

VWorks Automation Control

Setup Guide



Notices

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Contact Information

Agilent Technologies, Inc. Automation Solutions 5301 Stevens Creek Blvd. Santa Clara, CA 95051 USA

Technical Support: 1.800.979.4811 or +1.408.345.8011 service.automation@agilent.com

Customer Service: 1.866.428.9811 or +1.408.345.8356 orders.automation@agilent.com

European Service: +44 (0)1763853638 euroservice.automation@agilent.com

Documentation feedback: documentation.automation@agilent.com

Web: www.agilent.com/lifesciences/ automation

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VWorks Automation Control Setup Guide

Preface

This preface contains the following topics:

- "About this guide" on page vi
- "Accessing Automation Solutions user guides" on page viii



About this guide

Who should read this guide

Job roles

This user guide is for people with the following job roles:

Job role	Responsibilities		
Integrator	Someone who writes software and configures hardware controlled by VWorks software.		
Lab manager,	Someone who is responsible for:		
administrator, or technician	 Developing the applications that are run using VWorks software 		
	• Developing training materials and standard operating procedures for operators		
Operator	Someone who performs the daily production work using VWorks software and solves routine problems.		
	Your organization may choose to create its own procedures for operators including the procedures in this guide.		

What this guide covers

This guide describes how to:

- Install the VWorks software
- Migrate protocols from previous versions of the VWorks software
- Define labware
- Specify pipette speed and accuracy
- Track and manage labware using a database inventory system
- Manage user accounts
- Implement ActiveX

This guide does not provide instructions for writing protocols, running protocols, troubleshooting protocols, or operating devices using the VWorks software. For information about these topics, see the *VWorks Automation Control User Guide*, relevant Agilent Technologies device user guide or third-party user documentation.

Software version

This guide documents VWorks software installer 10 and later.

Related guides

The *VWorks Automation Control Setup Guide* should be used in conjunction with:

- VWorks Automation Control User Guide
- Agilent Technologies device user guides
- Third-party device user documents

For information about	See
Accessing user guides for Automation Solutions products	"Accessing Automation Solutions user guides" on page viii
VWorks software licenses	"About upgrading a VWorks software license" on page 2

Accessing Automation Solutions user guides

About this topic

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

Where to find user information

The Automation Solutions user information is available in the following locations:

- *Knowledge base*. The help system that contains information about all of the Automation Solutions products is available from the Help menu within the VWorks software.
- *PDF files.* The PDF files of the user guides are installed with the VWorks software and are on the software CD that is supplied with the product. A PDF viewer is required to open a user guide in PDF format. You can download a free PDF viewer from the internet. For information about using PDF documents, see the user documentation for the PDF viewer.
- *Agilent Technologies website.* You can search the online knowledge base or download the latest version of any PDF file from the Agilent Technologies website at www.agilent.com/lifesciences/automation.

Accessing safety information

Safety information for the Agilent Technologies devices appears in the corresponding device user guide.

You can also search the knowledge base or the PDF files for safety information.

Using the knowledge base

Knowledge base topics are displayed using web browser software such as Microsoft Internet Explorer and Mozilla Firefox.

Note: If you want to use Internet Explorer to display the topics, you might have to allow local files to run active content (scripts and ActiveX controls). To do this, in Internet Explorer, open the Internet Options dialog box. Click the **Advanced** tab, locate the **Security** section, and select **Allow active content to run in files on my computer**.

To open the knowledge base, do one of the following:

- From within VWorks software, select Help > Knowledge Base or press F1.
- From the Windows desktop, select Start > All Programs > Agilent Technologies > VWorks > User Guides > Knowledge Base.

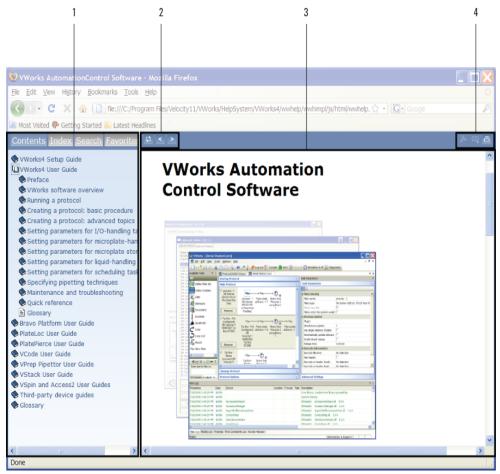
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Centrifuge	Main Protocol			۲	Task Parameters	۲
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Downstack	Remove	flt btm)		-	Braking (1 - 100 %):	25
	Plate 2 (384				Desired mode:	Time at speec
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Workspace Available T	Protocol Option	s		۲	Advanced Settings	۲

Opening the help topic for an area in the VWorks window

To access the context-sensitive help feature:

- In the main window of the VWorks software, click the help button .
 The pointer changes to O. Notice that the different icons or areas are highlighted as you move the pointer over them.
- 2 Click an icon or area of interest. The relevant topic or document opens.





Item Feature

- **1** *Navigation area.* Consists of four tabs:
 - *Contents.* Lists all the books and the table of contents of the books.
 - *Index.* Displays the index entries of all of the books.
 - *Search*. Allows you search the Knowledge Base (all products) using keywords. You can narrow the search by product.
 - Favorites. Contains bookmarks you have created.
- 2 *Navigation buttons.* Enable you to navigate through the next or previous topics listed in the Contents tab.
- 3 *Content area.* Displays the selected online help topic.
- 4 *Toolbar buttons.* Enable you to print the topic or send documentation feedback by email.

For information about	See
Who should read this guide and what this guide covers	"About this guide" on page vi
VWorks software licenses	"About upgrading a VWorks software license" on page 2
Contacting Agilent Technologies	"Reporting problems" on page 114

Preface Accessing Automation Solutions user guides

VWorks Automation Control Setup Guide



VWorks Automation Control Setup Guide

1 Installing and setting up the VWorks software

This chapter contains the following topics:

- "About upgrading a VWorks software license" on page 2
- "Installing the VWorks software" on page 3
- "Uninstalling the VWorks software" on page 6
- "Migrating files created in VWorks3, VWorks4, or BenchWorks" on page 7



About upgrading a VWorks software license

About this topic

If you have already purchased a license for the latest version of the VWorks Automation Control software, you can obtain license upgrades. For example, if you have an instrument license, you can upgrade to a system license. This topic describes the available license packages for the VWorks software. To upgrade your license, contact Automation Solutions Customer Service. After acquiring a license upgrade, see "Installing the VWorks software" on page 3 for details on activating the new licence.

If you have a previous version of the VWorks software, uninstall it before installing the latest version of the VWorks software. See "Uninstalling the VWorks software" on page 6.

Available license packages

The following license packages are available for the VWorks software.

This package	Is used for
Simulation license	Running the VWorks software in simulation mode. This license is useful for testing protocols on computers that are not controlling any devices.
Instrument license	Controlling a Bravo Platform or Vertical Pipetting Station in a standalone mode.
BenchTop license	Controlling a benchtop workstation, such as the BenchCel Workstation, with up to 10 integrated devices.
System license	Controlling an automated system, such as the BioCel System, with no limit on the number of integrated devices.
VWorks Application Programming Interface license	Controlling the VWorks software using an external system.
VWorks Hooks Interface license	Integrating with LIMS, sample, and workflow management systems by providing a callback interface to hook into key VWorks software events.
VWorks Device Driver Interface license	Writing device drivers using a COM interface.
VWorks Software Developer Kit license	Interfacing with the VWorks software using the VWorks Application Programming Interface license, VWorks Hooks Interface license, and VWorks Device Driver Interface license.
VWorks Watcher license	Monitoring a folder for new files, and then running a predefined JavaScript function whenever a new file appears in the folder.

Note: The device drivers that you receive are based on the type of license that you purchase.

Related information

For information about	See
Installing the VWorks software and activating a license	"Installing the VWorks software" on page 3
Uninstalling the VWorks software	"Uninstalling the VWorks software" on page 6
Migrating a protocol created with a previous version of the VWorks software	"Migrating files created in VWorks3, VWorks4, or BenchWorks" on page 7

Installing the VWorks software

Before you begin

CAUTION If you have been using the BenchWorks, VWorks3, or VWorks4 software to control your devices, contact Automation Solutions Customer Service for assistance. Do not attempt to migrate files until you have received their guidance. Depending on your system configuration, additional firmware upgrades may be required to prevent damage to your devices.

If you have a previous version of the VWorks software, uninstall it before installing the new version. See "Uninstalling the VWorks software" on page 6.

If you are upgrading the license for a current version of the software, for example, from an instrument license to a system license, you do not have to reinstall the software. However, you must activate the upgraded license. See "Activating the software license" on page 4.

Computer requirements

If your organization uses a computer other than one configured by Agilent Technologies, make sure the computer meets the following minimum requirements:

- Computer system
 - Microsoft Windows XP with Service Pack 3 or Microsoft Windows Vista with Service Pack 1
 - 2 GHz or faster 32-bit (x86) processor, multicore preferred
 - 2 GB system memory
 - 40 GB hard drive capacity with 10 GB free space
 - 1280 x 1024 pixel screen resolution

Installing the VWorks software

- Microsoft Internet Explorer 6.0 or Mozilla Firefox 1.0 with JavaScript enabled (required for using the context-sensitive help and knowledge base)
- A PDF viewer, such as Adobe Reader (required for opening the user guide PDF files)
- Communications interface using one of the following:
 - Dedicated 10BaseT or faster Ethernet card (two network cards if connecting to your local area network)
 - RS-232 DB9 serial port, if you are controlling a device via a serial connection

To facilitate the setup process, a software installation CD is supplied. You can use the CD to install the necessary software and setup configurations.

Installing the software

To install the software:

1 Insert the VWorks software CD into the computer CD-ROM drive. The software installer should start automatically.

If installer does not start, navigate to the CD-ROM drive, and then doubleclick **VWorks_buildx.x.x.exe**.

- **2** Follow the instructions that appear on the screen.
- **3** On the last page of the installation wizard, do one of the following:
 - If this is a new installation, select Launch VWorks Activation Program to obtain a license. Click Finish and proceed to step 4.
 - If you already have a current license, clear the Launch VWorks Activation **Program** check box. Click **Finish** to complete the installation process.
- **4** Follow the instructions in the VWorks Software Activation dialog box to obtain a license file for the VWorks software.

Activating the software license

To activate the software license:

1 After you obtain the license file (VWorks.vln), place the file in the folder that contains the VWorks software. For example, if you installed the software in the C:\Program Files\Agilent Technologies\VWorks folder, place the VWorks.vln file in that folder.

Note: If you have a simulation license and you want to use the VWorks inventory management feature, see "Workflow for setting up a MySQL database" on page 140.

2 Start the VWorks software.

CAUTION If the BenchWorks, VWorks3, or VWorks4 software was installed on the computer previously, do not attempt to migrate files until you have received guidance from Automation Solutions Customer Service. Depending on your system configuration, additional firmware upgrades may be required to prevent damage to your devices.

For information about	See
Upgrading software license	"About upgrading a VWorks software license" on page 2
Uninstalling VWorks software	"Uninstalling the VWorks software" on page 6
Migrating protocols created with BenchWorks, VWorks3, or VWorks4	"Migrating files created in VWorks3, VWorks4, or BenchWorks" on page 7
Reporting a problem with the software	"Reporting problems" on page 114

Uninstalling the VWorks software

About this topic

If you have a previous version of the VWorks software, you must first uninstall it before installing the new software. This topic explains how to uninstall the previous version.

Uninstalling the software

To uninstall the VWorks software:

- 1 On the Windows desktop, click **Start > Control Panel**. The Control Panel window appears.
- 2 Double-click Add/Remove Programs. The Add or Remove Programs window appears.
- 3 Select the VWorks software you want to uninstall, and then click Change/ Remove. The removal process might take a few minutes.

When the removal process is finished, the following folders and files may remain depending on the version of the VWorks software:

- ...\VWorks folder:
 - Users folder
 - VWorks.vln file

...\VWorks Workspace folder:

- Barcode Input Files folder
- Protocol Files folder
- Device Files folder
- RunSet Files folder
- Scripts folder
- VWorks folder

Typically, uninstalling the VWorks software without removing the registry files is sufficient. However, you can remove the Automation Solutions files from the registry if you do not intend to run the VWorks software on the computer again, or if you want a completely fresh start with VWorks software. For assistance, contact Automation Solutions Technical Support.

For information about	See
Converting protocols created with previous versions of the VWorks software	"Migrating files created in VWorks3, VWorks4, or BenchWorks" on page 7
Reporting a problem	"Reporting problems" on page 114

Migrating files created in VWorks3, VWorks4, or BenchWorks

About this topic

Before you can use the new VWorks software to run the protocols that you created using the BenchWorks, VWorks3, or VWorks4 software, the protocols and associated files must be updated for compatibility. This topic describes some of the file compatibility issues and procedures for file migration.

Although the new software includes a file migration feature, numerous postmigration adjustments may be required. Agilent Technologies strongly recommends that you contact Automation Solutions Customer Service before attempting a file migration procedure.

IMPORTANT After the protocols are migrated, you can modify the protocols to take advantage of new VWorks features, such as task looping, time constraints, and task groups.

Before attempting file migration

CAUTION Do not attempt to migrate files until you have contacted Automation Solutions Customer Service for guidance. Careful planning and preparation is required to optimize the migration process. Depending on your system configuration, additional firmware upgrades may be required to prevent damage to your devices. Make sure you are aware of any limitations or post-migration adjustment requirements.

- Contact Automation Solutions Customer Service for guidance.
- Verify whether any firmware upgrades are required.
- Make a backup copy of the files and Windows registry entries to be migrated, including:
 - Profiles
 - Devices
 - Protocols
 - Runsets
 - Labware
 - Liquid classes
 - JavaScript

Preparing for file migration

This section provides a partial list of some file migration limitations and postmigration adjustment requirements. Contact Automation Solutions Customer Service for guidance on issues that impact your configuration and how to take advantage of the latest enhancements in the new software.

Migrating files created in VWorks3, VWorks4, or BenchWorks

Potential	migration	issues

Issue	Description
User account passwords	During file migration, all user account passwords are reset to password. After migration, verify the user accounts. As an Administrator, you can change password to a default password that complies with your organization's user account policies.
Devices	• <i>Name changes.</i> During file migration, the software changes the device names in the migrated files. Verify the device name changes in the protocols and device files before running any protocols. See the following table for a list of name changes.
	• <i>Vertical Pipetting Station shelves.</i> Standard, Reagent, and Shaking shelves can be migrated. The following shelves will be converted to Standard shelves and must be reconfigured after the migration: Filter, Servo, Tipbox, and Tip Chute.
	• <i>Device files.</i> Before you can run a migrated protocol, the protocol must be associated with a device file.
Liquid class specifications	If no liquid class was specified in the VWorks3 software, the following VWorks3 VPrep parameters are moved into the Liquid Library after migration: Aspirate velocity, Aspirate acceleration, Dispense velocity, Dispense acceleration
JavaScript parameters	The latest VWorks software contains various enhancements that resulted in the renaming of some variables. Your scripts may require editing to make them work in the latest software. For guidance, contact Automation Solutions Customer Service.

Devices name changes

During file migration, the software changes the device names in the migrated files.

Old name	New name
Access2 Automated Microplate Loader	Automated Centrifuge Loader, or Centrifuge Loader
Bio IO	BioCel I/O Interface
Delid Station (Vacuum), Tip Box Delidder	Vacuum Delid Station
PlatePierce Seal Piercing Station	Microplate Seal Piercer
Shuttle Robot Microplate Rotator	Shuttle
VCode Barcode Print and Apply Station	Microplate Labeler
Velocity11 Conveyor	Microplate Conveyor

Migrating files created in VWorks3, VWorks4, or BenchWorks

Old name	New name
Velocity11 Phantom Human Robot	Phantom Robot
Velocity11 Robot	3-Axis Robot
VMix Mixing Station	Mixing Station
VPrep Pipetting System	Vertical Pipetting Station
VShuttle Rotating Microplate Mover	Rotator
VSpin Microplate Centrifuge	Microplate Centrifuge
VStack Labware Stacker	Labware Stacker

Migrating a single protocol

IMPORTANT This procedure is for VWorks users that have Administrator or Technician privileges and are familiar with the file migration limitations for their particular system.

IMPORTANT The first time you start the VWorks software on the computer, a message appears stating that some settings from the previous software version were found. The message asks whether to migrate these settings. The message refers only to global settings, not to protocols.

CAUTION Before you attempt to migrate a protocol, contact Automation Solutions Customer Service for guidance. Careful planning and preparation is required to optimize the migration process. Depending on your system configuration, additional firmware upgrades may be required to prevent damage to your devices. Make sure you are aware of any limitations or post-migration adjustment requirements.

To migrate a single protocol:

- **1** Make sure you are prepared for file migration. See "Before attempting file migration" on page 7.
- **2** Start the VWorks software.
- **3** Select File > Open.
- 4 Locate and select the protocol, and then click Open.
- **5** When the warning appears stating that you are opening a protocol created in an older version, click **OK**.
- 6 In the **Browse for Folder** dialog box, select a folder or create a new folder for the migrated protocols, and click **OK**.

Migrating files created in VWorks3, VWorks4, or BenchWorks

Browse For Folder	? 🗙
Please select a folder to store the migrated files.	
🖃 🧰 VWorks	~
🛅 biotek	
DHCP	
🗉 🧰 HelpSystem	
🗉 🧰 hit picking	
E CabwareDefinitions	
i logs	
Migrated files	
ReleaseNotes	
🛅 Schema	
🗉 🧰 tip box states	~
<	>
Folder: Migrated files	
Make New Folder OK Ca	ancel

The migration starts. All associated files (device, profiles, teachpoints, labware definitions, and liquid definitions) are migrated and the new files appear in the newly created destination folder.

- 7 In the Migration Tool dialog box, read the message describing whether the migration was successful and any warnings that were encountered during the migration. Click **OK**.
- 8 In the VWorks software window, check the Log area for error messages.

The VWorks software notifies you of any changes to task parameters that occurred during the VWorks software development. For example, auto tip tracking is available in the latest version but was not previously available.

- **9** Double-check the device file.
- **10** Verify the protocol is intact, and save the new protocol file.

Note: The new VWorks software installs default profiles. When you migrate a protocol, the software automatically migrates the associated profiles unless a naming conflict occurs. If a default profile has the same name as a profile that you created previously, the software displays a warning message.

IMPORTANT After migration, you can modify the protocols to take advantage of new features in the VWorks software, such as looping, time constraints, and task groups.

Migrating a folder of files

IMPORTANT This procedure is for VWorks users that have Administrator or Technician privileges and are familiar with the file migration limitations for their particular system.

IMPORTANT The first time you start the VWorks software on the computer, a message appears stating that some settings from the previous software version were found. The message asks whether to migrate these settings. The message refers only to global settings, not to protocols.

CAUTION Before you attempt to migrate a protocol, contact Automation Solutions Customer Service for guidance. Careful planning and preparation is required to optimize the migration process. Depending on your system configuration, additional firmware upgrades may be required to prevent damage to your devices. Make sure you are aware of any limitations or post-migration adjustment requirements.

To migrate a number of protocols stored in one folder:

- 1 Make sure you are prepared for file migration. See "Before attempting file migration" on page 7.
- 2 Start the VWorks software.
- **3** Select **Tools** > **Migrate all files in a folder**. The Migrate All Files in One folder dialog box appears.

😻 Migrate All Files in One Folder	×
Source folder:	
$\label{eq:constraint} C: \ensuremath{\sc box{Documents}} \ensuremath{\sc box{VW3DeviceandProtocols} \ensuremath{\sc box{Documents}} \sc box{Docu$	
Destination folder:	
C:\Program Files\Agilent Technologies\VWorks\New Folder\	
	Cancel

4 Select the source and destination folders and click **OK**.

The migration starts. All associated files (device, profiles, teachpoints, labware definitions, liquid definitions) are migrated and the new files appear in the newly created destination folder.

5 In the Migration Tool dialog box, read the message describing whether the migration was successful and any warnings that were encountered during the migration. Click **OK**.

Migration Tool
Migrated successfully. But you got the following warning message: In file C: \Program Files\Agilent Technologies\/Works\Dev1209.dev: The following shelf which belongs to VPrep □ Shelf 7 has been converted to Standard Shelf. You must configure it with any desired accessory in Vertical Pipetting Station Diagnostics.
ОК

Note: The new VWorks software installs default profiles. When you migrate protocols, the software automatically migrates the associated profiles unless a naming conflict occurs. If a default profile has the same name as a profile that you created previously, the software displays a warning message.

- **6** Double-check the device files.
- 7 Verify the protocols are intact, and save the new protocol files.

IMPORTANT After migration, you can modify the protocols to take advantage of new features in the VWorks software, such as looping, time constraints, and task groups.

For information about	See
Different file types and how they are related	VWorks Automation Control User Guide
Setting up user accounts	"Managing user accounts" on page 105
Devices supported by the VWorks software	VWorks Automation Control User Guide



VWorks Automation Control Setup Guide

2 Defining labware

This chapter contains the following topics:

- "About defining labware with the Labware Editor" on page 14
- "Labware Editor overview" on page 16
- "Workflow for defining labware" on page 19
- "Opening the Labware Editor" on page 21
- "Adding a labware entry" on page 23
- "Setting general properties" on page 26
- "Setting microplate properties" on page 28
- "Setting tip and well properties for pipetting" on page 32
- "Creating and assigning labware classes" on page 34
- "Using labware classes example" on page 37
- "Adding a labware image" on page 40
- "Setting Centrifuge Loader properties" on page 41
- "Setting BenchCel Workstation properties" on page 42
- "Setting Bravo Platform properties" on page 46
- "Setting Stacker properties" on page 48
- "Setting Direct Drive Robot properties" on page 51



About defining labware with the Labware Editor

Labware defined

Labware is a physical object such as a microplate, lid, or tipbox that will be acted upon by the tasks stored in your protocol.

The VWorks software requires all labware that will be handled by the automation system to be defined in the labware database.

Labware entry defined

A labware entry is the collection of properties or parameter values that describe a specific type of labware. This information is used by the VWorks software to command the robot and other devices to do tasks based on the information in the definition.

All labware parameters are entered and accessible through the Labware Editor.

Labware Editor defined

The Labware Editor is the VWorks software interface through which you can enter information about labware.

You must be logged in as an administrator or technician to use the Labware Editor.

Types of information stored

Two main types of information are stored in the labware database:

- Information about the labware properties
- Information about labware classes

About labware properties or parameters

Labware has physical properties such as width, length, and number of wells. Labware can also have non-physical properties, such as robot-handling speed, robot grip offsets, and microplate-handling options.

After labware is defined in the Labware Editor, all you have to do is select the type of labware to use each time you set up a protocol.

About labware classes

Labware classes are sets of labware entries, grouped so they are easier to manage than many individual labware entries.

Labware classes are used in combination with the device manager to restrict which types of labware can be used on which devices during a protocol run. This prevents wasted runs and damage to the devices on the platform.

An example of how damage can be prevented by labware restriction is where a tipbox that is too tall for a device crashes into the device as the robot delivers it.

For information about	See
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Overview of the Labware Editor	"Labware Editor overview" on page 16
Opening the Labware Editor	"Opening the Labware Editor" on page 21

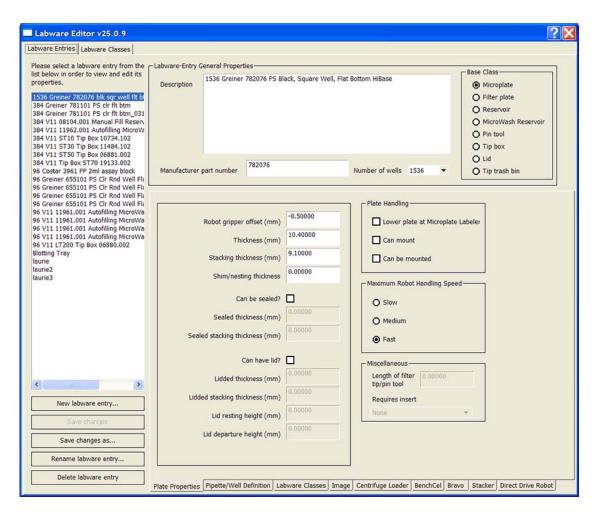
Labware Editor overview

Labware Editor tabs

The Labware Editor has two tabbed pages:

- *Labware Entries.* Provides tools for creating and editing labware definitions
- *Labware Classes.* Provides tools for creating and editing labware classes and the labware entries for each class.

Labware Entries tab



Sub-tabs

The Labware Entries tab contains the following sub-tabs that contain the properties associated with a labware entry.

To find out more about	See
Plate Properties tab	"Setting microplate properties" on page 28
Pipette/Well Definition tab	"Setting tip and well properties for pipetting" on page 32
Labware Classes tab	"Using labware classes example" on page 37
Image tab	"Adding a labware image" on page 40
Centrifuge Loader tab	"Setting Centrifuge Loader properties" on page 41
BenchCel tab	"Setting BenchCel Workstation properties" on page 42
Bravo tab	"Setting Bravo Platform properties" on page 46
Stacker tab	"Setting Stacker properties" on page 48
Direct Drive Robot tab	"Setting Direct Drive Robot properties" on page 51

Labware selection list

The labware selection list, which is the left-hand column, displays the list of labware definitions and allows you to select the labware entry that you want to edit.

Labware-Entry General Properties area

The Labware-Entry General Properties area displays the labware properties that apply across all sub-tabs.

-Labware-Entry G	384 Costar 3658 PP blk sør well rnd btm			Base Class Microplate Filter plate Reservoir MicroWash Reservoir Pin tool Tip box			
Manufacturer p	oart number	3658		Number of wells	384	•	O Lid O Tip trash

Labware Classes tab

You use the Labware Classes tab to create labware classes and assign defined labware to a labware class.

ease select a labware class from the below in order to view and edit its	Labware-Entry Membership		
operties.	Labware entries that are not a member of this labware class:		Labware entries that are a member of this labware class:
ses Filter Platepad ses Taller Plate ses Taller Plate ses Type Box ses Vacuum Delidder ses Vacuum Platepad	1536 Greiner 782075 PS wht HiBase 1536 Greiner 782076 bik sqr well fit btr 1536 Greiner 782032 PS bik cir btn Lof 384 Costar 3657 PP Sqr well rnd btr 384 Costar 3711 TC black sqr well dr b 384 Gostar 3711 TC black sqr well dr btr 384 Greiner 781091 TC bik sqr well dr btr 384 V11 06104.001 Manual Fill Reserv 384 V11 06104.001 Manual Fill Reserv 384 V11 ST10 Tip Box 10734.102 384 V11 ST10 Tip Box 10734.102 384 V11 ST50 Tip Box 10881.002 384 V11 ST50 Tip Box 5100 10734.103 384 Velocity11 08104.001 Manual Fill R 384 Velocity11 Tip Box ST50 06881.002 384 Velocity11 Tip Box ST50 06881.002 384 Velocity11 Tip Box ST50 06881.002 96 Greiner 655101 PS Crl Rnd Well Filst 96 Greiner 655101 PS Crl Rnd Well Filst 96 V111 11961.001 Autofilling MicroWas 96 V111 11961.001 Autofilling MicroWas 96 V111 11961.001 Autofilling MicroWas 96 V111 11961.001 Autofilling MicroWas 96 V111 11961.001 Autofilling MicroWas	>> < <	384 Velocity11 Tip Box d30 11484.004 384 Velocity11 Tip Box d30 11484.004 96 Costar 3363 PP rnd well vbtm 96 Costar 3365 PP rnd well rnd btm 96 Costar 3788 P5 chr nd well rnd btm 96 Costar 3961 PP 2ml assay block
New labware class			
Save changes			
Save changes as			
Rename labware class			

Related information

For information about	See
The Labware Editor	"About defining labware with the Labware Editor" on page 14
Workflow for defining labware in the Labware Editor	"Workflow for defining labware" on page 19

Workflow for defining labware

Labware standards and considerations

IMPORTANT All labware used with Agilent Technologies products must conform to the American National Standards Institute (ANSI) microplate standards. This includes deepwell and PCR plates. A group within the Society for Biomolecular Sciences (SBS) recommends and maintains the standards. Visit www.sbsonline.org for more information, or contact your labware's manufacturer.

Vertical Pipetting Station users. In addition to the ANSI standards for labware, Vertical Pipetting Station 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 depends 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.

Workflow

The following table presents the sequence of steps to define labware for devices that use the VWorks software.

Note: Some of these steps may be omitted, depending on your system configuration.

Step	For this task	See
1	Add the labware entry to the Labware Editor.	 "Opening the Labware Editor" on page 21 "Adding a labware entry" on page 23
2	Set the general properties of the labware.	"Setting general properties" on page 26

Workflow for defining labware

Step	For this task	See "Setting microplate properties" on page 28		
3	Set the microplate properties. BioCel System 3-Axis Robot only. Set the robot gripper offset.			
4	Bravo Platform or Vertical Pipettor only. Set the pipetting properties.	"Setting tip and well properties for pipetting" on page 32		
5	Assign the labware to a class.	"Creating and assigning labware classes" on page 34		
6	Optional. Add a labware image.	. "Adding a labware image" on page 40		
7	<i>Centrifuge Loader only.</i> Set the robot gripper offset if using a Centrifuge Loader.	"Setting Centrifuge Loader g properties" on page 41		
8	BenchCel Workstation only. Set the robot and stacker gripping positions.	"Setting BenchCel Workstation properties" on page 42		
9	<i>Bravo Platform only.</i> Set properties for the Bravo gripper, if applicable.	"Setting Bravo Platform properties" on page 46		
10	BenchCel Workstation and Labware Stacker only. Set the gripper and sensor settings and any microplate notch positions.	"Setting Stacker properties" on page 48		
11	<i>Direct Drive Robot only.</i> Set the robot gripper offsets and the grip force.	"Setting Direct Drive Robot properties" on page 51		
12	Save a new or edited labware entry.	"Adding a labware entry" on page 23		

For information about	See	
The Labware Editor	 "About defining labware with the Labware Editor" on page 14 "Labware Editor overview" on 	
	page 16	
Opening the Labware Editor	"Opening the Labware Editor" on page 21	

Opening the Labware Editor

About this topic

You use the Labware Editor when you want to view, add, delete, edit, or rename labware entries or labware classes. This topic explains how to open the Labware Editor from the Tools menu and protocol editor in the VWorks software. See the device user guide for details on how to open the Labware Editor from the device diagnostics software.

Before you start

You must be logged in as an administrator or technician to open the Labware Editor.

If you are adding labware, make sure you have the following:

- Calipers
- Two samples of the labware you are adding

Procedure

To open the Labware Editor from the Tools menu:

In the **VWorks** window, choose **Tools** > **Labware Editor**. The Labware Editor window opens.

Labware Editor v25.0.9							? 🗙
Labware Entries Labware Classes							
Please select a labware entry from the list below in order to view and edit its properties. 1536 Greiner 782076 bik sqr well fit b 384 Greiner 781101 PS of fit bitm, 031 384 VI1 08104.001 Manual Fill Resen, 384 VI1 1082.001 Autofiling MicroW 384 VI1 15710 Tip Box 10734.102 384 VI1 15710 Tip Box 10734.102		1536 Greiner 782076 PS Black, Square Well, Elat Bottom HiBase			-Base Class Microplate Filter plate Reservoir MicroWash Reservoir Pin tool Tip box		
384 V11 ST50 Tip Box 06881.002 384 V11 Tip Box ST70 19133.002 96 Costar 3961 PP 2ml assay block 96 Greiner 655101 PS Clr Rnd Well Fli 96 Greiner 655101 PS Clr Rnd Well Fli	Manufacturer part number	782076		Number of wells 153	36 🔻	O Lid O Tip trash bin	
96 Greiner 653101 PS Cir Rnd Yvell Flu 96 Greiner 653101 PS Cir Rnd Yvell Flu 96 Greiner 65101 PS Cir Rnd Yvell Flu 96 V11 11961.001 Autofiling MicroWva 96 V11	Stacking thic Shim/nesti Car Sealed thic Sealed stacking thic	offset (mm) ckness (mm) ckness (mm) ng thickness n be sealed? ckness (mm)	0.00000	Plate Handling-	nted		
	10 	ckness (mm)	0.00000	Miscellaneous Length of filter tip/pin tool	0.00000		
New labware entry			0.00000	Requires insert		*	
Save changes Save changes as	Lid departure l	height (mm)	0.00000				
Rename labware entry							
Delete labware entry	Plate Properties Pipette/Well I	Definition Lab	ware Classes Image	Centrifuge Loader B	enchCel Bravo	Stacker Direct Drive Robot	t

To open the Labware Editor from the protocol editor:

1 Open a protocol file (File > New > Protocol or File > Open). This opens the Main Protocol area with Process-1 and a list of Plate properties in the Task Parameters area.

 $\it Note:$ If the Task Parameters area is empty, click $\it Add \, Process$ in the Main Protocol area.

2 Select Edit labware from the Plate type list under Plate identity.

Plate identity					
Plate name:		process - 1			
Plate type:		384 Greiner 781101 PS clr fit btm 💌			
Plates have lids:		Edit labware			
Plates enter the system sealed:	1536 Greiner 782076 blk sar well fit btm				
Process control		384 Greiner 781101 PS dr fit btm			
Simultaneous plates:	384 V11 08104.001 Manual Fill Reservoir 384 V11 11962.001 Autofiling MicroWash				
Use single instance of plate:					
Automatically upda	te labware:	384 V11 ST10 Tip Box 10734.102 384 V11 ST30 Tip Box 11484.102			
Enable timed release	e:	384 V11 ST50 Tip Box 06881.002			
Release time:		384 V11 Tip Box ST70 19133.002			
🖃 Barcode informa	tion	96 Costar 3961 PP 2ml assay block 96 Greiner 655101 PS Clr Rnd Well Flat 8tm			
Barcode filename:		96 Greiner 655101 PS Cir Rhd Weil Flat 8tm 96 V11 11961.001 Autofiling MicroWash			
Has header:	Has header:	96 V11 LT200 Tip Box 06880.002			
Barcode or header	South:	No Selection			
Barcode or header	West:	No Selection			
Barcode or header	or header North: No Selection				
Barcode or header	East:	No Selection			

For information about	See		
The Labware Editor	• "About defining labware with the Labware Editor" on page 14		
	• "Labware Editor overview" on page 16		
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19		
Adding a labware entry	"Adding a labware entry" on page 23		

Adding a labware entry

Before you start

You must be logged in as an administrator or technician to perform this procedure.

Before you add a new labware entry:

- Check to see if it is already defined in the Labware Editor.
 - Some common labware and some Agilent Technologies labware comes already defined in the VWorks software.
- Contact Automation Solutions Technical Support with the definition you need.

Automation Solutions Technical Support maintains a large collection of labware definitions and might be able to supply you with what you need. However, these labware definitions will still require some fine-tuning for each particular system. The generic definitions available for some microplate types are a good starting point.

To find out if a type of microplate is already defined:

- 1 In the VWorks window, click Main Protocol, and select the microplate icon in a process.
- 2 In the **Plate identity** area, click the **Plate type** list and look for the microplate name.

If the list does not contain an entry for the microplate type, it is not yet defined.

Task Parameters	۲				
11 21					
Plate identity					
Plate name:	process - 2				
Plate type:					
Plates have lids:	Edit labware				
Plates enter the system sealed:	1536 Greiner 782076 blk sgr well fit btm				
Process control	384 Greiner 781101 PS clr fit btm				
Simultaneous plates:	384 V11 08104.001 Manual Fill Reservoir				
Use single instance of plate:	384 V11 11962.001 Autofilling MicroWash				
Automatically update labware:	384 V11 ST10 Tip Box 10734, 102 384 V11 ST30 Tip Box 11484, 102				
Enable timed release:	384 V11 ST50 Tip Box 06881.002				
Release time:	384 V11 Tip Box ST70 19133.002				
Barcode information	96 Costar 3961 PP 2ml assay block				
Barcode filename:	96 Greiner 655101 PS Cir Rnd Well Flat Btm 96 V11 11961,001 Autofiling MicroWash				
Has header:	96 V11 LT200 Tip Box 06880.002				
Barcode or header South:	No Selection				
Barcode or header West:	No Selection				
Barcode or header North:	No Selection				
Barcode or header East:	No Selection				
Plate type: The type of labware used					

Procedure

To add a labware entry:

- **1** Open the Labware Editor.
- 2 In the Labware Entries tab, click New labware entry at the bottom left of the window.

	abware-Entry General Properties			100 A 100 A000
low in order to view and edit its srites. iGrener 782076 bit sgr well fit bit Grener 781101 PS dr fit bits Srener 781101 PS dr fit bits vi1 105104.001 Manual Fil Reserva Vi1 11550 June Nathfilling MicroWe Vi1 5710 Tip Box 10734.102 Vi1 5730 Tip Box 10734.102 Vi1 5730 Tip Box 1084.102		1536 Greiner 782076 PS Black, Square Well, Elat Bottom HBase		Base Class Microplate Filter plate Reservoir MicroWash Reservoir Pin tool O Tip box
V11 Tip Box ST70 19133.002 ostar 3961 PP 2ml assay block reiner 655101 PS CIr Rnd Well Flat 11 11961.001 Autofiling MicroWas 11 LT200 Tip Box 06880.002	Manufacturer part number 782076		Number of wells 1536 •	O Lid O Tip trash bin
			Plate Handling	
	Robot gripper offset (mm)	-0.50000	Lower plate at Microplate L	abeler
	Thickness (mm)	10.40000	Can mount	
	Stacking thickness (mm)	0.40000	Can be mounted	
		0.00000	Can be mounted	
	Shim/nesting thickness		Maximum Robot Handling Speed	
	Can be sealed?	1	O Slow	
	Sealed thickness (mm)	0.00000	O Medium	
	Sealed stacking thickness (mm)	0.00000	● Fast	
	Can have lid?		- Miscellaneous	
	Lidded thickness (mm)		Length of filter 0.00000	
	Lidded stacking thickness (mm)	0.00000	tip/pin tool (mm) Requires insert	
New labware entry	Lid resting height (mm)	0.00000	None	
Save changes		0.0000		
Save changes as	Lid departure height (mm)			

Note: You can save time by using a definition for a similar labware type as a template. Select the pre-existing definition in the list, click **Save changes as**, and enter a name for the new labware definition.

3 In the New Labware Entry dialog box, type a name for the labware type, and click **OK**.

For clarity, enter a detailed name for the labware that includes labwarespecific information. For example, the name should include the number of wells, the manufacturer's name and part number, and descriptive terms, such as *square-well*, *flat-bottom* or *tipbox*.

The new entry appears in the labware list.

To save the labware entry:

- 1 Edit the properties as appropriate for the labware type. See "Workflow for defining labware" on page 19.
- 2 Click Save changes to save the newly defined labware entry.

For information about	See
The Labware Editor	 "About defining labware with the Labware Editor" on page 14 "Labware Editor overview" on page 16
Plate Properties tab	"Setting microplate properties" on page 28
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Opening the Labware Editor	"Opening the Labware Editor" on page 21

Setting general properties

About general properties

The general properties describe the type of labware that is being entered into the database and are visible on all of the sub-tabs of the Labware Editor.

Before you start

- You must be logged in as an administrator or technician to perform this procedure.
- You must first create an entry for the labware.

Procedure

To define the general properties of a piece of labware:

- **1** Open the Labware Editor.
- 2 In the Labware Entries tab, select the labware from the list.
- **3** Under Labware-Entry General Properties, type a detailed description of the labware in the Description box.

Labware Editor v25.0.7					? 2
Please select a labware entry from the Labware-Entry General Properties		, Square Well, Flat	Bottom HBase		Base Class O Microplate O Filter plate O Reservoir O MicroWash Reservoir O Pin tool O Tip box
384 V11 Tip Box ST70 19133.002	82076		Number of wells	1536 🔻	O Lid O Tip trash bin
Robot gripper of	ffset (mm)	0.50000	Plate Handing	ate at Micropla	te Labeler
		10.40000	Can mou		
Stadding thick	ness (mm)	9. 10000	Can be n	nounted	
Shim/nesting	thickness	0.00000	-Maximum Robo	ot Handling Spe	eed
Can b Sealed thick	be sealed?	3.00000	O Slow		
Sealed stading thide		0.00000	O Medium O Fast		
Car	n have lid?		Miscellaneous		
Lidded thide	ness (mm)	0.00000	Length of filt tip/pin tool (ter 0.00000 mm)	
New labware entry Lidded stacking thick	1	3.00000	Requires ins	ert	-
Save changes Lid departure he	1	0,00000			
Rename labware entry					
Delete labware entry Plate Properties Pipette/Well Def	finition Laby	vare Classes Imag	ge Centrifuge Loader	r BenchCel	Bravo Stacker Direct Drive Robot

- **4** In the **Manufacturer part number** box, type the appropriate number for your reference.
- 5 In the Number of wells list, select the number of wells in the microplate.

If you are defining a tipbox, this is the number of tips that the box can hold.

6 In the **Base Class** area, select one of the options.

The option you select determines which Labware Editor properties are available. For example, when a base class of **Microplate** is selected, the **Length of filter tip/pin tool (mm)** property is unavailable.

Note: The Pin tool base class is not used.

For information about	See
Opening the Labware Editor	"Opening the Labware Editor" on page 21
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Setting microplate properties for labware	"Setting microplate properties" on page 28

Setting microplate properties

Before you start

You must have a technician or administrator user account to perform this procedure.

Setting microplate properties

To set microplate properties:

- **1** Open the Labware Editor.
- 2 In the Labware Entries tab, click the Plate Properties sub-tab.

Figure Plate Properties sub-tab

		Plate Handling
Robot gripper offset (mm)	0.50000	Lower plate at Microplate Labeler
Thickness (mm)	14.40000	Can mount
Stacking thickness (mm)	12.76000	Can be mounted
Shim/nesting thickness	0.00000	Maximum Robot Handling Speed
Can be sealed?		O Slow
Sealed thickness (mm)	0.00000	O Medium
Sealed stacking thickness (mm)	0.00000	⊙ Fast
Can have lid?		- Miscellaneous
Lidded thickness (mm)	0.00000	Length of filter 0.00000 tip/pin tool (mm)
Lidded stacking thickness (mm)	0.00000	Requires insert
Lid resting height (mm)	0.00000	Nestable Tip Insert 🔹
Lid departure height (mm)		
]

Plate Properties

3 Enter the values for the available parameters according to the labware type you are defining. The following table describes each parameter.

Note: The Base Class you select in the General Properties section determines which microplate properties are available.

Parameter	Description
Robot gripper offset (mm)	<i>Note:</i> Applies to the 3-Axis Robot in the BioCel Systems only. The Direct Drive Robot ignores this value, and uses the gripper offset values on the Direct Drive Robot tab.
	The height (mm) of the gripper above any teachpoint when the VWorks software is picking up or placing a microplate of this type. The value is typically 0–3 mm.
	<i>Note:</i> The offset could be a negative value, indicating it is below the teachpoint.
	This parameter is used by the VWorks software when running protocols. The gripper offset parameter in the device Diagnostics software performs the same function when picking and placing labware using commands in the Diagnostics software.
Thickness (mm)	The distance from the bottom of the microplate skirt to the top of the microplate.
	For a tipbox, this is the distance from the bottom of the box to the top of the tips.
	To increase the number of contact points, measure the distance at the corner of the microplate or tipbox (using calipers). This method prevents the calipers from angling inward, which can produce inaccurate measurements.
Stacking thickness	The thickness of two stacked microplates minus the thickness of one microplate.
(mm)	Measure the distance using calipers.
	Example:
	Thickness of two stacked microplates $(x) = 23.14$ mm
	Thickness of one microplate = 14.14 mm
	Stacking thickness: 23.14 mm - 14.14 mm = 9.00 mm
	Plate Thickness X Stacking Thickness X

Setting microplate properties

Parameter	Description
Shim/nesting thickness	The distance between the bottom of the microplate skirt and the exterior bottom of the wells. (Shown as c below.) $s_{kirt} \left\{ \begin{array}{c} & \\ & \\ & \\ & \\ & \\ & \\ & \\ & \\ & \\ & $
Can be sealed?	The option to include the microplate seal.
Sealed	The thickness of the microplate with a seal in place.
thickness (mm)	Available only if Can be sealed? is selected.
Sealed stacking	The stacking thickness of the microplate with a seal in place.
thickness (mm)	Available only if Can be sealed? is selected.
Can have lid?	The option to include a microplate lid.
Lidded	The thickness of the microplate with a lid in place.
thickness (mm)	Available only if Can have lid? is selected.
Lidded stacking	The stacking thickness of the microplate with the lid in place.
thickness (mm)	Available only if Can have lid? is selected.
Lid gripper offset (mm)	The height (a) above the lid resting height (b) at which the gripper can grip the lid.
Lid resting height (mm)	The height (c) above the bottom of the microplate (d) at which the bottom of a microplate lid rests.

Parameter	Description
Lid departure height (mm)	The height (e) above the lid resting height to which the lid is lifted.

Plate Handling	
Lower plate at Microplate Labeler	The option to lower the microplate on the Microplate Labeler stage if the microplate has a thick skirt. This allows the Microplate Labeler to place the label above the thick skirt.
Can mount	The option to place this microplate on top of another microplate.
	This property is for filter plates that are placed on top of waste plates during filtration steps of a protocol.
	This option can also be used to mount lids onto microplates.
Can be mounted	The option to place another microplate on top of this microplate.
	This property is for collection microplates that collect filtrate from filter plates during the filtration steps of a protocol. Many different microplates might be able to fit under any one type of filter plate.
	IMPORTANT The wells of the waste plate must have a large enough diameter that the filter plate does not stick on the waste plate. The robot must be able to pick up the filter plate without the waste plate lifting up with it.
	This option can also be used to mount lids onto microplate.
Maximum Robot	Handling Speed
Maximum robot	The maximum speed at which the robot can move this type of microplate.
handling speed	In addition to this microplate-specific speed, you set the general robot speed via the Tools > Options menu in the VWorks software. If these speeds are different, the robot uses the slower of the two speeds.
	<i>Note:</i> To increase throughput, you can use a higher speed when the robot is not carrying labware. For details, see the <i>VWorks Automation Control User Guide</i> .
Miscellaneous	
Length of filter tip/pin tool (mm)	The length the filter nozzle extends below the bottom edge of the skirt. Use a caliper to measure the length.

Setting tip and well properties for pipetting

Parameter	Description
Requires insert	The option to require an insert for use with nestable tipboxes.

Related information

For information about	See
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Opening the Labware Editor	"Opening the Labware Editor" on page 21
Setting general properties for labware	"Setting general properties" on page 26
Setting Direct Drive Robot properties for labware	"Setting Direct Drive Robot properties" on page 51

Setting tip and well properties for pipetting

When to set the pipetting properties

If the VWorks software is controlling a Vertical Pipetting Station or a Bravo Platform, you must set the properties for the labware type in the Pipette/Well Definition sub-tab.

Setting properties

To set pipette/well properties:

- **1** Open the Labware Editor.
- 2 In the Labware Entries tab, click the Pipette/Well Definition sub-tab.

Figure	Pipette/Well Definition sub-tab
--------	---------------------------------

- Well Dimensions	- Well Positions
Well volume (µL) 130.00000	Row-wise teachpoint to well (mm) 2.25000
	2.25000
Well depth (mm) 11.45000	Column-wise teachpoint to well (mm)
Well diameter (mm) 3.70000	Row-wise well to well (mm) 4.50000
	4.50000
- Well Geometry	Column-wise well to well (mm)
Operat	- Tip Darameters
O Round	Tip Parameters
⊙ Square	Agilent Technologies tip box
	Disposable tip capacity (µL) 10 µL 🔹
- Well-Bottom Shape	
0	O 3rd party tip box
O Rounded	Disposable tip capacity (µL)
⊙ Flat	
Overhead	
O V-Shaped	Disposable tip length (mm)
Pipette/Well Definition	

3 Enter the values for the available parameters according to the labware type that you are defining. The following table provides a description of each parameter.

IMPORTANT Use calipers to carefully measure the labware you are defining in the Labware Editor.

Parameter	Description
Well volume	Maximum volume (µL) of fluid for one well.
Well depth	Distance (mm) from the top of the microplate to the bottom of the well.
Well diameter	Diameter of the well (mm).
Well Geometry	Shape of the wells: round or square.
Well-Bottom Shape	Shape of the well bottoms: rounded, flat, or V-shaped.
Row-wise teachpoint to well	Distance (mm) from the teachpoint to the center of the A1 well along the row (letter axis).
	This setting should be 0 mm for standard 96-well microplates and 2.25 mm for standard 384-well microplates.
Column-wise teachpoint to well	Distance (mm) from the teachpoint to the center of the A1 well along the column (number axis).
	This setting should be 0 mm for standard 96-well microplates and 2.25 mm for standard 384-well microplates.

Creating and assigning labware classes

Parameter	Description					
Row-wise well to well	Distance (mm) from well-center to well-center across the row.					
	This setting should be 9 mm for standard 96-well microplates and 4.5 mm for standard 384-well microplates.					
Column-wise well to well	Distance (mm) from well-center to well-center across the column.					
	This setting should be 9 mm for standard 96-well microplates and 4.5 mm for standard 384-well microplates.					
Disposable tip capacity	Volume capacity (μL) of the disposable tips when labware is a tipbox.					
Disposable tip length	Length (mm) of the disposable tips being used when labware is a tipbox.					

Related information

For information about	See
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Opening the Labware Editor	"Opening the Labware Editor" on page 21
Setting general properties for labware	"Setting general properties" on page 26
Setting microplate properties for labware	"Setting microplate properties" on page 28

Creating and assigning labware classes

About labware classes

When you configure a device for the VWorks software, you can associate the device with labware classes to indicate what labware can (and cannot) be used with the device. Associating a device with a labware class is performed in the device file under the Allowed/prohibited labware property.

For example, if you have a Microplate Vacuum Alignment Station on a Bravo platform, you might want to set up a labware class from which tube racks are excluded. (Most types of tube racks will cause an error on the Microplate Vacuum Alignment Station).

VWorks software is provided with six labware classes already defined:

- Uses Filter Platepad
- Uses Standard Platepad

- Uses Taller Plate
- Uses Tip Box
- Uses Vacuum Delidder
- Uses Vacuum Platepad

These default classes should be enough for your microplate handling needs. However, if you want an additional special class that is excluded from a particular device or set of devices, you can create a new class.

About creating and assigning labware classes

The Labware Classes tab in the Labware Editor provides the tools for creating and managing labware classes and labware entry membership.

Select a class (in the left-most column) to see the labware entries that are members and non-members for that class (right two columns). In the example below, the class Uses Filter Platepad is selected and the labware that are members and non-members of this class are displayed.

Labware Editor v3.0.0				
Labware Entries Labware Classes				
Please select a labware class from the list below in order to view and edit its properties. Uses Filter Platepad Uses Tip Box Uses Vacuum Delidder Uses Vacuum Platepad Uses Vacuum Platepad	Labware-Entry Membership Labware entries that are not a member of this labware class: 1536 Greiner 782075 PS whit HiBase 1536 Greiner 782075 PS and the the 1536 Greiner 783092 PS bik of the the 384 Costar 3657 PP Sgr well rnd btn 384 Costar 3657 PP Sgr well rnd btn 384 Costar 3712 TC bik sgr well cri btn 384 Greiner 781091 TC bik sgr well cri btn 384 Greiner 781010 PS cri fit btn 384 Greiner 781001 PS cri fit btn 384 W11 Sti DTI PB sgr well cri t 384 W11 Sti DTI Bbx 10734.102 384 W11 Autofilling MicroWash 384 W11 Sti DTI PB bx 10734.102 384 W11 Sti DTI PB bx 5770 19133.002 384 Welocity11 Ti Btox ST50 10681.002 384 Welocity11 Tip Box ST50 10734.103 384 Welocity11 Tip Box ST50 1081.002 384 Welocity11 Tip Box ST50 06881.002 384 Welocity11 Tip Box ST50 06881.002 384 Welocity11 Tip Box ST50 06881.002 384 Welocity11 108104.001 Manual Fill R 384 Welocity11 Tip Box ST50 06881.002 384 Welocity11 108104.002 Tip Box Z200 384 Will Cont Autofilling MicroWash 384 Will Cont Autofilling MicroWash 384 Will Cont Autofilling MicroWash 384 Welocity11 Tip Box Z200 384 Welocity11 06880.002 Tip Box Z200 384 Welocity11 10802 Tip Box Z200 384 Welocity11 10802 Tip Box Z200 384 Welocity11 Tip Box Z200 Zip Box Z200 384 Welocity11 10802 Tip Box Z200 384 Welocity11 Tip Box Z200 Zip Box Z200	× ×	Labware entries that are a member of this labware class: 384 Corning 3673 PS wht sqr well rnd t 384 Velocity11 Tip Box d30 11484.004 96 Costar 3363 PP rnd well well rnd bm 96 Costar 3788 PS cir rnd well rnd bm 96 Costar 3961 PP 2ml assay block	
New labware class				
Save changes				
Save changes as				
Rename labware class				
Delete labware class				

Creating labware classes

To create a new labware class:

- **1** Open the Labware Editor.
- 2 In the Labware Classes tab, click New labware class.
- **3** In the **New Labware Class** dialog box, enter a name for the labware class and click **OK**.

The class appears in the list of labware classes.

Note: You can also create a new labware class by clicking **Save changes as** and entering a different name.

Assigning labware classes

To associate a specific piece of labware with a labware class:

- **1** Open the Labware Editor.
- 2 In the Labware Classes tab, select an item from the middle column.
- **3** Click > to move the labware entries or labware classes to the right-hand column.

To select more than one item, use SHIFT+click or CTRL+click. If you want to move all entries, click >>.

4 Click Save Changes to save your changes.

Note: You can also assign labware to a class using the Labware Classes tab on the Labware Entries tab. This may be more convenient when you are defining a new piece of labware and want to assign it to an existing labware class.

For information about	See
Opening the Labware Editor	"Opening the Labware Editor" on page 21
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
An example demonstrating the use of labware class	"Using labware classes example" on page 37

Using labware classes example

Example

You have configured shelves 2, 4, and 6 of a Vertical Pipettor as devices that are accessible by the system's robot. You are using a mix of microplates, some of which are too tall to fit on shelf 2. By using labware classes, you will ensure that the robot will never try to place the wrong type of labware on shelf 2.

The labware has been defined and added to the Labware Editor but it still has the default settings for class membership.

You need to:

- **1** Assign the tall labware to the appropriate labware class.
- **2** Restrict shelf 2 from using any labware that is a member of the Uses Taller Plates class.

Assigning the labware to a labware class

To assign the labware:

- **1** Open the Labware Editor.
- 2 In the Labware Entries tab, select the labware from the list, and then click the Labware Classes sub-tab. The classes that the labware are and are not a member of is displayed.
- **3** Select Uses Taller Plates from the All labware classes area, and then click > to move the class to the Labware classes that this labware entry belongs to area.
- 4 Click Save changes.

Using labware classes example

e Entries Labware Classes				
list below in order to view and edit its	abware-Entry Description	General Properties	uare Well, Flat Bottom	Base Class Microplate Filter plate Reservoir MicroWash Reservoir Pin tool Tip box
11 Tip Box ST70 19133.002 star 3961 PP 2ml assay bear 112 eiser SSS101 RS //L RWL, Utwell Fat 5 v11 11951.001 Autofiling Micro Was 6 v11 11951.001 Autofiling Micro Was 6 v11 117200 Tip Box 06880.002 ure	Manufact	781101 turer part number	Number of wells 384	O Tip trash bin
ure]	Uses	ware dasses: Fiter Patepad Vacuum Platepad	Laburare classes that this laburare entry belongs to: .uses Standard Patepad .uses Taker Pates 	
New labware entry Save changes Save changes as				
and a changes donn				

Setting restrictions for shelf 2

To restrict shelf 2:

- **1** In the **VWorks** window, open the device file, and ensure the correct Vertical Pipetting Station device is selected.
- 2 In the Devices list under Vertical Pipetting Station, select Shelf 2.
- **3** Under Shelf 2 Location Properties, click the Allowed/prohibited labware field, and then click the _____ button. The Allowed/Prohibited Labware Classes dialog box opens.
- 4 In the Unassigned labware classes area, select Uses Taller Plates, and then click < to move it to the Labware classes prohibited from using this device area.
- 5 Click OK.

Figure VWorks software main window (partial) and Allowed/Prohibited Labware Classes dialog box.

vice File - 1 *				
1	: 2↓			
Vertical Pipetting Station Urefical Pipetting Station - 1 Shelf 1 Shelf 2 Shelf 3	Approach he	nibited labware	9 <pre>socation Properties 9 <no bar="" code="" device=""></no></pre>	
Allowed / Prohibited Laby	vare Classes for "Ve	ertical Pipetting Statio	and an approximit	[
Labware classes prohibited from usi	ng Unassigned	d labware classes:	Labware classes allowed device:	to use this
Uses Taller Plates	Uses Filter Uses Vacu	r Platepad um Platepad	Uses Standard Platepar	1
	<<		>>	
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_				
		ssign selected labware	Allow selected k	

For information about	See
Opening the Labware Editor	"Opening the Labware Editor" on page 21
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Labware classes	"Creating and assigning labware classes" on page 34

Adding a labware image

About labware images

To make it easier for operators to identify a labware type, you can insert an image of it in the Labware Editor.

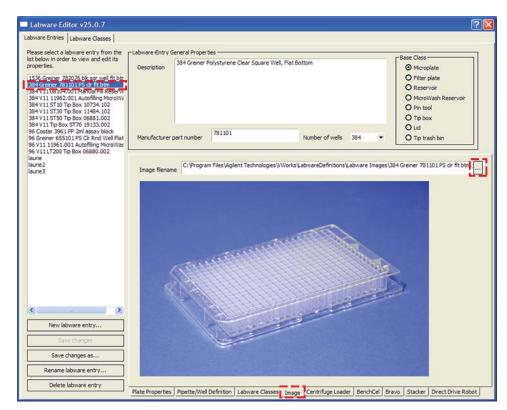
Before you start

Make sure the image file you want to add is either the JPG, GIF, or BMP format.

Procedure

To insert an image:

- **1** Open the Labware Editor.
- 2 In the Labware Entries tab, select the labware in the left column, and then click the Image sub-tab.



- **3** At the **Image filename** box, click the ... button to locate the file.
- 4 In the **Open** dialog box, select the image file and click **Open**. The image appears below the file name.
- 5 Click Save changes.

Related information

For information about	See
Opening the Labware Editor	"Opening the Labware Editor" on page 21
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Using the Labware Editor	"Labware Editor overview" on page 16

Setting Centrifuge Loader properties

When to set Centrifuge Loader properties

If you are operating a Centrifuge with an Centrifuge Loader, set the corresponding properties in the Centrifuge Loader sub-tab of the Labware Editor.

You must be logged in as an administrator or technician to perform this procedure.

Procedure

To set Loader properties:

- **1** Open the Labware Editor.
- 2 In the Labware Entries tab, click the Centrifuge Loader sub-tab.
- **3** In the Robot gripper offset (mm) box, type the distance from the bottom of the microplate where the robot can grip the microplate.
- **4** *Optional.* Select the **Ignore plate sensor during pick and place** check box if you want to ignore the microplate sensor, for example if you are using a black microplate that has a finish and skirt that would otherwise avoid detection.

Centrifuge Loader Gripper (dedicated to Cen	trifuge) ————
Robot gripper offset (mm)	6.00000
Ignore plate sensor during pick and place	

For information about	See
Opening the Labware Editor	"Opening the Labware Editor" on page 21
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Using the Labware Editor	"Labware Editor overview" on page 16

Setting BenchCel Workstation properties

About the BenchCel Workstation properties

The BenchCel Workstation X-Series and R-Series each have their own gripper offsets and positions. When you add a new labware entry, default parameter values are automatically inserted for both series. These values are approximate and should be ignored because the labware you are defining may be different.

Any labware that you are using with the X-Series must be redefined to work with the R-Series BenchCel Workstation because the parameter values are different for the same piece of labware.

Note: You must also define a subset of the Stacker properties (under the Stacker sub-tab) because they apply to the built-in stackers of the BenchCel Workstation.

Procedure

To define the BenchCel Workstation properties:

- **1** Open the Labware Editor.
- 2 In the Labware Entries tab, click the BenchCel sub-tab.

Figure BenchCel sub-tab

	Labware-Entry Ge	eneral Properties									
below in order to view and edit its geneties. 356 Greener 782076 bit sogr weil fit bit 14 Greiner 781101 PS drift bitm	Description	1536 Greiner 783	2076 PS Bla	dk, Square M	ell, Flat E	3ottom HBase			e Class Microplate Filter plate Reservoir MicroWash Res Pin tool Tip box	servoir	
14 V11 ST50 Tip Box 06881.002 14 V11 Tip Box ST70 19133.002 Costar 3961 PP 2ml assay block Greiner 655101 PS Cir Rnd Well Flat Greiner 655101 PS Cir Rnd Well Flat	Manufacturer p	art number	82076			Number of wells	1536		Uid Tip trash bin	xin	
Greiner 655101 PS Cir Rnd Well Flat Greiner 655101 PS Cir Rnd Well Flat	-Y-Series Crime	er Offsets and Po	eitions			R-Series Gripp	ar Officate	and Dositions -			
V11 11961.001 Autofiling MicroWas V11 11961.001 Autofiling MicroWas V11 11961.001 Autofiling MicroWas		Robot grip		4.00000	mm	-		ot gripper offs	et 5.00000	mm	
96 V11 11961.001 Autofiling MicroWas 96 V11 LT200 Tip Box 06880.002 Blotting Tray Jaurie Jaurie3	Ä	Gripper ope	n position	0.10000	mm		Gripper open		-1.00000	mm	
	Gr	Gripper holding plate position			mm	G	Gripper holding plate			mm	
	Gripper I	Gripper holding lidded plate		0.00000	mm	Gripper	ipper holding lidded plate			mm	
		Gripper holding li	d position	0.00000	mm		Gripper holding lid p			mm	
	Gr	ipper holding stac	k position	4.50000	mm	G	ripper holdir	ng stack positi	and the second second	mm	
		Lid gripp	per offset	0.00000	mm		L	id gripper offs	et 0.00000	mm	
		Stacker grip	per offset	4.50000	mm		Stack	er gripper offs	et 4.00000	mm	
New labware entry		Orientation serv	sor offset	7.00000	mm		Orientati	on sensor offs	et 7.00000	mm	
Save changes as							Plate pre	esence thresho	ld 0		
Rename labware entry						Stack holdin	hodtem o	Hold with sta	cker grippers	-	

3 Click the button that corresponds to the BenchCel Workstation type that is currently operating and for which you are defining the labware.

	mm	Robot gripper offset		mm
0.10000	mm	Gripper open position	-1.00000	mm
4.00000	mm	Gripper holding plate position	5.00000	mm
0.00000	mm	Gripper holding lidded plate position	0.00000	mm
0.00000	mm	Gripper holding lid position	0.00000	mm
4.50000	mm	Gripper holding stack position	10.00000	mm
	mm	Lid gripper offset	0.00000	mm
4.50000	mm	Stacker gripper offset	4.00000	mm
7.00000	mm	Orientation sensor offset	7.00000	mm
		Plate presence threshold	0	
		Stack holding method Hold with stacker	grippers 💌	
	0.00000 0.00000 4.50000 0.00000 4.50000	4.00000 mm 0.00000 mm 4.50000 mm 4.50000 mm 4.50000 mm 7.00000 mm	4.00000 mm Gripper holding plate position 0.00000 mm Gripper holding lidded plate position 0.00000 mm Gripper holding lid ded plate position 4.50000 mm Gripper holding stack position 0.00000 mm Gripper holding stack position 4.50000 mm Lid gripper offset 4.50000 mm Stacker gripper offset 7.00000 mm Orientation sensor offset Plate presence threshold Plate presence threshold	4.00000 mm Gripper holding plate position 5.00000 0.00000 mm Gripper holding lidded plate position 0.00000 0.00000 mm Gripper holding lidded plate position 0.00000 4.50000 mm Gripper holding stack position 10.00000 0.00000 mm Lid gripper offset 0.00000 4.50000 mm Stacker gripper offset 4.00000 7.00000 mm Orientation sensor offset 7.0000 Plate presence threshold 0 0 0

IMPORTANT Make sure you enter values for the correct model of the BenchCel Workstation. Fields for X-Series and R-Series BenchCel Workstations can be enabled regardless of the type of BenchCel Workstation that you are operating.

4 Measure the labware and enter the values for the following fields.

Parameter	Description
Robot gripper offset (mm)	The distance from the bottom of a microplate to where the robot grippers will hold the microplate.
	IMPORTANT Make sure that the gripper points do not close at the edge of the skirt. Otherwise, the gripper can slip onto the body of the microplate and drop the microplate.
Gripper open position (mm)	The distance the grippers move from the home position as the robot releases a microplate. A larger value moves the grippers closer together. A smaller value opens the grippers wider.
	Set this to -1 for R series and 0.1 for X Series BenchCel Workstations.
Gripper holding plate position (mm)	The distance that the grippers move inward from their home position when holding a microplate that is not in a stack. A larger value moves the grippers closer together and holds the microplate tighter. A smaller value opens the grippers wider.
	<i>Note:</i> How tightly the robot grippers should hold a microplate depends on the microplate material and design. You might want to run some tests to optimize the parameter.

Setting BenchCel Workstation properties

Parameter	Description
Gripper holding lidded plate position (mm)	The distance that the grippers move inward from home position when holding a lidded microplate.
	An increasing value moves the grippers closer together and holds the lidded microplate tighter. A decreasing value opens the grippers wider.
Gripper holding lid position (mm)	The distance the grippers move inward from home position when holding a microplate lid. Increasing the value moves the grippers closer together and holds the lid tighter. Decreasing the value opens the grippers wider.
	In general, type a value that is less than Gripper holding plate position to open the grippers slightly. Holding the lid too tightly might cause the microplate to be lifted with the lid.
Gripper holding stack position (mm)	The distance the grippers move inward from the home position when holding a microplate that is in a stack. A larger value moves the grippers closer together and holds the microplate tighter. A smaller value opens the grippers wider.
	Note: Because the weight of the entire stack will be on the robot grippers, you should use a value greater than the Gripper holding plate parameter.
Stacker gripper offset (mm)	The distance from the bottom of a microplate to where the stacker grippers will hold the microplate.
	Be careful not to grab the microplate on the top edge of the skirt where the stacker grippers could slip onto the microplate body.
	Change this value only if the stacker is not gripping the microplates correctly.
Orientation sensor offset (mm)	The distance from the bottom of a microplate to where the orientation sensors will check for notches.
	You can calculate the initial offset as follows: Determine the halfway distance between the top of the microplate and the top of the microplate skirt, and then add the height of the skirt.
	Divide this height by 2
	See the <i>BenchCel Microplate Handling</i> <i>Workstation User Guide</i> for details on how to determine the optimum Orientation sensor offset.

Parameter	Description		
Stack holding method	<i>R-Series only.</i> The option that specifies how the stacker holds the stack of microplates:		
	• <i>Hold with stacker gripper</i> . For the greatest precision, select this method, for example, if your microplate has a narrow gripping tolerance requiring a specific stacker gripper offset. Holding the stack with grippers results in slower cycle time than the Hold with shelf method.		
	• <i>Hold with shelf.</i> For faster cycle time, select this method if your microplate has a wider gripping tolerance and does not require a specific stacker gripper offset.		

For information about	See
Using the Labware Editor	"Labware Editor overview" on page 16
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Opening the Labware Editor	"Opening the Labware Editor" on page 21
Setting general properties for labware	"Setting general properties" on page 26

Setting Bravo Platform properties

When to set Bravo properties

If you are operating a Bravo Platform that has a robot gripper, use this procedure to ensure that the parameter values are set correctly.

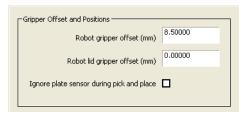
Note: The Bravo robot gripper is an optional feature.

You must be logged in as an administrator or technician to perform this procedure.

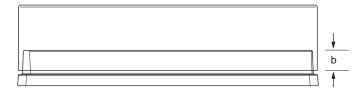
Procedure

To set Bravo Platform properties:

- **1** Open the Labware Editor.
- 2 In the Labware Entries tabs, click the Bravo sub-tab.
- **3** Under **Gripper Offset and Positions**, type the **Robot gripper offset**. This is the height (mm) of the gripper above any teachpoint when the Bravo gripper is picking up or placing a microplate of this type.



4 Enter the **Robot lid gripper offset**. This is the height (mm) above the lid resting height at which to grip the lid. (Shown as *b* below.)



5 Select **Ignore plate sensor during pick and place** to tell the robot gripper to ignore the feedback from the microplate sensor during a pick and place for this labware. Typically, this is selected when troubleshooting.

For information about	See
Opening the Labware Editor	"Opening the Labware Editor" on page 21
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Using labware classes	"Creating and assigning labware classes" on page 34

Setting Stacker properties

When to set Stacker properties

If you are using a Stacker or a BenchCel Workstation in your automation system, you must set the properties in the Stacker sub-tab of the Labware Editor.

You must be logged in as an administrator or technician to perform this procedure.

Before you start

BenchCel Workstation users. Make sure you have read the sections of the *BenchCel Microplate Handling Workstation User Guide* that describe the location and function of the stacker sensors.

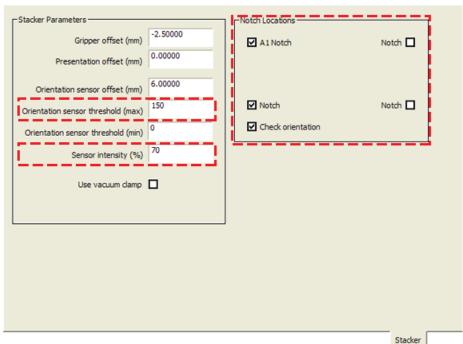
Setting properties

To set stacker properties:

- **1** Open the Labware Editor.
- 2 In the Labware Entries tab, click the Stacker sub-tab.
- **3** Enter the values for the available properties according to the labware you are defining.

BenchCel Workstation only. Set only the maximum orientation sensor threshold, sensor intensity, and notch locations. The other settings are used by the Stacker.





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Parameter	Description			
<i>Stacker only.</i> Stacker gripper offset	Adjusts the height at which the microplate stage stops for the grippers to grip the microplate, with respect to the Stacker's grip teachpoint.			
	Change this value only if the stacker is not gripping the microplates correctly.			
Stacker only.	You should never need to change this value.			
Presentation offset	Adjusts the height of the Stacker plate stage with respect to the presentation teachpoint of a Stacker.			
<i>Stacker only.</i> Orientation sensor offset	Adjusts the height at which the orientation checking sensors view the microplate, with respec to the sensor.			
Orientation sensor threshold (max)	Specifies the highest value that an orientation sensor can register when sensing a notch. Any sensor reading above this value indicates that a solid microplate wall is present. Any sensor value below this threshold indicates that either a notch or no microplate is present.			
	If the stacker does not sense a notch when it should, you will get a "wrong plate type" or a "plate rotated 180 degrees" error message. Adjust the sensor threshold value.			
	The maximum value is 255.			
<i>Stacker only.</i> Orientation sensor	Indicates whether a microplate was downstacked or is present on the stage.			
threshold (min)	This threshold specifies the lowest value that an orientation sensor can register and still consider a notch to be present.			
	If the orientation sensor returns a value below this threshold, an error message appears stating that no microplate is present on the stage.			
	If the stacker does not sense a notch when it should, a "wrong plate type" or a "plate rotated 180 degrees" error message appears. In this case adjust the sensor threshold value.			
Sensor intensity	Sets the percentage of maximum sensor intensity for all sensors. If the sensor intensity is set too low, a microplate will not be detected even though one is present. If it is set too high, the sensors might become saturated, causing failure to detect the orientation of a microplate.			
	This parameter adjusts for the fact that clear, black, and white microplates reflect light differently. For example, white microplates generally reflect more light so the sensor intensity should be set lower.			

The following table provides descriptions of each parameter.

Setting Stacker properties

<i>Stacker only</i> . Use vacuum clamp		
	Instructs theStacker you are using a vacuum clamp in the Stacker stage to grasp the microplate during delidding.	
Notch Locations	• <i>Check orientation.</i> Turns on microplate- orientation checking based on the selected notch locations for your microplate. The notch locations are ignored when this check box is cleared.	
	• <i>Notch location check boxes.</i> Select the corresponding notch or notches for your microplate.	
	For BenchCel Workstations, the A1 well of the microplate is positioned in the far, left corner as you face the front of the BenchCel Workstation.	
	For BioCel Systems, the A1 well of the microplate is positioned in the far, left corner from the perspective of the robot.	
	Notches 000000000000000000000000000000000000	
	IMPORTANT The Stacker has only two	

IMPURIAN1 The Stacker has only two orientation sensors for detecting notches. If the wrong microplate is loaded and an orientation sensors detect notches, the sensors will not flag an incorrect orientation for the wrong microplate.

IMPORTANT If the orientation sensors detect notches in the correct location, the sensors will not flag an incorrect orientation for the wrong microplate.

For information about	See
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Opening the Labware Editor	"Opening the Labware Editor" on page 21
Using the Labware Editor	"Labware Editor overview" on page 16

Setting Direct Drive Robot properties

When to set Direct Drive Robot properties

If you are using the Direct Drive Robot in your automation system, you must specify the robot properties for the labware that the robot will handle. Because the weight, material, and design varies, you specify the properties for each labware type.

You must be logged in as an administrator or technician to perform this procedure.

About the robot gripper offset properties

The robot gripper offset parameters tell the Direct Drive Robot where to grip a given labware type when transferring it from one device to another. Each device within a system can pose different accessibility challenges when transferring the labware. For example, some devices can have a deep, recessed area, whereas others are more flat. Some devices might have tall flanges that make it impossible for the robot to grip a microplate at a very low point.

The Direct Drive Robot uses three types of gripper offset ranges to determine the most compatible grip position for the labware type:

- 1 *Gripper offset range for the labware.* Specified on the Direct Drive Robot tab in the Labware Editor for each labware definition.
- **2** Gripper offset range for pick-location device. Specified in the DD Robot Diagnostics software for a given device (device A).
- **3** Gripper offset range for place-location device. Specified in the DD Robot Diagnostics software for a given device (device B).

If the three gripper offset ranges overlap, the robot can use the smallest common gripper offset to perform a direct labware transfer from device A to device B without regripping the labware. If the three ranges do not overlap, the software attempts to plan a path through one or more regrip stations. If the robot cannot perform the transfer without risking a physical collision, an error message appears at the time of the requested labware transfer and the run cannot continue.

To provide the system with the greatest flexibility for identifying a grip position that works for all locations, you should set the widest possible range for each gripper offset parameter.

To set Direct Drive Robot properties:

- **1** Open the Labware Editor.
- 2 In the Labware Entries tab, click the Direct Drive Robot sub-tab.

Direct Drive Robot Gripper		 1		
Minimum landscape gripper offset (mm)	0.00000			
Maximum landscape gripper offset (mm)	10.00000			
Minimum portrait gripper offset (mm)	0.00000			
Maximum portrait gripper offset (mm)	10.00000			
Grip torque (% of maximum)	50			
		 1		
			Direct Drive	P.

Figure Direct Drive Robot sub-tab

3 Enter the values for the following properties according to the labware type that you are defining.

Parameter	Description
Landscape gripper offset (mm)	• <i>Minimum.</i> The distance from the bottom of the microplate to the lowest point where the robot grippers can hold the microplate in landscape orientation. Default: 0 mm
	• <i>Maximum</i> . The distance from the bottom of the microplate to the highest point where the robot grippers can hold the microplate in landscape orientation. Default: 10 mm
	The minimum and maximum values depend on the given microplate features and the robot gripper arms, which are 3 mm tall. For example, if the microplate has a 4-mm tall skirt, you could set the gripper offset range from 0 mm (minimum) to 2 mm (maximum). At the minimum, the gripper will be flush with the bottom of the microplate, while at the maximum the robot can still grip the microplate securely.

Parameter	Description
Portrait gripper offset (mm)	• <i>Minimum</i> . The distance from the bottom of the microplate to the lowest point where the robot grippers can hold the microplate in portrait orientation. Default: 0 mm
	• <i>Maximum</i> . The distance from the bottom of the microplate to the highest point where the robot grippers can hold the microplate in landscape orientation. Default: 10 mm
	The long sides of some microplates have a raised section in the middle of each side. In this case, set the minimum gripper offset higher than the uneven surface to ensure that the robot can grip the microplate evenly and securely. The following example shows how the range can vary depending on the microplate features.
	Maximum Minimum
	Li Minimum
Grip torque percentage	The grip force with which the robot grips the microplate, where 100% is the maximum gripping force. A smaller value grips the microplate with less force than a greater value.
	The force with which the robot can grip a microplate depends on the microplate weight, material, and design. You should run some tests to optimize the setting.

For information about	See
Workflow for adding labware to the Labware Editor	"Workflow for defining labware" on page 19
Opening the Labware Editor	"Opening the Labware Editor" on page 21
Using the Labware Editor	"Labware Editor overview" on page 16
Direct Drive Robot	www.agilent.com/lifesciences/automation

2 Defining labware

Setting Direct Drive Robot properties



VWorks Automation Control Setup Guide

3 Specifying pipette speed and accuracy

This chapter contains the following topics:

- "About liquid classes" on page 56
- "Opening the Liquid Library Editor" on page 58
- "Creating a liquid class" on page 59
- "Calibrating the pipettor" on page 62



About liquid classes

Liquid Library Editor defined

The Liquid Library Editor provides tools for users with technician or administrator privileges to enter values for properties that affect pipetting speed, accuracy, and precision.

Figure Liquid Library Editor window

Liquid Library Editor v8.2.2		
Please select a liquid entry from the list below in order to view and edit its properties.	Use this box to enter a description of t	he liquid entry and any notes pertaining to its use.
894 disposable tip 0.5 - 10.4 384 disposable tip 10 - 50.4 96 disposable tip 1 - 2.4 96 disposable tip 2 - 50.4 96 disposable tip 51 - 200.4 fixed tip 0.05 - 1.4 fixed tip 0.05 - 1.4	Enter description of new liquid type he	re 🖉
fixed tip 11 - 50ul fixed tip 3 - 10ul	Aspirate Parameters	Z-axis Aspirate Parameters
fixed tip 51 - 200ul fixed tip wash fast fixed tip wash slow	1 Velocity (0.1 - 500 ul/s)	40 Velocity into wells (1 - 250 mm/s)
	2 Acceleration (1 - 1000ul/s^2)	100 Acceleration into wells (1 - 2000 mm/s^2)
	1000 Post-aspirate delay (0 - 300000 ms)	10 Velocity out of wells (1 - 250 mm/s)
New liquid entry Save changes	Copy values to dispense tab	10 Acceleration out of wells(1 - 2000 mm/s^2)
Rename liquid entry	Lopy values to dispense tab	
Delete liquid entry	Aspirate Dispense Equation	

Default liquid library entries

When installing VWorks software, you might have elected to install the default liquid library entries. These entries are provided as examples and thus might only approximate your particular reagents. For the best performance, you should create your own liquid library definitions.

When to use the Liquid Library Editor

You use the Liquid Library to fine-tune the volume aspirated or dispensed by your Bravo Platform or Vertical Pipetting Station.

IMPORTANT Verify the pipetting of your Bravo Platform or Vertical Pipetting Station. Accurate and precise pipetting depends on a variety of factors including the liquid properties.

Liquid classes defined

The values entered into the Liquid Library Editor can be saved as a collection, known as a liquid class. Using liquid classes saves time when writing protocols because you do not have to enter values for the liquid properties every time you create a protocol.

Types of liquid classes

You might want to create different classes for different:

• Types of liquids

For example, water versus DMSO

- Volumes of liquids For example, 1 μL versus 200 μL
- Liquid operations For example, washing versus mixing

Liquid library database defined

The data that represents a liquid class is saved to the liquid library database, which is maintained in the Windows registry.

Using a liquid class

When preparing for a protocol run, you select the liquid class that you want to use. During the run, the liquid class values are referenced for pipetting operations.

Calibrating the Bravo Platform and Vertical Pipetting Station

The Liquid Library Editor also has an equation editor that can be used to calibrate the Bravo Platform and Vertical Pipetting Station.

For information about	See
Opening the Liquid Library Editor	"Opening the Liquid Library Editor" on page 58
Creating a liquid class	"Creating a liquid class" on page 59
Calibrating your pipettor	"Calibrating the pipettor" on page 62

Opening the Liquid Library Editor

Before you start

You must be logged in as an administrator or technician to open the Liquid Library Editor.

Procedure

To open the Liquid Library Editor from VWorks software:

1 Select Tools > Liquid Library Editor.

The Liquid Library Editor opens.

order to view and edit its properties.			
834 disposable tp 0.6 - 10.0 384 disposable tp 10 - 50.0 96 disposable tp 1 - 20.0 96 disposable tp 2 - 50.0 96 disposable tp 51 - 20.0 fixed tp 0.05 - 1.0 fixed tp 0.05 - 1.0	Enter description of new liquid type here		
fixed tip 11 - 50ul fixed tip 3 - 10ul	Aspirate Parameters	Z-axis Aspirate Parameters	
fixed tip 51 - 200ul fixed tip wash fast fixed tip wash slow	1 Velocity (0.1 - 500 ul/s)	40 Velocity into wells (1 - 250 mm/s)	
	2 Acceleration (1 - 1000ul/s^2)	100 Acceleration into wells (1 - 2000 mm/s^2)	
	1000 Post-aspirate delay (0 - 300000 ms)	10 Velocity out of wells (1 - 250 mm/s)	
New liquid entry Save changes	Copy values to dispense tab	10 Acceleration out of wells(1 - 2000 mm/s^2)	

For information about	See
Liquid classes	"About liquid classes" on page 56
Creating a liquid class	"Creating a liquid class" on page 59
Calibrating your pipettor	"Calibrating the pipettor" on page 62

Creating a liquid class

About this topic

This topic describes how to create a liquid class using the Liquid Library Editor.

You must be logged in as an administrator or technician to perform this procedure.

Liquid compatibility



WARNING Agilent Technologies products are intended to be used with non-hazardous liquids. Please contact Automation Solutions Technical Support before using any non-aqueous solvents or solvents generally considered to be hazardous.

Procedure

To create a liquid class:

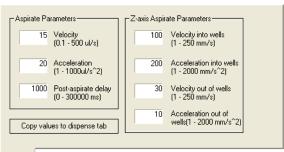
- **1** Open the Liquid Library Editor.
- 2 Click New liquid entry.

Liquid Library Editor v9.0.0		? 🛛
Please select a liquid entry from the list below in order to view and edit its properties.	Use this box to enter a description of t	ne liquid entry and any notes pertaining to its use.
384 disposable tip 0.5 - 10ul 384 disposable tip 10 - 50ul 96 disposable tip 1 - 2ul 96 disposable tip 2 - 50ul 96 disposable tip 51 - 20uul fixed tip 0.5 - 1ul fixed tip 1 3ul fixed tip 1 - 3ul fixed tip 1 - 30ul fixed tip 1 - 10ul fixed tip 1 - 10ul fixed tip 1 - 10ul		re
fixed tip 3 - 10ul fixed tip 51 - 200ul fixed tip wash fast	15 Velocity (0.1 - 500 ul/s)	100 Velocity into wells (1 - 250 mm/s)
fixed tip wash slow	20 Acceleration (1 - 1000ul/s^2) 1000 Post-aspirate delay	200 Acceleration into wells (1 - 2000 mm/s^2) 30 Velocity out of wells
New liquid entry	(0 - 300000 ms)	(1 - 250 mm/s)
Rename liquid entry Save changes as	Copy values to dispense tab	wells(1 - 2000 mm/s^2)
Delete liquid entry	Aspirate Dispense Equation	

- 3 In the New Liquid Entry dialog box, type a name for the liquid class and click OK.
- **4** *Optional.* In the box at the top right of the **Liquid Library Editor** window, type a note describing the entry for your records.
- **5** On the **Aspirate** tab, type the values for the following aspirate parameters.

3 Specifying pipette speed and accuracy

Creating a liquid class

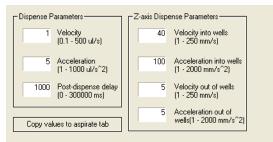


Aspirate

Note: The upper limits for some of the parameters might not be achievable for the device you are using.

Aspirate	Definition
Velocity (µL/s)	Specifies the speed of the aspiration stroke.
Acceleration $(\mu L/s^2)$	Specifies acceleration during the aspiration stroke.
Post-aspirate delay (ms)	Specifies the time the pipettor waits after aspiration is complete before moving the tips out of the wells.
Z-axis velocity into wells (mm/s)	Specifies how fast the pipettor moves as the tips enter the wells.
Z-axis acceleration into wells (mm/s^2)	Specifies the acceleration of the pipettor as the tips move into the wells.
Z-axis velocity out of wells (mm/s)	Specifies how fast the tips leave the wells.
Z-axis acceleration out of wells (mm/s^2)	Specifies the acceleration of the pipettor as the tips move out of the wells.

6 Click the **Dispense** tab and enter values for the dispense properties.



The following table describes the dispense parameters.

Dispense	Definition
Velocity	Specifies the maximum speed of the dispensing stroke, in microliters per second.
Acceleration	Specifies acceleration during the dispensing stroke, in microliters per second squared.

Dispense	Definition
Post-dispense delay	Specifies the time the pipettor waits after the dispense stroke before moving the tips out of the wells, in milliseconds.
Z-axis velocity into wells	Specifies how fast the pipettor moves as the tips enter the wells, in millimeters per second.
Z-axis acceleration into wells	Specifies the acceleration of the pipettor as the tips enter the wells, in milliliters per second squared.
Z-axis velocity out of wells	Specifies how fast the pipettor moves as the tips leave the wells, in millimeters per second.
Z-axis acceleration out of wells	Specifies the acceleration of the pipettor as the tips leave the wells, in millimeters per second squared.

7 Click Save changes.

The changes are now stored in the liquid library database.

For information about	See
Liquid classes	"About liquid classes" on page 56
Opening the Liquid Library Editor	"Opening the Liquid Library Editor" on page 58
Calibrating your pipettor	"Calibrating the pipettor" on page 62

Calibrating the pipettor

About calibrating the pipettor

You can improve the accuracy of pipetted volumes by:

- Calibrating the pipettor
- Plotting the actual volume dispensed as a function of the set dispense volume
- Calculating the polynomial coefficients of the plot
- Entering the coefficients into the liquid library equation editor

Do you need to calibrate your pipettor?

Pipetting accuracy is the ability to dispense an absolute volume of liquid. In practice, the volume that is actually dispensed by a pipettor may be different from the dispense volume that you select. This difference is the absolute error.

In some protocols, as long as you dispense an excess of liquid, the actual volume pipetted is not important. In other protocols, pipetting accuracy can be a critical factor. You must remember, though, that every step of an experiment has error and there is no point taking time to improve the accuracy of pipetting to four significant digits if another step in your protocol has error at the third significant digit.

If you are sure that the overall error of the experiment is limited by pipetting accuracy, and error at this number of significant figures makes a practical difference to you interpretation of the data, consider performing an accuracy calibration.

Method overview

This section gives an overview of the method you can use to measure pipetting accuracy. It does not give a detailed procedure because that depends on exactly how you choose to conduct the experiment.

To calibrate a pipettor, an independent method of measuring dispensed volume is required. One method is to dispense a solution of fluorescein dye and measure the fluorescence emitted from each microplate well.

IMPORTANT Whichever method you use, verify that the error in the detection method is significantly smaller than the pipetting error. Otherwise, the error you detect might be from the detection method and not the pipetting error.

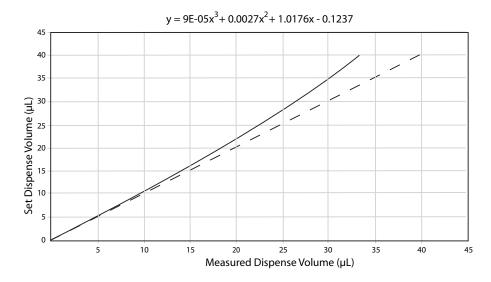
The overall method is:

- **1** Perform a series of pipetting operations in which different volumes are pipetted.
- **2** Measure the volumes of dispensed liquid using the independent measuring method.
- **3** In a spreadsheet program, tabulate the dispense volumes that you set in the software against the measured volumes.
- 4 Plot a graph, with the set dispense volume on the *y*-axis and measured dispense volume on the *x*-axis.

The plot will be a curve, reflecting the fact that absolute error is a function of the magnitude of the measurement.

5 Use the statistical functions of the spreadsheet program to fit a curve to the data.

Your result might look like this:



The dashed line is a reference line, where the set dispense volume equals the measured dispense volume. The equation is the polynomial for the line, calculated by the spreadsheet program.

6 Enter the curve information into the equation editor of the Liquid Library Editor.

If you repeat the experiment, you will find that the curve is much closer to a straight line. This is because the equation you entered adjusts the action of the servo motor that determines aspirate and dispense volumes, thereby calibrating the dispense.

Using the equation editor

You use the equation editor in the Liquid Library Editor to enter the calibration curve data and correct for pipetting inaccuracy.

To enter a polynomial into the equation editor:

- **1** Open the Liquid Library Editor.
- **2** Click the **Equation** tab to display the equation editor.
- **3** In the **Highest order of polynomial** text box, enter the value for the highest order of the polynomial.

This is the largest exponent in the equation and tells you how many terms are in the equation. For example, if the highest order of the polynomial is 3, the equation will have the general form: $y = a + bx + cx^2 + dx^3$, where 'x' is the volume specified by any pipettor task that uses this liquid class. With an exponent of three, four rows are added to the equation editor table.

4 In the Coefficient/Term table, enter the coefficient and exponent for each of the terms in the equation, starting with the zero order term.

Calibrating the pipettor

To enter a value, single-click the **Coefficient** table row twice. Note that the exponents are already entered for you and cannot be edited.

The following example is for the curve displayed in the previous graph.

Coefficient Term 0.123700 x^0 1.017600 x^1 0.002700 x^2 0.000090 x^3	Each row represents a coefficient in the target volume polynomial. First enter the highest order of the polynomial in the edit box below, then enter a value for each coefficient in the table to the left. The default configuration is for linear target volume with slope = 1. The maximum order of the polynomial is 10.
3	Highest order of polynomial (e.g., 2 for y=a+bx+cx²)
Aspirate Dispense Equat	ion

5 Click Save changes.

For information about	See
Liquid classes	"About liquid classes" on page 56
Opening the Liquid Library Editor	"Opening the Liquid Library Editor" on page 58
Creating a liquid class	"Creating a liquid class" on page 59



VWorks Automation Control Setup Guide

4 Tracking and managing labware in storage

This chapter contains the following topics:

- "About labware inventory management" on page 66
- "Connecting to the inventory management database" on page 69
- "Opening the inventory editor" on page 71
- "About inventory groups" on page 72
- "Creating and managing location groups" on page 74
- "Creating and managing plate groups" on page 76
- "Loading labware into storage devices" on page 79
- "Moving labware between storage devices" on page 82
- "Unloading labware out of inventory" on page 85
- "Using a plate group to process labware" on page 88
- "Creating a plate group with a barcode input file" on page 93
- "Inventory editor views and filters" on page 95
- "Auditing plate volumes in the inventory editor" on page 97
- "Reinventorying the labware inventory" on page 100
- "Resolving labware inventory problems" on page 102



About labware inventory management

About this topic

This topic provides the background information you need to understand how to use the labware inventory manager to track groups of microplates moving into and out of a microplate storage device.

Who should read this

Read this topic if your lab automation system has a storage device such as a Liconic StoreX, Heraeus Cytomat PLC, or an Agilent Technologies Plate Hub Carousel and you are using, or want to set up, inventory management with a database.

Before you start

Before creating protocols that use the storage device, make sure you have read the device driver user documentation for your particular storage device as well as "Resolving labware inventory problems" on page 102.

Barcode tracking versus inventory management

Barcode tracking

Barcode tracking without an inventory system is limited because the microplate locations are stored in memory and are lost when you exit the VWorks software.

Inventory management

The inventory management system allows long-term tracking of microplates because barcode data is permanently stored in a database. This is useful for lab automation systems with devices that store microplates for a long time, such as a Heraeus Cytomat PLC and Liconic StoreX.

Required database

To use inventory management, you must have an SQL database set up, either on the computer that runs the VWorks software or a computer that is on the same local area network.

How microplates are stored

The long-term storage devices supported by the VWorks software store microplates in cassettes and slots. A cassette is a vertical rack that has many slots, with each holding one microplate.

Information that is stored

The inventory maintains a list of microplates located in a long-term microplate storage device.

The information contained about each microplate in the inventory includes:

- Device in which the microplate is located
- Cassette and slot location of the microplate
- Name of the group or location to which it belongs
- Labware type
- Any north-side, south-side, east-side, and west-side barcodes *Note:* West side barcodes are tracked only if an optional barcode reader is used.
- Volume of the wells in the microplate

The list of microplates in the inventory is displayed in the Inventory Editor dialog box. An example view is shown below.

Location G	roups Plate Groups Inventory Ma	nagemer	nt				
2000		plates th	at are currently in a mass storage device)				-
	nt filter:	1	labore and the second se	1	1	lane	southb
cassette	device	easthc		DOTTDDC			
cassette 1		eastbc		northbc	plate_name process - 1	-	southbo
cassette 1 1	device StoreX/CytomatPLC Driver - 1 StoreX/CytomatPLC Driver - 1	eastbc	1536 Greiner 782076 bik sqr weil fit btm 1536 Greiner 782076 bik sqr weil fit btm	northbc	plate_name process - 1 process - 1	2	SOUTHD
cassette 1 1 1	StoreX/CytomatPLC Driver - 1	eastbc	1536 Greiner 782076 blk sqr well flt btm	northbc	process - 1	2 3	southb
cassette 1 1 1 1	StoreX/CytomatPLC Driver - 1 StoreX/CytomatPLC Driver - 1	eastoc	1536 Greiner 782076 bik sqr well fit btm 1536 Greiner 782076 bik sqr well fit btm	northbc	process - 1 process - 1	2 3 4	southo

The list of microplates in the inventory is updated every time the robot moves a microplate into or out of a storage device. The list is current at all times.

Inventory manager

The Inventory Editor dialog box provides the tools for you to manage the labware inventory. From here you can:

- Create plate groups
- Create location groups
- Review information about labware in a group
- Import groups from a barcode file
- Change the labware type associated with labware in the database
- Delete labware from the database
- Inventory the labware in a storage device

Plate groups and location groups

With long-term storage devices, typically only a sub-set of the labware stored in the device is used in one protocol. You can set up two different types of labware sub-sets, called plate groups and location groups. Which you choose for a particular protocol depends on what you are planning to do.

A plate group is a group of labware based on the unique database identifier for that labware.

A location group is a group of slots that are not based on information in the labware database.

About labware inventory management

Inventory management tasks

The following tasks are used with the inventory management system. These are the tasks that move labware in to and out of a storage device:

- Load
- Unload
- Incubate at microplate storage device

About manually moving labware

Keeping the database synchronized

The database cannot track labware that you manually add, remove, or move. To keep the database synchronized with the storage device, load and unload the microplate storage device robotically, or periodically reinventory the storage device.

Instead of manually adding labware to the storage device, write a protocol to downstack and load the labware. Instead of manually removing labware from the storage device, write a protocol to unload and upstack the labware.

If you must manually load and unload labware

If you must manually load and unload labware, create a protocol to load or unload the exact labware that you are manually adding or removing, and then simulate the protocol in the software.

With an appropriate protocol, the simulated run accurately changes the labware listed in the database without actually moving any labware.

Terminology

The following terms are used to describe the movement of labware in the system.

Term	Definition
Unload	The act of moving labware from a storage device into the system.
Load	The act of moving labware from the system into a storage device.
System	Labware that are being processed by the current protocol are considered to be in the system.
	For example:
	• Labware on a platepad is in the system.
	• Labware in a plate hotel is in the system.
	• Labware being incubated in an incubator is in the system.
	• Labware half-way up a Stacker rack is not in the system, unless it will be moved during the current protocol.
	• Labware being stored in a Plate Hub Carousel is not in the system unless it will be moved during the current protocol.

Database backup

The inventory management database can be backed up onto another computer using a software utility. Contact Automation Solutions Technical Support for more information about the software utility.

Related information

For information about	See
Inventory groups, plate groups and location groups	"About inventory groups" on page 72
Setting up the database	"Setting up the database" on page 69
Moving labware in and out of a storage device	• "Loading labware into storage devices" on page 79
	• "Unloading labware out of inventory" on page 85
	• "Moving labware between storage devices" on page 82
Incubating labware	"Using a plate group to process labware" on page 88
Using barcode input files	"Creating a plate group with a barcode input file" on page 93

Connecting to the inventory management database

Who should read this

Read this topic if your lab automation system has a storage device, such as a Liconic StoreX, Heraeus Cytomat PLC, or Agilent Technologies Plate Hub Carousel, and you are using or setting up inventory management with a database.

Setting up the database

Before you can connect to the database, you must install and configure the inventory management database. To set up the inventory management database, contact Automation Solutions Technical Support for assistance.

Connecting to the database

The database connection is specified in the VWorks software.

Connecting to the inventory management database

To connect to the database:

- 1 In the **VWorks** window, choose **Tools** > **Options**. The Options dialog box appears.
- 2 Under DB Setup, verify the following, and then click OK.
 - Enable database connection is selected.
 - Connection string is dsn=velocity11.

Note: Velocity11 is the factory-default database name specified in the ODBC. If you changed the name in the ODBC, you must update the Connection string field in the Options dialog box.

Authorized user:	
Password:	
Send email from:	
Send email when an error occurs:	
Addresses to send to when an error occurs	6
View Options	
Hide disabled parameters:	Г
Remember simulator state between session	
Enable database connection:	v
Connection string:	dsn=velocity11
Error Handling	
Halt on low disk space:	F
Disk space threshold (0 - 100 %):	
Scheduler error behavior:	Processes as many plates as possible
Deadlock behavior:	Abort
Watcher Options	
Path to Watcher configuration file:	C:\VWorks Workspace\Watcher\WatcherConfi
Start watching when user logs in:	Г
Enable database connection:	

For information about	See
Inventory groups, plate groups and location groups	"About inventory groups" on page 72
Moving labware in and out of a storage device	• "Loading labware into storage devices" on page 79
	• "Unloading labware out of inventory" on page 85
	• "Moving labware between storage devices" on page 82
Incubating labware	"Using a plate group to process labware" on page 88
Using barcode input files	"Creating a plate group with a barcode input file" on page 93
Specifying the database name in the ODBC	"Resolving labware inventory problems" on page 102

Opening the inventory editor

Who should read this

Read this topic if your lab automation system has a storage device such as a Liconic StoreX, Heraeus Cytomat PLC, or an Agilent Technologies Plate Hub Carousel and you are using inventory management with a database.

Before you start

Before you can open the inventory editor, the inventory database that the editor communicates with must be installed and configured.

Opening and closing the inventory editor

To open the inventory editor:

Select Tools > Inventory Editor.

Alternatively, select a Load or Unload task in a protocol and click Edit location groups or Edit plate groups.

To close the inventory editor:



Click 🔀 in the top-right corner of the window.

For information about	See
Setting up the inventory management database	"Setting up the database" on page 69
Inventory groups, plate groups and location groups	"About inventory groups" on page 72
Moving labware in and out of a storage device	• "Loading labware into storage devices" on page 79
	• "Unloading labware out of inventory" on page 85
	• "Moving labware between storage devices" on page 82
Incubating labware	"Using a plate group to process labware" on page 88
Using barcode input files	"Creating a plate group with a barcode input file" on page 93

About inventory groups

Who should read this

Read this topic if your lab automation system has a storage device such as a Liconic StoreX incubator, Heraeus Cytomat PLC, or Agilent Technologies Plate Hub Carousel.

Inventory groups defined

An inventory group is a group of labware or slots that is a subset of the labware listed in the inventory.

Types of inventory groups

There are two types of inventory groups:

- Location group
- Plate group

Location groups

Location groups are used to move labware to and or from a specific location in the storage device.

Example:

In this example, a location group that contains slots 1-10 in cassette 1 is created.

When an Unload task uses this location group, the robot moves whatever labware are in cassette 1, slots 1–10, regardless of the identity of the labware, out of the storage device and into the system.

When a Load task uses a location group, it moves the labware that are in the system into cassette 1, slots 1–10 of the storage device, regardless of the identity of the labware.

When to use

Location groups are used when:

- The storage device is being filled or emptied.
- The groups of labware are removed from the lab automation system and replaced with other groups of labware on a regular basis. This would be done by replacing a cassette of labware with a new one.

Plate groups

Plate groups are used to move specific labware to or from the storage device, but without regard for the location. Plate groups can be used when operators do not routinely remove and replace whole cassettes of labware.

When a labware is first moved into the system by the system's robot, such as when it is downstacked, it is assigned an identifier in the database. After that, the VWorks software tracks where that labware is at all times. This tracking does not require the labware to have barcode labels, the VWorks software tracks what it does with every labware during a protocol and so is able to track where each labware goes. Plate groups make use of this tracking system.

Note: You cannot use a plate group with a Load task, unless a native location or location group is associated with it— you must specify a location group. You can associate a plate group with the location group so that the labware that are loaded are immediately loaded into a plate group as well.

Note: When you load into a plate group you must also load into a location group, native location, or choose return to original locations, otherwise the software will not know where to put the labware.

Example:

A plate group in a storage device contains the following microplates:

- Plate 26
- Plate 31
- Plate 41
- Plate 107

These microplates are scattered around the storage device, not necessarily in adjacent slots of the same cassette. When the Unload task uses this plate group, it moves these microplates out of the storage device and into the system.

When to use

Plate groups are typically used in compound management systems where labware are housed in the storage device almost permanently.

For each protocol, a different plate group is unloaded, run, and then loaded back to a storage device. As long as the identification of the labware is tracked, the labware can be stored in any open location.

Group membership

A single labware can be a member of more than one plate group.

For information about	See
Creating a location group	"Creating and managing location groups" on page 74
Creating a plate group	"Creating and managing plate groups" on page 76
Moving labware in and out of a storage device	 "Loading labware into storage devices" on page 79 "Unloading labware out of inventory" on page 85
	 "Moving labware between storage devices" on page 82
Incubating labware	"Using a plate group to process labware" on page 88

Creating and managing location groups

Using barcode input files	"Creating a plate group with a barcode input file" on page 93
•	VWorks Automation Control User Guide

Creating and managing location groups

Who should read this

Read this topic if your lab automation system has a storage device such as a Liconic StoreX incubator, Heraeus Cytomat PLC, or Agilent Technologies Plate Hub Carousel.

Procedure

To create a location group:

- **1** Select **Inventory Editor** from the **Tools** menu.
- 2 Click the Location Groups tab.
- **3** Click **Create new** and enter a name for the group.

Inventory Editor	
Please enter a new name	
Location group	
ОК	Cancel

- 4 Click OK.
- 5 Select a group of slots in the Available Slots area.

device	cassette	slot	eastbc	labware	^
StoreX/CytomatPLC Driver - 1	1	1		1536 Gre	
StoreX/CytomatPLC Driver - 1	1	2		1536 Gre	
StoreX/CytomatPLC Driver - 1	1	3		1536 Gre	
StoreX/CytomatPLC Driver - 1	1	4		1536 Gre	
StoreX/CytomatPLC Driver - 1	1	5		1536 Gre	
StoreX/CytomatPLC Driver - 1	1	6			
StoreX/CytomatPLC Driver - 1	1	7			
StoreX/CytomatPLC Driver - 1	1	8			
StoreX/CytomatPLC Driver - 1	1	9			
StoreX/CytomatPLC Driver - 1	1	10			

You can use CTRL+click or SHIFT+click to select more than one slot.

6 Drag the group into the **Location Members** area.

Note: The slots do not have to be adjacent to each other.

Creating and managing location groups

Available Slots						Location Members			
device	cassette	slot	eastbc	labware	^	device	cassette	slot	occupancy
StoreX/CytomatPLC Driver - 1	1	1		1536 Gre		StoreX/CytomatPLC Driver - 1	1	1	
StoreX/CytomatPLC Driver - 1	1	2		1536 Gre	Ξ	StoreX/CytomatPLC Driver - 1	1	2	
StoreX/CytomatPLC Driver - 1	1	3		1536 Gre		StoreX/CytomatPLC Driver - 1	1	3	
StoreX/CytomatPLC Driver - 1	1	4		1536 Gre	-	StoreX/CytomatPLC Driver - 1	1	4	
StoreX/CytomatPLC Driver - 1	1	5		1536 Gre		StoreX/CytomatPLC Driver - 1	1	5	
StoreX/CytomatPLC Driver - 1	1	6							

7 Click Save Changes.

8 Close the inventory editor.

The location group is listed in the Available locations area of the Load/ Unload Task Parameters toolbar.

Native Locations	Groups	
Available locations		Edit location groups
Name	Number of plates	^
Location group	5	
PlateHubGroup1	10	
To move	4	
Final location	4	*

Deleting a location group

To delete a location group from the inventory:

- **1** Open the inventory editor.
- 2 Select a location group in the Saved Locations group box.
- **3** Click **Delete**.

For information about	See
Creating a plate group	"Creating and managing plate groups" on page 76
Opening the inventory editor	"Opening the inventory editor" on page 71
Moving labware in and out of a storage device	• "Loading labware into storage devices" on page 79
	• "Unloading labware out of inventory" on page 85
	• "Moving labware between storage devices" on page 82
Incubating labware	"Using a plate group to process labware" on page 88

Creating and managing plate groups

For information about	See
Using barcode input files	• "Creating a plate group with a barcode input file" on page 93
	VWorks Automation Control User Guide
Using storage tasks in a protocol	VWorks Automation Control User Guide

Creating and managing plate groups

About this topic

This topic describes how to create a plate group, which is a list of specific labware that can be moved to or out of a labware storage device without regard for which slots they are stored.

Who should read this

Read this topic if your lab automation system has a storage device such as a Liconic StoreX incubator, Heraeus Cytomat PLC, or Agilent Technologies Plate Hub Carousel.

Procedure

To create a plate group:

- **1** Select **Inventory Editor** from the **Tools** menu.
- 2 Click the **Plate Groups** tab.
- **3** Click **Create new** and enter a name for the group.

	y Editor	
lease ent	er a new name	₽) 1
group3		

4 Click OK.

To add labware to the plate group:

1 Select a group of available labware.

device	cassette	slot	eastbc	labware
StoreX/CytomatPLC Driver - 1	1	2		1536 Greiner
StoreX/CytomatPLC Driver - 1	1	3		1536 Greiner
StoreX/CytomatPLC Driver - 1	1	4		1536 Greiner
StoreX/CytomatPLC Driver - 1	1	5		1536 Greiner
StoreX/CytomatPLC Driver - 1	1	1		1536 Greiner

You can use CTRL+click or SHIFT+click to select more than one labware.

2 Drag the group into the **Group Members** area.

- Available Plates					Group Members			
device	cassette	slot	eastbc	labware	device	cassette	slot	occupancy
StoreX/CytomatPLC Driver - 1	1	2		1536 Greiner	StoreX/CytomatPLC Driver - 1	1	2	
StoreX/CytomatPLC Driver - 1	1	3		1536 Greiner	StoreX/CytomatPLC Driver - 1	1	4	
StoreX/CytomatPLC Driver - 1	1	4		1536 Greiner	StoreX/CytomatPLC Driver - 1	1	5	
StoreX/CytomatPLC Driver - 1	1	5		1536 Greiner				
StoreX/CytomatPLC Driver - 1	1	1		1536 Greiner				

3 Click Save Changes.

4 Close the inventory editor.

The plate group is listed in the Available groups area of the Groups tab in the Load/Unload Task Parameters toolbar.

rameters	*
riginal locations	
Locations Groups	
e groups:	Edit plate groups
Number of plates	
3	
3	
	riginal locations ocations Groups e groups: Number of plates

Changing the processing order

You can change the order in which the labware in a plate group will be processed.

To change the processing order:

1 In the plate group list, select a labware.

cassette	slot	occupancy	eastbc	labware
1	3			384 Greiner 781101 P
1	5			384 Greiner 781101 P
1	13			384 Greiner 781101 P
2 Hub Caro	4 Isel -	12 4		384 Greiner 781101 P
	1 1 1	1 3 1 5 1 13	1 3 1 5 1 13	1 3 1 1 5 1 1 13

2 Drag it to another position in the list.

device	cassette	slot	occupancy	eastbc	labware
PlateHub Carousel - 1	1	3			384 Greiner 781101 P
PlateHub Carousel - 1	2	4			384 Greiner 781101 P
PlateHub Carousel - 1	1	5			384 Greiner 781101 P
PlateHub Carousel - 1	1	13			384 Greiner 781101 P

Deleting a plate group

To delete a plate group from the inventory:

- **1** Open the inventory editor.
- 2 Select the plate group in the Saved Groups group box.

Creating and managing plate groups

3 Click **Delete**.

For information about	See
Creating a location group	"Creating and managing location groups" on page 74
Opening the inventory editor	"Opening the inventory editor" on page 71
Moving labware in and out of a storage device	• "Loading labware into storage devices" on page 79
	• "Unloading labware out of inventory" on page 85
	• "Moving labware between storage devices" on page 82
Incubating labware	"Using a plate group to process labware" on page 88
Using barcode input files	• "Creating a plate group with a barcode input file" on page 93
	• VWorks Automation Control User Guide
Using storage tasks in a protocol	VWorks Automation Control User Guide

Loading labware into storage devices

About this topic

This topic describes how to add labware into a storage device in the system. You do this when filling the device. Adding labware into the system adds the labware identifications into the record that the VWorks software tracks in the system.

Who should read this

Read this topic if your lab automation system has a storage device such as a Liconic StoreX incubator, Heraeus Cytomat PLC, or Agilent Technologies Plate Hub Carousel.

Ways to fill a storage device

There are two ways to fill an empty storage device with labware.

- Robotically
- Manually

Loading labware robotically

To load labware robotically, the labware are placed in a stacker, downstacked and moved to the storage device.

To load labware robotically:

1 Create a protocol.



2 Make sure that the **Downstack** task is configured to use the stacker.

Stacker - 1.Stacker	Use earlie
	Use later
evices available to perform task:	

Loading labware into storage devices

3 Create a location group.

Make sure that the location group is listed in the Available locations area of the Load Task Parameters toolbar.

Native Locations	Groups	
Available location	IS:	Edit location groups
Name	Number of plates	^
Location group	5	
PlateHubGroup	10	
To move	4	
Final location	4	~

4 Drag the group into the Assigned locations area.

Assigned locations:						
Location group						
Number of selected locations: 0 Number of assigned locations: 5						

5 Click **Start** and resolve any error messages.

Note: If you are using the simulator to "virtually" load labware, make sure that simulation mode is on before you click Start.

- **6** In the **Number of Cycles** dialog box, enter a number that is equal to or less than the number of labware you want to load into the storage device.
- 7 Click OK.
- **8** To confirm that the labware are in the inventory:
 - **a** Click the **Load** task.
 - **b** Click **Edit location groups** to open the inventory editor.
 - **c** Click the **Inventory Management** tab.

Select view type: View by plate (s	shows on	ly plates that are currently in a mass storage	device)				
Current filter:							
device	eastbc	labware	northbc	plate_name	slot	southbc	status
StoreX/CytomatPLC Driver - 1		1536 Greiner 782076 blk sqr well flt btm		process - 1	1		OK
StoreX/CytomatPLC Driver - 1		1536 Greiner 782076 blk sqr well fit btm		process - 1	2		OK
StoreX/CytomatPLC Driver - 1		1536 Greiner 782076 blk sqr well fit btm		process - 1	3		ОК
StoreX/CytomatPLC Driver - 1		1536 Greiner 782076 blk sqr well fit btm		process - 1	4		ОК
StoreX/CytomatPLC Driver - 1		1536 Greiner 782076 blk sgr well fit btm		process - 1	5		ок

Loading labware manually

Labware can be loaded manually two ways:

- Cassettes of labware are physically put in to the storage device and a run is simulated to create the matching list of plates in the inventory
- Cassettes of labware are physically put into the storage device, manually added to the inventory and then re-inventoried

Note: To load by reinventory, the storage device must have a barcode reader.

To load labware manually using a simulated run:

- **1** Physically load the cassettes of labware into the storage device.
- **2** Follow the procedure to load labware robotically, but turn on the simulation mode. To do this, click **Simulation is off**. The button label changes to display Simulation is on.
 - Make sure that the location group matches the cassettes that you loaded.
- **3** Click **Start** to run the simulator.
- **4** In the **Number of Cycles** dialog box, enter a number that is equal to or less than the number of labware you want to load into the storage device.
- **5** Review the inventory editor to make sure that the labware listed in the inventory match the labware actually in the device.
- **6** To turn off the simulation mode, click **Simulation is on**. The button label changes to display Simulation is off.

To load labware manually and then re-inventory:

- **1** Physically load the cassettes of labware into the storage device.
- 2 Open the Inventory Editor and click the Inventory Management tab.
- **3** From the Select view type list, select View by location (shows all available plate locations whether they are occupied or not.
- **4** In the **Inventory Management Functions** area:
 - **a** Enter the name of the labware in the Name field.
 - **b** Select the labware type from the **Labware** list.
 - **c** Select **Replace inventoried labware with the labware type selected above ONLY if a labware type is not already assigned**. (This prevents you from accidently overwriting an occupied slot with the wrong labware type).
- **5** Select the slots into which you loaded the labware. Use SHIFT+click or CTRL+click to select more than one item.
- **6** Click **Re-inventory selected locations**.

siect vie	w type: View by location (sh	nows all avai	lable plate locations, whether occu	pied or n	ot)				-3	Name:
Curre	nt filter:									Labware: 96 Greiner 655101 PS Clr Rnd Well F
ssette	device	eastbc	labware	northbc	plate name	slot	southbc	status	westbc 🔨	
	Plate Hub Carousel - 1		384 Greiner 781101 PS dr fit btm		process - 1	-		OK		O Replace any inventoried labware with the labware type selected above
	Plate Hub Carousel - 1		384 Greiner 781101 PS dr flt btm		process - 1	13		ОК		
	Plate Hub Carousel - 1		384 Greiner 781101 PS dr flt btm		process - 1	14		ОК		Replace inventoried labware with the abware type selected above ONLY if a
	Plate Hub Carousel - 1		384 Greiner 781101 PS dr flt btm		process - 1	15		ОК		abware type selected above ONLY IF a
	Plate Hub Carousel - 1		384 Greiner 781101 PS dr fit btm		process - 1	16		ОК		NOTE: The second option only works if a bar
	Plate Hub Carousel - 1		384 Greiner 781101 PS dr fit btm		process - 1	1		OK		code reader is present on the plate storage
	Plate Hub Carousel - 1		384 Greiner 781101 PS clr fit btm		process - 1	10		OK		device.
	Plate Hub Carousel - 1					2				-
	Plate Hub Carousel - 1					3				Re-inventory selected locations
	Plate Hub Carousel - 1					4				
	Plate Hub Carousel - 1					5				
	Plate Hub Carouse - 1		<u> </u>	51			l –		L L.	
		 2 								BaleffuleRaourel 1
			32		Delete s	electe	d entries	from inv	entory	9145e:Elde Caourel - 1
			8							 Blaistillie Gaoured - 1
			300		F	Refres	ih invento	ry view		Phales Hule Chaptered + 3
			ala							94.655106 Gaoured - 3
			A2			Vi	sualize Pla	ite		Philos Eluio Charouscel - 3
			904							3 Philipping Caroured - 3
			98							3 Milling Caronerd - 3
			9.5							Maintaine Caronred - 3
			96							(b) Phile Character (b) 1
			1	-						4 Plate Hub Carousel - 1
			2							4 Plate Hub Carousel - 1
			3							4 Plate Hub Carousel - 1
			4							4 Plate Hub Carousel - 1
			5							4 Plate Hub Carousel - 1 4 Plate Hub Carousel - 1

The inventory editor opens.

3 Click the **Inventory Management** tab and note the device, cassette, and slot locations of the microplates that you want to move.

In this example, the microplates will be moved from PlateHub, cassette 1, slots 1-4.

4 Click the **Location Groups** tab and create a location group for these microplates.

Note: The labware do not need to be in adjacent slots for them to be in a location group.

Location Groups Plate Groups					
Saved Locations Select a location group:	Location Members		1.00		
Location group	device	cassette	slot	occupancy	2
PlateHubGroup1	StoreX/CytomatPLC Driver - 1	1	1	occupied	
To move	StoreX/CytomatPLC Driver - 1	1	2	occupied	
	StoreX/CytomatPLC Driver - 1	1	3	occupied	
	StoreX/CytomatPLC Driver - 1	1	4	occupied	

5 In the **Inventory Management** tab, note the device, cassette, and slot numbers for the destination slots.

In this example, the microplates will be moved to PlateHub2, cassette 12, slots 7-10.

6 Click the Location Groups tab and create a location group for these slots.

ocation Groups Plate Groups					
Saved Locations Select a location group:	Location Members				
Final location	device	cassette	slot	occupancy	
Location group	PlateHub Carousel - 1	12	7	empty	
PlateHubGroup1 To move	PlateHub Carousel - 1	12	8	empty	
	PlateHub Carousel - 1	12	9	empty	
	PlateHub Carousel - 1	12	10	empty	

- 7 Click Save changes and close the inventory editor.
- 8 Select the **Unload** task, and in the **Task Parameters** area drag the location group in the first device to the **Assigned locations** area.

Task Parameters	i i	۲
Native Locations	Groups	
Available locations:		Edit location groups
Name	Number of plates	^
PlateHubGroup1	10	
To move	4	v
Assigned locations:	•	
Number of selected Number of assigne		

9 Select the Load task, and in the Protocol Task Parameters area drag the location group in the second device to the Assigned locations area.

Moving labware between storage devices

Task Parameters	5	*
Use original loca	ations	
Native Locations	Groups	
Available locations		Edit location groups
Name	Number of plates	^
PlateHubGroup1	10	
To move	4	
Final location	4	
Assigned locations	1	
- Final location		

10 Compile the protocol and check for errors.

- 11 Click Start to start the run.
- 12 In the Number of Cycles dialog box, type the number of microplates that you are moving and click OK.
- **13** Open the inventory editor, and click the **Inventory Management** tab to make sure that the microplates moved as expected.

For information about	See
Creating a location group	"Creating and managing location groups" on page 74
Creating a plate group	"Creating and managing plate groups" on page 76
Opening the inventory editor	"Opening the inventory editor" on page 71
Moving labware in and out of a storage device	 "Loading labware into storage devices" on page 79 "Unloading labware out of inventory" on page 85
Incubating labware	"Using a plate group to process labware" on page 88
Using barcode input files	 "Creating a plate group with a barcode input file" on page 93 VWorks Automation Control User Guide

4 Tracking and managing labware in storage Unloading labware out of inventory

For information about...

See...

Load and Unload tasks

VWorks Automation Control User Guide

Unloading labware out of inventory

About this topic

This topic describes how to remove plates that are in a storage device from the system. Removing labware from the system also removes the labware identification from the system records.

Who should read this

Read this topic if your lab automation system has a storage device such as a Liconic StoreX incubator, Heraeus Cytomat PLC, or Agilent Technologies Plate Hub Carousel.

Ways to unload labware

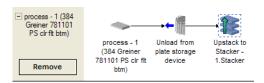
There are two ways to remove labware from a plate storage device.

- Robotically
- Manually

Unloading labware robotically

To unload labware from a storage device robotically:

1 Create a protocol.



2 Make sure that the **Upstack** task is configured to use the appropriate stacker.

Devices involved in task:
Stacker - 1.Stacker

- **3** In the inventory editor, identify the labware that you want to move:
 - **a** Click the **Unload** task.
 - **b** Click **Edit location groups** to open the inventory editor.

Unloading labware out of inventory

- **c** Click the **Inventory Management** tab. Note the device, cassette and slot numbers for the labware that you want to remove.
- **4** If necessary, create a location group in the inventory editor that contains the labware you want to remove.

Save the changes and confirm it by making sure it is listed in the Available locations area on the Locations tab of the Locad Task Parameters toolbar.

5 Drag the location group into the **Assigned locations** area.

Turk Further	eters	*
	tions Groups	
Available loca	ations:	Edit location groups
Name	Number of plates	
LocationGroup	p1 5	
FirstStack	16	
Assigned locat	abns:	
	ected locations: 16 signed locations: 0	

- 6 Click Start.
- 7 In the **Number of Cycles** dialog box, enter a number that equals the number of plates you want to remove from the storage device.
- 8 Click OK.
- **9** Confirm that the plates are no longer in the inventory:
 - a Click the Load task.
 - **b** Click **Edit location groups** to open the inventory editor.
 - c Click the Inventory Management tab.

Unloading a storage device manually

To unload a storage device manually, cassettes of labware are physically removed from the storage device and a run is simulated to unload the matching list of labware from the inventory.

To unload plates manually using a simulated run:

- **1** Physically remove the cassettes of labware from the storage device.
- **2** Follow step 1 to step 5 in the procedure above for unloading a storage device robotically.
- **3** Click **Simulation is off** to turn on the simulator.
- 4 Click Start.
- **5** In the **Number of Cycles** dialog box, enter a number that equals the number of labware you want to remove from the storage device.
- 6 Click **OK**.
- 7 Confirm that the labware are no longer in the inventory:

- a Click the Load task.
- **b** Click **Edit location groups** to open the inventory editor.
- **c** Click the **Inventory Management** tab.

To unload labware manually and then reinventory the database:

- **1** Physically unload the cassettes of labware from the storage device.
- 2 Open the Inventory Editor and click the Inventory Management tab.
- **3** From the Select view type list, select View by location (shows all available plate locations whether they are occupied or not.
- **4** Select the slots from which you unloaded the labware. Use SHIFT+click or CTRL+click to select more than one slot.
- **5** In the **Inventory Management Functions** area, click **Delete selected entries from inventory**. Click **Yes** to the message asking if you are sure you want to delete the selected labware. The labware is deleted from the database.
- **6** Click **Re-inventory selected locations**.

For information about	See	
Creating a location group	"Creating and managing location groups" on page 74	
Creating a plate group	"Creating and managing plate groups" on page 76	
Moving labware in and out of a storage device	 "Loading labware into storage devices" on page 79 "Moving labware between storage devices" on page 82 	
Incubating labware	"Using a plate group to process labware" on page 88	
Using barcode input files	 "Creating a plate group with a barcode input file" on page 93 VWorks Automation Control User Guide 	

Using a plate group to process labware

About this topic

This topic shows an example protocol where a plate group is moved out of a Plate Hub Carousel, transferred to a liquid-handling device where liquid is aspirated, and then loaded back into the same or different locations of the Plate Hub Carousel.

Who should read this

Read this topic if your lab automation system has a storage device such as a Liconic StoreX incubator, Heraeus Cytomat PLC, Agilent Technologies Plate Hub Carousel.

Before you start

- Place the labware in a Plate Hub Carousel (or other) storage device and make sure the labware are stored in the inventory editor.
- Create a plate group containing the labware that you want to process.

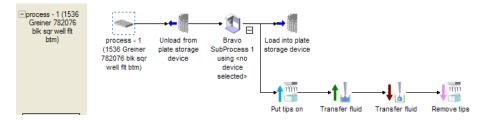
To enable the software to track individual plates:

• Under Protocol Options, select the Dynamically assign empty slot to load to storage device option.

Processing a plate group and returning the plates to the original location

To process a plate group:

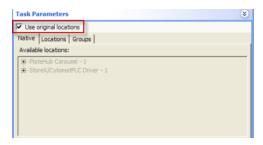
1 Create a process like the one shown below.



- 2 Select the Unload task, and in the Task Parameters area, click the Groups tab and drag the plate group to the Assigned location area.
- **3** If you want the labware to be handled in the same numerical order or will not be reusing the labware, select **Remove plates from group when processed**. *Note:* The labware can be loaded back into the group during the Load task execution.

 Task Parameters
 Image: Control of Control

4 Select the **Load** task and then select **Use original locations**. The Locations and Native tabs will become unavailable.



Optional. You can reassign the labware back to the original group or to a new plate group. Click the **Groups** tab and drag the plate group from the **Available groups** area to the **Assigned locations** area.

		*
✓ Use original location	ions	
Native Locations	Groups	
Available groups:		Edit plate groups
Name	Number of plates	
SourcePlateGroup1	4	
Destination	0	
in the second		
Assigned scations:		
Assigned scations:		

- 5 Click Start.
- **6** In the **Number of Cycles** dialog box, enter a number that is equal to or less than the number of labware that you want to process from the group.
- 7 Click **OK**.
- 8 To confirm that the labware have been returned to their original position in the inventory:
 - a Click the Load task.

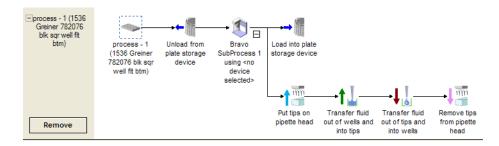
Using a plate group to process labware

- **b** Click Edit location groups or Edit plate groups.
- c Click the Inventory Management tab.

Processing a plate group and returning the labware to a different location

To process a plate group:

1 Create a protocol like the one shown below.



2 Select the **Unload** task and in the **Task Parameters** toolbar, click the **Groups** tab and drag the plate group you created at the beginning to the **Assigned locations** area.

Task Parameters		۲
Native Locations	Groups	
Available groups:		Edit plate groups
Name	Number of plates	
SourcePlateGroup1	4	
Remove plates f	om group when processed	
Assigned locations:		
SourcePlateGr		
Number of selected Number of assigned	locations: 0 locations: 4	
Advanced Setting	5	۲

- **3** Select the **Load** task and in the **Task Parameters** toolbar choose one of the following ways to load the labware into a different location.
 - Specify a pre-defined location group to load to. To specify a predefined location group, click the **Locations** tab and drag the location group in the **Available locations** to the **Assigned locations** area.

Using a plate group to process labware

Task Parameters		۲
Use original locations	s	
Native Locations Gr	oups	
Available locations:		Edit location groups
Name	Number of plates	
DestinationForSource	4	
Assigned locations:		
Number of selected loc Number of assigned loc		
Advanced Settings		۲

Assign specific locations to load to without using a location group. To assign specific locations without defining a location group, click the **Native** tab and drag the locations from the **Available locations** area to the **Assigned locations** area.

Task Parameters 😵
Use original locations
Native Locations Groups
Available locations:
Plate Hub Carousel - 1
cassette 1
cassette 2
+- cassette 3
⊕ cassette 4
Cossette 5
in cossette 6
⊕ cassette 7 ⊕ cassette 8
Assigned cations:
Hub Carousel - 1, cassette 3
Number of selected locations: 16 Number of assigned locations: 16
Advanced Settings

4 Click Start.

٠

- **5** In the **Number of Cycles** dialog box, enter a number that is equal to or less than the number of labware that you want to process from the group.
- 6 Click OK.
- 7 To confirm that the labware have been returned to their assigned positions in the inventory:
 - **a** Click the **Load** task.
 - **b** Click Edit location groups or Edit plate groups.
 - **c** Click the **Inventory Management** tab.

Using a plate group to process labware

For information about	See	
Software inventory	"About labware inventory management" on page 66	
Creating a plate group	"Creating and managing plate groups" on page 76	
Moving labware in and out of a storage device	• "Loading labware into storage devices" on page 79	
	• "Unloading labware out of inventory" on page 85	
	• "Moving labware between storage devices" on page 82	
Using barcode input files	• "Creating a plate group with a barcode input file" on page 93	
	• VWorks Automation Control User Guide	
Starting a run	VWorks Automation Control User Guide	
Load and Unload tasks	VWorks Automation Control User Guide	

Creating a plate group with a barcode input file

About this topic

This topic describes how to use a barcode input file to create a plate group. This is the most efficient way to create a plate group if you previously used a barcode input file to label a collection of labware that are now stored in a storage device.

Who should read this

Read this topic if your lab automation system has a storage device such as a Liconic StoreX incubator, Heraeus Cytomat PLC, or Agilent Technologies Plate Hub Carousel.

Procedure

IMPORTANT All labware with barcodes listed in the selected barcode input file series must already be in the storage device.

To create a plate group with a barcode input file:

- **1** Open the inventory editor.
- 2 Click the **Groups** tab.
- 3 Click the Browse button and navigate to the .bar file that you want to use.

Create group from bar code	e file: Browse		
Available bar code groups:		•	Import

4 From the **Available Barcode groups** list box, select the group that you want to use.

In the following example of a barcode input file, the options would be Set1 and Set2.

Creating a plate group with a barcode input file

📕 B	arcod	leInputF	ile.bar	- Note	pad	_ 🗆 🗵
Eile	<u>E</u> dit	F <u>o</u> rmat	⊻iew	<u>H</u> elp		
<na< td=""><td>me>S</td><td>iet1</td><td></td><td></td><td></td><td></td></na<>	me>S	iet1				
	1001					
	1002					
	1003					
	1004					
	1005 1006					
	1000					
	1008					
	1009					
	1010					
<na< td=""><td>me>S</td><td>iet2</td><td></td><td></td><td></td><td></td></na<>	me>S	iet2				
	2002					
	2002	_				
	2002	-				
	2002 2002					
	2002					
	2002					
	2002					
	2002					
GEN	2003	0				-
•						

5 Click Import.

The labware labeled with west-side barcodes listed in the series will be used to create a group and will appear in the **Plates currently in the selected group** list.

6 In the Inventory Management tab, specify a labware type for each labware.

For information about	See
Software inventory	"About labware inventory management" on page 66
Opening the inventory editor	"Opening the inventory editor" on page 71
Using the labware selection list	"Reinventorying the labware inventory" on page 100

Inventory editor views and filters

About this topic

This topic describes how to make the inventory editor easier to work with by showing only the items in the inventory editor that are relevant at the particular time.

Who should read this

Read this topic if your lab automation system has a storage device such as a Liconic StoreX incubator, Heraeus Cytomat PLC, or Agilent Technologies Plate Hub Carousel.

Inventory editor views

There are three ways to view the labware in the inventory editor.

To set the view:

- **1** Open the inventory editor.
- 2 Click to select the Inventory Management tab.
- **3** From the **Select view type** list, select one of the following options:

View	Description
View by plate	Displays every labware in the inventory. This is the most frequently used view.
View by location	Displays both labware and slots.
View unassigned plates	Displays labware that were orphaned during previous runs, or the labware that are in the system but not in a storage device.

Filtering displayed labware

To simplify your view of the database, you can filter the records that are displayed.

To filter the labware records:

- 1 Right-click on a list in any of the tabbed pages of the inventory editor and select **Show all**.
- **2** Right-click on a particular cell and select from the available filtering options.

View	Description
Use last filter	Returns the display of items to that displayed when the last filter was applied
Filter by row	The items that have the same value as the selected item in the row are displayed

Inventory editor views and filters

View	Description
Filter by column	The items that have the same value as the selected item in the column are displayed

The items that have the same value as the selected item in the row are displayed.

device	cassette	slot			
platehub2	1	1			
platehub2	1	2			
platehub2	1	3			
platehub2	1	4			
PlateHub	1	1			
PlateHub	1	2			
PlateHub	1	3			
PlateHub	1	4			
PlateHub	1	5			
PlateHub	1	6			
PlateHub	1	7			
PlateHub	1	8			
PlateHub	2	1			
PlateHub	2	Select	all		
		Unselect all Invert selection Show all Use last filter			
	Filter by row Filter by column		y row		device = PlateHub
			۶.	cassette = 2	

The result is that only those plates in cassette number 2 are listed.

ocation Members					
device	cassette	slot			
PlateHub	2	1			
PlateHub	2	2			

2

To show all labware records:

Right-click on the database list and select Show all.

For information about	See
Software inventory	"About labware inventory management" on page 66
Opening the inventory editor	"Opening the inventory editor" on page 71

Auditing plate volumes in the inventory editor

About this topic

The VWorks software tracks the pipetting tasks performed on the labware during a protocol run, calculating the volume resulting from those tasks, and storing the information in the database. When the labware is displayed in the software, the volume is represented with color.

This topic describes how to use the inventory editor to audit the volume in a labware.

Procedure

To audit the volume of a labware:

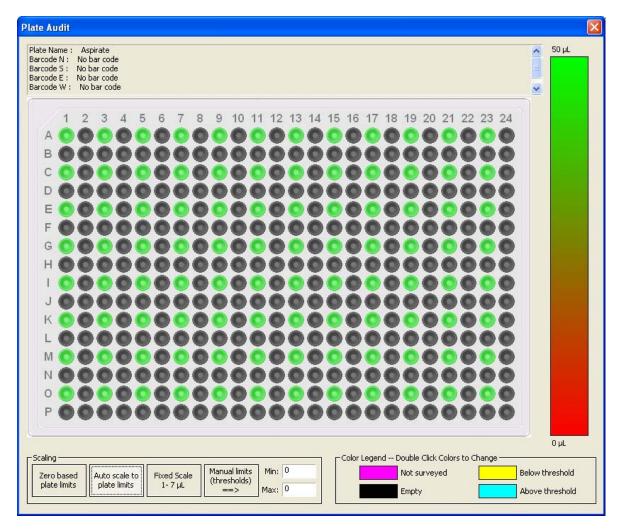
- **1** Open the inventory editor.
- 2 Click the Inventory Management tab.
- **3** From the **Select view type** list, select the view.
- **4** Select the labware you want to audit.

cation Gro	oups Plate Groups	Inventory Management				
nventory \	View					-Inventory Management Functions
elect view	type: View unassi	gned plates (shows all plates that were orphaned by a	borted protocols)		•	
Current	filter					Name:
current	, moor ,					Labware:
levice	eastbc	labware	northbc	plate name	southbc	
ravo1	No bar code	384 Corning 3673 P5 wht sgr well rnd btm	No bar code	Aspirate	No bar co	O Replace any inventoried labware with the labware type selected above
tacke2	No bar code	384 Corning 3673 PS wht sar well rnd btm	No bar code	Aspirate	No bar co	abivale type selected above
tacke2	No bar code	384 Corning 3673 PS wht sqr well rnd btm	No bar code	Aspirate	No bar co	Replace inventoried labware with the
itacke2	No bar code	384 Corning 3673 PS wht sgr well rnd btm	No bar code	Aspirate	No bar cc	 Iabware type selected above ONLY if a
tacke2	No bar code	384 Corning 3673 PS wht sqr well rnd btm	No bar code	Aspirate	No bar cc	labware type is not already assigned
tacke2	No bar code	384 Corning 3673 PS wht sqr well rnd btm	No bar code	Aspirate	No bar cc	
itacke2	No bar code	384 Corning 3673 PS wht sar well rnd btm	No bar code	Aspirate	No bar cc	NOTE: The second option only works if a bar
stacke2	No bar code	384 Corning 3673 PS wht sgr well rnd btm	No bar code	Aspirate	No bar cc	code reader is present on the plate storage device. Otherwise labware names will always
itacke2	No bar code	384 Corning 3673 PS wht sar well rnd btm	No bar code	Aspirate	No bar co	be overwritten.
itacke2	No bar code	384 Corning 3673 P5 wht sar well rnd btm	No bar code	Aspirate	No bar cc	be overwhitten.
itacke2	No bar code	384 Corning 3673 P5 wht sqr well rnd btm	No bar code	Aspirate	No bar cc	
Stacke2	No bar code	384 Corning 3673 PS wht sar well rnd btm	No bar code	Aspirate	No bar co	Reinventory selected locations
Stacke2	No bar code	384 Corning 3673 PS wht sar well rnd btm	No bar code	Aspirate	No bar cc	
itacke2	No bar code	384 Corning 3673 PS wht sqr well rnd btm	No bar code	Aspirate	No bar co	
				unnamed - 1		
		1.0 Greiner 384 ps clear		unnamed - 1		
				unnamed - 1_		
		1.0 Greiner 384 ps clear		unnamed - 1		Delete selected entries from inventory
						Refresh inventory view
						Visualize Plate
						· v
						Select one or more items by CTRL-clicking or
6						SHIFT-clicking.

5 Click **Visualize Plate**. The Audit Plate dialog box opens.

4 Tracking and managing labware in storage

Auditing plate volumes in the inventory editor



The liquid volume is displayed on the right. You can change the limits of this scale in the Scaling area.

Click this button	То
Zero based plate limits	Set the gradient limits from 0 μ L to the highest volume found in the labware.
Auto scale to plate limits	Set the scale limits to the lowest and highest volume found in the labware.
Fixed Scales 1-7 µL	Set the minimum and maximum limits to 1 μ L and 7 μ L, respectively.
Manual limits (thresholds)	Manually set the lower and upper limits. Enter the value (in μ L) in the Min and Max boxes.

The color legend indicates the following conditions.

4 Tracking and managing labware in storage

Auditing plate volumes in the inventory editor

Condition	Description
Not surveyed	The well is not available for measurement.
Empty	The well is empty.
Below threshold	The well is below the lower limit set by the user.
Above threshold	The well is above the upper limit set by the user.

Double-click on a color in the legend to change it.

For information about	See
Software inventory	"About labware inventory management" on page 66
Opening the inventory editor	"Opening the inventory editor" on page 71

Reinventorying the labware inventory

About this topic

This topic describes how to use the reinventory feature of labware inventory.

This feature can be used to check for mismatches by comparing the identities of the labware actually in a storage device to the labware that the inventory database says should be in the storage device.

The reinventory feature can also be used to enter barcode information for labware that have been manually placed into the storage device.

Note: Reinventorying requires that the storage device has a barcode reader.

Who should read this

Read this topic if your lab automation system has a storage device that includes an optional barcode reader.

About performing an inventory

The accuracy of the inventory database can be checked by performing a new inventory of the database. You can perform an inventory of the entire storage device or part of it.

The device's barcode reader checks all selected slots for the presence of a barcode and reads those that it finds. The results are checked against the inventory database.

IMPORTANT For reinventorying to be successful, each labware must have a unique barcode.

Reinventorying logic

If a labware is found in a slot that, according to the inventory database, should be empty, a line is added to the inventory editor for that slot and the labware barcode is recorded. If that barcode is already associated with another slot in the database, the previous association is deleted. In doing this, the system assumes that the labware has been manually moved.

If the inventory has a line for a labware in a particular slot, but the inventory finds no labware in that slot, the line is removed from the inventory. However, the data in the system that is associated with the labware is not deleted. If in the future, a labware with an identical barcode is returned to the system, when the next inventory is performed the data can be reassociated with it.

Procedure

To reinventory the storage device:

- **1** Open the inventory editor.
- 2 Click the **Inventory Management** tab.
- **3** From the Select view type list box, select View by location.

This lists the labware in the inventory database by location.

4 Select the labware that you want to inventory.

You can use SHIFT+click to select a range of listed labware.

- **5** In the **Name** box, type the name of the location group.
- 6 From the Labware box, select the type of labware.

-Inventory Management Functions		
Name:	Location Group	
Labware:	Corning 384 Black TC 3712	

7 Select one of the following options.

Option	Comments
Replace any inventoried labware with the labware selected above	Labware for all selected items are replaced with the labware displayed in the list box. This overwrites labware already assigned.
Replace inventoried labware with the labware selected above ONLY if a labware is not already assigned	Labware for all selected items that do not already have a labware entry are replaced with the indicated labware.

8 Click **Reinventory selected locations**.

A barcode reader reads each labware in the storage device and adds the barcode data to the inventory database.

For information about	See
Inventory groups, plate groups and location groups	"About inventory groups" on page 72
Moving labware in and out of a storage device	• "Loading labware into storage devices" on page 79
	• "Unloading labware out of inventory" on page 85
	• "Moving labware between storage devices" on page 82
Changing the labware associated with labware record in the inventory database	"Reinventorying the labware inventory" on page 100
Inventory editor filters	"Inventory editor views and filters" on page 95

Resolving labware inventory problems

About this topic

This topic describes how to check and test the Windows Open Database connection that is used by the VWorks software inventory management system.

Checking the database settings

The inventory management database uses a Windows Open Database Connectivity (ODBC) interface. If you encounter inventory management problems, you may need to check the database settings.

To check the database settings:

1 In Windows, navigate to Start > Control Panel > Administrative Tools > Data Sources (ODBC).

The ODBC Data Sources Administrator dialog box opens.

💷 ODBC Data Source	Administrator	? 🛛			
User Data Sources:	I File DSN Drivers Tracing Connection	n Pooling About			
Velocity	MySQL ODBC 3.51 Driver	<u>R</u> emove			
An ODBC User data source stores information about how to connect to the indicated data provider. A User data source is only visible to you, and can only be used on the current machine.					

- 2 Click the System DSN tab.
- **3** Click **Configure**.

The Connector/ODBC dialog box opens showing the database settings.

Resolving labware inventory problems

Connector/ODB	C 3.51.12 - Configure Data Sour	ce Name 🔹 💽
Connector	r/ODBC	MySQL
Login Connect O	ptions Advanced	Database
Data Source Name		The database to be current upon
Description Server	MySQL ODBC 3.51 Driver DSN	Connect.
User	root	Default [none]
Password		
Database	velocity11	
<u>I</u> est	Diagnostics >> Dk	<u>Cancel</u> <u>H</u> elp

The **Data Source Name** and **Database Name** fields must both contain velocity11.

Testing the connection

To test the database connection:

- 1 Follow the procedure in "Checking the database settings" on page 102 to open the **Connector/ODBC** dialog box.
- 2 Click Test.

A message appears and confirms a successful connection.

For information about	See	
Inventory groups, plate groups and location groups	"About inventory groups" on page 72	
Moving labware in and out of a storage device	• "Loading labware into storage devices" on page 79	
	• "Unloading labware out of inventory" on page 85	
	• "Moving labware between storage devices" on page 82	
Changing the labware associated with plates in the inventory database	"Reinventorying the labware inventory" on page 100	
Inventory editor filters	"Inventory editor views and filters" on page 95	

4 Tracking and managing labware in storage

Resolving labware inventory problems



VWorks Automation Control Setup Guide

Managing user accounts

This chapter contains the following topics:

- "Planning user accounts and privileges" on page 106
- "Managing user accounts" on page 108
- "Setting up email for error notification" on page 110



Planning user accounts and privileges

The role of user accounts

You must have a user account to log in to VWorks software. Your user account is associated with a user role that determines the privileges you have to perform particular functions. Users are added and assigned privileges by an Administrator.

The effect of privileges

Privileges have the following effects:

- If you do not have the privilege to perform a function associated with a particular menu command, the text of the command is gray.
- If you do not have the privilege to perform the functions accessed from a particular tabbed page, the tab is not visible to you.
- In some cases, if you do not have the privilege to perform an operation, when you attempt the operation you get an error message telling you that your privileges are insufficient.

User roles and privileges

User roles enforce the following privileges:

User role	Has privileges to
Guest	 Log in and log out. Access the Knowledge Base through the Help menu. Use context-sensitive help.
Operator	 Perform guest functions (see above). Operate devices in real-time using diagnostics software. Run protocols.
Technician	 Perform operator functions (see above). Create and save protocols. Manage devices through the device manager. Perform all of the functions listed in the Tools menu (except managing users).
Administrator	Perform technician functions (see above).Manage user accounts.Run a protocol that contains compiler errors.

For information about	See
managing user accounts	"Managing user accounts" on page 108
Setting up email notification	"Setting up email for error notification" on page 110

Managing user accounts

About user accounts and passwords

User accounts and passwords use the following conventions:

- User accounts can be disabled but not deleted.
- User names and passwords are case-sensitive.
- Passwords must contain six or more characters.
- If a user enters an incorrect password five times consecutively, the user is locked out until an administrator resets the account.

Adding a user account

To add a user account:

- **1** Select Tools > User Management.
- 2 In the User Management dialog box, click Create new user and enter a name for the user.
- 3 In the Set Password dialog box, enter the password twice for the new user.
- 4 Enter values in the User information, and User security areas.

Please select the users you wish to edit:	21		
administrator	User information		
Operator	First name:	Joe	
	Last name:	Tuckahoe	
	Email address:	Joe.Tuckahoe@Agilent.com	
	E User security		
	Security level:	Operator	
	Password can expire:	5	
	Password expiration date: Automatically logout after period of inactivity:	10/16/2009	
		V	
	Period of inactivity before automatically logging out (min):	30	
	Miscellaneous		
	Account disabled: Number of failed login attempts:	D	
Create new user		0	
Create copy of user	User information		
Update selected user			

5 Click Update selected user to save changes, and then close the dialog box.

Disabling a user account

You cannot delete a user account, but you can disable it.

To disable an account so that the user cannot log in:

- **1** Select Tools > User Management.
- **2** Select the account.
- **3** Select the **Account disabled** check box.
- 4 Click Update selected user to save changes, and then close the dialog box.

Resetting a user account

If a user mistypes the password five consecutive times, the user is locked out of the account until an administrator resets the account.

To reset an account:

- **1** Select Tools > User Management.
- **2** Select the account.
- **3** Click Reset failed login count.
- 4 Click Update selected user to save changes, and then close the dialog box.

Changing a password

An administrator can reset the password of any account. Technicians can change their own passwords at Log in.

To reset a password:

- **1** Select Tools > User Management.
- **2** Select the account.
- 3 Click Set password, enter the new password twice and click OK.

Set Password	×
New password: Confirm new password:	
ОК	Cancel

4 Click **OK** to the Password Update message.

For information about	See
User accounts	"Planning user accounts and privileges" on page 106
Setting up email notification	"Setting up email for error notification" on page 110

Setting up email for error notification

About email error notification

Email setup in the VWorks software enables you to do the following tasks:

- Automatically be notified by email or pager when errors occur during a protocol run
- Send a bug report to Agilent Technologies

Requirements for email notification

Before you can send an email from VWorks software, the controlling computer must:

- Be connected to a network with internet access
- Have network access to an outgoing mail server that supports one of the authentication methods available through the VWorks software.

Procedure

To set up the outgoing mail server:

- **1** Select Tools > Options.
- 2 In the Email Setup area make sure Enable email notification is selected.
- 3 Enter the name of your SMTP server name (outgoing email server).
- **4** If the server requires a user name and password:
 - **a** Select the **Authentication type** from the list.

IMPORTANT The authentication type is critical. Check with your network administrator to determine the best authentication network for your email server. (NTLM is typically used when Microsoft Exchange is the email server.)

- **b** Enter your **Authenticated user** name and **Password** for the selected authentication type.
- **5** Next to the **Send email from** field, enter the email address you want to use for auto-generated crash reports.
- 6 Select Send email when an error occurs, then next to Addresses to send to when an error occurs, enter the address to which you want the email delivered.

Note: Multiple email addresses must be separated with a semicolon.

7 Click **OK** to save the email setup information and close the dialog box.

	Simulation quality:	Standard	2
	Email Setup		
	nable email notification:	N N N N N N N N N N N N N N N N N N N	
	MTP server name:		
	Authentication type:	LOGIN	
	Authorized user:		
	Password:		_
	end email from:		
	Send email when an error occurs:		
A	Addresses to send to when an error occurs:		1
	ail Setup		

For information about	See
Using user accounts	"Planning user accounts and privileges" on page 106
Managing user accounts	"Managing user accounts" on page 108

5 Managing user accounts

Setting up email for error notification



VWorks Automation Control Setup Guide

6 Troubleshooting problems

This chapter contains the following topics:

- "About troubleshooting guidelines" on page 114
- "Reporting problems" on page 114



About troubleshooting guidelines

For problems that you encounter after installing the software, you try to locate a solution using the guidelines in one of the following documents:

- VWorks Automation Control User Guide
- Applicable user guide for the device

If you are unable to resolve the problem, see "Reporting problems" on page 114.

Reporting problems

Contacting Automation Solutions Technical Support

If you find a problem with the VWorks software, contact Automation Solutions Technical Support at one of the following:

Europe

Phone: +44 (0)1763853638

email: euroservice.automation@agilent.com

US and rest of world

Phone: 1.800.979.4811 (US only) or +1.408.345.8011

email: service.automation@agilent.com

Note: You can also send a software bug report from within the VWorks software.

Reporting hardware problems

When contacting Agilent Technologies, make sure you have the serial number of the device ready. See the device user guide for the location of the label.

Reporting software problems

When you contact Automation Solutions Technical Support, make sure you provide the following:

- Short description of the problem
- Software version number
- Error message text (or screen capture of the error message dialog box)
- Screen capture of the About VWorks software dialog box.
- Relevant software files

To find the VWorks software version number:

In the VWorks software, select **Help > About VWorks**.

To find the Diagnostics software version number:

- **1** Open **Diagnostics**.
- 2 Read the version number on the title bar of the diagnostics window.

To send compressed protocol and associated files in VZP format:

In the VWorks software, select $\ensuremath{\textit{File}}\xspace > \ensuremath{\textit{Export}}\xspace$ to export and compress the following files:

- Protocol file
- Device file (includes the device profile and teachpoint file)
- Labware definitions
- Liquid classes
- Pipette techniques
- Hit-picking files
- Plate map files
- Barcode files
- Error library
- Log files

Reporting user guide problems

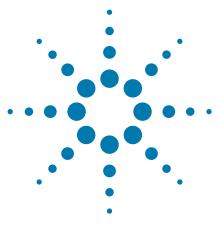
If you find a problem with this user guide or have suggestions for improvement, send your comments using one of the following methods:

- Click the feedback button (\mathbf{N}) in the online help.
- Send an email to documentation.automation@agilent.com.

For information about	See
Troubleshooting problems with the VWorks software	VWorks Automation Control User Guide
Troubleshooting problems with a device controlled by the VWorks software	Applicable user guide for the device

6 Troubleshooting problems

Reporting problems



VWorks Automation Control Setup Guide

7 VWorks ActiveX control

This chapter contains the following topics:

- "About the VWorks ActiveX control" on page 118
- "Methods" on page 120
- "Events" on page 132
- "Enumerated types" on page 136



About the VWorks ActiveX control

What is the VWorks ActiveX control

The VWorks ActiveX control is the software component that allows the VWorks software to interact with a third-party lab automation system.

How the VWorks ActiveX control is used

In an Agilent Technologies automation system, the VWorks software runs in standalone mode, and the ActiveX control is not used. The operator uses the VWorks software, which is already configured to control the devices in the system. However, some integrations, such as those with LIMS, require that a third-party application control the VWorks software. The VWorks ActiveX control enables third-party applications to interface with the VWorks software. Through the ActiveX control, the third-party application can create an instance of the VWorks software, schedule protocol runs, and display various VWorks dialog boxes.

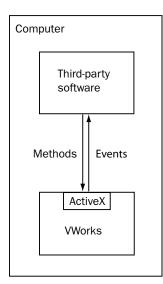
Each ActiveX control consists of a collection of the following:

- Methods. Functions that can be called to invoke individual operations
- *Properties.* Variables that are used in methods (for example, speed = fast)
- *Events*. Notifications that methods have completed or resulted in errors

To ensure proper integration, you must know the available methods and properties for the ActiveX control.

The following diagram illustrates the use of the VWorks ActiveX control in a lab automation system environment. Actions you perform are conducted through ActiveX methods. System responses are relayed back through ActiveX events.

Note: Although the VWorks ActiveX control generates events, the third-party application must implement handlers for them.



Integrating the VWorks ActiveX control

When integrating the VWorks ActiveX control in a third-party lab software:

- **1** Install the VWorks ActiveX control. To install the VWorks ActiveX control:
 - **a** Insert the VWorks software CD into the controlling computer CD-ROM drive.
 - **b** In the CD folder, double-click VWorks Installer.exe.
 - **c** Follow the directions in the installation wizard window.
- **2** Open the Command Prompt window and type VWorks/register to register the application program interface.
- **3** Refer to the description of the Methods and Properties in this section.

For information about	See
VWorks ActiveX methods	"Methods" on page 120
VWorks ActiveX events	"Events" on page 132
VWorks ActiveX enumerated types	"Enumerated types" on page 136

Methods

AbortProtocol

Description

Aborts the protocol run that is in progress.

Parameters

None

Returns		
Name	Туре	Description
returnCode	V11ReturnCode	See"Enumerated types" on page 136.

Visual C++ example

VWorks4Lib.V11ReturnCode retCode;

retCode = oVWorks4COM.AbortProtocol();

Visual Basic .NET example

Dim retCode as VWorks4Lib.V11ReturnCode
retCode = oVWorks4COM.AbortProtocol()

CloseProtocol

Description

Closes the specified protocol file.

Parameters

Name	Туре	Description
protocol	BSTR	The protocol file path.

Returns

Name	Туре	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.
		<i>Note:</i> returnCode is RETURN_SUCCESS if the file closed successfully.

Visual C++ example

VWorks4Lib.V11ReturnCode retCode;

retCode = oVWorksCOM.CloseProtocol("myprotocol.pro");

Visual Basic .NET example

Dim vwRetCode As VWorks4Lib.V11ReturnCode
vwRetCode = oVWorksCOM.CloseProtocol("myprotocol.pro")

CompileProtocol

Description

Compiles the protocol and is used with the LogMessage event.

Parameters

Name	Туре	Description
protocol	BSTR	The protocol file path.
errorCount	*LONG	The number of errors found.
warningCount	*LONG	The number of warnings found.

Returns

Name	Туре	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

VWorks4Lib.V11ReturnCode retCode;

LONG errCount, wrnCount;

retCode = oVWorks4COM.CompileProtocol ("c:\\myprotocol.pro", &errCount, &wrnCount);

Visual Basic .NET example

Dim retCode as VWorks4Lib.V11ReturnCode

Dim errCount, wrnCount as Long

retCode = oVWorks4COM.CompileProtocol ("c:\myprotocol.pro", errCount, wrnCount)

EnumerateUsers

Description

Returns the list of users with VWorks accounts.

Parameters

None.

Returns

notanio		
Name	Туре	Description
user	*VARIANT	The user name.
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual Basic .NET example

Dim oEnumerateUsers As Object = Nothing Dim retCode As VWorks4Lib.V11ReturnCode Dim sUsers As String = ""

retCode = oVWorksCOM.EnumerateUsers(oEnumerateUsers)

```
If Not (oEnumerateUsers Is Nothing) Then
Dim i As Integer
For i = 0 To oEnumerateUsers.GetLength(0) - 1
sUsers = sUsers & oEnumerateUsers(i) & " , "
Next
End If
```

GetSimulationMode

Description

Gets the simulation mode state.

Parameters

None.

Returns

Name	Туре	Description
mode	VARIANT_BOOL	 The value that indicates the simulation state: True = The simulation mode is on. False = The simulation mode is off.

Visual C++ example

VARIANT_BOOL bSimMode; bSimMode= oVWorksCOM.GetSimulationMode();

Visual Basic .NET example

Dim bSimMode as Boolean
bSimMode= oVWorksCOM.GetSimulationMode()

GetTipStates

Description

Gets the state of the tipboxes in a protocol for automated tip tracking.

Parameters

Name	Туре	Description
protocol	BSTR	The protocol file path.

Returns

Name	Туре	Description
TipStateXML	BSTR	The current status of the tipboxes.
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual Basic .NET example

Dim TipStateXML As String = ""
Dim retCode As VWorks4Lib.V11ReturnCode
retCode = oVWorksCOM.GetTipStates("c:\myprotocol.pro",
TipStateXML)

LoadProtocol

Description

Loads the protocol for a run.

Parameters

Name	Туре	Description
protocol	BSTR	The protocol file path.

Returns

Name	Туре	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

VWorks4Lib.V11ReturnCode retCode;

retCode=oVWorks4COM.CompileProtocol("c:\\myprotocol.pro");

Visual Basic .NET example

```
Dim retCode as VWorks4Lib.V11ReturnCode
retCode=oVWorks4COM.CompileProtocol ("c:\myprotocol.pro")
```

LoadRunsetFile

Description

Loads the runset file.

Parameters

Name	Туре	Description
runset	BSTR	The runset file path.

Returns

Name	Туре	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

VWorks4Lib.V11ReturnCode retCode; retCode=oVWorks4COM.LoadRunsetFile ("c:\\myrunset.rst");

Visual Basic .NET example

Dim retCode as VWorks4Lib.V11ReturnCode
retCode=oVWorks4COM.LoadRunsetFile ("c:\myrunset.rst")

Login

Description

Logs into VWorks software using the provided user name and password.

Parameters

Name	Туре	Description
userName	BSTR	The user name.
password	BSTR	The password.

Returns

Name	Туре	Description
loginResult	V11LoginResult	See "Enumerated types" on page 136.

Visual C++ example

VWorks4Lib.V11LoginResult retCode;

loginResult= oVWorksCOM.Login("user1", "mypassword!");

Visual Basic .NET example

Dim loginResult as VWorks4Lib.V11LoginResult

loginResult= oVWorksCOM.Login("user1", "mypassword!")

Logout

Description

Logs out the current user session.

Parameters

None.

Returns

Name	Туре	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

VWorks4Lib.V11ReturnCode retCode; retCode = oVWorksCOM.Logout();

Visual Basic .NET example

Dim retCode as VWorks4Lib.V11ReturnCode
retCode = oVWorksCOM.Logout()

PauseProtocol

Description

Pauses the protocol run that is in progress. The tasks that are in progress will be finished. No new tasks will be started.

Parameters

None.

Returns

Name	Туре	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

VWorks4Lib.V11ReturnCode retCode;

retCode = oVWorksCOM.PauseProtocol();

Visual Basic .NET example

Dim retCode as VWorks4Lib.V11ReturnCode
retCode = oVWorksCOM.PauseProtocol()

ReinitializeDevices

Description

Reinitializes devices.

Parameters

None

Returns

Name	Туре	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

VWorks4Lib.V11ReturnCode retCode; retCode=oVWorks4COM.ReinitializeDevices ();

Visual Basic .NET example

Dim retCode as VWorks4Lib.V11ReturnCode
retCode=oVWorks4COM. ReinitializeDevices ()

ResumeProtocol

Description

Resumes the protocol run.

Parameters

None.

Returns

Name	Туре	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

VWorks4Lib.V11ReturnCode retCode; retCode = oVWorksCOM.ResumeProtocol ();

reccode = ovworkscom.Resumeriococor

Visual Basic .NET example

Dim retCode as VWorks4Lib.V11ReturnCode
retCode = oVWorksCOM.ResumeProtocol ()

RunProtocol

Description

Starts the protocol run.

Parameters

Name	Туре	Description
protocol	BSTR	The protocol file path.
runCount	LONG	The number of times to run the protocol.

Returns

Name	Туре	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

VWorks4Lib.V11ReturnCode retCode; retCode=oVWorks4COM.RunProtocol ("c:\\myprotocol.pro",2);

Visual Basic .NET example

Dim retCode as VWorks4Lib.V11ReturnCode
retCode=oVWorks4COM.RunProtocol ("c:\myprotocol.pro",2)

SetSimulationMode

Description

Sets the simulation mode.

Parameters

Name	Туре	Description
mode	VARIANT_BOOL	 The value that sets the simulation state: True = Turns on the simulation mode. False = Turns off the simulation mode.

Returns

netuins		
Name	Туре	Description
returnCode V11ReturnCo	V11ReturnCode	See "Enumerated types" on page 136.
		<i>Note:</i> returnCode is always RETURN_SUCCESS.

Visual C++ example

oVWorksCOM.SetSimulationMode(VARIANT_TRUE); oVWorksCOM.SetSimulationMode(VARIANT_FALSE);

Visual Basic .NET example

oVWorksCOM.SetSimulationMode(True) oVWorksCOM.SetSimulationMode(False)

ShowDiagsDialog

Description

Displays the device diagnostics dialog box.

Parameters

None

Returns

Name	Туре	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

VWorks4Lib.V11ReturnCode retCode; retCode=oVWorks4COM.ShowDiagsDialog ();

Visual Basic .NET example

Dim retCode as VWorks4Lib.V11ReturnCode
retCode=oVWorks4COM. ShowDiaqsDialoq ()

ShowLoginDialog

Description

Displays the User Authentication (or login) dialog box.

Parameters

None

Returns

Name	Туре	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

VWorks4Lib.V11ReturnCode retCode;

retCode=oVWorks4COM.ShowLoginDialog ();

Visual Basic .NET example

Dim retCode as VWorks4Lib.V11ReturnCode
retCode=oVWorks4COM. ShowLoginDialog ()

ShowManageUserDialog

Description

Displays the User Management dialog box.

Parameters

None

Returns

Name	Туре	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

VWorks4Lib.V11ReturnCode retCode; retCode=oVWorks4COM.ShowManageUserDialog ();

Visual Basic .NET example

Dim retCode as VWorks4Lib.V11ReturnCode
retCode=oVWorks4COM. ShowManageUserDialog ()

ShowOptionsDialog

Description

Displays the Options dialog box.

Parameters

None

Returns		
Name	Туре	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

VWorks4Lib.V11ReturnCode retCode;

retCode=oVWorks4COM.ShowOptionsDialog ();

Visual Basic .NET example

```
Dim retCode as VWorks4Lib.V11ReturnCode
retCode=oVWorks4COM. ShowOptionsDialog ()
```

ShowPlateGroupEditorDialog

Description

Displays the Plate Group Editor dialog box.

Parameters

None

Returns

Name	Туре	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

VWorks4Lib.V11ReturnCode retCode; retCode=oVWorks4COM.ShowPlateGroupEditorDialog ();

Visual Basic .NET example

Dim retCode as VWorks4Lib.V11ReturnCode
retCode=oVWorks4COM. ShowPlateGroupEditorDialog ()

ShowTipStateEditor

Description

Displays the Tip State Editor dialog box.

Parameters

Name	Туре	Description
Protocol	BSTR	The protocol file path.

Returns

Name	Туре	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

VWorks4Lib.V11ReturnCode retCode;

retCode=oVWorks4COM.ShowTipStateEditor
("c:\\myprotocol.pro");

Visual Basic .NET example

Dim retCode as VWorks4Lib.V11ReturnCode
retCode=oVWorks4COM. ShowTipStateEditor
("c:\myprotocol.pro")

ShowVWorks

Description

Displays or hides the VWorks software window.

Parameters

Name	Туре	Description
showOrHide	VARIANT_BOOL	 The value that displays or hides the window: TRUE = Display the window. FALSE = Hide the window.

Returns

Name	Туре	Description
returnCode	V11ReturnCode	See "Enumerated types" on page 136.

Visual C++ example

VWorks4Lib.V11ReturnCode retCode; retCode=oVWorks4COM.ShowVWorks (VARIANT_TRUE);

Visual Basic .NET example

Dim retCode as VWorks4Lib.V11ReturnCode
retCode=oVWorks4COM. ShowVWorks (True)

For information about	See
VWorks ActiveX control	"About the VWorks ActiveX control" on page 118
VWorks ActiveX events	"Events" on page 132
VWorks ActiveX enumerated types	"Enumerated types" on page 136

Events

LogMessage

Description

The LogMessage event occurs every time a message is posted to the log.

Parameters

Name	Туре	Description
session	LONG	The session ID.
logClass	LONG	The type of log event: Error, Warning, or Event.
timeStamp	BSTR	The time at which the error occurred.
device	BSTR	The device name. An empty string is permitted.
location	BSTR	The location. An empty string is permitted.
process	BSTR	The process plate name. An empty string is permitted.
task	BSTR	The task name. An empty string is permitted.
fileName	BSTR	The protocol file or device file name. An empty string is permitted.
message	BSTR	The the error message text.

Returns

None.

MessageBoxAction

Description

The MessageBoxAction occurs when a user response is required.

Parameters

Name	Туре	Description
caption	BSTR	The title of the message.
message	BSTR	The message body.
session	LONG	The session ID.
type	LONG	The type of message:
		$0 = MB_OK$
		1 = MB_OKCANCEL
		2 = MB_ABORTRETRYIGNORE
		3 = MB YESNOCANCEL
		$4 = MB_{YESNO}$
		5 = MB_RETRYCANCEL

Returns

Name	Туре	Description
actionToTake	LONG*	The value that indicates the action to take:
		1 = OK
		2 = CANCEL
		3 = ABORT
		4 = RETRY
		5 = IGNORE
		6 = YES
		7 = NO

ProtocolComplete

Description

The $\ensuremath{\mathsf{ProtocolComplete}}$ event occurs after startup, cleanup, and main protocols are finished.

Paramters		
Name	Туре	Description
session	LONG	The session ID.
protocol	BSTR	The protocol file path.
protocol_type	BSTR	The type of protocol: Startup, Main, or Cleanup.

Returns

None.

ProtocolAborted

Description

The ProtocolAborted event occurs when the operator or automation client aborts the protocol run.

Parameters

Name	Туре	Description
session	LONG	The session ID.
protocol	BSTR	The protocol file path.
protocol_type	BSTR	The type of protocol: Startup, Main, or Cleanup.

Returns

None.

RecoverableError

Description

The RecoverableError event occurs whenever an error is displayed and expects the operator to abort, retry, or ignore the error.

Parameters

Name	Туре	Description
session	LONG	The session ID.
device	BSTR	The device name. An empty string is permitted.
location	BSTR	The location. An empty string is permitted.
description	BSTR	The description of the error.

Returns

Name	Туре	Description
actionToTake	*LONG	The value that indicates the action to take:
		• 0 = Abort
		• 1 = Retry
		• 2 = Ignore

Name	Туре	Description
vworksHandlesError	*VARIANT_BOOL	 Value values are: TRUE = Allows the VWorks software to handle the error. the VWorks software will not display the error message. FALSE = Prevents the VWorks software from handling the error.

UnrecoverableError

Description

The UnrecoverableError event occurs when an error is displayed and does not expect the operator to respond with a decision.

Parameters

Name	Туре	Description
session	LONG	The session ID.
description	BSTR	The description of the error.

Returns

None.

UserMessage

Description

The UserMessage event occurs when a User Message task occurs.

Parameters		
Name	Туре	Description
session	LONG	User message tasks can — prompt user for data entry.
caption	BSTR	— prompt user for data entry.
message	BSTR	
wantsData	VARIANT_BOOL	_

Returns

Name	Туре	Description
userData	*BSTR	Allows user to enter data if wantsData = True.

Related information

For information about	See
VWorks ActiveX control	"About the VWorks ActiveX control" on page 118
VWorks ActiveX methods	"Methods" on page 120
VWorks ActiveX enumerated types	"Enumerated types" on page 136

Enumerated types

V11ReturnCode

Description

Indicates the method call status.

Constants		
Name	Value	Description
RETURN_SUCCESS	0	The method was called successfully.
RETURN_BAD_ARGS	1	The method contains bad arguments.
RETURN_FAIL	2	The method call failed.

V11LoginResult

Description

Indicates the login status.

Constants

Name	Value	Description
LOGIN_SUCCESS	0	The login was successful.
LOGIN_FAIL	1	The login failed.
LOGIN_DISABLED	2	The login was disabled.
LOGIN_EXPIRED	3	The login period passed.
LOGIN_TOO_MANY_FAILED _ATTEMPTS	4	Too many login attempts were made and failed.

Name	Value	Description
LOGIN_NOT_ENOUGH_AUT HORIZATION	5	Higher access priveleges are required to perform the requested action.

Related information

For information about	See
VWorks ActiveX control	"About the VWorks ActiveX control" on page 118
VWorks ActiveX methods	"Methods" on page 120
VWorks ActiveX events	"Events" on page 132

7 VWorks ActiveX control

Enumerated types



VWorks Automation Control User Guide

Setting up a MySQL database

This chapter contains the following topics:

- "Workflow for setting up a MySQL database" on page 140
- "Installing and configuring a MySQL database" on page 141
- "Setting up a MySQL ODBC in Windows" on page 145



Workflow for setting up a MySQL database

About this topic

The VWorks labware inventory management feature requires an SQL database. An SQL database may already be set up if the computer was configured by Agilent Technologies to control a device that uses a database, for example, a Plate Hub Carousel.

If you have a VWorks simulation license and your computer was not configured by Agilent Technologies, you must install and configure the SQL database before you can use the inventory management feature.

Workflow

The following procedures are for the Microsoft Windows XP operating system.

Step	For this task	See
1	Download the installation files, install and configure a MySQL database.	"Installing and configuring a MySQL database" on page 141
2	Set up a MySQL ODBC in Windows	"Setting up a MySQL ODBC in Windows" on page 145
3	Connect to the VWorks inventory management database	"Connecting to the inventory management database" on page 69

Installing and configuring a MySQL database

About this topic

Read this topic if you have a VWorks simulation license and want to use the VWorks labware inventory management feature.

This topic describes how to install and configure the MySQL database, which is required for the inventory management feature.

Note: The database may be configured already if the computer was provided by Agilent Technologies and your system contains a device that requires a database, such as a Plate Hub.

Obtaining the installation software

Download the installation files for the generally available (GA) releases of the following software for the Windows platform:

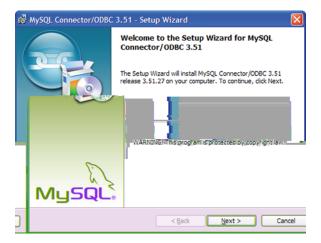
- MySQL Connector/ODBC 3.51 (Windows msi installer) http://dev.mysql.com/downloads/connector/odbc/3.51.html
- MySQL Server 5.x (Windows Essentials) http://dev.mysql.com/downloads/mysql/5.0.html

Installing the software

The following procedures are for the Microsoft Windows XP operating system.

To install MySQL Connector/ODBC:

1 Double-click the installation file (*.msi). The MySQL Connector/ODBC Setup Wizard appears.



2 Click Next to start the wizard. Select the Typical setup, click Next, and follow the instructions that appear on the screen.

To install MySQL Server:

1 Double-click the Windows Essentials MySQL installation file (*.msi). The MySQL Server Setup Wizard appears.

🖟 MySQL Server 5.0 - Setup Wizard		
	Welcome to the Setup Wizard for MySQL Server 5.0	
	The Setup Wizard will install MySQL Server 5.0 release 5.0.81 on your computer. To continue, click Next.	
MySQL	WARNING: This program is protected by copyright law.	
	< Back Next > Cancel	

- **2** Click **Next** to start the wizard. Select the **Typical** setup, click **Next**, and follow the instructions that appear on the screen.
- **3** On the Wizard Completed page, select the **Configure the MySQL Server now** check box, and then click **Finish**. The MySQL Server Configuration wizard appears.

MySQL Server Instance Configuration Wizard		
	Welcome to the MySQL Server Instance Configuration Wizard 1.0.15.0 The Configuration Wizard will allow you to configure the MySQL Server 5.0 server instance. To Continue, click Next.	
MySQL.	Next > Cancel	

- 4 To start the configuration wizard, click Next.
- 5 Choose the Standard Configuration, and then click Next.
- **6** When the Windows options page appears, select the following check boxes, and then click **Next**:
 - a Install as Windows Service
 - b Launch the MySQL Server automatically
 - c Include Bin Directory in Windows PATH

MySQL Server Inst	ance Configuration Wizard	
MySQL Server Instance Configuration Configure the MySQL Server 5.0 server instance.		
Please set the Win		
Con on	Windows.	
🔽 Include Bin D		
MySQL, SE	neck this option to include the directory containing the rver / client executables in the Windows PATH variable they can be called from the command line.	
	< Back Next > Cancel	

- 7 On the Security options page, do the following, and then press Next:
 - a Select Modify Security Settings
 - **b** Enter the password as velocity11
 - **c** Select Enable root access from remote machines
 - d Select Create An Anonymous Account



- **8** On the Ready to execute page, click **Execute** to start the configuration file creation.
- **9** When the configuration file has been successfully created and the security settings have been applied, click **Finish**.



Related information

For information about	See
Setting up a MySQL database	"Workflow for setting up a MySQL database" on page 140
How to set up a MySQL ODBC connection in Windows	"Setting up a MySQL ODBC in Windows" on page 145
VWorks labware inventory management feature	"About labware inventory management" on page 66
How to connect to the VWorks inventory management database	"Connecting to the inventory management database" on page 69

Setting up a MySQL ODBC in Windows

About this topic

Read this topic if you have a VWorks simulation license and want to use the VWorks labware inventory management feature. If your computer was not configured by Agilent Technologies, you must install and configure the SQL database before you can use the inventory management feature.

This topic describes how to set up the MySQL ODBC in Microsoft Windows.

Before you begin

Make sure you have the following file: \Program Files\Agilent Technologies\VWorks\Schema\velocity11_mysql5.sql

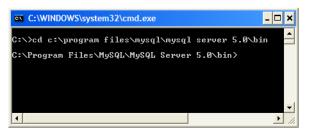
Procedure

To set up a MySQL ODBC connection:

- 1 Copy the velocity11_mysql5.sql file to the following folder on the computer: \Program Files\MySQL\MySQL Server 5.0\bin\
- 2 From the Windows desktop, open a command window as follows:
 - a Choose Start > Run.
 - **b** In the Run dialog box, type cmd, and click **OK**.
- **3** In the command window:
 - **a** Type the following and press ENTER:

```
cd c:\program files\mysql\mysql server 5.0\bin
```

This command changes the directory to the MySQL Server 5.0 program directory.



- **b** To copy the provided velocity11 database file into the MySQL Server program, type the following and press ENTER:
 - mysql < velocity11_mysql5.sql
- **c** Close the command window.
- **4** To open the ODBC Data Source Administrator:
 - a Choose Start > Control Panel, and then double-click Administrative Tools.
 - **b** Double-click **Data Sources (ODBC)**. The ODBC Data Source Administrator window appears.

IMPORTANT Remove any previously defined MySQL ODBC Driver Sources before continuing.

5 Click the System DSN tab and press Add to create a new data source.

🐼 ODBC Data Source Administrator	? 🛛
User DSN System DSN File DSN Drivers Tracing Connect	ion Pooling About
System Data Sources:	
Name Driver	A <u>d</u> d
	<u>R</u> emove
	Configure
An ODBC System data source stores information about the indicated data provider. A System data source is on this machine, including NT services.	
OK Cancel	Help

6 In the Create New Data Source window, select **MySQL ODBC 3.51 Driver**, and then **Finish**.

Name Microsoft ODBC for Oracle Microsoft Paradox Driver ("db) Microsoft Paradox-Treiber ("db) Microsoft Text Driver ("bt; ".csv) Microsoft Visual FoxPro Driver Microsoft Visual FoxPro Treiber MySOL ODBC 3.51 Driver SQL Server	
< Back Finish	Cancel

- 7 In the Connector/ODBC 3.51.21-Add Data Source Name window, click the Login tab, and enter the following to define your data source:
 - Data Source Name: velocity11
 - **Description**: v11 database (optional)
 - Server: localhost
 - User: root
 - Password: velocity11
 - Database: velocity11

Connector/ODB	C 3.51.21 - Add Data Source N	lame 🔹 💽
C	onnector/ODBC	MysqL
Login Connect Op	ations Advanced	
Data Source Name	velocity11	Database
Description	v11 database	The database to be current upon connect.
Server	localhost	OptionalYes
User	root	Default [none]
Password	•••••	
Database	velocity11	
	Test Diagnostics >>	Qk <u>C</u> ancel <u>H</u> elp

- ${\bf 8}$ Click the Advanced tab, and on the Flags 1 page, select the following:
 - Return Matching Rows

Connector/ODBC 3.51.21 - Add Data Source Na	me ?X
Connector/ODBC	
Login Connect Optons Advanced Flags 1 Flags 2 Flags 3 Debug Return Matching Rows Allow Big Results Use Compressed Protocol Change ESIDN Columns To Int Safe Ø Enable Auto Reconnect Enable auto_Increment NULL search	This is the graphical configuration for Connector/ODBC.
Test Dagnostics >>	Qk Qancel Help

Enable Auto Reconnect

- **9** To verify that the data source file is properly configured, press **Test**. A message appears telling you that the connection was successful. Click **OK**.
- 10 On the System DSN tab, verify that velocity11 appears in the System Data Source box, and then click OK.

Name velocity1	Driver MySQL ODBC 3.51 Driver	Add
		Remove
	An ODBC System data source stores information the indicated data provider. A System data sou	

Related information

For information about	See
The steps to follow for setting up a MySQL database	"Workflow for setting up a MySQL database" on page 140
How to install and configure MySQL	"Installing and configuring a MySQL database" on page 141
VWorks labware inventory management feature	"About labware inventory management" on page 66
How to connect to the VWorks inventory management database	"Connecting to the inventory management database" on page 69

Glossary

- **clamps (BenchCel)** The components inside of the stacker head that close and open the stacker grippers during the loading, unloading, downstacking, and upstacking processes.
- **controlling computer** The lab automation system computer that controls the devices in the system.

cycle See seal cycle.

- **deadlock** An error that occurs when the number of locations available in the system is less than the number of microplates in the system. Because the microplates cannot move to the expected locations, the protocol pauses.
- **device** An item on your lab automation system that can have an entry in the device file. 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.
- **downstack** The process in which a microplate is moved out of the stack.
- **error handler** The set of conditions that define a specific recovery response to an error.
- **home position** The position where all robot axes are at the 0 position (the robot head is approximately at the center of the *x*-axis and at 0 of the *z*-axis, and the robot arms are perpendicular to the *x*-axis).
- **homing** The process in which the robot is sent to the factory-defined home position for each axis of motion.
- **hot plate (PlateLoc)** A heated metal plate inside the sealing chamber that descends and presses the seal onto the plate.
- **insert** A pad placed under the plate to support the bottom of the wells for uniform sealing.
- **location group** A list of labware that can be moved into or out of particular slots in a storage device.
- **plate group** A list of specific labware that can be moved into or out of a storage device without regard for the slot locations.

- **plate instance** A single labware in a labware group that is represented by the process plate icon.
- **plate stage** The removable metal platform on which you load a plate.
- **plate-stage support** The structure on which you load a plate stage. The plate-stage support extends when the door opens.
- **profile** The Microsoft Windows registry entry that contains the communication settings required for communication between a device and the VWorks software.
- **process** A sequence of tasks that are performed on a particular labware or a group of labware.
- **protocol** A schedule of tasks to be performed by a standalone device, or devices in the lab automation system.
- **regrip station** A location that enables the robot to change its grip orientation (landscape or portrait), or adjust its grip at the specified gripping height. Grip height adjustment might be necessary after a robot picks up a labware higher than the specified gripping height because of physical restrictions at a teachpoint.
- **robot grippers** The components that the robot uses to hold labware.
- **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.
- **safe zone** The boundary within which the robot is allowed to move without colliding with external devices.
- **seal cycle** The process in which a single plate is sealed on the PlateLoc Sealer.
- **seal entry slot** The narrow entry on the back of the PlateLoc Sealer where the seal is inserted into the device.
- **seal-loading card** A rectangular card that is used to facilitate the seal loading process on the PlateLoc Sealer.
- **seal-roll support** The triangular structures at the top of the PlateLoc Sealer where a roll of seal is mounted.

sealing chamber The area inside of the PlateLoc Sealer where the seal is applied to a plate.

shelves (BenchCel) The components inside of the stacker head that provide leveling surfaces for the microplates, thus ensuring accurate robot gripping, during the downstacking process.

stacker grippers The padding at the bottom of the stacker racks that hold microplates when a microplate is loaded, downstacked, or upstacked.

subprocess A sequence of tasks performed as a subroutine within a protocol. Typically the subprocess is performed by a single device type, such as the Bravo device.

task An operation performed on one or more labware.

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 define 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 device teachpoints.

touch screen The interface on the front of the PlateLoc Sealer where sealing parameters are set, the seal cycle can be started or stopped, and the seal cycle can be monitored.

upstack The process in which a microplate is moved back into the stack.

waypoint A set of coordinates that define a location the robot passes through on its way to a teachpoint.

workspace The boundary within which the robot can move without limitations.

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