

Microplate Seal Piercer

User Guide

Original Instructions

Notices

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Letter to our Customers

Dear Customer,

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

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

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

Velocity11 product name changes

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

New contact information

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Preface

This preface contains the following topics:

- “Who this guide is for” on page iv
- “What this guide covers” on page v
- “What is new in this user guide” on page vii
- “Accessing Velocity11 user information” on page viii

Who this guide is for

About this topic This topic describes the target audience of this user guide.

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

Job role	Responsibilities
Lab manager, administrator, or technician	Someone who is responsible for: <ul style="list-style-type: none"><input type="checkbox"/> Solving the more challenging problems that might arise<input type="checkbox"/> Developing training materials and standard operating procedures for operators
Operator	Your organization may choose to create its own procedures for operators including the procedures in this guide.

Related topics

For more information about...	See...
Who should read this guide	"Who this guide is for" on page iv
What's new in this version	"What is new in this user guide" on page vii
How to access different formats of this user guide	"Accessing Velocity11 user information" on page viii

What this guide covers

What is covered This guide covers the description, installation, setup, and operation of the PlatePierce that is used in the following ways:

- As a single device, controlled from the built-in hardware controls
- Integrated with other devices in a Velocity11 lab automation system, controlled from a computer

This guide also provides the ActiveX reference information needed to integrate the PlatePierce in a third-party lab automation system.

What is not covered This guide does not provide instructions for:

- Creating protocols and setting task parameters in the Velocity11 lab automation software
- Operating other devices in Velocity11 lab automation systems
- Operating the PlatePierce integrated into a third-party lab automation system

Firmware version This guide documents PlatePierce firmware version 3.

Software version This guide documents PlatePierce ActiveX (PlatePierce.ocx) version 4.

Related guides The *PlatePierce User Guide* should be used in conjunction with the following user documents:

- Velocity11 lab automation system user guides, such as the *BioCel User Guide*. These user guides provide the system setup requirements and user operation instructions.
- Velocity11 lab automation system software user guides, such as the *VWorks User Guide*. These user guides explain how to create protocols and set task parameters for each device in the system.
- Third-party lab automation system user documents. These documents explain how to set up and use the third-party lab automation system.

Related topics

For more information about...	See...
Reporting problems	“Reporting problems” on page 61
Who should read this guide	“Who this guide is for” on page iv
What’s new in this version	“What is new in this user guide” on page vii
How to access different formats of this user guide	“Accessing Velocity11 user information” on page viii

What is new in this user guide

About this topic This topic lists new information in this revision of the *PlatePierce User Guide*.

New information The following are new or updated in this revision of the user guide:

- CE compliance information
- Safety information
- Product description
- Electrical requirements
- Compressed air requirements
- Pin plate list and description
- Hardware procedures
- Software description and procedures
- Troubleshooting information

Related topics

For more information about...	See...
CE compliance information	“Safety standards” on page 16
Safety labels	“Safety labels” on page 16
PlatePierce description	“Description of the PlatePierce” on page 2
Pin plates	“Pin plate” on page 8
Electrical requirements	“Meeting lab requirements” on page 21
Compressed air requirements	“Meeting lab requirements” on page 21
Lab automation system software	“Lab automation system software” on page 13
Using ActiveX controls	“Integrating the PlatePierce into third-party systems” on page 63
How to operate the PlatePierce	“PlatePierce workflows” on page 14
Troubleshooting information	“Troubleshooting” on page 55

Accessing Velocity11 user information

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

Formats available Velocity11 user information is provided to you as:

- Online help
- A PDF file
- A printed book

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

Where to find the user information

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

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

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

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

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

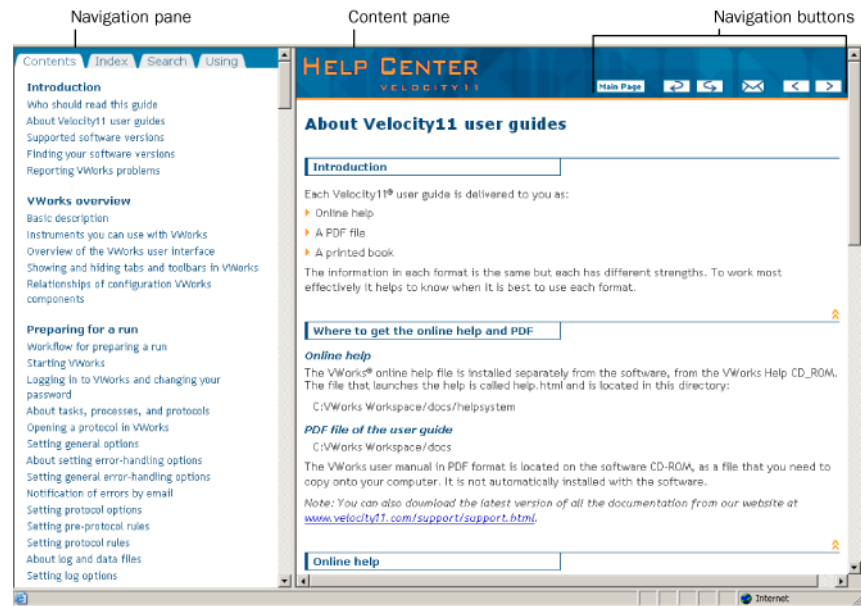
To open the online help:

In the Velocity11 lab automation software, press F1.

Main features

The online help window contains the following:

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



PDF user guide

Computer requirements

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

Printing and searching

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

More information

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

Related topics

For more information about...	See...
Who should read this guide	“Who this guide is for” on page iv
What this guide covers	“What this guide covers” on page v
What’s new in this revision of the user guide	“What is new in this user guide” on page vii

Introduction

1

This chapter contains the following topics:

- “Description of the PlatePierce” on page 2
- “Hardware overview” on page 5
- “Status light” on page 7
- “Pin plate” on page 8
- “Inserts” on page 10
- “Plate compatibility” on page 12
- “Seal compatibility” on page 12
- “Lab automation system software” on page 13
- “PlatePierce workflows” on page 14
- “Safety information” on page 16

Description of the PlatePierce

About this topic

This topic describes the PlatePierce and explains its uses.

Description

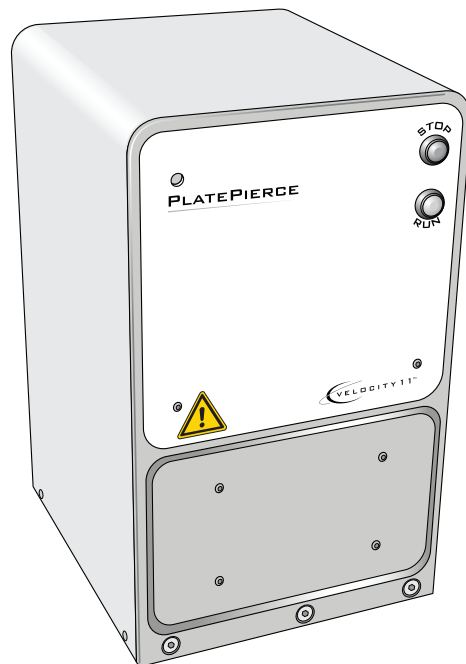
The PlatePierce Seal Piercing Station is a device that pierces sealed microplates (plates) at each well. Plates that will be processed in most automated systems must be pierced to allow pipettes to access the well contents during the automated process.

Components

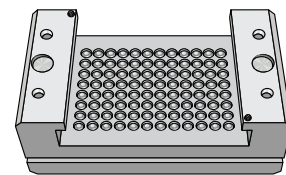
The PlatePierce Seal Piercing Station consists of the following:

- PlatePierce device.* The device you use to pierce sealed plates.
- Pin plate.* The interchangeable component containing the piercing pins. The pin plate is installed inside of the PlatePierce and can be changed to accommodate different plate formats (96 round wells, 384 round wells, or 384 square wells).
- Inserts.* The metal pads loaded under plates to ensure uniform piercing across each plate.
- PlatePierce ActiveX software.* The software that enables the PlatePierce to be integrated into a lab automation system.

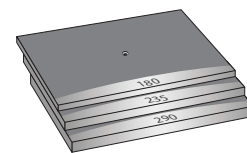
The following diagram shows the PlatePierce components. Note that the appearance of the pin plate can vary by type.



PlatePierce Seal Piercing Station



Pin plate



Inserts



ActiveX software

Features and applications

The PlatePierce has the following features:

- Manual or automated operation
- Interchangeable piercing-pin plates to process 96-well or 384-well plates that have the round- or square-well format
- Pierce specifications as follows:
 - ◆ *96-well plates.* 4.5 mm deep, 4.8 mm in diameter
 - ◆ *384-round-well plates.* 2.1 mm deep, 2.00 mm in diameter
 - ◆ *384-square-well plates.* 2.1 mm deep, 2.7 mm wide
- Automatic plate height detection to maintain consistent pierce depth

Because of the shallow pierce depth, the PlatePierce is ideal for screening applications, where plates contain low-volume fluids. The shallow pierce depth also prevents carry-over contamination and reduces the need for frequent cleaning.

Ways to operate the PlatePierce

You can operate the PlatePierce in the following ways:

- As a standalone device
- In a Velocity11 lab automation system
- In another company's lab automation system

As a standalone device

You can manually operate the PlatePierce using the built-in hardware controls on the front of the device.

In a Velocity11 lab automation system

You can set up the PlatePierce in a Velocity11 lab automation system such as the BioCel or the Element. In the lab automation system, you connect the PlatePierce to a controlling computer, and you operate the integrated device using software supplied with the system. Integrated PlatePierce operation allows you to automate the loading and piercing of multiple plates in one protocol run.

In another company's lab automation system

You can set up the PlatePierce in a third-party lab automation system that has a multi-axis robot. To install the PlatePierce in the system, you must connect the device to the controlling computer. You can operate the integrated PlatePierce using the third-party software. The integrated PlatePierce allows you to automate the loading and piercing of multiple plates in one run.

Note: Communication between the third-party system and the PlatePierce is achieved through the use of ActiveX controls.

Incompatible lab automation systems

The PlatePierce does not extend the plate all the way out of the device. Therefore, lab automation systems, such as the BenchCel, are not compatible with the PlatePierce. Many systems that have articulated robot arms are compatible with the PlatePierce.

Related topics

For more information about...	See...
PlatePierce hardware features	"Hardware overview" on page 5
PlatePierce physical dimensions	"Meeting lab requirements" on page 21
Pin plates	"Pin plate" on page 8
Inserts	"Inserts" on page 10
Plate requirements	"Plate compatibility" on page 12
Requirements for lab automation systems	"Lab automation system software" on page 13
PlatePierce workflows	"PlatePierce workflows" on page 14
How to operate the PlatePierce safely	"Safety information" on page 16

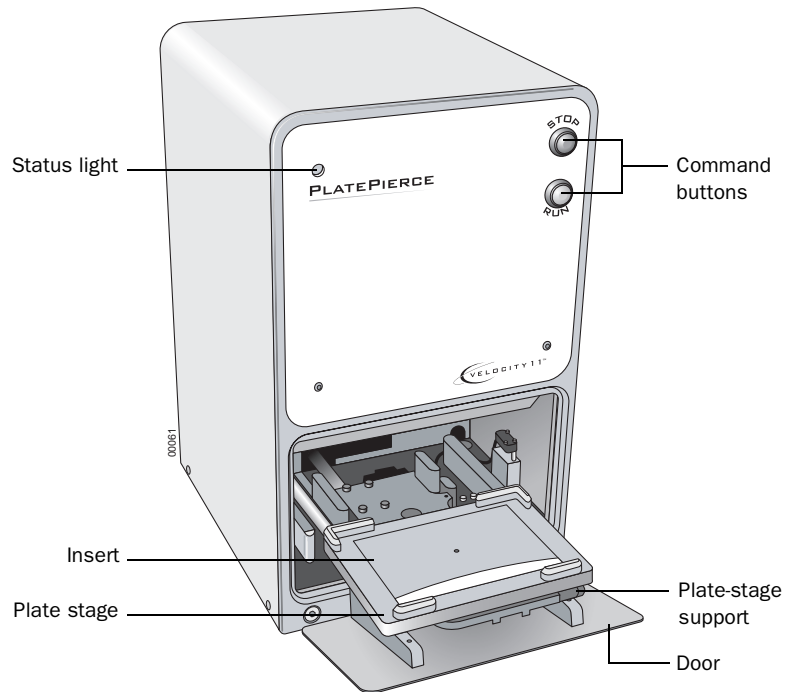
Hardware overview

About this topic

This topic describes the PlatePierce device.

Front features

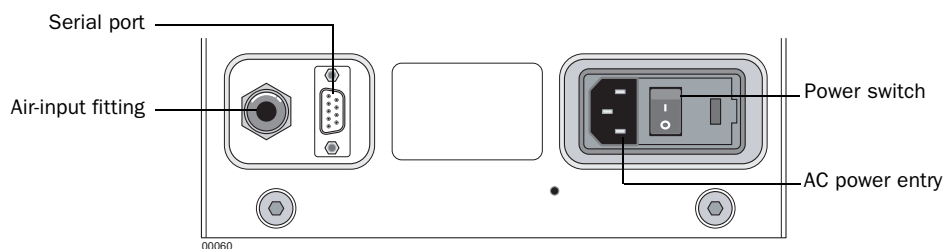
The following diagram shows the front features of the PlatePierce with its door open. Note that the plate stage is extended whenever the door is open.



Feature	Description
Status light	The colored light that shows the status of the PlatePierce.
Command buttons	The controls that allow you to start or stop a piercing process.
Insert	The metal pad that provides support under the plate to assure uniform piercing.
Plate stage	The structure on which the insert and the plate are loaded.
Plate-stage support	The structure on which you load a plate stage. The plate-stage support extends when the door opens.
Door	The structure that prevents you from reaching into the device during the piercing process.

Connection panel

The following diagram shows the features of the connection panel on the back of the PlatePierce.



PlatePierce back view

Feature	Description
Serial port	Connects the serial cable from the controlling computer to the PlatePierce.
Air-input fitting	Connects the air tubing to the PlatePierce.
Power switch	Turns on or off the power to the PlatePierce.
AC power entry	Connects the power cord to the PlatePierce.

Related topics

For more information about...	See...
Installing the PlatePierce	"Unpacking and installing the PlatePierce" on page 19
How to operate the PlatePierce as a standalone device	"Standalone device workflow" on page 14
Setting up the PlatePierce in a lab automation system	<input type="checkbox"/> "Lab automation system software" on page 13 <input type="checkbox"/> "Integrating the PlatePierce into third-party systems" on page 63
How to operate the PlatePierce in a lab automation system	"Lab automation system workflow" on page 15

Status light

About this topic

This topic describes the code for the PlatePierce status light.

Colored light description

The light on the front of the PlatePierce changes color to indicate the status of the instrument. The following table lists the possible colors and the corresponding status.

Color	Status
Red	The piercing process is stopping. The red status light turns on momentarily before the door opens and does not indicate success or error in the piercing process.
Orange	The piercing process is in progress.
Blinking orange	The plate is not positioned correctly on the plate stage. The piercing process is aborting.
Blinking red	Insufficient air pressure is preventing the PlatePierce from piercing the plate seal.
Blinking green	Either: <ul style="list-style-type: none"><input type="checkbox"/> Power is turned on but the RUN button has not been pressed to initialize the PlatePierce.<input type="checkbox"/> Time-out occurred during a piercing process, and the operation could not be completed for some reason.
Solid green	The PlatePierce is ready to run.

Related topics

For more information about...	See...
Installing the PlatePierce	"Unpacking and installing the PlatePierce" on page 19
How to operate the PlatePierce as a standalone device	"Standalone device workflow" on page 14
Setting up the PlatePierce in a lab automation system	<ul style="list-style-type: none"><input type="checkbox"/> "Lab automation system software" on page 13<input type="checkbox"/> "Integrating the PlatePierce into third-party systems" on page 63
How to operate the PlatePierce in a lab automation system	"Lab automation system workflow" on page 15

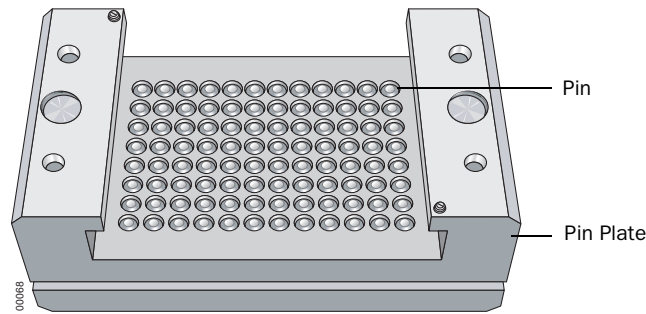
Pin plate

About this topic

This topic describes the pin plate and explains its use in the PlatePierce.

Pin plate description

The pin plate is a component that contains pins for piercing the plate seal. It moves down and up during the piercing process. The following diagram shows a pin plate.



Pin plate types

The following table lists the different types of pin plates you can use. The pin plate you select depends on the number of wells in the plate and the well shape. For the latest list of pin plates, see the Velocity11 website (www.velocity11.com).

Pin plate type	Description
96-pin round (8541.001)	<p>The piercing pins have round shafts. The pierce specifications are:</p> <ul style="list-style-type: none"> <input type="checkbox"/> 4.5 mm deep <input type="checkbox"/> 4.8 mm in diameter <p>The pin plate is suitable for most 96-well plate types.</p>
384-pin round (02349.002)	<p>The piercing pins have round shafts. The pierce specifications are:</p> <ul style="list-style-type: none"> <input type="checkbox"/> 2.1 mm deep <input type="checkbox"/> 2.0 mm in diameter <p>The pin plate is ideal for 384-well plates that have round wells and contain low-volume fluid or single-use storage tubes.</p>
384-pin square (18331.001)	<p>The piercing pins have square shafts. The pierce specifications are:</p> <ul style="list-style-type: none"> <input type="checkbox"/> 2.1 mm deep <input type="checkbox"/> 2.7 mm wide <p>The pin plate is ideal for creating large holes in square, deep-well storage plates and can be used for multiple pierces.</p>

Although the PlatePierce is compatible with all Velocity11 seals, the optimum number of reseal-and-pierce repeats can vary. For example, the recommended number of reseal-and-pierce repeats for the Pierceable Aluminum Seal (part number 6644.001) is five for all pin plate types.

Note also that the number of effective pierces can depend on the plate type, plate material, plate format, diameter of the well, diameter of the hole in the seal, seal type, seal temperature used to seal the plate, and other factors.

Related topics

For more information about...	See...
How to change pin plates	"Changing the pin plate" on page 44
How clean the pin plate	"Cleaning the pin plate" on page 54
Plate compatibility	"Plate compatibility" on page 12
Seal compatibility	"Seal compatibility" on page 12

Inserts

About this topic

This topic describes inserts and their uses in the PlatePierce.

What are inserts

Inserts are pads that support the bottoms of plates for uniform piercing. You use inserts to support plates that tend to bend during the piercing process.

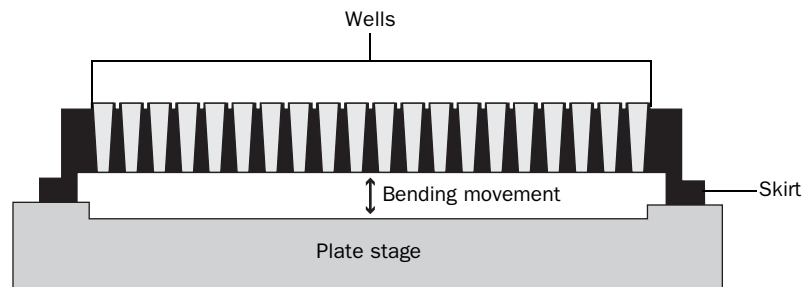
When to use inserts

Causes of non-uniform piercing

During the piercing process, the pin plate descends briefly to pierce the seal on the plate. Under optimum conditions, the piercing is uniform across the plate. However, the following factors can affect piercing results:

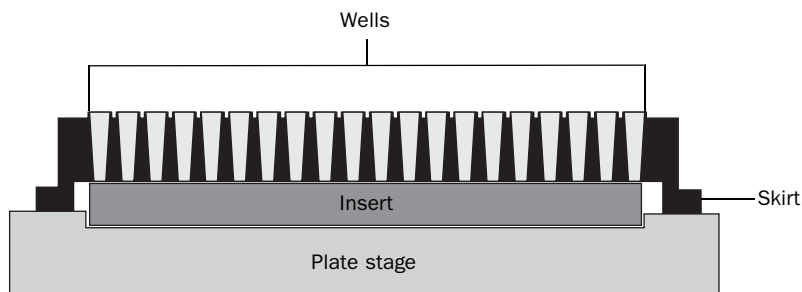
- Because of the material used, some plates tend to bend during the piercing process.
- In some plate designs, the plate skirt sits lower than the plate bottom, causing uneven piercing or plate breakage.

The following diagram shows the side profile of a plate. In this example, the plate skirt extends past the bottom of the wells. Depending on the plate material, such plate designs can cause non-uniform piercing. When the pin plate presses down, the wells at the center of the plate might bend downward, causing the seal over the center area to be unpierced. In addition, the plate can break during the piercing process because most of the piercing pressure is applied to the skirt.



Using inserts to support plates

You should always place an insert under the plate to provide equal support under every well and to ensure equal distribution of pressure across the plate. The following diagram shows an insert supporting the wells for uniform piercing. Notice that the plate skirt is now raised.



Inserts supplied with the PlatePierce

The following table lists the inserts that are supplied with the PlatePierce.

Insert	Description	Thickness	Height above plate stage
180	Metal pad	4.60 mm (0.180 in)	0 mm (0 in)
235	Metal pad	6.00 mm (0.235 in)	1.4 mm (0.055 in)
290	Metal pad	7.37 mm (0.290 in)	2.8 mm (0.11 in)

Insert selection

The type of insert you use depends on the plate design. In general, select the thinnest insert that sufficiently supports the center of the plate and keeps the plate skirt raised above the plate stage. An insert that is too thin can cause a plate to break during the piercing process.

Velocity11 recommends that you perform tests using spare plates to determine the best insert for the plate you are piercing.

Related topics

For more information about...	See...
Loading inserts	"Loading an insert" on page 47
Plate requirements	"Plate compatibility" on page 12

Plate compatibility

About this topic This topic explains the requirements for the plates you can use in the PlatePierce.

Acceptable plates Use only plates that meet the standards established by the Society of Biomolecular Sciences (SBS), including deep-well, PCR, and standard plates in the following formats:

- 96 wells
- 384 wells

For the latest plate standards, go to www.sbsonline.org. You can also contact the labware manufacturer to inquire about SBS-standard plates.

Related topics

For more information about...	See...
Loading plates	“Starting the piercing process” on page 49
Inserts (plate supports)	“Inserts” on page 10
Pin plates	“Pin plate” on page 8

Seal compatibility

About this topic This topic explains the types of seals that can be pierced by the PlatePierce.

Compatible seals The PlatePierce is compatible with Velocity11 pierceable seals, including the following:

- Pierceable Aluminum (6644.001)
- Clear Pierceable Seal (14414.001)
- Clear Pierceable Thin Seal (17318.001)

For the latest list of compatible seals, see the Velocity11 website at www.velocity11.com.

Related topics

For more information about...	See...
Loading plates	“Starting the piercing process” on page 49
Inserts (plate supports)	“Inserts” on page 10
Pin plates	“Pin plate” on page 8

Lab automation system software

About this topic

This topic describes the software you use to set up and control the PlatePierce in a Velocity11 lab automation system. For information about integrating the PlatePierce in a third-party lab automation system, see “Integrating the PlatePierce into third-party systems” on page 63.

Read this topic only if you are using the PlatePierce in a lab automation system.

Lab automation requirements

In a lab automation system, you can use a plate-loading robot to automate the piercing of multiple plates. You use the lab automation system software to set up the communication between the system and the PlatePierce, set up the piercing parameters, and control the automation.

Lab automation system software

Velocity11 provides lab automation platforms, including the BioCel and Element plate-handling systems. You can install the PlatePierce in these systems to automate the multiple-plate piercing process.

You use the Velocity11 lab automation system software, such as VWorks, to control the PlatePierce in the system. The software allows you to:

- Create protocols.* Protocols determine the sequence of tasks you want to automate in a run. For example, you can use a protocol to pierce 10 plates in sequence in one protocol run.
- Set PlatePierce task parameters.* The task parameters specify the piercing device and the piercing pressure for a multiple-plate run.
- Start and stop a run.* You can start and stop the protocol run from the controlling computer.

PlatePierce Diagnostics

PlatePierce Diagnostics is a component of the supplied PlatePierce ActiveX software that enables integration with a lab automation system. Accessed through the Velocity11 lab automation system software, such as VWorks, PlatePierce Diagnostics allows you to:

- Create profiles.* Profiles allow you to set up communication between the PlatePierce and the controlling computer.
 - Manually run the PlatePierce.* This is equivalent to running the device from the command buttons on the front of the PlatePierce. Use the manual adjustments and controls to run a single plate for diagnostic use only.
 - Check the odometer.* The odometer indicates the number of piercings the device has performed. You can refer to this value for preventive maintenance purposes.
-

Related topics

For more information about...	See...
Operating the PlatePierce in a lab automation system	“Lab automation system workflow” on page 15
Creating and managing PlatePierce profiles	“Creating and managing profiles (lab automation systems only)” on page 36
Creating and managing protocols	Velocity11 lab automation software user guide
Setting PlatePierce task parameters	Velocity11 lab automation software user guide
Starting and stopping the protocol run	Velocity11 lab automation software user guide
Using ActiveX control to configure third-party lab automation software to interface with the PlatePierce	“Integrating the PlatePierce into third-party systems” on page 63

PlatePierce workflows

About this topic

This topic presents the workflows for operating the PlatePierce as a standalone device and in a Velocity11 lab automation system.

Standalone device workflow

The following table presents the basic steps for operating the PlatePierce as a standalone device. When optimizing the piercing results, repeat steps 4 through 5.

Step	Procedure	See...
1	Load or change the pin plate.	“Changing the pin plate” on page 44
2	Turn on the air.	“Turning on and turning off the air” on page 34
3	Turn on the power.	“Turning on and turning off the air” on page 34
4	Load or change the insert.	“Loading an insert” on page 47
5	Load and pierce the sealed plate.	“Starting the piercing process” on page 49

**Lab automation
system workflow**

The following table presents the basic steps for operating the PlatePierce in a Velocity11 lab automation system. When optimizing the piercing pressure, repeat steps 7 through 8 for a single plate before starting a batch run.

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

Step	Procedure	See...
1	Load or change the pin plate.	“Changing the pin plate” on page 44
2	Turn on the air.	“Turning on and turning off the air” on page 34
3	Turn on the power.	“Turning on and turning off the power” on page 35
4	Create PlatePierce profiles.	“Creating and managing profiles (lab automation systems only)” on page 36
5	Establish communication with the PlatePierce.	“Establishing communication with the PlatePierce (lab automation systems only)” on page 40
6	Create protocols and set task parameters.	Velocity11 lab automation system software user guide, such as the <i>VWorks User Guide</i>
7	Load or change the insert.	“Loading an insert” on page 47
8	Start the protocol run (seal cycles).	“Starting the piercing process” on page 49

Related topics

For more information about...	See...
PlatePierce physical dimensions	“Meeting lab requirements” on page 21
Installing the PlatePierce	“Connecting and disconnecting the power source” on page 26
Configuring the PlatePierce in a lab automation system	<input type="checkbox"/> “Lab automation system software” on page 13 <input type="checkbox"/> “Integrating the PlatePierce into third-party systems” on page 63
How to operate the PlatePierce as a standalone device	“Standalone device workflow” on page 14

Safety information

Before installing and using the PlatePierce

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

Intended product use

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

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

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

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

Pinch hazards

!! INJURY HAZARD !! Do not reach into the PlatePierce when the power and air are turned on and the device is connected to the AC outlet. The PlatePierce can be in a state in which the pin plate is in the lowered position and an action can cause it to move upwards with considerable force, resulting in injury if your hand is inside the PlatePierce.

Chemical hazards

!! INJURY HAZARD !! Some chemicals used when working with the PlatePierce can be hazardous. Make sure you follow your local, state, and federal safety regulations when using and disposing of the chemicals. Follow standard laboratory procedures and cautions when working with chemicals.

Gas cylinders and pressure regulators

Compressed air is used to move components inside the PlatePierce.








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

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

Safety labels

Warnings in the user documentation or on the device must be observed during all phases of operation, service, and repair of this device. Failure to comply with these precautions violates safety standards of design and the intended use of the product. Agilent Technologies assumes no liability for the customer's failure to comply with these requirements.

The following table lists the common symbols you might find on the device. The symbol on the label indicates the risk of danger. A description of the warning and information that will help you avoid the safety hazard are provided in this guide.

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

Safety and regulatory compliance

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

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

Electromagnetic compatibility

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

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

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

Sound emission declaration

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

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

Unpacking and installing the PlatePierce

2

This chapter contains the following topics:

- “Installation workflow” on page 20
- “Meeting lab requirements” on page 21
- “Unpacking and inspecting the PlatePierce” on page 23
- “Connecting and disconnecting the power source” on page 26
- “Connecting and disconnecting the air source” on page 27
- “Connecting to the controlling computer (lab automation system only)” on page 29
- “Installing the PlatePierce ActiveX software” on page 30

Installation workflow

About this topic

This topic presents the workflow for unpacking and installing the PlatePierce as a standalone device or in a Velocity11 lab automation system.

Workflow

The following table presents the workflow for unpacking and installing the PlatePierce.

Note: If you are installing the PlatePierce as a standalone device, skip steps 5 through 7.

Step	Procedure	See...
1	Prepare your lab for the installation.	“Meeting lab requirements” on page 21
2	Unpack the PlatePierce.	“Unpacking and inspecting the PlatePierce” on page 23
3	Connect the PlatePierce to the power source.	“Connecting and disconnecting the power source” on page 26
4	Connect the PlatePierce to the air source.	“Connecting and disconnecting the air source” on page 27
5	<i>Lab automation system only.</i> Connect the PlatePierce to the controlling computer.	“Connecting to the controlling computer (lab automation system only)” on page 29
6	<i>Lab automation system only.</i> Install the PlatePierce ActiveX software.	“Installing the PlatePierce ActiveX software” on page 30
7	<i>Lab automation system only.</i> In the Velocity11 lab automation system software, add the PlatePierce and set the properties for the device.	Velocity11 lab automation system software user guide, such as the <i>VWorks User Guide</i> or the <i>Device Driver User Guide</i> .

Related topics

For more information about...	See...
Workflow for installing and operating the PlatePierce in a third-party lab automation system	The third-party product documentation
Operating the PlatePierce	“PlatePierce workflows” on page 14

Meeting lab requirements

Laboratory requirements

The PlatePierce has the following laboratory requirements:

Requirement	Value
Bench space	Depth: 34.3 cm (13.5 inches) Width: 20.3 cm (8.00 inches) Height: 35.1 cm (13.8 inches) Weight: 19 kg (42 lb)
Ambient temperature	4–40 °C (39–104 °F)
Humidity condition	10–90% RH, non-condensing
Electrical supply	Voltage: 110–240 ~ Frequency: 50 –60 Hz Current: 0.5 A !! DAMAGE HAZARD !! Always connect the PlatePierce to an AC circuit that is properly grounded.
Compressed air supply	Quality: Clean, compressed, oil-free Source: House, cylinder, or portable pump Flow rate: < 0.94 Lps (2.0 cfm) Pressure: 0.62–0.69 MPa (90–100 psi) <i>Note:</i> Compressed air is used to move components inside the PlatePierce.

When planning the lab space for the PlatePierce, you should consider the following:

- Make sure the lab bench can support the weight of the PlatePierce, and the surface is level.
- Provide adequate bench space for the PlatePierce.
- Make sure there is sufficient clearance around the PlatePierce so that you can reach the back of the device to turn off the power in an emergency.
- Place the PlatePierce within 1.8 m (6 ft) of the electrical outlets.
- Place the PlatePierce within 4.6 m (15 ft) of the air source.
- Place the PlatePierce away from heat and air conditioning ducts.
- Place the PlatePierce away from direct sunlight.
- Lab automation system installation only.* Check with the lab automation system manufacturer for installation requirements.

Computer requirements

If you plan to operate the PlatePierce in a Velocity11 lab automation system, you must connect the device to a computer. In addition, you must install the PlatePierce ActiveX software to enable the device to interface with the computer.

The lab automation system computer must meet the following minimum requirements to interface with the PlatePierce:

- PC running Windows NT 4.0, Windows 2000, or Windows XP
- Pentium 166 processor
- 32 MB RAM
- RS-232 serial port with DB 9 connector

For lab automation system requirements, see the Velocity11 lab automation system software user guide (such as *VWorks User Guide*) or the third-party lab automation system software user documentation.

Related topics

For more information about...	See...
Installing the PlatePierce	"Installation workflow" on page 20
How to operate the PlatePierce as a standalone device	"Standalone device workflow" on page 14
How to operate the PlatePierce in a Velocity11 lab automation system	"Lab automation system workflow" on page 15
How to integrate the PlatePierce in a third-party lab automation system	"Integrating the PlatePierce into third-party systems" on page 63

Unpacking and inspecting the PlatePierce

About this topic

This topic lists the items that are included with your PlatePierce.

Unpacking precautions

When unpacking the PlatePierce, be sure to:

- Note the dimensions of the shipping container before moving it to make sure you have adequate clearance through doorways and passages.
 - Make sure the final location is nearby and easily accessible.
 - Use care when lifting the PlatePierce to prevent personal injury and damage to the device. The PlatePierce weighs 18 kg (40 lb) and might require two people to lift it.
-

Unpacking the PlatePierce

To unpack the PlatePierce:

1. Open the top of the PlatePierce shipping container.
2. Lift the contents out of the container and set each item carefully on the lab bench or final location where you want to install the device.
3. Remove packing foams from the device.
4. Remove components from the plastic bags or other packing material.

!! IMPORTANT !! A small piece of foam is packed inside the PlatePierce. You will remove the packing foam after you install the device, turn on the air, turn on the power, and press RUN to open the door.

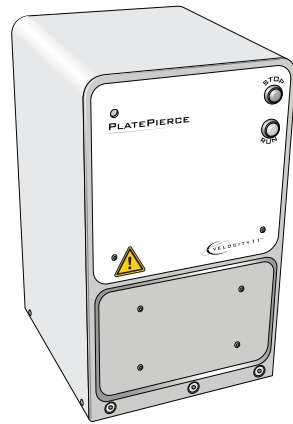
!! DAMAGE HAZARD !! Save the packing materials and shipping container in case you need to move or ship the PlatePierce.

!! DAMAGE HAZARD !! The packing materials and shipping container were designed to protect the device. Packing the PlatePierce using other materials might damage the device and void your warranty.

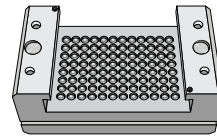
Inspecting the contents

After you unpack the PlatePierce, check that you have the items in the following diagram. Inspect the items to make sure you have everything shown. If any of the items are missing or damaged, contact Velocity11 Technical Support.

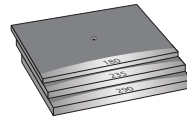
Note: The pin plate appearance might vary, depending on the pin plate you ordered.



PlatePierce Seal Piercing Station



Pin plate (one or more)



Inserts

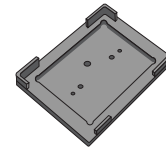
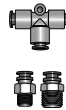


Plate stage



Air tubing and switch assembly



Union-tee fitting and NPT fittings

or



Metric air tubing and switch assembly



Metric union-tee fitting



Power cord



RS-232 DB9 serial cable



ActiveX CD



PlatePierce User Guide

Related topics

For more information about..	See...
Installation requirements	“Meeting lab requirements” on page 21
Installing the PlatePierce	<ul style="list-style-type: none"><input type="checkbox"/> “Connecting and disconnecting the power source” on page 26<input type="checkbox"/> “Connecting and disconnecting the air source” on page 27<input type="checkbox"/> “Connecting to the controlling computer (lab automation system only)” on page 29<input type="checkbox"/> “Installing the PlatePierce ActiveX software” on page 30

Connecting and disconnecting the power source

About this topic

This topic explains how to connect the PlatePierce to a grounded power source.

Before you start

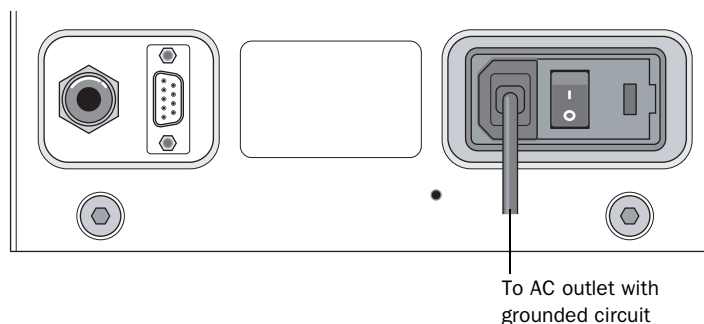
Make sure you have the supplied power cord.

Connecting the power source

!! INJURY HAZARD !! Do not reach into the PlatePierce when the power and air are turned on and the device is connected to the AC outlet.

To connect the PlatePierce to a grounded power source:

1. Plug one end of the power cord into the AC power entry located on the back of the PlatePierce.



2. Plug the other end of the cord into an AC outlet with grounded circuit.

Disconnecting the power source

To disconnect the PlatePierce from its power source:

1. Unplug the power cord from the AC outlet.
2. Unplug the power cord from the back of the PlatePierce.

Related topics

For more information about...	See...
PlatePierce installation requirements	"Meeting lab requirements" on page 21
Unpacking the PlatePierce	"Unpacking and inspecting the PlatePierce" on page 23
How to operate the PlatePierce	"PlatePierce workflows" on page 14

Connecting and disconnecting the air source

About this topic

Compressed air is used to move parts inside the PlatePierce. This topic explains how to connect the PlatePierce to the air source and check the connections for leaks before use.

Before you start

Make sure you have the following:

- Air tubing with switch (supplied)
- NPT fitting adaptor (supplied)

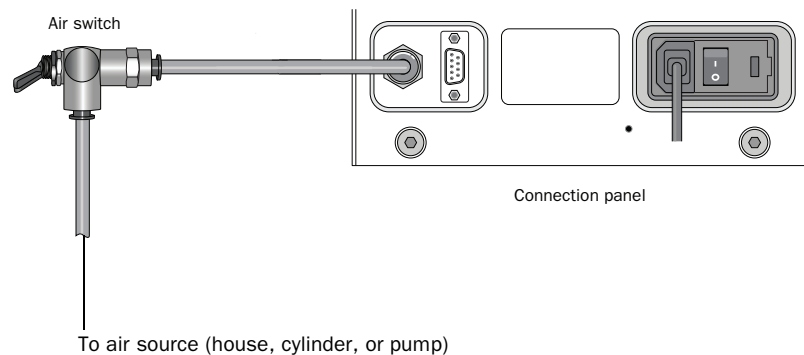
Connecting the air source

To connect the PlatePierce to the air source:

1. Turn off the air at the source (house, cylinder, or pump).
2. If your air source uses a threaded connection, attach the supplied 1/4-inch or 1/8-in NPT fitting to the connection. The NPT fitting is threaded on one end and has a quick-release fitting on the other end.
3. Connect one end of the air tubing to the air source (house, cylinder, or pump), and then connect the free end of the tubing to the quick disconnect fitting at the air-input port.

To connect the tubing, push the end of the tubing into the quick disconnect fitting at the air source and on the back of the PlatePierce.

The following diagram shows the air tubing connection on the back of the PlatePierce.



Checking the air connections

To check the air connections:

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

If you feel resistance at the connection, the tubing has been properly installed.

2. Turn on the air at the source (house, cylinder, or pump).

- Listen near each connection for hissing sounds that might indicate a leak.

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

Disconnecting the air source

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

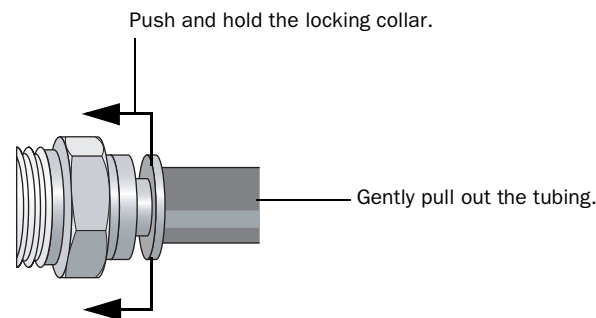
You might need to disconnect the air tubing before moving or shipping the PlatePierce and before performing maintenance or cleaning.

To disconnect the air tubing from the PlatePierce:

- Turn off the air at the source (house, cylinder, or pump).
- Push and hold the locking collar against the fitting, and then gently pull the air tubing out.

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

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



Related topics

For more information about...	See...
Air source requirements	"Meeting lab requirements" on page 21
Components for connecting the PlatePierce to the air source	"Unpacking and inspecting the PlatePierce" on page 23
Air-input fitting on the connection panel	"Connection panel" on page 6

Connecting to the controlling computer (lab automation system only)

About this topic This topic explains how to connect the controlling computer to the PlatePierce. Read this topic only if you intend to use the PlatePierce in a lab automation system.

Before you start Make sure you have the supplied RS-232 DB9 serial cable.

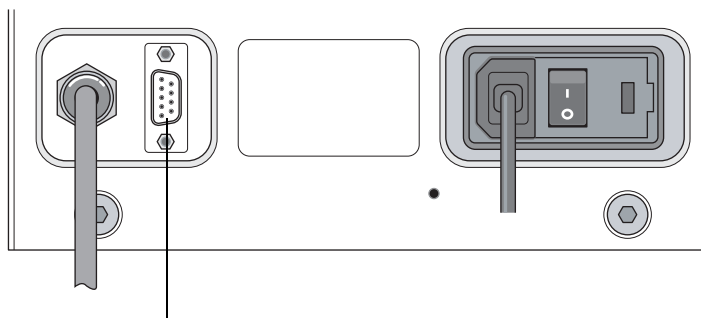
Connecting the controlling computer

To connect the controlling computer to the PlatePierce:

1. Turn off the computer.
2. Connect the female end of the serial cable to a COM port on the controlling computer.

Note the number of the COM port. You will need to provide this number in the software.

3. Connect the male end of the serial cable to the serial port on the back of the PlatePierce.



To controlling computer

Related topics

For more information about...	See...
The controlling computer requirements	“Meeting lab requirements” on page 21
Workflow for installing and operating the PlatePierce in a third-party lab automation system	The third-party product documentation
Using ActiveX control to configure third-party lab automation system software	“Integrating the PlatePierce into third-party systems” on page 63

Installing the PlatePierce ActiveX software

About this topic

This topic explains how to install the PlatePierce ActiveX software.

Note: Read this topic only if you intend to use the PlatePierce in a lab automation system.

PlatePierce ActiveX description

PlatePierce ActiveX is the supplied software that allows the PlatePierce to interact with the Velocity11 and third-party lab automation system software.

PlatePierce ActiveX includes a component called PlatePierce Diagnostics, the user interface that allows you to create and manage PlatePierce profiles and control the device for operation or for diagnostic purposes.

Installing the software

To install the PlatePierce ActiveX software:

1. Insert the PlatePierce Software CD into the controlling computer CD-ROM drive.
2. In the CD folder, double-click PlatePierce Installer.exe.
3. Follow the directions in the installation wizard window.

After installation

After you install the PlatePierce ActiveX software, in the Velocity11 lab automation system software:

1. Add the PlatePierce device. See the Velocity11 lab automation system software user guide (such as *VWorks User Guide*) for instructions.
2. Create PlatePierce profiles. See “Creating and managing profiles (lab automation systems only)” on page 36.
3. Create protocols. See the Velocity11 lab automation system software user guide (such as *VWorks User Guide*) for instructions.

In the third-party lab automation system:

Integrate the PlatePierce ActiveX control in the third-party lab automation system software. See “Integrating the PlatePierce into third-party systems” on page 63.

Related topics

For more information about..	See...
The controlling computer requirements	“Meeting lab requirements” on page 21
Workflow for operating the PlatePierce in a Velocity11 lab automation system	“Lab automation system workflow” on page 15
Using ActiveX control to configure third-party lab automation system software	“Integrating the PlatePierce into third-party systems” on page 63
Workflow for installing and operating the PlatePierce in a third-party lab automation system	The third-party product documentation

Getting started

3

This chapter contains the following topics:

- “Turning on and turning off the air” on page 34
- “Turning on and turning off the power” on page 35
- “Creating and managing profiles (lab automation systems only)” on page 36
- “Establishing communication with the PlatePierce (lab automation systems only)” on page 40

Turning on and turning off the air

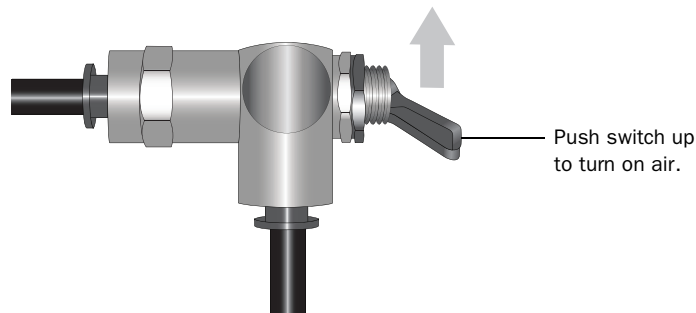
About this topic

This topic explains how to turn on and turn off the air to the PlatePierce.

Turning on and turning off the air

To turn on the air:

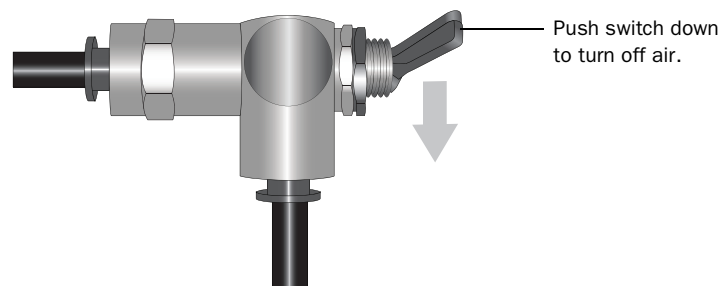
1. Turn on the air at the source (house, cylinder, pump).
2. Turn on the air switch on the PlatePierce air tubing line.



If you hear a hissing sound, turn off the air, check the connections, and turn on the air again.

To turn off the air:

1. Turn off the air switch on the PlatePierce air tubing line.



2. Turn off the air at the source (house, cylinder, pump).

Related topics

For more information about...	See...
Air pressure requirements	"Meeting lab requirements" on page 21
Connecting the PlatePierce to the air source	"Connecting and disconnecting the air source" on page 27

Turning on and turning off the power

About this topic

This section explain how to turn on and turn off the power to the PlatePierce.

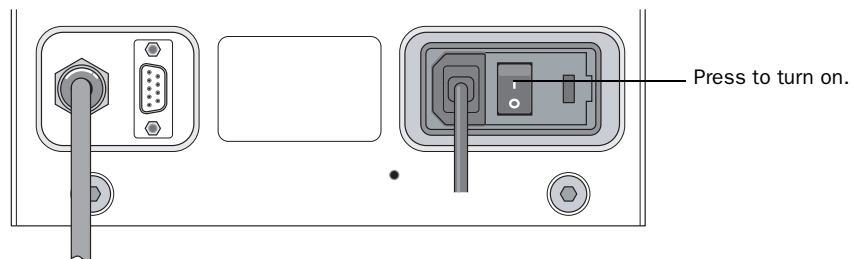
Before you start

Make sure the air is turned on.

Turning on the power

To turn on the power:

On the back of the PlatePierce, press the power switch to the on (I) position. The following diagram shows the location of the power switch on the back of the PlatePierce.

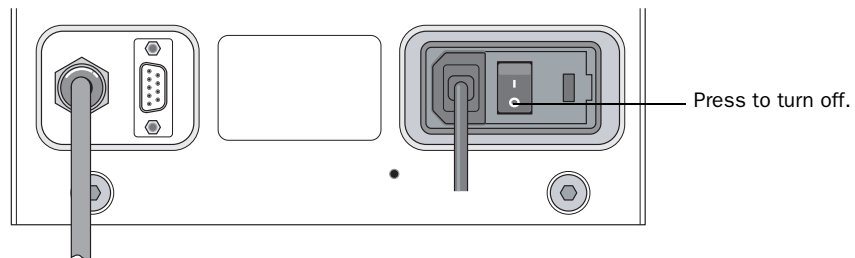


When you turn on the power, the green status light on the front of the PlatePierce blinks.

Turning off the power

To turn off the power:

With the air still on, on the back of the PlatePierce, press the power switch to the off (O) position. The status light on the front of the PlatePierce turns off.



Related topics

For more information about...	See...
Electrical requirements	"Meeting lab requirements" on page 21
Connecting the PlatePierce to the power source	"Connecting and disconnecting the power source" on page 26
Turning on the air	"Turning on and turning off the air" on page 34

Creating and managing profiles (lab automation systems only)

About this topic

This topic explains how to use PlatePierce Diagnostics (a component of the PlatePierce ActiveX software) to create and manage profiles for PlatePierce. Read this topic only if you intend to use the PlatePierce in a Velocity11 lab automation system.

About profiles

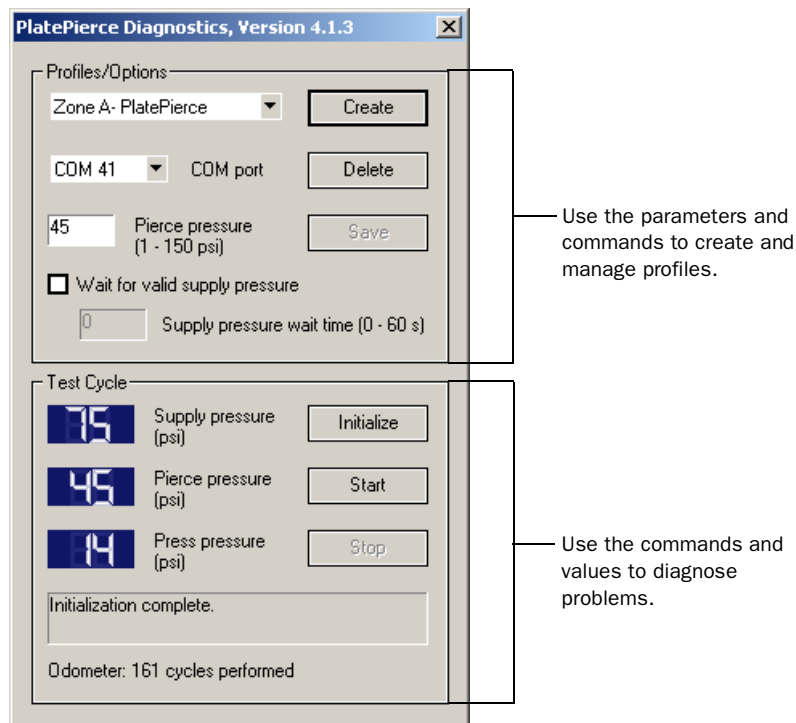
!! IMPORTANT !! Each PlatePierce you install in the lab automation system requires a unique profile.

In the Velocity11 lab automation system, profiles are used mainly to enable the lab automation system software to identify the PlatePierce COM port.

About PlatePierce Diagnostics

PlatePierce Diagnostics is a component of the PlatePierce ActiveX software. You use PlatePierce Diagnostics to:

- Create and manage profiles.
- Establish communication with a selected PlatePierce.
- Diagnose and troubleshoot problems with the PlatePierce.



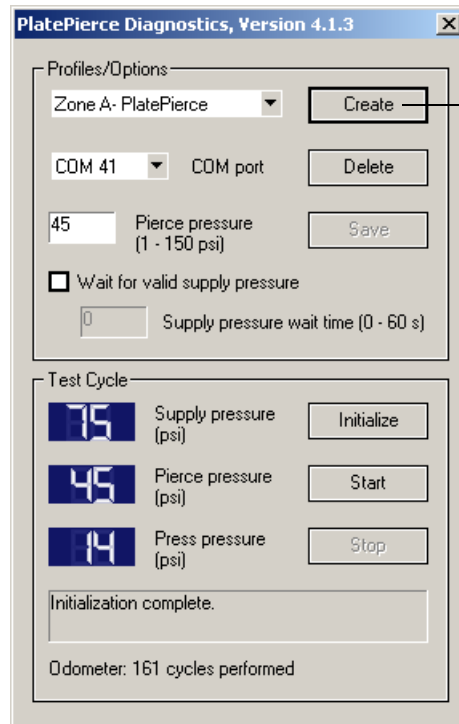
Before you start

Make sure you install the PlatePierce ActiveX software.

Creating profiles

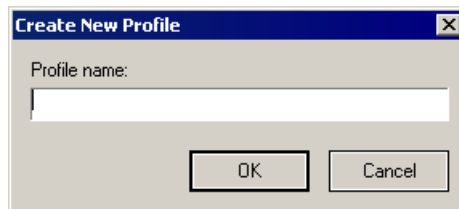
To create profiles for the PlatePierce:

1. Start the Velocity11 lab automation system software.
2. Open PlatePierce Diagnostics. The PlatePierce Diagnostics dialog box opens.



Click to create a new profile.

3. In the Profiles/Options area, click Create. The Create New Profile dialog box opens.



4. In the Create New Profile dialog box, type a name in the Profile name box.
5. Click OK to return to the PlatePierce Diagnostics dialog box. Make sure the new profile name is selected in the Profiles/Options area (to the left of the Create button).

6. Specify the following:

Selections, parameters, or options	Description
COM port	The COM port of the PlatePierce. <i>Note:</i> Make sure the COM port number matches the number you noted in “Connecting the controlling computer” on page 30.
Pierce Pressure (1–100 psi)	The pressure you want to use during the piercing process. Although the valid range is 1–100 psi, Velocity11 recommends that you set the pressure between 70 psi and 95% of the incoming pressure from the source (house, cylinder, or pump).
Wait for valid supply pressure	The option that requires the PlatePierce to check and wait for the supply pressure to exceed the pierce pressure before the piercing process can begin. Select this option to make sure the pressure is sufficient to fully pierce the sealed plate.
Supply pressure wait time (0–60 s)	The length of time the PlatePierce must wait for the supply pressure to exceed the piercing pressure. When the wait time is reached, the PlatePierce ends the operation, opens the door, and moves the plate forward. This parameter is available only if you select the Wait for valid supply pressure option.

7. When you are finished, click **Save** to save the profile.**Editing profiles****To edit a profile:**

1. In the Velocity11 lab automation software, open **PlatePierce Diagnostics**. The PlatePierce Diagnostics dialog box opens.
2. In the PlatePierce Diagnostics dialog box, select the profile you want to edit in the Profiles/Options area.
3. Make the necessary changes to the profile.
4. Click **Save** to save the changes.

Deleting profiles**To delete a profile:**

1. In the Velocity11 lab automation software, open **PlatePierce Diagnostics**. The PlatePierce Diagnostics dialog box opens.
2. In the PlatePierce Diagnostics dialog box, select the profile you want to delete in the Profiles/Options area.
3. Click **Delete**.

Related topics

For more information about..	See...
Installing the PlatePierce ActiveX software	“Installing the PlatePierce ActiveX software” on page 30
How to open PlatePierce Diagnostics	Velocity11 lab automation system software user guide, such as the <i>VWorks User Guide</i> and the <i>Device Driver User Guide</i>
Creating and managing protocols	Velocity11 lab automation system software user guide, such as the <i>VWorks User Guide</i>
Setting task parameters in the protocols	Velocity11 lab automation system software user guide, such as the <i>VWorks User Guide</i>
Workflow for operating the PlatePierce in a Velocity11 lab automation system	“Lab automation system workflow” on page 15
Using ActiveX control to configure third-party lab automation system software	“Integrating the PlatePierce into third-party systems” on page 63
Workflow for installing the PlatePierce in a third-party lab automation system	The third-party product documentation

Establishing communication with the PlatePierce (lab automation systems only)

About this topic

This topic describes how to establish communication between the controlling computer and the PlatePierce in a Velocity11 lab automation system.

Note: Read this topic only if you are using the PlatePierce in a Velocity11 lab automation system.

Before you start

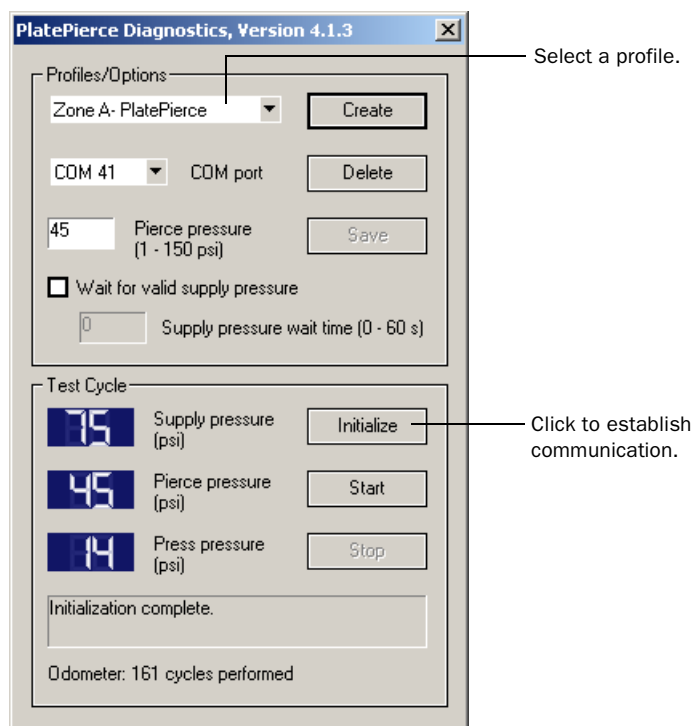
Make sure:

- The PlatePierce is connected to the controlling computer.
- The Velocity11 lab automation software is installed.
- The PlatePierce ActiveX software is installed.
- A profile is created for the PlatePierce.

Establish communications

To establish communication with the PlatePierce:

1. In the lab automation software, open PlatePierce Diagnostics.
2. In the Profiles/Options area, select the profile you want to use.



3. In the Test Cycle area, click **Initialize**.

The **Initialization complete** message displays when communication is verified.

If errors occur during initialization, check the computer connection and make sure the correct COM port is selected.

Related topics

For more information about...	See...
Operating the PlatePierce in a Velocity11 lab automation system	"Lab automation system workflow" on page 15
How to open PlatePierce Diagnostics	Velocity11 lab automation system software user guide, such as the <i>VWorks User Guide</i> and the <i>Device Driver User Guide</i>
Creating and managing profiles	"Creating and managing profiles (lab automation systems only)" on page 36
Creating and managing protocols	Velocity11 lab automation system software user guide
Starting and stopping the protocol run	Velocity11 lab automation system software user guide
Using ActiveX control to configure third-party lab automation system software	"Integrating the PlatePierce into third-party systems" on page 63

Piercing sealed plates

4

This chapter contains the following topics:

- “Changing the pin plate” on page 44
- “Loading an insert” on page 47
- “Starting the piercing process” on page 49
- “Stopping the piercing process” on page 51

Changing the pin plate

About this topic

The pin plate is the component that pierces the plate seal. Different types of pin plates can be used, depending on the number of wells in the plate, the well shape, and the number of times you want to use it to pierce a plate seal.

Before you start to use the PlatePierce, make sure you have installed the correct pin plate. This topic explains how to change the pin plate. For a description of pin plates, see “Pin plate” on page 8.

Before you start

Make sure you have the correct pin plate.

Removing a pin plate

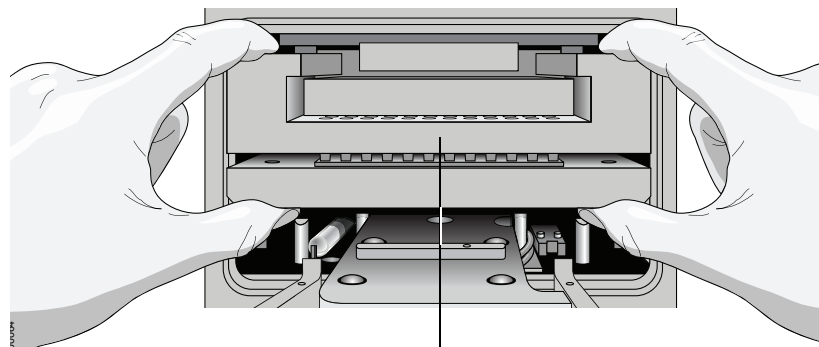
!! INJURY HAZARD !! Do not reach into the PlatePierce when the power and air are turned on and the device is connected to the AC outlet.

To remove a pin plate:

1. Open the door. To do this:
 - a. Turn on the air.
 - b. Turn on the power.
 - c. Press the RUN button on the front of the PlatePierce.
2. With the door open, turn off the air.
3. Turn off the power.
4. Disconnect the power cord from the back of the PlatePierce.

!! INJURY HAZARD !! Changing the pin plate while the PlatePierce is still connected to its power source can cause injury.

5. Remove the plate stage.
6. Reach into the PlatePierce with both hands, gently push the pin plate down, and then carefully pull it out.



Push down, and then pull out.

- Without turning it over, carefully place the pin plate down on a level surface.

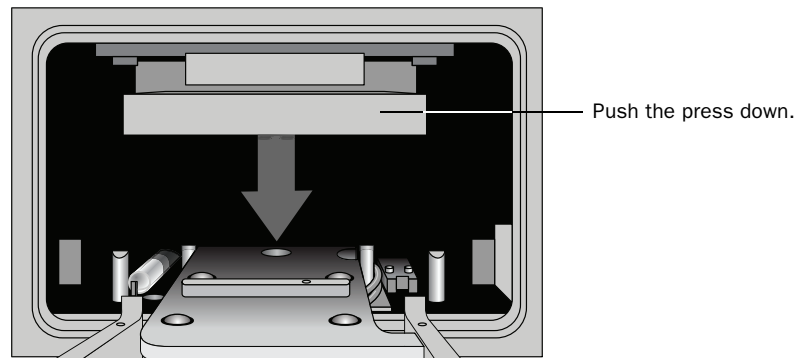
!! IMPORTANT !! If you turn the 96-pin pin plate over, the pins might fall out. (The 384-pin plate has a pin retainer to prevent the pins from falling out.)

Inserting a pin plate

!! INJURY HAZARD !! Do not reach into the PlatePierce when the power and air are turned on and the device is connected to the AC outlet.

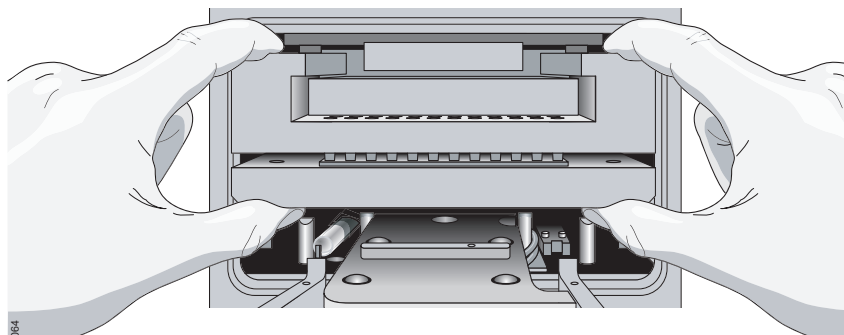
To insert a pin plate:

- Make sure the power and the air are turned off, and the door is open.
If no pin plate is installed, the press (the component that moves the pin plate) remains at its current position and does not descend.
- Reach into the PlatePierce and push the press down.



- Carefully insert the pin plate into the PlatePierce.

!! DAMAGE HAZARD !! Make sure you push the pin plate all the way until it stops.



- Load the plate stage.
- Turn on the air.
- Turn on the power.

The green status light blinks.

!! INJURY HAZARD !! Do not reach into the PlatePierce. Extending your hand into the PlatePierce when you press the RUN button can cause serious injury.

7. Press the **RUN** button on the front of the PlatePierce.

The pin plate moves up and the blinking green status light becomes a solid green light.

Related topics

For more information about...	See...
Pin plate description	"Pin plate" on page 8
Turning on and turning off the air	"Turning on and turning off the air" on page 34
Turning on and turning off the power	"Turning on and turning off the power" on page 35

Loading an insert

About this topic

This topic explains how to load an insert. An insert is required to ensure uniform piercing across the plate.

Before you start

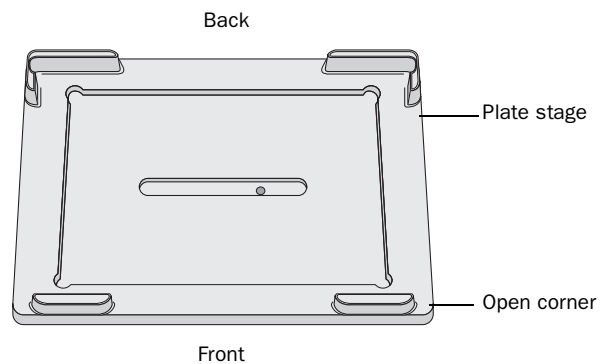
Make sure:

- The door is open.
- You have the correct insert.

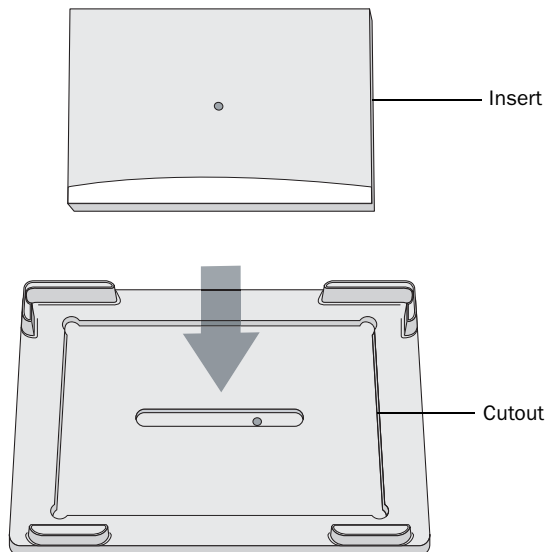
Loading an insert

To load an insert:

1. Make sure the plate stage sits level on the plate-stage support and is in the orientation shown.



2. Place the insert on the plate stage. The insert should fit into the cutout area on the plate stage.



Related topics

For more information about..	See...
Turning on and turning off the air	"Turning on and turning off the air" on page 34
Turning on and turning off the power	"Turning on and turning off the power" on page 35
Insert selection	"Insert selection" on page 11

Starting the piercing process

About this topic

This topic explains how to pierce a sealed plate when using the PlatePierce as a standalone device or in a Velocity11 automation system.

Before you start

Make sure:

- The correct pin plate is installed.
- The air is turned on.
- The power is turned on.
- The correct insert is loaded on the plate stage.
- Standalone PlatePierce only* The plate is loaded.
- Lab automation system only* Communication between the controlling computer and the PlatePierce is established.

Standalone device

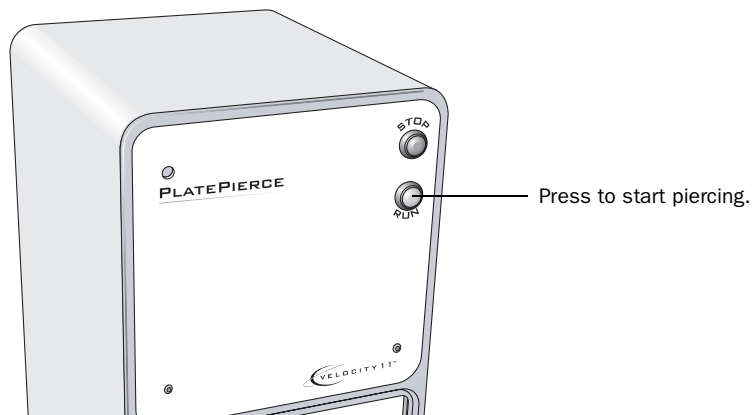
!! INJURY HAZARD !! Do not reach into the PlatePierce when the power and air are turned on and the device is connected to the AC outlet.

To pierce a sealed plate:

1. Place a plate on the plate stage. Make sure the plate sits level on the plate stage and is within the raised tabs.
2. Press the RUN button on the front of the PlatePierce.

The indicator light turns orange, the plate moves into the PlatePierce and the door closes. The plate seal is pierced, the door opens, and the plate moves forward.

If the plate is not correctly positioned on the plate stage, the indicator light turns red, the door opens before the seal is pierced, and the plate moves forward. Reload the plate correctly, and then press RUN.



Lab automation system

You can set the start the piercing process from the Velocity11 lab automation system software. The robot will load the plate and the software will use the information you specified in the piercing process. For detailed instructions, see the lab automation system software user guide.

Related topics

For more information about...	See...
Changing the pin plate	"Changing the pin plate" on page 44
Turning on the air	"Turning on and turning off the air" on page 34
Turning on the power	"Turning on and turning off the power" on page 35
Lab automation system only. Establishing communication between the controlling computer and the PlatePierce.	"Establishing communication with the PlatePierce (lab automation systems only)" on page 40
Loading an insert	"Loading an insert" on page 47

Stopping the piercing process

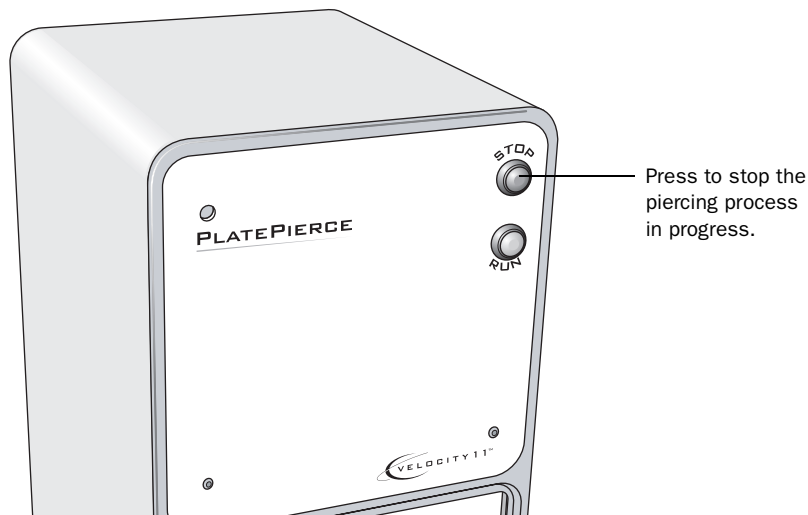
About this topic

You can stop the PlatePierce at any time during a piercing process. This topic explains how to stop the piercing process that is in progress.

Standalone device procedure

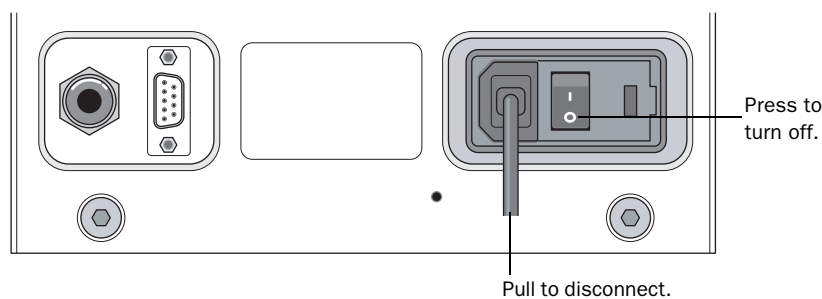
To stop a piercing process in progress:

Press the STOP button on the front of the PlatePierce. The indicator light turns red, the door opens, and the plate moves forward.



To stop the PlatePierce in an emergency:

In case the STOP button on the front of the device does not work or is not responding fast enough, turn off the power. The on/off switch is on the back of the device. Alternatively, you can disconnect the power cord.



Lab automation system procedure

You can stop the piercing process by stopping the protocol run in the Velocity11 lab automation system software. For instructions, see the Velocity11 lab automation system software user guide.

Related topics

For more information about...	See...
PlatePierce hardware components	“Hardware overview” on page 5
Starting the piercing process	“Starting the piercing process” on page 49
Troubleshooting problems	“Troubleshooting” on page 55
Reporting problems to Velocity11	“Reporting problems” on page 61

Maintenance and troubleshooting

5

This chapter contains the following topics:

- “Cleaning the pin plate” on page 54
- “Troubleshooting” on page 55
- “Diagnostic tools” on page 59
- “Reporting problems” on page 61

Cleaning the pin plate

About this topic

This topic explains how to clean the PlatePierce pin plate. If you have missing or damaged pins, contact Velocity11 Technical Support.

Cleaning the pin plate

Over time, as the pin plate is used repeatedly, excess seal can adhere to the piercing pins. In addition, to prevent carry-over contamination, you should inspect the pin plate between applications and clean it if necessary.

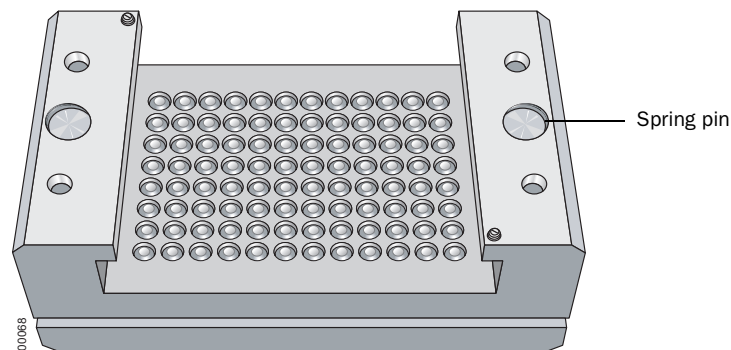
!! INJURY HAZARD !! Some chemicals used when working with the PlatePierce can be hazardous. Make sure you follow your local, state, and federal safety regulations when using and disposing of the chemicals.

To clean the pin plate:

1. Place the pin plate in an ultrasonic bath containing sufficient water to cover the entire plate.
2. Run the ultrasonic bath for a short period, inspect the pin plate, and repeat if necessary.

The cleaning ability of ultrasonic water baths varies with the water temperature, ultrasonic power, frequency and sweep rate that you choose.

3. Dry the pin plate.
4. Place two drops of oil around the edges of each of the spring pins.



Related topics

For more information about...	See...
Safety information	"Safety information" on page 16
PlatePierce hardware components	"Hardware overview" on page 5
Pin plate description	"Pin plate" on page 8

Troubleshooting

About this topic

This topic lists possible hardware and software problems, the causes of the problems, and ways to resolve the problems. If you are still experiencing problems with the PlatePierce after trying the solutions, contact Velocity11 Technical Support.

Hardware problems

Problem	Cause	Solution
The PlatePierce does not turn on.	Your lab does not meet the electrical requirements.	Make sure your lab meets the electrical requirements. See “Meeting lab requirements” on page 21.
	The PlatePierce is not connected to the power source.	Connect the PlatePierce to the power source. See “Connecting and disconnecting the power source” on page 26.
	The fuse is blown.	Call Velocity11 Technical Support.
A hissing sound can be heard.	A leak is present in the air connection.	Check the air connections at the PlatePierce and the source (house, cylinder, or pump).
The door does not open.	The air is turned off, the air tubing is not connected to the PlatePierce, or the air pressure is too low.	Turn off the power, and then turn off the air. Do the following: <ol style="list-style-type: none">1. Check the air tubing connections.2. Turn on the air at the source and check the air pressure. See “Meeting lab requirements” on page 21 for the required pressure.3. Turn on the power. The door should open.
The door does not close.	The air is turned off, the air tubing is not connected to the PlatePierce, or the air pressure is too low.	Turn off the power, and then turn off the air. Do the following: <ol style="list-style-type: none">1. Check the air tubing connections.2. Turn on the air at the source and check the air pressure. See “Meeting lab requirements” on page 21 for the required pressure.3. Turn on the power.4. Turn off the power.5. Turn off the air. The door should close.
Oil is present in the piercing chamber.	The compressed air is not from an oil-free compressor and oil has leaked into the PlatePierce.	Call Velocity11 Technical Support.

Problem	Cause	Solution
The piercing does not start.	The power is turned off, the power cord is not connected to the PlatePierce or the AC outlet, or your lab does not meet the electrical requirements.	Turn on the power, check the power connections, or make sure your lab meets the electrical requirements. See “Meeting lab requirements” on page 21.
The seal over the center area of the plate was not pierced.	The center area of the plate bent downward during the piercing process because of a lack of support under the wells.	Make sure you load an insert under the plate or select a thicker insert.
The seal was not pierced or the pins did not pierce all the way through the seal.	The air pressure might be too low.	Check the air pressure at the source (house, cylinder, or pump). See “Meeting lab requirements” on page 21 for the required air pressure.
The status light turns red briefly before the door opens.	The piercing process is stopping. The red status light turns on momentarily before the door opens and does not indicate success or error in the piercing process.	Check the color of the status light that appears after the red light to determine whether an error occurred and you need to take action.
The red status light is blinking.	Insufficient air pressure is preventing the PlatePierce from piercing the plate seal.	Check the air pressure at the source (house, cylinder, or pump). See “Meeting lab requirements” on page 21 for the required air pressure.
The status light turns orange.	The piercing process is in progress.	No action.
The orange status light is blinking.	The plate is not positioned correctly on the plate stage. The piercing process is aborting.	Reload the plate before restarting the piercing process.
The status light turns green.	The PlatePierce is ready to run.	No action.
The green status light is blinking.	<input type="checkbox"/> Power is turned on but the RUN button has not been pressed to initialize the PlatePierce. <input type="checkbox"/> Time-out occurred during a piercing process, and the operation could not be completed for some reason.	<p>Press the RUN button to initialize the device.</p> <p>If you pressed the STOP button to stop a piercing process, you can press the START button to restart the process.</p>

Software error messages

Error message	Cause	Solution
Profile name given to Initialize() is invalid.	The profile name selected does not exist on the computer.	Select an existing profile name or create a new profile with the desired name.
COM port specified in profile does not exist.	The selected COM port in the profile does not exist on the computer.	Check the profile and select a valid COM port.
Unable to open the serial port.	The serial cable is disconnected, or the serial port is being used by another application.	Check the serial port connection. Make sure another application is not using the serial port.
PlatePierce is not responding.	The serial cable is disconnected, or the power is turned off.	Reconnect the serial cable or turn on the power.
Cannot start press cycle — serial port is not open.	The serial cable is disconnected, or the power is turned off.	Reconnect the serial cable or turn on the power.
Pierce pressure must be in the range of 1-100 psi.	In the lab automation system software, the piercing pressure is set outside of the range.	Check the piercing pressure setting in the lab automation system software. See the lab automation system software user guide for instructions.
Pierce pressure must be 5 psi less than the supply pressure.	The piercing pressure is set too high and is within 5 psi of the supply or source (house, cylinder, or pump) pressure.	In the lab automation system software, make sure the piercing pressure is at least 5 psi lower than the supply or source (house, cylinder, or pump) pressure. You can change either the pressure of the supply or source, or you can change the piercing pressure.
Unable to set the pierce pressure.	The PlatePierce did not accept or respond to the command. The serial cable is disconnected, or the power is turned off.	Reconnect the serial cable or turn on the power.
Unable to begin press cycle.	The PlatePierce did not accept or respond to the command. The serial cable is disconnected, or the power is turned off.	Reconnect the serial cable or turn on the power.
Bad EEPROM in PlatePierce.	A firmware error is detected.	Contact Velocity11 Technical Support.
Problem with positioning the plate.	The plate was not loaded properly.	Reload the plate and restart the piercing.
Door did not close.	An obstacle is preventing the door from closing, or the air pressure is insufficient.	Remove obstacles in the PlatePierce doorway. Check the air pressure at the source (house cylinder, or pump). See “Meeting lab requirements” on page 21 for the required air pressure.

Error message	Cause	Solution
Press did not move down.	The air is turned off.	Turn on the air.
Press did not move up.	The air is turned off.	Turn on the air.
Tray will not extend from PlatePierce.	An obstacle is preventing the plate stage from moving forward, or the air pressure is insufficient.	Remove the obstacle. Check the air pressure at the source (house cylinder, or pump). See “Meeting lab requirements” on page 21 for the required air pressure.
There is not sufficient air pressure.	The air pressure from the source (house, cylinder, or pump) is too low.	<input type="checkbox"/> Make sure the air is turned on. <input type="checkbox"/> Make sure the air pressure at the source (house, cylinder, or pump) meets the installation requirements. See “Meeting lab requirements” on page 21.
There is not a sufficient pressure differential.	The air pressure from the source (house, cylinder, or pump) must be at least 5 psi greater than the piercing pressure.	Change either the pressure of the supply or source, or change the piercing pressure in the lab automation system software to achieve the minimum pressure difference.
Press cycle timed out before completion.	The press or piercing cycle did not complete in the time given. The serial cable disconnected, the power turned off, or the air pressure dropped during the piercing process.	Check the serial cable connection, the power connection, and the air pressure at the source (house, cylinder, or pump).

Related topics

For more information about...	See...
Maintaining the PlatePierce	“Cleaning the pin plate” on page 54

Diagnostic tools

About this topic

This topic explains tools you can use to diagnose problems with the PlatePierce.

Standalone device procedure

When diagnosing problems with the PlatePierce, remember to check the air pressure at the source (house, cylinder, or pump). Always use spare plates when performing test runs.

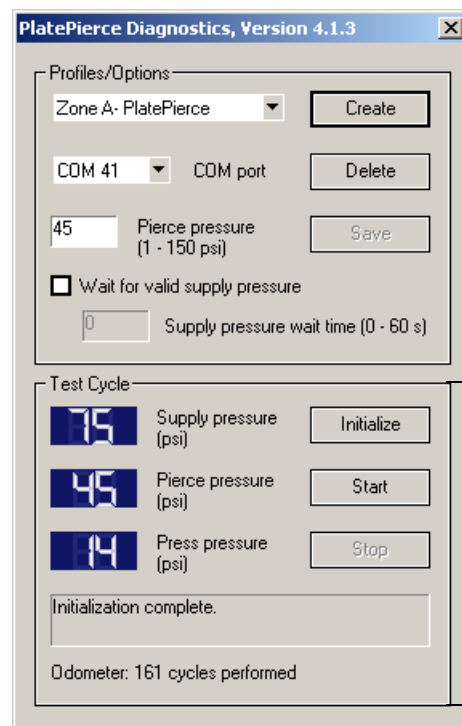
Lab automation procedure

When the PlatePierce is installed in a lab automation system, the device might be difficult to access when performing diagnostic procedures. Instead, you can use PlatePierce Diagnostics to manually control the PlatePierce.

PlatePierce Diagnostics is a component of the PlatePierce ActiveX software. You can use the functions in PlatePierce Diagnostics to manually start and stop the piercing process when diagnosing PlatePierce problems. Using controls in the software is equivalent to using the RUN and STOP buttons on the front of the PlatePierce.

To start PlatePierce Diagnostics and use the diagnostic functions:

1. In the Velocity11 lab automation system software, make sure the device file is open.
2. Open PlatePierce Diagnostics.



Use the commands and values to diagnose problems.

3. In the Test Cycle area, you can click the following:
 - ◆ **Initialize.** Establishes communication with the PlatePierce.
 - ◆ **Start.** Starts the piercing process.
 - ◆ **Stop.** Stops the piercing process.
4. In the Test Cycle area, monitor the following parameters during a test run.

Parameter	Description
Supply pressure (psi)	The air pressure from the source.
Pierce pressure (psi)	The air pressure inside of the PlatePierce.
Press pressure (psi)	The actual air pressure applied during the piercing process. Before the piercing begins, the value is 0. During the piercing process, the value increases until it reaches the specified piercing pressure.
Message box	The area where the status of the device is displayed.
Odometer	The number of piercings the device has performed.

Related topics

For more information about...	See...
How to open PlatePierce Diagnostics	Velocity11 lab automation system software user guide, such as the <i>VWorks User Guide</i> and the <i>Device Driver User Guide</i>
Maintenance tasks	“Cleaning the pin plate” on page 54
Reporting problems	“Reporting problems” on page 61
Hardware description	“Hardware overview” on page 5
Safety information	“Safety information” on page 16

Reporting problems

About this topic

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

Reporting hardware problems

When contacting Velocity11, make sure you have the serial number of the device ready. You can locate the serial number on the back of the PlatePierce.

Reporting software problems

If you find a problem in the PlatePierce Diagnostics software or in the Velocity11 lab automation system software, such as VWorks, contact Velocity11 by:

- Sending a bug report from within the software
- Sending an email to service@velocity11.com or euroservice@velocity11.com

Make sure you have the software version number ready.

To find the PlatePierce Diagnostics software version number from the CD:

Look on the PlatePierce ActiveX CD label.

To find the PlatePierce Diagnostics software version number from either the PlatePierce.ocx file:

1. Navigate to C:\VWorks Workspace\bin.
2. Right-click PlatePierce.ocx and select Properties.
3. Click the Version tab.

To find the version number from within the PlatePierce Diagnostics software:

1. In the Velocity11 lab automation system software, open PlatePierce Diagnostics.
2. Read the version number on the title bar.

Sending files

When resolving software bugs or other problems, Velocity11 might ask you to send the following files:

- Device files
- Protocol files*
- Protocol log file*
- Velocity11 registry files from the Windows registry
- Error message text (or screen capture of the error message window)
- Screen capture of the About window

For instructions on how to locate the device, protocol, protocol log, and registry files, see the Velocity11 lab automation system software user guide.

* The protocol file and protocol log file are needed if the problem occurred during the protocol run, or if you are having problems running the protocol.

Reporting user guide problems

If you find a problem with this user guide or have suggestions for improvement, please send your comments using the feedback button in the online help. Your comments will be reviewed promptly and used to write the next version of the guide.

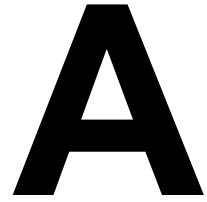


You can also send an email directly to documentation@velocity11.com.

Related topics

For more information about...	See...
Troubleshooting information	"Troubleshooting" on page 55
Safety information	"Safety information" on page 16
Hardware description	"Hardware overview" on page 5

Integrating the PlatePierce into third- party systems



This appendix contains the following topics:

- “PlatePierce ActiveX control” on page 64
- “Integrating the PlatePierce ActiveX control” on page 65
- “Properties” on page 66
- “Methods” on page 67

PlatePierce ActiveX control

About this topic

This topic explains what the PlatePierce ActiveX control is and how it is used in a lab automation system.

What is the PlatePierce ActiveX control

The PlatePierce ActiveX control is the software component that allows the PlatePierce to interact with any Velocity11 or a third-party lab automation system.

How the PlatePierce ActiveX control is used

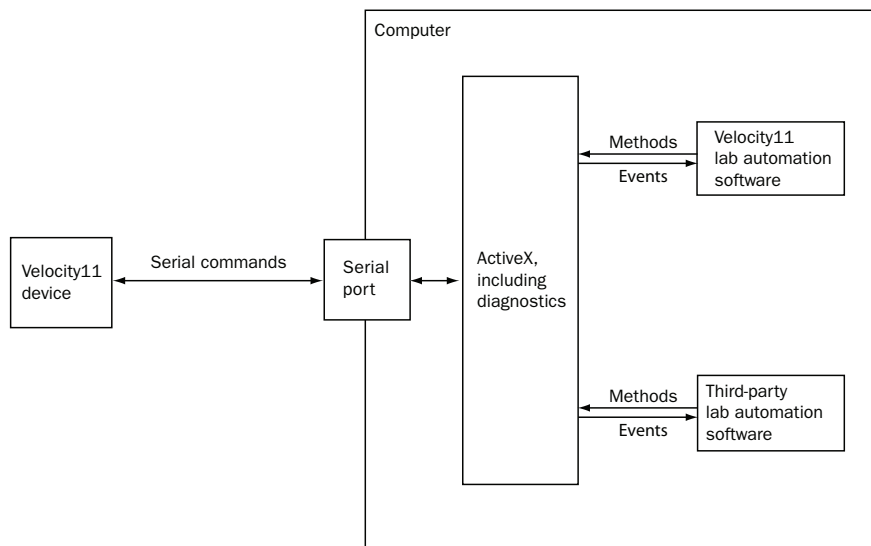
In a Velocity11 lab automation system, lab automation system software such as VWorks is already configured to interface with the PlatePierce. The operator can control the device using the software.

In a third-party lab automation system, you need to use ActiveX to configure the third-party software to interface with the PlatePierce. 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

When integrating the PlatePierce in a lab automation system, you need to know the available methods and properties for the ActiveX control.

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



Related topics

For more information about...	See...
The PlatePierce ActiveX methods and properties	<input type="checkbox"/> “Properties” on page 66 <input type="checkbox"/> “Methods” on page 67
Workflow for using PlatePierce in a Velocity11 lab automation system	“Lab automation system software” on page 13
Workflow for using PlatePierce in a Velocity11 lab automation system	Third-party lab automation system user documentation

Integrating the PlatePierce ActiveX control

About this topic This topic explains how to integrate the PlatePierce ActiveX control in a third-party lab automation system.

Procedure When integrating the PlatePierce ActiveX control into the third-party lab automation system software:

1. Install the PlatePierce ActiveX control. See “Installing the PlatePierce ActiveX software” on page 30.
2. Refer to the description of the Methods and Properties in this appendix.

Related topics

For more information about...	See...
The PlatePierce ActiveX methods and properties	<input type="checkbox"/> “Properties” on page 66 <input type="checkbox"/> “Methods” on page 67
Workflow for using PlatePierce in a Velocity11 lab automation system	Third-party lab automation system user documentation

Properties

Property: Blocking**Type**

VT_BOOL

Comments

Determines if the code will run in blocking or non-blocking (multithreading) mode.

TRUE = blocking

FALSE = non-blocking

C++ Example

```
PlatePierce.SetBlocking(TRUE);  
PlatePierce.GetBlocking();
```

**Property:
ControlPicture****Type**

VT_PICTURE

Comments

Icon used to represent the ActiveX control

C++ Example

```
IPictureDisp* MyIcon;  
MyIcon = PlatePierce.GetControlPicture();
```

Methods

Method: LONG
Initialize(LPCTSTR Profile)

Arguments

Profile (see “Creating and managing profiles (lab automation systems only)” on page 36.)

Comments

Initializes the profile identified by Profile by:

1. Opening the COM port found in the profile
2. Checking that the PlatePierce is responding

Returns

An HRESULT. In blocking mode, the value will be S_OK if the method is returned successfully, and an error code if it is not. The error is available with a call to GetLastError(). In non-blocking mode, the value will be S_OK if the thread was able to launch, an error code if not.

Events

If in non-blocking mode, an InitializeSuccessful event is returned if successful, and an Error event if not successful.

C++ Example

```
PlatePierce.Initialize("my profile");
```

Method: LONG
StartCycle(USHORT Pressure)

Arguments

Pressure

Comments

Starts the piercing process by:

- Checking to make sure the serial port is open
- Setting the piercing pressure to the value of *Pressure*
- Commanding the PlatePierce to begin the press cycle
- Polling the PlatePierce for its status, until it returns to its idle state, an error state, or if the press cycle has timed out. The polling operation is performed as a state self-transition, with a thread sleep time of 100 ms.

Returns

An HRESULT. In blocking mode, the value will be S_OK if the method returned successfully, and an error code if not. The error is available with a call to GetLastError(). In non-blocking mode, the value will be S_OK if the thread was able to launch, and an error code if not.

Events

If in non-blocking mode, a CycleSuccessful event is fired if successful, and an Error event is fired if not successful.

C++ Example

```
PlatePierce.StartCycle(60);
```

**Method: void
ShowDiagsDialog(VT
_BOOL Modal)**

Arguments

Modal

Determines if the diagnostics dialog window will be opened as a modal, or non-modal window. TRUE = modal.

Comments

Displays the diagnostics dialog box.

C++ Example

```
PlatePierce.ShowDiagsDialog(TRUE);
```

**Method: BSTR
GetLastError()**

Arguments

None

Comments

Gets the last encountered error.

Returns

A string corresponding to the last error encountered. This method provides the standard way of determining the nature of an error in blocking mode (since error events are not used), but is also applicable in non-blocking mode.

C++ Example

```
PlatePierce.SetBlocking(TRUE);  
if (PlatePierce.StartCycle(-10) != S_OK) {  
    // Using a pressure of -10 psi (-0.069 MPa) will  
    // cause an error. Print it to screen.  
    cout << GetLastError();  
}
```

**Method: VARIANT
EnumerateProfiles()**

Arguments

None

Comments

Gets a list of the PlatePierce profiles available on the computer.

Returns

A variant containing a SAFEARRAY of BSTR values, representing the names of the profiles in the ActiveX. If no profiles are available, the variant will be empty.

C++ Example

```
VARIANT vaResult =  
PlatePierce.EnumerateProfiles();
```

Methods: LONG
Abort(), LONG
Ignore(), LONG
Retry()

Arguments

None

Comments

- If the Initialize() or StartCycle() method fails, these methods may be called to take further action.
- Abort() dictates that the PlatePierce will stop execution of the current command.
- Ignore() will cause the PlatePierce to ignore the current error and continue with the current command.
- Retry() will cause the PlatePierce to ignore the current error and retry the current command.

Returns

In each case, an HRESULT. An S_OK will be returned if the method is returned successfully, and an error code if not. The corresponding error can be retrieved by a call to the GetLastError() method.

C++ Example

```
PlatePierce.SetBlocking(TRUE);  
if (PlatePierce.Initialize("profile 1") != S_OK) {  
    // If "profile 1" does not exist  
    PlatePierce.ShowDiagsDialog(FALSE);  
    // open up the diagnostics and create a profile of  
    // that name  
}  
PlatePierce.Retry( );  
// try again
```

Glossary

B

Term	Definition
controlling computer	The lab automation system computer that controls the devices in the system.
insert	A pad placed under the plate to support the bottom of the wells for uniform piercing.
pin plate	The interchangeable component that contains the piercing pins.
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.
press	The metal structure that holds and moves the pin plate inside the PlatePierce.
profile	The Windows registry entry that contains the communication settings needed for communication between a device and the Velocity11 lab automation software.
protocol	A sequence of tasks to be performed by the lab automation system.
run	A process in which one or more plates are pierced. In a standalone device, the run consists of one piercing cycle. In a lab automation system, a run can consist of multiple piercing cycles that are automated.
piercing chamber	The area inside of the device where the piercing process occurs.
task parameters	The parameters associated with each task in a protocol. For example, in a PlatePierce task, the parameters include the piercing pressure.

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Note: You can search our technical documentation on our web site at www.velocity11.com.

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