Vertical Pipetting Station

VPrep Diagnostics version 27.0.0 (2008) for
BenchWorks, PrepWorks, or VWorks3 software

User Guide

Agilent Technologies

Notices

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A WARNING 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.

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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

New contact information

Documentation feedback: documentation.automation@agilent.com

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Contents

Preface

This guide describes how to use the VPrep® Pipetting System, also known as the VPrep Pipettor.

This preface contains the following topics:

Who should use this guide

About this topic

This topic describes the target audience of this user guide.

Job roles and responsibilities

This guide is intended to be read by people with the following job roles:

Job Role	Responsibilities
Lab manager, administrator or technician	Someone who is responsible for: ❑ Installing the VPrep Pipettor ❑ Developing the protocols that use the VPrep Pipettor ❑ Developing the applications that use the VPrep Pipettor ❑ Solving the more challenging problems that may arise ❑ Developing training materials and standard operating procedures for operators
Operator	Someone who performs the daily production work that uses the VPrep Pipettor and solves routine problems. Your organization may choose to create its own procedures for operators based on the information in this guide.

Related topics

For more information about...	See...
What this guide covers	“What this guide covers” on page ix
How to access different formats of this user guide	“Accessing Velocity11 user information” on page x

What this guide covers

What is covered

This guide covers the description, installation, setup, and operation of the VPrep Pipettor.

What is not covered

This guide does not provide instructions for the BenchWorks™, VWorks™, or PrepWorks™ automation control software, or third-party software.

For more information about these topics, see the relevant user guides for these products.

Software version

This guide documents VPrep Diagnostics version 27.0.0 or later.

Related guides

Use this guide in conjunction with the following:

- *Velocity11® lab automation system.* See the lab automation system software user guides, such as the *VWorks User Guide*. These user guides explain how to define labware, create protocols, and set task parameters for each device in the system.
- *Standalone device.* The *PrepWorks Software User Guide* explains how to define labware, create protocols, and set task parameters for a VPrep Pipettor that is not part of a lab automation system.
- *Third-party systems.* If the VPrep Pipettor is a device in a third-party system, see the relevant third-party system guides. If you are using the PrepWorks software to control the VPrep Pipettor is a third-party system, see the *PrepWorks Software User Guide*

Related topics

For more information about...	See...
Reporting problems	“Reporting problems” on page 82
Who should read this guide	“Who should use this guide” on page viii
How to access different formats of this user guide	“Accessing Velocity11 user information” on page x

Accessing Velocity11 user information

About this topic

This topic describes the different formats of Velocity11 user information and explains how to access the user information.

Formats available

Velocity11 user information is provided to you as:

- ❑ Online help
- ❑ A PDF file
- ❑ A printed book

The information in each format is the same but each format has different benefits.

Where to find user information

Online help

The online help is added to your computer with the Velocity11 lab automation system software installation.

PDF file

The PDF file of the user guide is on the software CD that is supplied with the product.

Velocity11 website

You can search the online help or download the latest version of any PDF file from the Velocity11 website at www.velocity11.com.

Note: All Velocity11 user information can be searched from the website at www.velocity11.com.

Online help

The online help is the best format to use when you are working at the computer and when you want to perform fast or advanced searches for information.

To open the online help:

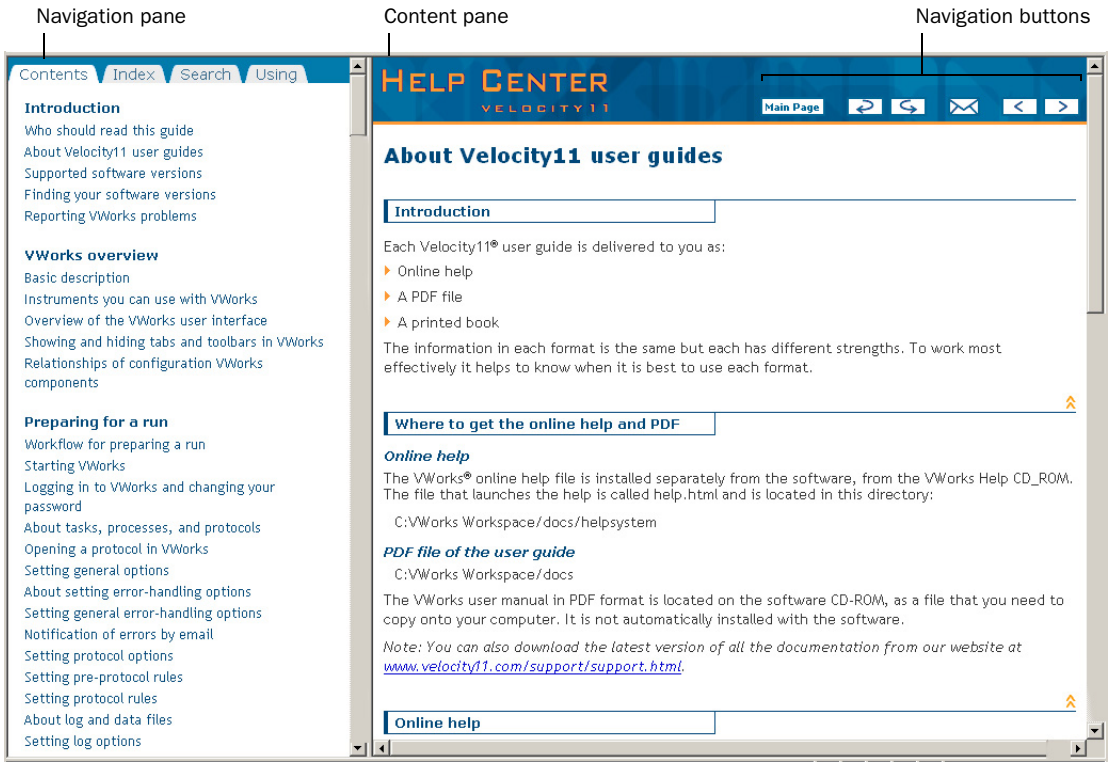
1. In the Velocity11 lab automation software, press F1. The online help window opens.

Main features

The online help window contains the following:

- ❑ *Navigation pane*. Consists of four tabs. The Contents, Index, and Search tabs provide different ways to locate information. The Using tab contains information about using the help system.
- ❑ *Content pane*. Displays the online help topics.
- ❑ *Navigation buttons*. Enables you to navigate through the pages.

The online help includes a navigation pane, content pane, and navigation buttons.



PDF user guides

Computer requirements

To open a user guide in PDF format, you need a PDF viewer. You can download a free PDF viewer from the internet.

Printing and searching

The user guides in PDF format are mainly for printing additional copies. You can perform simple searches in the PDF file, although these searches are much slower than online help searches.

More information

For more information about using PDF documents, see the user documentation for the PDF viewer.

Related topics

For more information about...	See...
Who should read this guide	“Who should use this guide” on page viii
What this guide covers	“What this guide covers” on page ix

VPrep Pipettor overview

1

This chapter contains the following topics:

VPrep Pipettor description

About this topic

This topic describes the VPrep Pipetting System (VPrep Pipettor) and explains its uses.

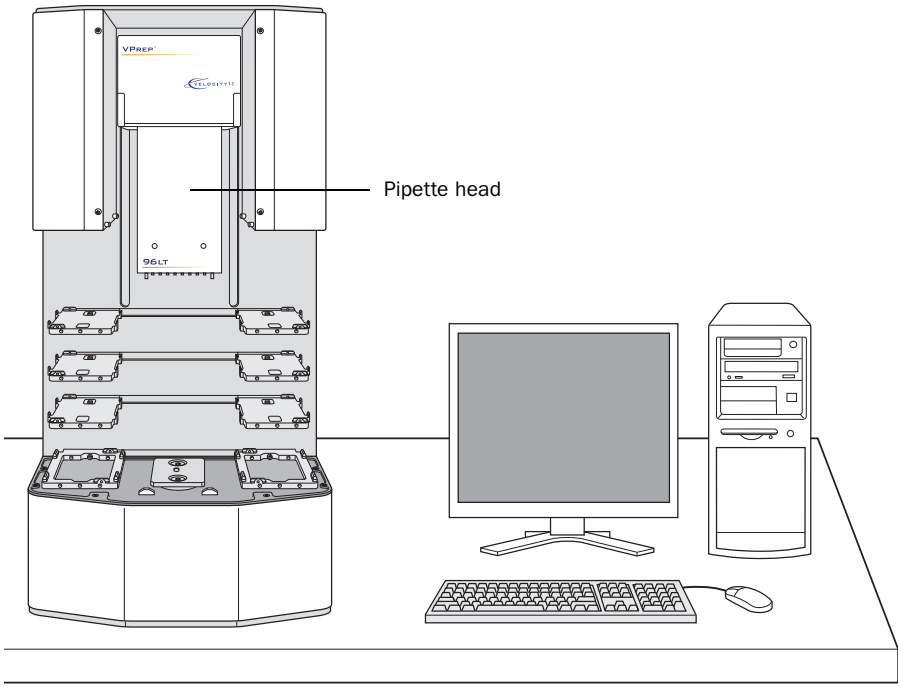
Description

The VPrep Pipettor is an automated liquid-handling platform that dispenses liquid accurately and precisely into microplates.

The system consists of the following components:

- ❑ Pipetting platform with eight sliding shelves
- ❑ Pipette head
- ❑ Velocity11 automation control software
- ❑ Computer

A variety of interchangeable fixed-tip and disposable-tip pipette heads are available, including 8-, 16-, 96- and, 384-channel pipette heads. VPrep Pipettor accessories are also available, such as plate sensing and alignment shelves and autofilling reservoirs.



System configuration variations

The VPrep Pipettor can be used in the following ways:

- ❑ As a standalone device controlled by a computer
- ❑ Integrated with other devices in a lab automation system

As an integrated device in a lab automation system, the VPrep Pipettor can be used to prepare plates for high-throughput screening or other automated processes.

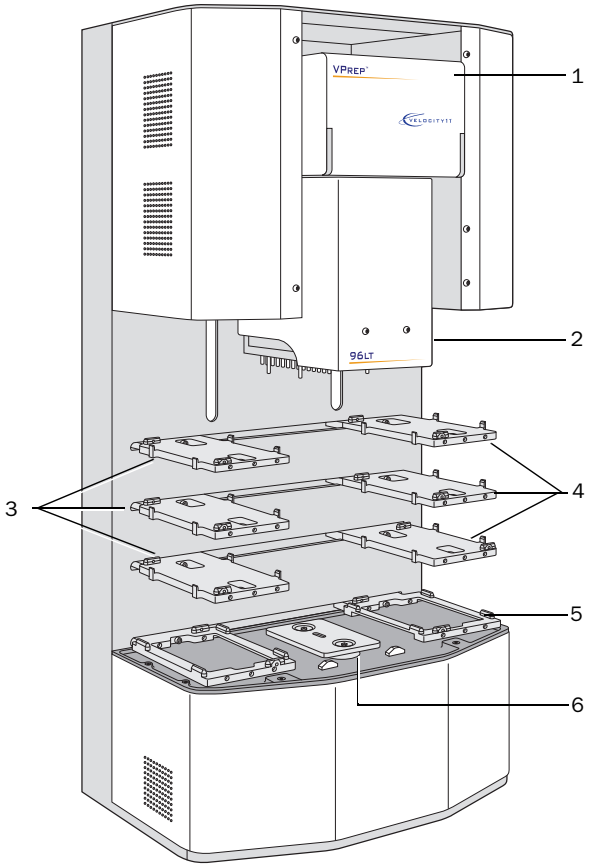
Related topics

For more information about...	See...
Hardware overview	“Hardware overview” on page 4
Accessories	“VPrep Pipettor accessories” on page 105
Automation-ready labware	“Labware considerations” on page 10
Software that controls the VPrep Pipettor	“Software description” on page 11
Safety information	“Safety” on page 15
Installation requirements	“Installing VPrep Pipettor” on page 21

Hardware overview

About this topic This topic describes the hardware features and axes of motion.

Front view The VPrep Pipettor front view contains the following features.



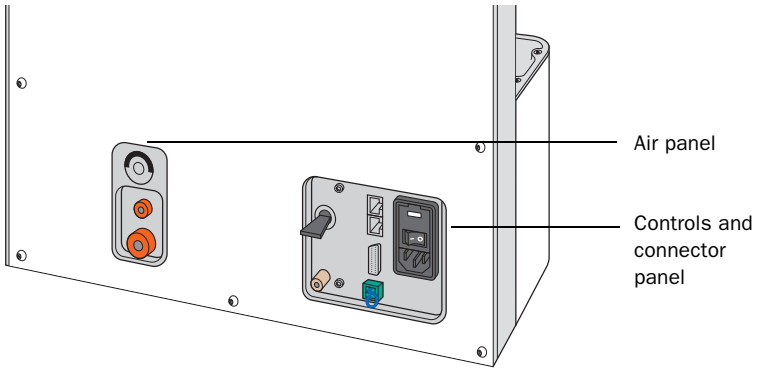
Item	Feature	Description
1	Head mount	Fixture to which the pipette head mounts.
2	Pipette head	Interchangeable fixed-tip or disposable-tip head that aspirates and dispenses fluid.
3	Shelves 1, 3, 5 (left)	Actuated shelves used to hold microplates, reservoirs, wash stations, and other liquid containers.
4	Shelves 2, 4, 6 (right)	Actuated shelves used to hold microplates, reservoirs, wash stations, and other liquid containers.

Item	Feature	Description
5	Shelves 7 (left) and 8 (right)	Actuated shelves that have access to the tipbox press. These shelves have a higher vertical clearance for tall labware or accessories.
6	Tipbox press	Actuated press for mounting tips onto the barrels of a disposable-tip pipette head during tips-on operations.

In a lab automation system, the shelves on one side of the VPrep Pipettor are accessible by a robot. Typically, shelves 2, 4, 6, and 8 are the robot-accessible shelves in a Velocity11 lab automation system.

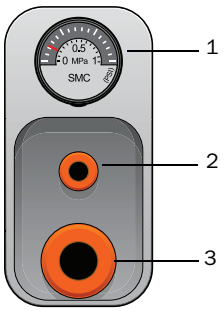
Back view

The back panel of the VPrep Pipettor contains an air panel and a controls and connector panel.



Air panel

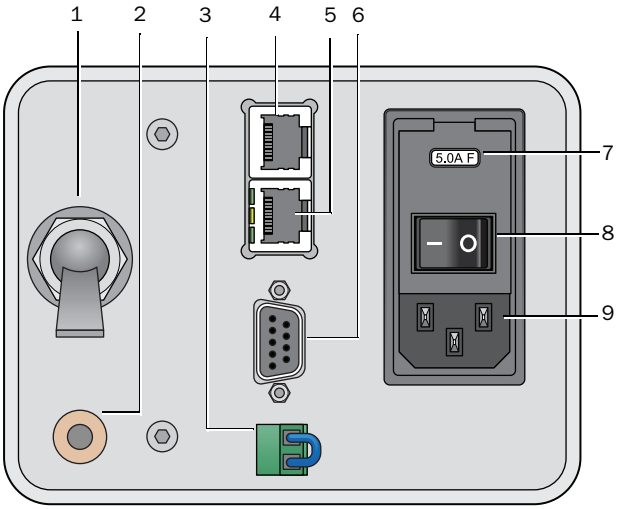
The VPrep Pipettor air panel has the following features.



Item	Feature	Description
1	Pressure gauge	Indicates the air pressure.
2	Air input port	Connects to a compressed air source, which is used to actuate the shelves and the tipbox press.
3	Vacuum port	Connects to a vacuum source for use with vacuum shelves.

Controls and connector panel

The VPrep Pipettor controls and connector panel contains the following features.



Item	Feature	Description
1	Air switch	Turns on (up) or off (down) the air supply.
2	Drainage port	Provides an exit path for waste or overflow liquids.
3	Robot-disable circuit loop	Enables connection of a pendant to the VPrep Pipettor robot-disable circuit. Velocity11 strongly recommends configuring a robot-disable pendant at the front of the VPrep Pipettor for easy access.
4	Pump I/O port	Connects the serial cable from a Pump Module to the VPrep Pipettor to enable communication. *Note:* This is not an Ethernet port and should only be used to connect Velocity11 accessories to the VPrep Pipettor.
5	Ethernet port	Unsupported.
6	Serial port	Connects the serial cable from the controlling computer to the VPrep Pipettor to enable communication.
7	Fuse enclosure	Houses the main fuse. See “Electrical requirements” on page 24.
8	Power switch	Turns on (–) or off (o) the power.
9	AC power connector	Connects the power cable.

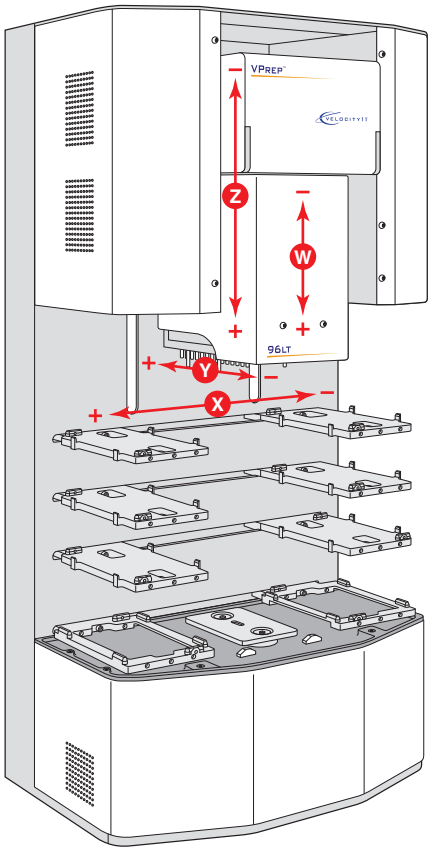
Accessories

VPrep Pipettor accessories are optional components that can be added to enhance existing functions and facilitate operation. For details, see “VPrep Pipettor accessories” on page 105.

VPrep Pipettor axes

The pipette head has the following axes of motion:

- ❑ *x-axis*. Horizontal, left and right
- ❑ *y-axis*. Horizontal, forward and backward
- ❑ *z-axis*. Vertical up and down
- ❑ *w-axis*. Vertical displacement of the pipettor inside the pipette head during aspirate and dispense tasks



Each shelf moves horizontally to the center position under the pipette head during pipetting tasks, and then moves back to the outer position.

Related topics

For information about...	See...
Pipette heads	"Pipette heads" on page 8
Connecting the VPrep Pipettor	"Installing VPrep Pipettor" on page 21
Accessories	"VPrep Pipettor accessories" on page 105
Laboratory requirements	"Laboratory requirements" on page 23

Pipette heads

About this topic

The VPrep Pipettor head mount is fitted with a 3-axis positioning stage (*x*-, *y*-, and *z*-axes) that provides access to all quadrants of 96-well, 384-well, and 1536-well microplates. The head mount accepts interchangeable pipette heads with either disposable tips or fixed tips. This topic describes the types of pipette heads.

Disposable-tip pipette heads

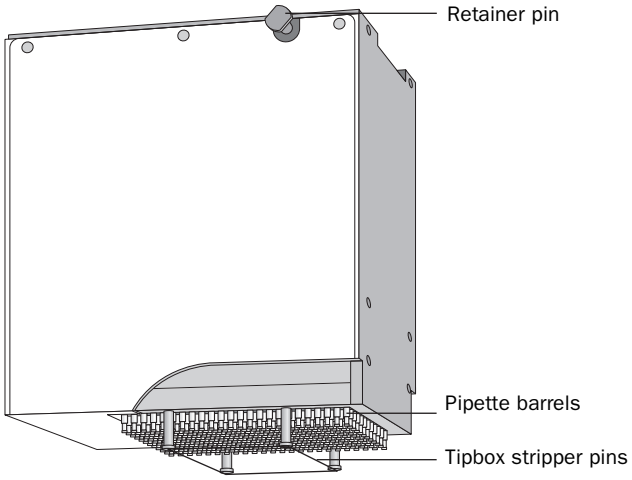
Disposable-tip pipette heads enable you to change pipette tips during a run to prevent cross-contamination. The following types of disposable-tip pipette heads are available for use on the VPrep Pipettor:

- ❑ Series II and Series III 96- and 384-channel pipette heads can dispense fluid into all the wells in a plate simultaneously.

  Note: The Series II and Series III pipette heads are functionally equivalent on the VPrep Pipettor. The Series III design enables mounting on a Bravo™ Automated Liquid Handling Platform.

- ❑ 8- and 16-channel serial dilution pipette heads (SDH) can dispense fluid into a single column or row in a plate.

Series III 384-channel disposable-tip pipette head



The following table lists the available disposable-tip pipette heads.

Head type	Max volume	Dispense into…
8LT	200 µL	96-well, 384-well
16ST	70 µL	96-well, 384-well, 1536-well plates
96LT	200 µL	96-well, 384-well plates
96ST	70 µL	96-well, 384-well, 1536-well plates
384ST	70 µL	384-well, 1536-well plates

The large transfer (LT) pipette heads can dispense up to 200 µL per well and the small transfer (ST) pipette heads can dispense up to 70 µL per well. You can use the 96ST and 384ST pipette heads to dispense fluid into each quadrant of a plate and replace the tips after completing each quadrant.

Fixed-tip pipette heads

The fixed-tip pipette heads have non-disposable dispensing needles and include the following types:

- *96- and 384-channel*. Able to dispense fluid into an entire plate simultaneously.
- *8-channel*. Able to dispense fluid into a single column in a plate.

The following table lists the available fixed-tip pipette heads.

Head type	Max volume	Dispense into…
8F200	200 µL	96-well, 384-well, and 1536-well plates
96F	50 µL	96-well, 384-well, and 1536-well plates
96F	200 µL	96-well, 384-well, and 1536-well plates
384F	50 µL	384-well, 1536-well plates

Controlling the pipette heads

You use the applicable Velocity11 automation control software to do the following:

- Calibrate volumes
- Control pipette speed
- Enable tip touching
- Enable dynamic tip extension and retraction

Related topics

For more information about...	See…
Setting up the VPrep Pipettor and installing a pipette head	"Setting Up VPrep Pipettor" on page 31
Exchanging a pipette head	"Changing the pipette head" on page 66
Creating a profile	"Creating a profile for the VPrep Pipettor" on page 41

Labware considerations

About this topic

This topic provides guidelines for selecting automation-ready labware for use with the VPrep Pipettor.

Acceptable microplates

Use only labware that meet the American National Standards Institute (ANSI) standards. For the latest labware standards, go to www.sbsonline.org. You can also contact the labware manufacturer to inquire about ANSI-compliant labware.

Height limitations on shelves 1 and 2

In addition to the ANSI standards for labware, shelves 1 and 2 have a height restriction to ensure clearance for the pipette head. The maximum height of the labware that you can use on shelves 1 and 2 is dependent on several factors, such as the type of pipette head, tip size, and type of shelf.

Note: The software displays an error message if you select a labware definition that exceeds the maximum allowable height for shelves 1 and 2.

Related topics

For more information about...	See…
Defining labware in the software	User guide for the applicable Velocity11 automation control software
Accessories	"VPrep Pipettor accessories" on page 105

Software description

About this topic

This topic provides an overview of the software that you use to set up, control, and troubleshoot the VPrep Pipettor.

Lab automation system control software

If the VPrep Pipettor is an integrated device in a lab automation system, you use lab automation software to control the VPrep Pipettor. Velocity11 provides the following software for lab automation:

- *BenchWorks Automation Control software*. If the VPrep Pipettor is part of a Velocity11 BenchCel Microplate Handling Workstation, use the BenchWorks software to set up the VPrep Pipettor device profiles, define labware and liquids, create protocols, and run protocols. For instructions, see the *BenchWorks User Guide*.
- *VWorks Automation Control software*. If the VPrep Pipettor is part of a Velocity11 BioCel or Element system, use the VWorks software to set up the VPrep Pipettor device profiles, define labware and liquids, create protocols, and run protocols. For instructions, see the *VWorks User Guide*.

PrepWorks

If the VPrep Pipettor is set up as a standalone instrument, use PrepWorks to set up the VPrep Pipettor profiles, define labware and liquids, create protocols, and run protocols. For instructions, see the *PrepWorks Software User Guide*.

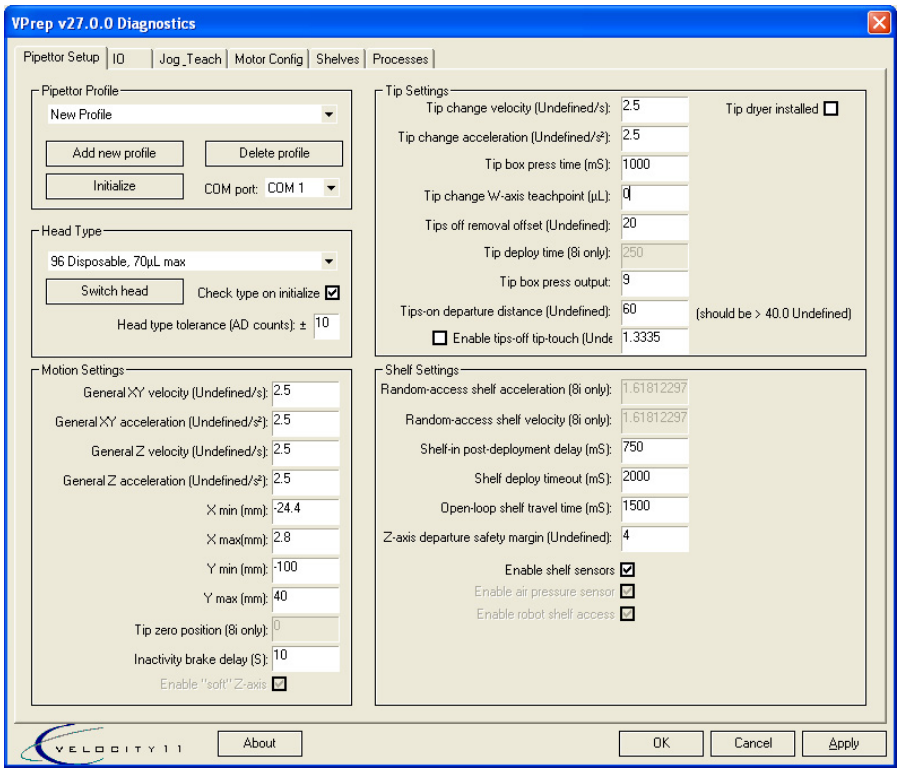
PrepWorks ActiveX control

The PrepWorks ActiveX control enables the VPrep Pipettor to interact with any Velocity11 or third-party lab automation system. For information about the PrepWorks ActiveX control, see the *PrepWorks Software User Guide*.

Contact Velocity11 Technical Support for more information about the automated control of the VPrep Pipettor.

VPrep Diagnostics software

VPrep Diagnostics is a component of the supplied software, which you can access through the Velocity11 automation control software.



!! DAMAGE HAZARD !! Ensure that only fully trained VPrep Pipettor administrators have access to the user account passwords. Improper use of VPrep Diagnostics by an untrained operator could damage the VPrep Pipettor. For example, the pipette head could collide with a shelf if a teachpoint is not defined properly.

Use VPrep Diagnostics to do the following:

- ❑ *Create profiles.* A profile contains the communication and configuration settings (base, head type and teachpoint settings) required to run protocols for a given hardware configuration. The profiles also store teachpoints and configured shelf location information.
- ❑ *Set teachpoints.* A teachpoint is a set of coordinates that tells the pipette head exactly where to move to perform a task for a particular type of labware.
- ❑ *Configure the accessory shelves.* If you have shelf accessories, such as a Weigh Shelf, you must specify the location. This location information is stored in the profile.
- ❑ *Run individual tasks in real time.* Running tasks, such as aspirate and dispense, in real time is useful when calculating the correct parameters for a protocol or for troubleshooting a problem.
- ❑ *Diagnosing problems.* Moving and adjusting individual hardware components can help to diagnose and troubleshoot problems.

Labware Editor and Liquid Library Editor

You use the following software components to create definitions that are stored in a database.

- ❑ *Labware Editor*. Creates a database of information defining the labware classes.
- ❑ *Liquid Library Editor*. Creates a database of information defining the liquid classes.

The labware and liquids definitions can be shared by other integrated devices in a lab automation system or by multiple VPrep Pipettors that are controlled from the same computer.

You can access the Labware Editor and the Liquid Library Editor through the Velocity11 automation control software.

Related topics

For more information about...	See…
Setting up the VPrep Pipettor	"Setting Up VPrep Pipettor" on page 31
Using VPrep Diagnostics	❑ "Creating a profile for the VPrep Pipettor" on page 41 ❑ "Setting or editing shelf teachpoints" on page 46 ❑ "Running diagnostics tasks" on page 96 ❑ "VPrep Pipettor accessories" on page 105
Defining labware and liquids	User guide for the applicable Velocity11 automation control software
Using the software	User guide for the applicable Velocity11 automation control software

Workflow for operating the VPrep Pipettor

The following table presents the basic workflow for operating the VPrep Pipettor as a standalone device or in a Velocity11 lab automation system.

Note: The steps for installing and operating the VPrep Pipettor in a third-party lab automation system might differ. For details, refer to the third-party user documentation.

Step	Procedure	See…
1	Install the VPrep Pipettor.	"Installing VPrep Pipettor" on page 21
2	Set up the VPrep Pipettor, including mounting the pipette head, creating profiles, and setting teachpoints.	"Setting Up VPrep Pipettor" on page 31
3	Create protocols and set task parameters.	User guide for the applicable Velocity11 automation control software
4	Prepare the VPrep Pipettor for a run.	"Preparing to run a protocol" on page 60
5	Start the protocol run.	User guide for the applicable Velocity11 automation control software

Safety

2

This chapter contains the following topics:

General safety information

About this topic

The VPrep Pipettor is designed for safe operation. Under normal operating conditions, you are protected from high-pressure gas and moving parts. However, you must be aware of the potential hazards and understand how to avoid being exposed to them.

Before using the VPrep Pipettor

Before using the VPrep Pipettor, make sure you are properly trained in:

- ❑ General laboratory safety
- ❑ The correct and safe operation of the VPrep Pipettor
- ❑ The correct and safe operation of other lab automation systems or components used in combination with the VPrep Pipettor

Intended product use

!! INJURY HAZARD !! Do not remove the VPrep Pipettor covers or otherwise disassemble the system. Doing so can cause injuries and damage the VPrep Pipettor.

!! INJURY HAZARD !! Using controls, making adjustments, or performing procedures other than those specified in this user guide can expose you to high-pressure gases and moving parts. Exposure to these hazards can cause severe injury.

Velocity11 products must only be used in the manner described in the user guides. Any other use can damage the product or injure you. Velocity11 is not responsible for damages caused, in whole or part, by unauthorized modifications, or by procedures that are not explicitly described in the product user guides. Any modifications or changes to products not expressly described in Velocity11 user guides are not covered under the warranty.

The VPrep Pipettor is not intended or approved for diagnosis of disease in humans or animals.

Related topics

For information about…	See…
Safety hazards	“Potential safety hazards” on page 17
Stopping the VPrep Pipettor in an emergency	“Emergency stops” on page 19
Reporting problems with the VPrep Pipettor	“Reporting problems” on page 82

Potential safety hazards

About this topic

This topic describes potential hazards that you can encounter when using the VPrep Pipettor.

Safety shield

Velocity11 recommends that you enclose the VPrep Pipettor in a safety shield or enclosure to restrict access to the VPrep Pipettor while it is operating. For example, you can connect a light curtain to the VPrep Pipettor robot-disable circuit.

!! INJURY HAZARD !! Operating the VPrep Pipettor without a safety shield or enclosure cover increases the risk of injury.

Moving parts

The VPrep Pipettor has moving parts that can injure you if you deviate from the procedures given in this guide. It is the responsibility of every operator to follow safety precautions and keep away from the VPrep Pipettor whenever it is likely to move.

!! INJURY HAZARD !! Do not initialize the VPrep Pipettor while touching it.

!! INJURY HAZARD !! Keep fingers, hair, clothing, and jewelry away from the VPrep Pipettor while it is in motion. Never touch any of the moving parts or attempt to move labware while the VPrep Pipettor is in operation. The device could pinch, pierce, or bruise you. For example, a pipette tip could pierce your hand.

High-voltage electronics

High-voltage electronics can be found in the VPrep Pipettor. Under normal operating conditions, you are protected from exposure to the high voltage.

!! INJURY HAZARD !! Do not try to gain access to the interior of the VPrep Pipettor. Do not remove panels for any reason. Exposure to high-voltage electronics can cause severe injury.

High-voltage electronics can also be found in the supplied computer. See the computer manufacturer documentation on the high-voltage hazard warnings. Make sure you follow the instructions on the safe operation of the computers.

!! 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. Use of incorrect power cords can cause damage to the device.

!! DAMAGE HAZARD !! Operating the VPrep Pipettor at the wrong voltage can seriously damage the instrument.

High-pressure gas cylinders

Compressed air is used to move components inside the VPrep Pipettor.

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.

!! INJURY HAZARD !! Working with open, charged air lines can result in injury. Turn off the compressed air line before installing the VPrep Pipettor. Contact your facilities department or a Velocity11 service representative with questions about setting up the air line.

!! DAMAGE HAZARD !! Ensure that the air coming into the VPrep Pipettor is properly filtered from moisture or aerosolized impurities. Significant moisture or impurities in the air line can adversely affect the performance and life of the VPrep Pipettor.

!! DAMAGE HAZARD !! Using oil compressors can cause oil to leak into the VPrep Pipettor and void your warranty.

!! DAMAGE HAZARD !! Air pressure greater than 0.69 MPa (100 psi) can damage the VPrep Pipettor.

Chemicals

Some chemicals used when working with the VPrep Pipettor 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.

Improper access or use

!! DAMAGE HAZARD !! Improper use of the VPrep Diagnostics by an untrained user could damage the VPrep Pipettor. For example, the pipette head could collide with a shelf if a teachpoint is not defined properly.

Ensure that only fully trained VPrep Pipettor administrators have access to the user account passwords.

Improper cleaning hazard

!! DAMAGE HAZARD !! Do not use any abrasives, corrosive cleaning agents, or metal brushes to clean any VPrep Pipettor component or accessory.

Moving the VPrep Pipettor

Before moving a VPrep Pipettor, see “Laboratory requirements” on page 23 for information on selecting the new location.

!! DAMAGE HAZARD !! Velocity11 is not responsible for damage if the VPrep Pipettor is incorrectly packaged and moved by someone other than a Velocity11 employee.

!! INJURY HAZARD !! The VPrep Pipettor is a heavy instrument, weighing approximately 82 pounds. Do not attempt to move the VPrep Pipettor without assistance. Ensure that proper lifting techniques are used when lifting the VPrep Pipettor.

Related topics

For information about…	See…
General safety	"General safety information" on page 16
Stopping the VPrep Pipettor in an emergency	"Emergency stops" on page 19
Reporting problems with the VPrep Pipettor	"Reporting problems" on page 82

Emergency stops

About this topic

Velocity11 strongly recommends that the VPrep Pipettor be fitted with a robot-disable pendant positioned at the front of the unit for easy access. You can acquire a robot-disable pendant from Velocity11. The pendant connects to the robot-disable circuit loop on the rear panel of the VPrep Pipettor.

This topic describes how to stop the pipette head in an emergency. The procedure can vary for an integrated device in a lab automation system. For details, see the user guide for your lab automation system, such as the *BioCel User Guide*.

When to do this

In addition to emergency situations, quickly stopping the pipette head motion is useful if you are working in VPrep Diagnostics, for example while adjusting the VPrep Pipettor teachpoints.

When you perform an emergency stop, the internal logic of the VPrep Pipettor is preserved, which makes it possible to resume a protocol. However, if you turn off the power switch, the internal logic is lost until you reinitialize the VPrep Pipettor.

!! DAMAGE HAZARD !! Do not turn off the power switch on the rear panel of the VPrep Pipettor to stop a run. When you turn on the power again, the protocol cannot resume, and the shelf movement could result in a pipette head crash.

!! IMPORTANT !! Do not use the emergency stop procedure for a normal stop or to pause and continue a run. The pipetting accuracy of the running protocol might be impaired. For a normal stop or to pause a run, use the Stop button or Pause button in your Velocity11 automation control software.

Stopping in an emergency

!! DAMAGE HAZARD !! The robot-disable circuit does not turn off the air pressure. Therefore, the shelves can continue to move.

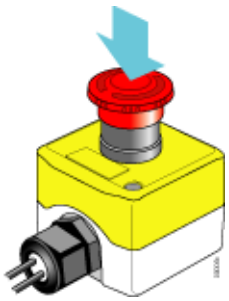
The robot-disable pendant stops the pipette head motion as follows:

- ❑ Turns off power to all the motors
- ❑ Activates the *z*-axis brake to prevent the pipette head from falling

The air pressure remains on. Therefore, the shelves can continue to move.

To stop the pipette head motion:

1. Press the red button on the robot-disable pendant.
2. To release the button, turn it clockwise.



Recovering from an emergency stop

To re-enable the motors in the pipette head:

1. Ensure the robot-disable button is released. If necessary, turn the button clockwise to release it.
2. In the message dialog that appears on screen, click one of the following buttons:
   - **Abort**—Cancels the protocol.
   - **Retry**—Attempts to resume the protocol.
   - **Ignore and Continue**—Ignores the error condition and attempts to perform the next command.

Related topics

For information about…	See…
Stopping or pausing a run	User guide for the applicable Velocity11 automation control software
Recovering from a crash	“Recovering from a head collision” on page 76
Recovering from a power outage	“Recovering from a power outage” on page 74
Connector locations	“Hardware overview” on page 4

Installing VPrep Pipettor

3

This chapter describes how to unpack and set up the VPrep Pipettor. All of the procedures in this chapter can be performed by someone with operator privileges.

This chapter contains the following topics:

Installation workflow

Workflow

The following table presents the procedures for installing the VPrep Pipettor.

Step	Procedure	See…
1	Verify laboratory requirements.	"Laboratory requirements" on page 23
2	Unpack and inspect the VPrep Pipettor.	*VPrep Pipetting System Unpacking Guide*
3	Mount the VPrep Pipettor on the lab bench.	"About mounting the VPrep Pipettor" on page 26
4	Connect the power and computer.	"Connecting the power and the computer" on page 27
5	Connect the air supply and the vacuum source, if applicable.	"Connecting the air and vacuum sources" on page 28
6	Install the instrument control software, if not already installed.	User guide for the applicable Velocity11 automation control software

Related topics

For information about…	See…
Safety guidelines	"Safety" on page 15
Setting up the VPrep Pipettor	"Setting Up VPrep Pipettor" on page 31
Setting up device files and writing protocols	User guide for the applicable Velocity11 automation control software
Maintenance guidelines	"Maintaining VPrep Pipettor" on page 61

Laboratory requirements

Laboratory space requirements

General bench requirements

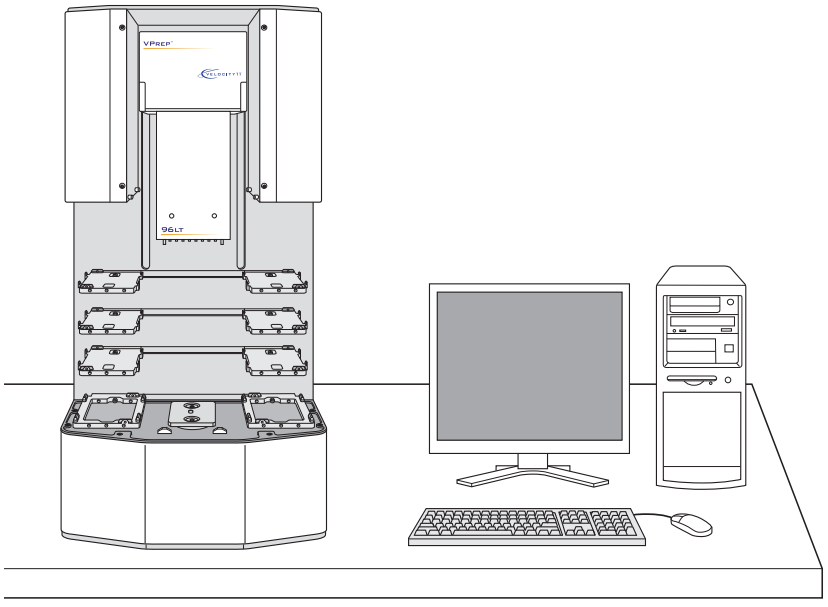
Make sure the bench for the VPrep Pipettor has the following:

- ❑ Sufficient space to accommodate the VPrep Pipettor, computer, monitor, and accessories
- ❑ Sufficient clearance on the back side of the VPrep Pipettor to access power, communication, and air tubing connections
- ❑ Easy access to disconnect the power to the VPrep Pipettor quickly if necessary
- ❑ A fixed bench (without wheels) that can support the weight of the VPrep Pipettor without excessive shaking or movement
- ❑ Proper height for any operator to comfortably operate the VPrep Pipettor

VPrep Pipettor physical specifications

Dimension	Value
Width	38.1 cm (15.0 in)
Height	78.7 cm (31.0 in)
Depth	25.9 cm (10.2 in)
Weight	37.2 kg (82 lb)

Note: Measurements do not include the cables or the computer.



Electrical requirements

The VPrep Pipettor device has the following power requirements. For power requirements of other devices in the workstation, see the device user documentation.

Utility	Requirement
Electrical	100–240~, 50/60 Hz, 5.5 A
Fuse	5 A, 250 V, 0.25 × 1.25 in (6.35 x 31.75 mm), fast acting

Compressed air requirements

The VPrep Pipettor requires the use of clean, dry, compressed air to move the pneumatic components, such as the shelves. The compressed air can be from the following sources:

- ❑ Centralized source (house)
- ❑ Compressed-air cylinders
- ❑ Portable pumps

!! DAMAGE HAZARD !! Using oil compressors can cause oil to leak into the VPrep Pipettor and void your warranty.

!! DAMAGE HAZARD !! Air pressure greater than 0.69 MPa (100 psi) can damage the VPrep Pipettor.

The VPrep Pipettor has the following compressed air requirements:

Requirement	Value
Quality	Clean, dry, compressed
Flow rate	340 Lpm (1.2 cfm)
Pressure	0.65–0.69 MPa (95–100 psi)

Environmental requirements

The lab must meet the following environmental requirements.

Requirement	Value
Ambient temperature	5–40 °C
Humidity condition	10–90% RH, non-condensing
Elevation	1–2000 m

Locate the VPrep Pipettor away from heat and air conditioning ducts and away from direct sunlight, as these conditions could damage or cause interference with the VPrep Pipettor.

Computer requirements

Typically, the VPrep Pipettor is shipped with a computer that controls the VPrep Pipettor operations. The computer contains all the necessary software and is configured to operate the VPrep Pipettor.

!! IMPORTANT !! Velocity11 recommends that you use the supplied computer, because it is set up and tested for VPrep Pipettor operations.

If your laboratory requires the use of a computer other than the Velocity11-supplied computer, ensure the computer meets the following minimum requirements:

- ❑ Computer system
  - ◆ Pentium 4, 2 GHz or faster
  - ◆ 256 MB RAM
  - ◆ Windows 2000 or Windows XP
  - ◆ 50 GB free hard disk space
- ❑ Communications interface—RS-232 DB9 serial port

You can use the provided software CD to install the necessary software and setup configurations for the VPrep Pipettor.

Related topics

For information about…	See…
Safety guidelines	"Safety" on page 15
Mounting the VPrep Pipettor	"About mounting the VPrep Pipettor" on page 26
Connecting the VPrep Pipettor	❑ "Connecting the power and the computer" on page 27 ❑ "Connecting the air and vacuum sources" on page 28

About mounting the VPrep Pipettor

About this topic

If the VPrep Pipettor is part of a Velocity11 lab automation system, such as the BioCel, the unit is already mounted.

This topics describes the requirements for mounting the VPrep Pipettor on a lab bench or table or as part of a third-party lab automation system.

Mounting requirements

!! INJURY HAZARD !! The VPrep Pipettor is a heavy instrument, weighing approximately 82 pounds. Do not attempt to move the VPrep Pipettor without assistance. Ensure that proper lifting techniques are used when lifting the VPrep Pipettor.

Ensure the destination lab bench meets the requirements listed in “General bench requirements” on page 23.

Verify that all VPrep Pipettor parts are free of possible shipping damage. If anything appears to be missing or damaged, contact Velocity11 Technical Support.

If the VPrep Pipettor is operated as a standalone device, you are not required to fasten the VPrep Pipettor to the lab bench or table. Place the VPrep Pipettor next to the computer on the lab bench or table.

If the VPrep Pipettor is integrated as part of a third-party lab automation system, the VPrep Pipettor must be in a fixed position so that the other devices in the system can train teachpoints specific to the location of the VPrep Pipettor shelves. For mounting instructions, contact Velocity11 Technical Support.

Related topics

For information about…	See…
Connecting the VPrep Pipettor	❑ “Connecting the power and the computer” on page 27 ❑ “Connecting the air and vacuum sources” on page 28
Set up requirements	“Laboratory requirements” on page 23
Hardware components	“Hardware overview” on page 4
Contacting Velocity11	“Reporting problems” on page 82

Connecting the power and the computer

About this topic

This topic provides instructions on how to connect the VPrep Pipettor to a grounded power source and to its controlling computer.

Before you begin

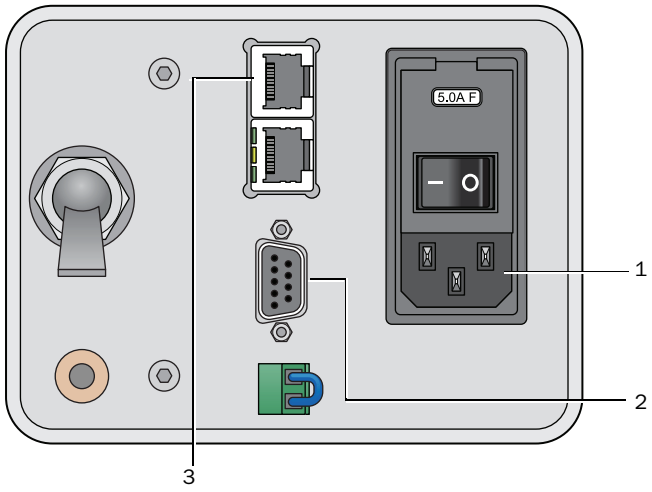
Before you plug in the VPrep Pipettor, make sure the laboratory set up requirements have been met. See "Laboratory requirements" on page 23.

!! INJURY HAZARD !! Interconnect cables should be routed carefully to prevent trip hazards.

!! DAMAGE HAZARD !! Operating the VPrep Pipettor at the wrong voltage might seriously damage the instrument.

Connecting the power and computer

The following figure shows the connections on the rear panel of the VPrep Pipettor.



Item	Connector
1	AC power connector
2	Serial communications port (DB-9) for the controlling computer
3	PUMP I/O port

To connect the VPrep Pipettor:

1. Connect the VPrep Pipettor power cable by plugging in one end of the cable at the AC power connector on the rear panel as the figure shows. Plug in the other end of the cable at an appropriately grounded electrical socket.
2. Connect the VPrep Pipettor serial communications cord by plugging in one end of the cable at the serial communications port on the

VPrep Pipettor rear panel as the figure shows. Plug in the other end of the cable to the computer that controls the VPrep Pipettor.

Be sure to tighten the thumbscrews on the connector.

3. If you are using the Velocity11 Pump Module, see "Setting up a Pump Module" on page 110 for connection details.

Related topics

For information about…	See…
Set up requirements	"Laboratory requirements" on page 23
How to set up the VPrep Pipettor	"Workflow for setting up the VPrep Pipettor" on page 32
Component locations	"Hardware overview" on page 4

Connecting the air and vacuum sources

About this topic

Compressed air is used to move the VPrep Pipettor shelves, tipbox press, and other components. If the VPrep Pipettor is fitted with vacuum shelves, a vacuum source is required. This topic explains how to connect the VPrep Pipettor to an air source and vacuum source and how to check the connections for leaks before use.

Before you begin

Make sure the laboratory set up requirements for compressed air have been met. See "Laboratory requirements" on page 23.

Make sure you have the supplied ¼-in tubing for the compressed air.

If the VPrep Pipettor is fitted with vacuum shelves, make sure you have the supplied 3/8-in tubing for the vacuum.

Ensure you follow all safety precautions.

!! INJURY HAZARD !! Working with open, charged air lines can result in injury. Switch the compressed air line off before installing the VPrep Pipettor. Contact your facilities department or a Velocity11 service representative with questions about setting up the air line.

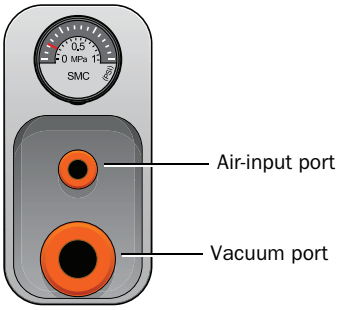
!! DAMAGE HAZARD !! Ensure that the air coming into the VPrep Pipettor is properly filtered from moisture and impurities. Significant moisture or impurities in the air line can adversely affect the performance and life of the VPrep Pipettor.

Connecting the air source

To connect the VPrep Pipettor to the air source:

1. Turn off the air at the source (house, cylinder, or pump).
2. Using a sharp knife, cut the supplied tubing to the length required for the air line.

3. Connect one end of the air tubing to the air source (house, cylinder, or pump).
4. Connect the free end of the air tubing to the quick-disconnect fitting at the air-input port on the VPrep Pipettor, as the figure shows.



To connect the tubing, push the end of the tubing into the quick-disconnect fitting.

Note: If your house air uses a threaded nozzle, attach the ¼-in NPT fitting to your house air.

Connecting the vacuum source

Only a VPrep Pipettor that is fitted with a vacuum shelf requires a vacuum source.

To connect the VPrep Pipettor to the vacuum source:

1. Turn off the vacuum supply at the source.
2. Using a sharp knife, cut the supplied 3/8-in tubing to the length required for the vacuum line. Ensure the cut edge of the tubing is square and clean.
3. Connect one end of the vacuum tubing to your house vacuum supply, and then connect the free end of the tubing to the quick-disconnect fitting at the vacuum-input port on the back of the VPrep Pipettor. See previous figure.

Checking air and vacuum connections

To check the air and vacuum connections:

1. With the air source turned off, gently tug the air tubing at each connection.

   If you feel resistance at the connection, the tubing has been properly installed.
2. Turn on the air at the source (house, cylinder, or pump).
3. Listen near each connection for hissing sounds that might indicate a leak.

   If you hear hissing sounds, turn off the air at the source, check and tighten the connections, and then turn on the air again. If the problem persists, contact your facilities department or Velocity11 Technical Support.

4. If you connected a vacuum source, repeat step 1 to step 3 for the vacuum connections.

Disconnecting air and vacuum sources

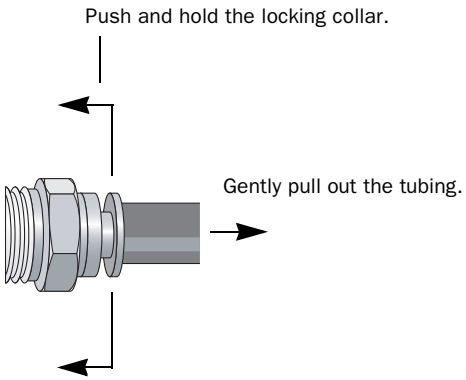
You must disconnect the air and vacuum tubing before moving or shipping the VPrep Pipettor and before performing maintenance or cleaning.

!! DAMAGE HAZARD !! Do not pull the tubing out of the orange quick-disconnect fitting. Doing so can damage the fitting.

To disconnect the air and vacuum tubing from the VPrep Pipettor:

1. Turn off the air at the source (house, cylinder, or pump).
2. If a vacuum source is connected, turn off the vacuum at the source.
3. At the back of the VPrep Pipettor, push and hold the locking collar against the quick-disconnect fitting, and then gently pull the tubing out of the fitting.

   The following diagram shows a close-up view of the quick-disconnect fitting.



   Note: Alternatively, you can use the SMC Pneumatics tool (TG-2) to aid in this task. See the manufacturer's documentation for use instructions. Contact your local SMC parts supplier for ordering details.

4. Repeat step 3 for the vacuum line, if applicable.

Related topics

For more information about…	See…
Air source requirements	"Laboratory requirements" on page 23
How to set up the VPrep Pipettor	"Workflow for setting up the VPrep Pipettor" on page 32
Component locations	"Hardware overview" on page 4

Setting Up VPrep Pipettor

4

This chapter explains how to set up the VPrep Pipettor instrument and configure the PrepWorks software. Read this chapter after unpacking and installing your VPrep Pipettor.

This chapter contains the following topics:

Workflow for setting up the VPrep Pipettor

Step	Procedure	Role	See…
1	Install the pipette head.	Operator	"Installing a pipette head" on page 33
2	Start up the VPrep Pipettor.	Operator	"Starting up the VPrep Pipettor" on page 36
3	(VWorks and BenchWorks software only) Set up or verify the device files for the pipette head and each shelf.	Administrator or Technician	User guide for the applicable Velocity11 automation control software
4	Create a VPrep Pipettor profile.	Administrator or Technician	❑ "Creating a profile for the VPrep Pipettor" on page 41 ❑ "Initializing a pipettor profile" on page 45
5	Edit or set teachpoints.	Administrator or Technician	❑ "Setting or editing shelf teachpoints" on page 46 ❑ "Ensuring teachpoint accuracy for tipboxes" on page 51 (disposable-tip pipette heads only)
6	(Special accessory shelves) Reconfigure the shelves for accessories, such as the Weigh Shelf, reinitialize the profile, and then reteach the shelf.	Administrator or Technician	"VPrep Pipettor accessories" on page 105
7	Create protocols and set task parameters.	Administrator or Technician	User guide for the applicable Velocity11 automation control software
8	Preparing to run a protocol	Operator	"Preparing to run a protocol" on page 60

Installing a pipette head

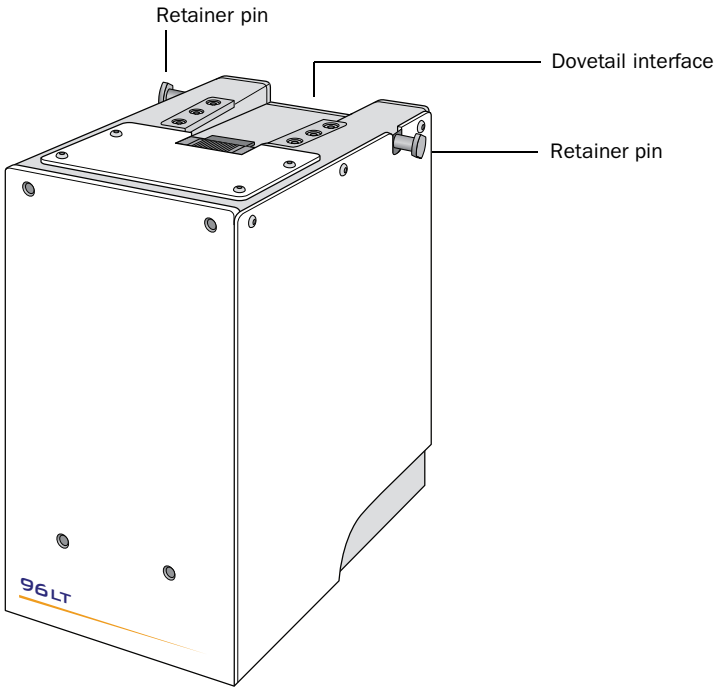
About this topic

This topic describes how to install the pipette head when you set up the VPrep Pipettor. For details on how to replace a pipette head, see "Changing the pipette head" on page 66.

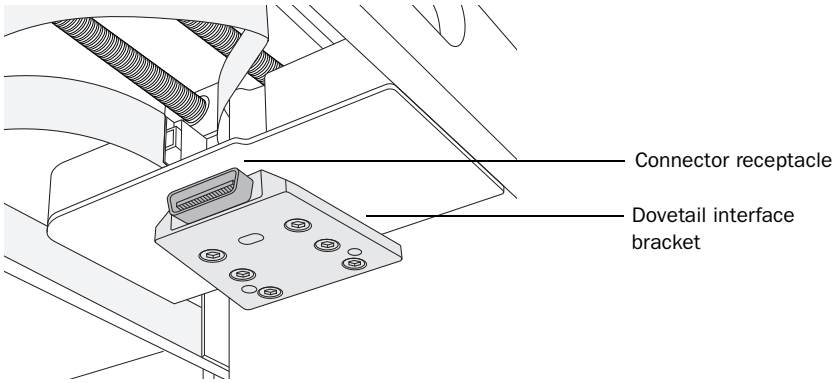
About the pipette head mount

The pipette head fits onto the head mount using a dovetail interface, shown in the following figures. The 96- and 384-channel pipette heads have two head-retainer pins that secure the head in the head mount. The 8- and 16-channel pipette heads have a lock on the front of the head.

Pipette head



VPrep Pipettor head mount (bottom view)



Installing the pipette head

!! DAMAGE HAZARD !! Always turn off the VPrep Pipettor before installing or removing a pipette head. Failure to turn off the VPrep Pipettor before installing or removing a pipette head can damage the pipette head electronics.

To install the pipette head on the head mount:

1. Verify that the head mount of the VPrep Pipettor is in an easily accessible position.

   Velocity11 ships the VPrep Pipettor with the head mount already in position for easy access.

2. On the VPrep Pipettor rear panel, ensure the power switch is set to **off (o)**.

3. Remove the pipette head from the packaging, using care to avoid touching the tips or barrels.

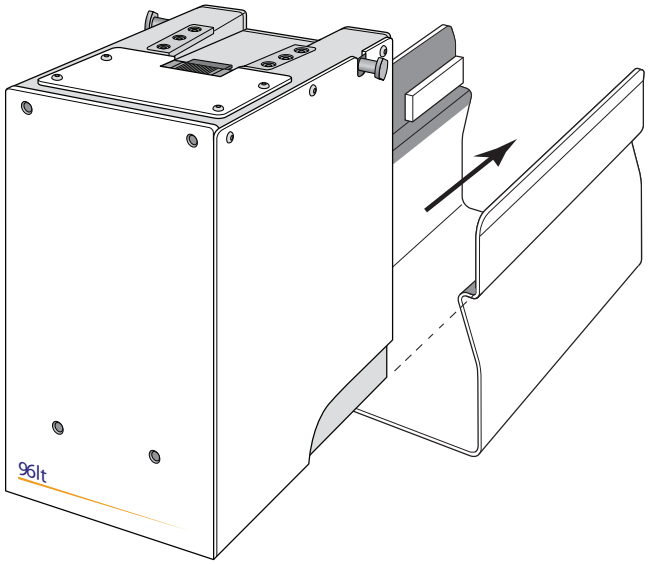
   !! DAMAGE HAZARD !! Do not place the bottom of the pipette head on a surface. Doing so can damage the pipette barrels.

4. (96- and 384-channel heads only)

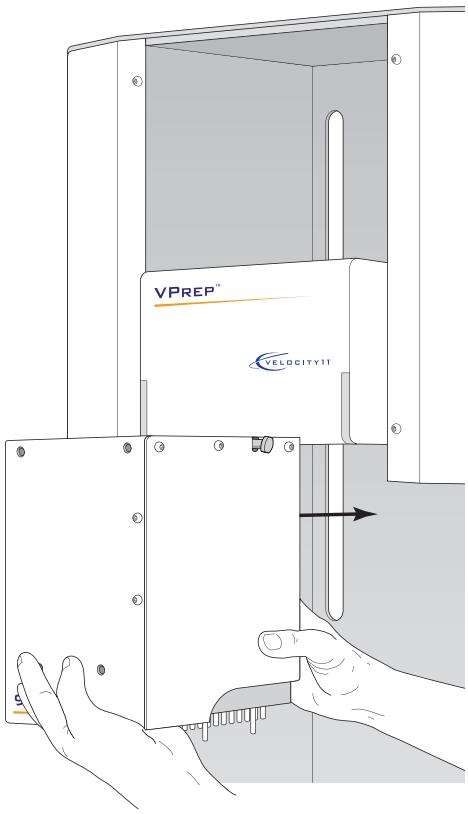
   a. Slide the head into the head stand to protect the barrels and tips.

   b. Pull out and twist the two head-retainer pins so that they remain retracted.

   c. Slide the head out of the stand.



5. Slide the pipette head onto the head mount as the figure shows.



6. Do one of the following to lock the pipette head in place:
   - (96- and 384-channel heads) Twist the two head-retainer pins so that they snap into place.
   - (8- and 16-channel heads) On the front of the pipette head, rotate the head lock (not shown) counterclockwise to the **Lock** position.
7. To verify that the pipette head is secure, firmly support the head with your hands while you attempt to move the head from side to side as if to remove it. If the head is locked, it will not disengage from the dovetail interface.

   !! DAMAGE HAZARD !! Do no touch the pipette head barrels or tips with your hands.

   !! DAMAGE HAZARD !! If the pipette head is not properly secured in place, it could drop unexpectedly. Dropping the pipette head or bumping the tips or barrels will damage the head.

Related topics

For information about…	See…
Safety guidelines	“Safety” on page 15
Starting up the VPrep Pipettor	“Starting up the VPrep Pipettor” on page 36
Replacing a pipette head	“Changing the pipette head” on page 66
Connector and switch locations	“Hardware overview” on page 4

Starting up the VPrep Pipettor

About this topic

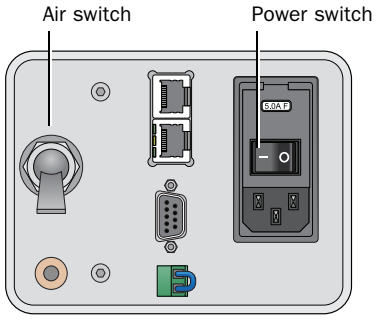
This topic describes how to start up the VPrep Pipettor.

Procedure

To start up the VPrep Pipettor:

1. On the VPrep Pipettor rear panel, check the air pressure gauge and verify the incoming air pressure is between 0.65 to 0.69 MPa (95 to 100 psi).

2. Verify that the power and serial communication cables are plugged into the VPrep Pipettor.
3. Turn on any accessories, for example, Pump Modules.
4. On the VPrep Pipettor rear panel, set the air switch to **on (up)**, and press the power switch to the **on (-)** position.



!! INJURY HAZARD !! **The shelves might move when you turn on the power and the air. Keep fingers, hair, clothing, and jewelry away from the VPrep Pipettor while it is in motion. Never touch any of the moving parts or attempt to move labware while the VPrep Pipettor is in operation. The device could pinch, pierce, or bruise you.**

5. Turn on the computer and the monitor, and start the Microsoft Windows operating system.
6. Start the lab automation control software.

Related topics

For information about…	See…
Air-pressure, power, and other requirements	“Laboratory requirements” on page 23.
The workflow this procedure belongs to	“Workflow for setting up the VPrep Pipettor” on page 32
Using lab automation software	User guide for the applicable Velocity11 automation control software

Shutting down the VPrep Pipettor

About this topic

This topic describes how and when to shut down the VPrep Pipettor.

When to do this

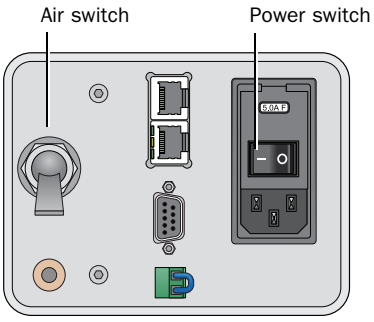
Shut down the VPrep Pipettor before you:

- ❑ Install accessories
- ❑ Clean the VPrep Pipettor
- ❑ Move the VPrep Pipettor

Procedure

To shut down the VPrep Pipettor:

1. Verify that the post-run clean-up procedure was completed after the last run.
2. (Optional) Home the pipette head.
3. Shut down the computer and turn off the monitor.
4. Turn off any accessories, for example, Pump Modules.
5. If using an Auto Filling Reservoir, drain the reservoir to prevent siphoning.
6. On the VPrep Pipettor rear panel, set the air switch to **off (down)**, and press the power switch to the **off (o)** position.



Related topics

For information about…	See…
Post-run cleanup	“Routine maintenance” on page 62
Stopping a run under normal conditions	User guide for the applicable Velocity11 automation control software
Stopping in an emergency	“Emergency stops” on page 19
Homing the pipette head	“Homing the head” on page 87

Opening VPrep Diagnostics

About this topic

This topic describes how to open VPrep Diagnostics.

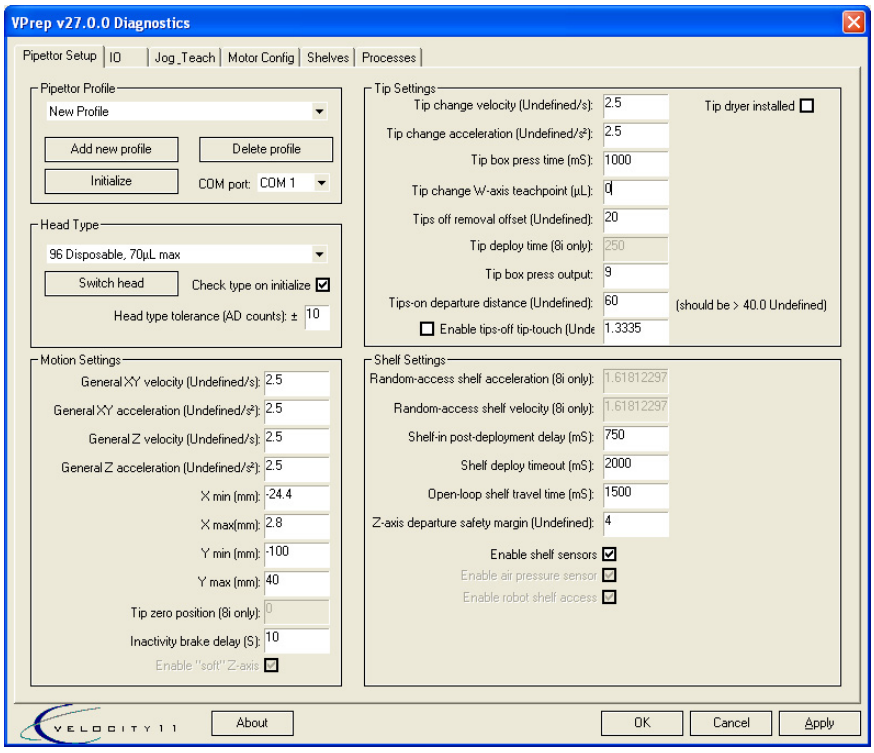
Starting from VWorks software

To open VPrep Diagnostics:

1. Start the VWorks software.
2. In the **VWorks** window, choose **File > Device File > Open**, and then select the appropriate device file (*.dev).

   !! IMPORTANT !! Before you can create a profile in VWorks, you must open or create a device file. To create a device file, see the *VWorks User Guide*.
3. On the **Device Manager** tab, click **Device Diagnostics** in the **Device List** toolbar.

Note: To show or hide a toolbar, choose **View > Toolbars**, and then select the toolbar.



Starting from PrepWorks software

To open VPrep Diagnostics:

1. Start the PrepWorks software.
2. In the **PrepWorks** window, click **Diagnostics** on the Utility toolbar.

Note: To show or hide a toolbar, choose **View > Toolbars**, and then select the toolbar.

Related topics

For information about…	See…
Starting the automation control software	User guide for the applicable Velocity11 automation control software
Creating a profile	“Creating a profile for the VPrep Pipettor” on page 41
Editing shelf teachpoints	“Setting or editing shelf teachpoints” on page 46

Creating a profile for the VPrep Pipettor

About this topic

This topic describes how to use the VPrep Diagnostics to create a profile for the VPrep Pipettor.

!! DAMAGE HAZARD !! **This topic is appropriate for lab managers, administrators, or technicians (advanced users). Using an improperly created profile can damage the VPrep Pipettor.**

About profiles

Profiles enable the automation control software to:

- ❑ Identify and communicate with the VPrep Pipettor
- ❑ Determine which pipette head is being used
- ❑ Store teachpoints and other registry file values

Every VPrep Pipettor setup that requires different teachpoints requires a profile for that set of teachpoints. For example, if you add an accessory such as a Weigh Shelf to the VPrep Pipettor, you must modify the profile to include the new teachpoint for the Weigh Shelf.

The VPrep Pipettor requires a profile for each combination of base, pipette head, and tip type. If you move a pipette head from one VPrep Pipettor to another, you must create two profiles, one for each VPrep Pipettor base. The VPrep Pipettor has no firmware, so all configuration settings are stored in the profile, which is part of the Windows registry.

Profiles for disposable-tip heads

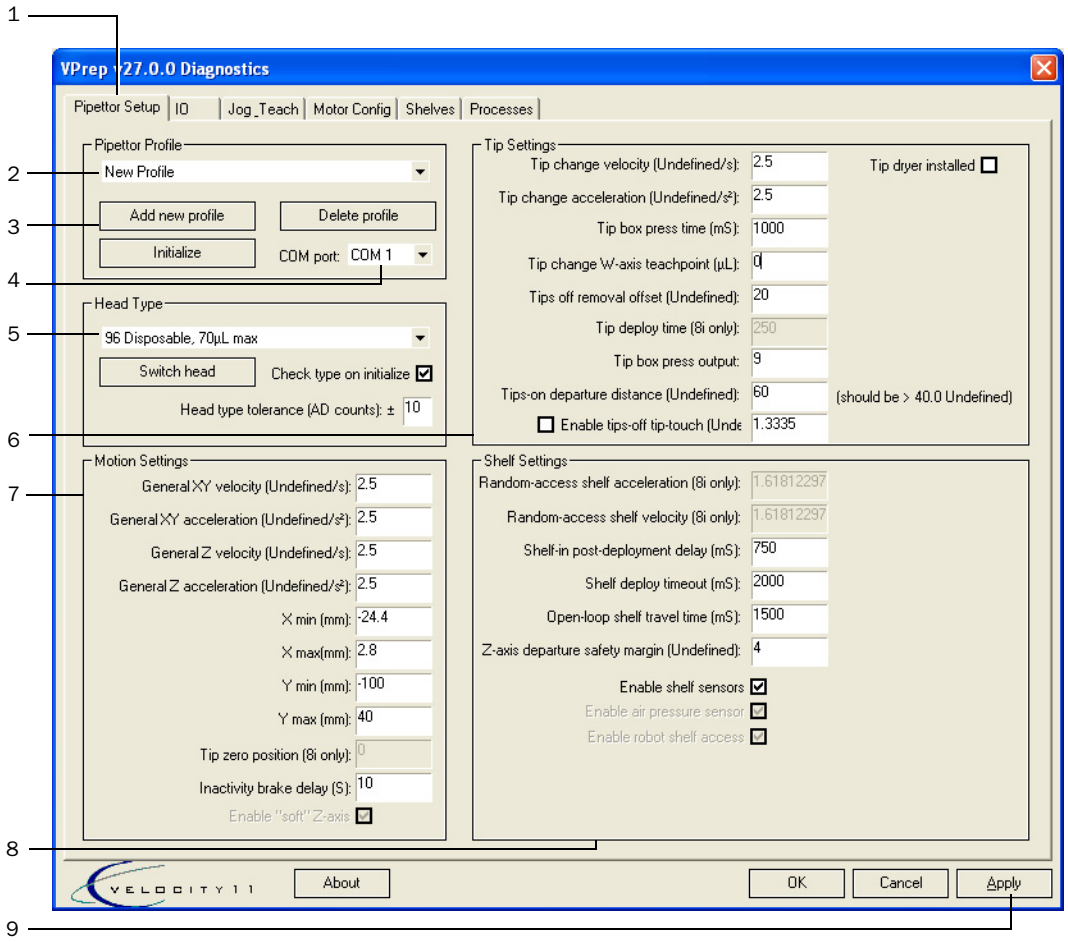
You must have a pipette profile for each combination of VPrep Pipettor base, pipette head, and tip type. For example, if your laboratory has two VPrep Pipettors (base A and base B) that share two pipette heads (heads 1 and 2), and the pipette heads can use two tip sizes (tip n and nn), you must have eight profiles to accommodate each of the eight possible configurations. The following table shows this example.

Example of eight configurations that require eight profiles

Tips	Base A		Base B	
	Head 1	**Head 2**	**Head 1**	**Head2**
Tip n	*Profile 1:* base A head 1 tip n	*Profile2:* base A head 2 tip n	*Profile 5:* base B head 1 tip n	*Profile 6:* base B head 2 tip n
Tip nn	*Profile 3:* base A head 1 tip nn	*Profile 4:* base A head 2 tip nn	*Profile 7:* base B head 1 tip nn	*Profile 8:* base B head 2 tip nn

Creating a profile

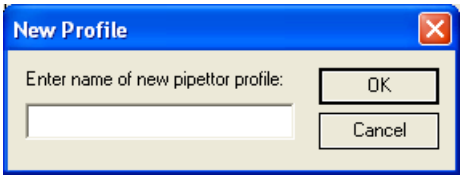
The following figure shows the steps for creating a profile.



To create a profile:

1. In VPrep Diagnostics, click the **Pipettor Setup** tab.
2. Under **Pipettor Profile**, select an existing profile with similar settings to use as a template for creating the new profile. For example, select an LT or ST profile depending on whether you are using an LT or ST pipette head.

   The software automatically copies the settings from the previously selected profile.
3. Click **Add new profile**, type a name in the **New Profile** dialog box, and click **OK**.



Use a profile name that identifies the specific configuration. For example, a profile named 96LT 12.00096.00Z2_022X07 identifies the pipette head type, the head serial number, and the VPrep Pipettor base serial number.

4. Verify the **COM port** is set to the correct serial port on the controlling computer.
5. Configure the pipette head settings as follows:

   !! DAMAGE HAZARD !! Do not change the Head type tolerance setting from the Velocity11 default.

   a. Select the **Head Type** from the list.

   b. Ensure the **Check type on initialize** check box is selected (default) if you want to be notified if the mounted head does not match the profile head type when you run a protocol.

      !! IMPORTANT !! You should clear the check box under certain conditions. For example, if the VPrep Pipettor with an 8F50 pipette head is part of a BioCel system, selecting the check box could disrupt initialization.
6. (Disposable-tip pipette heads only) Under **Tip Settings**, verify the values for the tip-change parameters. For details, see “Tip Settings area” on page 138.
7. In the **Motion Settings** area, verify the general velocity and acceleration parameters. For details, see “Motion Settings area” on page 137.

   !! DAMAGE HAZARD !! Do not change the Xmin, Xmax, Ymin, Ymax settings from the Velocity11 default settings.

   !! DAMAGE HAZARD !! Do not increase the velocity or acceleration settings, because doing so could damage the VPrep Pipettor.
8. Under **Shelf Settings**, verify the applicable settings. See “Shelf Settings area” on page 139.
9. Click **Apply** to save the new profile.

The VPrep Pipettor must be initialized before you edit the teachpoints. See “Initializing a pipettor profile” on page 45.

Related topics

For information about…	See…
Opening VPrep Diagnostics	“Opening VPrep Diagnostics” on page 39
Replacing the pipette head	“Changing the pipette head” on page 66
Initializing a profile	“Initializing a pipettor profile” on page 45
Setting teachpoints	“Setting or editing shelf teachpoints” on page 46
Creating and running protocols	User guide for the applicable Velocity11 automation control software

Initializing a pipettor profile

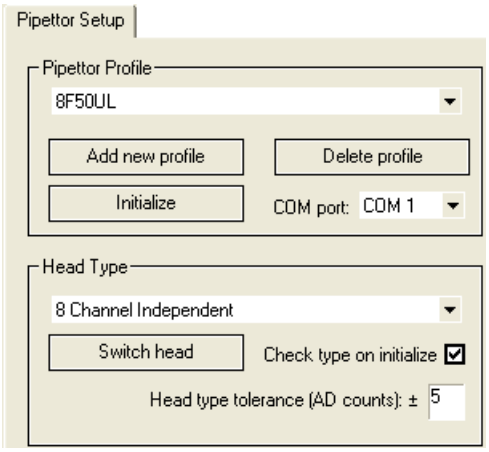
About this topic

To initiate communication with the VPrep Pipettor using a new profile, you must initialize the profile.

Initializing a profile

To initialize the profile:

1. In VPrep Diagnostics, click the **Pipettor Setup** tab.



2. Select the **Pipettor Profile** from the list.
3. Verify that the specified **Head Type** matches the pipette head mounted on the VPrep Pipettor.

   For example, if you installed a Series III pipette head, you must select a Series III head type.
4. Click **Initialize** to establish communication with the VPrep Pipettor. You can hear a click when the initialization is complete.

Related topics

For information about…	See…
Opening VPrep Diagnostics	“Opening VPrep Diagnostics” on page 39
Creating a profile	“Creating a profile for the VPrep Pipettor” on page 41
Replacing the pipette head	“Changing the pipette head” on page 66
Setting teachpoints	“Setting or editing shelf teachpoints” on page 46
Creating and running protocols	User guide for the applicable Velocity11 automation control software

Setting or editing shelf teachpoints

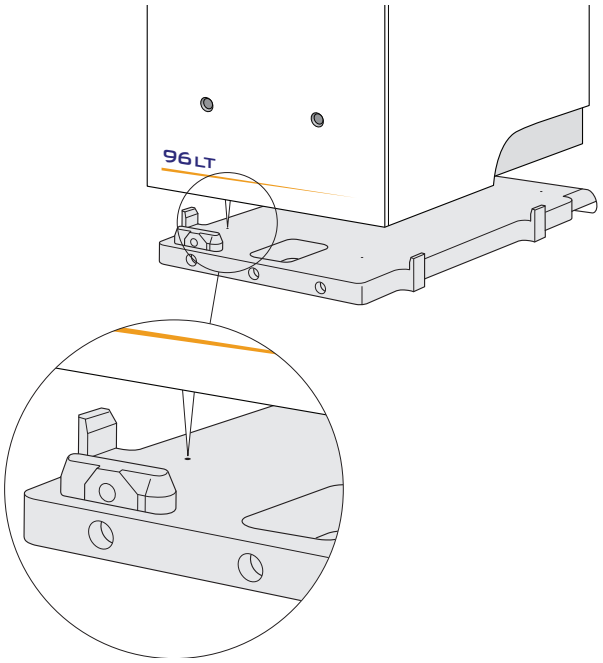
About this topic

This topic describes how to set and edit the shelf teachpoints for the VPrep Pipettor.

!! DAMAGE HAZARD !! This topic is appropriate for lab managers, administrators, or technicians (advanced users). Setting a teachpoint incorrectly can damage the VPrep Pipettor.

Teachpoint defined

A teachpoint is the *x*-, *y*-, and *z*-axial coordinates that the pipette head moves to when the left-front tip (A1 position for a 96-well plate) is over the shelf index point and almost touching the surface of the shelf.



When aspirating or dispensing, the software uses the shelf teachpoint and information about the labware geometry to determine where to position the pipette head to access the wells specified in the protocol.

When to do this

You must edit teachpoints when you:

- ❑ Set up the VPrep Pipettor
- ❑ Add an additional accessory or pipette head to the VPrep Pipettor

Before you begin

Verify that the following conditions are met:

- ❑ You have administrative privileges for the Windows Registry.

  Teachpoints are stored in the Windows registry, which requires administrative privileges for making changes. See the system administrator for details.
- ❑ (BenchWorks and VWorks software only) A device file exists for the VPrep Pipettor.
- ❑ The shelves are free of any labware and are in the out position.
- ❑ You selected the correct profile and head type, and you initialized the profile.
- ❑ You are familiar with the axes of motion. See "VPrep Pipettor axes" on page 7.

!! DAMAGE HAZARD !! Use the Toggle shelf button to move previously used shelf to the out position before selecting a new shelf.

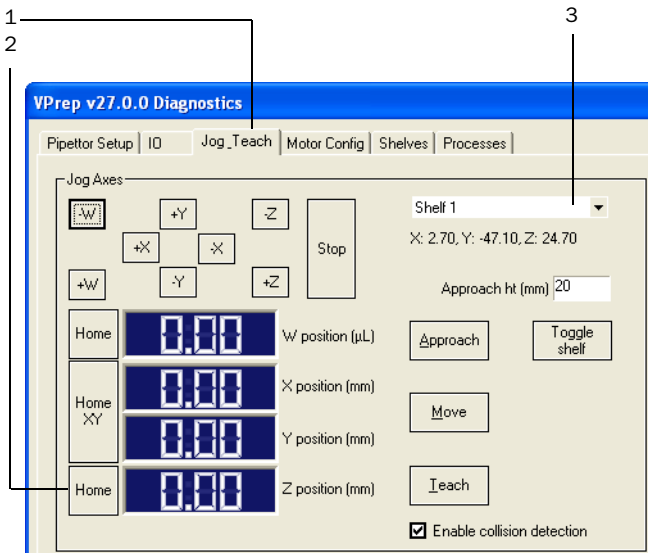
!! DAMAGE HAZARD !! To stop the pipette head in an emergency, press the red button on the robot-disable pendant to immediately stop the head movement. Note that the Stop button on the Jog Teach tab is not an immediate stop.

Note: Each shelf teachpoint is set individually. Adjusting one shelf's teachpoint has no effect on the another shelf's teachpoint.

Editing a shelf teachpoint

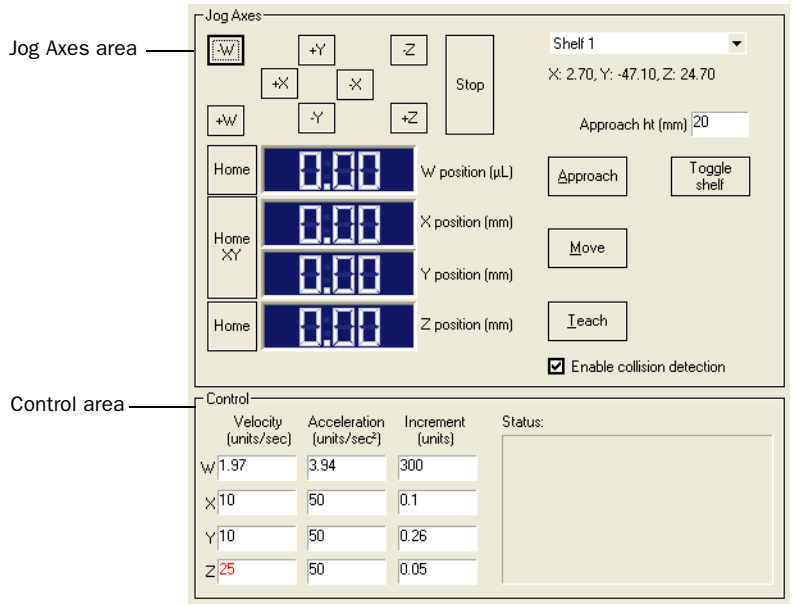
To edit a teachpoint

1. In VPrep Diagnostics, click the **Jog Teach** tab.



2. To ensure that the pipette head is out of the path of the shelves, click the **Home Z position** button.

3. Select a shelf from the list. The currently stored coordinates for that teachpoint appear below the list. Make a note of the stored coordinates as a back-up.
4. (Disposable-tip head only) Manually attach a single tip to the A1 barrel (left front) of the pipette head.
5. In the **Jog Axes** area, set the **Approach ht** to a safe stopping distance above the shelf (typically, 20 mm).



!! IMPORTANT !! The approach height value is dependent on the type of head, the tip size, and shelf height. For example, the Approach height for shelves 1 and 2 might be smaller than the approach height for other shelves. If you are uncertain about how to set this value, start with a large value, such as 50 mm.

6. Click **Approach**. The head moves along the *x*-, *y*-, and *z*-axes to the specified point above the saved teachpoint.
7. Verify that the shelf has enough clearance to move into position under the pipette head. If necessary, adjust the approach height to ensure sufficient clearance.
8. Click **Toggle shelf**. The shelf slides into position under the pipette head.
9. Use the **Control** parameter settings and the axis buttons under **Jog Axes** to jog the pipette head down to the teachpoint position as follows:

   !! IMPORTANT !! You may want to set the Z Increment value based on how far above the shelf the pipette head is located. If you are uncertain about how to set this value, start with a small value, such as 1 mm or less.

   a. Under **Control**, set the **Z Increment** to approximately 2–5 mm.

   b. Under **Jog Axes**, click the **+Z** button to jog the head down until it approaches the shelf.

c. Under **Control**, set the **Z Increment** to a smaller value, approximately 0.1–0.2 mm.

d. Set the **X** and **Y Increment** to approximately 0.1–0.2 mm.

e. Under **Jog Axes**, click the **+Z** button to jog the head down until the tip is as close as possible to the shelf without actually touching the shelf. You should be able to slide a thin sheet of paper between the shelf and the tip.

f. Use the **X** and **Y** buttons to position the tip exactly at the shelf index point.

10. (Shelves 1–6 only) Click **Teach**, and then click **Yes** when the confirmation dialog box appears.

    The software stores the coordinates of the pipette head as the teachpoint for the selected shelf.

11. (Shelves 7 and 8 only) If you are using short tips, for example 10 µL or 30 µL tips, go to "Teaching shelves 7 and 8 for short tips" on page 49.

    For all other tip sizes, move the tip to the shelf index mark as described in step 9 above. Then adjust for the *y*-axis offset as follows:

    a. Under **Control**, set the **Y Increment** to **5**.

    b. Under **Jog Axes**, click the **+Y** button.

    c. Click **Teach**, and then click **Yes** when the confirmation dialog box appears.

    Note: The index points on shelves 7 and 8 are offset 5 mm out along the *y*-axis from the location of the A1 well in a 96-well plate.

12. Under **Jog Axes**, click **Approach** to move the pipette head up, and then click **Toggle shelf** to move the shelf out.

13. Repeat step 3 to step 12 to teach the next shelf.

(Disposable-tip heads only) After you adjust the shelf teach points for shelves 7 and 8, see "Ensuring teachpoint accuracy for tipboxes" on page 51.

Teaching shelves 7 and 8 for short tips

Generally, the *xy*-axis coordinates for shelves 2, 4, and 6 are identical, and the *xy*-axis coordinates for shelves 1, 3, and 5 are identical. Because the short tips cannot reach the index point on shelves 7 and 8, you can adjust the shelf teachpoint using the *xy*-axis coordinates from the shelf above the one that you are teaching.

To adjust the shelf teachpoint for short tips:

1. Ensure the pipette head is in the home position and the shelves are in the out position.
2. To teach shelf 7, approach the teachpoint for shelf 5 as follows:

   a. In the **Jog Axes** area, select **Shelf 5** from the list.

b. Ensure the **Approach ht** is set to a safe stopping distance above the shelf, and then click **Approach**.

The pipette head moves to the shelf 5 approach height. The *x*- and *y*-axes coordinates for the shelf 7 teachpoint will be based on the shelf 5 teachpoint.

3. Select **Shelf 7** from the list, and then click **Toggle shelf**. Shelf 7 moves into position under the pipette head.
4. Set the **Z Increment** to approximately 1 mm, and then click the **+Z** button to jog the head down as far as it will go.
5. Click **Teach**, and then click **Yes** when the confirmation dialog box appears.
6. Under **Jog Axes**, click **Approach** to move the pipette head up, and then click **Toggle shelf** to move the shelf out.
7. To teach shelf 8, perform step 2 to step 6, but use the shelf 6 *xy*-axes coordinates.

(Disposable-tip heads only) After you adjust the shelf teach points for shelves 7 and 8, see "Ensuring teachpoint accuracy for tipboxes" on page 51.

Related topics

For information about…	See…
Opening VPrep Diagnostics	"Opening VPrep Diagnostics" on page 39
Creating profiles	"Creating a profile for the VPrep Pipettor" on page 41
Ensuring teachpoints for tipboxes	"Ensuring teachpoint accuracy for tipboxes" on page 51
Initializing a profile	"Initializing a pipettor profile" on page 45
Configuring a shelf for an accessory, such as the Weigh Shelf	"VPrep Pipettor accessories" on page 105
Creating protocols	User guide for the applicable Velocity11 automation control software
Preparing to run a protocol	"Preparing to run a protocol" on page 60

Ensuring teachpoint accuracy for tipboxes

About this topic

The tips-on and tips-off operations for disposable-tip pipette heads require a tipbox on shelf 7 or 8 to attach the fresh tips and receive the used tips.

!! DAMAGE HAZARD !! This topic is appropriate for lab managers, administrators, or technicians (advanced users). Setting a teachpoint incorrectly can damage the VPrep Pipettor.

When to do this

The pipette head barrels must be located at a specific position relative to the tipbox for proper tipbox operations. The software uses a combination of the shelf teachpoint and the tipbox labware definition to position the head correctly.

!! DAMAGE HAZARD !! The VPrep Pipettor requires a pipette profile for each combination of base, pipette head, and tip size. Teachpoint values created for one combination can be inaccurate for another.

!! IMPORTANT !! Make sure you set the teachpoints for shelves 7 and 8 before making any teachpoint adjustments for tipboxes.

Each combination of VPrep Pipettor base, pipette head, shelf, and tip size requires an adjustment to the shelf teachpoint or the tipbox labware definition. Your system setup determines which type of adjustment is appropriate:

- *Teaching tipboxes.* If no other devices share the labware definitions, teach the tipbox. You can also teach the tipbox if you are setting up the first device in a system that contains multiple devices. When you teach the tipbox, the software stores the offset in the tipbox labware definition.
- *Adjusting shelf teachpoints for tipboxes.* If multiple devices share the tipbox labware definitions, adjust the shelf teachpoints rather than changing the tipbox labware definition. In this case, the software stores the teachpoint adjustment (offset) in the selected profile.

!! DAMAGE HAZARD !! Modifying the coordinates for a tipbox labware definition based on one device can invalidate the labware definition for other devices in the system. For example, teaching a tipbox for shelf 7 can invalidate the tipbox definition for shelf 8.

To determine when to adjust the shelf teachpoint for tipbox operations rather than teaching the tipbox, see the following workflows.

Workflows

The workflow you use varies depending on whether the VPrep Pipettor is a standalone instrument or part of a lab automation system that shares tipbox labware definitions.

Workflow for a standalone VPrep Pipettor

Step	Procedure	See…
1	Open VPrep Diagnostics.	"Opening VPrep Diagnostics" on page 39
2	Ensure the shelf teachpoints are set properly.	"Setting or editing shelf teachpoints" on page 46
3	Teach the tipbox on the tipbox on shelf 7 or 8.	"Teaching a tipbox" on page 53

Workflow for devices that share a tipbox labware definition

Step	Procedure	See…
1	Open VPrep Diagnostics.	"Opening VPrep Diagnostics" on page 39
2	Ensure the shelf teachpoints are set properly.	"Setting or editing shelf teachpoints" on page 46
3	Teach the tipbox on the target shelf of the first VPrep Pipettor only.	"Teaching a tipbox" on page 53
4	Determine if the tipbox definition is valid for the same shelf on the next VPrep Pipettor in the system. If necessary, adjust the teachpoint of the tipbox shelf. Repeat this step for each VPrep Pipettor in the system.	❑ "Evaluating a shelf teachpoint for a tipbox" on page 56 ❑ "Adjusting a shelf teachpoint for a tipbox" on page 58
5	If both shelves 7 and 8 are tipbox shelves, determine if the saved tipbox definition works on shelf 8 of each VPrep Pipettor in the system. If necessary, adjust the shelf 8 teachpoints.	❑ "Evaluating a shelf teachpoint for a tipbox" on page 56 ❑ "Adjusting a shelf teachpoint for a tipbox" on page 58

Before you begin

!! DAMAGE HAZARD !! If the system includes a combination of VPrep Pipettor and Bravo instruments, do not perform the following procedure without first contacting Velocity11 Technical Support for assistance.

Tipbox operations can be performed from shelf 7 or 8. At the teachpoint for a tipbox, the barrels should be just inside the tip collars when the tipbox press is actuated during a tips-on or tips-off process.

Verify the following:

- ❑ The shelf teachpoint is set for the selected profile.
- ❑ All labware is removed from the shelves.
- ❑ No tips are installed on the pipette head.
- ❑ A labware definition exists for the tipbox.

Teaching a tipbox

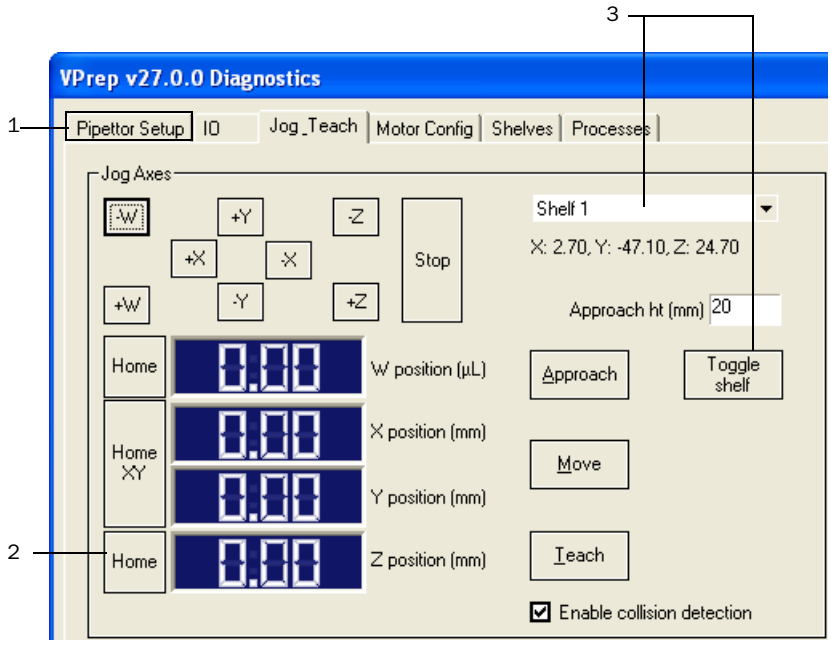
!! DAMAGE HAZARD !! Modifying the coordinates for a tipbox labware definition based on one device can invalidate the labware definition for the other devices in the system.

!! DAMAGE HAZARD !! The Teach tip box button can change the row-wise and column-wise teachpoint to well values in the labware definition. For a 384-well tipbox, these values should always be 2.25.

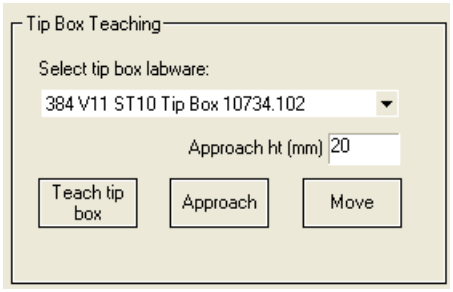
If no other devices share the labware definitions on the computer that controls the VPrep Pipettor, you can edit the tipbox labware definition without the risk of compromising the accuracy for another device. When you teach a tipbox, the adjusted coordinates are saved in the labware definition as an offset distance from the teachpoint of the shelf that holds the tipbox.

To teach a tipbox:

1. On the **Pipettor Setup** tab, select and initialize the profile.
2. On the **Jog Teach** tab, click the **Home Z position** button to ensure that the pipette head is out of the path of the shelves.



3. Select the tipbox shelf (shelf 7 or 8) from the list, and then click **Toggle shelf**. The shelf slides into place below the pipette head.
4. Place the tipbox containing a full set of tips securely in place on the specified shelf.
5. Under **Tip Box Teaching**, do the following:
   a. Select the tipbox from the **Select tip box labware** list.



   b. Set the **Approach ht** to a safe stopping distance above the tipbox, approximately 50 mm.

      !! IMPORTANT !! The value that you use for approach height varies depending on the type of pipette head and the labware height.

   c. Click **Approach**. The pipette head moves to the specified location above the tipbox.
6. Fine tune the pipette head position as follows:
   a. Under **Control**, set the **Z Increment** to a small value, approximately 2 mm to 5 mm.

b. Click the **+Z** button repeatedly until the pipette head approaches the tipbox.

c. Set the **Z Increment** to a much smaller value, approximately 0.1 mm to 0.2 mm.

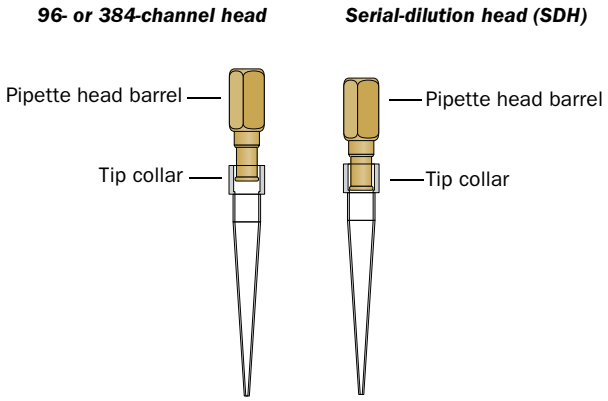
d. Set the **X** and **Y Increment** units to approximately 0.1 mm to 0.2 mm.

e. Use the **X** and **Y** buttons to position the barrel nozzles above the center of the tip collars.

f. Click the **+Z** button repeatedly until the pipette head barrels are in the correct position for the head type.

For 96- or 384-channel heads, ensure the head barrels are halfway into the tip collars.

For serial-dilution heads, ensure the head barrels are all the way into the tip collars.

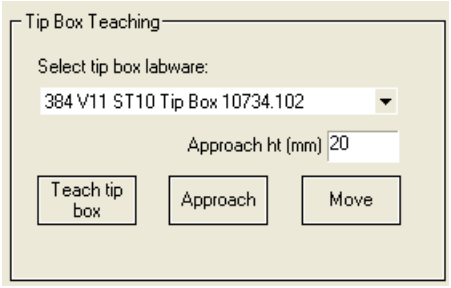


7. Click **Teach tip box**. The software saves the coordinates (offsets from the shelf teachpoint) in the tipbox labware definition.

!! IMPORTANT !! If you use both serial dilution pipette heads and 96- or 384-channel pipette heads on the same VPrep Pipettor base, two different labware definitions are required for the tipbox because the *z*-axis offset is different.

To test the tipbox coordinates:

1. Under **Tip Box Teaching**, do the following:



a. Click **Approach**. The pipette head moves to the approach height above the tipbox.

b. Click **Move**. The pipette head moves down inserting the barrels into the tips.

To remove the tips from the pipette head, see "Running the Tip attach task" on page 102.

2. To move the pipette head out of the path of the shelves, click the **Home Z position** button.
3. Remove the tipbox from the shelf, and click **Toggle shelf** to move the shelf to the out position.

Evaluating a shelf teachpoint for a tipbox

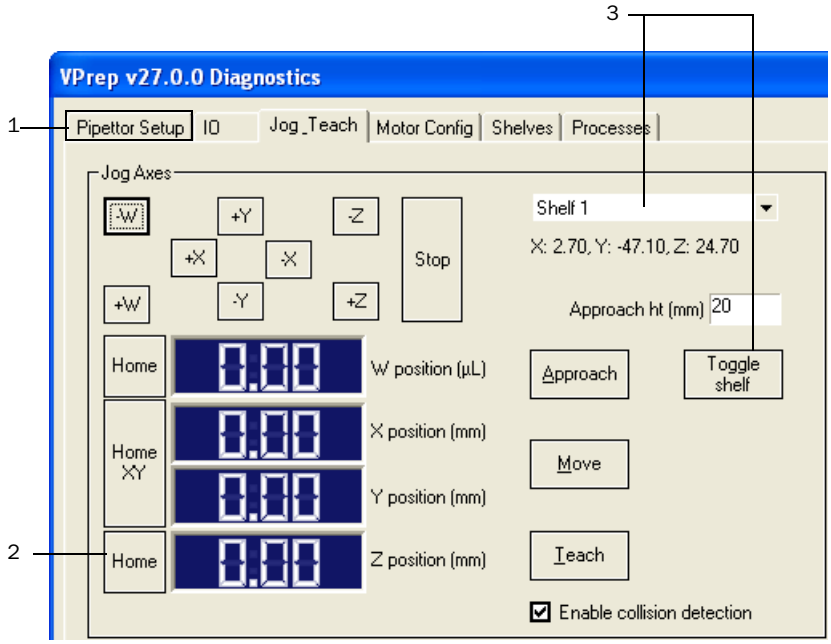
The labware database stores the definitions of every piece of labware that you use with your VPrep Pipettor. If the VPrep Pipettor is part of a system that shares labware definitions, use the following procedure to adjust the shelf teachpoint for a tipbox instead of reteaching the tipbox.

The teachpoint for the tipbox is based on the teachpoint for shelf 7 or shelf 8 and then adjusted in the *z*-axis.

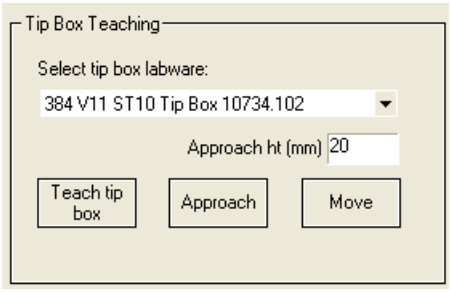
!! DAMAGE HAZARD !! If you are adjusting the shelf teachpoint for a tipbox, make sure you set up labware classes to ensure only that tipbox is used on that shelf. For details on setting up labware classes, see your software user guide, such as the *VWorks User Guide*.

To evaluate the precision of a shelf teachpoint for a tipbox:

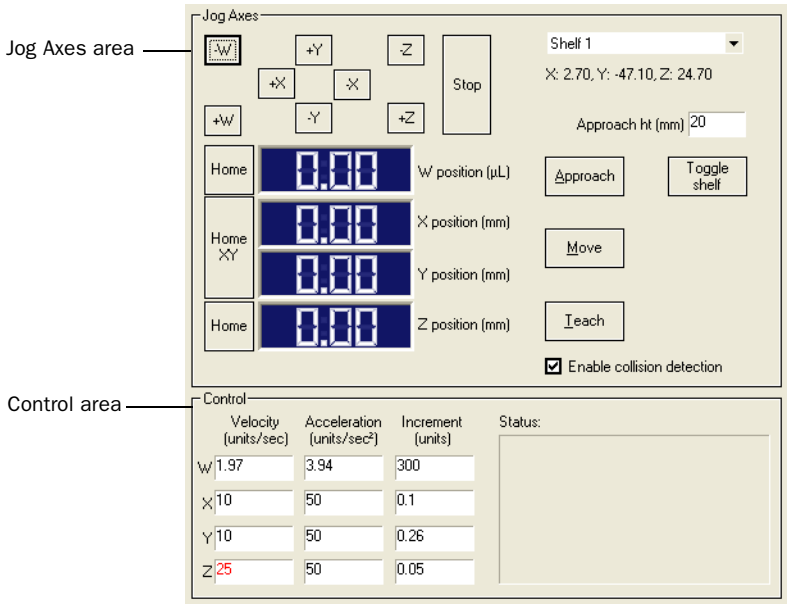
1. On the **Pipettor Setup** tab, ensure that the correct profile is selected. If you have not already done so, initialize the profile.
2. On **Jog Teach** tab, click the **Home Z position** button to ensure that the pipette head is out of the path of the shelves.
3. Select the tipbox shelf (shelf 7 or 8) from the list, and then click **Toggle shelf**. The shelf slides into place below the pipette head.



4. Place a tipbox containing a full set of tips securely in place on the selected shelf.
5. In the **Tip Box Teaching** area, set the **Approach ht** to 50 mm, and then click **Approach**. The head moves to the specified location above the tipbox.

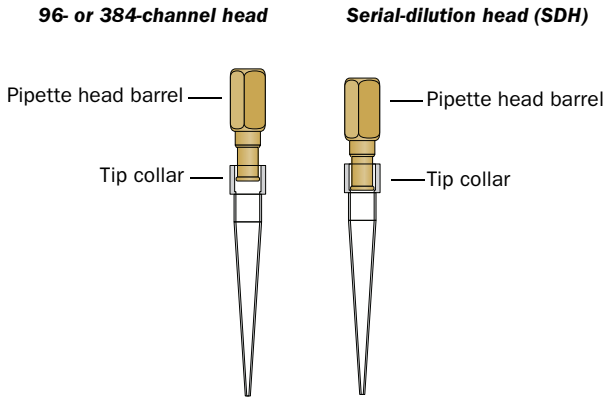


6. Use the settings under **Control** and the axis buttons in the **Jog Axes** area to jog the head down slowly to the stored *z*-axis location as follows:
   a. In the **Control** area, set the **Z Increment** value to 10 mm, and then click the **+Z** button to move the head until you have moved approximately 40 mm.
   b. Reduce the **Z Increment** value to 1 mm or less, and click the **+Z** button to move the head until it has traveled 50 mm.
   c. Keep track of the total distance moved. When you have moved 50 mm you will have arrived at the saved *z*-axis location.



7. Determine if the tips are in the correct location for the type of pipette head:
   - *96- or 384-channel pipette heads*. The head barrels should be halfway into the tip collars, as the figure shows.

- *Serial-dilution pipette heads (SDH)*. The head barrels should be all the way down into the tip collars.



If the tips are in the correct location, no teachpoint adjustment is required.

If the tips are not in the correct location, see "Adjusting a shelf teachpoint for a tipbox" on page 58.

Adjusting a shelf teachpoint for a tipbox

Before performing the following procedure, evaluate whether the shelf teachpoint is appropriate for the tipbox. See "Evaluating a shelf teachpoint for a tipbox" on page 56.

To adjust the shelf teachpoint for the tipbox:

!! DAMAGE HAZARD !! If you are adjusting the shelf teachpoint for a tipbox, make sure you set up labware classes to ensure only that tipbox is used on that shelf. For details on setting up labware classes, see the software user guide, such as the *VWorks User Guide*.

1. On the **Jog Teach** tab, use the **X** and **Y** buttons to fine tune the head position. When the tips are in the correct position, record the *xy*-axis coordinates that appear in the **Jog Axes** display.
2. Under **Tip Box Teaching**, click **Approach** to lift the pipette head.
3. Remove the tipbox from the shelf.
4. Under **Jog Axes**, click **Move** to bring the pipette head to the saved shelf teachpoint.
5. Use the **X** and **Y** buttons to move the pipette head to the *x*- and *y*-axes coordinates that you recorded in step 1.
6. Click **Teach** to save the adjusted shelf teachpoint.

!! IMPORTANT !! The shelf is now configured for tipbox operations when referencing the saved labware definition offsets for the specific tipbox type.

Related topics

For information about…	See…
Opening VPrep Diagnostics	“Opening VPrep Diagnostics” on page 39
Setting the shelf teachpoints	“Setting or editing shelf teachpoints” on page 46
Creating profiles	“Creating a profile for the VPrep Pipettor” on page 41
Initializing a profile	“Initializing a pipettor profile” on page 45
Configuring a shelf for an accessory, such as the Weigh Shelf	“VPrep Pipettor accessories” on page 105
Defining labware and creating protocols	User guide for the applicable Velocity11 automation control software
Performing tips-on and tips-off tasks	“Running the Tip attach task” on page 102
Preparing to run a protocol	“Preparing to run a protocol” on page 60

Preparing to run a protocol

About this topic

This topic describes how to prepare the VPrep Pipettor for a run.

Procedure

To prepare the VPrep Pipettor for a a run:

1. Ensure the correct pipette head is installed and the VPrep Pipettor is turned on.
2. Initialize the profile for the hardware configuration. See “Initializing a pipettor profile” on page 45.
3. If required, place plates, tipboxes, and other labware in their correct locations on the VPrep Pipettor shelves.
4. If you are using an accessory, such as a Pump Module or Weigh Shelf, ensure the reservoirs are filled, the waste bottles are empty, and all tubing is correctly connected.
5. Ensure that the protocol has been checked for errors using the compile feature. If possible, run the protocol in simulation mode to identify possible conflicts or errors.

Related topics

For information about…	See…
Installing and setting up VPrep Pipettor	❑ “Installing VPrep Pipettor” on page 21 ❑ “Setting Up VPrep Pipettor” on page 31
Installing, setting up, and running the automation control software	User guide for the applicable Velocity11 automation control software
Initializing the VPrep Pipettor	“Initializing a pipettor profile” on page 45
Changing the pipette head	❑ “Changing the pipette head” on page 66 ❑ “Installing a pipette head” on page 33

Maintaining VPrep Pipettor

5

This chapter describes how to maintain the VPrep Pipettor in good working order and what to do when you encounter a problem.

This chapter contains the following topics:

Routine maintenance

About this topic

Preventive maintenance is an important part of keeping the VPrep Pipettor running smoothly and error free. This topic describes the periodic routine maintenance you should perform.

Practice good housekeeping by cleaning up spills immediately and routinely cleaning the VPrep Pipettor and pipette head after use. Contact Velocity11 Technical Support if you are unable to resolve problems.

Routine inspection and maintenance

Periodically, perform the routine maintenance listed below. Your schedule might vary depending on the frequency of VPrep Pipettor use.

Maintenance task	Schedule	Symptoms
Clean the VPrep Pipettor.	Weekly or as needed	Dust, grime, or chemical deposits on exterior
Verify shelf teachpoint accuracy	Bimonthly	Inaccurate dispensing on a particular shelf
Calibrate the Weigh Shelf, if applicable.	Bimonthly	Deterioration of liquid-level accuracy in reservoir
Inspect the Pump Module tubing. Change out the tubing as necessary.	Monthly	Tube deterioration, or liquid fails to pump or fails to drain properly
Check the pressure gauge on the rear panel and check the air-pressure level at the air source.	Monthly	Insufficient air pressure errors and unresponsive shelves
Inspect shelf movement for smoothness.	Monthly	Jerky shelf movement, or shelf moves too fast or too slow
Inspect moving parts to ensure they are not rubbing against each other.	Monthly	Rub marks or noises that might indicate rubbing

Related topics

For information about…	See…
Safety guidelines	“Safety” on page 15
Cleaning between protocol runs	“Cleaning up after a run” on page 63
Cleaning the VPrep Pipettor	“Cleaning the VPrep Pipettor” on page 65
Air source requirements	“Laboratory requirements” on page 23
Reporting a problem	“Reporting problems” on page 82

Cleaning up after a run

About this topic

This topic describes the post-run tasks you perform after a protocol run before running the next protocol.

Cleaning up after a run

To clean up the VPrep Pipettor after a run:

1. Ensure the tips are clean or fresh:
   - *Fixed-tip pipette head*. Use the wash-tips task in VPrep Diagnostics to wash the pipette tips.
   - *Disposable-tip pipette head*. Use the tips-off task in VPrep Diagnostics to remove the pipette tips.
2. Ensure all shelf and head movement has stopped, and then remove any manually placed labware from the shelves, and clean the shelves and base of any spills or debris.
3. Wash the liquid reservoirs and wash trays.
4. If the system has a Pump Module:
   a. (Optional) Wash the tubing and reinstall the reservoirs or wash trays. Ensure that the tubing is connected to the correct pumps and allows the shelves to move freely.
   b. Fill the fluid reservoir bottle, replace the cap, and attach the fluid line that pumps towards the VPrep Pipettor to the cap connector.
   c. Empty the waste container, replace the cap, and attach the fluid line that pumps away from the VPrep Pipettor to the cap connector.
   d. To prime the fluid lines between the pump and reservoirs, use VPrep Diagnostics to fill the lines with the appropriate fluid.
5. Check the run log file for errors. For details on the run log, see the appropriate software user guide, such as *VWorks User Guide*.
6. (Weigh Shelf only) Recalibrate the Weigh Shelf if:
   - Moving the reservoir, wash station, and Weigh Shelf
   - Changing the tubing connected to the reservoir or wash station
   - Changing the liquid type used in the reservoir or wash station
   - More than two weeks have elapsed since the last Weigh Shelf calibration

Related topics

For information about…	See…
Log and data files	User guide for the applicable Velocity11 automation control software
Safety guidelines	“Safety” on page 15
Shutting down	“Shutting down the VPrep Pipettor” on page 38
Maintaining the VPrep Pipettor	“Routine maintenance” on page 62
Wash tips and tips-on and off tasks	“Running diagnostics tasks” on page 96
Calibrating a Weigh Shelf	“Calibrating a Weigh Shelf” on page 124
Reporting a problem	“Reporting problems” on page 82

Cleaning the VPrep Pipettor

About this topic

This topic provides guidelines for periodic routine cleaning of the VPrep Pipettor to remove dust, grime, or chemical deposits on the exterior.

For details on cleaning up between protocols, see “Cleaning up after a run” on page 63.

Procedure

!! INJURY HAZARD !! Disconnect the power and communication cables before cleaning.

!! DAMAGE HAZARD !! Do not use harsh abrasives, corrosive cleaning agents, or metal brushes to clean any VPrep Pipettor component or accessory.

To clean the VPrep Pipettor:

1. Shut down the VPrep Pipettor.
2. Disconnect the power cord and communication cord.
3. Use standard laboratory wipes and a mild detergent or ethanol to clean the painted white surfaces and the aluminum surfaces.

Related topics

For information about…	See…
Safety guidelines	“Safety” on page 15
Shutting down the VPrep Pipettor	“Shutting down the VPrep Pipettor” on page 38
Cleaning between protocol runs	“Cleaning up after a run” on page 63
Moving the pipette head	“Moving the pipette head manually” on page 71
Removing the pipette head	“Changing the pipette head” on page 66
Maintaining the VPrep Pipettor	“Routine maintenance” on page 62
Reporting a problem	“Reporting problems” on page 82

Changing the pipette head

About this topic

This topic describes how to exchange the pipette head using the Switch Head wizard in VPrep Diagnostics. The wizard positions the pipette head for easy access and provides prompts that step you through the procedure.

Before you begin

!! IMPORTANT !! If a pipette head is being used for the first time, make sure you have a profile specifically for the pipette head.

Verify the following:

- ❑ (Disposable-tip pipette heads only) The currently mounted head contains no tips. To remove any tips, see "Running the Tip attach task" on page 102.
- ❑ All shelves are moved to the out position and clear of the pipette head. To move a shelf, use the Toggle shelf button on the Pipettor Setup tab in VPrep Diagnostics.

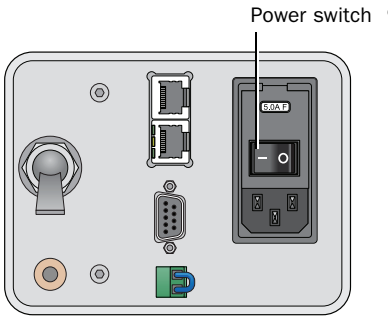
Changing a pipette head

To change the pipette head using the Switch Head wizard:

1. In VPrep Diagnostics, click the **Pipettor Setup** tab.
2. On the **Pipettor Setup** tab, do the following:
   a. Select the correct **Pipettor Profile** from the list.
   b. Select the **Head Type** from the list.
   c. Click **Switch head**.
3. In the **Switch Head** wizard:
   a. Click **Next** to confirm that you want to change the pipette head.
   b. When the message tells you that all the shelves appear to be clear, click **Next** to move the head into position.

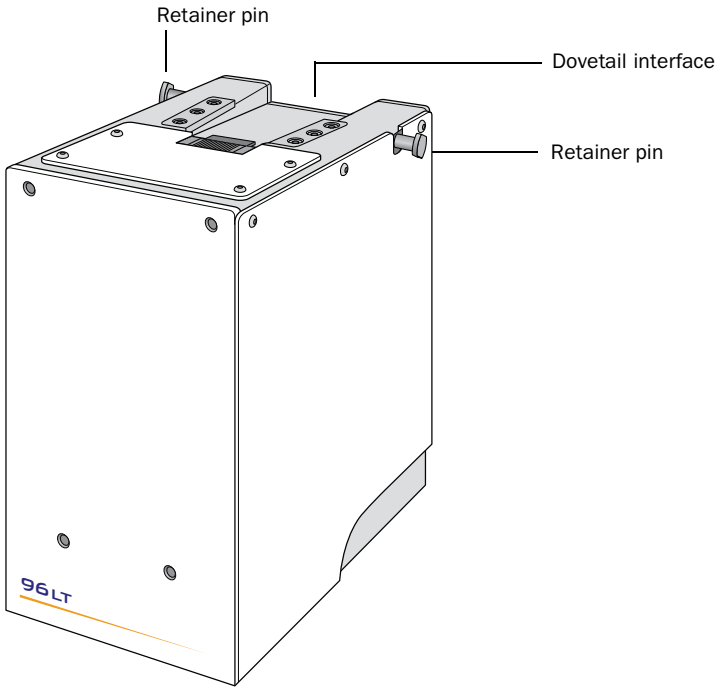
   !! INJURY HAZARD !! Keep clear of the VPrep Pipettor while it is in motion. Never touch any of the moving parts or attempt to move labware while the VPrep Pipettor is in operation. The device could pinch, pierce, or bruise you.

   After the pipette head moves down into position, a message appears in the Switch Head wizard telling you to turn off the power and change the head.
4. To turn off the VPrep Pipettor, press the power switch on the rear panel to the **off (o)** position.



!! DAMAGE HAZARD !! **Always turn off the VPrep Pipettor before removing a pipette head. Failure to turn off the VPrep Pipettor before changing the pipette head can damage the pipette head electronics.**

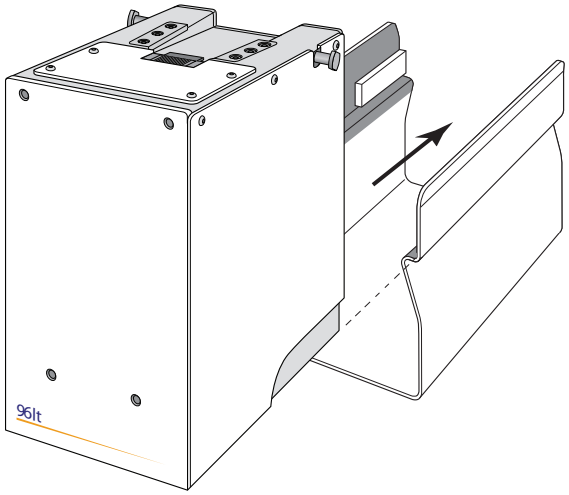
5. To unlock the mounted pipette head, do one of the following:
   - *8- and 16-channel heads*. On the front of the pipette head, rotate the head lock (not shown) counterclockwise to the **Unlock** position.
   - *96- and 384-channel heads*. Pull out and twist the two head-retainer pins one-quarter turn so that they remain retracted.



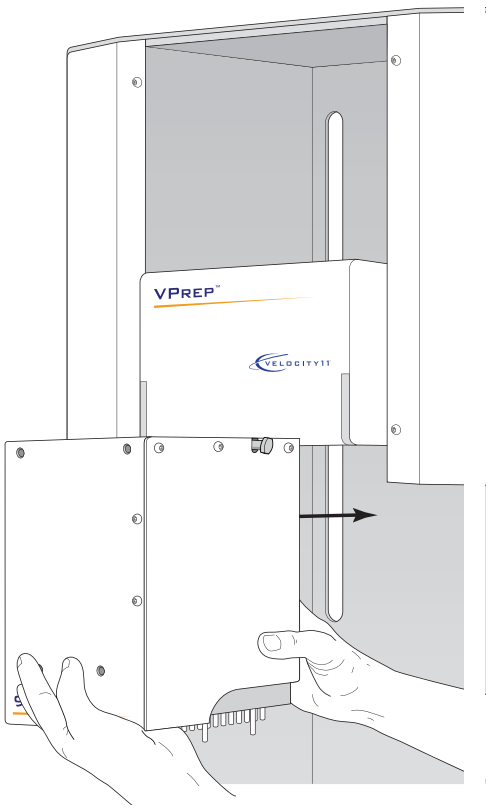
6. Grasp the pipette head firmly using care not to touch the tips or barrels. While supporting the head with your hands, use your thumbs to push the head from side to side and slide it out of the VPrep Pipettor head mount.

!! DAMAGE HAZARD !! **Support the pipette head carefully without touching the barrels or tips. Dropping the head or bumping the tips or barrels will damage the head.**

7. Carefully slide the pipette head into the head stand to protect the barrels and tips for storage.



8. Slide the pipette head onto the VPrep Pipettor head mount. Press the pipette head firmly into place to ensure the head is plugged into the connector receptacle on the head mount.



9. To lock the pipette head in place, do one of the following:
   - *98- and 384-channel heads*. Twist the two head-retainer pins so that they snap into place.

- *8- and 16-channel heads*. On the front of the pipette head, rotate the head lock (not shown) counterclockwise to the **Lock** position.

10. To verify that the pipette head is secure, firmly support the head with your hands while you attempt to move the head from side to side as if to remove it. If the head is locked, it will not disengage from the dovetail interface.

    !! DAMAGE HAZARD !! Do no touch the pipette head barrels or tips with your hands.

    !! DAMAGE HAZARD !! If the pipette head is not properly secured in place, it could drop unexpectedly. Dropping the pipette head or bumping the tips or barrels will damage the head.

11. To turn on the power, press the power switch on the rear panel to the **on (-)** position.
12. In the **Switch Wizard** window, click **Next** to initialize the installed pipette head.

    A message appears and tells you to wait while the head initializes.

    !! INJURY HAZARD !! During initialization the pipette head can move. Keep fingers, hair, clothing, and jewelry away from the VPrep Pipettor while it is in motion. Never touch any of the moving parts or attempt to move labware while the VPrep Pipettor is in operation. The device could pinch, pierce, or bruise you.

Related topics

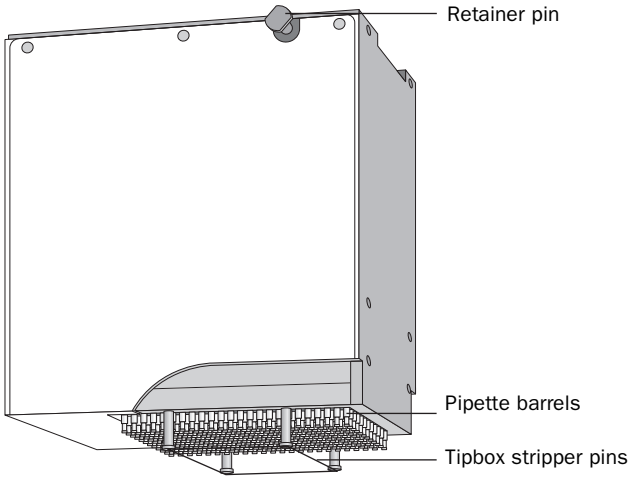
For information about…	See…
Safety guidelines	“Safety” on page 15
Opening VPrep Diagnostics	“Opening VPrep Diagnostics” on page 39
Creating a profile	“Creating a profile for the VPrep Pipettor” on page 41
Pipette heads	❑ “Pipette heads” on page 8 ❑ “Installing a pipette head” on page 33
Moving the pipette head	❑ “Moving the pipette head manually” on page 71 ❑ “Jogging the pipette head” on page 89 ❑ “Using the Approach and Move commands” on page 91

Retracting and releasing stripper pins

About this topic

The disposable-tip pipette heads have four stripper pins that prevent the tipbox from raising off the shelf when tips are being applied.

However, you can retract the stripper pins to perform a task where the pins will interfere. For example, if you are using a 96ST pipette head in a 384-tip rack, it can help prevent tips from touching other tips during a tips-on task.



Retracting tipbox stripper pins

To retract the tipbox stripper pins:

1. Put the pipette head upside down on a stable surface, so that the barrels are facing up.
2. Insert the end of a 2 mm hex wrench into the head of one of the pins.
3. Push the pin into the pipette head until you feel it stop.

   It should be nearly flush with the surface. If it is not flush, twist the pin counterclockwise in quarter-turn increments, pushing in after each twist.
4. When the pin is properly seated, twist it counterclockwise no more than 180° until it locks.
5. Repeat step 2 to step 4 for the other pins.

Releasing tipbox stripper pins

To release the retracted tipbox stripper pins:

1. Insert a 2 mm hex wrench into the pin head.
2. Turn the wrench clockwise to release the pin.
3. Repeat step 1 to step 2 for the other pins.

Related topics

For information about…	See…
Removing a pipette head	“Changing the pipette head” on page 66
Maintaining the VPrep Pipettor	See “Routine maintenance” on page 62.
Reporting a problem	“Reporting problems” on page 82

Moving the pipette head manually

About this topic

This topic describes how to move the pipette head manually in the *x*- and *y*-axis. For example, you might want to move the head position when changing pipette heads or cleaning the VPrep Pipettor.

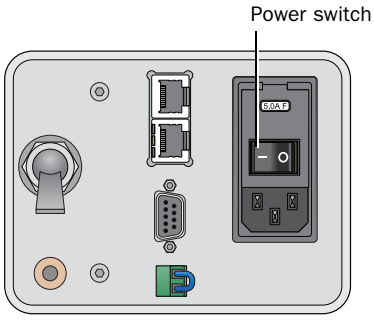
To use VPrep Diagnostics to move the pipette head to a specific location, see “Using VPrep Diagnostics” on page 85.

Procedures

!! DAMAGE HAZARD !! Turn off the VPrep Pipettor before attempting to move the pipette head manually. Manually moving the pipette head in any of its axes without first disabling the servos could damage the pipette head motors.

To move the pipette head manually:

1. On the back of the VPrep Pipettor, press the power switch to the **off (o)** position.



2. Use your hands to gently move the pipette head along the *x*-axis and *y*-axis.
3. When you are finished moving the pipette head, press the power switch to the **on (-)** position.

Related topics

For information about…	See…
Using VPrep Diagnostics to move the pipette head	❑ "Homing the head" on page 87 ❑ "Jogging the pipette head" on page 89 ❑ "Using the Approach and Move commands" on page 91

Replacing the fuse

About this topic

This topic describes how to replace the main fuse in the VPrep Pipettor.

Before you begin

!! DAMAGE HAZARD !! A blown fuse can indicate more serious problems. If the new fuse blows after replacement, contact Velocity11 Technical Support.

!! DAMAGE HAZARD !! Using an incorrect fuse can damage the VPrep Pipettor.

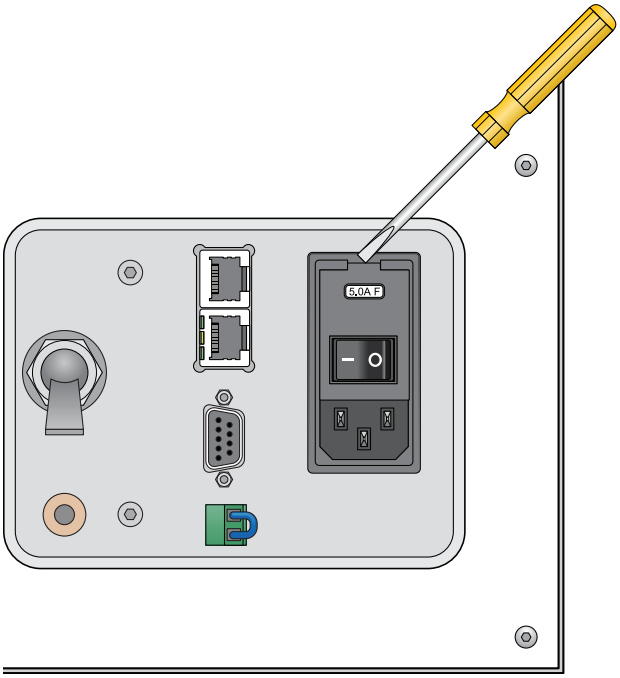
Use only the specified fuse type: 5 A, 250 V, 0.25 × 1.25 in (6.35 x 31.75 mm), fast acting.

You can order fuses from Velocity11.

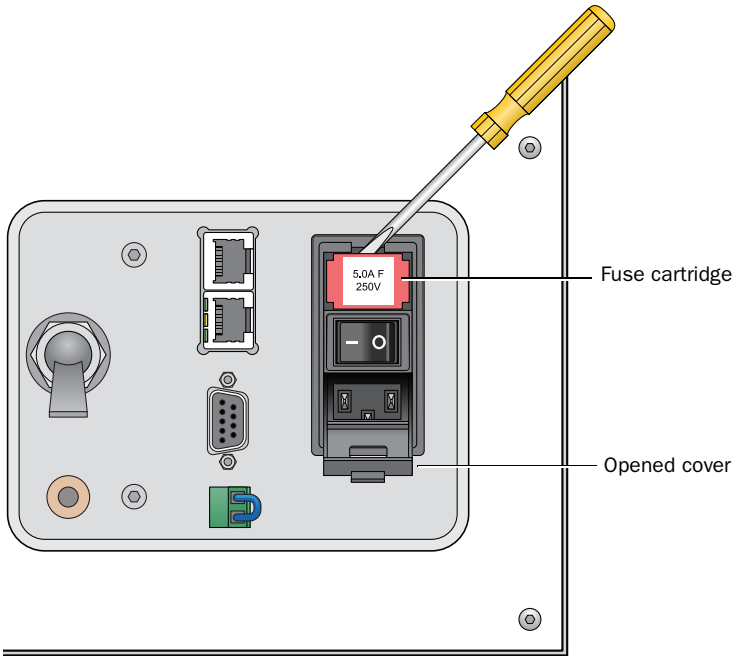
Procedure

To replace the fuse in the power switch:

1. Shut down the VPrep Pipettor, and unplug the power cable from the rear panel connector.
2. At the rear panel power switch enclosure, use a small flat-head screwdriver (2.5 mm) to pry open the tab at the top of the enclosure and open the enclosure cover.



3. At the top of the enclosure, insert the screwdriver head in the notch to dislodge the red fuse cartridge. Slide the fuse cartridge all the way out of the enclosure.



4. Replace the fuse on the right side of the fuse cartridge.
5. Slide the fuse cartridge back into the power switch enclosure.
6. Press the enclosure cover securely into the closed position.

7. Plug in the power cable at the rear panel connector, and then start up the VPrep Pipettor.

Related topics

For information about…	See…
Safety guidelines	"Safety" on page 15
Shutting down the VPrep Pipettor	"Shutting down the VPrep Pipettor" on page 38
Starting the VPrep Pipettor	"Starting up the VPrep Pipettor" on page 36
Maintaining the VPrep Pipettor	"Routine maintenance" on page 62
Reporting a problem	"Reporting problems" on page 82

Recovering from a power outage

About this topic

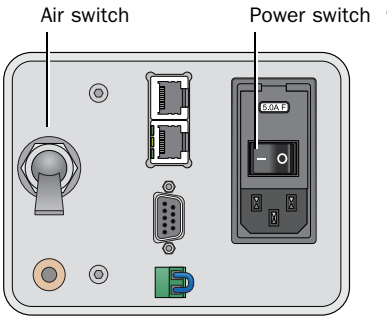
A loss of power can be the result of either inadvertently turning off the power switch or a power failure. Regardless of the cause, a loss of power disrupts the communication between the VPrep Pipettor and the automation control software. You cannot resume a protocol that was running at the time of the power outage. To recover from the power outage safely, perform the following procedure.

!! DAMAGE HAZARD !! If a power outage occurs when the pipette tips are inside of a plate, the shelves will move to the outer position. The shelf movement can cause damage to a fixed-tip head.

Recovering from a power outage

To recover from a power outage:

1. On the VPrep Pipettor rear panel, ensure the power switch is set to the **off (o)** position and the air switch is set to the **off (down)** position.



2. Ensure that the shelves are moved out and clear of the pipette head. If necessary, you can manually move a shelf to the out position.

3. If possible, cancel the run in the automation control software.

   !! DAMAGE HAZARD !! Before you click Abort, make sure the shelves are in the out position. Aborting a run causes the shelves to retract, which could cause a head collision.

   For example, click **Abort** if an error message appears with options to Retry, Ignore, or Abort.

   Alternatively, click **Pause** on the toolbar, and then click **Abort process**.
4. On the rear panel, press the power switch to the **on (–)** position.
5. Open VPrep Diagnostics and initialize the correct profile. Ignore the low air-pressure warning. Wait until the pipette head moves upwards in the *z*-axis to the top of its travel.
6. On the rear panel, set the air switch to the **on (up)** position.

   The shelves should move to the outer positions.
7. Re-initialize the profile so that the system also monitors the air pressure.
8. To continue an interrupted protocol task manually, use the **Processes** tab in VPrep Diagnostics. See “Running diagnostics tasks” on page 96.

Related topics

For information about…	See…
Safety guidelines	“Safety” on page 15
Stopping or pausing a run	User guide for the applicable Velocity11 automation control software
Stopping in an emergency	“Emergency stops” on page 19
Opening VPrep Diagnostics	“Opening VPrep Diagnostics” on page 39
Initializing a profile	“Initializing a pipettor profile” on page 45
Reporting a problem	“Reporting problems” on page 82

Recovering from a head collision

About this topic

This topic describes what to do in the event that the pipette head collides with an object, such as an accessory or labware.

If you cannot resolve the problem, contact Velocity11 Technical Support.

Procedure

To recover from a head collision:

1. Clean up any spills that might have occurred as a result of the collision.
2. Carefully inspect the impacted parts for signs of damage:
   - *Pipette barrel or tip*. Compare the affected area to the surrounding barrels or tips.
   - *Shelves*. Verify the teachpoints.
   - *Alignment Shelf*. Verify the rollers and springs are not damaged and still allow plates to be easily picked and placed.

   Make sure the specific functionality of shelves has not been compromised.
3. For each axis, jog the pipette head in both directions while listening for any new noise. If new noises are present or if any axis movement is impaired, contact Velocity11 Technical Support.
4. Check the VPrep Pipettor alignment as follows:
   a. If the pipette head was impacted side-to-side, re-install the head.
   b. Attach the correct tip type.
   c. Move to the teachpoints and verify the alignment in the *x*-, *y*-, and *z*-axes.

   If the *x*- or *y*-axis are misaligned, contact Velocity11 Technical Support.

Related topics

For information about…	See…
Safety guidelines	“Safety” on page 15
Stopping in an emergency	“Emergency stops” on page 19
Removing and installing a pipette head	“Changing the pipette head” on page 66
Jogging the pipette head	“Jogging the pipette head” on page 89
Reporting a problem	“Reporting problems” on page 82

Troubleshooting hardware problems

About this topic

This topic lists some potential hardware problems, the possible causes, and ways to resolve the problems.

Hardware problems

Locate your problem in the table and try the solution. If the problem persists after you try the solutions, contact Velocity11 Technical Support.

Problem	Possible cause	Solution
The VPrep Pipettor does not turn on.	Your lab does not meet the electrical requirements.	Make sure your lab meets the electrical requirements. See "Laboratory requirements" on page 23.
	The power cord is damaged or is not connected to the power source.	Ensure the power cord is in good condition and is connected to the VPrep Pipettor and the power source. See "Connecting the power and the computer" on page 27.
	The VPrep Pipettor fuse is bad.	See "Replacing the fuse" on page 72. A bad fuse could be indicative of other problems. If the fuse blows again, contact Velocity11 Technical Support.
A hissing sound is present when the air is turned on and nothing is moving.	A leak is present in the air connections or inside the device.	Check the air tubing and the connections on the VPrep Pipettor rear panel and at the source for leaks. See "Checking air and vacuum connections" on page 29.
The VPrep Pipettor does not dispense accurately on a particular shelf.	The shelf is loose, or the teachpoint is incorrect.	Gently wiggle the shelf to check the tightness. Verify the teachpoint. See Setting or editing shelf teachpoints and "Ensuring teachpoint accuracy for tipboxes" on page 51.
	The pipette head barrels or o-rings are bad.	Contact Velocity11 Technical Support.
The pipette head will not disengage from the head mount.	The pipette head is locked.	Verify that the head retainer pins are retracted (96- or 384-channel head), or the head lock is in the unlocked position (8- or 16-channel head).
Liquid fails to pump into or drain from an autofilling reservoir.	The Pump Module tubing has deteriorated or is not connected properly.	Inspect the tubing and the connections, and replace if necessary. See "Setting up a Pump Module" on page 110.

Problem	Possible cause	Solution
The liquid in the wash trays or reservoirs is overflowing causing flooding.	The tubing is kinked or the Weigh Shelf might require recalibration.	Inspect the tubing, and see "Calibrating a Weigh Shelf" on page 124.
During a tips-off operation, the tips remain on the pipette barrels.	Static electricity buildup is causing the tips to stick on the barrels.	Edit the profile to include a tip-touch during the tips-off task. To edit the profile, see "Creating a profile for the VPrep Pipettor" on page 41, and select the **Enable tips-off tip-touch** check box on the **Pipettor Setup** tab. For more details, see "VPrep Diagnostics - Pipettor Setup tab" on page 136.
During initialization, a *z*-position timeout occurs.	The *z*-motor brake is sticking.	Contact Velocity11 Technical Support.

Related topics

For information about…	See…
Safety guidelines	"Safety" on page 15
Stopping in an emergency	"Emergency stops" on page 19
Reporting a problem	"Reporting problems" on page 82

Resolving hardware-related error messages

About this topic

This topic describes some hardware-related error messages and their possible causes and solutions. For software error messages, see the user guide for your automation control software, such as the *VWorks User Guide*.

Communication or power

If the communication or power problem persists after you try the solutions or you cannot locate the error message in the table, contact Velocity11 Technical Support.

Error	Possible cause	Solution
Pipettor not initialized.	A command was issued before the VPrep Pipettor was fully initialized.	Initialize or re-initialize the VPrep Pipettor.
E-Stop detected.	The robot-disable circuit was activated.	See “Recovering from an emergency stop” on page 20.
Incorrect number of modules found.	The VPrep Pipettor is turned off or the power or serial communication cable is not connected properly.	Perform the following steps: a. Ensure the power switch is set to **on (-)**. b. Ensure the power cable and serial cables are connected and in good condition. c. If the cables are in good condition, click **Retry**. d. If either cable is damaged, go to step e. e. Click **Abort**, and shut down the VPrep Pipettor. f. Replace the damaged cables.
	The computer COM port is not set correctly.	Perform the following steps: a. Click **Abort**. b. Verify the **COM port** setting in the VPrep Diagnostics **Pipettor Setup** tab. c. Close the automation control software. d. Power cycle the VPrep Pipettor by turning off and then turning on the instrument. e. Restart the automation control software.

Error	Possible cause	Solution
Could not issue NumcNoOp() to Servo 1 while waiting for E-Stop clear.	The VPrep Pipettor lost power or communications during a process, or the system encountered an error.	Perform the following steps: a. Click **Abort**, and close the automation control software. b. Turn off the VPrep Pipettor. c. Verify the power and serial cables are in good condition and connected properly. d. Turn on the VPrep Pipettor. e. Restart the automation control software. *Note:* The tips might have liquid that will be expelled when the pipette head moves home.
Motor power fault error.	The servo motors are not working properly.	Try to clear the error as follows: a. Power cycle the VPrep Pipettor by turning off and then turning on the instrument. b. Initialize the VPrep Pipettor.
Could not establish communication with VPrep on COM *n*. CHome: Check Head Type: Could not configure IO 1. EStop Pushed: Unidentified board rev. Could not issue NmcNoOp to x. Could not issue ServoSetIoCtrl. Can't get board revision number. Error initializing IO subsystem x.	The VPrep Pipettor is not connected properly to the computer, or the serial communication is faulty.	Perform the following steps: a. Ensure the serial cable is in good condition and connected properly to the computer and the VPrep Pipettor. See "Connecting the power and the computer" on page 27. b. If the cable is in good condition and connected correctly, click **Retry**. c. If the cable is damaged, go to step d. d. Click **Abort**, and shut down the VPrep Pipettor. e. Replace the damaged cable.
Error initializing reagent module. Illegal pump number.	The VPrep Pipettor was turned on before turning on the Pump Module.	Perform the following steps: a. Turn off the Pump Module and the VPrep Pipettor. b. Turn on the Pump Module. c. Turn on the VPrep Pipettor.

Other hardware error messages

Locate the error message in the table and try the solution. If the problem persists after you try the solutions or you cannot locate the error message in the table, contact Velocity11 Technical Support.

Error	Possible cause	Solution
Incorrect head type installed.	The mounted pipette head does not match the head type specified in the selected profile.	If the correct pipette head is already installed: a. In VPrep Diagnostics, click the **Pipettor Setup** tab. b. Verify the selected **Head Type** matches the installed pipette head, and then click **OK**. c. Click **Retry**. If the installed pipette head is not correct: a. Click **Abort**. b. See "Changing the pipette head" on page 66.
Excessive air pressure.	The air pressure has exceeded the maximum allowed, or the air-pressure sensor or gauge is not working properly.	Verify that the air pressure does not exceed 95 psi, adjust the pressure if necessary, and then click **Retry**. You can use an independent pressure gauge to verify that the air-pressure gauge on the rear panel is working correctly.
Shelf *n* timed out moving in.	A blockage prevented the shelf from moving.	Check for a head crash or other shelf blockage. If there is no evidence of blockage, the shelf sensor may have malfunctioned.
Weigh Shelf found without valid reagent module	The system detected a Weigh Shelf but did not detect a corresponding Pump Module.	Verify that the Weigh Shelf and Pump Modules are connected properly. See "Setting up a Pump Module" on page 110.
No tipbox is present.	Tipbox sensor did not detect a tipbox.	Perform the following steps: a. Ensure a tipbox is on the tipbox shelf or that a tip chute is installed. b. On the tipbox press, ensure that the sensor LEDs change color when the sensor should be triggered. c. On the VPrep Diagnostics **IO** tab, verify that the tipbox sensor state changes. d. Click **Retry**.

Related topics

For information about…	See…
Safety guidelines	“Safety” on page 15
Software error messages	User guide for the applicable Velocity11 automation control software
Shutting down	“Shutting down the VPrep Pipettor” on page 38
Using VPrep Diagnostics	“Using VPrep Diagnostics” on page 85
Reporting a problem	“Reporting problems” on page 82

Reporting problems

About this topic

If you have a technical problem that you cannot resolve after reading the maintenance and troubleshooting instructions, read the information in this topic for how to report hardware, software, and user guide problems.

Contacting Velocity11

If you find a problem with the system, contact Velocity11 Technical Support using one of the following methods:

- ❑ Sending an email to service@velocity11.com or euroservice@velocity11.com
- ❑ Calling Velocity11 Technical Support at 1.800.979.4811 or +1.650.846.6611 outside the US
- ❑ Sending a bug report from within the Velocity11 automation control software

Reporting hardware problems

When contacting Velocity11, make sure you have the serial number of the device ready. You can find the serial number label on the lower left side or rear of the VPrep Pipettor.

Reporting software problems

When reporting software problems, provide the following:

- ❑ Software version number
- ❑ Relevant software files

Finding the software version number

When you contact Velocity11 Technical Support, make sure you have the software version number ready. To find the software version number, see the appropriate user guide for your Velocity11 automation control software.

You can find the VPrep Diagnostics software version number in the software. To do this:

1. Open **VPrep Diagnostics.**
2. Read the version number on the title bar.

Sending files

When resolving software bugs or other problems, send the following files:

- ❑ Detailed, precise description of the problem you are experiencing
- ❑ Device files (if the issue occurs when a device file is open)
- ❑ Protocol files (if the issue occurs during a protocol run or simulation)
- ❑ Protocol log file (if the issue occurs during a protocol run or simulation)
- ❑ Velocity11 registry files from the Windows registry
- ❑ Error message text (or screen capture of the error message window)
- ❑ Screen capture of the About PrepWorks dialog box, About VWorks dialog box, or About BenchWorks dialog box

For instructions on how to locate the device, protocol, protocol log, and registry files, see the software user guide, for example, the *VWorks User Guide*.

Reporting user guide problems

If you find a problem with this user guide or have suggestions for improvement, send your comments using one of the following methods:

- ❑ Click the feedback button () in the online help.
- ❑ Send an email to documentation@velocity11.com.

Related topics

For information about…	See…
Troubleshooting problems	❑ "Troubleshooting hardware problems" on page 77 ❑ "Resolving hardware-related error messages" on page 79
Software error messages	User guide for the applicable Velocity11 automation control software
Stopping in an emergency	"Emergency stops" on page 19
Shutting down	"Shutting down the VPrep Pipettor" on page 38

Using VPrep Diagnostics

6

This chapter explains how to use VPrep Diagnostics to control the VPrep Pipettor.

Velocity11 recommends that only administrators and experienced personnel use the procedures in this chapter to diagnose problems with the VPrep Pipettor.

This chapter contains the following topics:

About VPrep Diagnostics

Use VPrep Diagnostics to do the following:

- ❑ *Create profiles.* A profile contains the communication and configuration settings (base, head type and teachpoint settings) required to run protocols for a given hardware configuration. The profiles also store teachpoints and configured shelf location information.
- ❑ *Set teachpoints*. A teachpoint is a set of coordinates that tells the pipette head exactly where to move to perform a task for a particular type of labware.
- ❑ *Move the pipette head*. You can home the head, jog the head incrementally, and approach or move to a teachpoint.
- ❑ *Configure the shelves and reservoirs.* If you have shelf accessories, such as a Weigh Shelf and a MicroWash Reservoir, you must specify the configuration. The location information is stored in the profile.
- ❑ *Run individual tasks.* Running tasks, such as aspirate and dispense, is useful when calculating the correct parameters for a protocol, performing one-time operations, and troubleshooting.
- ❑ *Diagnose problems*. Moving and adjusting individual hardware components can help to diagnose and troubleshoot problems.

Related topics

For information about...	See...
Opening diagnostics	"Opening VPrep Diagnostics" on page 39
Creating and initializing profiles	❑ "Creating a profile for the VPrep Pipettor" on page 41 ❑ "Initializing a pipettor profile" on page 45
Setting teachpoints	❑ "Setting or editing shelf teachpoints" on page 46 ❑ "Ensuring teachpoint accuracy for tipboxes" on page 51
Configuring the accessories	❑ "Configuring reservoirs for the Pump Module" on page 118 ❑ "Installing and calibrating a Weigh Shelf" on page 122
Running a task	"Running diagnostics tasks" on page 96

Homing the head

About this topic

This topic describes when and how to home the pipette head. The procedure is the same whether or not a pipette head is mounted on the VPrep Pipettor.

The VPrep Pipettor has a defined home position for each of the four axes of motion. Homing sends the pipette head to the home position for the specified axes.

When to do this

When you first initialize the VPrep Pipettor after startup, the pipette head automatically homes. You may also want to home the pipette head to:

- ❑ Move the head to a safe position or out of the way of the shelves.
- ❑ Reset the axes. For example, if you notice the VPrep Pipettor is not moving to locations or teachpoints accurately, home the pipette head.

Homing the pipette head

!! INJURY HAZARD !! Stay clear of the VPrep Pipettor while it is in motion. Never touch any of the moving parts or attempt to move labware while the VPrep Pipettor is in operation. The device could pinch, pierce, or bruise you. For example, a pipette tip could pierce your hand.

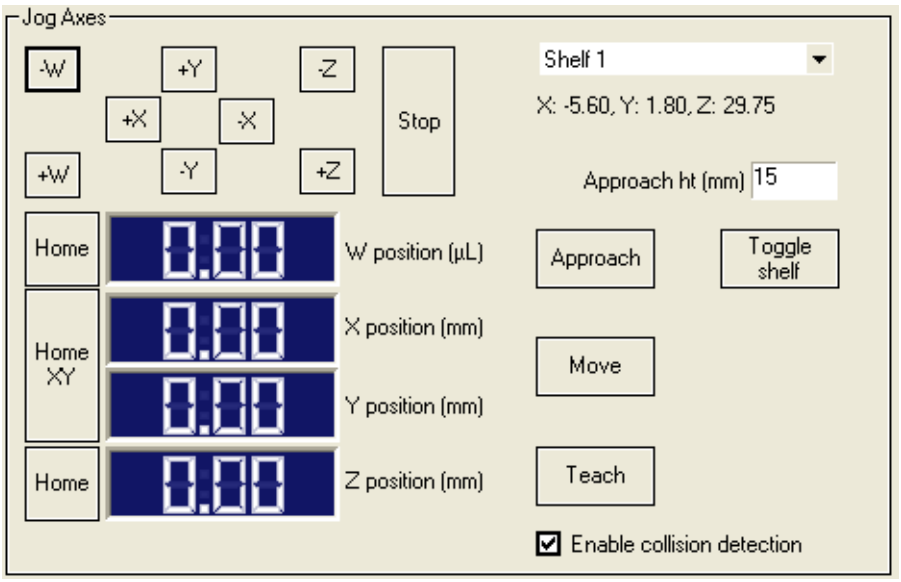
!! INJURY HAZARD !! When the internal pipette head mechanism is homed along the *w*-axis, for example during initialization, any liquids present in the syringes or tips are ejected.

To home the head in all axes:

1. In the **VPrep Diagnostics** dialog box, click the **Pipettor Profile** tab.
2. Click **Initialize**. The head homes the *z*-axis first and then homes the other axes.

To home the head in each axis individually:

1. In the **VPrep Diagnostics** dialog box, click the **Jog Teach** tab.
2. Under **Jog Axes**, click the corresponding **Home** button for the direction that you want to move the head.



- **Home W position** moves the internal head syringe mechanism to its home position.
- **Home Z Position** moves the head to its *z*-axis (vertical) home position.
- **Home XY** moves the pipette head to its *xy*-axes (horizontal) home positions.

Related topics

For information about...	See...
Opening diagnostics	"Opening VPrep Diagnostics" on page 39
Moving the pipette head	❑ "Jogging the pipette head" on page 89 ❑ "Using the Approach and Move commands" on page 91 ❑ "Moving the pipette head manually" on page 71
Changing the pipette head	"Changing the pipette head" on page 66
Reporting a problem	"Reporting problems" on page 82

Jogging the pipette head

About this topic

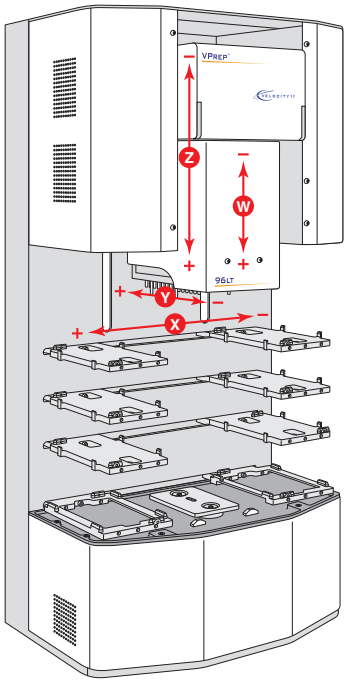
Jogging moves the pipette head incrementally along the *xy*-axes, *z*-axis, or *w*-axis. Jogging the head is useful for setting teachpoints and performing maintenance activities.

Before you begin

!! INJURY HAZARD !! Stay clear or the VPrep Pipettor when the pipette head is moving or about to move. In particular, the *z*-axis motor is powerful and a pipette tip could pierce your hand.

!! DAMAGE HAZARD !! Before jogging the pipette head, ensure no obstructions are in the path of the pipette head.

The **Jog Teach** tab provides the controls for jogging the pipette head. The labeling conventions for the axes of motion are as follows.

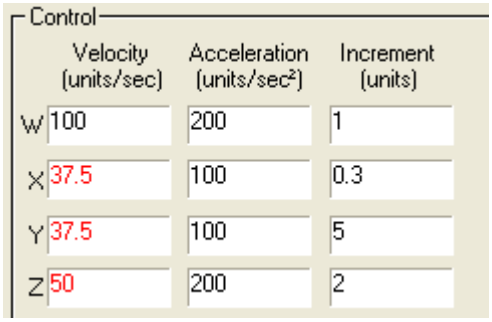


Jogging the pipette head

To jog the pipette head:

1. In VPrep Diagnostics, click the **Jog Teach** tab**.**
2. Under **Control**, type a value in the **Increment** column for the corresponding axis.

   Note: Red highlights an out-of-range value.



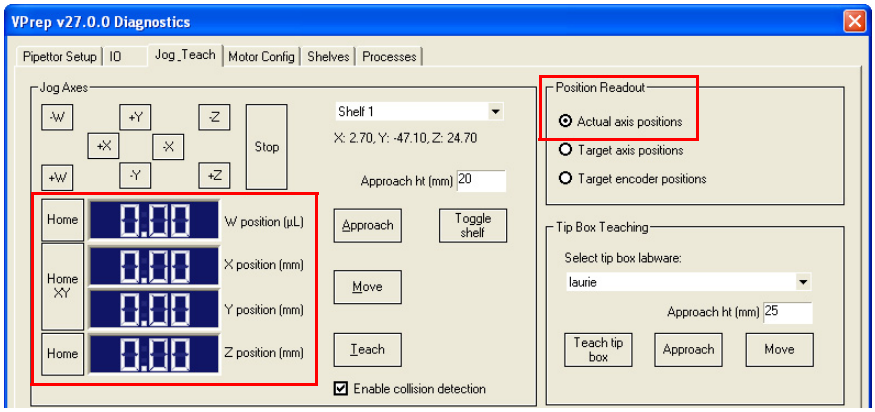
3. Under **Jog Axes**, click the corresponding axis button to move the pipette head the specified distance:
   - To move the pipettor inside the pipette head, click **–W** (aspirate) or **+W** (dispense).
   - To jog vertically, click **–Z** (up) or **+Z** (down).
   - To jog sideways, click **+X** (left) or **–X** (right).
   - To jog back and forth, click **+Y** (backwards) or **–Y** (forwards).

The current position of the pipette head appears in the **Jog Axes** display. The display shows the distance (mm) that the pipette head traveled from the home position.

Monitoring the head position

To display the coordinates of the pipette head:

Under **Position Readout**, ensure the **Actual axis positions** option is selected. The Jog Axes display shows the coordinates for the current position of the pipette head.



Related topics

For information about...	See...
Opening diagnostics	“Opening VPrep Diagnostics” on page 39
Pipette head axes of motion	“Hardware overview” on page 4

For information about...	See...
Setting or editing teachpoints	"Setting or editing shelf teachpoints" on page 46
Moving the pipette head	❑ "Homing the head" on page 87 ❑ "Using the Approach and Move commands" on page 91 ❑ "Moving the pipette head manually" on page 71
Reporting a problem	"Reporting problems" on page 82

Using the Approach and Move commands

About this topic

This topic describes the Approach and Move commands. Typically, you use these commands when editing teachpoints to move the head quickly to specific locations on the VPrep Pipettor shelves.

- ❑ **Move**. Instructs the pipette head to move to the teachpoint for the selected shelf.
- ❑ **Approach**. Instructs the pipette head to move to a specified stopping distance above the teachpoint for the selected shelf.

VPrep Diagnostics contains two sets of Approach and Move commands on the **Jog Teach** tab:

- ❑ **Jog Axes**. Approach or move the pipette head to a selected shelf teachpoint.
- ❑ **Tip Box Teaching**. Approach or move the head to the teachpoint for a given tipbox on the selected shelf.

!! DAMAGE HAZARD !! **Before you click Approach or Move, verify that the pipette head is clear of any obstacles.**

Approaching a shelf

To approach a shelf:

1. Initialize the profile for the given configuration.
2. On the **Jog Teach** tab, select the shelf that you want to approach.
3. In the **Approach ht** box, type a safe stopping distance above the teachpoint.
4. Click **Approach**. The pipette head moves to the specified location above the saved teachpoint.

Moving to a teachpoint

To move to a shelf teachpoint:

1. Initialize the profile for the given configuration.
2. On the **Jog Teach** tab, select the shelf.
3. Click **Move**. The pipette head moves to the saved teachpoint for the shelf.

Related topics

For information about...	See...
Opening diagnostics	"Opening VPrep Diagnostics" on page 39
Setting or editing teachpoints	"Setting or editing shelf teachpoints" on page 46
Moving the pipette head	❑ "Homing the head" on page 87 ❑ "Jogging the pipette head" on page 89 ❑ "Moving the pipette head manually" on page 71
Reporting a problem	"Reporting problems" on page 82

Changing the pipette head speed

About this topic

You might want to slow down the pipette head when creating teachpoints or troubleshooting a problem. This topic describes how to change the speed at which the pipette head moves.

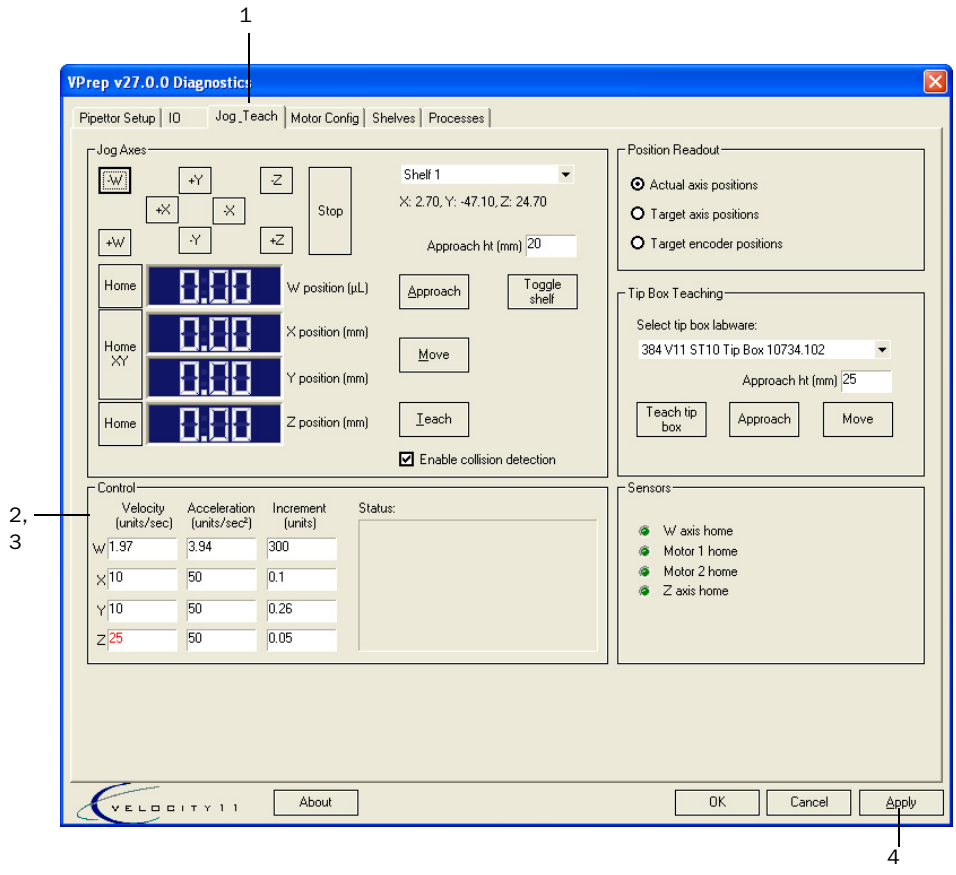
This topic is appropriate for users who have Administrator or Technician privileges in the Velocity11 automation control software.

Procedure

!! INJURY HAZARD !! If you logged in as an Administrator, a message appears and warns you about the risk of operating the VPrep Pipettor at high speeds. Click OK if you want to continue.

!! IMPORTANT !! If you change the velocity and acceleration settings for the *w*-axis, pipetting performance is affected.

The following figure shows the steps for setting the speed of the pipette head.



To set the pipette head speed:

1. In VPrep Diagnostics, click the **Jog Teach** tab.
2. As a backup, make a note of the **Velocity** and **Acceleration** values that appear in the **Control** area.

3. Type the new values for **Velocity** and **Acceleration**. The following table shows the range of possible values.

Axis	Accelerations	Velocities
W	0.001-1000.0 µl/s²	0.001-1000.0 µl/s
X	0.001-1000.0 mm/s²	0.001-20.0 mm/s
Y	0.001-1000.0 mm/s²	0.001-20.0 mm/s
Z	0.001-1000.0 mm/s²	0.001-20.0 mm/s

If any values appear in red, adjust the values until they are within the allowable range.

!! INJURY HAZARD !! In Administrator mode the VPrep Pipettor will run regardless of out-of-range conditions.

4. Click **Apply**.

Related topics

For information about...	See...
Opening diagnostics	“Opening VPrep Diagnostics” on page 39
Safety issues	“Safety” on page 15

Using actuator controls and indicators

About this topic

The VPrep Diagnostics **IO** tab provides controls and indicators for actuating the shelves, the tipbox press, and the *z*-motor brake.

(Vacuum Shelf only) The **IO** tab provides controls for turning on and off the vacuum for a given shelf. For details on the vacuum controls and indicators, see the "Vacuum Control area" on page 142.

Using the actuator controls

To use the actuator controls:

1. In VPrep Diagnostics, click the **IO** tab.
2. To move a shelf out or in, click the **Out/In** button for the shelf. The text on the button changes to match the current state.
3. To move the tipbox press, click the **Tip box press Down/Up** button. The text on the button changes to match the current state.

   !! INJURY HAZARD !! Activating the Tipbox Press generates hundreds of pounds of force. Stay clear of the device when activating the Tipbox Press.
4. Return the VPrep Pipettor to its normal state after actuating the shelves. The normal state has the following conditions:
   - All shelves: **Out**
   - Tipbox press: **Down**
   - Z-motor brake: **Locked**

Related topics

For information about...	See...
Opening diagnostics	"Opening VPrep Diagnostics" on page 39
IO tab controls and indicators	"VPrep Diagnostics - IO tab" on page 141
Troubleshooting problems	"Troubleshooting hardware problems" on page 77
Reporting a problem	"Reporting problems" on page 82

Running diagnostics tasks

About this topic

Using VPrep Diagnostics to run a task is useful when calculating the parameters for a protocol, performing a one-time operation, and troubleshooting.

This topic describes how to use the **Processes** tab in VPrep Diagnostics to perform tasks such as aspirate, dispense, mix, or wash tips.

Note: The Dry tips task is no longer supported.

Workflow

Make sure you perform all the steps in the following workflow for any of the diagnostic tasks:

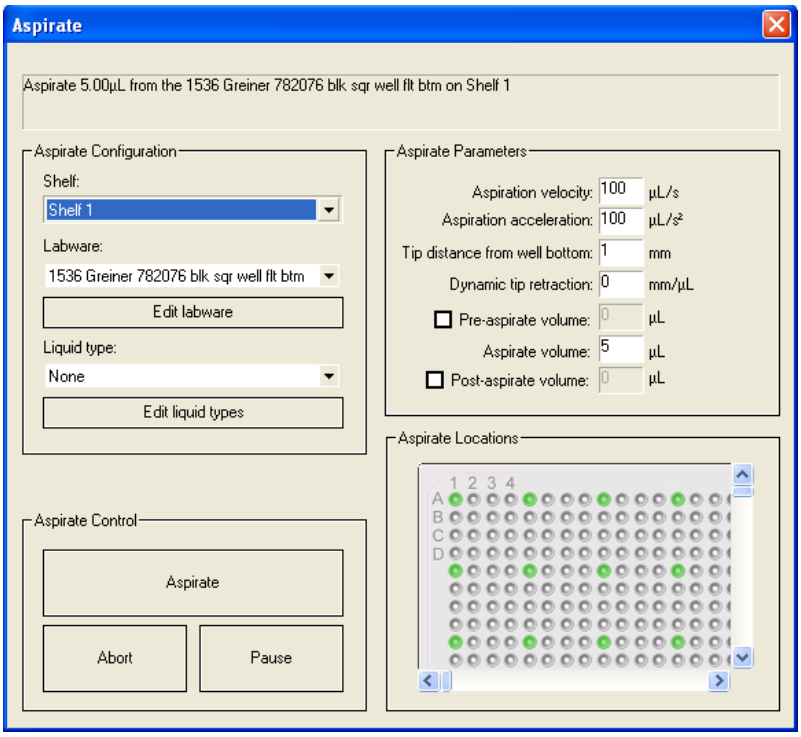
Step	Procedure
1	In VPrep Diagnostics, click the **Processes** tab.
2	Click the button for the task you want to perform. ❑ **Aspirate** ❑ **Dispense** ❑ **Mix** ❑ **Wash** ❑ **Tip attach** (Tips-on and tips-off tasks) ❑ **Reservoir** (Available only if the VPrep Pipettor is connected to a Velocity11 Pump Module.)
3	Configure the task parameters: ❑ "Running the Aspirate task" on page 97 ❑ "Running the Dispense task" on page 98 ❑ "Running the Mix task" on page 99 ❑ "Running the Wash tips task" on page 100 ❑ "Running the Tip attach task" on page 102 (tips on or tips off) ❑ "Running the Reservoir task" on page 103
4	Set up any required labware on the VPrep Pipettor.
5	Start the task using the controls in the dialog box for the corresponding task.

Running the Aspirate task

The Aspirate task draws liquid from a plate or reservoir on a specified shelf.

To aspirate from a specific shelf:

1. Click **Aspirate**. The **Aspirate** dialog box appears.



2. Under **Aspirate Configuration**, select the target shelf from the **Shelf** list.
3. Select the **Labware** and the **Liquid type** from the lists.

   Note: To add a labware to the list, click **Edit labware**, and use the Labware Editor. To add a liquid to the list, click **Edit liquid types** and use the Liquid Library Editor.
4. Under **Aspirate Parameters**, verify the parameter values. For details, see “Aspirate Parameters” on page 153.
5. Under **Aspirate Locations**, click the target wells in plate layout graphic. Green indicates the selected wells.

   To select all or clear all selections, right-click the graphic and choose **Select all wells** or **Clear all selected wells** from the shortcut menu.

   Use the vertical and horizontal scrollbars to view different areas of the plate.
6. Verify that the correct labware is positioned on the selected shelf.
7. To start the task, click **Aspirate**.

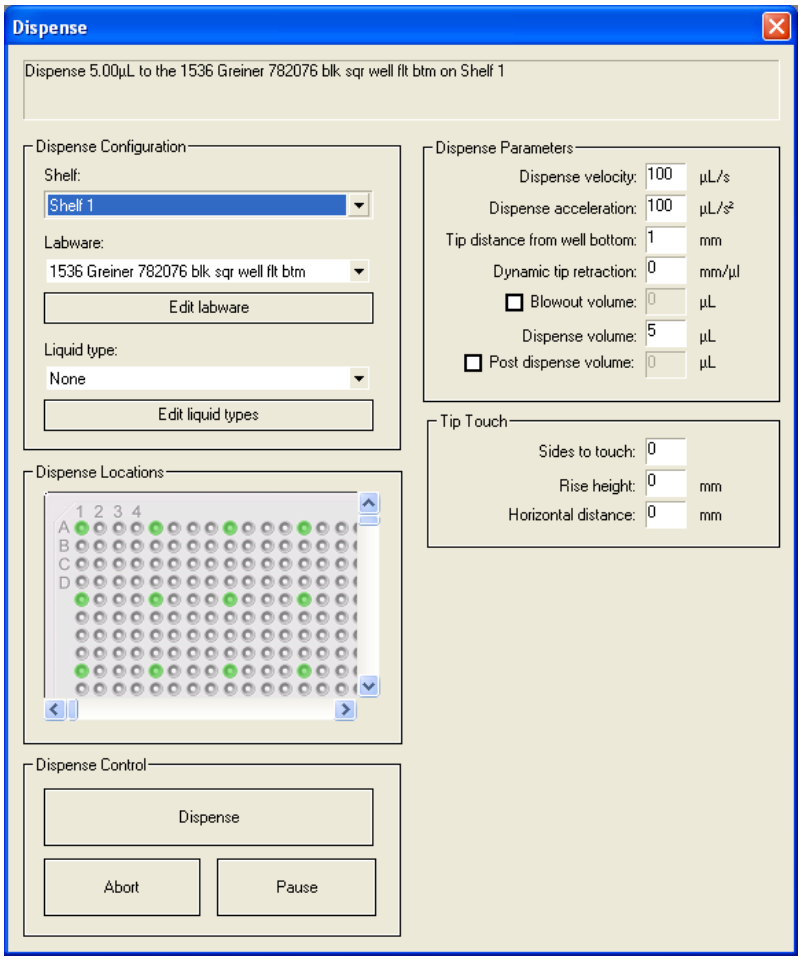
   Note: To cancel the task, click **Abort**. To temporarily pause the task, click **Pause**.

Running the Dispense task

The Dispense task dispenses liquid to a plate or reservoir on a specified shelf.

To dispense liquids to a specific shelf:

1. Click **Dispense**. The **Dispense** dialog box appears.



2. Under **Dispense Configuration**, select the **Shelf**.
3. Select the **Labware** and the **Liquid type** from the lists.

   Note: To add labware to the list, click **Edit labware** and use the Labware Editor. To add a liquid to the list, click **Edit liquid types** and use the Liquid Library Editor.
4. Under **Dispense Parameters**, verify the parameter values. For details, see “Dispense Parameters” on page 155.
5. Verify the **Tip Touch** parameters. For details, see “Tip Touch parameters for Dispense task” on page 155.

6. Under **Dispense Locations**, click the target wells in plate layout graphic. Green indicates the selected wells.

   To select all or clear all selections, right-click the graphic and choose **Select all wells** or **Clear all selected wells** from the shortcut menu.

   Use the vertical and horizontal scrollbars to view different areas of the plate.

7. Verify that the correct labware is positioned on the selected shelf.
8. To start the task, click **Dispense**.

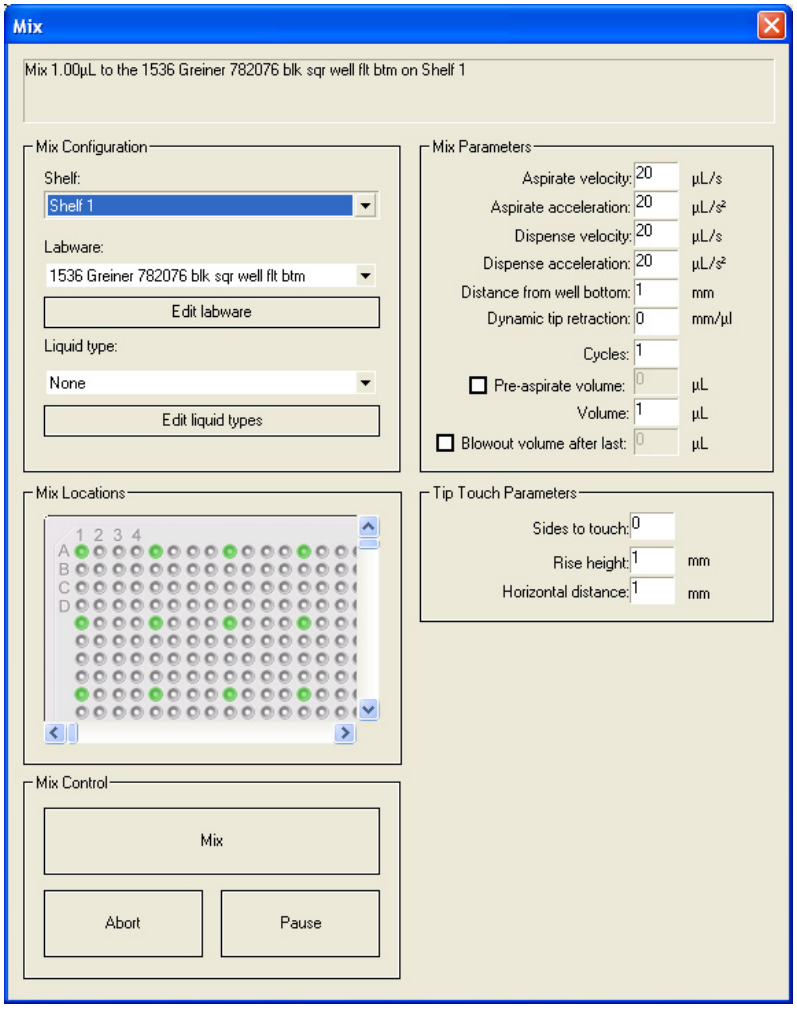
   Note: To cancel the task, click **Abort**. To temporarily pause the task, click **Pause**.

Running the Mix task

The Mix task aspirates and dispenses liquid multiple times to mix the liquid.

To mix a liquid on a specific shelf:

1. Click **Mix**. The **Mix** dialog box appears.



2. Under **Mix Configuration**, select the target shelf from the **Shelf** list.
3. Select the **Labware** and **Liquid type** from the lists.

   Note: To add labware to the list, click **Edit labware** and use the Labware Editor. To add liquids to the list, click **Edit liquid types** and use the Liquid Library Editor.
4. Under **Mix Parameters,** verify the parameter values.

   For details on the parameter values, see "Mix Parameters" on page 157.
5. Under **Tip Touch Parameters**, verify the settings.
6. Under **Mix Locations**, click the target wells in plate layout graphic. Green indicates the selected wells.

   To select all or clear all selections, right-click the graphic and choose **Select all wells** or **Clear all selected wells** from the shortcut menu.

   Use the vertical and horizontal scrollbars to view different areas of the plate.
7. Verify that the correct labware is positioned on the selected shelf.
8. To start the task, click **Mix** in the **Mix Control** area.

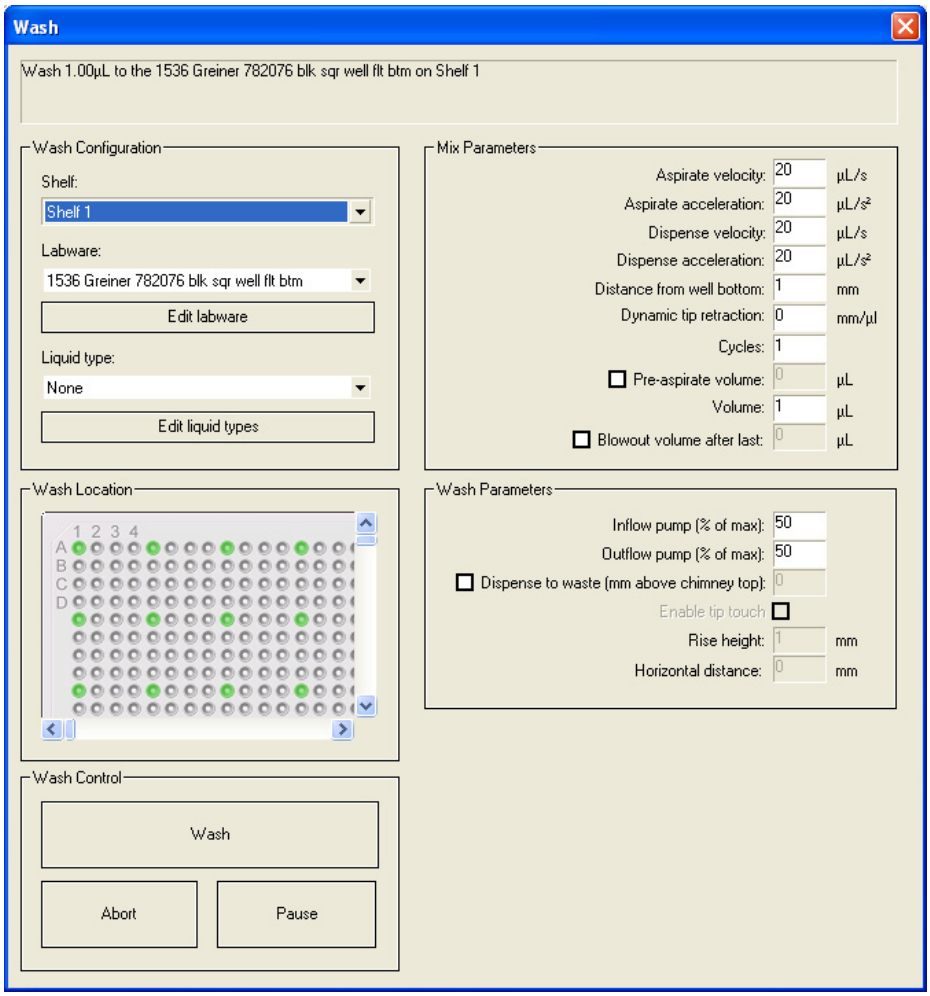
   Note: To cancel the task, click **Abort**. To temporarily pause the task, click **Pause**.

Running the Wash tips task

The Wash tips task is used to wash the tips on a mounted pipette head.

To wash the tips:

1. Click **Wash tips**. The **Wash** dialog box appears.



2. Under **Wash Configuration**, select the target shelf from the **Shelf** list.
3. Select the **Labware** and **Liquid type** from the lists.

   Note: To add labware to the list, click **Edit labware** and use the Labware Editor. To add liquids to the list, click **Edit liquid types** and use the Liquid Library Editor.
4. Under **Mix Parameters**, verify the values. For details, see “Mix Parameters for the Wash tips task” on page 159.
5. Under **Wash Parameters**, verify the values. For details, see “Wash Parameters” on page 160.
6. Under **Wash Locations**, click the target wells in plate layout graphic. Green indicates the selected wells.

   To select all or clear all selections, right-click the graphic and choose **Select all wells** or **Clear all selected wells** from the shortcut menu.

   Use the vertical and horizontal scrollbars to view different areas of the plate.
7. Verify that the correct labware and accessories are in place on the VPrep Pipettor.

8. To start the task, click **Wash**.

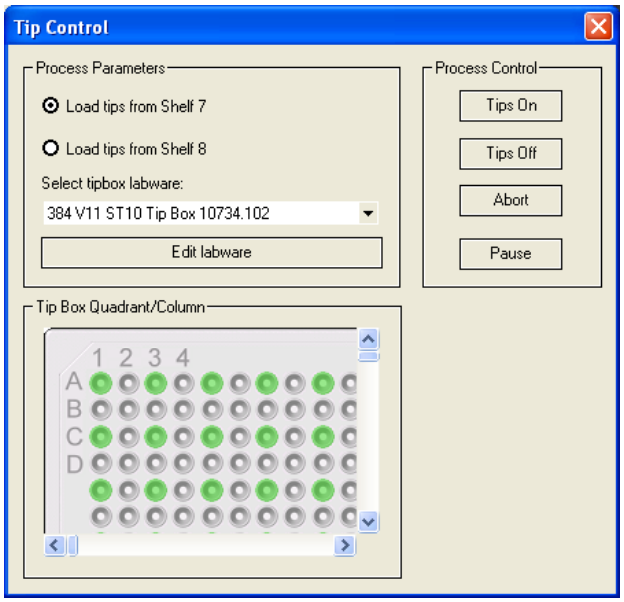
   Note: To cancel the task, click **Abort**. To temporarily pause the task, click **Pause**.

Running the Tip attach task

The Tip attach task performs tips-on and tips-off operations for disposable-tip pipette heads.

To attach or detach the pipette tips:

1. Click **Tip attach**. The **Tip Control** dialog box appears.



2. Under **Process Parameters**, select one of the following to specify the tipbox shelf:
   - **Load tips from Shelf 7**
   - **Load tips from Shelf 8**
3. Select the tipbox type from the **Select tipbox labware** list.

   Note: To add a selection to the list, click **Edit labware** and use the Labware Editor.
4. Under **Tip Box Quadrant/Column**, right-click the graphic. In the shortcut menu, choose the tip locations.
5. Verify that the tipbox is in position on the specified tipbox shelf.
6. Under **Process Control**, either click **Tips On** to apply the specified tips, or click **Tips Off** to eject the specified tips.

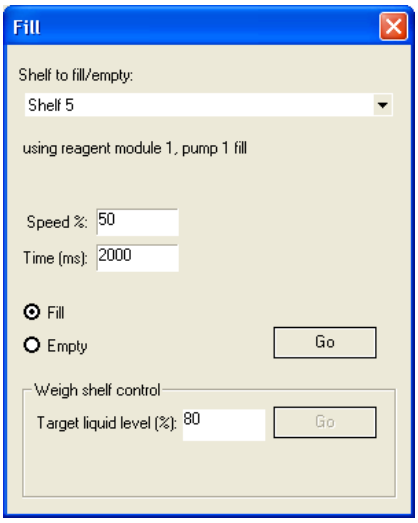
   Note: To cancel the task, click **Abort**. To temporarily pause the task, click **Pause**.

Running the Reservoir task

The Reservoir task is available only if the VPrep Pipettor is connected to a Velocity11 Pump Module. You can use the Reservoir task to fill and empty a specified reservoir.

To run the Reservoir task:

1. Click **Reservoir**. The **Fill** dialog box appears.



2. Select the target shelf from the **Shelf to fill/empty** list.
3. Verify the values for **Speed** and **Time**. You can use the default values in most cases:
   - **Speed**. The value for the speed of the pump as a percentage of its total output. Default: 50%
   - **Time**. The time duration of the fill/empty process. Default: 20 s
4. On the VPrep Pipettor, verify the following:
   - Reservoir is positioned on the selected shelf.
   - Pump Module and tubing is properly connected.
   - Fluid supply has sufficient volume for the fluid to be filled, or the waste container has sufficient space for the fluid to be emptied.
5. Select the process option: **Fill** or **Empty**.
6. (Weigh Shelf only) Type a value for the level in the **Target liquid level** box.
7. To start the task, do one of the following:
   - *Non Weigh Shelf*. Click **Go**.
   - *Weigh Shelf*. Under **Weigh shelf control**, click **Go**.

Related topics

For information about...	See...
Opening diagnostics	“Opening VPrep Diagnostics” on page 39
Creating protocols	User guide for the applicable Velocity11 automation control software
Editing labware and liquid definitions	User guide for the applicable Velocity11 automation control software
Troubleshooting problems	“Troubleshooting hardware problems” on page 77
Reporting a problem	“Reporting problems” on page 82

VPrep Pipettor accessories

A

This chapter describes the accessories that can be used with the VPrep Pipettor and provides the installation and removal procedures. This chapter contains the following topics:

VPrep Pipettor accessories overview

About this topic This topic describes the accessories that are available for the VPrep Pipettor and provides guidelines on determining the shelf locations.

Description The following accessories are available for the VPrep Pipettor.

Accessory	Description	See…
Pump Module	Pumps fluids to and from an autofilling reservoir. You can use the Pump Module with the Weigh Shelf and the Auto Filling Reservoir or MicroWash Reservoir.	"Setting up a Pump Module" on page 110
Reservoirs		
❑ Auto Filling Reservoir	Supplies reagents to the pipette head for 96- and 384-well plates. Use this reservoir with a Pump Module to refill and empty the reservoir automatically during a run. You can also use this reservoir with a Weigh Shelf.	"Configuring reservoirs for the Pump Module" on page 118
❑ Manual Fill Reservoir	Supplies reagents to the pipette head for 96- and 384-well plates. This reservoir requires manual refilling and emptying.	"Setting up a Manual Fill Reservoir" on page 108
❑ MicroWash Reservoir	Washes the pipette tips during a run to prevent carryover and reduce cross-contamination. Use this reservoir with a Pump Module.	"Configuring reservoirs for the Pump Module" on page 118
Shelves		
❑ Microplate Alignment Shelf	Uses spring-loaded clamps to align the plate with the shelf A1 position.	"Installing a Microplate Alignment Shelf" on page 126
❑ Sensor Alignment Shelf	Senses the presence of a microplate and aligns and holds the plate during pipetting tasks.	"About the Sensor Alignment Shelf" on page 128
❑ Shaking Shelf	Mixes the liquid that is in a container on the shelf by shaking the container at a specified amplitude and duration.	Velocity11 Technical Support
❑ Vacuum Alignment Shelf	Uses vacuum to hold PCR plates flat on the shelf to ensure reliable pipetting in every well.	"About the Vacuum Alignment Shelf" on page 129
❑ Weigh Shelf	Works with a Pump Module to provide precise liquid-level control for the Auto Filling Reservoir or MicroWash Reservoir.	"Installing and calibrating a Weigh Shelf" on page 122

Accessory	Description	See…
Tip Chute	Directs disposable tips to the tip trash.	"About the Tip Chute" on page 130
Tube-Stripper Plate	Prevents septum tubes from adhering to the tips of a fixed-tip pipette head during pipetting tasks.	"Setting up a Tube-Stripper Plate" on page 131
Tubing Rack	Provides mounting on the VPrep Pipettor for the tubing quick-disconnect fittings, which enable easy reservoir removal or tubing replacement.	"Installing the Tubing Rack" on page 112

Determining the shelf location

To determine where to locate an accessory on the VPrep Pipettor, consider the following factors:

- *Shelves 1 and 2*. The top shelves have a height limitation for labware when using a pipette head with long tips. For example, the 96LT head with 200 µL tips and the 96ST head with 70 µL tips prevent the use of tall labware on shelves 1 and 2.
- *Shelves 7 and 8*. The bottom shelves may be unavailable for certain types of labware when using a pipette head with short tips. For example, 10 µL or 30 µL tips may not reach a low-volume plate on these shelves. In this case, you could use a MicroWash Reservoir on shelves 7 and 8, but the short tips can reach only partially into the chimneys.
- *Robot-accessibility*. If part of a lab automation system, either the left or right side of the VPrep Pipettor is accessible by a robot. Locate accessories that are not accessed by the robot on the opposite side. For example, if the right side of the VPrep Pipettor is robot-accessible (shelves 2, 4, 6, and 8), locate any reservoirs or wash stations on shelves 1, 3, 5, or 7.

Related topics

For information about…	See…
Starting up and shutting down the VPrep Pipettor	❑ "Starting up the VPrep Pipettor" on page 36 ❑ "Shutting down the VPrep Pipettor" on page 38
Pipette heads	"Pipette heads" on page 8
Setting up liquid and labware definitions	User guide for the applicable Velocity11 automation control software
Using an accessory in a protocol	User guide for the applicable Velocity11 automation control software

Setting up a Manual Fill Reservoir

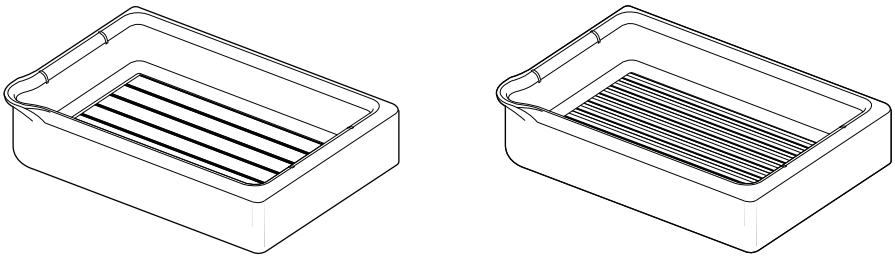
About this topic

The Manual Fill Reservoir is an open tray that you can install on a shelf to supply reagents to 96- and 384-channel pipette heads. You must manually refill and empty the reservoir.

Description

Velocity11 reservoirs are approved for use with most reagents and solvents. If you have questions on the use of a particular chemical or solvent in a Velocity11 reservoir, contact Velocity11 Technical Support prior to use.

The figure shows the two types of Manual Fill Reservoirs: one for 96-well plates and one for 384-well plates.



96-well 384-well

Setting up the reservoir

!! INJURY HAZARD !! Turn off the VPrep Pipettor before you install or remove any accessory.

To set up a Manual Fill Reservoir:

1. Turn off the VPrep Pipettor.
2. Fill the reservoir and place it on a shelf. The reservoir can be in any orientation.

To remove the Manual Fill Reservoir from a shelf:

1. Turn off the VPrep Pipettor.
2. Lift the reservoir from the shelf. Discard the fluid from the reservoir according to applicable regulations.

Related topics

For information about…	See…
Starting up and shutting down the VPrep Pipettor	❑ "Starting up the VPrep Pipettor" on page 36 ❑ "Shutting down the VPrep Pipettor" on page 38
Safety guidelines	"Safety" on page 15
Accessory location guidelines	"Determining the shelf location" on page 107
Setting up liquid and labware definitions	User guide for the applicable Velocity11 automation control software
Using the accessory in a protocol	User guide for the applicable Velocity11 automation control software

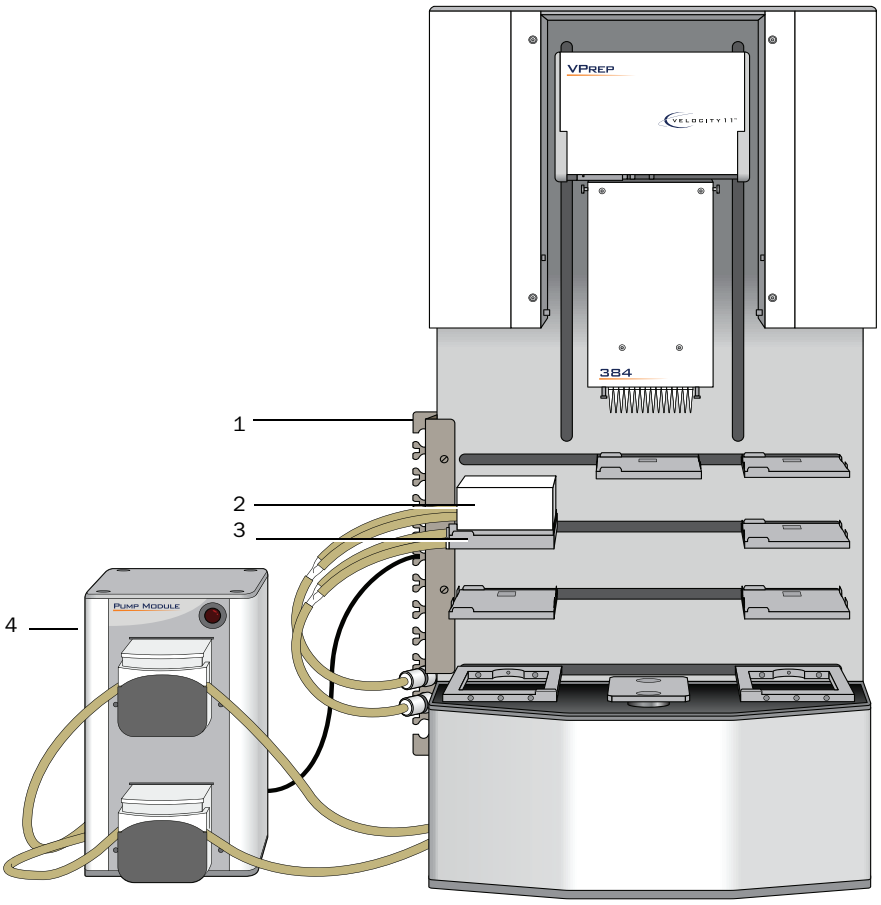
Setting up a Pump Module

About this topic

This topic provides the installation and configuration instructions for the Pump Module and a reservoir.

Description

The Pump Module transfers fluids into and transfers waste away from a reservoir. You can use the Pump Module with an Auto Filling Reservoir and a Weigh Shelf or with a MicroWash Reservoir. The following figure shows a typical configuration.



Item	Accessory	Description
1	Tubing Rack	Mounts the quick-disconnect fittings, which enable easy reservoir removal for washing and repair, as well as tube replacement.
2	Reservoir	Autofilling tray, such as the Auto Filling Reservoir or MicroWash Reservoir.
3	Weigh Shelf	Ensures precise liquid-level control in the reservoir.

Item	Accessory	Description
4	Pump Module	Contains two peristaltic pumps, one that pumps the fluid into the reservoir, and a second that pumps the waste fluid from the reservoir.

!! IMPORTANT !! The Pump Module must be internally configured to specify use with or without a Weigh Shelf. If a configuration change is required, contact Velocity11 Technical Support.

Setup workflow

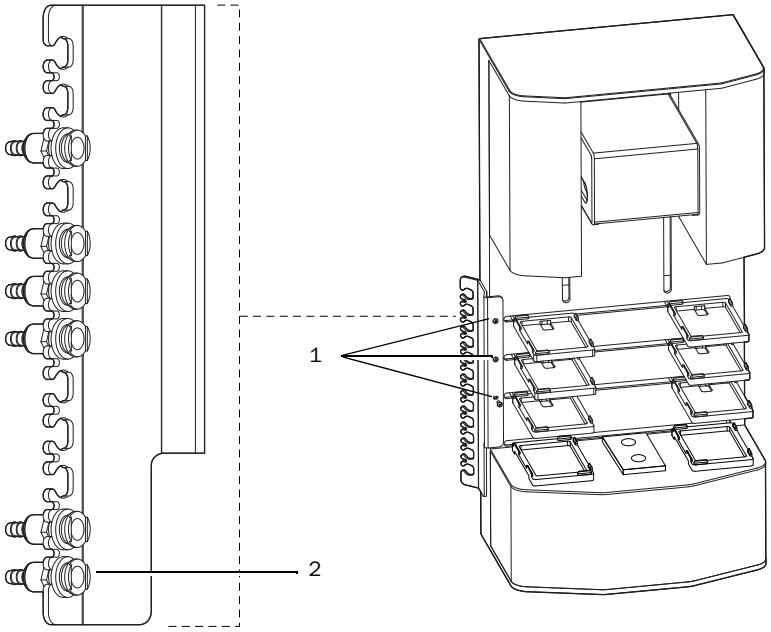
Step	Procedure	See…
1	Install the Tubing Rack on the VPrep Pipettor.	"Installing the Tubing Rack" on page 112
2	Connect the power and communication cables for the Pump Modules and Weigh Shelf, if applicable.	"Connecting power and communication" on page 112
3	Route the tubing between the source or waste bottle, Pump Module, and reservoir.	"Routing the tubing" on page 115
4	In VPrep Diagnostics, configure the type of shelf.	❑ "Configuring reservoir operations" on page 120 ❑ "Calibrating a Weigh Shelf" on page 124

Installing the Tubing Rack

!! INJURY HAZARD !! Make sure you turn off the VPrep Pipettor before connecting an accessory.

To install the Tubing Rack on the VPrep Pipettor:

1. Secure the Tubing Rack to the VPrep Pipettor left side using the three hex-head screws as the figure shows.
2. Attach the quick-disconnect fittings to the Tubing Rack. To do this, slide the threaded portion of the fitting through a Tubing Rack notch, and screw the nut onto the opposite side of the fitting.



Connecting power and communication

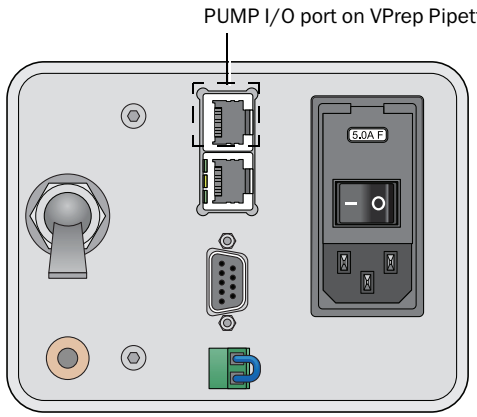
!! INJURY HAZARD !! Ensure that the Pump Module and the VPrep Pipettor are turned off before connecting the cables and routing the tubing.

!! IMPORTANT !! The Weigh Shelf requires a specially configured Pump Module.

Use one Pump Module for each pairing of reservoir and Weigh Shelf.

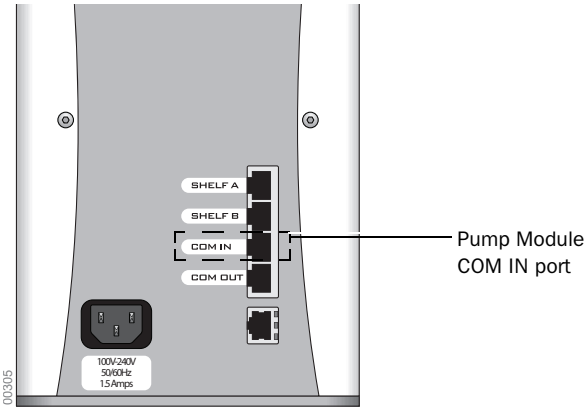
To connect the power and communication cables:

1. Turn off the VPrep Pipettor and the Pump Module.
2. Position the Pump Module within six feet of the VPrep Pipettor.
3. At the VPrep Pipettor rear panel, plug one end of the provided serial (RJ-45) cable into the PUMP I/O port, as the following figure shows.



Note: Older VPrep Pipettors might require an adapter to convert the port to RJ-45 output. Contact a Velocity11 Technical Support.

4. Plug the other end of the serial cable into the COM-IN port on the back of the first Pump Module, as the following figure shows.

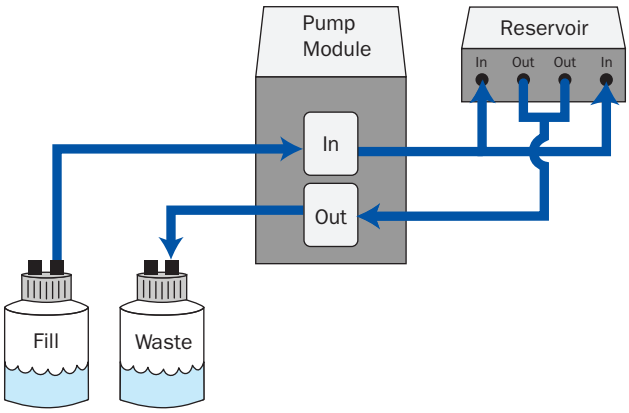


5. To connect multiple Pump Modules:
   a. Use the second RJ-45 cable provided to connect the COM-OUT port on the first Pump Module to the COM-IN port on the second Pump Module.
   b. Use the third RJ-45 cable provided to connect the COM-OUT port on the second Pump Module to the COM-IN port on the third Pump Module.

   Repeat this step for each Pump Module in the series.
6. Using the provided power cable, plug one end of the cable into the Pump Module AC power connector on the rear panel and plug the other end into an appropriately grounded electrical receptacle.
7. To connect a Weigh Shelf, route the serial cable from the Weigh Shelf through a notch in the Tubing Rack. Plug in the cable at the SHELF A port on the back of the Pump Module.

Before you route tubing

The following figure shows a simplified tubing configuration example for a single Pump Module and reservoir.



Ensure you have the required tubing, quick-disconnect fittings, and bottles. Each Pump Module shipment includes the following.

Component	Description
Tube A	3/16-in Marprene tubing with quick-disconnect plugs on both ends
Tube B	¼-in Marprene drain tubing
Source bottle	4-gallon Carboy for source fill liquid
Waste bottle	4-gallon Carboy for waste liquid

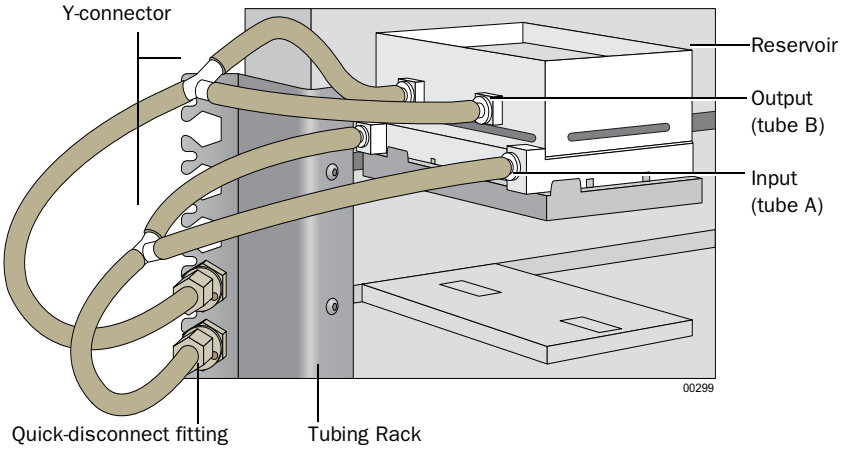
!! INJURY HAZARD !! Turn off the Pump Modules and the VPrep Pipettor before connecting the cables and routing the tubing.

!! IMPORTANT !! Shelves 1 and 2 have a height limitation for labware when using a pipette head with long tips, such as the 96LT head with 200 µL tips or the 96ST head with 70 µL tips. Shelves 7 and 8 might not be ideal locations for a MicroWash Reservoir if using a pipette head with short tips. The 10 µL or 30 µL tips can reach only partially into the reservoir chimneys if located on a bottom shelf.

Routing the tubing

To connect the Pump Module tubing to a reservoir:

1. Place the reservoir on the VPrep Pipettor shelf.
2. Route the tubing from the reservoir to the Tubing Rack as follows:



   a. *Fill (input)*. Cut three lengths of tube A: two for the measured distance between the two reservoir input ports and the Y-connector, and a third for the distance between the Y-connector and a quick-disconnect fitting on the Tubing Rack. Connect the tubing as the figure shows.

   b. *Empty (output)*. Cut three lengths of tube B for the output ports following the procedure in step a, and connect the tubing as the figure shows.

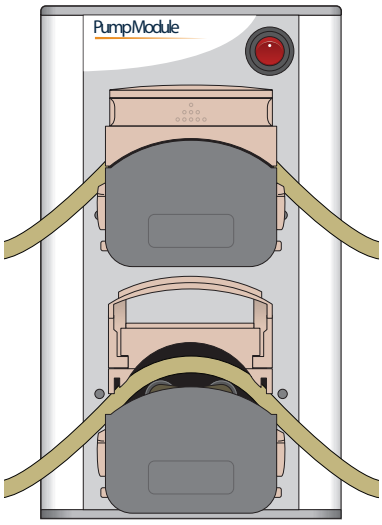
3. Route the input tubing (reservoir fill) from the source bottle through the Pump Module as follows:

   a. Cut a length of tube A for the distance from the source bottle through the Pump Module to the Tubing Rack on the VPrep Pipettor. Leave plenty of slack.

   b. Attach a quick-disconnect fitting to one end of the tubing, and insert the quick-disconnect fitting into the output port of the source bottle.

   c. At the Pump Module, lift up the pump head cover and insert a portion of the tubing into a pump head. Slide the tubing over the rollers such that it gently arches over the rollers.

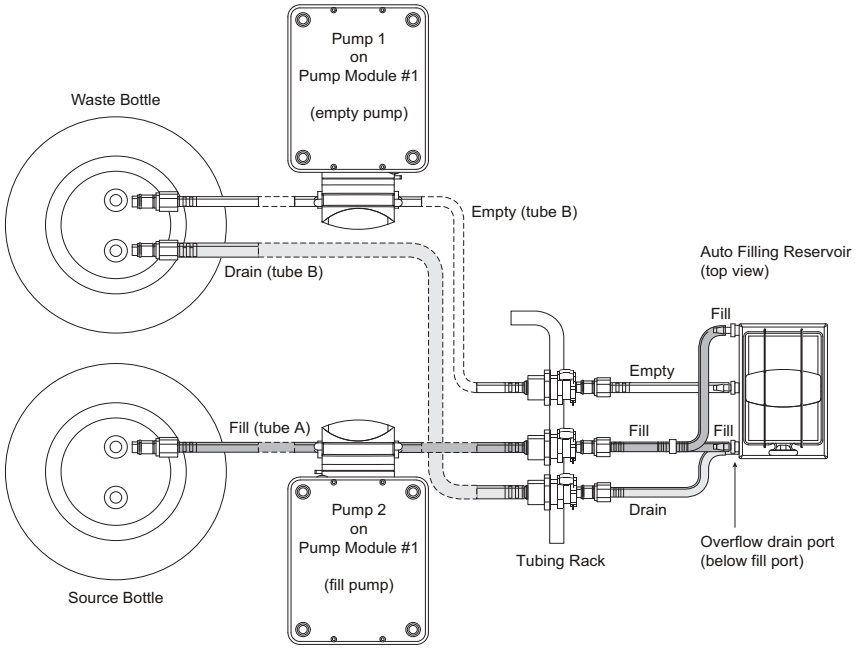
   d. Close the pump head cover and ensure the tubing is centered in the V-grooves on either side of the pump head.



e. Attach the other end of input tubing (tube A) to the corresponding quick-disconnect fitting on the Tubing Rack.

4. To route the output tubing (reservoir empty), cut tube B to a measured length from the waste bottle through the Pump Module to the Tubing Rack. Connect the tubing following the same procedure described in step 3.

   The following figure shows a top view of a tubing configuration example.



(Auto Filling Reservoir only) To route the overflow gravity-drain tubing:

1. Cut tube B to the measured length from the reservoir drain port to the Tubing Rack. Attach the tubing using the quick-disconnect fittings.
2. Cut tube B to the measured length from the Tubing Rack to the waste bottle.
3. Attach a quick-disconnect fitting to one end of the tubing, and insert the fitting into one of the ports on the waste bottle.
4. Attach the other end of the tubing into the corresponding Tubing Rack quick-disconnect fitting.

!! DAMAGE HAZARD !! Do not connect the overflow line to the empty line, else the overflow will not drain properly. To enable the gravity drain system to work effectively, tube B must always travel downward.

To complete the Pump Module setup:

1. Slide the VPrep Pipettor shelf that is holding the reservoir back and forth to ensure the shelf has enough tubing for unrestricted travel.
2. Turn on the Pump Modules, and then turn on the VPrep Pipettor.
3. Start your Velocity11 automation control software, and then configure the shelf in VPrep Diagnostics.

Removing a Pump Module

To remove the Pump Module:

1. Run the Pump Module to drain the reservoir until empty. For details, see “Running the Reservoir task” on page 103.
2. Turn off the Pump Modules, and then turn off the VPrep Pipettor.
3. Disconnect the Pump Module power and communication cables. Unplug the Weigh Shelf cable from the Pump Module.
4. Disconnect the tubing from the Tubing Rack quick-disconnect fittings.
5. Remove the reservoir from the shelf.
6. Remove the tubing from the Pump Module and from the source and waste bottles.

Related topics

For information about…	See…
Starting up and shutting down the VPrep Pipettor	❑ “Starting up the VPrep Pipettor” on page 36 ❑ “Shutting down the VPrep Pipettor” on page 38
Opening VPrep Diagnostics	“Opening VPrep Diagnostics” on page 39

For information about…	See…
Accessory location guidelines	“Determining the shelf location” on page 107
Configuring reservoir settings	“Configuring reservoirs for the Pump Module” on page 118
Calibrating a Weigh Shelf	“Installing and calibrating a Weigh Shelf” on page 122
Setting up liquid and labware definitions	User guide for the applicable Velocity11 automation control software
Using an accessory in a protocol	User guide for the applicable Velocity11 automation control software

Configuring reservoirs for the Pump Module

About this topic

This topic describes the following reservoirs that work with the Pump Module:

- ❑ Auto Filling Reservoir
- ❑ MicroWash Reservoir

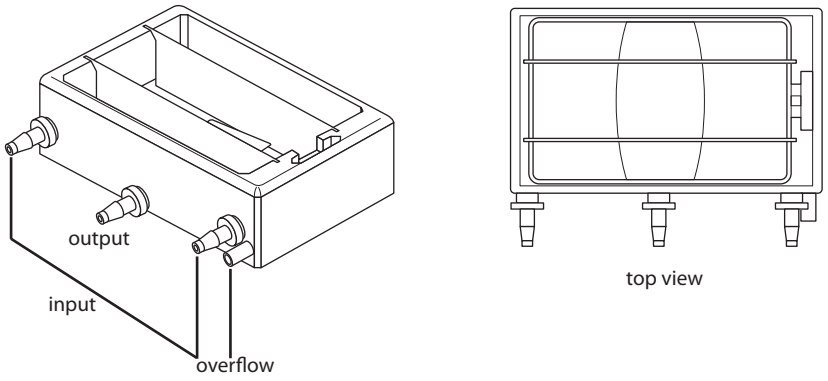
To install a Pump Module and reservoir, see “Setting up a Pump Module” on page 110.

Velocity11 reservoirs are approved for use with most reagents and solvents. If you have questions on the use of a particular chemical or solvent in a Velocity11 reservoir, contact Velocity11 Technical Support prior to use.

Auto Filling Reservoir

The Auto Filling Reservoir is an open tray that can be installed on a Weigh Shelf for precision liquid-level control. The reservoir can supply reagents to 96- and 384-channel pipette heads.

When properly configured in VPrep Pipettor, the Pump Module automatically fills and drains the Auto Filling Reservoir. As the figure shows, two input ports are available to supply reagents to the pipette head. An output port is used to pump the waste and excess fluid from the reservoir. An overflow drain port can also be connected to drain the excess fluid.



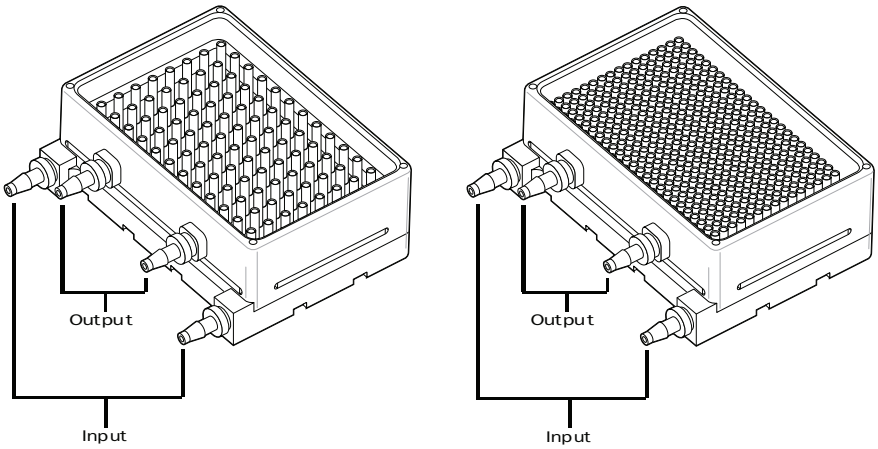
MicroWash Reservoir

The MicroWash Reservoir is a wash station that is available in a 96- or 384-chimney configuration. The chimneys in the reservoir prevent carryover and reduce contamination.

The Pump Module pumps wash liquid into the MicroWash Reservoir through two input ports. The wash liquid flows up through the chimneys in the reservoir to wash the tips. The waste overflows from the chimney and is removed through two output ports.

Optionally, the MicroWash Reservoir can be used on a Weigh Shelf for precision liquid-level control.

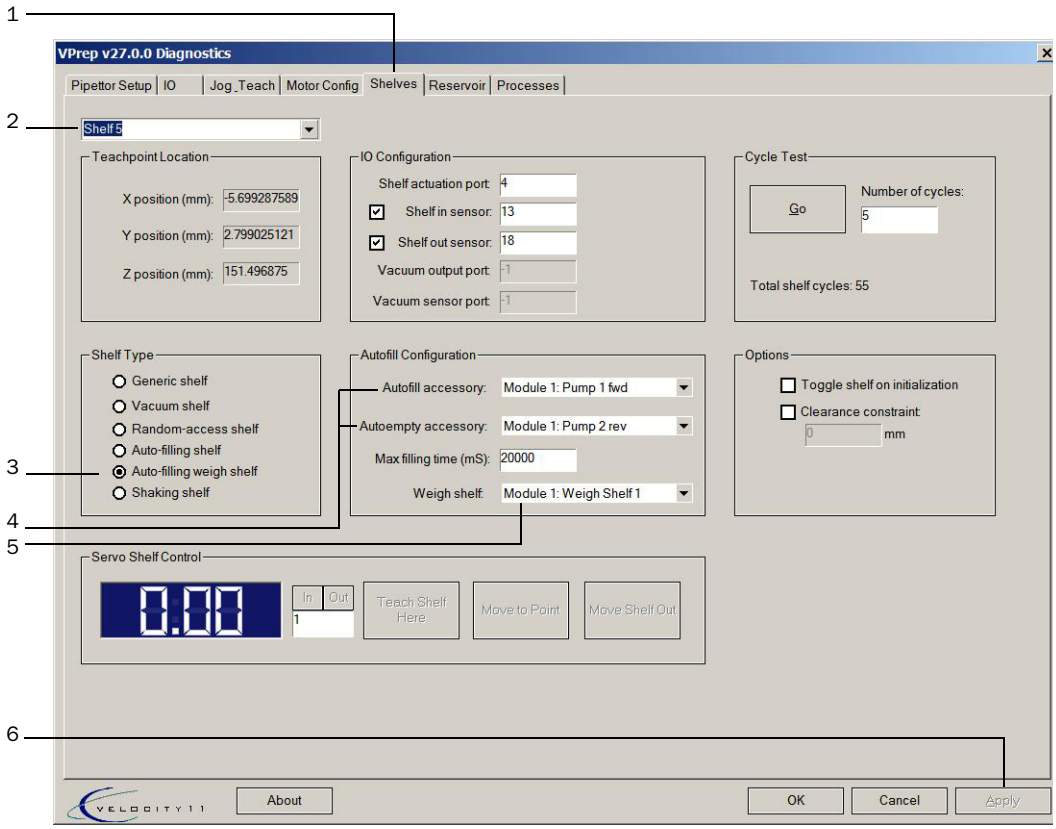
The reservoir type must match the type of pipette head installed for the run. The following figure shows the 96- and 384-chimney reservoirs.



Configuring reservoir operations

Before you begin, connect the Pump Module, Weigh Shelf, and autofilling reservoir per “Setting up a Pump Module” on page 110.

The following figure shows the steps for configuring reservoir operations.



To configure the autofilling reservoir operations:

1. In VPrep Diagnostics, click the **Shelves** tab.
2. In the upper left list, select the shelf that you want to configure.
3. Under **Shelf Type**, select one of the following:
   - **Auto filling shelf**. Select this option if the reservoir is not on a Weigh Shelf.
   - **Auto filling weigh shelf**. Select this option if the reservoir is on a Weigh Shelf.
4. Under **Autofill Configuration**, specify the filling and emptying parameters:
   a. **Autofill accessory**. Select the Pump Module, pump number, and the flow direction (forward or reverse) to fill the reservoir.

b. **Autoempty accessory**. Select the Pump Module, pump number, and the flow direction (forward or reverse) to empty the reservoir.

For example, if a single Pump Module connects to a left side shelf on the VPrep Pipettor, select **Module 1: Pump 1 fwd** for autofilling, and **Module 1: Pump 2 rev** for autoemptying. However, if the Pump Module connects to a right side shelf, select **Module 1: Pump 1 rev** for autofilling, and **Module 1: Pump 2 fwd** for autoemptying.

5. If using a Weigh Shelf, set the following:
   a. Use the **Max filling time** default value of 20 seconds.

      Note: If the reservoir fails to fill to a specified percentage of the Weigh Shelf full setting within the **Max filling time**, the pump shuts off.

   b. In the **Weigh shelf** list, select the appropriate configuration of Pump Module and Weigh Shelf number. For example, a single Pump Module and Weigh Shelf is connected to the VPrep Pipettor, select **Module 1: WeighShelf1**.
6. Click **Apply** to save the settings.

Related topics

For information about…	See…
Starting up and shutting down the VPrep Pipettor	❑ "Starting up the VPrep Pipettor" on page 36 ❑ "Shutting down the VPrep Pipettor" on page 38
Accessory location guidelines	"Determining the shelf location" on page 107
Setting up a Pump Module	"Setting up a Pump Module" on page 110
Calibrating a Weigh Shelf	"Installing and calibrating a Weigh Shelf" on page 122
Draining or filling a reservoir	"Running the Reservoir task" on page 103
Setting up liquid and labware definitions	User guide for the applicable Velocity11 automation control software
Using an accessory in a protocol	User guide for the applicable Velocity11 automation control software

Installing and calibrating a Weigh Shelf

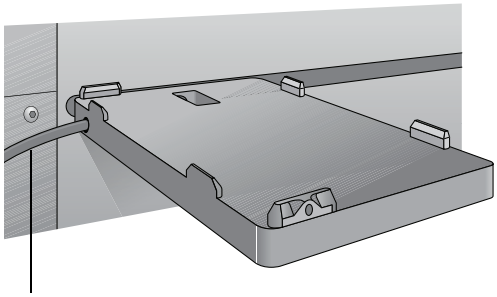
About this topic

The Weigh Shelf works with a Pump Module to control the liquid level in the Auto Filling Reservoir or in a MicroWash Reservoir. This topic describes how to install and calibrate a Weigh Shelf.

Description

The Weigh Shelf contains an electronic monitor that checks the percentage of liquid in a reservoir. By monitoring the weight of the reservoir, the Weigh Shelf controls when the Pump Module is activated. The Weigh Shelf works with the Pump Module to maintain an optimal level of liquid and ensures the reservoir is not overfilled.

!! IMPORTANT !! The Pump Module must be internally configured to specify use with or without a Weigh Shelf. If a configuration change is required, contact Velocity11 Technical Support.



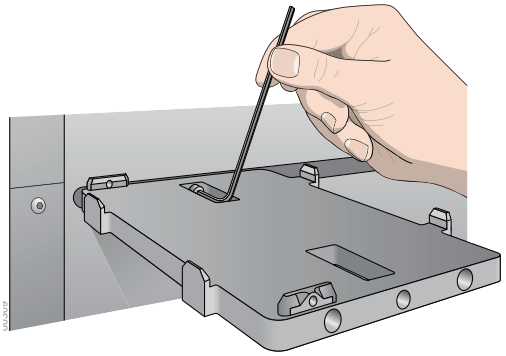
Installation and setup workflow

Step	Procedure	See…
1	Install the Weigh Shelf on the VPrep Pipettor.	“Installing a Weigh Shelf” on page 123
2	Connect the Weigh Shelf communication cable to the Pump Module.	“Setting up a Pump Module” on page 110
3	Configure the Weigh Shelf reservoir operations.	“Configuring reservoir operations” on page 120
4	Calibrate the Weigh Shelf.	“Calibrating a Weigh Shelf” on page 124
5	Verify the teachpoint accuracy for the Weigh Shelf.	“Setting or editing shelf teachpoints” on page 46

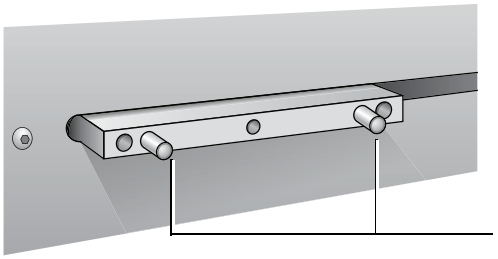
Installing a Weigh Shelf

To install a Weigh Shelf:

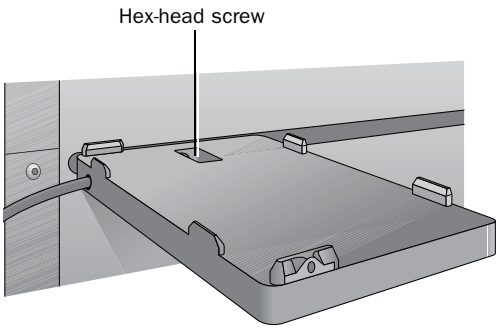
1. Shut down the VPrep Pipettor to ensure the power and air are turned off.
2. If applicable, remove the standard shelf from the Weigh Shelf location as follows:
   a. At the top center of the shelf, use a 3 mm hex wrench to remove the screw securing the shelf to the shelf connector.
   b. Slide the shelf off of the dowel pins of the VPrep Pipettor shelf connector.



3. Slide the Weigh Shelf onto the two dowel pins of the VPrep Pipettor shelf connector.



4. To secure the shelf in position, use a 3 mm hex wrench to tighten the screw at the top center of the shelf.



About connecting a Weigh Shelf

Use one Pump Module for each pairing of reservoir and Weigh Shelf. For the connection procedure, see “Setting up a Pump Module” on page 110.

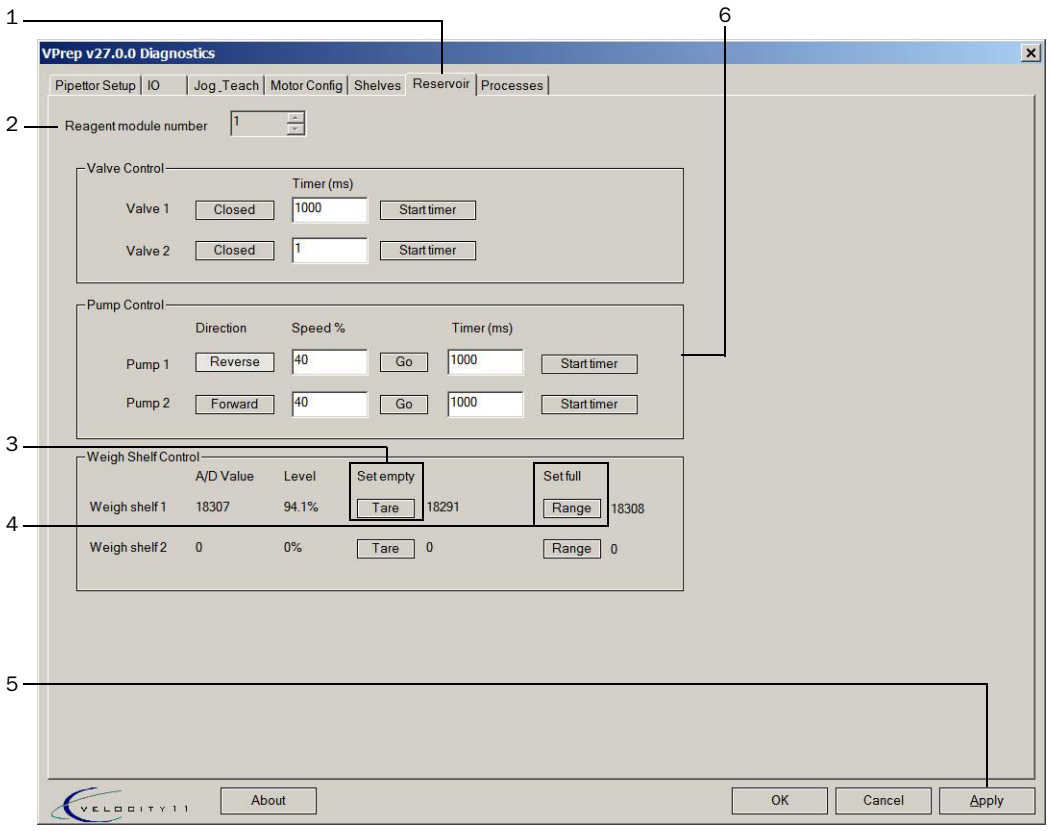
Before the Weigh Shelf is ready for use in a protocol, you must:

- ❑ Configure the autofilling shelf parameters in VPrep Diagnostics. See “Configuring reservoir operations” on page 120.
- ❑ Calibrate the Weigh Shelf empty and full settings

Calibrating a Weigh Shelf

Before you begin, ensure that the empty reservoir is in place on the Weigh Shelf.

The following figure shows the steps for calibrating a Weigh Shelf.



To calibrate a Weigh Shelf:

1. In VPrep Diagnostics, click the **Reservoir** tab.
2. In the **Reagent module number** box, select the number of the Pump Module to which the Weigh Shelf is connected. For example, if you have a single Weigh Shelf connected to a single Pump Module, select **1**.
3. Under **Weigh Shelf Control**, set the empty level for the reservoir as follows:
   a. Ensure that the reservoir is empty.

b. In the **Set empty** column for **Weigh shelf 1**, click **Tare**.

Note: **Weigh shelf 1** corresponds to the Pump Module SHELF A input port. Velocity11 recommends using one Pump Module for each pairing of reservoir and Weigh Shelf.

4. To set the full level of the reservoir:
   a. Run the pump to fill the reservoir to the desired full level. For details on how to run the Pump Module to fill the reservoir, see "Running the Reservoir task" on page 103.
   b. In the **Set full** column for **Weigh shelf 1**, click **Range**.
5. Click **Apply** to save the settings.
6. Run the pump that is designated as the empty pump to remove any liquid from the reservoir. Verify that the **Level** reading decreases as the liquid level decreases. For details on how to run the Pump Module to drain the reservoir, see "Running the Reservoir task" on page 103.

Related topics

For information about…	See…
Starting up and shutting down the VPrep Pipettor	❑ "Starting up the VPrep Pipettor" on page 36 ❑ "Shutting down the VPrep Pipettor" on page 38
Opening VPrep Diagnostics	"Opening VPrep Diagnostics" on page 39
Accessory location guidelines	"Determining the shelf location" on page 107
Connecting the Pump Module	"Setting up a Pump Module" on page 110
Configuring the reservoirs	"Configuring reservoirs for the Pump Module" on page 118
Setting teachpoints	"Setting or editing shelf teachpoints" on page 46
Using an accessory in a protocol	User guide for the applicable Velocity11 automation control software

Installing a Microplate Alignment Shelf

About this topic

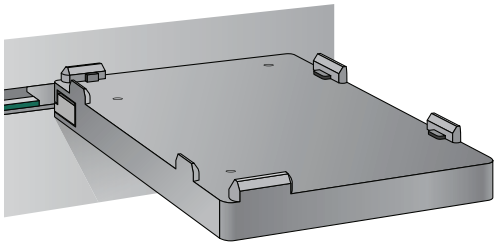
The Microplate Alignment Shelf ensures precise positioning of microplates. This topic describes how to install the shelf.

Description

The Microplate Alignment Shelf is particularly useful for 1536-well and 384-well microplates where high-precision positioning of the tips is essential.

The shelf uses three spring-loaded arms to move the plate into position and hold it in place during pipetting tasks.

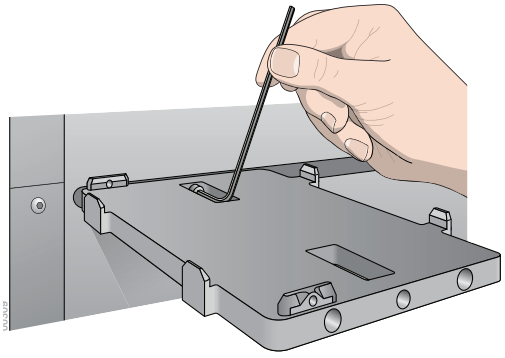
Microplates are the only labware appropriate for use on the Microplate Alignment Shelf.



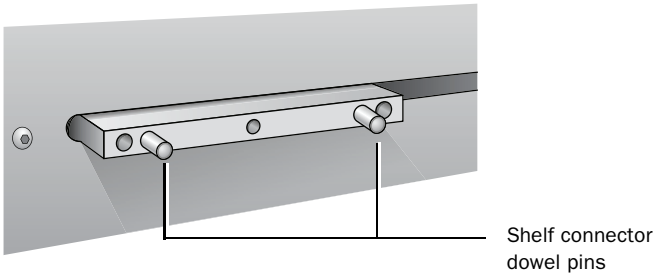
Installing the shelf

To install a Microplate Alignment Shelf:

1. Shut down the VPrep Pipettor to ensure that the power and air are turned off.
2. If applicable, remove the standard shelf from the target location as follows:
   a. At the top center of the standard shelf, use a 3 mm hex wrench to remove the screw securing the shelf to the shelf connector.
   b. Slide the shelf off of the dowel pins of the VPrep Pipettor shelf connector.



3. Slide the Microplate Alignment Shelf onto the two dowel pins of the VPrep Pipettor shelf connector.



4. Secure the shelf to the connector using a 3 mm hex wrench to tighten the screw at the bottom center of the shelf.

!! DAMAGE HAZARD !! **Before using the Microplate Alignment Shelf, verify that the teachpoint is accurate.**

Related topics

For information about…	See…
Accessory location guidelines	“Determining the shelf location” on page 107
Editing teachpoints	“Setting or editing shelf teachpoints” on page 46
Editing labware definitions	User guide for the applicable Velocity11 automation control software
Using the accessory in a protocol	User guide for the applicable Velocity11 automation control software

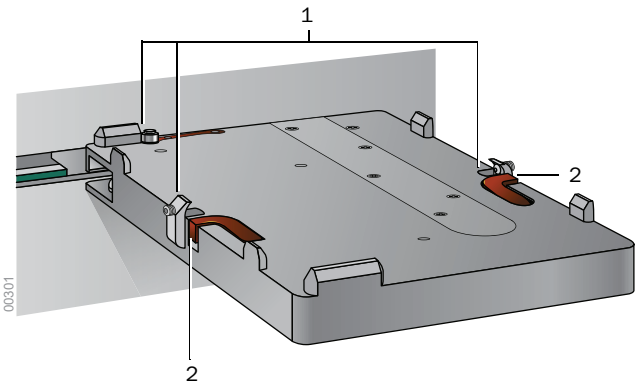
About the Sensor Alignment Shelf

About this topic

The Sensor Alignment Shelf ensures precise positioning of microplates. This topic describes the shelf, which is a Velocity11-installed accessory.

Description

The Sensor Alignment Shelf is particularly useful for 1536- and 384-well microplates where high-precision positioning is essential. The shelf has two built-in sensors that detect the presence of a microplate. During pipetting tasks, the shelf movement actuates three alignment clamps. The clamps position and actively hold the plate during pipetting operations, and then release the plate after the pipetting task is completed.



Item	Feature	Description
1	Actuated clamps	Three clamps are actuated by the shelf movement.
2	Sensors	Two sensors detect the presence of a plate.

About using the shelf

Microplates are the only labware appropriate for use on the Sensor Alignment Shelf.

!! DAMAGE HAZARD !! Before using the Sensor Alignment Shelf, verify that the teachpoint is accurate.

!! DAMAGE HAZARD !! Clean up any spills immediately. Excess fluid can damage the sensing mechanism in the Sensor Alignment Shelf.

Related topics

For information about…	See…
Accessory location guidelines	“Determining the shelf location” on page 107
Editing teachpoints	“Setting or editing shelf teachpoints” on page 46

For information about…	See…
Editing labware definitions	User guide for the applicable Velocity11 automation control software
Using the accessory in a protocol	User guide for the applicable Velocity11 automation control software

About the Vacuum Alignment Shelf

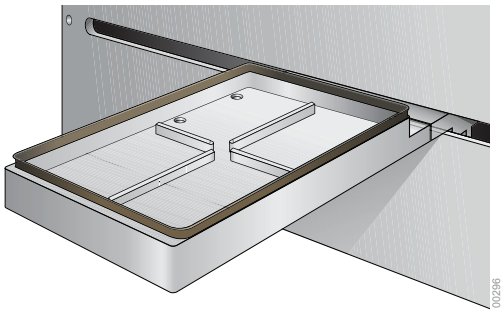
About this topic

The Vacuum Alignment Shelf is designed to prevent problems caused by warped PCR microplates. This topic describes the shelf, which is a Velocity11-installed accessory.

Description

The Vacuum Alignment Shelf uses a vacuum system to hold the PCR plate flat and ensure reliable pipetting in every well. A vacuum sensor ensures proper plate engagement before any liquid handling steps.

The following figure shows the Vacuum Alignment Shelf.



Before using the shelf

Verify the setup:

- ❑ Ensure the vacuum tubing is in good condition and is connected from the vacuum source to the vacuum port on the back of the VPrep Pipettor.
- ❑ Make sure the vacuum is turned on at the source.
- ❑ Verify that the teachpoint for the Vacuum Alignment Shelf is accurate.
- ❑ (Optional) Create a special labware class for the plates that require the Vacuum Alignment Shelf.

  Microplates are the only labware appropriate for use on the Vacuum Alignment Shelf. In the Labware Editor, you can define a labware class for the plates that require the vacuum alignment to automate which plates are placed on the Vacuum Alignment Shelf.

!! DAMAGE HAZARD !! **Clean up any spills immediately. Excess fluid can damage the Vacuum Alignment Shelf.**

Related topics

For information about…	See…
Accessory location guidelines	"Determining the shelf location" on page 107
Vacuum connections	"Connecting the air and vacuum sources" on page 28
Editing teachpoints	"Setting or editing shelf teachpoints" on page 46
Editing labware definitions	User guide for the applicable Velocity11 automation control software
Using the accessory in a protocol	User guide for the applicable Velocity11 automation control software

About the Tip Chute

About this topic

The Tip Chute is a Velocity11-installed accessory that routes used tips to a trash receptacle.

Description

When the VPrep Pipettor is part of the lab automation system, such as the BioCel system, the Tip Chute can be mounted on shelf 7 to direct used disposable tips to a trash receptacle. When shelf 7 moves into position under the pipette head during a tips-off process, the Tip Chute is in position to direct the discarded tips to the trash receptacle.

Related topics

For information about…	See…
Other accessories	"VPrep Pipettor accessories overview" on page 106
Using an accessory in a protocol	*VWorks User Guide* or *PrepWorks User Guide*

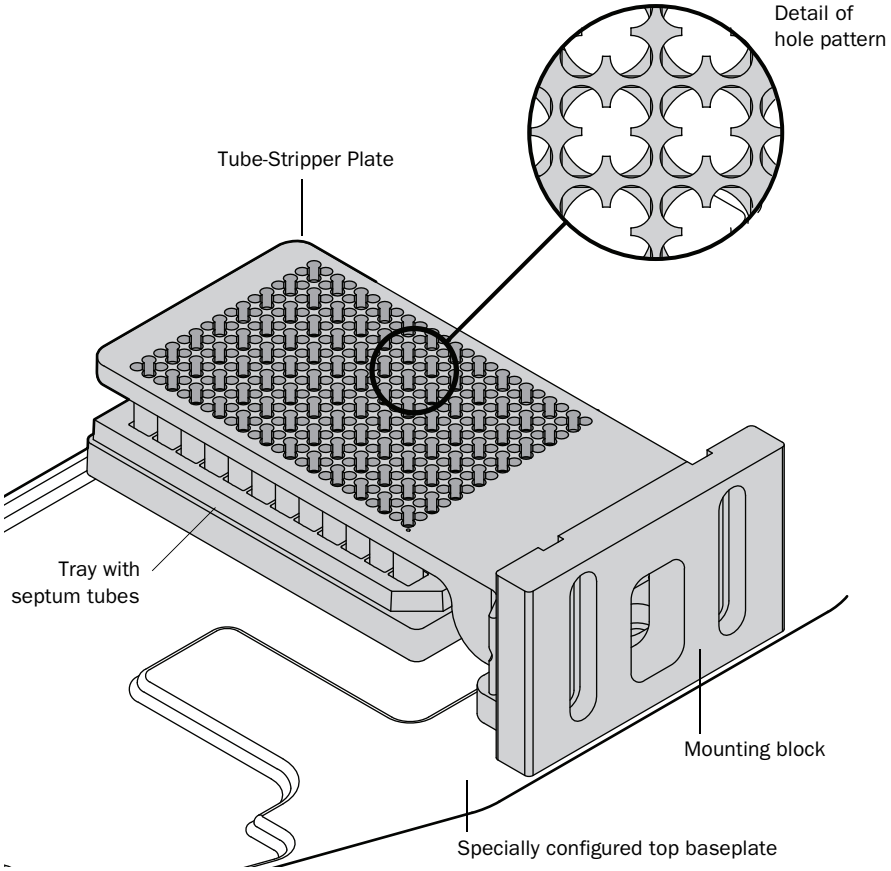
Setting up a Tube-Stripper Plate

About this topic

The Tube-Stripper Plate prevents septum tubes from adhering to the tips of a fixed-tip pipette head during pipetting tasks. This topic describes how to set up the Tube-Stripper Plate.

Description

The Tube-Stripper Plate is compatible with fixed-tip pipette heads. During a pipetting process, the shelf that contains a tray of septum tubes (shelf 7 or 8) moves into position under the Tube Stripper Plate. The pipette tips enter the tubes through the holes in the Tube-Stripper Plate. When the pipette head lifts up, the Tube-Stripper Plate holds the tubes in place in the tray.



The tip holes in the Tube-Stripper Plate are arranged in a pattern that enables compatibility with both 96- and 384-tip pipette heads. See the figure detail. For a 96-tip pipette head, the tip goes through the center of the hole. For a 384-tip pipette head, each tip in a set of four goes through each of the four semicircles in the pattern.

Before you begin

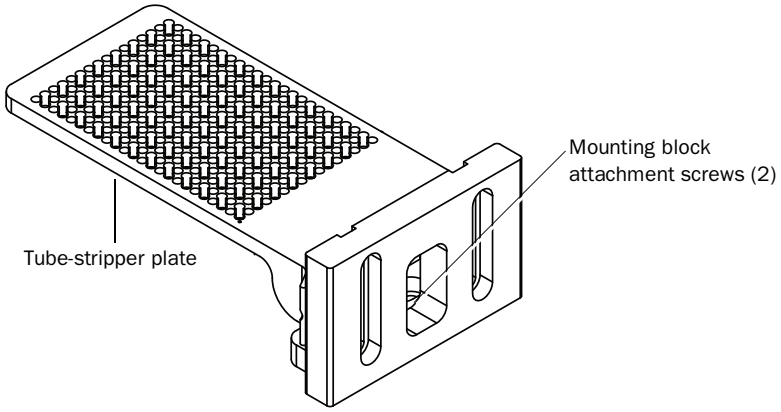
The Tube-Stripper Plate requires a specially configured VPrep Pipettor top baseplate.

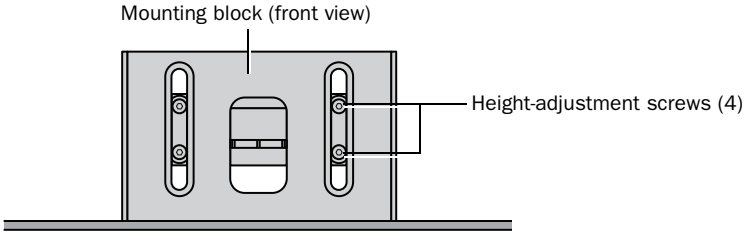
!! DAMAGE HAZARD !! **Before you install the Tube-Stripper Plate, verify that the teachpoints for shelves 7 and 8 are accurate.**

Setting up the Tube-Stripper Plate

To set up a Tube-Stripper Plate:

1. Position the mounting block above the two screw holes on the front center of the VPrep Pipettor top baseplate between shelves 7 and 8.
2. Secure the mounting block to the top baseplate using the two hex-head screws provided.
3. While holding the Tube-Stripper Plate in position against the back of the mounting block, insert the four height-adjustment screws through the vertical slots in the front of the mounting block. Use two screws in each vertical slot.





4. Check the clearance above and below the Tube-Stripper Plate to determine whether a height adjustment is required. Verify the following:
   - Shelves 5 and 6 can move in and out above the Tube-Stripper Plate.
   - A plate loaded with septum tubes on shelf 7 or 8 can move into position under the Tube-Stripper Plate.
5. To adjust the height of the Tube-Stripper Plate:
   a. Use a hex wrench to loosen the four adjustment screws on the front of the mount, and slide the Tube-Stripper Plate up or down as required.
   b. At the desired height, tighten the four adjustment screws.

Related topics

For information about…	See…
Editing teachpoints	"Setting or editing shelf teachpoints" on page 46
Using the accessory in a protocol	*VWorks User Guide* or *PrepWorks User Guide*
Other accessories	"VPrep Pipettor accessories overview" on page 106

VPrep Diagnostics quick reference

B

This appendix provides a quick reference of the following:

VPrep Diagnostics - Pipettor Setup tab

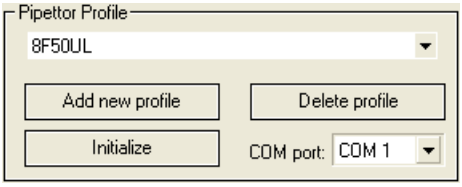
About this topic

This topic describes the following controls in the Pipettor Setup tab:

- ❑ Pipettor Profile
- ❑ Head Type
- ❑ Motion Settings
- ❑ Tip Settings (Disposable-tip heads only)
- ❑ Shelf Settings

Pipettor Profile area

The Pipettor Profile area contains the following controls.

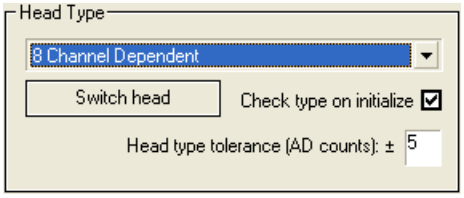


Control	Description
Pipettor Profile list	Specifies the active profile.
Add new profile	Opens the New Profile dialog box so that you can name the new profile. To add a profile, see “Creating a profile for the VPrep Pipettor” on page 41.
Delete profile	Deletes the profile selected in the Pipettor Profile list. **!! DAMAGE HAZARD !! A profile can be used by multiple protocols. Using the wrong profile can damage the VPrep Pipettor**.
Initialize	Initiates communication with the VPrep Pipettor using the selected profile on the specified COM port.
COM port	Specifies the serial communication port on the controlling computer.

Head Type area

To change the pipette head, see “Changing the pipette head” on page 66.

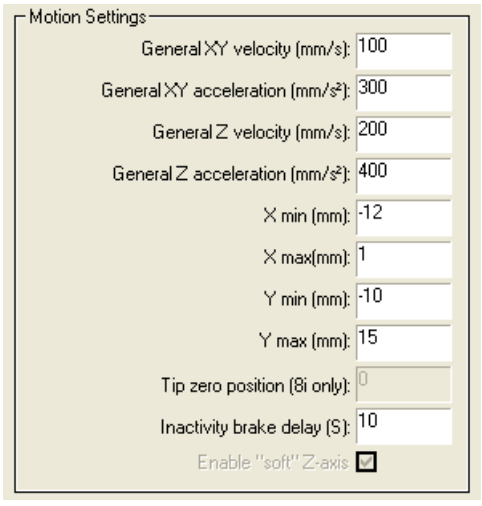
The Head Type area contains the following controls.



Control	Description
Head type list	Specifies the pipette head for the active profile. The type should match the head mounted on the VPrep Pipettor when the profile is in use.
Switch head	Starts a wizard that lowers the pipette head into position for replacement and steps you through the replacement procedure.
Check type on initialize	Verifies that the pipette head specified in the profile matches the head mounted on the VPrep Pipettor when the profile is used by a protocol. **!! DAMAGE HAZARD !! If this check box is cleared, the VPrep Pipettor will run with any head installed. Therefore, if you select a 96-channel head type while a 384-channel pipette head is installed, the head will crash.**
Head type tolerance (AD counts)	**!! DAMAGE HAZARD !! Do not change from Velocity11 default.** Specifies the tolerance in the head type detection circuit.

Motion Settings area

The Motion Settings area contains the following controls.

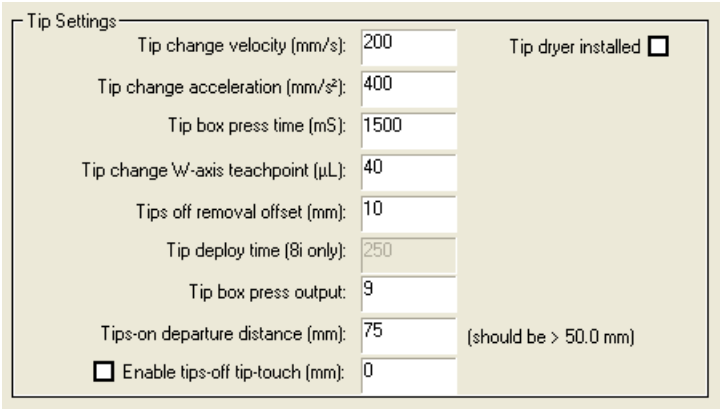


!! DAMAGE HAZARD !! Do not change the Motion Settings unless authorized by Velocity11 personnel. Changing any of these settings can cause damage to the VPrep Pipettor.

Control or indicator	Description
General XY velocity	Specifies the speed of the *x*- and *y*-axes.
General XY acceleration	Specifies the acceleration of the *x*- and *y*-axes.
General Z velocity	Specifies the speed of the *z*-axis.
General Z acceleration	Specifies the acceleration of the *z*-axis.
Tip Zero Position (8i only)	(8i channel pipette head only) Indicates the zero position for the 8i dispense.
Inactivity brake delay	Specifies the amount of inactive time after which the *z*-axis brake turns on. Turning on the brake saves energy.

Tip Settings area

The Tip Settings area contains the following controls for disposable-tip pipette heads.

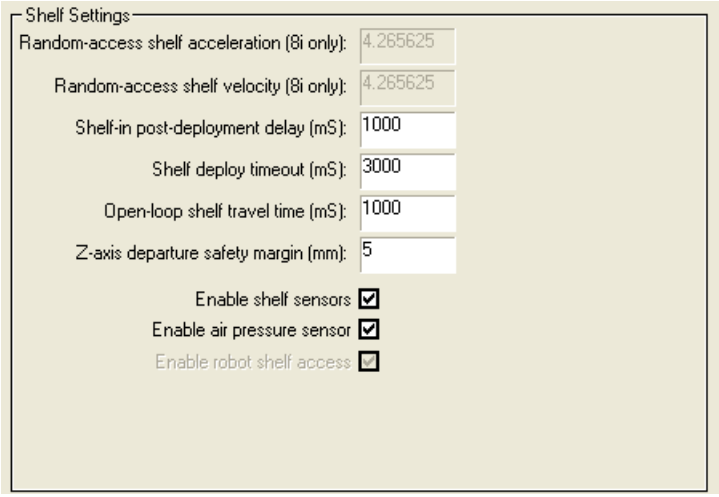


Control	Description
Tip change velocity (mm/s)	Sets the speed at which the tip change occurs (*w*-axis).
Tip change acceleration (mm/s²)	Specifies the acceleration at which the tip change occurs (*w*-axis).
Tip box press time (ms)	Specifies the length of time the tipbox press is active.
Tip change W-axis teachpoint (µl)	Specifies the location of the *w*-axis during tip removal.
Tips off removal offset (mm)	Specifies the distance between the tips-off and the tips-on *z*-axis positions.
Tip deploy time (8i only)	(8i channel pipette head only) Specifies the length of time to push the tips into the tipbox.

Control	Description
Tip box press output	**!! DAMAGE HAZARD !! Do not change this value.** Sets the digital output number the tipbox press is connected to.
Tips-on departure distance (mm)	Sets the distance that the pipette head raises after a tips-on operation.
Enable tips-off tip-touch	Activates the tips to touch the walls of the plate wells during tips-off operations.
Tip dryer installed	Not supported.

Shelf Settings area

The Shelf Settings area contains the following controls.



Control	Description
Random-access shelf acceleration (8i only)	(8i channel pipette head only) Specifies the random-access shelf acceleration.
Random-access shelf velocity (8i only)	(8i channel pipette head only) Specifies the speed of the random-access shelf.
Shelf-in post-deployment delay (mS)	Sets the duration for liquid to settle after a shelf stops moving. If no shelf sensors are in use, this delay is added to the open-loop shelf travel time.
Shelf deploy timeout (mS)	Sets the time for a shelf to reach its destination if the shelf sensors are in use.
Open-loop shelf travel time (mS)	Sets the duration to wait before doing anything else with the shelf.

Control	Description
Z-axis departure safety margin (mm)	**!! DAMAGE HAZARD !! Do not change this value.** Specifies the vertical distance to move the tips after pipetting tasks, such as aspirating, dispensing, and mixing.
Enable shelf sensors	Activates the shelf sensors, which ensure that a shelf has reached its destination. **!! DAMAGE HAZARD !! If you disable the shelf sensors, ensure that adequate time is specified under for the Open-loop shelf travel time and the shelves move freely. Disabling these sensors causes the pipette head to move to the shelf teach point after the open-loop and post-deployment delay times have elapsed.**
Enable air pressure sensor	Activates an air pressure sensor that reports an error message if the air pressure drops below 80 psi or rises above 100 psi.
Enable robot shelf access	Activates the shelf sensors on the robotically accessible shelves: shelves 2,4, 6, and 8.

Related topics

For information about…	See…
Creating a profile	❑ "Creating a profile for the VPrep Pipettor" on page 41 ❑ "Initializing a pipettor profile" on page 45
Editing teachpoints	"Setting or editing shelf teachpoints" on page 46
Changing the pipette head	"Changing the pipette head" on page 66

VPrep Diagnostics - IO tab

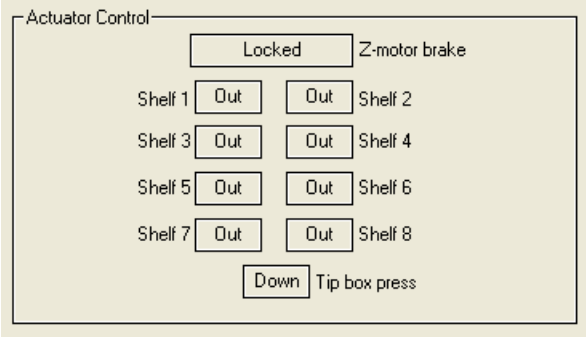
About this topic

The IO tab contains the following areas:

- ❑ Actuator Control
- ❑ Sensors
- ❑ Vacuum Control (vacuum shelves only)

Actuator Control area

The Actuator Control area contains the following controls.



Control	Description	Default state
Z-motor brake	Locks and frees the brake on the *z*-motor. All processes automatically lock the *z*-motor brake when pressing tips on.	Locked
Shelf In/Out	Moves the selected shelf in or out.	Out
Tip box press	Moves the tipbox press up or down.	Down

!! INJURY HAZARD !! Activating the Tip Box Press generates hundreds of pounds of force. Keep all body parts clear of the machine when activating the Tip Box Press.

!! DAMAGE HAZARD !! Do NOT activate the Tip Box Press above tips unless the z-motor brake is locked.

!! IMPORTANT !! After actuating the shelves, return the VPrep Pipettor to the *normal* state (all shelves out, tipbox press down, and *z*-axis brake free).

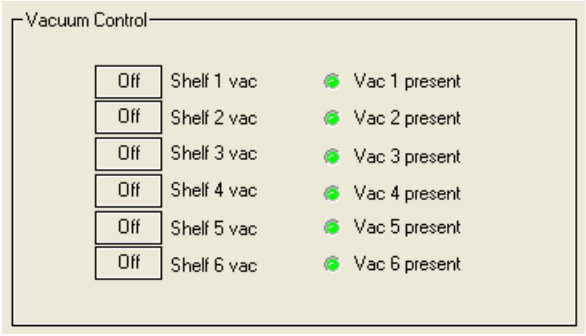
Sensors area

The Sensors area contains the following controls and indicators.

Control or indicator	Description
Update sensors	Enables the sensor display: ❑ Green is inactive ❑ Yellow is active
W axis home Z axis home	Indicates *w*- and *z*-axes are in the home position.
Motor 1 home Motor 2 home	Indicates the *x*- and *y*- motors are in the home position. These sensors are yellow during initialization or during homing routine.
Tip box present	Indicates the tipbox sensor has been tripped.
Air pressure	Displays the pressure of the compressed air coming into the VPrep Pipettor.

Vacuum Control area

The Vacuum Control area is for the Velocity11-installed Vacuum Alignment Shelf only.



Control or indicator	Description
Shelf vac On/Off	Turns on or off the vacuum to the specified shelf.
Vac present (sensors 1 to 6)	Indicates full vacuum when lit. This should occur only when the vacuum to that shelf is on and the plate is making a good seal.

Related topics

For information about…	See…
Opening VPrep Diagnostics	“Opening VPrep Diagnostics” on page 39
Using actuator controls	“Using actuator controls and indicators” on page 95
Vacuum Alignment Shelf	“About the Vacuum Alignment Shelf” on page 129

For information about…	See…
Troubleshooting problems	“Troubleshooting hardware problems” on page 77
Reporting a problem	“Reporting problems” on page 82

VPrep Diagnostics - Jog Teach tab

About this topic

!! DAMAGE HAZARD !! The Jog Teach tab opens only in the administrator mode, which enables running the VPrep Pipettor in out-of-range conditions.

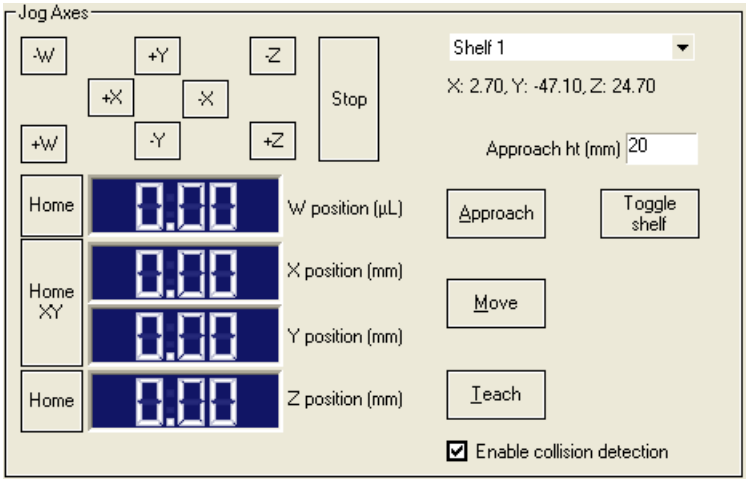
!! DAMAGE HAZARD !! For details on editing teachpoints, see “Setting or editing shelf teachpoints” on page 46 and “Ensuring teachpoint accuracy for tipboxes” on page 51.

This topic describes the following controls in the Jog Teach tab:

- ❑ Jog Axes
- ❑ Control
- ❑ Position Readout
- ❑ Tip Box Teaching

Jog Axes area

The Jog Axes area contains the following controls and indicators.



Axes buttons label conventions

Axis (direction of motion)		Range (approximate)
–X (right)	+X (left)	–12 to 0
–Y (forward)	+Y (backward)	–10 to 20
–Z (up)	+Z (down)	0 to 225
–W (pipetting aspirate)	+W (pipetting dispense)	Varies with pipette head type

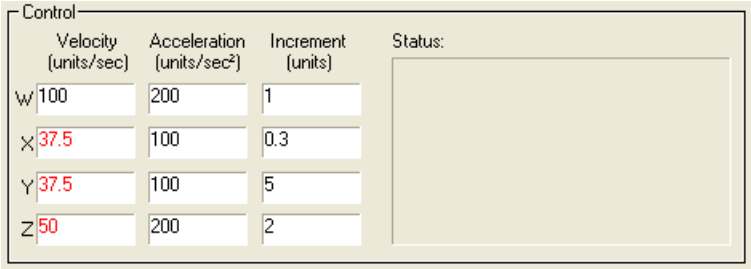
Controls

Control or indicator	Description
Shelf list	Specifies the shelf that you are moving or teaching.
Coordinates display	Displays the current teachpoint coordinates for the selected shelf.
W, X, Y, Z buttons	Homes the pipette head in the corresponding directional axis in the increments defined in the Control area.
Stop	Stops the pipette head movement.
Home W position	Homes the pipette head in the vertical aspirate-dispense axis. The home position is near the low-to-mid W-axis range.
Home XY position	Homes the pipette head in the horizontal (forward-backward and side-to-side) axis. The home position is near the middle of the *x*- and *y*-axes range.
Home Z position	Homes the pipette head in the vertical (up-down) axis. The home position is near the top of the *z*-axis range.
Approach ht	Specifies a vertical offset that is used when you click Approach to move the pipette head above a teachpoint.
Approach	Moves to the specified Approach ht above the teachpoint for the selected shelf.
Toggle shelf	Moves the selected shelf into position under the pipette head or back to the out position. *Note:* Toggling a shelf can release a stuck shelf. The pneumatic cylinder for a shelf can get stuck if a shelf is inactive for awhile.
Move	Moves the pipette head to the teachpoint for the selected shelf.

Control or indicator	Description
Teach	Saves the teachpoint coordinates to the teachpoint file for the shelf.
Enable collision detection	Displays a warning if a possible collision is detected.

Control area

For each directional axis, you can adjust how the pipette head moves. Any out-of-range values appear in red.



!! DAMAGE HAZARD !! **Inputting an incorrect value in the Control area could cause damage to the VPrep Pipettor.**

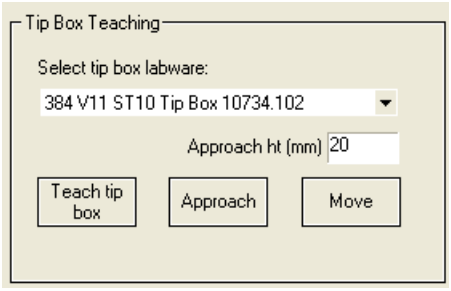
Control or indicator	Description
Velocity	Sets the speed of each pipette head movement. For example, you might want to specify a slower speed when setting teachpoints.
Acceleration	Sets how quickly the pipette head reaches the velocity setting.
Increment	Sets the distance moved each time you click an axial button: W, X, Y, or Z.

Position Readout area

Control	Description
Actual axis positions	Displays the current (real-time) pipette head position in millimeters.
Target axis positions	For Velocity11 use only.
Target encoder positions	For Velocity11 use only.

Tip Box Teaching area

The Tip Box Teaching area contains the following controls.



Selection or command	Description
Select tip box labware	Specifies a tipbox definition from the labware database.
Approach ht	Specifies a vertical offset (*z*-axis) above a tipbox that the pipette head moves to when you click Approach.
Approach	Moves the pipette head to the teachpoint for the selected labware, with a vertical offset specified by Approach ht.
Teach tip box	Saves the coordinates for the tipbox teachpoint in the labware definition.
Move	Moves the pipette head to the tipbox teachpoint for the selected location.

Sensors area

The Sensors area contains the following indicators.

Sensor	Description
W axis home	Changes to green when the *w*-axis motor returns to the home position. The *w*-axis motor controls the aspirate-dispense movement within the pipette head.
Motor 1 home Motor 2 home	Change to green when motor 1 and motor 2 return to home position. The motor 1 moves the pipette head horizontally, left and right. Motor 2 moves the pipette head horizontally, forward and backward.
Z axis home	Changes to green when the *z*-axis motor returns to the home position. The *z*-axis motor moves the pipette head vertically, up and down.

Related topics

For information about…	See…
Opening VPrep Diagnostics	“Opening VPrep Diagnostics” on page 39
Editing teachpoints	“Setting or editing shelf teachpoints” on page 46
Troubleshooting problems	“Troubleshooting hardware problems” on page 77
Reporting a problem	“Reporting problems” on page 82

VPrep Diagnostics - Motor Config tab

Only users with administrator privileges may have access to the Motor Config tab.

!! DAMAGE HAZARD !! The settings on the Motor Config tab are for Velocity11 use only. Do not change the settings from the manufacturer’s defaults.

Related topics

For information about…	See…
Troubleshooting problems	“Troubleshooting hardware problems” on page 77
Reporting a problem	“Reporting problems” on page 82

VPrep Diagnostics - Shelves tab

About this topic

This topic describes the controls and indicators on the Shelves tab.

General controls and indicators

Control or indicator	Description
Shelf list	Specifies the shelf selection and displays the corresponding parameters for teachpoint location, IO configuration, shelf type, and so forth.
Teachpoint Location	Displays the pipette head teachpoint coordinates for the selected shelf.
Shelf Type	Specifies the function of the selected shelf: ❑ *Generic shelf*. Specifies a general-purpose shelf ❑ *Vacuum shelf*. Specifies the Vacuum Alignment Shelf. ❑ *Random-access shelf*. Only used with the 8i pipette head ❑ *Autofilling shelf*. Specifies the Auto Filling Reservoir or MicroWash Reservoir, which use the Pump Module. ❑ *Autofilling weigh shelf*. Specifies the Weigh Shelf and Auto Filling Reservoir or MicroWash Reservoir, which use the Pump Module. ❑ *Shaking shelf*. Specifies an orbital shaking shelf.
IO Configuration ❑ Shelf actuation port ❑ Vacuum output port ❑ Vacuum sensor port	**!! DAMAGE HAZARD !! Do not change the port settings from the Velocity11 defaults for the Shelf actuation port, Vacuum output port, and Vacuum sensor port.**
❑ Shelf in sensor ❑ Shelf out sensor	Activate the sensors for the selected shelf and sets the sensor thresholds. *Note:* If you disable the shelf sensors for a given shelf, make sure you specify a valid time for the Open-loop shelf travel time parameter on the Pipettor Setup tab under Shelf Settings.

Autofill Configuration area

(Velocity11 Pump Module and Weigh Shelf accessories only)

Control or indicator	Description
Autofill accessory	Specifies the valve and Pump Module to use for filling the reservoir.
Autoempty accessory	Specifies the valve and Pump Module to use for emptying the reservoir.
Max filling time [mS]	Specifies the maximum amount of time to run the Pump Module.
Weigh shelf	Specifies which Weigh Shelf is connected to the Pump Module.

Servo Shelf Control area

(8i pipette head only) This area provides the following controls for the random-access shelf.

Control or indicator	Description
In	Moves shelf toward the pipette head by the specified increment.
Out	Moves shelf toward its home position by the specified increment.
Teach Shelf Here	Sets the teachpoint for the servo shelf.
Move to Point	Moves the shelf to the specified teachpoint.
Move Shelf Out	Moves the shelf to its home position.

Cycle Test area

You can use the controls in Cycle Test to move a shelf in and out and test the shelf sensors.

Control or indicator	Description
Number of cycles	Specifies the number of times to move the shelf in and out.
Go	Starts the cycle test.

Options area

The Options area provides additional shelf controls.

Control or indicator	Description
Toggle shelf on initialization	Moves the shelf in and out after homing, which can reduce friction if the shelf has not been used recently.
Clearance constraint	Designates a z-axis departure distance for the pipette head to move after a task. If greater, this value overrides the value for the Z-axis departure safety margin entered in the Shelf Settings area on the Pipettor Setup tab. *Note:* This value, which can be set for each shelf individually, takes into consideration shelf objects that are outside the dimension limits of standard labware.

Related topics

For information about…	See…
Opening VPrep Diagnostics	“Opening VPrep Diagnostics” on page 39
Setting up accessories	“VPrep Pipettor accessories” on page 105
Troubleshooting problems	“Troubleshooting hardware problems” on page 77
Reporting a problem	“Reporting problems” on page 82

VPrep Diagnostics - Reservoir tab

About this topic

This topic describes the controls and indicators on the Reservoir tab. The Reservoir tab is available only if a Pump Module is configured for the VPrep Pipettor.

The Reservoir tab contains the following controls.

Control	Description
Reagent module number	Specifies the active Pump Module for the valve, pump, or Weigh Shelf settings.
Valve Control	Enables control of the valves on a specially configured reservoir.
❑ Closed/Open	Specifies whether the given valve is open or closed.
❑ Timer (ms)	Specifies the duration of the Open or Closed setting.
❑ Start timer	Starts the open or close valve task.
Pump Control	Enables control of the pumps on the Pump Module. ❑ *Pump 1*. Controls the upper pump on the Pump Module. ❑ *Pump 2*. Controls the lower pump on the Pump Module.
❑ Direction	❑ *Forward*. Moves the pumped fluid in the forward direction of the pump. ❑ *Reverse*. Moves the fluid in the opposite direction.
❑ Speed %	Specifies how quickly the pump moves the fluid, where 100% is the fastest setting.
❑ Go	Starts the pump.
❑ Timer (ms)	Specifies the duration of a timed pump task.
❑ Start timer	Starts the timed pump task. The task stops when the timer stops.
Weigh Shelf Control	Provides the controls and indicators for: ❑ *Weigh shelf 1*. Corresponds to a Weigh Shelf connected to the SHELF A input port on the Pump Module. ❑ *Weigh shelf 2*. Corresponds to a Weigh Shelf connected to the SHELF B input port on the Pump Module.

Control	Description
❑ A/D Value	Displays a sensor reading that corresponds to the current weight of the reservoir that is on the Weigh Shelf.
❑ Level (%)	Displays the percent full scaled to the range you specify under Tare and Range.
❑ Set empty: Tare	Sets the empty level of the reservoir that is on the Weigh Shelf. The corresponding A/D value for *empty* displays to the right of the Tare button.
❑ Set full: Range	Sets the full level of the reservoir that is on the Weigh Shelf. The corresponding A/D value for *full* displays to the right of the Range button.

Related topics

For information about…	See…
Opening VPrep Diagnostics	"Opening VPrep Diagnostics" on page 39
Setting up accessories	"VPrep Pipettor accessories" on page 105
Troubleshooting problems	"Troubleshooting hardware problems" on page 77
Reporting a problem	"Reporting problems" on page 82

VPrep Diagnostics - Processes tab

About this topic

The Processes tab contains the following controls that you can use to run a task in real time. This topic describes the corresponding task dialog boxes.

- ❑ *Aspirate*. See "Aspirate dialog box" on page 153.
- ❑ *Dispense*. See "Dispense dialog box" on page 155.
- ❑ *Mix*. See "Mix dialog box" on page 157.
- ❑ *Wash*. See "Wash dialog box" on page 159.
- ❑ Tip attach. For tips on or tips off, see "Tip Control dialog box" on page 161.
- ❑ *Reservoir*. See "Fill dialog box" on page 161.

Aspirate dialog box

To run the Aspirate task, see "Running the Aspirate task" on page 97.

The Aspirate button displays the Aspirate dialog box, which contains the following controls.

Aspirate Configuration

Control	Description
Shelf list	Specifies the target shelf.
Labware	Specifies the labware. To add a labware selection to the list, click Edit labware, and use the Labware Editor.
Liquid type	Specifies the liquid. To add a selection to the list of liquids, click Edit liquid types and use the Liquid Library Editor.

Aspirate Parameters

Parameter	Description
Aspirate velocity	Specifies the speed (µL/s) at which the fluid is drawn into the tips.
Aspirate acceleration	Specifies the acceleration (µL/s²) at which the fluid is drawn into the tips.
Tips distance from well bottom	Specifies the distance (mm) to aspirate from the bottom of the well.
Dynamic tip retraction	Specifies the distance (mm) to move the head down for each microliter aspirated.
Pre-aspirate volume	Specifies the volume of air (µL) to draw into the tips before drawing the fluid.

Parameter	Description
Aspirate volume	Specifies the volume of fluid (µL) to draw into the tips.
Post-aspirate volume	Specifies the volume of air (µL) to draw into the tips after drawing the fluid.

Aspirate Locations and Aspirate Control

Control	Description
Plate layout graphic	Specifies the target wells in the plate. Click the wells in the graphic to select the target wells. Green indicates the selected wells. Alternatively, right-click the graphic and choose one of the following commands from the shortcut menu: ❑ Select all wells ❑ Clear all selected wells ❑ Select or clear all wells in highlighted row ❑ Select or clear all wells in highlighted column
Aspirate	Starts the task.
Abort	Cancels the task.
Pause	Pauses the task or resumes a paused task.

Dispense dialog box

To run the Dispense task, see "Running the Dispense task" on page 98.

The Dispense button displays the Dispense dialog box, which contains the following controls.

Dispense Configuration

Control	Description
Shelf list	Specifies the target shelf.
Labware	Specifies the labware. To add a labware selection to the list, click Edit labware, and use the Labware Editor.
Liquid type	Specifies the liquid. To add a selection to the list of liquids, click Edit liquid types and use the Liquid Library Editor.

Dispense Parameters

Parameter	Description
Dispense velocity	Specifies how fast the fluid is released from the tips.
Dispense acceleration	Specifies the acceleration at which the fluid is released from the tips.
Tips distance from well bottom	Specifies the distance (mm) from the bottom of the well to dispense.
Dynamic tip retraction	Specifies the distance (mm) to raise the head for each microliter dispensed.
Dispense volume	Specifies the volume of fluid released into the well.
Blowout volume	Specifies the amount of airspace pushed through the tips after dispensing. (The tips are still in the wells.)
Post-dispense volume	Specifies the amount of airspace ejected from the tips after the tips have moved out of the wells.

Tip Touch parameters for Dispense task

Parameter	Description
Sides to touch	Specifies the number of sides on the plate well to touch. Range: 0 to 4
Rise height	Specifies the vertical distance the tips rise (from the dispense height) before tip touching commences.

Parameter	Description
Horizontal distance	Specifies the horizontal distance for a tip to move. This number is based on the well diameter specified by the plate type. ❑ Positive value indicates the distance for the tips to move past the well radius. ❑ Zero indicates that the tip will move a horizontal distance equal to the radius of the well. ❑ Negative value indicates that the tip will move a distance less than the radius of the well.

Dispense Locations and Dispense Control

Control	Description
Plate layout graphic	Specifies the target wells in the plate. Click the wells in the graphic to select the target wells. Green indicates the selected wells. Alternatively, right-click the graphic and choose one of the following commands from the shortcut menu: ❑ Select all wells ❑ Clear all selected wells ❑ Select or clear all wells in highlighted row ❑ Select or clear all wells in highlighted column.
Dispense	Starts the task.
Abort	Cancels the task.
Pause	Pauses the task or resumes a paused task.

Mix dialog box

To run the Mix task, see “Running the Mix task” on page 99.

The Mix button displays the Mix dialog box, which contains the following controls.

Mix Configuration

Control	Description
Shelf list	Specifies the target shelf.
Labware	Specifies the labware. To add a labware selection to the list, click Edit labware, and use the Labware Editor.
Liquid type	Specifies the liquid. To add a selection to the list of liquids, click Edit liquid types and use the Liquid Library Editor.

Mix Parameters

Parameter	Description
Aspirate velocity	Specifies the speed at which the fluid is aspirated during the mix cycle.
Aspirate acceleration	Specifies the acceleration at which the fluid is aspirated.
Dispense velocity	Specifies the speed at which the fluid is dispensed during the mix cycle.
Dispense acceleration	Specifies the acceleration at which the fluid is dispensed.
Distance from well bottom	Specifies the distance (mm) from the bottom of the well at which the mix operation will be performed.
Dynamic tip retraction	Specifies the distance (mm) to lower the head for each microliter aspirated and raise for each microliter dispensed.
Cycles	Specifies how many times to repeat the aspirate/dispense cycle.
Pre-aspirate volume	Specifies the volume of air to draw into the tip before the first aspiration stroke.
Volume	Specifies the volume of fluid to be repeatedly aspirated and dispensed.
Blowout volume after last	Specifies the volume dispensed from the tips following the last mix step. The tips are still in the wells.

Mix task Tip Touch parameters

Parameter	Description
Sides to touch	Specifies the number of sides on the plate well to touch. Range: 0 to 4
Rise height	Specifies the vertical distance the tips rise (from the dispense height) before tip touching commences.
Horizontal distance	Specifies the horizontal distance for a tip to move. This number is based on the well diameter specified by the plate type. ❑ Positive value indicates the distance for the tips to move past the well radius. ❑ Zero indicates that the tip will move a horizontal distance equal to the radius of the well. ❑ Negative value indicates that the tip will move a distance less than the radius of the well.

Mix Locations and Mix Control

Control	Description
Plate layout graphic	Specifies the target wells in the plate. Click the wells in the graphic to select the target wells. Green indicates the selected wells. Alternatively, right-click the graphic and choose one of the following commands from the shortcut menu: ❑ Select all wells ❑ Clear all selected wells ❑ Select or clear all wells in highlighted row ❑ Select or clear all wells in highlighted column.
Mix	Starts the task.
Abort	Cancels the task.
Pause	Pauses the task or resumes a paused task.

Wash dialog box

To run the Wash tips task, see "Running the Wash tips task" on page 100.

The Wash tips button displays the Wash dialog box, which contains the following controls.

Wash Configuration

Control	Description
Shelf list	Specifies the target shelf.
Labware	Specifies the labware. To add a labware selection to the list, click Edit labware, and use the Labware Editor.
Liquid type	Specifies the liquid. To add a selection to the list of liquids, click Edit liquid types and use the Liquid Library Editor.

Mix Parameters for the Wash tips task

Parameter	Description
Aspirate velocity	Specifies the speed at which the fluid is aspirated during the mix cycle.
Aspirate acceleration	Specifies the acceleration at which the fluid is aspirated.
Dispense velocity	Specifies the speed at which the fluid is dispensed during the mix cycle.
Dispense acceleration	Specifies the acceleration at which the fluid is dispensed.
Dynamic tip retraction	Specifies the distance (mm) to lower the head for each microliter aspirated and raise for each microliter dispensed.
Cycles	Specifies how many times to repeat the aspirate/dispense cycle.
Pre-aspirate volume	Specifies the volume of air to draw into the tip before the first aspiration stroke.
Volume	Specifies the volume of fluid to be repeatedly aspirated and dispensed.
Blowout volume after last	Specifies the volume dispensed from the tips following the last mix step. The tips are still in the wells.

Wash Parameters

Parameter	Description
Inflow pump	Specifies the speed of the pump filling the selected shelf.
Outflow pump	Specifies the speed of the pump emptying the selected shelf.
Dispense to waste	Specifies that the tips dispense to waste for the selected shelf.
Enable tip touch	Specifies that the tips touch one or more sides of the plate wells.
Rise height	Specifies the vertical distance the tips rise before tip touching commences.
Horizontal distance	Specifies the horizontal distance for a tip to move. This number is based on the well diameter specified by the plate type. ❑ Positive value indicates distance for a tip to move past the well radius. ❑ Zero indicates that the tip will move a horizontal distance equal to the radius of the well. ❑ Negative value indicates that the tip will move a distance less than the radius of the well.

Wash Locations and Wash Control

Control	Description
Plate layout graphic	Specifies the target wells in the plate. Click the wells in the graphic to select the target wells. Green indicates the selected wells. Alternatively, right-click the graphic and choose one of the following commands from the shortcut menu: ❑ Select all wells ❑ Clear all selected wells ❑ Select or clear all wells in highlighted row ❑ Select or clear all wells in highlighted column.
Wash	Starts the task.
Abort	Cancels the task.
Pause	Pauses the task or resumes a paused task.

Tip Control dialog box

To run the tips-on or tips-off task, see “Running the Tip attach task” on page 102.

The Tip attach button displays the Tip Control dialog box, which contains the following controls.

Process Parameters

Control	Description
Load tips from Shelf 7 Load tips from Shelf 8	Specifies the tipbox shelf.
Select tipbox labware	Specifies the tipbox. To add a labware selection to the list, click Edit labware, and use the Labware Editor.
Liquid type	Specifies the liquid. To add a selection to the list of liquids, click Edit liquid types and use the Liquid Library Editor.

Tipbox Quadrant/Column and Process Control

Control	Description
Tipbox layout graphic	Specifies the target locations in the tipbox. Click the wells in the graphic to select the target locations. Green indicates the selected wells.
Tips On Tips Off	Starts the task.
Abort	Cancels the task.
Pause	Pauses the task or resumes a paused task.

Fill dialog box

The Reservoir button is available only if the VPrep Pipettor is connected to a Velocity11 Pump Module. To fill or empty a specified reservoir, see “Running the Reservoir task” on page 103.

The Reservoir button displays the Fill dialog box, which contains the following controls.

General controls

Control	Description
Shelf to fill/empty	Specifies the reservoir shelf.
Speed	Sets the speed of the pump as a percentage of its total output. Default: 50%
Time	Sets the duration of the fill/empty task. Default: 20 s

Control	Description
Fill	Enables the fill reservoir task.
Empty	Enables the empty reservoir task.
Go	Starts the fill or empty task for a reservoir without a Weigh Shelf.

Weight Shelf control parameters

Control	Description
Target liquid level	For a reservoir on a Weigh Shelf, sets the liquid level for the fill or empty task.
Go	For a reservoir on a Weigh Shelf, starts the fill or empty task.

Related topics

For information about…	See…
Opening VPrep Diagnostics	“Opening VPrep Diagnostics” on page 39
Troubleshooting problems	“Troubleshooting hardware problems” on page 77
Reporting a problem	“Reporting problems” on page 82

Glossary

Term	Definition
controlling computer	The computer that controls the device or devices in the lab automation system.
device	An item on your lab automation system that has an entry in the device manager. A device can be a robot, an instrument, or a location on the lab automation system that can hold a piece of labware.
device file	A file that contains the configuration information for a device. The device file has the .dev file name extension and is stored in the folder that you specify when saving the file.
homing	The process in which the robot is sent to the factory-defined home position for each axis of motion.
profile	The Windows registry entry that contains the communication settings required for communication between a device and the Velocity11 lab automation software, as well as device specific settings such as teachpoints.
protocol	A sequence of tasks to be performed by a device or by the lab automation system.
run	A process in which one or more microplates are processed. In a standalone device, the run consists of one cycle. In a lab automation system, a run can consist of multiple cycles that are automated.
task parameters	The parameters associated with each task in a protocol. For example, in a labeling task, the parameters include the label value.
teachpoint	A set of coordinates that tells the pipette head exactly where to move to perform a task for a particular type of labware. In the lab automation system, a teachpoint defines where the robot can pick up or place labware and the location of a known object.
teachpoint file	The XML file that contains the settings for one or more external device teachpoints.

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Note: You can also search our technical documentation on our website at www.velocity11.com.

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User Guide

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