Microplate Centrifuge

User Guide

Original Instructions

Agilent Technologies

Notices

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A WARNING or !!INJURY HAZARD!! notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

A **CAUTION** or **!!DAMAGE HAZARD!!** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

Agilent Technologies

Letter to our Customers

Dear Customer,

The Agilent Technologies acquisition of Velocity11 resulted in the following changes:

- Creation of Agilent Technologies Automation Solutions, formerly Velocity11
- Renaming of some Velocity11 products
- New Customer Service and Technical Support contact information
- New website address for product information

Please make a note of the following changes as they impact this user guide.

Velocity11 product name changes

Velocity11 product name	Changes to ...
Access2 Automated Microplate Loader	Automated Centrifuge Loader
Element Automation System	BioCel 900 System
IWorks Device Driver Programming Interface	VWorks Device Driver Interface
PlatePierce Seal Piercing Station	Microplate Seal Piercer
VCode Barcode Print and Apply Station	Microplate Barcode Labeler
Velocity11 Robot	3-Axis Robot
VHooks Integration Interface	VWorks Hooks Interface
VPrep Pipetting System	Vertical Pipetting Station
VSpin Microplate Centrifuge	Microplate Centrifuge
VStack Labware Stacker	Labware Stacker

Related guides

Microplate Centrifuge Quick Guide
Centrifuge with Loader Quick Guide
Centrifuge Diagnostics Version 8 Quick Reference
Microplate Centrifuge ActiveX v8 User Guide
Automated Centrifuge Loader ActiveX v9 User Guide

These guides are available at: www.agilent.com/chem/askb

Contents

1 Introduction

This chapter introduces the *VSpin User Guide*.

What This Guide Covers

Overview

This guide is intended to be used by installers, integrators and lab workers.

It covers how to:

- ❑ Unpack the VSpin™
- ❑ Mount the VSpin to a stable surface
- ❑ Install and use the VSpin Diagnostics software
- ❑ Set up the VSpin for operation
- ❑ Perform a spin
- ❑ Respond to errors
- ❑ Clean and maintain the VSpin
- ❑ Pack up your VSpin if you need to ship it

What This Guide Does Not Cover

This guide does not cover the operation of third-party lab automation systems, with the exception of the use of diagnostics software that is developed by Velocity11®.

Companion Documents

In addition to this guide, read *Getting Started*, which gives Velocity11 support information, explains how to use the online help versions of Velocity11 technical documents and provides general safety guidelines.

If you do not have a copy, you can download it from our website at www.velocity11.com.

Getting Help from Velocity11

Sending Us an Email

Software Errors

If you find an error in our software, or are unable to solve a technical problem after reading “Maintenance and Troubleshooting” on page 65, inform us by sending an email to service@velocity11.com.

Include in your email:

- ❑ Your software version number
- ❑ A detailed description of the problem

Documentation Errors

If you find an error in our documentation, you can quickly let us know by sending an email using the feedback button in the online help:

You can also send an email directly to documentation@velocity11.com. All feedback on our technical documentation is appreciated.

Bug Reports

If you are using the VSpin with the BioCel or BenchCel you can send us a bug report from within VWorks™ or BenchWorks™. Refer to the *BioCel User Guide* or *BenchCel User Guide* for more information.

Find Your Software Version

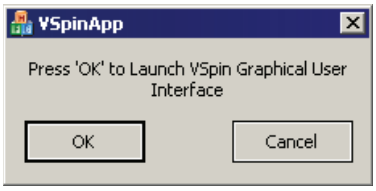
If you contact the Velocity11 Service Center, you might be asked for your current software version.

To find your software version:

1. If you have not done so, install your VSpin Diagnostics software.

   See “Installing the Software” on page 36.
2. Click **Start > Programs > Velocity11 > VSpin > VSpin Test Container**.

   The **VSpinApp** dialog box opens.



3. Click **OK**.
4. The **VSpin Control** dialog box opens.
5. Look for the version number on the title bar.

Safety Information

Before installing and using the VSpin

Before installing and using the VSpin, make sure you are aware of the potential hazards and understand how to avoid being exposed to them. You must be properly trained in the correct and safe installation and operation of the device.

Intended product use

!! INJURY HAZARD !! Do not remove the VSpin exterior covers or otherwise disassemble the product. Doing so can expose you to hazards that could cause serious injury and damage the VSpin.

!! INJURY HAZARD !! Using controls, making adjustments, or performing procedures other than those specified in the user guide can expose you to moving parts and hazardous voltage.

Agilent Technologies products must only be used in the manner described in the Agilent Technologies product user guides. Any other use may result in damage to the product or personal injury. Agilent Technologies is not responsible for any damages caused, in whole or in part, by improper use of the products, unauthorized alterations, adjustments or modifications to the products, failure to comply with procedures in Agilent Technologies product user guides, or use of the products in violation of applicable laws, rules or regulations. Except as otherwise expressly provided in Agilent Technologies product user guides, any alteration, adjustment, or modification to the products will void the product warranty.

The VSpin is not intended or approved for diagnosis of disease in humans or animals. You assume full responsibility for obtaining any regulatory approvals required for such use and assume all liability in connection therewith.

Safety features

The VSpin has been designed to maximize safety with the following safety features:

- The VSpin will not spin unless:
  - The door is closed and locked.
  - The buckets are unlocked.
  - The bucket payloads are balanced.
  - The appropriate software command is sent.
- The VSpin door will not unlock or open if the spindle is moving.

Moving parts

!! INJURY HAZARD !! Never attempt to touch any of the moving parts or remove plates while the VSpin is in operation. It is not possible to touch the rotor while it is in motion, if the door is functioning properly, but the door can cause possible pinching, piercing or bruising when it closes.

!! INJURY HAZARD !! **Keep your fingers, hair, clothing and jewelry away from the VSpin while it is in motion.**

Not all circumstances can be foreseen and more serious injury is possible. It is the responsibility of every operator to follow warnings and safety labels, and keep away from the gripper head whenever it is likely to move.

!! INJURY HAZARD !! **Do not attempt to manually unlock the door while the rotor is moving. Although no longer powered, the buckets may still be rotating at a dangerous speed.**

!! INJURY HAZARD !! **Do not operate the VSpin if any VSpin components or accessories are damaged or have been modified in any manner not authorized by Agilent Technologies. Do not operate the VSpin if foreign objects or liquids are trapped within the chamber. Discontinue use if the VSpin vibrates or emits noise above normal levels.**

!! INJURY HAZARD !! **Do not exceed a plate mass of 250 grams (8.82 ounces) for each bucket. Do not operate the VSpin above speeds of 1500 RPM unless it is securely mounted to a structure approved by Agilent Technologies.**

Hazardous-voltage electronics

!! INJURY HAZARD !! **Do not try to gain access to the interior of the VSpin. Do not remove the exterior panels. Hazardous voltage inside of a device can cause severe injury or death.**

!! INJURY HAZARD !! **Ensure that the power cords are in good condition and are not frayed. Use of frayed or damaged power cords can cause injury.**

High-pressure gas

!! INJURY HAZARD !! **Working with open, charged air lines can result in injury. Turn off the compressed air line when disconnecting or reconnecting devices that use compressed air. Contact your facilities department or Automation Solutions Technical Support with questions about setting up the air line.**

Follow the local, state, and federal safety codes for the placement and mounting of gas cylinders. For example, you might have to attach a standard cylinder bracket to a solid permanent structure to meet or exceed all local seismic and safety requirements.

Always use good laboratory practices when handling high-pressure cylinders. Make sure you follow any instructions provided with the cylinders.

!! DAMAGE HAZARD !! Make sure that air supply is properly filtered for moisture and aerosol impurities; there is no air filter on the VSpin. Dirt in unfiltered air can build up in air valves and can eventually cause a malfunction.

Chemical hazards

!! INJURY HAZARD !! **Sample plates may contain toxic, caustic or radioactive substances. If a sample plate containing anything other than innocuous materials breaks apart inside the VSpin, contact the Automation Solutions Technical Support.**

Some chemicals used when working with the VSpin can be hazardous. Make sure you:

- Follow standard laboratory procedures and cautions when working with chemicals.
- Follow your local, state, and federal safety regulations when using and disposing of the chemicals.

!! DAMAGE HAZARD !! Trapped liquids may cause corrosion inside the VSpin.

Damage hazards

!! DAMAGE HAZARD !! Do not use harsh abrasives, corrosive cleaning agents, or metal brushes to clean any VSpin components or accessories. Do not use any concentration of bleach (sodium hypoclorite). Do not allow cleaning agents to contact any electrical or sensitive mechanical components.

!! DAMAGE HAZARD !! Plates occasionally break apart inside the VSpin, and the plate fragments need to be removed so they do not interfere with moving parts and potentially damage the VSpin.

!! DAMAGE HAZARD !! Do not tamper with or adjust the VSpin rotor mounting screw, which fastens the rotor to the central motor axle. It is located on the bottom of the rotor. Contact Automation Solutions Technical Support if you think the rotor mounting screw requires maintenance. The VSpin is designed to have a permanently attached rotor, unlike many manual centrifuges that can have interchangeable rotors.

Safety labels

Warnings in the user documentation or on the device must be observed during all phases of operation, service, and repair of this device. Failure to comply with these precautions violates safety standards of design and the intended use of the product. Agilent Technologies assumes no liability for the customer's failure to comply with these requirements. The following table lists the common symbols. A description of the warning and information that will help you avoid the safety hazard are provided in this guide.

Symbol	Description
	Indicates that you must read the accompanying instructions (for example, the safety guide) for more information before proceeding.
	Indicates hazardous voltages.
	Indicates pinch, crush, and cut hazard.
	Indicates laser hazard.
	Indicates hot surface hazard.
	Indicates protective conductor terminal, which is bonded to conductive parts of an equipment for safety purposes.
	Indicates that you must not discard this electrical/ electronic product in domestic household waste.

Safety and regulatory compliance

The VSpin complies with the applicable EU Directives and bears the CE mark. See the Declaration of Conformity The VSpin is designed to comply with the standards listed in the following table.

Regulatory Compliance	Standard
EMC	
European Union	EMC Directive 2004/108/EC
	IEC 61326-1:2005 / EN 61326-1:2006
Canada	ICES/NMB-001:2004
Australia/New Zealand	AS/NZS CISPR 11:2004
Safety	
European Union	Machinery Directive 2006/42/EC
	Low Voltage Directive 2006/95/EC
	IEC 61010-1:2001 / EN61010-1:2001
Canada	CAN/CSA-C22.2 No. 61010-1-04
USA	ANSI/UL 61010-1:2004

Electromagnetic compatibility

If the VSpin causes interference with radio or television reception, which can be determined by turning the device off and on, try one or more of the following measures:

- Relocate the radio or television antenna.
- Move the device away from the radio or television.
- Plug the device into a different electrical outlet, so that the device and the radio or television are on separate electrical circuits.
- Make sure that all peripheral devices are also certified.
- Make sure that appropriate cables are used to connect the device to peripheral equipment.
- Consult your equipment dealer, Agilent Technologies, or an experienced technician for assistance.

Changes or modifications not expressly approved by Agilent Technologies could void the user's authority to operate the equipment.

Sound emission declaration

Sound pressure: Lp < 70 dB according to EN 27779:1991.

Schalldruckpegel: LP < 70 dB nach EN 27779:1991.

2

VSpin Overview

This chapter:

- Introduces the VSpin™ hardware and software
- Lists the operating requirements and technical specifications of the VSpin

VSpin Description

Introduction

The VSpin is a microplate centrifuge that is intended to be integrated with a robotic lab automation system such as the Velocity11® BioCel®. It is not designed for manual use, and using it in this manner is not recommended.

The VSpin has two buckets, each capable of carrying a single microplate, filter plate, or lidded microplate.

The microplates in the two buckets must be balanced to within 10 grams of each other. You can either pair one sample plate with another of equal weight, or you can pair a sample plate with a balance plate that has been equally weighted with water.

For more information about balancing the plates in the buckets, see "Starting a Spin" on page 58.

Optional VSpin Access or Access2

Not all robots can access the VSpin directly. For example, a crane style robot can pick and place plates vertically, but cannot move a plate horizontally through the VSpin door.

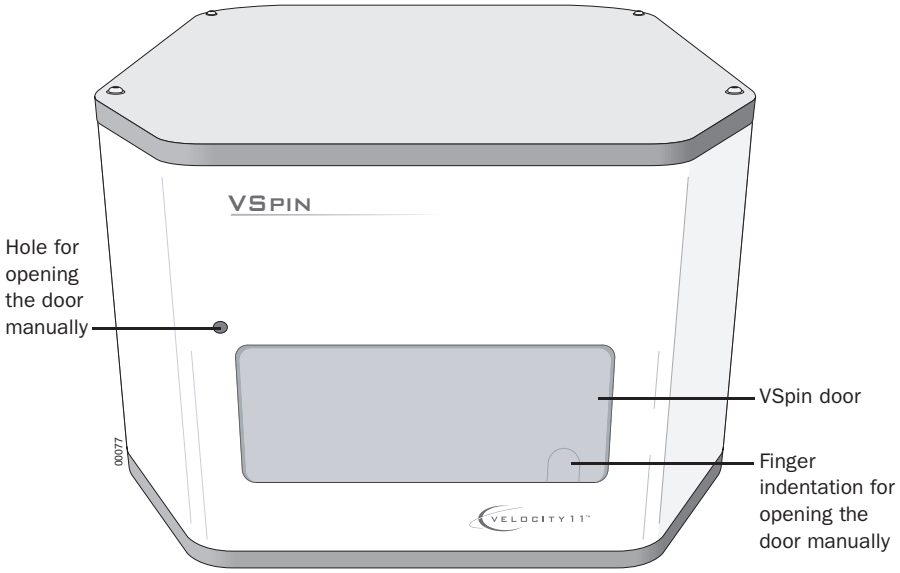
To allow plate placement by these robots, the VSpin can be paired with the Velocity11 Access™ or Access2™. The Access and Access2 are plate loaders that each have a plate stage and a gripper. After your robot places a plate onto the Access or Access2 plate stage, the gripper picks up the plate and moves it into the VSpin.

For more information, see the *Access User Guide* or the *Access2 User Guide*.

Hardware Overview

Front Features

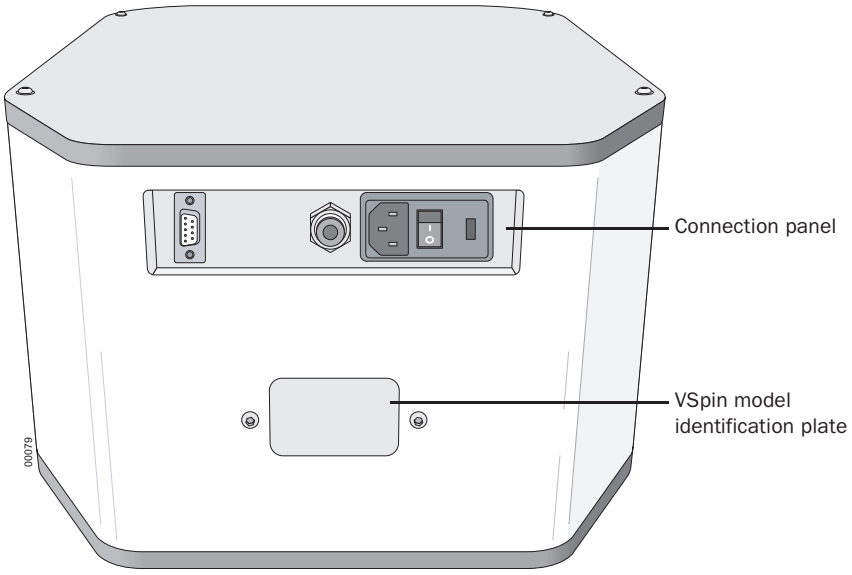
The following diagram shows the front features of the VSpin, most notably the door and features for opening the door manually:



For more information, see “Unlocking and Opening the Door Manually” on page 69.

Rear Features

The following diagram shows the rear features of the VSpin, most notably the connection panel:



For more information, see “About the Connection Panel” on page 32.

Performance Specifications

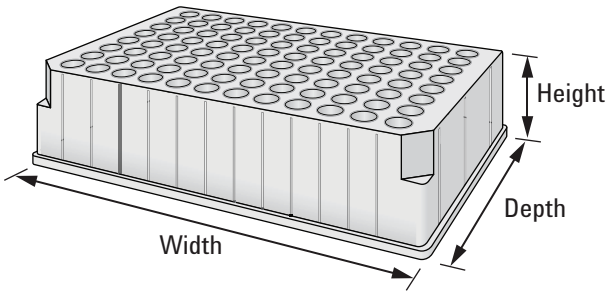
Property	Value
Spindle speed	0–3000 RPM
Labware dimensions	See Labware Compatibility.
Maximum centrifugal force on plate	1000 xg
Maximum imbalance	10 grams If you require a higher balance tolerance, contact Technical Support.
Maximum mass of each plate	250 grams
Acceleration	❑ 0–2000 RPM in 5.0 seconds ❑ 0–3000 RPM in 7.5 seconds
Deceleration	❑ 2000–0 RPM in 5.0 seconds ❑ 3000–0 RPM in 7.5 seconds

Labware Compatibility

The Centrifuge is designed for labware that comply with the standards ANSI/SLAS 1-2004 (R2012) through ANSI/SLAS 4-2004 (R2012).
The overall labware dimensions, including lid, must be within the following values. Carefully evaluate any labware before use. If you have questions, contact your Agilent Technologies representative for evaluation.

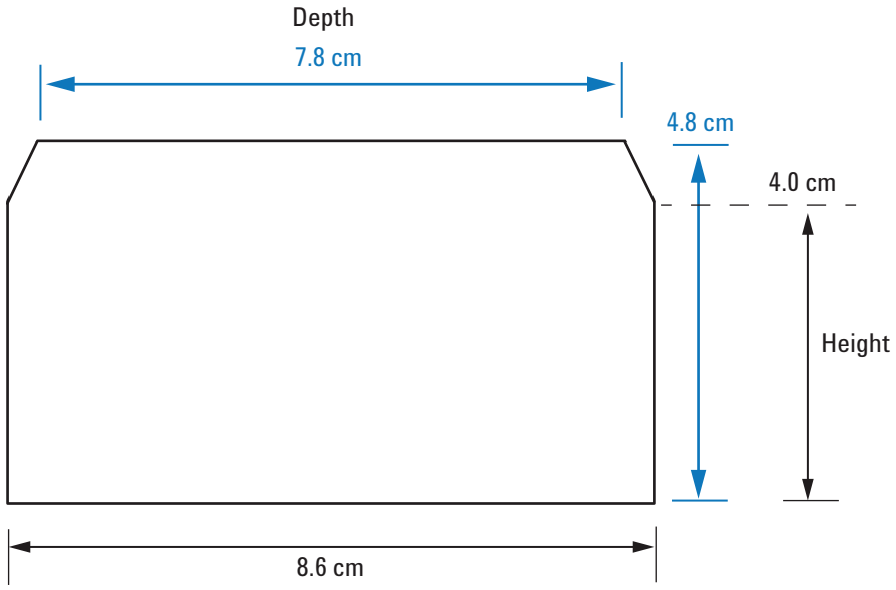
- ❑ Width: 12.8 cm (5.03 in)
- ❑ Depth and height:
  - ◆ 8.6 cm (3.38 in) up to 4.0 cm (1.57 in)
  - ◆ 7.8 cm (3.07 in) up to 4.8 cm (1.89 in)

Labware dimensions



!! IMPORTANT !! The labware depth and height must fit in the profile defined in the following figure.

Profile of centrifuge limits for labware height and depth



Software Overview

Lab Automation Software

The Centrifuge is designed to be used with a lab automation system such as the BioCel, that controls normal runs through its own software. For example, if you are using a BioCel, the VWorks software controls the Centrifuge. See the documents that came with your lab automation system for more information.

Centrifuge Diagnostics Software

To set up the Centrifuge for automated operation and to troubleshoot problems, use the diagnostics software, which is described in this guide. The diagnostics software sends simple real-time commands, which are issued immediately to the Centrifuge.

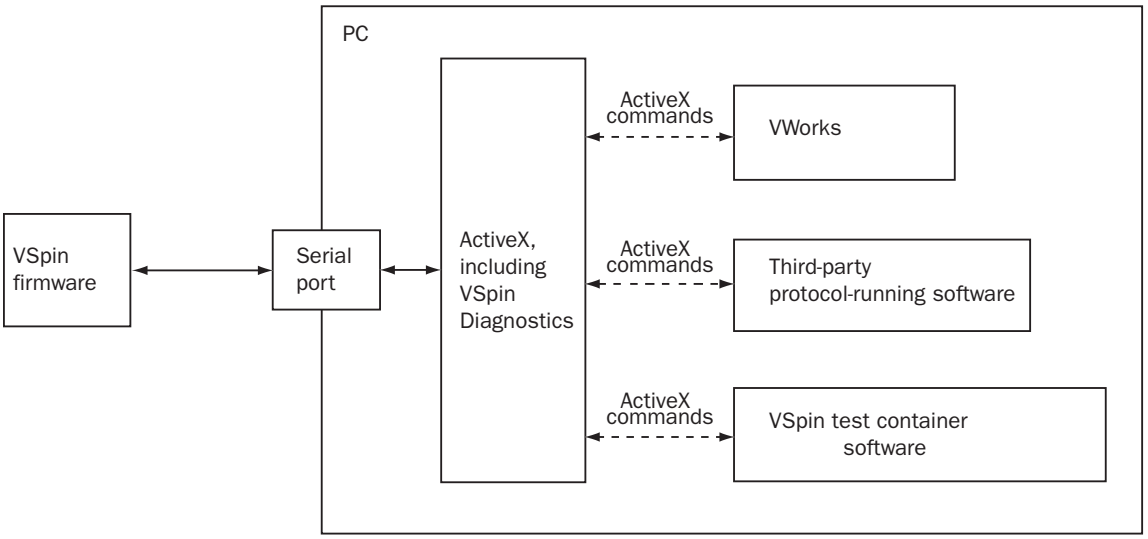
You must load a profile from the diagnostics software to initialize and run the Centrifuge. See the *Centrifuge Version 8 Quick Reference* and the *Microplate Centrifuge Quick Guide*.

Test Container Software

The VSpin test container is an application that lets you access the diagnostics software without VWorks or a link from third-party lab automation software. It is used mainly by integrators, and is located on the included software CD.

Software Control

The following diagram shows the options for controlling a VSpin from a computer (PC).



ActiveX Software

ActiveX is a set of Windows-based technologies that allows software components to interact with each other regardless of the programming language in which the components were created. From the VSpin Diagnostics software, simple commands can be used to initiate complex operations in networked VSpin centrifuges.

The VSpin ActiveX software includes:

- ❑ VSpin Diagnostics software
- ❑ Methods, which control individual operations
- ❑ Properties, which set the values used in methods, such as speed = fast
- ❑ Events, which are notifications that methods are complete or have errors

To allow you to develop your own controlling software, the chapter "ActiveX Controls" on page 87 provides the ActiveX methods, events and properties.

For the VSpin Access or Access2 control software, see the *Access User Guide* or the *Access2 User Guide*.

Required Software Summary

To determine the type of software you need to run your VSpin, refer to this table:

To operate the VSpin...	Use...
With a BioCel	❑ VWorks for lab automation runs ❑ VSpin Diagnostics software (included in VWorks) for troubleshooting and manual operation.
With a third-party system	❑ Third-party software for lab automation runs. ❑ VSpin Diagnostics software for troubleshooting and manual operation and configuring profile settings such as COM port and maximum velocity. See "About the Profiles Page" on page 16 for permanently stored settings.
With a third-party system and a Velocity11 Access or Access2	❑ Third-party software for lab automation runs. ❑ Access or Access2 Diagnostics software for troubleshooting and manual operation. ❑ VSpin Diagnostics software for VSpin troubleshooting and manual operation and configuring settings such as spin rate and duration.
As a stand-alone centrifuge for testing purposes	Test container software to let you open the VSpin Diagnostics software

Note: Although we provide companies that are using third-party lab automation systems with the VSpin Diagnostics software, your company may choose not to provide a way for your lab automation system to open this software.

About Profiles

What You Need to Know

In general, a profile is a collection of settings saved as a group that are not lost when you close the software. In the case of the VSpin, the settings stored in a profile are:

- ❑ Serial communications port
- ❑ Maximum spin speed
- ❑ Bucket tolerance
- ❑ Rehome after spin (not editable)
- ❑ Teachpoint for bucket position
- ❑ Motor settings (not editable)

These are the basic settings that you are unlikely to want to change for a particular VSpin application once it has been set up. It is possible to have multiple profiles for the same VSpin.

Example Use

If you have three centrifuges on your system, you would create three different profiles (VSpin1, VSpin2 and VSpin3 for example). Then, to perform a spin on the third centrifuge you would select the profile VSpin3. The profile initializes communication with the device and provides the basic settings. You then configure other settings for the individual spins, such as velocity and total time.

More Information

For more information about profiles, see the following topics:

- ❑ “About the Profiles Page” on page 16
- ❑ “Creating and Managing Profiles” on page 37
- ❑ “Using Profiles” on page 49

About Teachpoints

Teachpoint Defined

A teachpoint is a point in space to which a device such as a robot or bucket can move and is defined with respect to reference positions built in to that device.

For example, when you define a VSpin bucket position, the bucket position becomes a teachpoint where your robot can place a plate.

See “Creating and Managing Profiles” on page 37.

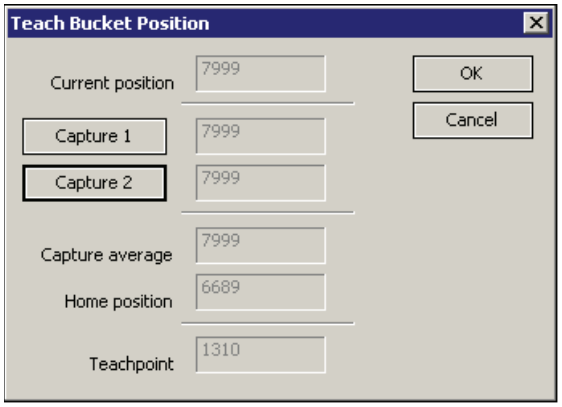
About the Home Position

On the VSpin, the home position is the reference position used to orient the rotor.

When you set the teachpoint for the VSpin, you are setting the angle from the home position to the angle that the rotor turns to line a bucket up with the door. The software designates this teachpoint as bucket number one. This teachpoint must be set for operation.

Teachpoints and the Teach Bucket Position Dialog Box

The Teach Bucket Position dialog box is used to align the buckets to the door by calculating a teachpoint value. In the following example, the Current position of 7999 is where bucket number one lines up with the door. Notice that this is the sum of the Home position value of 6689 and the Teachpoint value of 1310.



When you tell the VSpin to go to bucket number one, it finds the Home position and then moves an additional angle as defined by the Teachpoint value, in this case 1310, to end up at position value 7999.

There are 8000 units in one revolution, so bucket two will be at a position value that is 4000 units less than the bucket one position value. In this case, that is 3999.

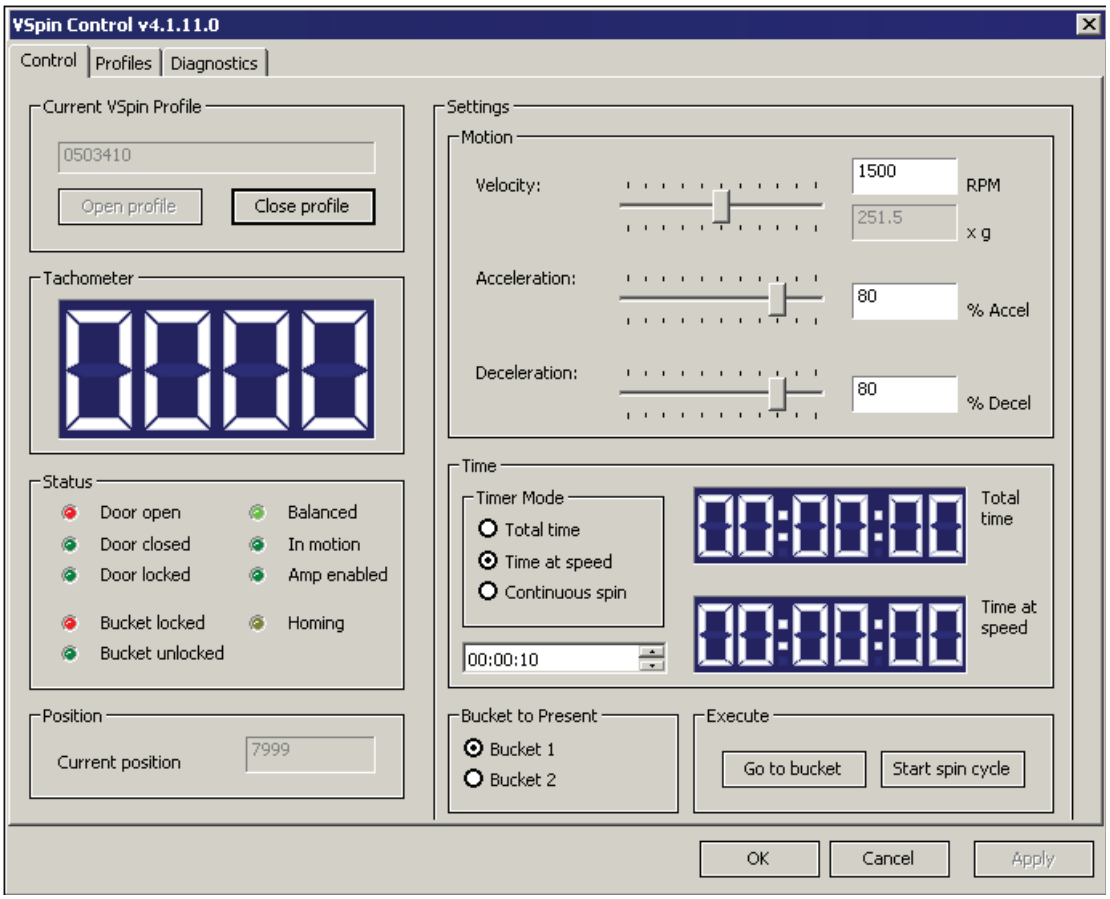
To see how to open and use the Teach Bucket Position dialog box, see “Creating and Managing Profiles” on page 37.

About the Control Page

Overview

The Control page is the first page displayed when you open the VSpin Diagnostics software. It is intended for testing and troubleshooting of the VSpin, and not automated operation.

The settings on this page are not permanently stored like the settings on the Profiles page, and therefore do not persist when you close the software.



Control Page Procedures

The following procedures are performed from the Control page:

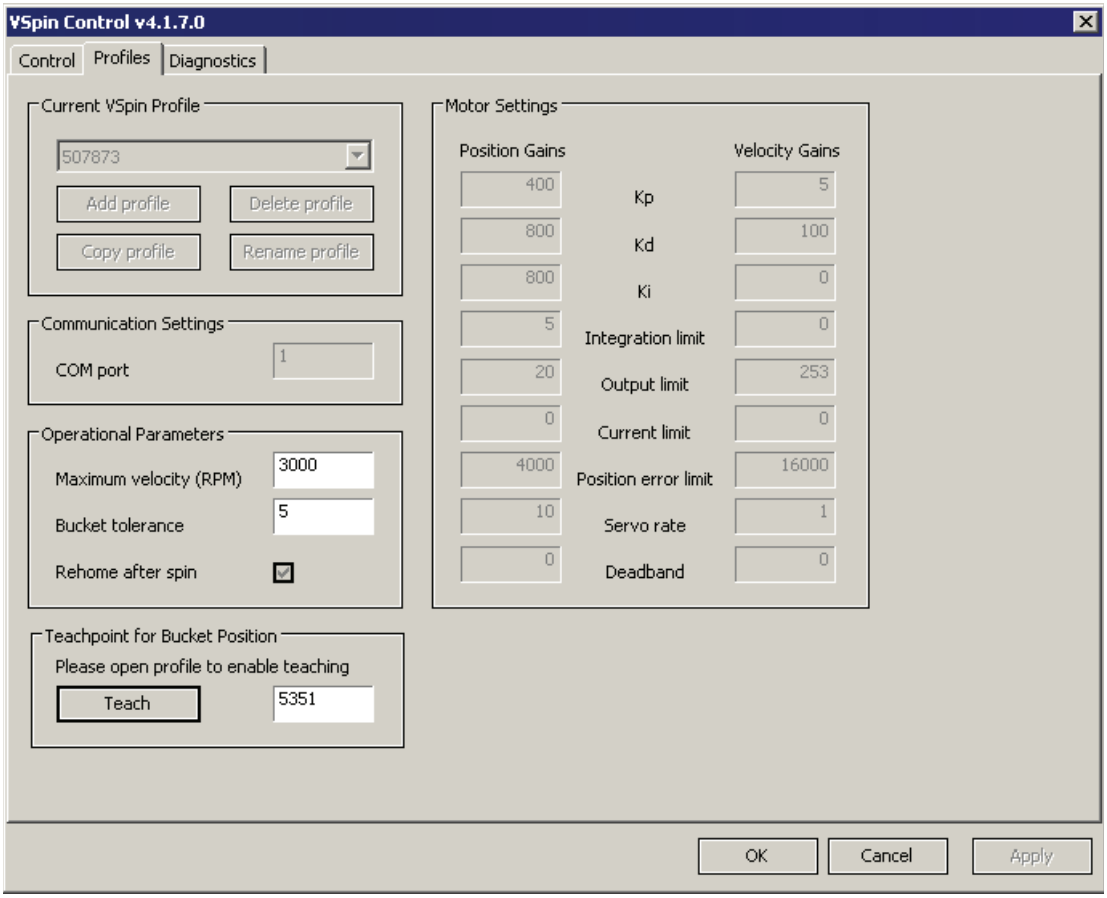
Function	Procedure
Configuring the velocity, acceleration and deceleration of the rotor	"Configuring Motion Settings" on page 51
Checking the: ❑ Status lights ❑ Current bucket position ❑ Bucket speed ❑ Spin time	"Monitoring the Progress of a Spin" on page 61
Opening or closing a profile	"Using Profiles" on page 49
Setting the spin time	"Configuring Time Settings" on page 54
Setting the door to open to bucket 1 or bucket 2	"Setting the Presented Bucket" on page 55
Starting or stopping a spin	"Starting a Spin" on page 58

About the Profiles Page

Overview

The Profiles page lets you set and save basic VSpin parameters. This is the only page that contains parameters that will be remembered after you close the software.

For more information, see “About Profiles” on page 12.



Motor Settings

Motor settings set the control values for the servo motor.

!! IMPORTANT !! These values are set at Velocity11 and cannot be changed through the diagnostics software.

Profiles Page Procedures

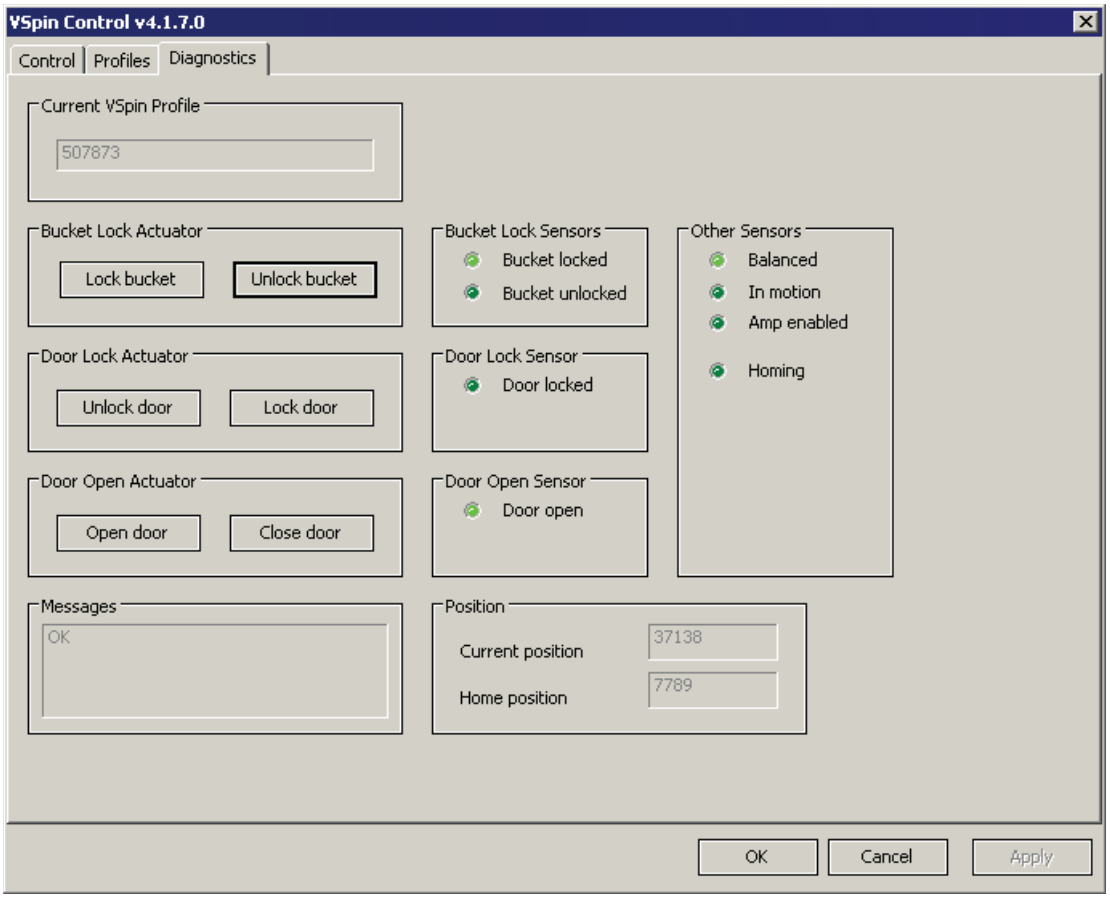
The following procedures are performed from the Profiles page.

Function	Profiles
Configuring Motion settings: ❑ Bucket tolerance ❑ Setting the maximum velocity of the rotor (default is 3000 RPM)	"Configuring Motion Settings" on page 51
Creating and managing profiles: ❑ Creating ❑ Editing ❑ Deleting ❑ Copying ❑ Renaming	"Creating and Managing Profiles" on page 37
Using profiles: ❑ Determining the current profile ❑ Opening ❑ Closing	"Using Profiles" on page 49
Selecting a serial communications port for a profile	"Connecting to the Computer" on page 35
Setting the bucket teachpoint	"Creating and Managing Profiles" on page 37
Motor Settings	Used by Velocity11 personnel only.

About the Diagnostics Page

Overview

The Diagnostics page helps you diagnose problems quickly by providing you with the controls and VSpin status information shown in the screen shot below.



Diagnostics Page Procedures

The following procedures are performed from the Diagnostics page.

Function	Procedure
Checking the spin status: ❑ Status lights, which provide the same information as the status lights on the Control page, excluding Door closed. ❑ Current bucket position ❑ Current home position	"Monitoring the Progress of a Spin" on page 61

Function	Procedure
Testing the VSpin actuators: ❑ The bucket lock ❑ The door lock ❑ Opening or closing the door	"Testing the VSpin Actuators" on page 76
Checking Diagnostics error messages for the above actuators from the Messages group box	"Checking Error Messages" on page 78

3 Installation

This chapter describes how to install and set up the VSpin™ for performing a spin, and is intended for personnel properly trained in the installation of such hardware.

Read this chapter if you are installing the VSpin yourself or are integrating it into a third-party robotics system. You do not need to read this chapter if Velocity11® has installed your VSpin for you and you are not planning to change how it is set up.

Installation Overview

Installation Procedures

The procedures you need to perform to properly install your VSpin are listed in order in the following table.

Step	Procedure	See...
1.	Verify that your lab meets the necessary requirements	"Laboratory Requirements" on page 23 "Preparing the Mounting Surface" on page 26
2.	Unpack the VSpin	"Unpacking the VSpin" on page 24
3.	Install the buckets	"Installing the Buckets" on page 31
4.	Prepare to install the VSpin	"Preparing the Mounting Surface" on page 26
5.	Install the VSpin	"Mounting the VSpin" on page 29
6.	Connect air and power sources	"Connecting to Air and Power Sources" on page 33
7.	Connect to the computer	"Connecting to the Computer" on page 35
8.	Install the software	"Installing the Software" on page 36
9.	Create a Profile	"Creating and Managing Profiles" on page 37
10.	Teach the bucket alignment so that it lines up with the door	"Aligning the Buckets" on page 40

Laboratory Requirements

What You Need

For proper VSpin operation, make sure your laboratory meets the following requirements:

Electrical Supply

- ❑ 100–240 VAC
- ❑ 50–60 Hz

Environment

- ❑ For speeds above 1500 RPM, or when an immovable position is required, use a dedicated permanent mounting surface, such as an aluminum table at least 0.5 inch (1.3 cm) thick and at least 100 pounds (45.5 kg) in weight with the correct bolt hole pattern.
- ❑ For speeds below 1500 RPM and when a consistent location is not required, use a 14 x 19 inch (36 x 49 cm) non-skid stable surface for free-standing operation.

Air supply

- ❑ 0.25 inch (0.64 cm) compressed air line capable of supplying 80 psi (550 kPa) at 1 cfm (0.5 L/s)
- ❑ Clean, dry air

VSpin Dimensions

Your lab must have space to accommodate these VSpin dimensions:

Height

- ❑ VSpin alone: 8.09 inches (20.0 cm)
- ❑ VSpin with Access™: 9.38 inches (23.8 cm)
- ❑ VSpin with Access2™: 9.88 inches (25.1 cm)

Width

12.9 inches (32.7 cm)

Note: Neither Access model changes the width of the VSpin arrangement.

Length

- ❑ VSpin alone: 18.1 inches (45.8 cm)
- ❑ VSpin with Access: 27.6 inches (70.1 cm)
- ❑ VSpin with Access2: 28.0 inches (71.1 cm)

Weight

- ❑ VSpin alone: 57.5 pounds (26.1 kg)
- ❑ VSpin with Access: 73.5 pounds (33.3 kg)
- ❑ VSpin with Access 2: 76.5 pounds (34.7 kg)

For an illustration of the VSpin dimensions, see “Preparing the Bench Surface for Installation” on page 26.

Unpacking the VSpin

Overview

After you have received your VSpin, but before you continue with the setup process, inspect all the items for possible shipping damage.

If anything is missing or appears to be damaged, contact the Velocity11 Service Center.

!! DAMAGE HAZARD !! Read and follow all unpacking information before use.

!! DAMAGE HAZARD !! Save the carton and packing materials in case you need to ship the VSpin. Using a different carton and packing materials could result in damage to the VSpin during shipping.

For a list of the packing materials, see "Packing the VSpin for Shipping" on page 83.

VSpin Package Contents

The VSpin package contains:

- ❑ A VSpin centrifuge
- ❑ A bucket box with two buckets
- ❑ An accessories box
  - ◆ A power cable
  - ◆ A serial communications cable
  - ◆ A fittings kit: Either North American or metric (see below)

    Note: If you live outside the U.S. you receive a metric fittings kit.
  - ◆ A product warranty
  - ◆ A VSpin software CD
  - ◆ A *VSpin User Guide*
  - ◆ A *Getting Started* guide
  - ◆ A Velocity11® product catalog

North American Fittings Kit Contents

The North American fittings kit contains:

- ❑ Tubing: One 15 foot, 0.25-inch tube for connecting to the air supply
- ❑ A Hose fitting: 0.25-inch NPT–0.25-inch one-touch hose
- ❑ A Hose fitting: 0.125-inch NPT–0.25-inch one-touch hose
- ❑ A One-touch T-hose fitting (use is optional, depending on your air supply)

Metric Fittings Kit Contents

The contents of the metric fittings kit varies depending on your installation package. Contact Velocity11 for an accurate list of contents. See *Getting Started* for contact information.

Preparing the Mounting Surface

Overview

Before you install the VSpin, refer to this topic for the dimensions of the VSpin door and the position of the buckets so that you can set up your robot to access the buckets properly.

Before mounting the VSpin you must prepare the mounting surface.

!! DAMAGE HAZARD !! If you drop or otherwise impact the VSpin or the buckets, the VSpin rotor or the buckets could be damaged. Either of these could lead to a failure that could further damage the unit during a spin. If you have dropped or subjected the VSpin to a forceful impact, contact Velocity11, and do not use the VSpin until it is determined to be safe to operate.

About Installing the VSpin

For the robot to move plates to and from the VSpin buckets, the three-dimensional position of the buckets must be fixed and known to the controlling software of the lab automation system. This requires that the VSpin is mounted on a stable base that does not move in relation to the robot.

You can mount the VSpin directly on a benchtop or on a mounting plate that also holds other components of your system. You should have the benchtop or mounting plate accurately drilled and tapped to create screw holes, according to the dimensions given in this topic.

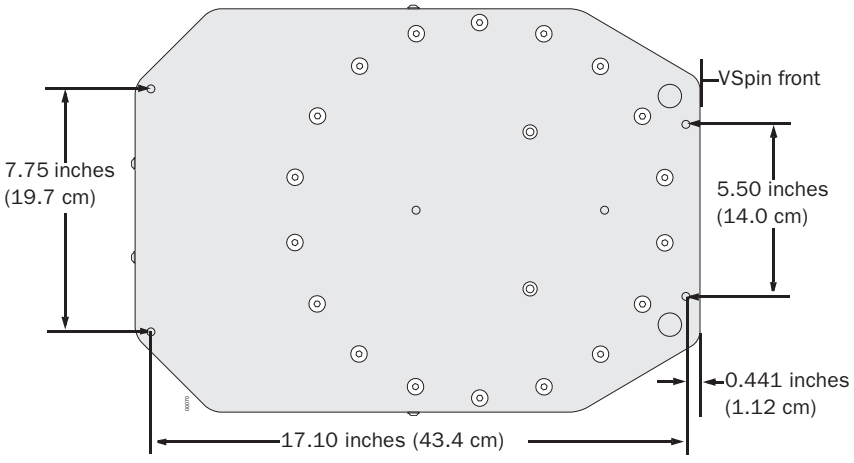
When you are planning where to install your VSpin, make sure you choose a place that allows access on all sides for cleaning and maintenance.

Preparing the Bench Surface for Installation

To prepare your bench surface for installation:

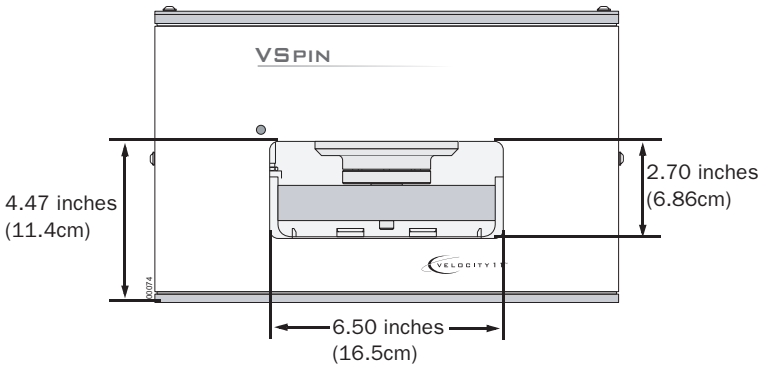
1. Prepare your mounting holes to accommodate the VSpin using the following diagram of the bottom of the VSpin.

   Use a #9 drill bit with an M6 tap to prepare the holes.



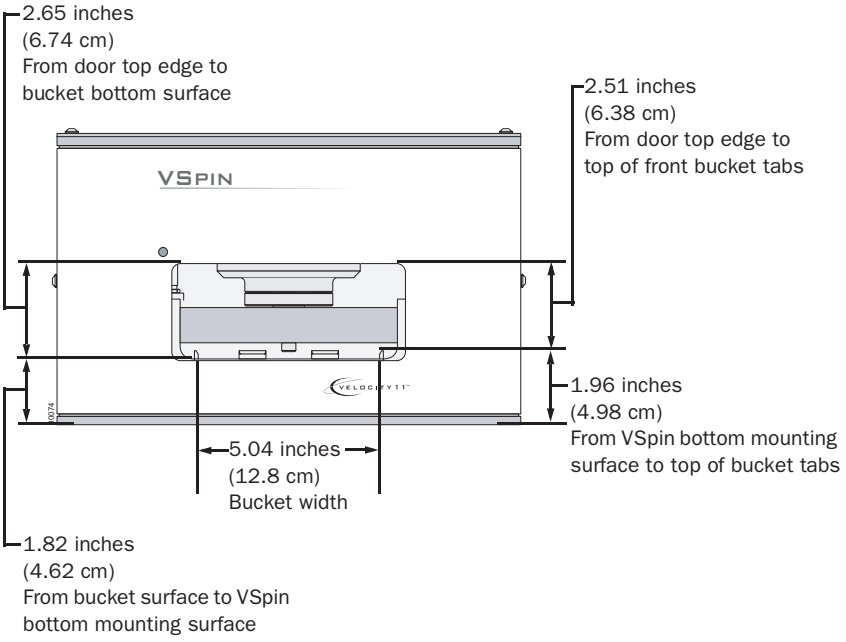
2. Reference the following diagram for the VSpin door dimensions.

   This is the front view, with the door open.

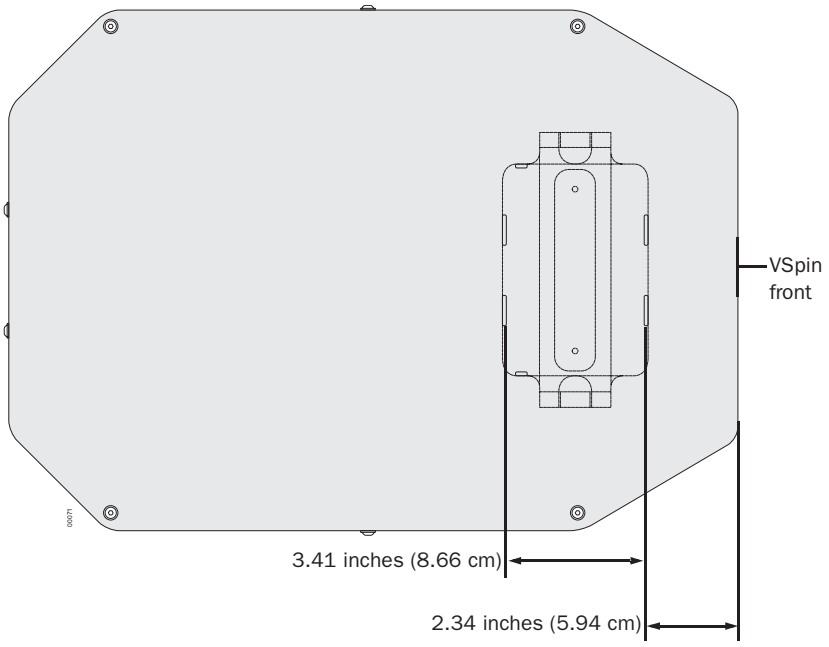


3. Reference the following diagram for the VSpin plate entry dimensions.

   This is the front view, with the door open.



4. Reference the following diagram for the VSpin bucket position.
   This is a top-down view, with the bucket in the load/unload position.



Mounting the VSpin

Required Preparation

This procedure assumes that you have already:

- ❑ Prepared your mounting surface
- ❑ Drilled the necessary holes
- ❑ Tapped the screw threads in your benchtop or mounting plate.

About the Procedure

Velocity11 provides four M6 X 30 flathead screws. You may need to obtain screws that are a more suitable length for your particular laboratory setup.

!! DAMAGE HAZARD !! When you remove the VSpin covers during this procedure, the circuit board will be exposed. This can be easily damaged. Do not touch the circuit board, and ground yourself with a device such as an anti-static wrist-band to avoid static discharge.

!! INJURY HAZARD !! Do not turn on the VSpin power when the covers are off. Touching the circuit board when the power is on could give you a shock.

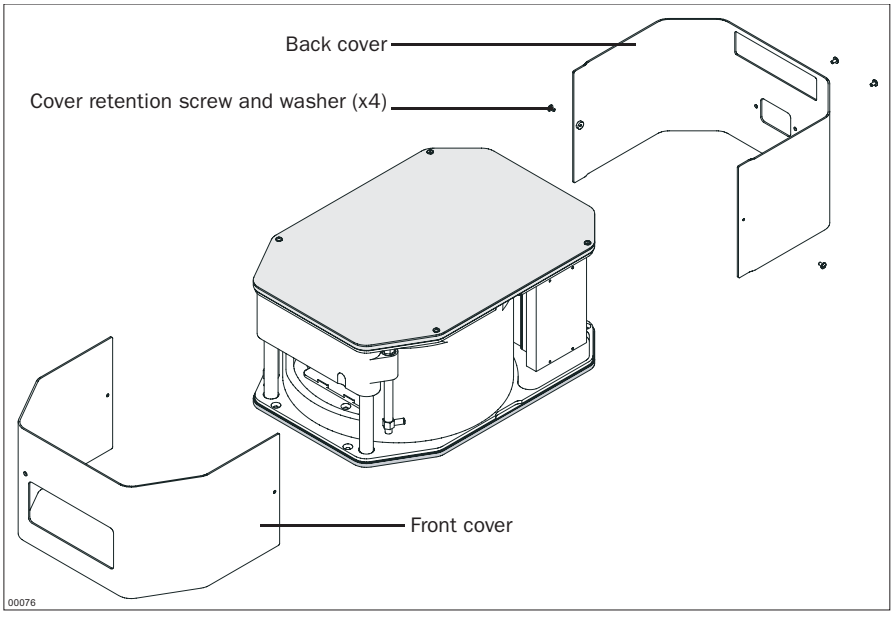
Mounting the VSpin

To mount the VSpin to a stable surface:

1. Remove the front and back VSpin covers, using the following diagram for reference.

   There are four retention screws and washers for each cover.

   Use a 2.5mm allen wrench to remove the screws.



2. Pick up the VSpin and place it on the bench so that the screw holes in its base align with the screw holes in your benchtop.

   All holes accommodate M6 flat head cap screws.

3. Screw one M6 flathead screw into a front screw hole, and another into the diagonally opposed screw hole on the rear, making sure that both screw completely into the base.

   Gently nudge the VSpin back and forth as you install the screws. This makes sure that the VSpin screw holes are seated squarely over the screw holes in the mounting surface.

   Tighten the front screw before tightening the rear screw.

4. Install the other two screws into the screw holes, making sure they screw completely into the base.

5. Check that the VSpin is firmly seated to your mounting surface by nudging it.

   If the VSpin moves, loosen the screws and return to step 3 to retighten them.

Installing the Buckets

Overview

After unpacking the VSpin, you need to install the buckets. The buckets are packaged in their own box to minimize damage to the VSpin during shipment.

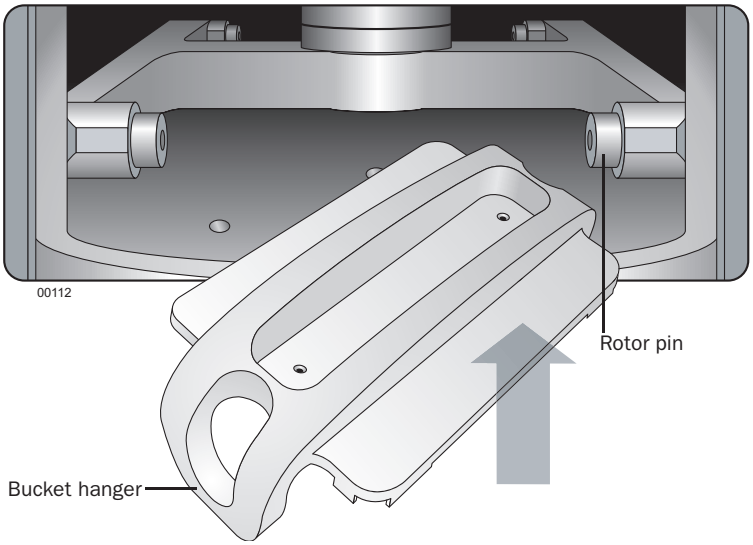
Procedure

To install or replace a bucket:

1. Open the door manually.

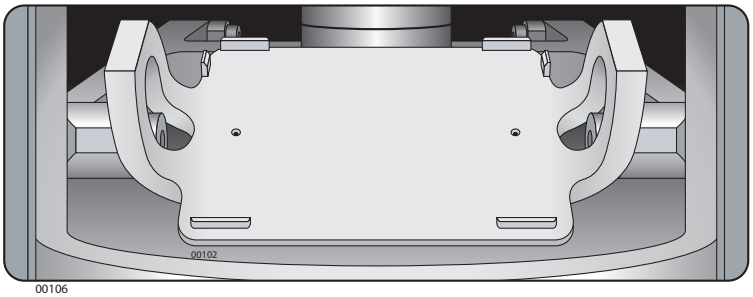
   See “Unlocking and Opening the Door Manually” on page 69.

2. Pass the bucket through the door as shown in the diagram.

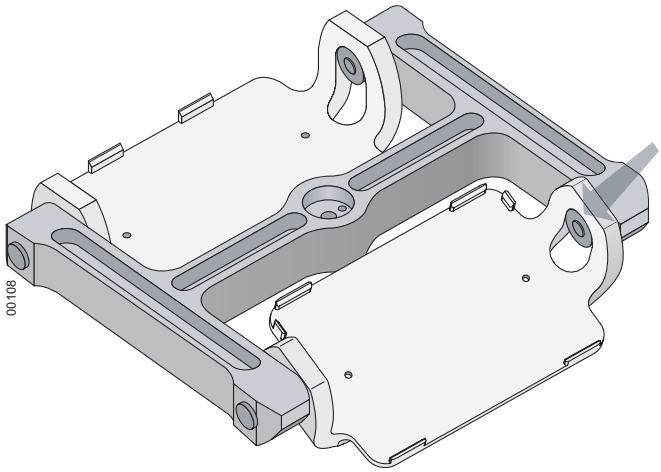


3. Flip the bucket right-side-up so that the bucket hangers line up with the rotor pins.
4. Align the bucket hangers so they are positioned over the rotor pins on the rotor.

   Make sure that after you turn the bucket over, the side of the bucket with the four tabs is facing towards the center of the VSpin as shown in the next diagram.



5. Push the bucket onto the pins until it seats snugly and can pivot freely.



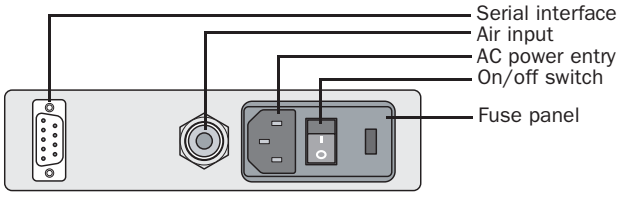
Removing the Buckets

To remove the buckets, see “Removing the Buckets” on page 71.

About the Connection Panel

Parts

The following diagram shows the common features of the connection panel at the rear of the VSpin.



Part	Comment
Serial interface	Connects a DB-9 RS-232 serial cable to provide control of the VSpin from a computer.
Air input	Connects a 0.25-inch (0.7 cm) air hose to supply the VSpin with 50–90 psi (345–621 kPa) of clean, dry air.
AC power entry	Connects a power cord.
On/off switch	Switches main power on or off.
Fuse panel	Holds one slow-blow fuse (7 A, 250 V, 3AG).

Connecting to Air and Power Sources

Overview

Before you can use the VSpin, you need to provide it with compressed air and electrical power. The air must be provided through the 0.25-inch (0.64 cm) tubing included with the VSpin. Use clean, dry air.

!! DAMAGE HAZARD !! Make sure that air supply is properly filtered for moisture and aerosol impurities; there is no air filter on the VSpin. Dirt in unfiltered air can build up in air valves and can eventually cause a malfunction.

Connecting the Compressed Air Line

!! IMPORTANT !! Use proper technique to bring an air line to the VSpin. If you have questions about this, ask your facilities department or the Velocity11 Service Center.

To install the compressed air line:

1. Switch off the air before installing the air hose into the VSpin.

   !! INJURY HAZARD !! Working with open, charged air lines can result in injury if the end of the line whips around rapidly. Switch the compressed air line off before installing the VSpin. If you have questions about installing your air line, contact your facilities department or the Velocity11 Service Center.

2. Verify that the air supplied to the VSpin meets the specifications in “Laboratory Requirements” on page 23.
3. Cut the supplied 0.25-inch air hose to the length you need.
4. Plug one end of the tubing into your laboratory air supply.
5. If your air-line uses a threaded port, attach the 0.25 inch NPT fitting to the port. Attach the 0.25-inch one-touch hose fitting into the 0.25 inch tubing.
6. Plug the other end of the 0.25-inch tubing into the one-touch air supply port on the back of the VSpin.

   Make sure that the 0.25-inch tubing is securely installed into the air supply port. If you pull the tubing gently, and feel resistance, the line has been properly installed. If the tubing comes free, it needs to be inserted with more force.

Note: You may have another machine in your laboratory connected to the air supply. In this case, use the T-connector to attach both the VSpin and your other machine to the air.

Disconnecting from the Compressed Air Line

To disconnect from the compressed air line with the one-touch fitting, see “Disconnecting the Air Supply” on page 67.

Connect the Power Cable

To connect the power cable to the VSpin:

1. Turn off the VSpin.
2. Verify that the voltage supplied to the VSpin meets the specifications in “Laboratory Requirements” on page 23.
3. Plug one end of the power cable into the power entry receptacle at the rear of the VSpin.
4. Plug the other end of the power cable into an appropriate grounded electrical socket.

About the Computer

Computer Functions

The computer you connect to the VSpin is used to:

- ❑ Control the VSpin
- ❑ Configure VSpin settings
- ❑ Diagnose problems

Minimum System Requirements

Make sure that your computer meets these requirements:

- ❑ Pentium 3 or better
- ❑ 256 MB RAM
- ❑ Windows 2000 or Windows XP
- ❑ 200 MB free hard disk space
- ❑ RS-232 DB-9 serial port

Connecting to the Computer

Overview

To operate your VSpin, you need to connect it to the computer that is running your lab automation software. For example, if you are using a Velocity11 BioCel, your VSpin needs to be connected to the computer that is running VWorks.

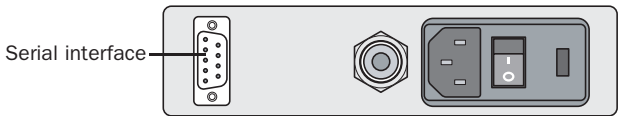
For more information about how the VSpin software integrates with your lab automation software, see “Software Overview” on page 9.

Connect the Serial Communications Cable

Before you can control the VSpin with your computer, you need to connect them together with the included serial communications cable.

To connect the VSpin to the computer:

1. Plug one end of the serial communications cable into the serial interface on the back of the VSpin.



2. Plug the other end of the serial communications cable into the available serial communications port on the PC you use to control the VSpin.
3. Note the number of the COM port that you connect to.

   You need this information when creating a profile.

Installing the Software

Introduction

After connecting the VSpin to the controlling computer, you need to install the software, which includes the VSpin Diagnostics software.

Procedure

To install the VSpin Software:

1. Place the VSpin CD into your CD ROM drive.
2. If the startup program does not start automatically:
   a. Double-click the **My Computer** icon.
   b. Double-click your CD drive icon.
   c. Double-click to open the folder **VSpin vX.Y.Z with Access2 vvX.Y.Z**, where X.Y.Z are the current version numbers.

      The Access2 software is included even if you don't have an Access2.
   d. Double-click **Setup.exe**

   The **InstallShield Wizard** appears.
3. Click **Next** from the **InstallShield** welcome screen.
4. Enter your customer information and click **Next**.
5. Choose **Complete** or **Custom** install.

   If you chose **Complete** install, go to step 7.

   If you chose **Custom** install, you can specify an install location other than the default directory (C:\Program Files\Velocity11\VSpin), and select portions of the software to install.
6. Click **Next**.

   The **Setup Status** dialog box appears while setup is in process and the message **InstallShield Wizard Complete** appears when setup is complete.
7. Click **Finish**.

You can now control the VSpin from your computer.

Creating and Managing Profiles

Overview

Before you can begin using your VSpin, you must create a profile.

After you have created several profiles, you can manage your profiles by editing, deleting, copying or renaming them.

Creating a Profile

New profiles are created from the Profiles page. Create a new profile if you want to store settings that are different from those stored in your other profiles, or there are no existing profiles.

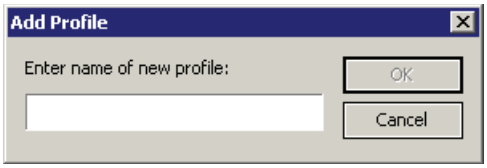
When you create a profile, the settings defined in "About Profiles" on page 12 are stored in the new profile.

To create a profile:

1. Click the **Profiles** tab at the top left of the **VSpin Control** dialog box.

   The **Profiles** page opens.
2. If another profile is already open, close it.
3. Click **Add profile**.

   The **Add Profile** dialog box opens.



4. Enter a profile name and click **OK**.

   The **Profiles** page settings from your current VSpin session are stored in this profile.
5. Configure the profile settings that you want from the **Profiles** page.

   For a list of settings on the Profiles page, see "About Profiles" on page 12.
6. To save the profile settings, click **Apply** in the lower right corner of the **VSpin Control** dialog box.

   The profile is saved.

Editing a Profile

To edit a profile, you must select from a list of existing profiles on the Profiles page.

To edit a profile:

1. Click the **Profiles** tab at the top left of the **VSpin Control** dialog box.

   The **Profiles** page opens.
2. Select a profile from the list box in the **Current VSpin Profile** group box.

3. Change the settings on the profiles page to suit your application.

   For a list of settings on the Profiles page, see "About Profiles" on page 12.

4. To save the changes to the profile, click **Apply** in the lower right corner of the **VSpin Control** dialog box.

   The profile is updated.

Deleting a Profile

Delete a profile if you no longer need it.

To delete a profile:

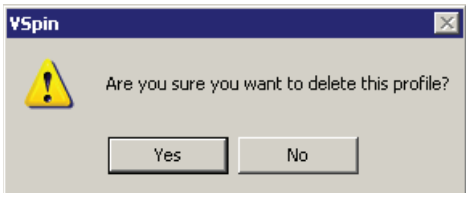
1. Click the **Profiles** tab at the top left of the **VSpin Control** dialog box.

   The **Profiles** page opens.

2. Select the profile you want to delete from the selection box in the **Current VSpin Profile** group box.

3. Click **Delete profile**.

   A confirmation dialog box opens, asking if you are sure you want to delete the profile.



4. To delete the profile, click **Yes**.

   The profile is deleted.

Copying a Profile

Copy a profile to quickly reproduce the settings from a profile that already has most of the settings you need for your application. You can then change the one or two settings that need to be different, and save them as a new profile.

For example, if you want to spin two types of samples on one VSpin and you want to set them up the same way, except for the maximum velocity, you could set up a profile for the first sample type, copy the profile and then modify the maximum velocity setting for the second sample type.

This is faster than making an entirely new profile.

To copy a profile:

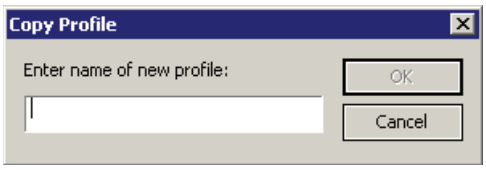
1. Click the **Profiles** tab at the top left of the **VSpin Control** dialog box.

   The **Profiles** page opens.

2. Select the profile you want to copy from the selection box in the **Current VSpin Profile** group box.

3. Click **Copy profile**.

   The **Copy Profile** dialog box opens.



4. Enter a unique name for the new profile and click **OK**.

   A copy of your active profile is saved under the new name.

Renaming a Profile

This option gives you the freedom to change the name of a profile after you have created it.

To rename a profile:

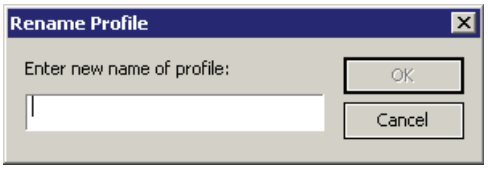
1. Click the **Profiles** tab at the top left of the **VSpin Control** dialog box.

   The **Profiles** page opens.

2. Select the profile you want to rename from the selection box in the **Current VSpin Profile** group box.

3. Click **Rename profile**.

   The **Rename Profile** dialog box appears.



4. Enter a new name for profile, and click **OK**.

   The name of the profile is changed.

Aligning the Buckets

When to Use

After you have set up and turned on the VSpin, you need to align the buckets to the door so that your robot or the Access or Access2 gripper can place plates onto the buckets.

Process Overview

The overall process for aligning the buckets is:

1. Prepare for teaching the bucket positions.

   See “Preparing to Teach” on page 40.

2. Either:

   - Align the buckets visually.

     If you feel that a visual alignment is good enough for your application, use this alignment method.

     See “Visual Alignment” on page 41.

   - Align the buckets mechanically.

     If you would like to determine a bucket alignment that is more accurate for your application, for example if you want the gripper of your robot to be properly centered within the bucket, use this alignment method.

     This requires taking a measurement of the farthest points the bucket can rotate clockwise and counterclockwise when a robot gripper is positioned over a bucket as it is when handling plates.

     The software averages these positions to center the bucket around the gripper. This position is called a bucket teachpoint, and is automatically calculated by the software.

     See “Mechanical Alignment” on page 42.

Preparing to Teach

To prepare for teaching bucket alignment:

1. Turn on the VSpin.

   See “Turning on the VSpin” on page 47.

2. Open VSpin Diagnostics software.

   See “Starting the Software” on page 48.

   The VSpin Control page opens.

3. Click **Open Profile** to open the profile for which you wish to teach the bucket position:

   a. Select a profile.

      Profiles created at Velocity11 are named with the serial number of the VSpin. This is a convenient way to match a profile to a VSpin if you have more than one VSpin.

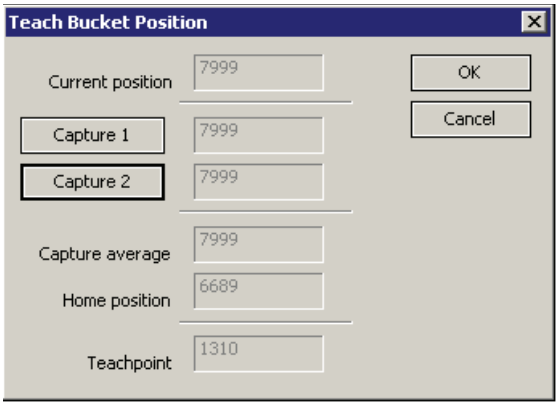
   b. Click **OK**.

4. Click the **Profile** tab.

   The **Profile** page opens.

5. Click **Teach**.

   The **Teach Bucket Position** dialog box opens.



6. Shut off air to the VSpin.

   After you shut off the air, the door falls closed.

Teaching the Bucket Position

After you have aligned the bucket to the door, you need to save this alignment in the profile you are using. This is referred to as teaching the bucket position, and is required to accurately position the bucket so that a robot gripper can place plates onto it.

At this point you have two options. You can align the buckets visually or mechanically.

Visual Alignment

To visually align and teach the bucket position:

1. Unlock and open the door.

   See “Unlocking and Opening the Door Manually” on page 69.

   !! DAMAGE HAZARD !! If the door lock is extended when the bucket is improperly aligned, turning the rotor manually could cause the rotor or the bucket to collide with the bucket lock and damage the bucket, rotor or bucket lock.

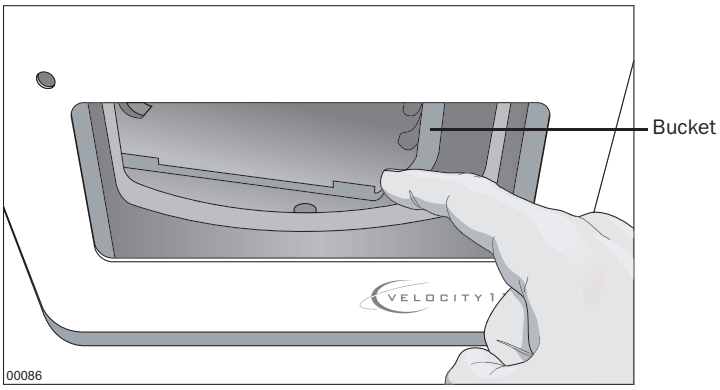
2. Disconnect the air supply.

   See “Disconnecting the Air Supply” on page 67.

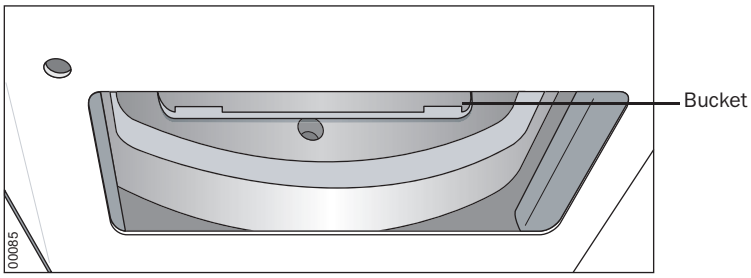
   If you do not disconnect the air supply or turn off the air source, the door closes when the rotor is turned.

3. Manually rotate the rotor and visually align the bucket with the door.

   The following illustration shows a misaligned bucket.



The following illustration shows the bucket aligned with the top edge of the door.



4. Click **Capture 1**.
5. Without changing the position of the buckets, click **Capture 2**.
6. Turn on the air source to the VSpin.
7. Click **OK**.

   The new teachpoint is listed on the **Profiles** screen.

Mechanical Alignment

To mechanically align and teach the bucket position:

1. Unlock and open the door.

   See “Unlocking and Opening the Door Manually” on page 69.

   !! DAMAGE HAZARD !! If the door lock is extended when the bucket is improperly aligned, turning the rotor manually could cause the rotor or the bucket to collide with the bucket lock and damage the bucket, rotor or bucket lock.
2. Disconnect the air supply.

   See “Disconnecting the Air Supply” on page 67.

   If you do not disconnect the air supply or turn off the air source, the door will close when the rotor is turned.
3. Insert the robot gripper into the VSpin so that the gripper is centered in the VSpin door.

   The gripper must be inserted far enough that when the rotor is turned, the buckets contact the gripper

4. Manually turn the rotor slightly so that the left side of the bucket lightly touches the gripper.
5. Click **Capture 1**.
6. Turn the rotor slightly so that the right side of the bucket lightly touches the gripper.
7. Click **Capture 2**.
8. Turn on the air source to the VSpin.
9. Click **OK**.

   The new teachpoint is listed on the **Profiles** screen.
10. Remove the gripper from the VSpin door.

    If you do not remove the gripper, it obstructs the closing of the door.

4 Performing a Spin

This chapter describes how to use the VSpin™ to perform a spin from the test container software for real-time testing and troubleshooting. Test container software is typically used by system integrators. For routine use, a spin is scheduled as part of a protocol run on your lab automation software.

When using a VSpin with a lab automation system, the general workflow for setting up and performing a spin is the same, but because the user interface is different, the details differ.

Workflow Overview

Workflow Steps

The general workflow for performing a run is given in the following table:

Step	Topic
1.	“Turning on the VSpin” on page 47
2.	“Starting the Software” on page 48
3.	“Using Profiles” on page 49
4.	“Configuring Motion Settings” on page 51
5.	“Configuring Time Settings” on page 54
6.	“Setting the Presented Bucket” on page 55
7.	“Starting a Spin” on page 58
8.	“Monitoring the Progress of a Spin” on page 61
9.	“Shutting Down the VSpin” on page 64

Turning on the VSpin

Procedure

To turn on the VSpin:

1. Verify that the air and power are connected to the VSpin and to their sources.
2. Verify that the serial communications cable is connected to the VSpin and to the computer.
3. Turn the power switch on.

   To verify that the VSpin has power, you must start the VSpin Diagnostics software. See “Starting the Software” on page 48.

   There are no outwardly observable signs that the VSpin has power.

Where to Go Next

Before you start a spin, refer to the “Workflow Overview” on page 46 to prepare your VSpin.

Starting the Software

Overview

This section explains how to start the VSpin test container software and open the VSpin Diagnostics software, with which you can directly control the VSpin.

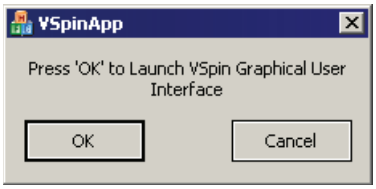
For use in a lab automation system, you would open the VSpin Diagnostics, create a profile, select the profile and control the spin, all through the lab automation software.

Procedure

To start the VSpin Diagnostics software:

1. Click **Start > Programs > Velocity11 > VSpin > VSpin Test Container**.

   The **VSpinApp** dialog box opens.



2. Click **OK**.

   The **VSpin Control** dialog box opens.

   If you receive an error, see "VSpin Error Reference" on page 79.

Where to Go Next

Before you start a spin, refer to the "Workflow Overview" on page 46.

Using Profiles

When to Use

Before you perform a spin you need to choose a profile.

You have the following options:

- ❑ If there is a profile already selected, verify that the Profiles page has the settings you need for your particular application.
- ❑ If you want to select a different profile than the one you already have open, close the current profile and open a new one.
- ❑ If there are no profiles, or none of the existing profiles meet your needs, you need to add one. See "Checking the Current Profile" on page 49.

To delete, copy, or rename a profile, see "Creating and Managing Profiles" on page 37.

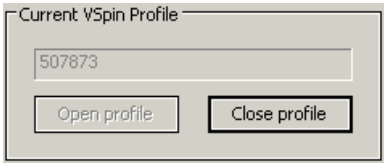
For general information about profiles, see "About Profiles" on page 12.

Checking the Current Profile

If a VSpin profile is open, the name of the profile is displayed in the upper left corner of the Control, Profiles and Diagnostics pages.

In the following example from the Control page, a profile named 507873 is in use.

From the Control page, you can open and close profiles.



Opening a Profile

To open a profile, choose from a list of existing profiles from the Control page. When the profile opens, the settings from that profile are loaded and a connection with a VSpin is established.

To open a profile:

1. Click **Open profile** in the **Current VSpin Profile** group box of the **Control** page.

   The **Select Profile** dialog box opens.

2. Select a profile from the list box and click **OK**.

   The profile opens and updates your settings.

   The computer establishes a serial connection to the VSpin.

3. Check that the status lights start blinking on the Control and Diagnostics pages while the VSpin homes, and that the VSpin door opens when homing is complete.

   If these events do not occur, or you receive an error at this point, refer to the "VSpin Error Reference" on page 79.

Closing a Profile

When you close a profile, you end the serial communication session between the VSpin and the computer.

You must close the currently running profile before you can open another.

To close a profile:

1. Click the **Control** tab at the top left of the **VSpin Control** dialog box.

   The **Control** page opens.

2. Click **Close profile**.

   The serial communication between the VSpin and the computer ends.

   The VSpin door closes and locks, and the buckets unlock.

Where to Go Next

Before you start a spin, refer to the "Workflow Overview" on page 46.

Configuring Motion Settings

Overview of Motion Settings

After selecting a profile, which sets the basic properties for the spin, configure the following motion settings before performing a spin.

Motion Parameters

These settings are not stored in a profile, and are therefore not saved when the software is closed.

Setting	Definition
Velocity	The rotor velocity, expressed as a percentage of maximum velocity in RPM (revolutions per minute). The maximum velocity is set on the Profiles page.
Acceleration	The acceleration of the next spin, expressed as a percentage of the maximum acceleration.
Deceleration	The deceleration of the next spin, expressed as a percentage of the maximum deceleration.

Profile Parameters

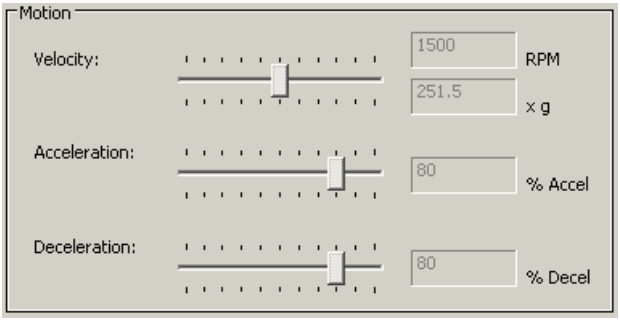
These parameters are stored in a profile, and are therefore saved when the software is closed.

Setting	Definition
Maximum velocity	A software limit on the greatest speed the rotor can attain during a spin. This cannot be set higher than 3000 RPM.
Bucket tolerance	The bucket tolerance is the margin of error allowed in positioning the bucket at the teachpoint. This setting is configured at Velocity11® and you should consult a Velocity11 representative before changing it. For a definition of teachpoints see, “About Teachpoints” on page 13.
Rehome after a spin	Available to Administrators and Velocity11 Service Center personnel only (when logged in through VWorks™ or Access2™ software). After a spin, the rotor does not always return exactly to the home position. This setting re-homes the rotor, keeping the buckets aligned accurately over multiple spins. This setting causes a delay of up to 4 seconds while the robot homes, but we strongly recommend that you keep this setting on. If you have any questions about this, contact Velocity11 Service Center. For a definition of Home position, see, “About the Home Position” on page 13. For more information about setting the Teachpoint for bucket position, see “Removing the Buckets” on page 71.

Making Motion Changes with the Motion Group Box

On the Control page, the Motion group box lets you adjust the following parameters, each controlled by a slider. Rotational velocity is measured in rotations per minute (RPM).

Note: If you are using the Total time setting and a short spin time, the target velocity may not be reached.



Changing the Velocity, Acceleration and Deceleration Parameters

When you change the velocity parameters, the approximate centrifugal force on the samples is also indicated (*g-force*).

To change a setting:

1. If you have not already opened a profile, you must open a profile to change these parameters.

   See "Using Profiles" on page 49.

   After you open a profile, the parameters become available to change after several seconds.
2. In the **Motion** group box in the **Control** page, click and drag the slider control until the value in the box is what you want.

   These parameters are not saved in the profile and are lost when you close the software.

Setting the Maximum Velocity

Changing the maximum velocity setting also changes the maximum value to which you can set the velocity slider.

To set the maximum velocity:

1. Click on the **Profiles** tab of the **VSpin Control** dialog box.

   The **Profiles** page opens.
2. Enter a value in the **Maximum Velocity (RPM)** box that is between 0 and 3000 RPM.
3. Click **Apply**.

   If you enter a value that is out of range, an error message prompts you to enter a different value. To resolve the error, see the "VSpin Error Reference" on page 79.

Setting the Bucket Tolerance

Each unit of error represents approximately 0.05 degrees.

Consult a Velocity11 representative before changing this setting.

To set the bucket tolerance:

1. Click the **Profiles** tab.
   The **Profiles** page opens.
2. Enter a value into the **Bucket tolerance** selection box.
3. Click **Apply**.

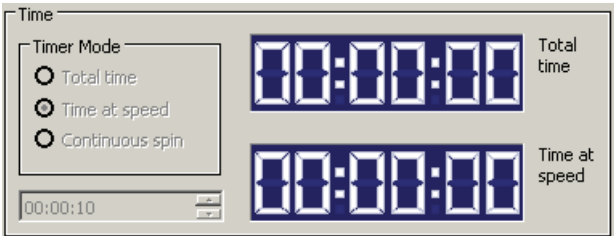
Where to Go Next

Before you start a spin, refer to the "Workflow Overview" on page 46.

Configuring Time Settings

The Time Group Box

From the Time group box on the Control page you can set and monitor the duration of a spin.



Changing the Timer Mode

Timer mode settings let you configure how the spin time is measured.

To change the timer mode settings:

1. Click one of the following radio buttons:

Setting	Definition
Total time	Sets the next spin session to last for the specified duration, including the time it takes to accelerate and decelerate.
Time at speed	Sets the next spin session to spin for the specified duration in the time setting selection box, not including the time it takes to accelerate or decelerate.
Continuous spin	Sets the next spin session to spin until told to stop. There is no time setting for this mode. To stop a spin see “Stopping a Spin” on page 60.

2. Select a time from the list box, at the lower left corner of the **Time** group box.

   This controls the amount of time the VSpin spins in the **Total time** and **Time at speed** modes.

Where to Go Next

Before you start a spin, refer to the “Workflow Overview” on page 46.

If you have received an error, see “VSpin Error Reference” on page 79.

Setting the Presented Bucket

About Bucket Positions

You can set bucket 1 or bucket 2 to be presented when the VSpin door opens.

This bucket position is an example of a teachpoint. For this reason, the process of setting a bucket position is called teaching.

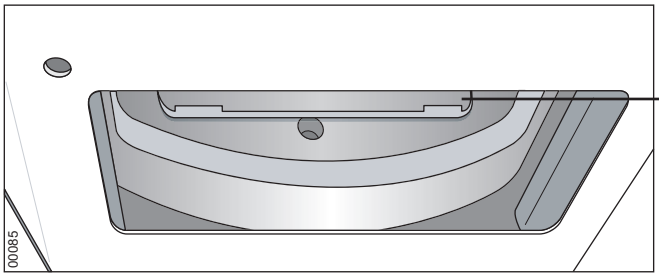
For more information about teachpoints, see “About Teachpoints” on page 13.

Checking the Bucket Alignment

Before you can set the bucket to present to the door, the bucket edge must be aligned parallel to the open door edge so that a robot will accurately place a plate on the bucket.

Accurate bucket alignment is also necessary to allow the rotor to lock properly.

Check the bucket alignment before you proceed.



If the bucket is not aligned correctly, see “Aligning the Buckets” on page 40.

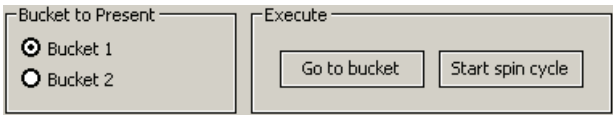
Selecting the Bucket to Present to the Door

To select the bucket that is presented to the door:

1. Click the **Control** tab.

   The **Control** page opens.

2. Choose the bucket to present to the door.



   For example, if you choose bucket 1:

   a. Click the **Bucket 1** radio button in the **Bucket to Present** group box.

   b. Click **Go to bucket** in the **Execute** group box.

      The door opens with bucket 1 presented.

      If the bucket 1 is already presented to the door, then no change occurs.

Where to Go Next

Before you start a spin, refer to the "Workflow Overview" on page 46.

Balancing the Plates

Bucket Pairs

Each VSpin is shipped with a pair of buckets that have been balanced to within one gram of each other. To stay within the balance tolerance of the VSpin, use only the buckets that came with your VSpin and avoid using buckets from other VSpin centrifuges.

Plate Balance Tolerance

!! IMPORTANT !! Before placing plates in the VSpin, make sure that the weight of the sample plate is within 10 grams of the weight of the counterweight plate to avoid an imbalance error.

Imbalance Errors

If the buckets and plates exceed the 10 gram balance tolerance, there will be no indication of an imbalance before a run. However, after a spin starts the imbalance state will be detected and:

- ❑ The rotor will stop.
- ❑ The green Balanced status light in either the Status group box of the Control page or the Other Sensors group box of the Diagnostics page will turn off.

Maximum Load

!! INJURY HAZARD !! Do not exceed a plate mass of 250 grams (8.82 ounces) for each bucket.

About Counterweight Plates

If you are using a counterweight plate, replace it regularly (weekly with heavy use), particularly if the plate is made from polystyrene.

!! IMPORTANT !! After repeated spins, a plate can become brittle and break apart during centrifugation. Polystyrene plates are especially prone to this problem.

If a plate breaks apart in the VSpin, see "Cleaning Up Broken Plates" on page 75.

Procedure

To balance the plates:

1. Weigh the sample plate with the amount of fluid in its wells that is present during a typical spin.
2. Choose a plate or a flat rectangular piece of material that weighs within ten grams of the sample plate and is capable of withstanding 1000 xg.

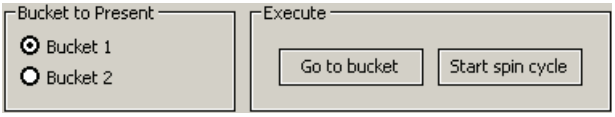
   If you choose a plate for a counterweight:

   - ◆ You can adjust the weight by adding or subtracting fluid from the wells.

- Choose the same plate as the type that you use for the sample plate.

If you use something other than a plate, the object must have the same dimensions as a plate so that it can be properly constrained within the bucket. Consult Velocity11 with any questions.

3. From the **Control** page, choose a bucket to hold the counterweight.



For example, if you choose bucket 2:

a. Select **Bucket 2** in the **Bucket to Present** group box on the **Control** page.

b. Click **Go to bucket** in the **Execute** group box.

The door opens on bucket 2.

4. Place the counterweight onto plate 2.

Be careful not to spill any fluid if you use a plate with fluid in its wells.

The VSpin is now ready to spin sample plates on bucket 1 that are within 10 grams of the counterweight on bucket 2.

Where to Go Next

Before you start a spin, refer to the “Workflow Overview” on page 46.

Starting a Spin

Safety Information

!! INJURY HAZARD !! Never attempt to touch any of the moving parts or remove plates while the VSpin is in operation. It is not possible to touch the rotor while it is in motion, if the door is functioning properly, but the door can cause possible pinching, piercing or bruising when it closes.

!! INJURY HAZARD !! Keep your fingers, hair, clothing and jewelry away from the instrument while it is in motion.

!! INJURY HAZARD !! Do not run the VSpin if any VSpin components or accessories are damaged or if any components or accessories have received rough handling or have been modified in any manner not authorized by Velocity11. Discontinue use if the VSpin vibrates or emits noise above normal levels.

!! INJURY HAZARD !! Do not operate the VSpin if foreign objects or liquids are trapped within the chamber.

!! INJURY HAZARD !! Do not operate the VSpin above speeds of 1500 RPM unless it is securely mounted to a structure approved by Velocity11. Consult Velocity11 for review and approval of mounting surface.

Procedure

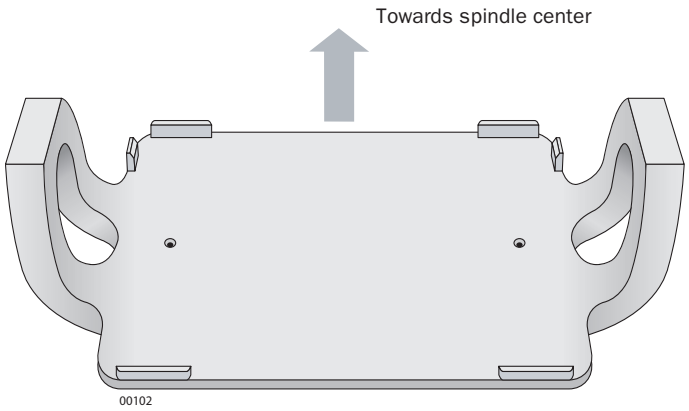
This procedure is for performing a spin through the diagnostics software, and is not how a spin would be performed in a lab automation run.

!! DAMAGE HAZARD !! Make sure that the VSpin buckets are taught correctly before operation, especially after performing maintenance.

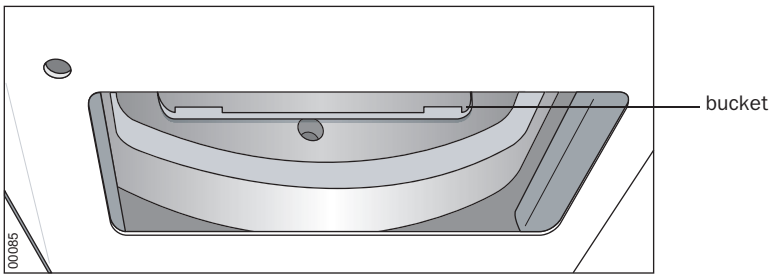
To teach the bucket position, see “Setting the Presented Bucket” on page 55.

To start a spin:

1. Make sure you have followed steps 1–6 in “Workflow Overview” on page 46.
2. Make sure that the buckets swing freely and are oriented so that two tabs are facing outward and four tabs are facing inward towards the center of the spindle.



3. Make sure that the bucket is accurately aligned with the door.

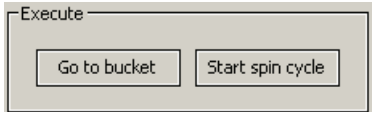


If the bucket is not aligned correctly, see "Teaching the Bucket Position" on page 41.

4. Using the directions in "Setting the Presented Bucket" on page 55, move the bucket that will contain the balance plate to the front and place the balance plate on the bucket.
5. Move the bucket that will contain the sample plate to the front and place the sample plate on the bucket.

   Leave the **Bucket to present** selection set for the bucket that contains the sample plate so that the sample plate is accessible for future spins.
6. Check your motion settings, and change them if necessary.

   See "Configuring Motion Settings" on page 51.
7. Click **Start spin cycle** from the **Execute** group box of the **Control** page.



The spin cycle starts, using the settings specified.

8. To perform additional spins, replace the sample plate with another one that is within 10 grams of the balance plate and click **Start spin cycle** again.

Stopping a Spin

You can stop a spin at any time.

To stop a spin:

1. Select the bucket you want to present to the door from the **Bucket to Present** group box.
2. Click **Go to bucket** from the **Execute** group box.

   The spin stops, and the door opens to the bucket you selected.

Where to Go Next

During a spin, you can monitor its progress. See "Monitoring the Progress of a Spin" on page 61.

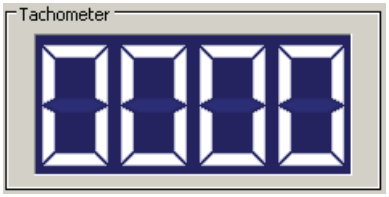
Monitoring the Progress of a Spin

Overview

You can monitor the progress of a spin by observing the change in parameters such as speed, duration, and error messages.

Checking the Rotational Speed

You can see the rotational speed of the VSpin rotor in the Tachometer display in the Control page. This is displayed in RPM.



See "Setting the Maximum Velocity" on page 52 for setting the maximum speed of the VSpin.

Checking the Current Bucket Position

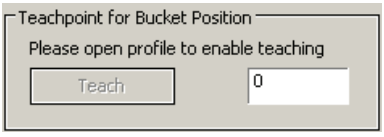
You can check the bucket position from all three pages. For more information, see "About Teachpoints" on page 13.

To check the current bucket position:

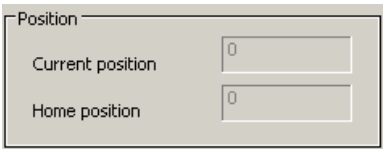
1. Either:
   - Check the **Current position** box in the **Position** group box on the **Control** page.

   - Check the value to the right of the **Teach** button in the **Teachpoint for Bucket Position** group box on the **Profiles** page.

   - Check the Current position box in the **Position** group box on the **Diagnostics** page.

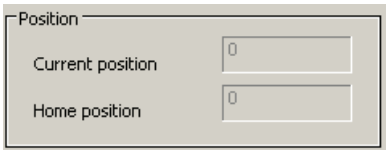
     

To align the buckets to the door, see "Teaching the Bucket Position" on page 41.

Checking the Home Position

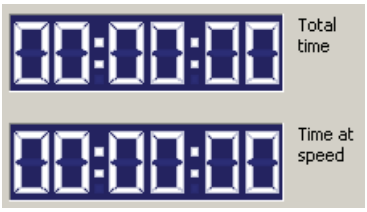
To check the home position:

1. Check the **Home position** box in the **Position** group box on the **Diagnostics** page.



Checking the Spin Time

You can monitor the duration of a spin with the two time displays in the Time group box on the Control page.



Total time displays the time that has elapsed since the VSpin started spinning.

Time at speed displays the time that has elapsed since the VSpin attained its target speed during the spin.

To change the maximum speed, see “Setting the Maximum Velocity” on page 52.

Checking the Status Lights

You can monitor the following states with the status lights on the Control and Diagnostics pages:

Status light	Color	Illuminates when...
Door open	Red	The door is open.
Door closed	Green	The door is closed. This light is not on the Diagnostics page.
Door locked	Green	The door is locked.
Bucket locked	Red	The bucket position is locked. When the bucket position is locked, the rotor and buckets are locked. This is important so that the plate-handling robot does not move the bucket when it picks or places plates.
Bucket unlocked	Green	The bucket position is unlocked.

Status light	Color	Illuminates when...
Balanced	Green	The plates are balanced. The VSpin must be spinning to detect an imbalance. To balance the buckets, see "Starting a Spin" on page 58.
In motion	Green	The rotor is spinning.
Amp enabled	Green	The amplifier is enabled. This status light is for diagnostics purposes, and helps a Velocity11 engineer to troubleshoot problems with your VSpin. The VSpin motor cannot function unless the amplifier is enabled. This status light only appears if your model of VSpin supports it.
Homing	Yellow	The buckets are returning to their home position. "About the Home Position" on page 13.

Where to Go Next

After your spin completes, refer to the "Workflow Overview" on page 46.

Shutting Down the VSpin

When to Use

Shut down the VSpin if you intend to:

- ❑ Move it
- ❑ Perform maintenance

Procedure

To shut down the VSpin:

1. Close any open profiles

   See “Closing a Profile” on page 50.
2. Turn the power off at the on/off switch.
3. Wait 10 seconds for the power supply to discharge before handling or moving the VSpin.

5

Maintenance and Troubleshooting

This chapter tells you how to keep your VSpin™ in good working order through cleaning, inspection and maintenance. It also explains what to do when you encounter a problem.

Routine Maintenance

VSpin Maintenance

To keep your VSpin working properly, we recommend that you schedule with the Velocity11 Service Center at least one maintenance visit every two years.

In general, practice good housekeeping by cleaning up spills and following the procedures described in this chapter.

Safety Warning

!! DAMAGE HAZARD !! Do not tamper with or adjust the VSpin rotor mounting screw, which fastens the rotor to the central motor axle. It is located on the bottom of the rotor. Consult Velocity11® if you think the rotor mounting screw requires maintenance. The VSpin is designed to have a permanently attached rotor, unlike many manual centrifuges that can have interchangeable rotors.

When to Contact Velocity11

Contact Velocity11 if you are unable to resolve problems after reading the “VSpin Error Reference” on page 79.

Disconnecting the Air Supply

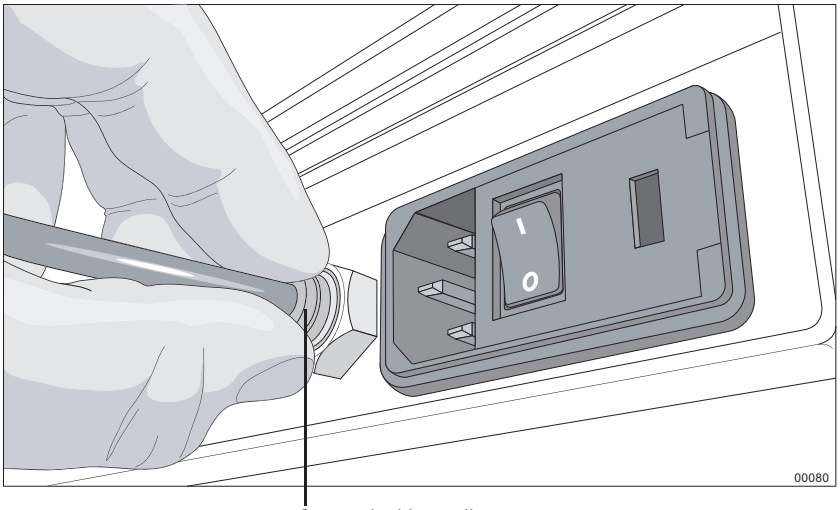
When to Use

Disconnect the air supply before:

- ❑ Performing maintenance on the VSpin
- ❑ Cleaning the VSpin
- ❑ Cleaning up broken plates

To disconnect the air supply:

1. Turn off the air supply so that there is no air pressure to the VSpin.
2. Push in the orange locking collar.



3. Gently pull on the air hose with your free hand until the air hose comes out.

Preparing to Clean the VSpin

Overview

Perform the following procedures before cleaning the VSpin:

Step	Procedure	Comments
1.	Disconnect the power supply.	Pull out the power cord.
2.	Disconnect the air supply.	See “Disconnecting the Air Supply” on page 67.
3.	Disconnect the serial cable	Pull out the serial cable.
4.	Unlock and open the door	See “Unlocking and Opening the Door Manually” on page 69.
5.	Remove the buckets	See “Removing the Buckets” on page 71

!! DAMAGE HAZARD !! Disconnect power, air and serial cable before performing any cleaning or maintenance.

Unlocking and Opening the Door Manually

Introduction

Before cleaning or performing maintenance on your VSpin, you will need to unlock and open the door.

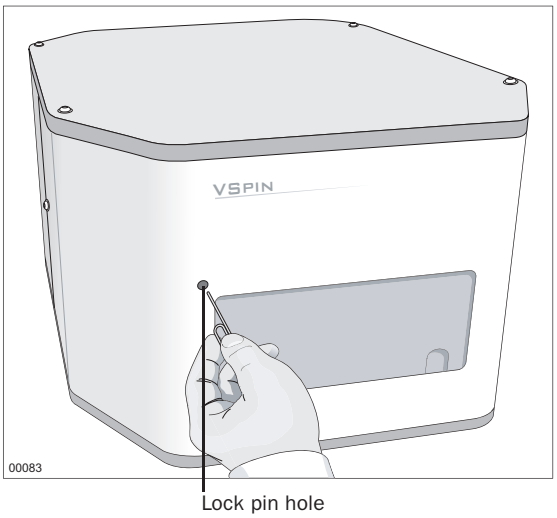
Procedure

To manually unlock and open the door manually:

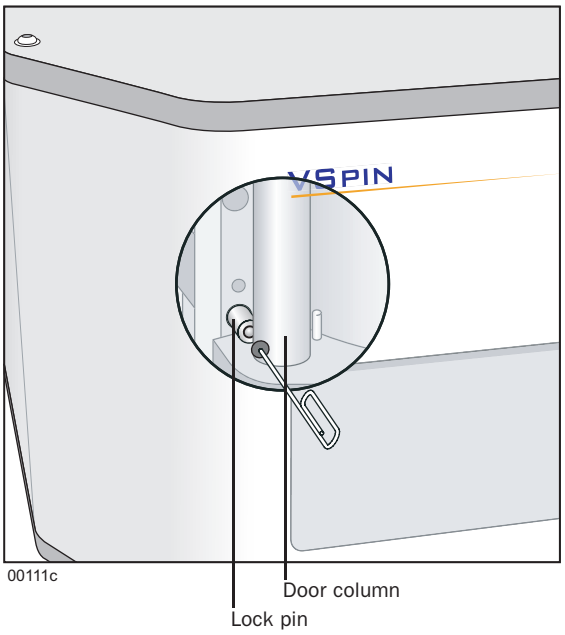
1. Before you continue, disconnect the serial communications cable and the power cable, and turn off and disconnect the air.

   To disconnect the air hose, see "Disconnecting the Air Supply" on page 67.

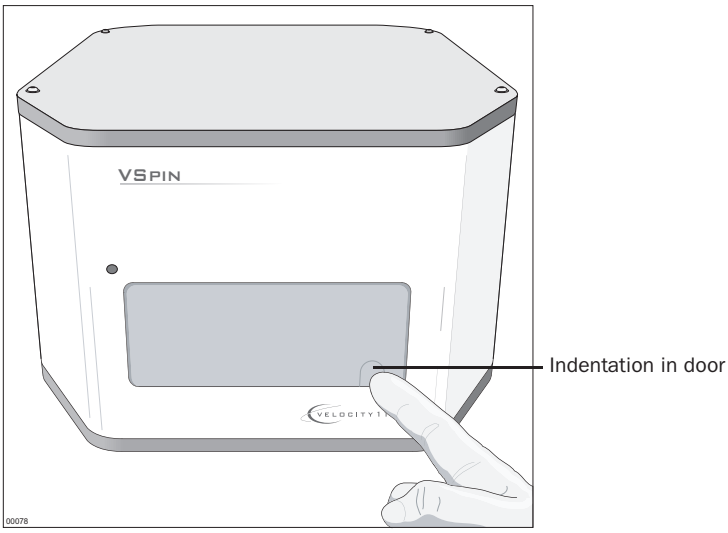
2. Put a small, thin tool such as a large unfolded paperclip, through the hole at the upper left of the door to push against and fully retract the lock pin. At the same time, push upward in the indentation in the door with your other hand.



The position of the door lock is shown below. Note that the paperclip is inserted at an angle so that it goes between the door column and the cover.



3. Remove the tool after the door begins to open, to continue opening the door. Otherwise, the tool will obstruct the door's movement.



!! INJURY HAZARD !! Do not attempt to manually unlock the door while the rotor is moving. Although no longer powered, the buckets may still be rotating at a dangerous speed.

Removing the Buckets

Overview

You need to remove the buckets before cleaning or moving the VSpin.

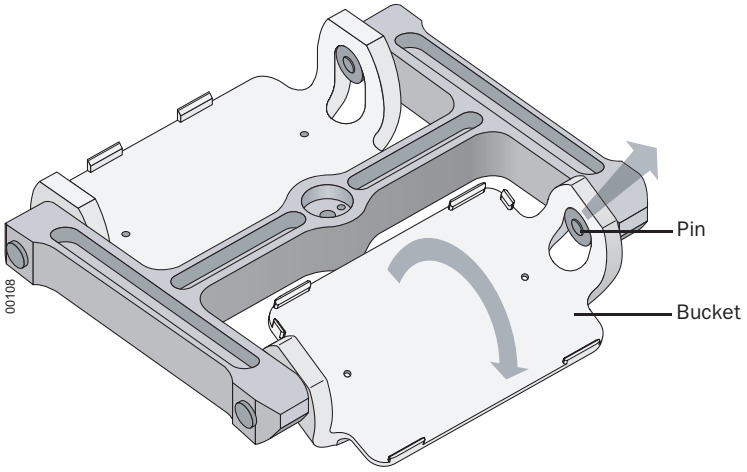
To access the buckets, you must open the door manually

Removing a Bucket

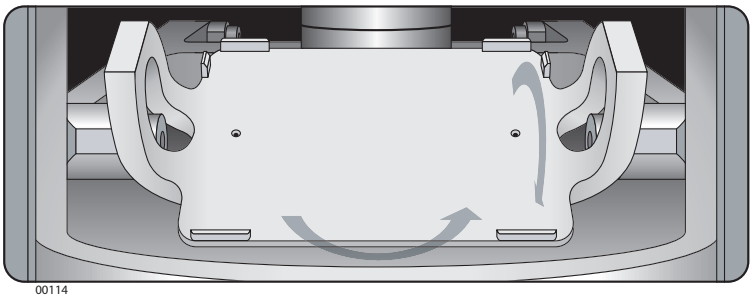
To remove a bucket:

1. Make sure the power and air are turned off.
2. Open the door manually.

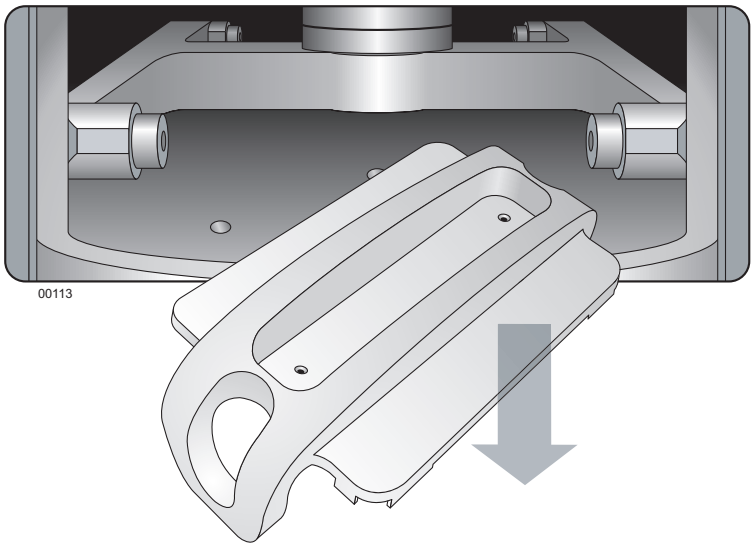
   See “Unlocking and Opening the Door Manually” on page 69.
3. Pivot the bucket in towards the center of the VSpin and pull the bucket towards you until it comes free of the pins.



4. Rotate one end of the bucket towards you, and turn it upside down.



5. Remove the bucket from the door.



Replacing the Buckets

To replace the buckets, see “Installing the Buckets” on page 31.

Cleaning the VSpin

Overview

To clean the VSpin, use soap, a mild detergent or an organic solvent such as isopropyl alcohol (propan-2-ol) on a cloth. Wipe off the inner shield surfaces, rotor and buckets. The buckets can be removed for thorough cleaning and inspection.

Cleaning Hazards

!! DAMAGE HAZARD !! Do not use harsh abrasives, corrosive cleaning agents or metal brushes to clean any VSpin components or accessories. Do not use any concentration of bleach (sodium hypoclorite). Do not allow cleaning agents to contact any electrical or sensitive mechanical components, such as the central motor seal or the bucket pivot bearings.

!! DAMAGE HAZARD !! Trapped liquids may cause corrosion.

Do not let liquids contact:

- ❑ The electronic components
- ❑ Mechanical components inside the motor assembly
- ❑ The spindle support assembly

Cleaning Procedure

!! INJURY HAZARD !! Disconnect the power, air and communications cables before performing any maintenance or cleaning.

To clean the VSpin:

1. Remove the buckets.

   See “Removing a Bucket” on page 71.

   This allows a more thorough cleaning and inspection of the VSpin interior.
2. Clean the VSpin, using the guidelines stated above.
3. Replace the buckets.

   See “To install or replace a bucket:” on page 31.

Lubrication

Spindle Lubrication

The VSpin requires no lubrication except for the spindle, which has been designed to remain lubricated for two years of operation.

Do not attempt to lubricate the spindle yourself. If you hear squeaking noises, or notice that it takes longer for the VSpin to reach the set spin velocity, contact the Velocity11 Service Center.

Bucket Pin Lubrication

The VSpin bucket pins use bushings and do not require lubrication.

If the buckets do not swing freely, consult the Velocity11 Service Center.

Do not attempt to lubricate the bucket pins yourself because this will not solve any problem you might have.

Cleaning Up Broken Plates

Overview

!! DAMAGE HAZARD !! Plates occasionally break apart inside the VSpin, and the plate fragments need to be removed so they do not interfere with moving parts and potentially damage the VSpin.

Counterweight plates are particularly susceptible to falling apart because of repeated wear, however, the fluid spilled from a counterweight plate is usually water, which is easy to clean up.

!! INJURY HAZARD !! Sample plates may contain toxic, caustic or radioactive substances. If a sample plate containing anything other than innocuous materials breaks apart, contact the Velocity11 Service Center.

Cleanup Guidelines

Whenever a plate breaks apart in the centrifuge, follow these guidelines:

- ❑ Depending on the amount of spillage, you may need to remove the buckets, or disassemble the VSpin.

  To remove the buckets, see “Removing the Buckets” on page 71.

  If you think the VSpin needs to be disassembled, contact the Velocity11 Service Center.
- ❑ Use a long pair of tweezers to remove broken plate fragments.
- ❑ If there is not very much spilled liquid you can vacuum up smaller fragments.
- ❑ Make sure that excess liquid is mopped up. Avoid using the VSpin until it has dried completely.

Testing the VSpin Actuators

Overview

Diagnose problems with VSpin actuators from the Diagnostics page.

The three actuators that you can test are the:

- ❑ Bucket Lock Actuator
- ❑ Door Lock Actuator
- ❑ Door Open Actuator

  The door cannot be opened until it is unlocked.

If there are problems with the actuators, check for error messages in the Messages group box.

Locking and Unlocking the Bucket Assembly

The bucket assembly (buckets and rotor) is automatically locked before a plate is picked from or placed on a bucket. When locked, the buckets do not swing and the rotor does not turn.

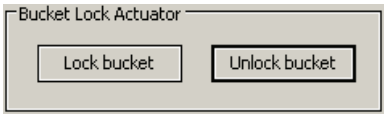
You can also manually lock the bucket assembly.

To lock the bucket assembly:

1. Click the **Diagnostics** tab.

   The **Diagnostics** page opens.
2. Click **Lock buckets** in the **Bucket Lock Actuator** group box.

   The movement of the bucket assembly is restricted.



   The bucket assembly locks, restricting bucket swinging and rotor spinning.

To unlock the bucket assembly:

1. Click the **Diagnostics** tab.

   The **Diagnostics** page opens.
2. Click **Unlock buckets** in the **Bucket Lock Actuator** group box.

   The bucket assembly is now free to spin, and can be moved by hand.

Locking and Unlocking the Door

You can command the door to lock or unlock, unless the VSpin is spinning.

The door must be locked before you can start a spin, and remains locked throughout the spin.

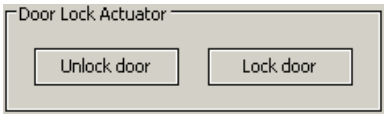
If the rotor starts spinning, the hardware interlocks close and lock the door automatically.

To lock the door:

1. Click the **Diagnostics** tab at the top of the **VSpin Control** dialog box.

   The **Diagnostics** page opens.

2. Click **Lock door** in the **Door Lock Actuator** group box.



   The door locks, and cannot be opened without sending an unlock command or unlocking it manually.

To unlock the door:

1. Click **Unlock door** in the **Door Lock Actuator** group box.

   The door unlocks.

Opening and Closing the Door

!! INJURY HAZARD !! When the door closes, it applies 10 pounds of force to any object that obstructs its movement. This is not enough to break a finger for instance, but it could cause abrasions or bruising.

You can command the door to open or close, unless the VSpin is spinning.

The door must be closed before you can start a spin.

The door will not open until it is unlocked.

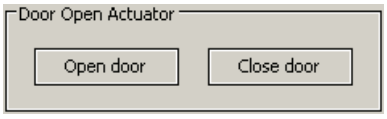
To open the door:

1. Click the **Diagnostics** tab at the top of the **VSpin Control** dialog box.

   The **Diagnostics** page opens.

2. Verify that the door is unlocked by checking the **Door locked** status lights on the **Control** or **Diagnostics** pages.

3. Click **Open door** in the **Door Open Actuator** group box.



   The door opens.

To close the door:

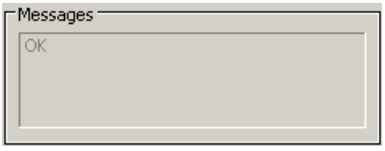
1. Click **Close door** in the **Door Open Actuator** group box.

   The door closes.

   !! INJURY HAZARD !! Keep hands clear of door during closing.

Checking Error Messages

If you have problems with the actuators, error messages are displayed in popup windows, and logged in the Messages group box.



The following types of error and status messages appear in the Messages group box of the Diagnostics page:

- ❑ Bucket lock failed
- ❑ Door lock failed
- ❑ Door open failed

If an error message is displayed, see the “VSpin Error Reference” on page 79.

Door Closed Status Anomaly

The Door closed sensor is not triggered when the door is fully closed, but rather when it is just starting to close.

As a result, it is occasionally possible for the door to be open slightly, but for the Door closed status light to still be lit.

In this regard, it is perhaps more accurate to think of the Door closed sensor as a “door not open” sensor.

VSpin Error Reference

Startup Errors

If you encounter problems during start up, it may be simply that the VSpin is protecting itself from improper operation. Consult Velocity11 for assistance in resolving start up problems.

Common Error Table

Refer to this table to resolve common errors. If your particular issue is not in the table, or following the recommended steps does not solve your problem, contact the Velocity11 Service Center.

Error	What this means	What to do
A position-error condition was encountered	The VSpin failed to go to the specified position. This could happen during any movement.	Check to see if something is blocking the rotor, such as a piece of plastic from a plate. Contact Velocity11.
Aborting current process	You have chosen an action that has aborted this process. For example, you clicked open door before the door finished closing.	Wait for the current action to finish before you perform the next action.
Aborting current close process		
Aborting current initialize process		
Aborting current open door process		
Aborting current reset process		
Aborting current spin cycle process		
An imbalance condition was encountered	Occurs during a spin if the buckets are imbalanced.	Refer to the procedure for "Starting a Spin" on page 58. If the problem persists, contact Velocity11.
Bad acceleration percentage: Must be between 1.0 and 100.0	Occurs when you try to spin with bad parameters that are out of range.	From the Control page, choose an acceleration percentage between 1.0 and 100.0
Bad bucket number: Must be 1 or 2	Occurs when you try to spin or open the door with parameters that are out of range.	Select bucket 1 or bucket 2. The VSpin has only two buckets.
Bad deceleration percentage: Must be between 1.0 and 100.0	Occurs when you try to spin with bad parameters.	From the Control page, choose a deceleration percentage between 1.0 and 100.0
Bad time: Must not be negative		Choose a time value that is 0 or greater.
Bad timer mode: Must be 0 or 1		Choose a value of 0 or 1.
Bad velocity percentage: Must be between 1.0 and 100.0		Choose a value between 1.0 and 100.0.

Error	What this means	What to do
Bucket failed to align within the specified bucket tolerance	Occurs after a spin when the bucket does not align with the door.	Follow the procedure for "Creating and Managing Profiles" on page 37. Increase the bucket tolerance; it is possible that it is set too small. If the problem persists, contact Velocity11.
Could not connect to the VSpin	Power or communications are not functioning properly.	Check to make sure that the: ❑ Power cord is properly plugged in to the VSpin power entry and the wall outlet ❑ Power switch is turned on ❑ Fuse is not burned out ❑ Serial cable is properly plugged into the VSpin and the computer ❑ VSpin is plugged into the serial port specified in the profile ❑ The specified serial port is not busy with another application
Close may not be called at present time	The VSpin is currently performing another process, and cannot perform the requested action. For example, the door cannot be opened while the rotor is spinning.	Wait for the current action to finish before you perform the next action.
Initialize may not be called at present time		
Open door may not be called at present time		
Reset may not be called at present time		
Spin cycle may not be called at present time		
IoBitDirIn() failed	Internal error.	Contact Velocity11.
IoBitDirOut() failed		
IoClrOutBit() failed		
IoSetOutBit() failed		
NMC network failure		
NmcDefineStatus() failed		

Error	What this means	What to do
NmcNoOp() failed: Communication likely failed	The VSpin may have become disconnected during operation.	Check to make sure that the: ❑ Power cord is properly plugged in to the VSpin power entry and the wall outlet ❑ Power switch is turned on ❑ Serial cable is properly plugged into the VSpin and the computer
Profile does not exist	The VSpin profile does not exist.	Create a new profile or select an existing one.
Sensor failed to indicate bucket unlock before the attempted move	The sensor is not working properly, the door, bucket or lock is not in a state that allows a spin to occur, or there is a bucket imbalance.	Contact Velocity11.
Sensor failed to indicate door lock before the attempted move		
Sensor indicated imbalance before the attempted move		
ServoClearBits() failed	Internal error.	Contact Velocity11.
ServoLoadTraj() failed		
ServoResetPos() failed		
ServoSetGain() failed		
ServoSetHoming() failed		
ServoStopMotor() failed		

Error	What this means	What to do
Timed out waiting for bucket to lock Timed out waiting for bucket to unlock Timed out waiting for door to close Timed out waiting for door to lock Timed out waiting for door to open Timed out waiting for door to unlock Timed out waiting for servo to home Timed out waiting for access to COM port Timed out waiting for amplifier to reset Timed out waiting for servo to door	❑ The action did not complete within the allotted time. ❑ The power or communications to the VSpin has been interrupted. ❑ A hardware problem has occurred that needs to be addressed.	Check to make sure that the: ❑ Power cord is properly plugged in to the VSpin power entry and the wall outlet ❑ Fuse is not burned out ❑ Power switch is turned on ❑ The serial cable is properly plugged into the VSpin and the computer Perform the action again. If the problem persists, contact Velocity11.
Tried to actuate bucket lock but failed	The system may have insufficient air pressure or another hardware problem may have occurred.	Check to make sure that the: ❑ Air hose is properly connected to the VSpin and to the air source ❑ Air is turned on at the source ❑ Air pressure is at the proper level as listed in “Laboratory Requirements” on page 23
Unrecognized hardware stepping	Occurs after initialize if hardware is unrecognized.	Contact Velocity11.
Unrecognized hardware stepping. Assuming hardware stepping 0	This error occurs when the software tries to query the VSpin or a version number, but receives no response. For example, VSpin models older than version 3 do not report their version number to the software. In this case the software assumes a stepping value of 0.	If you have received this error, you might have a VSpin older than version 3. Contact Velocity11 to resolve this issue.

Packing the VSpin for Shipping

Overview

If you need to ship your VSpin, it is important that you follow the procedures outlined in this topic to prevent damage.

!! DAMAGE HAZARD !! Do not ship your VSpin without the original packaging material. Contact the Velocity11 Service Center if you need replacement packaging.

Packing the VSpin is best done with two people.

Returning Your VSpin to Velocity11

If you plan to return your VSpin to Velocity11, call the Velocity11 Service Center for directions and to obtain a copy of the Velocity11 decontamination form.

!! IMPORTANT !! If you are shipping your VSpin back to Velocity11, you must decontaminate the VSpin and send us a completed copy of the Velocity11 decontamination form.

List of Packing Materials

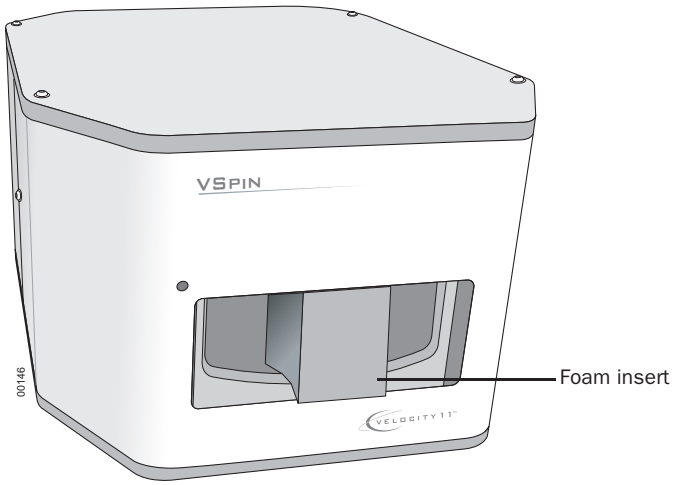
You need the following packing materials, which shipped with your VSpin:

- ❑ VSpin shipping box
- ❑ Foam insert for the VSpin door
- ❑ Anti-static bag for the VSpin
- ❑ Top piece of foam
- ❑ Bottom piece of foam
- ❑ Piece of spacer foam
- ❑ Bucket box
- ❑ Three pieces of foam wrap for the buckets
- ❑ Accessories box

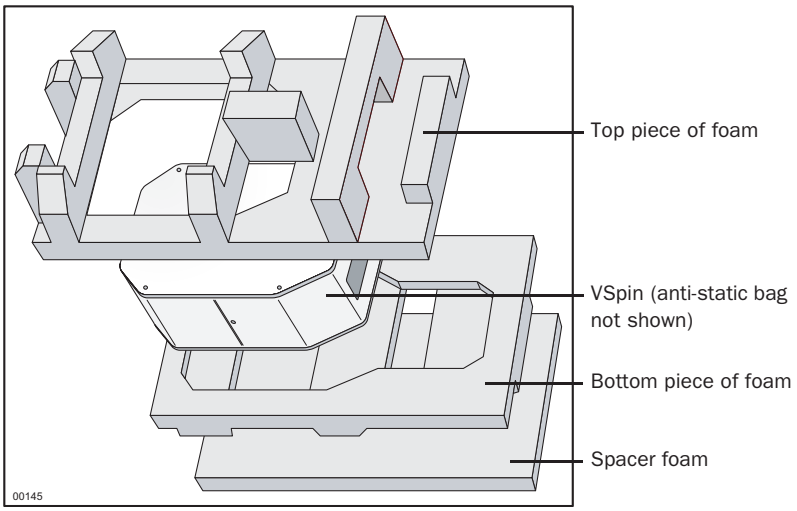
VSpin Packing Procedure

To pack the VSpin:

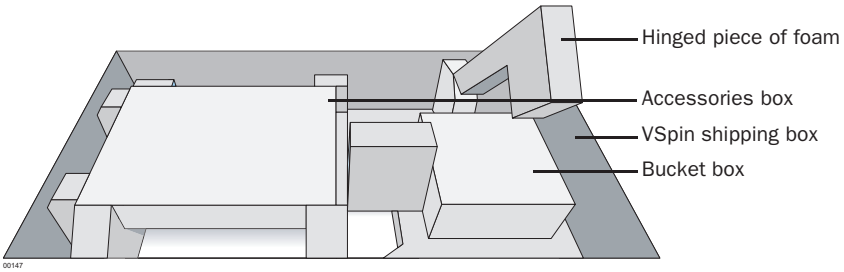
1. Open the VSpin door manually.
   See “Unlocking and Opening the Door Manually” on page 69.
2. Remove the buckets.
   See “Removing the Buckets” on page 71.
3. Place the foam insert into the door to keep it from moving.



4. Place the VSpin into the pink anti-static bag.
5. Pack the buckets into the bucket box:
   a. Pack each of the buckets in their foam-wrap material, and place them into the bucket box.
   b. Put an additional piece of foam-wrap material between the buckets to keep them from moving during shipment.
6. Place the VSpin packing contents into the VSpin shipping box using the following diagram as a guide:
   a. Place the piece of spacer foam into the box first.
   b. Place the bottom piece of foam into the box second.
   c. Place the VSpin into the bottom foam piece.
   d. Securely place the top pice of foam over the VSpin.



7. Place the bucket box under the hinged piece of the top packing foam.



8. Place the accessories box into the top piece of foam.
9. Close the VSpin shipping box, and seal it with packing tape.

6

ActiveX Controls

This chapter is needed by integrators who are integrating the VSpin into a third-party lab automation system.

About ActiveX Controls

Overview

VSpin ActiveX controls allow you to integrate the VSpin into a third-party lab automation system.

About ActiveX Examples

In the Visual Basic examples given in this chapter, assume that there is a VSpin control named VSpin1 on the current form. In the C++ examples, assume that there is a VSpin control named "m_VSpin" in the current class. In all examples, "My Profile" is used as the profile name.

As all profile names require a string of characters, Velocity11® recommends using the serial number of your VSpin for the profile name.

About Container Applications

The container application referred to in this chapter could be Velocity11 VWorks™, a test container (either provided by Velocity11 or obtained from Microsoft), or third-party lab automation software.

Setting Up Properties

Overview

Properties are variables whose values can be set or retrieved by the container application.

ControlPicture

Description

Retrieves a picture of the VSpin bitmap that can be used in the container application.

Example

This example paints a VSpin bitmap over a button.

Visual Basic	Visual C++

'Assume that there is a button
'named Command1 on the
'current form. You must set the
'Style property of Command1 to Graphical"
`Command1.Picture = VSpin1.ControlPicture`
	/* The CPicture class is imported into your project when the ActiveX is installed */
	`CButton button;`
	// Create a button
	`CPicture VSpinPic;`
	`VSpinPic = m_VSpin.GetControlPicture();`
	// Retrieve the picture
	`button.SetBitmap((HBITMAP) VSpinPic.GetHandle());`
	/*Paint the bitmap onto the button*/

Setting Up Methods

Overview

Methods are functions that can be called by the container application.

Initialize

Description

Initializes the VSpin.

Initialize() should typically be the first method called in an application, and only needs to be called once for each VSpin in the system. After successful homing the InitializeComplete event is sent.

Parameters

Argument Type	Argument Name	Range	Description
BSTR	profile_name	N/A	The VSpin Profile you would like to intialize.
SHORT	block	0,1	Whether or not function blocks initialization. 0=non-blocking 1=blocking

Returns

None

Example

Visual Basic	Visual C++
' Initialize to use profile "My Profile" `VSpin1.Initialize "My Profile", 1`	// Initialize to use blocking until initialization is complete. `m_VSpin.Initialize("My Profile",1);`

Close

Description

Closes the serial port used by the VSpin.

Close should always be called before exiting an application.

Parameters

None

Returns

None

Example

Visual Basic	Visual C++

`VSpin1.Initialize "My Profile", 1`
`'Open control dialog`
`VSpin1.ShowDiagsDialog 0`
`VSpin1.Close`
	// Initialize to use "My Profile."
	`m_VSpin.Initialize("My Profile",1);`
	// Show the main user dialog.
	`m_VSpin.ShowDiagsDialog(0);`
	`m_VSpin.Close();`
	`// Close the profile.`

ShowDiagsDialog

Description

Displays the Diagnostics dialog.

Parameters

Type LONG, name reserved, range 0

Returns

None

Example

Visual Basic	Visual C++

`VSpin1.Initialize "My Profile", 1`
`'Open diagnostics dialog`
`VSpin1.ShowDiagsDialog 0`
`VSpin1.Close`
	// Initialize to use profile.
	`m_VSpin.Initialize("My Profile",1);`
	// Open diagnostics dialog.
	`m_VSpin.ShowDiagsDialog(0);`
	`m_VSpin.Close();`
	// Close the profile

SpinCycle

Description

Commands the VSpin to perform a spin cycle.

Parameters

Argument Type	Argument Name	Range	Description
DOUBLE	vel_percent	1.0–100.0	Percentage of maximum velocity to run.
DOUBLE	accel_percent	1.0–100.0	Percentage of maximum acceleration to run.
DOUBLE	decel_percent	1.0–100.0	Percentage of max deceleration to run.
SHORT	timer_mode	0–1	When TIMER_MODE_TIME_TOTAL=0, the entire VSpin cycle takes *time* seconds. When TIMER_MODE_TIME_AT_SPEED=1, the VSpin spends *time* seconds at full speed.

Argument Type	Argument Name	Range	Description
LONG	time	1–2147483648	Number of seconds to spin.
SHORT	bucket_num	1–2	Which bucket to present after spin cycle finishes.

Returns

None

Example

Visual Basic	Visual C++

`VSpin1.Initialize "My Profile" 1`
`'Open diagnostics dialog`
`VSpin1.SpinCycle 55.0, 60.0, 90.0, 1, 10, 1`
	// Initialize to use profile "My Profile."
	`m_VSpin.Initialize("My Profile" ,1);`
	// Spin rotor #1 at 55% velocity, 60%
	// acceleration, 90% braking for 10
	// seconds at desired speed. Present bucket.
	// 1 upon completion.
	`m_VSpin.SpinCycle(55.0,60.0,90.0,1,10,1);`

SetErrorLevel

Description

Sets up the level of error reporting. Default is full error reporting or ERROR_HIGH.

Parameters

Argument Type	Argument Name	Range	Description
SHORT	error_level	0–2	ERROR_HIGH=0 ERROR_MED=1 ERROR_LOW=2

Returns

None

Example

Visual Basic	Visual C++

`VSpin1.Initialize "My Profile" 1`
`'Set high level error reporting`
`VSpin1.SetErrorLevel 0`
`VSpin1.Close`
	`m_VSpin.Initialize("My Profile",1);`
	// Set high level error reporting.
	`m_VSpin.SetErrorLevel(0);`
	`m_VSpin.Close();`

OpenDoor

Description

Opens the door to bucket_num. After successful opening, the OpenDoorComplete event is sent.

Parameters

Argument Type	Argument Name	Range	Description
SHORT	bucket_num	1–2	Which bucket is presented.
SHORT	block	0,1	Whether or not the function blocks. 0 = non-blocking 1 = blocking

Returns

None

Example

Visual Basic	Visual C++

`VSpin1.Initialize "My Profile", 1`
`'Open door and present 'bucket 1`
`VSpin1.OpenDoor 1, 1`
`VSpin1.Close`
	// Initialize to use profile.
	`m_VSpin.Initialize("My Profile" ,1);`
	// Block here until bucket 1 of VSpin 1 is
	// ready.
	`m_VSpin.OpenDoor(1, 1);`
	`m_VSpin.Close();`
	`// Close the profile.`

Setting Up Events

Overview

Events are sent asynchronously by ActiveX controls to notify the container that a procedure has finished or an error has occurred. Consult Microsoft's ActiveX documentation on how to handle events in your Visual C++ or Visual Basic code.

Error

Description

The stock Error event. See Microsoft documentation for explanation of function arguments.

Parameters

Argument Type	Argument Name
SHORT	Number
BSTR FAR*	Description
SCODE	Scode
LPCTSTR	Source
LPCTSTR	HelpFile
LONG	HelpContext
BOOL FAR*	CancelDisplay

InitializeComplete

(LONG reserved)—Called when the VSpin has initialized.

OpenDoorComplete

(LONG reserved)—Called when the VSpin door has opened.

SpinCycleComplete

(LONG reserved)—Called when the VSpin has finished spinning.

Index

Note: You can also use the online help to search for information, which you can download from www.velocity11.com

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Agilent Technologies

User Guide

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