BioCel Environmental-Control System

User Guide

Agilent Technologies

Notices

User Guide Part Number

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

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Agilent Technologies

Letter to our Customers

Dear Customer,

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

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

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

Velocity11 product name changes

Velocity11 product name	Changes to ...
Access2 Automated Microplate Loader	Automated Centrifuge Loader
Element Automation System	BioCel 900 System
IWorks Device Driver Programming Interface	VWorks 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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Contents

Preface

This preface contains the following topics:

Who should read this guide

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: ❑ Managing the Environmental-Control System ❑ Developing the applications that are run on it ❑ Solving the more challenging problems that might arise ❑ Developing training materials and standard operating procedures for operators
Operator	Someone who performs the daily production work on the Environmental-Control System and solves routine problems. Your organization may choose to create its own procedures for operators including the procedures in this guide.

Related topics

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

What this guide covers

What is covered

This guide describes the Environmental-Control System in the BioCel® Automation System, the operation of the relevant hardware components, and the use of the iSeries Diagnostic software.

What is not covered

This guide does not provide instructions for the BioCel System. For information about the BioCel System, see the *BioCel System User Guide*.

Software version

This guide documents iSeries Diagnostics version 3.0.3 or later.

Related guides

The *BioCel Environmental-Control System User Guide* should be used in conjunction with the following documents:

- ❑ *BioCel User Guide*. The document explains how to use the system.
- ❑ Velocity11 automation control software user guides, such as the *VWorks Automation Control User Guide*. These user guides explain how to use the software to operate the system.

Related topics

For more information about...	See...
Who should read this guide	"Who should read this guide" on page vi
How to access different formats of this user guide	"Accessing Velocity11 user guides" on page viii

Accessing Velocity11 user guides

About this topic

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

Formats available

Velocity11 user information is provided to you as:

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

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

Where to find user information

Online help

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

PDF file

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

Velocity11 website

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

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

Online help

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

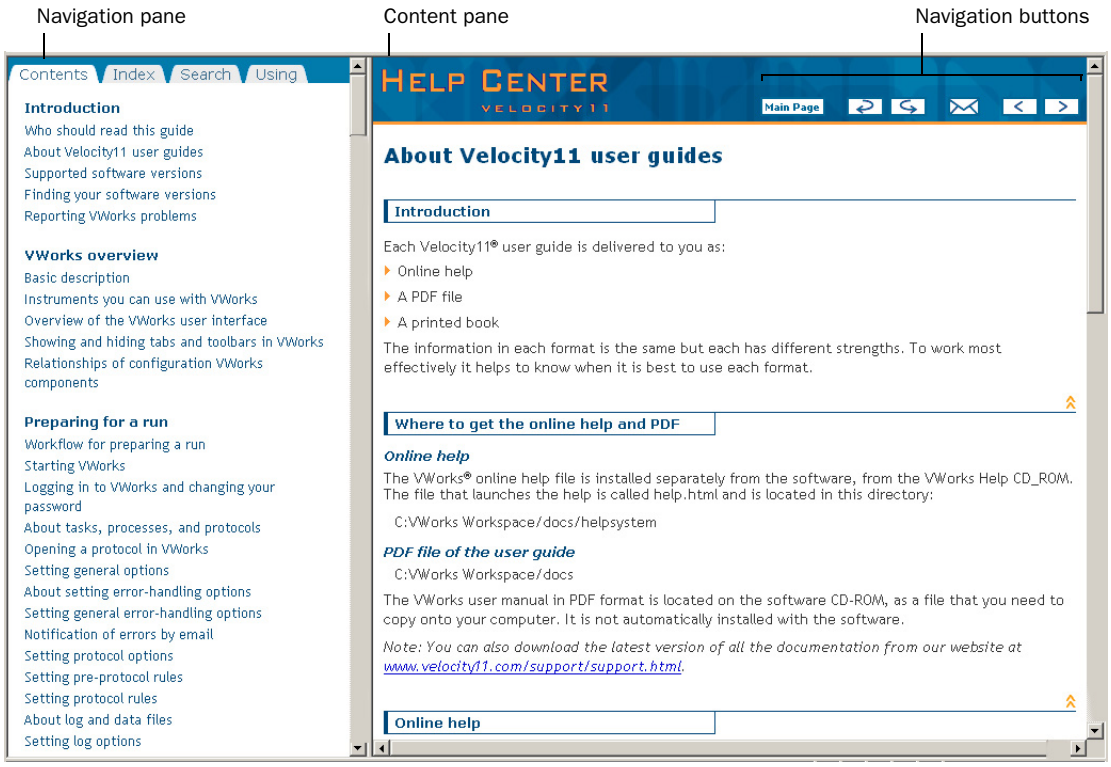
To open the online help:

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

Main features

The online help window contains the following:

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



PDF user guides

Computer requirements

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

Printing and searching

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

More information

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

Related topics

For more information about...	See...
Who should read this guide	“Who should read this guide” on page vi
What this guide covers	“What this guide covers” on page vii

BioCel Environmental-Control System overview

1

This chapter contains the following topics:

Environmental-Control System description

About this topic

This topic describes the BioCel Environmental-Control System and explains its use.

Description

The BioCel Environmental-Control System automatically maintains the desired percentage of relative humidity within the BioCel System. The system uses nitrogen gas to displace air inside the sealed BioCel System chamber, thereby reducing the humidity.

Components

The Environmental-Control System consists of the following components:

- ❑ Nitrogen On and Off buttons on the Environmental Controls panel
- ❑ Nitrogen Purge switch on the Environmental Controls panel
- ❑ Door-locking and interlock mechanisms
- ❑ Diagnostics software that allows you to set the desired percentage of relative humidity

Before you operate the system

!! INJURY HAZARD !! For safe operation, it is imperative that you follow the precautions in "Safety" on page 7.

Related topics

For information about...	See...
Environmental-Control System specifications	"Nitrogen requirements" on page 3
Environmental-Control System component description	"Hardware overview" on page 4
Safety information	"Safety" on page 7

Nitrogen requirements

About this topic

This topic lists the nitrogen requirements for the Environmental-Control System. For the BioCel System physical, electrical, and environmental requirements, see the *BioCel System User Guide*.

Requirements

Requirement	Value
Quality	Application dependent
Source	One of the following: ❑ Centralized source (house) ❑ Compressed-nitrogen cylinders
Pressure	0.6 MPa (100 psig) maximum
Flow rate	1100 Lpm (40 scfm) maximum

Note: The flow rate you use depends on the time required to achieve the target percentage of relative humidity.

Connection to the BioCel System

Nitrogen lines are connected at the top of the BioCel System. For the location of the external utilities connections, see the *BioCel System User Guide*.

Related topics

For information about...	See...
Environmental-Control System components	"Hardware overview" on page 4
Safety information	"Safety" on page 7
BioCel System lab requirements	*BioCel System User Guide*

Hardware overview

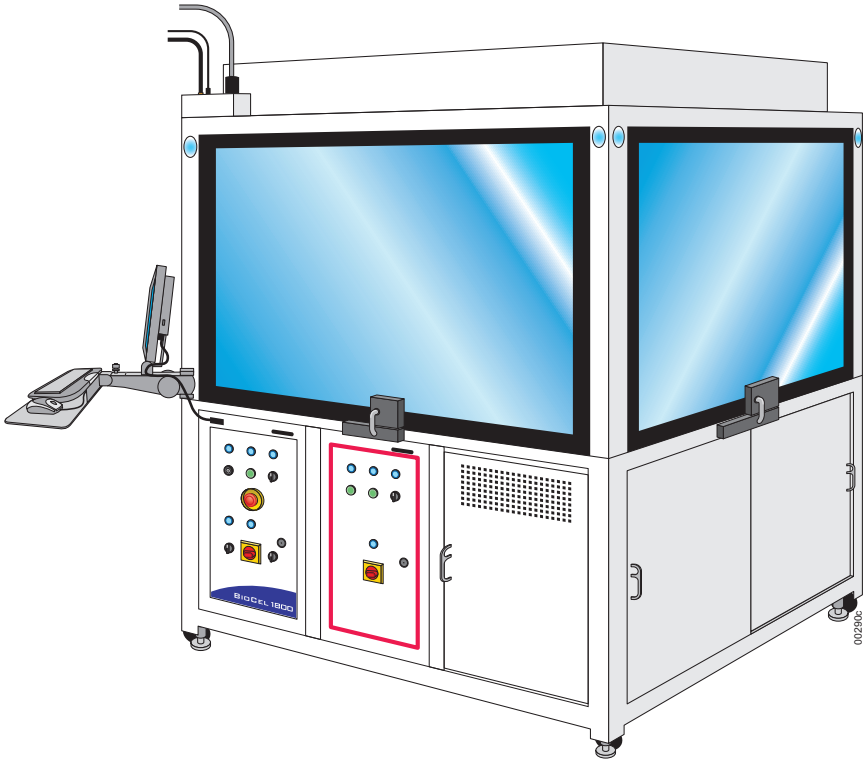
About this topic

This topic describes the following Environmental-Control System hardware features:

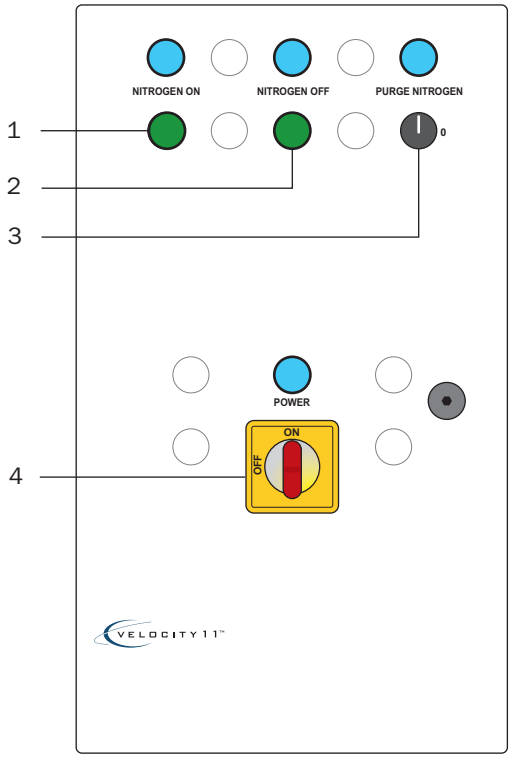
- ❑ Environmental Controls panel
- ❑ Nitrogen Utilities panel

Environmental Controls panel

The Environmental Controls panel consists of a switch for power, buttons for turning on and off the nitrogen, and a switch for purging the nitrogen. The Environmental Controls panel is located next to the power panel.



The following figure shows the Environmental Controls panel in detail.

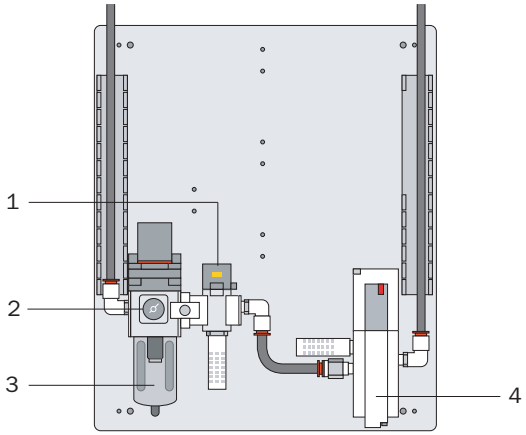


Item	Feature	Description
1	NITROGEN ON button	Turns on the nitrogen to the system.
2	NITROGEN OFF button	Turns off the nitrogen to the system.
3	PURGE NITROGEN switch	Purges the nitrogen from the system chamber. When you turn the PURGE NITROGEN switch, the nitrogen is turned off automatically.
4	POWER switch	Turns on and off the Environmental-Control System.

Nitrogen Utilities panel

The Nitrogen Utilities panel contains the nitrogen-supply connection, regulator, and filter. The utilities panel is located behind the Environmental Controls panel. To access the panel, slide open the cabinet door nearest the Environmental Controls panel.

The following figure shows the components that control the nitrogen supply in detail.



Item	Feature	Description
1	Nitrogen supply shutoff valve and residual pressure release	Turns on or off the nitrogen supply to the system. Use the valve to turn off the nitrogen supply only if the NITROGEN ON or the NITROGEN OFF buttons on the Environmental Controls panel is not working, or if the system is being serviced.
2	Nitrogen pressure regulator	Controls the nitrogen pressure to the system.
3	Filter	Filters the air supply to the system.
4	Interlock air shutoff valve	Shuts off the air to moving parts when the interlock circuit is interrupted.

Related topics

For information about...	See...
Environmental Controls panel	“Environmental Controls panel” on page 4
Nitrogen requirements	“Nitrogen requirements” on page 3
Safety information	“Safety” on page 7

Safety

About this topic

!! INJURY HAZARD !! It is imperative that you follow the precautions in this section and in the *BioCel System User Guide* for safe operation.

The BioCel System with the Environmental-Control System is designed for safe operation. Under normal operating conditions, you are protected from high-pressure gas and high levels of nitrogen. However, you must be aware of the potential hazards and understand how to avoid being exposed to them.

This section presents the Environmental-Control System safety information. Read this section in conjunction with the safety information in the *BioCel System User Guide*.

Safety standards

The BioCel System with the Environmental-Control System is CE-certified and complies with the following CE safety directives: EN61010-1:1993, including Amendment 2:1995 (Safety).

High-pressure gas cylinders

Nitrogen gas is used to displace air inside the BioCel System.

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.

Nitrogen gas

!! INJURY HAZARD !! Nitrogen is an odorless, colorless, and nontoxic gas that can cause suffocation by displacing air.

Always use nitrogen in a well-ventilated area. Always turn off the nitrogen source when the system is not in use.

The following safety label is placed in the BioCel System to warn you of low-oxygen hazards.

Oxygen monitors

!! INJURY HAZARD !! Do not remove the provided oxygen monitors.

Two oxygen monitors are provided with the system: one on the inside of the system, and one on the outside of the system. The oxygen monitors sense and display the percentage of oxygen present.

To prevent accidental suffocation:

- ❑ The internal monitor interacts with the safety interlock system so that when the system chamber contains less than 19.5% oxygen, the doors lock automatically. To open the doors, the system requires that you first purge the nitrogen.
- ❑ The external monitor interacts with the safety interlock system so that when the air surrounding the BioCel System contains less than 19.5% oxygen, the shutoff valves cut off the nitrogen supply to the system.

Door locks and safety interlock system

!! INJURY HAZARD !! Do not disable or defeat the door locks or interlocks.

The BioCel System has a door-locking and safety interlock system that prevent you from opening the doors and being exposed to high nitrogen levels. When you turn on nitrogen at the Environmental Controls panel, the doors lock automatically. To unlock the doors, you must first purge the nitrogen.

Related topics

For information about...	See...
Environmental Controls panel	“Environmental Controls panel” on page 4
Nitrogen requirements	“Nitrogen requirements” on page 3
Operating instructions	“Using the Environmental-Control System” on page 9

Using the Environmental-Control System

2

This chapter explains how to operate the Environmental-Control System. The topics are:

Workflow

Workflow steps

The following table presents the steps for using the Environmental-Control System for a protocol run.

Note: Velocity11 sets up the profile for the Environmental-Control System. Do not change the existing profile settings.

Step	For this task...	See...
1	Start up the BioCel System.	*BioCel System User Guide*
2	Turn on the Environmental-Control System.	"Turning on and off the Environmental-Control System power" on page 11
3	Set the desired percentage of relative humidity.	"Setting the percentage of relative humidity" on page 13
4	Close the doors.	"Closing and opening the doors" on page 15
5	Turn on the nitrogen.	"Turning on and off the nitrogen" on page 17.
6	Start a protocol run.	Velocity11 automation control software user guide, such as the *VWorks User Guide*
7	Monitor the percentage of relative humidity.	"Setting the percentage of relative humidity" on page 13
8	Purge the nitrogen.	"Purging the nitrogen" on page 20

Related topics

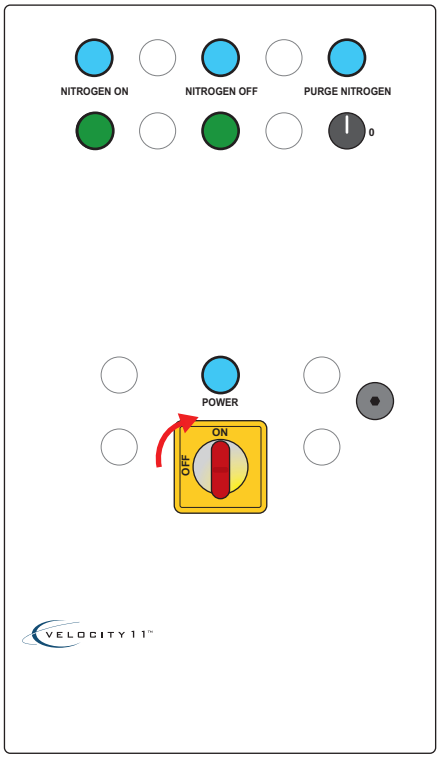
For information about...	See...
Operating the BioCel System	*BioCel System User Guide*
Running a protocol	Velocity11 automation control software user guide, such as the *VWorks User Guide*
Environmental-Control System components	"Hardware overview" on page 4
Nitrogen requirements	"Nitrogen requirements" on page 3
Safety information	"Safety" on page 7

Turning on and off the Environmental-Control System power

Turning on the power

To turn on the Environmental-Control System:

On the Environmental Controls panel, turn the **POWER** switch clockwise.

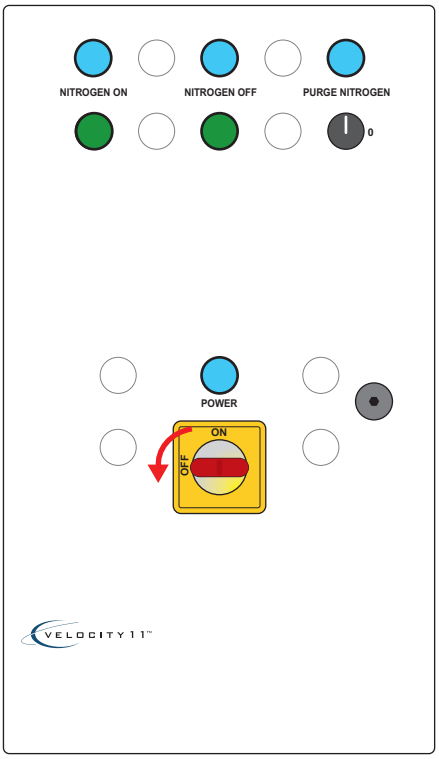


Turning off the power

After the protocol run is finished, turn off the nitrogen, and then turn off the Environmental-Control System.

To turn off the Environmental-Control System:

On the Environmental Controls panel, turn the **POWER** switch counterclockwise.



Related topics

For information about...	See...
Set the desired percentage of relative humidity	“Setting the percentage of relative humidity” on page 13
Closing or opening the doors	“Closing and opening the doors” on page 15
Turning on or turning off the nitrogen	“Turning on and off the nitrogen” on page 17
Monitoring the internal environment	“Monitoring the percentage of relative humidity” on page 19
Purging the nitrogen	“Purging the nitrogen” on page 20
Nitrogen requirements	“Nitrogen requirements” on page 3
Safety information	“Safety” on page 7

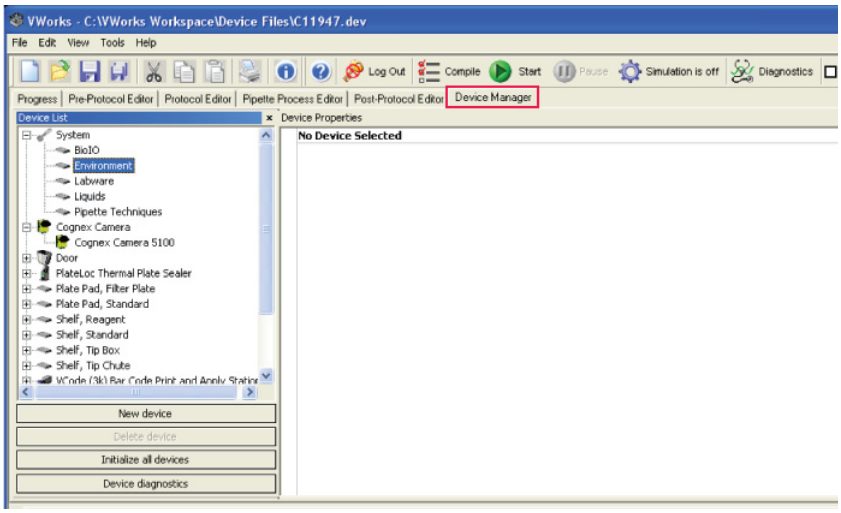
Setting the percentage of relative humidity

Procedure

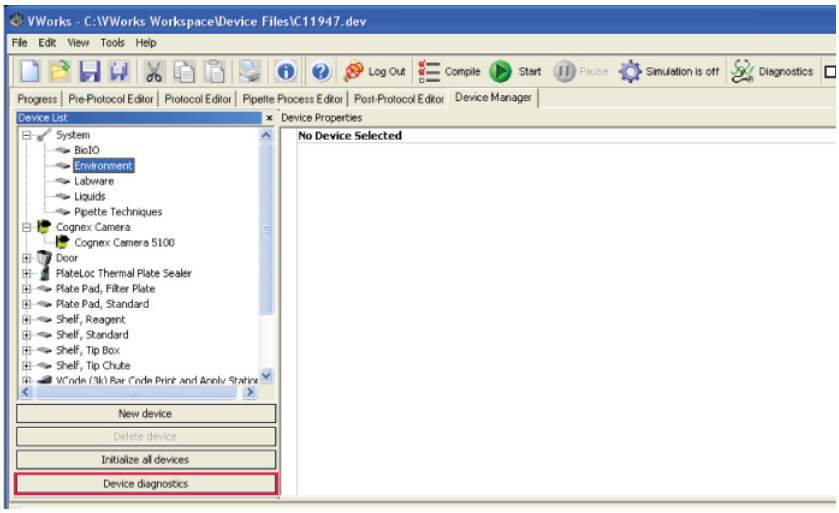
You set the desired percentage of relative humidity in the iSeries Diagnostics software.

To set the desired percentage of relative humidity:

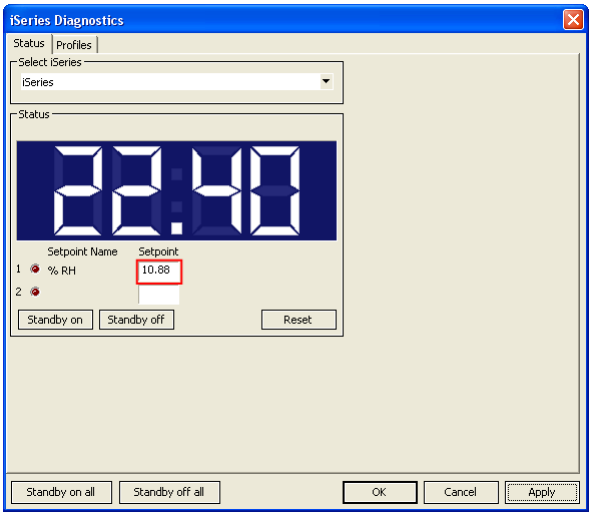
1. In the Velocity11 automation control software, click the **Device Manager** tab.



2. In the **Device List** area, select **Environment,** and then click **Device Diagnostics.** The iSeries Diagnostics dialog box opens.



3. In the **Status** tab, type the desired percentage of relative humidity in the **% RH Setpoint** box.



4. Click **OK** to save the setting and return to the Velocity11 automation control software window.

   You can click **Apply** to apply the setting without saving it.

Related topics

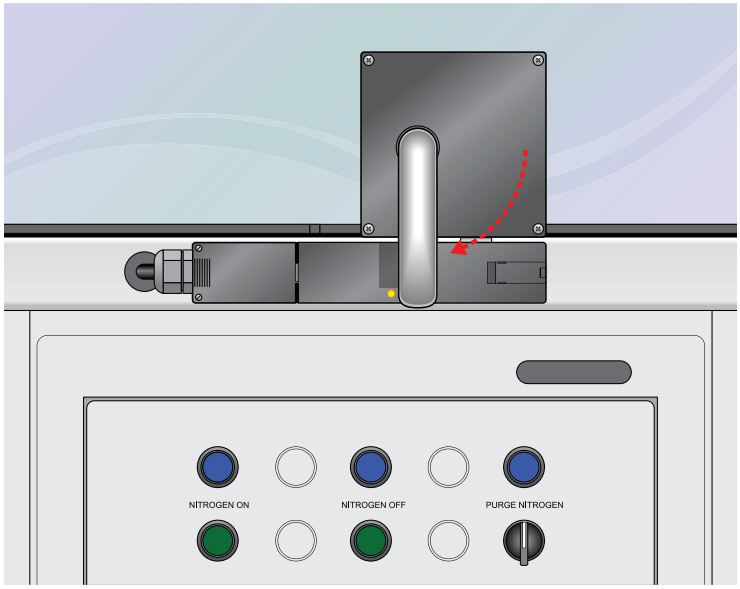
For information about...	See...
Turning on the Environmental-Control System	"Turning on and off the Environmental-Control System power" on page 11
Closing or opening the doors.	"Closing and opening the doors" on page 15
Turning on or turning off the nitrogen	"Turning on and off the nitrogen" on page 17
Nitrogen requirements	"Nitrogen requirements" on page 3
Safety information	"Safety" on page 7

Closing and opening the doors

Closing the doors

To close the BioCel System doors:

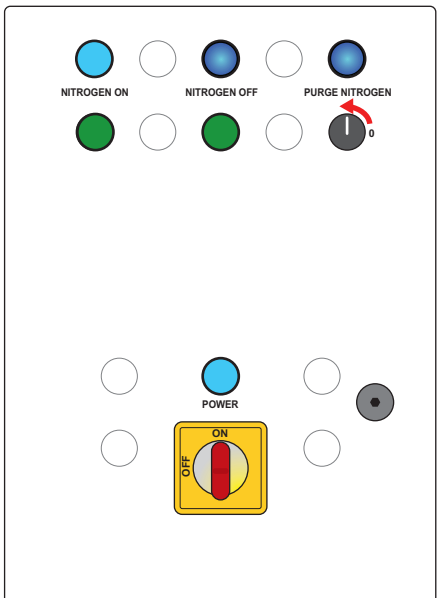
1. Close the system doors.
2. Turn the handle clockwise.



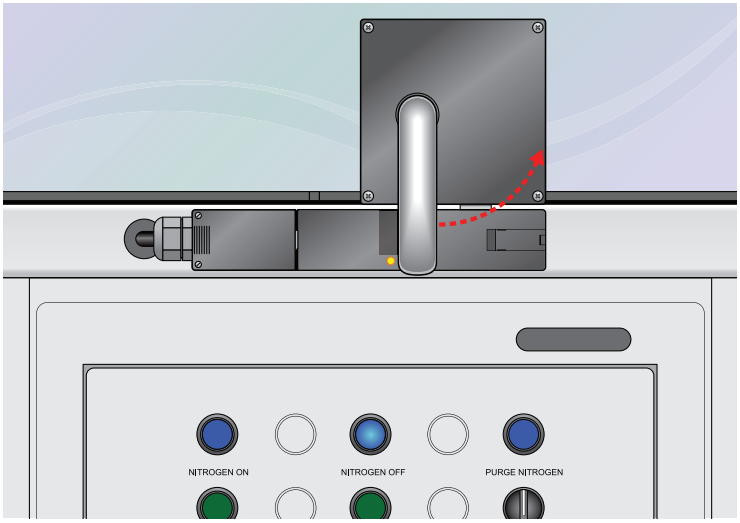
Opening the doors

To open the BioCel System doors:

1. On the Environmental Controls panel, turn the **PURGE NITROGEN** switch counterclockwise. The indicator light above the switch turns on. The nitrogen automatically turns off. The doors automatically unlock when the oxygen inside reaches a safe level.



2. Turn the handle counterclockwise.



3. Lift the door up.

Related topics

For information about...	See...
Turning on the Environmental-Control System	“Turning on and off the Environmental-Control System power” on page 11
Setting the desired percentage of relative humidity	“Setting the percentage of relative humidity” on page 13
Turning on the nitrogen	“Turning on and off the nitrogen” on page 17
Nitrogen requirements	“Nitrogen requirements” on page 3
Purging the nitrogen	“Purging the nitrogen” on page 20
Safety information	“Safety” on page 7

Turning on and off the nitrogen

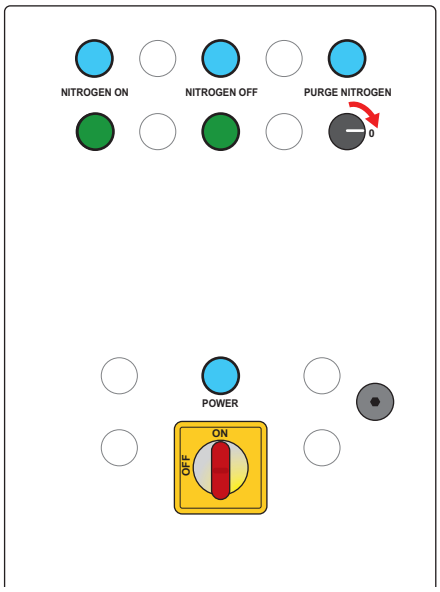
Before you start

Before you turn on the nitrogen, make sure the doors are closed and the handles are positioned vertically. See “Closing the doors” on page 15.

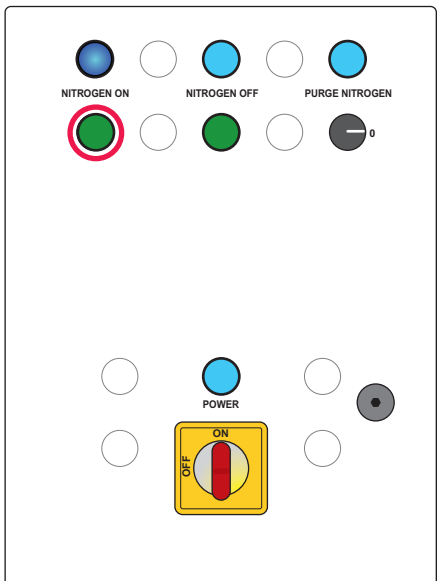
Turning on the nitrogen

To turn on the nitrogen:

1. Make sure the **PURGE NITROGEN** switch is in the off position (**0**). The indicator light above the switch should be off.



2. On the Environmental Controls panel, press the **NITROGEN ON** button. The indicator light above the button turns on.

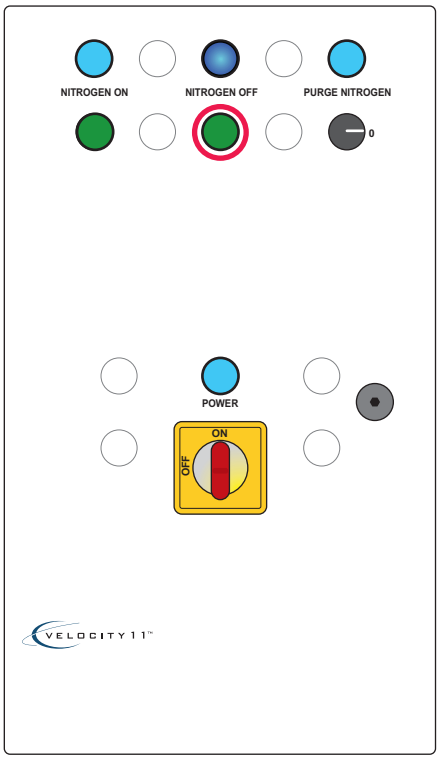


Turning off the nitrogen

The system turns off the nitrogen automatically when you press the PURGE NITROGEN button on the Environmental Controls panel.

To turn off the nitrogen manually:

On the Environmental Controls panel, press the **NITROGEN OFF** button. The indicator light above the button turns on.



Related topics

For information about...	See...
Safety information	“Safety” on page 7
Nitrogen requirements	“Nitrogen requirements” on page 3
Turning on the Environmental-Control System	“Turning on and off the Environmental-Control System power” on page 11
Setting the desired percentage of relative humidity	“Setting the percentage of relative humidity” on page 13
Closing the doors	“Closing and opening the doors” on page 15
Purging the nitrogen	“Purging the nitrogen” on page 20

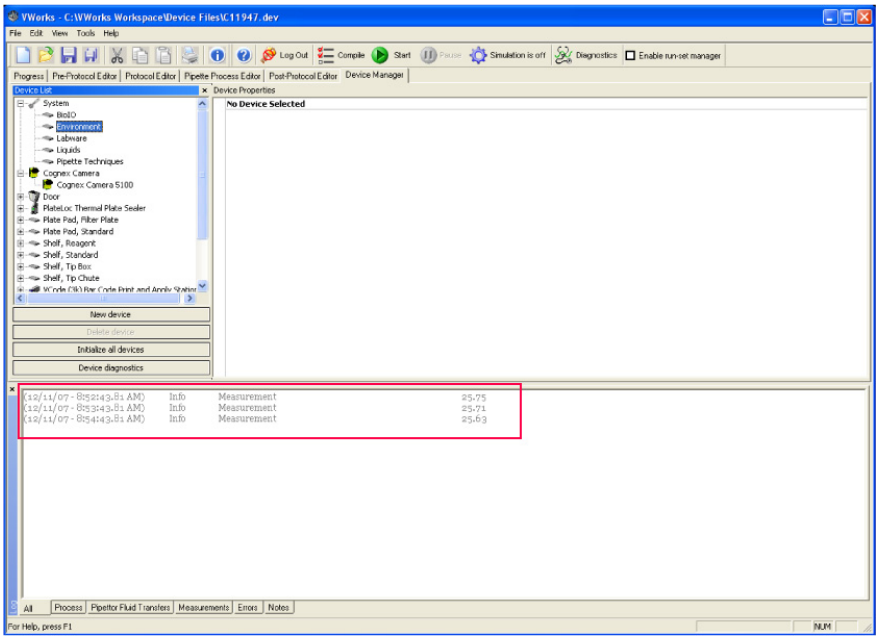
Monitoring the percentage of relative humidity

Procedure

The system checks and displays the percentage of relative humidity constantly.

To view the humidity level, in the Velocity11 automation control software window:

Check the measurements displayed in the Log area at the bottom of the window.



Related topics

For information about...	See...
Turning on the Environmental-Control System	“Turning on and off the Environmental-Control System power” on page 11
Setting the desired percentage of relative humidity	“Setting the percentage of relative humidity” on page 13
Closing the doors	“Closing and opening the doors” on page 15
Turning on the nitrogen	“Turning on and off the nitrogen” on page 17
Nitrogen requirements	“Nitrogen requirements” on page 3
Safety information	“Safety” on page 7

Purging the nitrogen

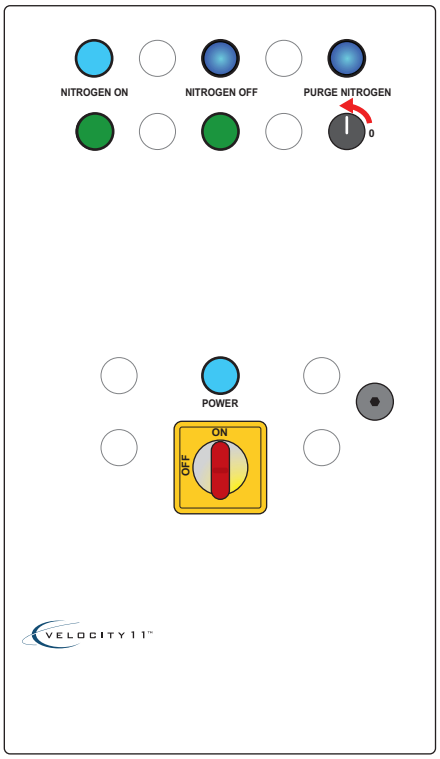
Procedure

The system locks the doors when the internal oxygen level is 19.5% or lower. To open the doors, you must first purge the nitrogen.

Note: The system purges the nitrogen automatically when the external oxygen monitor senses that the oxygen surrounding the BioCel System drops below 19.5%.

To purge the nitrogen manually:

On the Environmental Controls panel, turn the **PURGE NITROGEN** switch counterclockwise. The indicator light above the switch turns on. The nitrogen turns off automatically. Fans in the system expel the nitrogen and draw air from outside. The system requires approximately 3 minutes for the internal oxygen level to reach 19.5%.



Related topics

For information about...	See...
Opening the doors	“Closing and opening the doors” on page 15
Turning off the nitrogen	“Turning on and off the nitrogen” on page 17
Safety information	“Safety” on page 7

Schematic diagram

A

This appendix provides the schematic diagram and a description of the nitrogen system.

Nitrogen and power system

About this topic

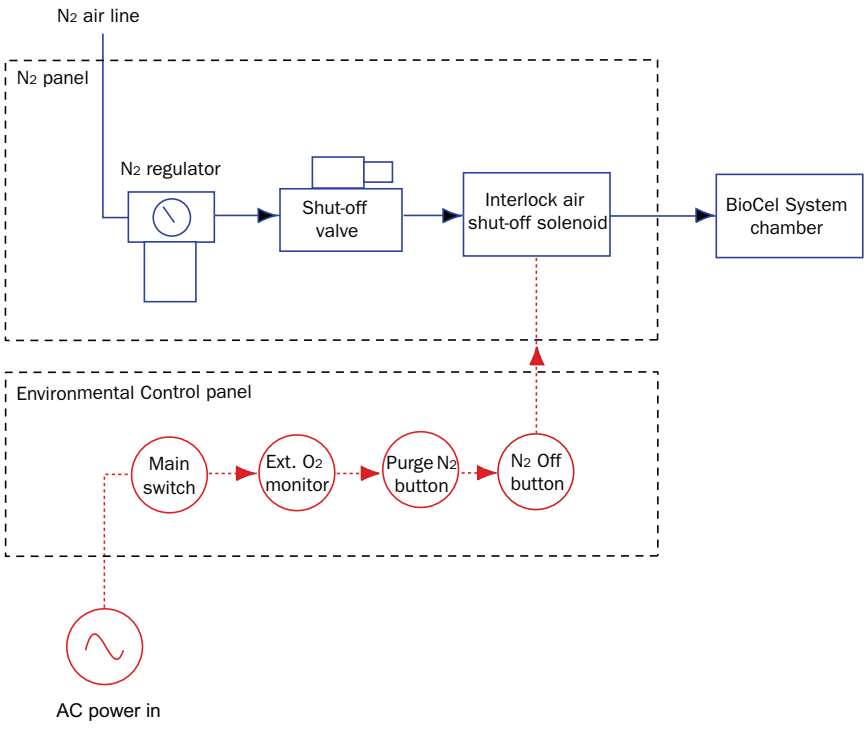
This topic summarizes the interaction between the nitrogen supply and power system. The information can be useful for troubleshooting purposes.

Diagram and description

The BioCel System uses nitrogen to displace air, thereby reducing the percentage of relative humidity. The flow of nitrogen through the system is controlled by the nitrogen pressure regulator in the nitrogen utilities panel (“Nitrogen Utilities panel” on page 6).

The following diagram shows when nitrogen is cut off from the system:

- ❑ The BioCel System is turned off (main switch).
- ❑ The external oxygen monitor senses the oxygen level dropped below 19.5%.
- ❑ The PURGE NITROGEN button is pressed.
- ❑ The NITROGEN OFF button is pressed.
- ❑ The nitrogen shutoff valve in the nitrogen utilities panel is turned off.



Related topics

For information about...	See...
Environmental Controls panel	"Environmental Controls panel" on page 4
Nitrogen utilities panel	"Nitrogen Utilities panel" on page 6
Power panel	*BioCel System User Guide*
Safety information	"Safety" on page 7

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