button is used to issue commands from the adjacent command line

Serial Terminal

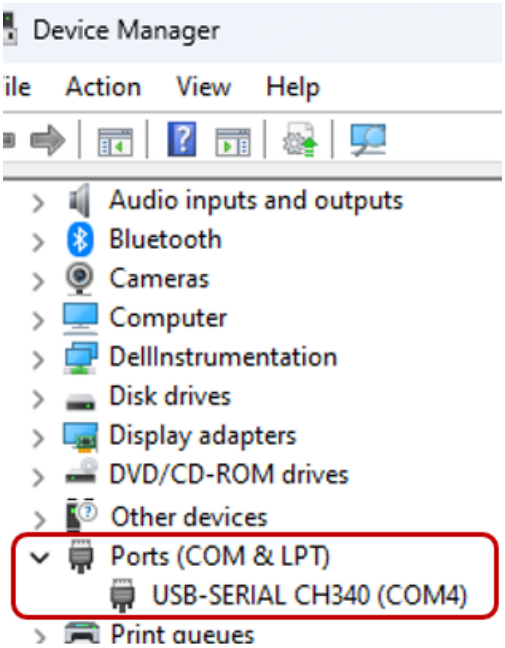
1. Select the correct COM port from the dropdown menu. Click Connect.




- The "Connected" bubble should turn green indicating a successful connection




- The correct COM port can be found by accessing the PORTS list in the Device Manager. It will be listed as "**USB-SERIAL CH340 (COM#)**"

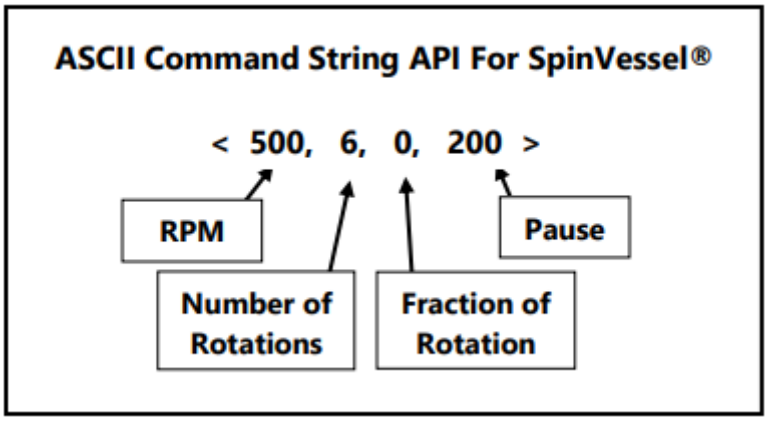



In this example you can see the device labeled as COM4

## Operation – Serial Terminal

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.




Hit ENTER to send command and start rotation of the MagWash® instrument.

To stop the device, enter: <0>

The optimal stirring mode is dependent upon the application and needs to be empirically determined. Factors to consider in determining optimal 25 or 50 mL MagWash® operation are the density of the particulates, their size and shape, as well as the volume and viscosity of the liquid.

Start with 500 RPM, 6.0 rotations and a 200 millisecond pause before reversing direction, then test to determine the appropriate RPMs and number of rotations for the particulate's magnetism, density, fragility, and solution viscosity.

Do not exceed 750 RPM. We have found that smaller circumference SpinVessels® require higher RPMs than larger circumference SpinVessels® do, because the critical factor is the linear speed generated at the circumference not the RPMs. See page 501 of our SLAS Technology paper for a full discussion of this phenomenon. RPMs between 500-750 are recommended. Some intermittent pausing may be seen at RPMs greater than 750RPM.

## Operation – Ideal Settings

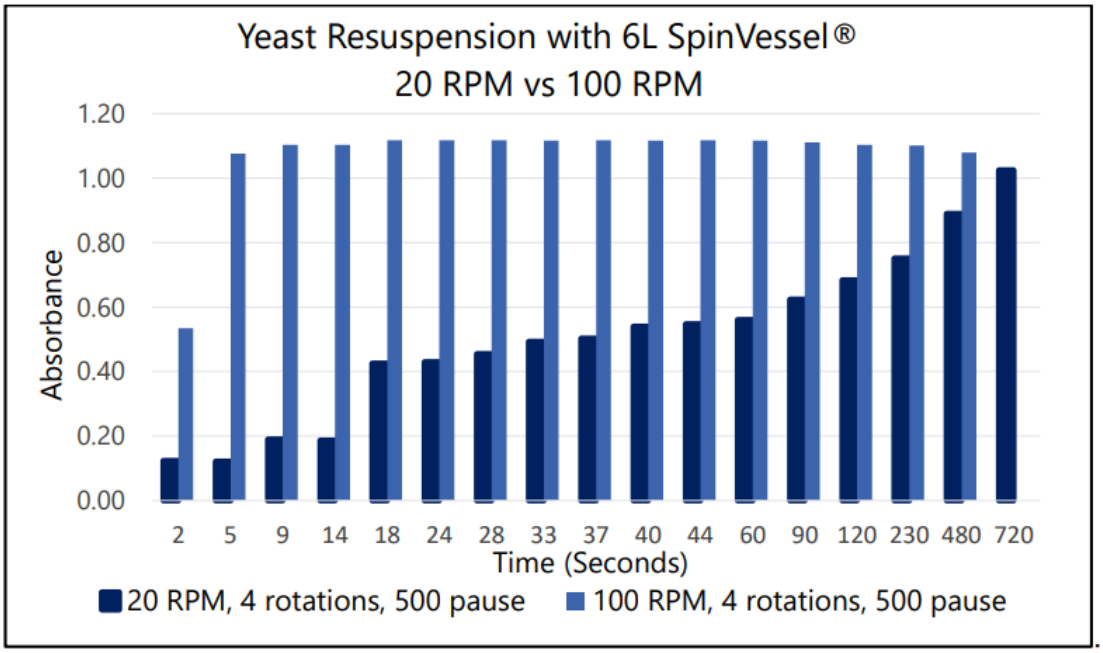
The following settings are ones to use when starting out with VP 418SV2-1-50CB-CC:

Speed: 500 RPM  Rotate: 6.0 times  Pause: 200 milliseconds

It is always a good idea to practice with water in the SpinVessel® to determine safe RPM, rotation and pause numbers before using expensive reagents.

We recommend that not more that 45ml be used in the 50ml SpinVessel® and not more than 20 in the 25ml as the vortex at the high speed will bring the liquid level high up on the tube wall. When separating magnetic beads, even lower volumes may be necessary depending on the magnetic strength of the beads or whether they stay in suspension. Even though the magnets used in the MagWash® are very strong Neodymium magnets, if the beads are not close enough, the time for separation may be extended.

See below for an example of low versus high RPM for a solution of yeast cells in a large circumference, 6 liter SpinVessel®. Note that, when given a longer mixing time, even the slower speed (20 RPM for more gentle mixing) was able to suspend the yeast cells.



## GENERAL PRODUCT CARE

When not in use, turn the power switch off. Do not place the Controller in chambers with temperatures above 40°C. To clean the SpinVessel®, wipe down with a cloth and mild detergent followed by a water wipe. Do not immerse SpinVessel® Motor Unit or Controller in liquid. The motor of the SpinVessel® is a stepper motor, 100-240 Volts, 50/60 Hz, CE compliant

## 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.

| **WARNING** |
| --- |
| To avoid personnel injury caused by electrical shock, do not remove the cover of the controller when the power is ON. |

| **CAUTION** |
| --- |
| Do not disconnect motor during operation. Otherwise, over-current breakdown may result. |