Alaris[®] System Maintenance v9.5.X

Software User Manual

Model 8975, v9.5.X Guardrails[®] Suite MX Compatible with v9.X Alaris[®] PC units



May 2010 Part Number: 11614346 Alaris[®] System Maintenance v9.5.X Software User Manual Part Number: 11614346

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Chapter 1 Introduction

Defined Terms

The following table identifies the defined terms used throughout this document for certain trademarked products and product features.

Product/Feature	Defined Term
Alaris [®] Auto-ID module	Auto-ID Module
Alaris [®] EtCO ₂ module	EtCO ₂ Module
Alaris [®] PCA module	PCA Module
Alaris® PC unit	PC Unit
Alaris [®] Pump module	Pump Module
Alaris [®] SpO ₂ module	SpO ₂ Module
Alaris [®] Syringe module	Syringe Module
Alaris® System Maintenance	System Maintenance Software
Guardrails [®] alert	Alert
Guardrails [®] clinical advisories	Clinical Advisories
Guardrails [®] CQI report	CQI Report
Guardrails [®] data set	Data Set
Guardrails [®] Editor software	Editor Software

About the Software

This software is provided under and subject to a license from CareFusion.

System Maintenance Software version 9.5.X allows you to perform routine maintenance on an Alaris[®] System. The functionality of this software replaces maintenance software (MSW) and the Flash tool for the Alaris[®] System. To use this software, you install it on a personal computer and then connect a serial cable between the personal computer and a PC Unit.

The System Maintenance software kit includes:

- System Maintenance software CD-ROM
- Serial cable
- This Software User Manual (pdf on CD-ROM and printed version)

A USB serial adapter (not supplied) can be used to connect one or more PC Units to a personal computer equipped with System Maintenance Software. The USB serial adapter must meet the following specifications:

- Plugs into a USB port on a personal computer.
- Provides RS-232 male DB9 port(s) for direct connection to PC Units.
- Draws its power from USB connection—a power adapter is not required.

Feature Summary

System Maintenance software can be used to perform the following functions:

- Maintain the PC Unit.
- Upgrade firmware on the PC Unit and attached modules.
- Perform preventive maintenance/check-in.
- Set and check preventive maintenance reminder dates.
- Troubleshoot and repair instruments.
- Module Calibration, as applicable.
- Set up, test, and configure the Auto-ID Module.
- Download and view instrument logs.
- Download CQI data logs.
- Transfer Data Sets from the personal computer to the PC Unit.
- Configure wireless network settings.
- Test communications board interaction with a wireless network.
- Disable Wireless Network configuration option.
- Support wireless protocols for b, b/g, a/b/g, and d networks.
- Support wireless security for WEP, WPA, and WPA2.

Perform all pre-inspections before instrument use. A qualified technician or biomedical engineer must perform inspections at least once a year or as required in accordance with CareFusion guidelines.

NOTE

- Inspections are intended to comply with requirements specified by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO).
- You can purchase a service agreement from CareFusion for preventive maintenance inspections.

Warnings

Warnings provide information needed to safely and effectively use the Alaris® product.

A **WARNING** is an alert to a <u>potential</u> hazard which could result in <u>serious</u> personal injury and/or product damage if proper procedures are not followed.

WARNING

- At no time should the System Maintenance software be used while the Alaris[®] System is connected to a patient.
- System Maintenance software and procedures are intended to be performed only by qualified personnel, or under direct supervision by qualified personnel.
- Prior to use, CareFusion recommends that you become familiar with each instrument and accessory used with the System Maintenance software. For specific instrument warnings, cautions, inspection requirements, and other related instrument information, refer to the applicable Alaris[®] System DFU and/or service manual.
- The instrument case should only be opened by qualified service personnel using proper grounding techniques. When the instrument case is opened, electrical shock hazard exists which can result in serious injury to persons and instrument component damage.
- To ensure proper calibration, run the post tests for the Pump Module and the accuracy tests for the Syringe Module after calibration. These tests are displayed in the default Calibration test lists.
- Ensure that the instrument is in operational status before returning it to patient use.
- Your PC Unit might not be compatible with every module. To determine module compatibility, refer to the applicable Alaris[®] System DFU.

Cautions

Cautions provide information needed to safely and effectively use the Alaris® product.

A **CAUTION** is an alert to a <u>potential</u> hazard which could result in <u>minor</u> personal injury and/or product damage if proper procedures are not followed.

CAUTION

- Loading the System Maintenance Software is considered a non-clinical service activity. Interconnecting a medical device with a personal computer might cause the safety or electromagnetic environment to change while the connection exists. The threat of higher leakage currents or EMI disturbance levels might be present. Remove the connection at both ends before patient use.
- By default, the System Maintenance Software is set to automatically clear logs after they are downloaded. Once log entries have been cleared, they cannot be downloaded again from the instrument. The log entries remain in the database and can be displayed using the View Reports tab in the main window.
- Only one PC Unit should be connected to a group of attached modules at any given time. Connection of multiple PC Units to each other will cause damage to the IUI connectors.
- Only one SpO₂ Module can be connected to the PC Unit at any one time.
- If a Pump Module fails the patient-side occlusion or rate accuracy verification (RAV) tests, calibration is required. Failure to calibrate and retest the instrument might result in improper instrument operation.
- For tests that require water, use distilled water at room temperature between 41°F and 104°F (5°C to 40°C). If water is not within this temperature range, the reading might be inaccurate.
- If multiple instances of the System Maintenance Software are running (typically on different personal computers), it is possible to assign different IP addresses to the same PC Unit. To ensure this does not occur, assign each PC Unit a single, unique IP address.

NOTE: If the System Maintenance Software instances are connected to the same System Maintenance Software databases, this problem cannot occur.

- Calibration verifications perform strenuous tests on the Syringe Module and PCA Module. In some cases, these tests differ from the check-in/preventive maintenance tests.
- Following calibration, use calibration verifications (rather than check-in/ preventive maintenance verifications) to verify correct calibration.
- Use of accessories or cables other than those specified might result in degraded electromagnetic compatibility performance or safety of the Alaris[®] System.
- The flow rate out of the gas source and into the EtCO₂ Module must be greater than 0.5 liter/minute to ensure accurate readings. It is recommended to place a flow meter between the gas source and the "T" in the line (breather line).

Chapter 2 Installation and Setup

System Requirements

To run the System Maintenance software, the personal computer must meet the following minimum hardware and software requirements.

CAUTION

For optimum performance of the System Maintenance Software, ensure that the personal computer is equipped with the required hardware and software, and do not use the personal computer with unspecified accessories or cables. Use of accessories or cables other than those specified might result in degraded electromagnetic compatibility performance or safety of the Alaris[®] System.

Hardware Requirements

The personal computer on which you install the System Maintenance Software must meet the following requirements:

- processor, Pentium Class, 1 GHz or faster
- RAM, 512 MB minimum
- HDD (hard disk drive), 5 GB minimum of free space after the operating system is installed
- CD-ROM drive
- video card, SVGA
- monitor, minimum resolution 1024 x 768; color depth set greater than 256 colors
- port: configurable RS-232, 9-pin, serial communications; or USB
- cable, serial communications (provided)

NOTES

- If the personal computer has a *serial* port, use a serial-to-serial cable.
- If the personal computer has a *USB* port, use a serial-to-USB cable or a serial-to-serial cable with a USB converter. USB converter products are not supported by CareFusion.
- keyboard
- mouse
- printer and printer connection (optional)

Software Requirements

One of the following operating systems:

- Microsoft[®] Windows 2000 Professional with Service Pack 4
- Microsoft[®] Windows XP with Service Pack 2
- Microsoft[®] Windows 2003 Server with Service Pack 1

Other software:

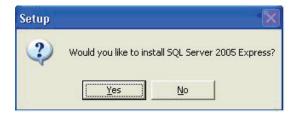
• Adobe Acrobat Reader v9.X

Install Software—Standard Installation

Follow these steps to install the System Maintenance Software on a personal computer for the first time. If you plan to migrate another version of the System Maintenance database, install the System Maintenance Software and migrate the data using the Migrate MSW file feature (**Options > Migrate MSW Data**).

Read all prompts carefully. During installation it is recommended that no other applications are running and that virus checking is disabled.

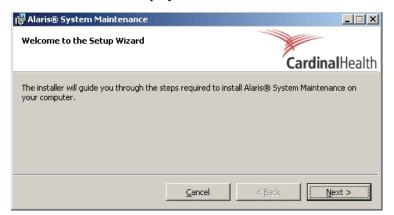
- Insert the System Maintenance Software CD into the CD-ROM drive of the personal computer. If the
 installation program automatically starts, go to the next step. If the installation program does not
 automatically start, choose Start > Run, then type d:\Setup.exe (where d: is CD drive).
 Alternatively, browse to the Setup.exe program on the System Maintenance Software CD, click Open,
 and then click OK.
- 2. When you are asked if you want to install SQL Server 2005 Express, click Yes.



3. If you are prompted to install prerequisite components, click **Install**. The components include Microsoft[®] .NET Framework 2.0, MSXML 6.0, Microsoft Report Viewer 2005, ASM Database (SQL Server Express 2005), and Adobe Reader 9.0.

🐻 Prerequisite Inst	aller 🔲 🗖 🔀
	In order to install 'Alaris System Maintenance' you must first install these components:
CardinalHealth	Microsoft .NET Framework 2.0 MSXML 6.0 Microsoft Report Viewer 2005 ASM Database Adobe Reader 9.0
Windows XP Sp2	Install Close

4. After installing prerequisites, or if prerequisites are already installed, the installation Setup Wizard Welcome window is displayed. Click **Next**.



- 5. Select the features that you want to install:
 - Full Install—installs System Maintenance databases and client tools.
 - Database—installs only System Maintenance databases.
 - Client Tools—installs only System Maintenance client tools.

To install only the database, click **Client Tools** and click the red X. To install only the client tools, click **Database** and click the red X.

🖶 Alaris® System Maintenance Setup	×
Custom Setup	
	CardinalHealth
Click on the icons in the tree below to change the	e way features will be installed.
	Full Install of the Alaris® System Maintenance Database and Client Tools
	This feature requires OKB on your hard drive. It has 2 of 2 subfeatures selected. The subfeatures require 34MB on your hard drive.
Location: C:\Program Files\Cardinal Health\A System Maintenance\	alaris Products\AlarisBrowse:
<u>R</u> eset <u>C</u> ance	< <u>B</u> ack <u>N</u> ext >

6. Click Browse to choose a location other than the default installation directory. The default directory is C:\Program Files\Cardinal Health\Alaris Products\Alaris System Maintenance\.

If an existing database is found, the following window is displayed. You can use the existing database (default) or overwrite the existing database (previous data will be lost). If a previous System Maintenance database was not found, this window will not be displayed.

🖟 Alaris® System Maintenance
Existing Database Found
CardinalHealth
!!!WARNING!!!
An existing database has been found on this computer. IF YOU OVERWRITE THIS DATABASE ALL PREVIOUS DATA WILL BE LOST.
Please select from one of the following choices.
O Use Existing Database
O Overwrite Database (Previous data will be lost)
<u>C</u> ancel < <u>B</u> ack <u>Next ></u>

- 7. Click Next to begin installation of the components of the System Maintenance Software.
- 8. Click **Next** to confirm installation.

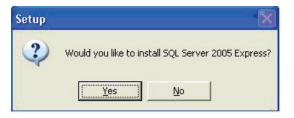
🙀 Alaris® System Maintenance			
Confirm Installation			
	CardinalHealth		
The installer is ready to install Alaris® S the following features:	ystem Maintenance on your computer. Preparing to install		
Install Location: C:\Program Files\Cardinal Health\Alaris Products\Alaris System Maintenance\ Alaris® System Maintenance Users: ALL			
Click "Next" to start the installation.			
	Cancel < Back		

When the installation is finished, an "Installation Complete" message is displayed. It is recommended that you restart your computer if prompted to do so.

Install Software—Custom Installation

Install Centralized System Maintenance Software Database on a Dedicated Server

- Insert the System Maintenance Software CD into the CD-ROM drive of the personal computer. If the
 installation program starts automatically, go to the next step. If the installation program does not start
 automatically, choose Start > Run, then type d:\Setup.exe (where d: is CD drive). Alternatively,
 browse to the Setup.exe program on the System Maintenance Software CD, click Open, and then click
 OK.
- 2. When you are asked if you want to install SQL Server 2005 Express, click Yes.



3. If you are prompted to install prerequisite components, click **Install**. The components include Microsoft .NET Framework 2.0, MSXML 6.0, Microsoft Report Viewer 2005, ASM Database (SQL Server Express 2005), and Adobe Reader 9.X.

👼 Prerequisite Inst	aller In order to install 'Alaris System Maintenance' you must first install these components:
CardinalHealth	Microsoft .NET Framework 2.0 MSXML 6.0 Microsoft Report Viewer 2005 ASM Database Adobe Reader 9.0
Windows XP Sp2	Install Close

4. Wait until the installation is completed. When the Alaris[®] System Maintenance welcome wizard is displayed, click **Next**.

5. On the Custom Setup window, ensure that Client Tools is *not* selected (unless you want to also install the client tools on the same computer as the System Maintenance database).

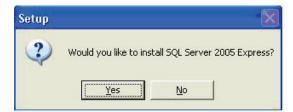
🛃 Alaris® System Maintenance Setup	×		
Custom Setup			
	Cardinal Health		
Click on the icons in the tree below to change th	ne way features will be installed.		
Ful Install	Alaris® System Maintenance Client Tools		
	This feature requires OKB on your hard drive.		
	Browse:		
Reset Cano	el < Back Next >		

- 6. Click Next.
- 7. Click Finish.

Install Client Tools on Biomedical Technician Workstation

Follow these steps to install the client tools on the Biomedical Technician Workstation.

- Insert the System Maintenance Software CD into the CD-ROM drive of the personal computer. If the
 installation program starts automatically, go to the next step. If the installation program does not start
 automatically, choose Start > Run, then type d:\Setup.exe (where d: is CD drive). Alternatively,
 browse to the Setup.exe program on the System Maintenance Software CD, click Open, and then click
 OK.
- 2. When you are asked if you want to install SQL Server 2005 Express, click No.



3. If you are prompted to install prerequisite components, click **Install**. The components include Microsoft .NET Framework 2.0, MSXML 6.0, Microsoft Report Viewer 2005, and Adobe Reader 9.0.

\delta Prerequisite Inst	aller 🔲 🗖 🔀
	In order to install 'Alaris System Maintenance' you must first install these components: Microsoft .NET Framework 2.0 MSXML 6.0
CardinalHealth	Microsoft Report Viewer 2005 Adobe Reader 9.0
Windows XP Sp2	Install Close

- 4. Wait until the installation is completed. When the Alaris[®] System Maintenance welcome wizard is displayed, click **Next**.
- 5. On the Custom Setup window, ensure that **Database** is *not* selected.

👹 Alaris® System Maintenance Setup			
Custom Setup			
	CardinalHealth		
Click on the icons in the tree below to change the way features will be installed.			
← Full Install	Alaris® System Maintenance Database		
	This feature requires OKB on your hard drive.		
	Browse:		
Reset Cance	I < Back Next >		

6. If the Database option is selected and you chose not to install SQL Server 2005 Express, a message is displayed. Click **Ok** to close the message window.

🙀 Alaris® System Maintenance	X
The AlarisSM9Db SQL Instance does not exist on this comp locally you must first install the AlarisSM9Db SQL Instance.	uter. To install the database
	ОК

7. Click Next.

A window that asks you to select the database server is displayed.

Alaris® System Maintenance	2		×
Select Location of Existing Dat	abase Server.		-
		Cardi	nal Health
The following existing database "Remote Database" and enter			erver, click
C Local Database			
• <u>R</u> emote Database			
Server Name:			
HospitalServer\AlarisSM9D	B		
	Const	a Park	Nexts
	⊆ancel	< <u>B</u> ack	<u>N</u> ext >

- 8. Choose the **Remote Database** option. Enter the server name and SQL instance. Example: HospitalServer\AlarisSM9DB
- 9. Click Next.

A "Machine Specified Not Found" message is displayed.



- 10. Click Continue.
- 11. Click Next to confirm.
- 12. Click Finish.

Configure Database Settings

Follow these steps to configure the database settings.

- 1. Start the System Maintenance Software.
- 2. If you are asked to select another database, click Yes.
- If you are not asked, choose Options > Database Settings on the main menu. The Database Settings dialog box is displayed.
- 4. Click **Add** to configure the connections for the Maintenance database, the Maintenance Log database, and the CQI Database.

Hospital Server

Database	Field Values	
Maintenance database	SQL Server field = <hospitalserver>\AlarisSM9DB</hospitalserver> Database field = Maintenance	
Maintenance Log database	Dase SQL Server field = <hospitalserver>\AlarisSM9DB Database field = MaintenanceLog</hospitalserver>	
CQI Database	SQL Server field = <hospitalserver>\CQI9DB</hospitalserver> Database field = CQI	

Standalone Computer

Database	Field Values
Maintenance database	SQL Server field = (local)\AlarisSM9Db Database field = Maintenance
Maintenance Log database	SQL Server field = (local)\AlarisSM9Db Database field = MaintenanceLog
CQI Database	SQL Server field = (local)\CQI9DB Database field = CQI

NOTE

If a database does not exist on your local database server, the "(local)" SQL Service field is replaced with the SQL Server name where the database is installed.

Alaris[®] Server (wireless)

Database	Field Values	
CQI Database	SQL Server field = <alarisappsserver></alarisappsserver> Database field = CQI	

5. Click **Test Connection** to verify the connection to the database.

Upgrade/Reinstall Software

Before you can upgrade or reinstall the System Maintenance Software, you must uninstall the existing software.

NOTE

Uninstalling the AlarisSM9DB database is NOT required to upgrade/reinstall the software (*Uninstall AlarisSM9DB Database Instance* on page 20).

- 1. Uninstall the existing software (see *Uninstall Software* on page 18).
- 2. Install/reinstall the software (see *Install Software—Standard Installation* on page 9 or *Install Software—Custom Installation* on page 12).

Uninstall Software

There are two ways to uninstall the System Maintenance Software. The method that you use depends on the version of software that you are uninstalling.

- System Maintenance Software CD: Use this method if the software being removed and the software that will be installed are the same software version.
- Windows Operating System: Use this method if the software being removed will be replaced with a different version of the software.

System Maintenance Software CD

- Insert the System Maintenance Software CD into the CD-ROM drive of the personal computer. The
 installation program starts automatically. If the installation program does not start, choose Start > Run,
 then type d:\Setup.exe (where d: is CD drive). Alternatively, browse to the Setup.exe program on
 the System Maintenance Software CD, click Open, and then click OK.
- 2. Enter information about installation as prompted, including destination.
- 3. When the message that a previous installation has been detected is displayed, click **Remove** to completely remove the existing System Maintenance Software and its components. Existing data is preserved.

🙀 Alaris® System Maintenance	
Welcome to the Setup Wizard	
	CardinalHealth
Select Remove to uninstall Alaris® System Maintenance, Select Cance	l to exit without uninstalling,
Car	ncel

4. Clicking **Remove** displays the following confirmation window. Click **Remove** again to initiate the uninstall process.

Alaris® System Maintenance Setup	X
Remove Alaris® System Maintenance	
You have chosen to remove the program from your computer.	CardinalHealth
Click Remove to remove Alaris® System Maintenance from your Click Cancel to exit the wizard.	computer.

5. When a message that indicates the software has been successfully uninstalled is displayed, click Finish.

Windows Operating System

- 1. Choose Start > Settings > Control Panel.
- 2. Double-click Add or Remove Programs.
- 3. Click Alaris[®] System Maintenance.
- 4. Click Remove.
- 5. Follow the prompts to complete the uninstallation procedure.

Uninstall AlarisSM9DB Database Instance

NOTE

All data will be lost when uninstalling the AlarisSM9DB database. Ensure that the database is backed up for future reference.

Use this procedure to uninstall the AlarisSM9DB database instance of Microsoft SQL Server 2005 Express and the following software:

- Microsoft SQL Server Native Client (if applicable)
- Microsoft SQL Server Setup Support Files (if applicable)
- Microsoft SQL Server VSS Writer (if applicable)

To uninstall the software:

- 1. Choose Start > Settings > Control Panel.
- 2. Double-click Add or Remove Programs.
- 3. Select the software (listed above) that you want to uninstall.
- 4. Click Remove.
- 5. Follow the prompts to complete the removal procedure.

If you are uninstalling Microsoft SQL Server 2005, when the following dialog box is displayed, select the instance named "AlarisSM9DB" and then click **Next** to continue with the removal procedure.

💱 Microsoft SQL Server 2005 Uninstall	×
Component Selection Select SQL Server 2005 components to uninstall.	
To uninstall existing components, select components to remove and click Next.	
Remove SQL Server 2005 instance components Select an instance:	
ALARISSM9DB: Database Engine ALARISSM9DB: Database En	
Remove SQL Server 2005 common components	
No common components have been installed.	
R	eport
< Back Next > Cancel	Help

Chapter 3 Overview

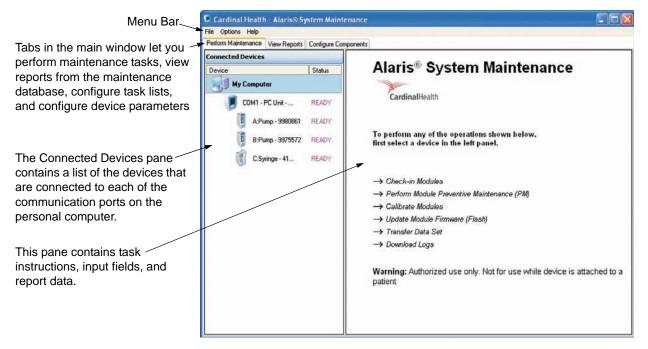
Start System Maintenance Software

1. On the personal computer desktop, double-click the Alaris[®] System Maintenance icon (or choose the program from the **Start** menu).

A series of status boxes is displayed as the System Maintenance Software scans for communication ports and establishes communication with connected devices.

When the startup routine is complete, the main window of the System Maintenance Software is displayed.

2. To check the version of System Maintenance Software, choose Help > About Alaris[®] System Maintenance.



Menu Bar

- File
 - **Refresh** (F5)—Refresh all ports.
 - **Refresh Selected Port** (Ctrl + F5)—Refresh the port that is selected in the Connected Devices pane.
 - **Exit** (Alt + F4)—Exit the software.
- Options
 - Application Settings—See *Application Settings* on page 30.
 - **Database Settings**—See *Database Settings* on page *31*.
 - **Export**—Export the CQI Database as well as information for all devices that have been connected to the PC Unit.
 - Import—Import the CQI Database as well as information for all devices that have been connected to the PC Unit.
 - Migrate MSW Data—Import a previous maintenance software v8 database.
- Help

About Alaris[®] System Maintenance—View version and copyright information.

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Chapter 4 PC Unit Connection

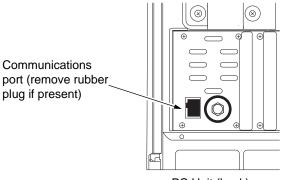
Hardware Connections

This section describes how to connect a PC Unit to the personal computer.

WARNING

At no time should the System Maintenance Software be used while the Alaris[®] System is connected to a patient.

1. If a rubber plug is covering the communications port, remove it.



PC Unit (back)

2. Connect the small end of the serial cable to the communications port on the back of the PC Unit.

Serial cable (both ends shown)



- 3. Connect the large end of the serial cable to a serial port on the personal computer.
- 4. If the PC Unit is not on, press the **System On** key.
- 5. If the System Maintenance Software is not running, start it.
- 6. Press F5 to refresh the ports.

Information about the PC Unit and attached modules is displayed in the Connected Devices pane.

Multiple PC Unit Connections

You can connect as many PC Units as there are available serial COM ports on the personal computer. To view all available COM ports:

- 1. On the main menu, click **Options > Application Settings**.
- 2. In the drop-down menu labeled Show only connected ports, click False.
- 3. Close the Application Settings window.

After a File/Refresh, a list of all available COM ports is displayed in the Connected Devices pane, whether or not they have a PC Unit attached.

- 4. Connect the PC Units to the available ports.
- 5. Press F5 to refresh the view for all ports, or press Ctrl+F5 to refresh only the port that is selected in the Available Devices pane. These options are also available in the **File** menu.

When a port refresh is selected, a list of connected devices is displayed in the Connected Devices pane. If problems occur when using the refresh feature while connected to a 4-port replicator, consider restarting the System Maintenance Software to restore the connection.

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Chapter 5 Application and Database Settings

Application Settings

Use the Application Settings dialog box to configure the available application options for the System Maintenance Software. To open the Application Settings dialog box:

1. On the main menu, choose **Options > Application Settings**.

The Application Settings dialog box is displayed.

- 2. To change an application setting, click the column to the right of that setting and make the appropriate change.
- 3. Close the Application Settings dialog box to save your changes.

Setting	Description
Flash	
• Allow serial number update	If true, the device serial number can be set through flash tasks.
• Default SpO ₂ Module for Flash	When flashing the firmware on an SpO ₂ Module, either Nellcor [®] or Masimo [®] can be selected as the default firmware.
General	
• Beep for user input	If true, causes application to beep when a running task requires attention.
• Beep on finished task	If true, causes application to beep when a task finishes.
• Enable task list edit button	If true, task list edit button is enabled, allowing Task List to be edited.
Show only connected ports	If true, only communication ports that have devices connected to them are displayed in the Connected Devices pane. If false, all available ports are displayed.
Log Downloading	If either clear downloaded logs setting is set to True , the software automatically clears the log during download. If you are performing an instrument investigation, CareFusion recommends that the logs not be cleared until the investigation is completed.
Clear downloaded CQI logs	If true, CQI logs are cleared from connected devices after download.
Clear downloaded logs	If true, all battery, error, and event logs (other than CQI logs) are cleared from connected devices after download. This setting does not affect whether CQI logs are cleared after downloading. The clearing of CQI logs after downloading is managed separately from all other settings used to clear logs.
Package Components	
Ignore incomplete packages	If true, any empty packages are ignored and do not produce an error.

Database Settings

Multiple database definitions can be defined for the three System Maintenance Software databases (Maintenance database, Maintenance Log database, and CQI database). Each definition contains the server name and authentication for the databases. Once defined, the user can select which database to use from this list of defined databases.

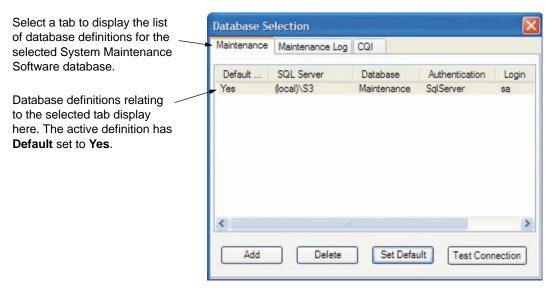
Once defined, do not change database settings unless you have a valid reason for doing so. For example, you may need to select a site-specific database in an environment that supports multiple hospital sites.

The System Maintenance Software automatically connects to the default database locations, but additional customizing may need to occur if your database definition is different from these default parameters.

Open Database Settings

On the main menu, choose **Options > Database Settings**.

The Database Selection dialog box is displayed.



Add a Database Definition

- 1. Click the tab of the desired System Maintenance Software database.
- 2. Click Add.

The Database Settings dialog box is displayed.

Database Settings		×
SQL Server	AI10EC 🗸]
Database name]
Test Connection	OK Cancel]

- 3. Select an SQL Server.
- 4. Select a Database name on this SQL Server.
- 5. Click **Test Connection** to test the connection to the server.
- 6. Click **OK** to acknowledge the test connection.
- 7. Click **OK** to save the definition.

Delete a Database Definition

- 1. Click the tab of the desired System Maintenance Software database.
- 2. Click the database definition that you want to delete.
- 3. Click Delete.

A confirmation dialog box is displayed.

4. Click **OK** to delete the database definition.

Set Active Database Definition

- 1. Click the tab of the desired System Maintenance Software database.
- 2. Click the database definition to make it active.
- 3. Click Set Default.

The System Maintenance Software now uses the selected definition as the active database and begins logging data to it as data is collected.

Test Database Definition Connection

- 1. Click the tab of the desired System Maintenance Software database.
- 2. Click the database definition to select it.
- 3. Click Test Connection.

If the connection fails, check the database definition for errors.

Migrate MSW Databases

There are two separate MSW application databases, MSW and MSW Log. Use the following procedure to migrate the MSW databases to the System Maintenance Software database.

1. On the main menu, click **Options > Migrate MSW Data**.

🕼 Cardinal Health - Alaris® System Maintenance				
File	Options Help			
Perf	Application Settings Database Settings		orts Configure Components	
Con	Database Setungs	_		
Der	Export		Status	
1	Import	•	•	
6	Migrate MSW Data			

The Database Selection screen is displayed:

D-(h DD	COL C	Database	A . 11 1' 1'	Lasta	Descored
Default DB Yes	SQL Server (local)\MedleyMTR8Db	Database MTR	Authentication SqlServer	Login sa	Password DD0D7C1/
:	Add De	lete Se	t Default	t Connection	>

2. If the desired MSW or MSW Log databases are not listed, continue with the following steps; otherwise, proceed to step 3.

NOTE

The desired MSW databases (MSW and MSW Log) must be configured as default DB.

a. Click the tab for the applicable database and then click Add. The Database Settings screen is displayed.

SQL Server	(local)\MedleyMTR8Db	*
Database name		~

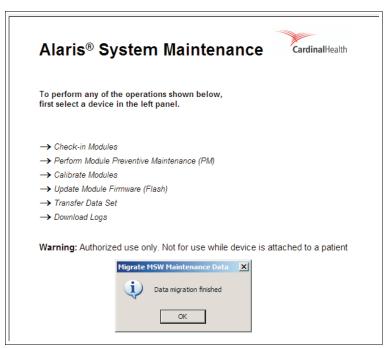
- b. Select the desired server from the SQL Server drop-down list.
- c. From the **Database name** drop-down list, select MTR for the MSW database or IMSLog for the MSW Log database.

NOTE

If the required database is not in the **Database name** drop-down list, the selected SQL Server is not correct.

- d. Click Test Connection to have the software verify that the MSW database configuration is correct.
- 3. Click on desired database.
- 4. Click Migrate—located at the bottom of the Database Selection screen—to start data migration.

The data migration progress screen is displayed. When the migration process is complete, the application displays the status of the migration.



Chapter 6 Preventive Maintenance

Introduction

WARNING

At no time should the System Maintenance Software be used while the Alaris[®] System is connected to a patient.

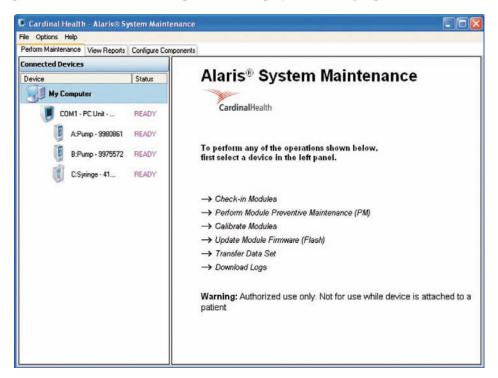
Preventive maintenance can be performed on connected modules by selecting from a list of automated tasks. Tasks can be individual tasks that exist in the list of master tasks or task groups that contain a collection of the individual tasks required to maintain devices.

Standard task groups include:

Check-in	Tasks required to check any module newly received into the facility. Run check-in on a newly received module to confirm that it was not damaged during transport and is ready to be put into use. System Maintenance Software guides you through check-in. The final task in the Check-in task group allows you to set a Preventive Maintenance (PM) Reminder Date to remind the user when preventive maintenance is due.
Preventive Maintenance	Tasks required to perform regular maintenance on a module. Run preventive maintenance tests a minimum of once a year to confirm that modules are performing correctly. System Maintenance Software guides you through preventive maintenance tests. Final task in Preventive Maintenance task group allows you to set the next PM Reminder Date to remind the user when preventive maintenance is due.
Calibration	Tasks required to test whether calibration is required and to calibrate connected modules. The calibration task group applies to EtCO ₂ Module, Syringe Module, PCA Module, and Pump Module.

General Steps

The main window is shown below. When you click a node such as **My Computer** in the Connected Devices pane, information on how to proceed is displayed in the right pane.



- 1. Click the **Perform Maintenance** tab.
- 2. Select the module (device).

The Tasks list is displayed.

NOTE

- The tasks in the Tasks list vary depending on which module you have selected and how the tasks are configured.
- You can edit the Tasks list, if desired (see *Tasks List* on page 168).

3. Click **Preventive Maintenance** in the Tasks list (Pump Module screen used as an example in following illustration).

NOTE

As a shortcut, you can double-click the task to select it and start it immediately.

Cardinal Health - Alaris® System Maint	enance			_ 🗆 ×
Perform Maintenance View Reports Configure	Components			
Connected Devices	1	Tasks Edit	A:Pump - 3647771	CardinalHealth
Device My Computer	Status	Preventive Maintenance Calibration	Instrument Inspection	Cardinaineaiui
COM1 - PC Unit - 12583575	READY	Rate Accuracy	Simultaneous Display	
A:Pump - 3647771	READY		UI Connectors	
		-	Alarm	
			🔲 Keypad	
			Door Ajar-Flo-Stop Sensors	
			Air-In-Line Sensor	
			Rate Accuracy	
			Patient Side Occlusion	
			Fluid Side Occlusion	
			Set PM Reminder Date	
		Start Selected Tasks		
		Abort Selected Tasks		
		Reset Selected Tasks		

- 4. If Preventive Maintenance was not automatically started, click Start Selected Tasks.
- 5. Follow all on-screen instructions carefully to ensure the successful completion of the task. If a task fails, the System Maintenance Software asks you if you want to rerun the failed task.

NOTE

At the end of some tests you are asked to indicate if the test passed or failed. Other tests automatically indicate a pass or fail result.

- To rerun the task, click **Yes**.
- To continue to the next task in a task group, click **No**.
- To correct a failure, abort the selected task and refer to the applicable Technical Service Manual.

6. When finished, click **Reset Selected Tasks** to return a module to the **READY** state (Pump Module screen used as an example in following illustration).

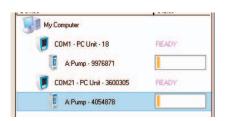
				_ 🗆 ×
File Options Help Perform Maintenance View Reports Configu	re Components			
Connected Devices Tasks Edit A:Pump - 3647771		A:Pump - 3647771	Y	
Device	Status	Check-in Preventive Maintenance	_	CardinalHealth
My Computer		Calibration	Instrument Inspection	
COM1 - PC Unit - 12583575	READY	Rate Accuracy	Simultaneous Display	
A:Pump - 3647771	COMPLETE			
			UI Connectors	
			Alarm	
			🔯 Keypad	
			💀 Door Ajar-Flo-Stop Sensors	
			Air-In-Line Sensor	
			Rate Accuracy	
			Patient Side Occlusion	
			Fluid Side Occlusion	
			Set PM Reminder Date	
		Start Selected Tasks Abort Selected Tasks		
		Reset Selected Tasks		

Run/Abort Tasks

Run Tasks Concurrently

You can run selected tasks concurrently on different connected modules. One PC Unit and a serial port is needed for each module being tested. Once you have started selected tasks on one connected device, select other devices in the Connected Devices pane and start tasks for those devices, if desired.

The status bar displays devices that are currently running tasks. If attention is required by a device to continue a task, the device progress bar and the Details Pane Task button for that task will be orange.



Select the device in the Connected Devices pane to display its task instructions and follow the displayed task instructions.

The System Maintenance Software sounds an alarm when a device needs attention or when a task is finished, if these options are set. For information on setting these options, see *Application Settings* on page 30.

Abort Tasks

You can abort (cancel) any running task that is currently selected in the Connected Devices pane.

Click Abort Selected Tasks.

The status of the task is reset to CANCEL.

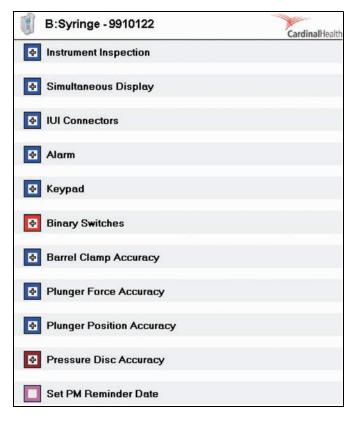
Start	Selected Tasks
Abort	Selected Tasks
Rese	t Selected Task:

Coloring Scheme

The preventive maintenance test results are identified using the following color scheme:

Blue—test passed
Brown—test aborted
Red—test failed
Orange-test is running, but waiting for user input
Purple—test has not yet been run
Green-test is automatically running (not requiring user input at this time)

Example:



Preventive Maintenance

To perform preventive maintenance, see the procedure in this section that applies to the module being tested:

PC Unit on page 41 Pump Module on page 47 PCA Module on page 59 Syringe Module on page 67 SpO₂ Module on page 77 EtCO₂ Module on page 84 Auto-ID Module and Handheld Scanner on page 91

PC Unit

Test Equipment

Test Equipment	Manufacturer	Model Number	Application
analyzer, electrical safety	Fluke BioMedical	232D or equivalent	ground tests

- 1. In the Connected Devices pane, click the PC Unit to be tested.
- 2. Click Preventive Maintenance in the Tasks list (double-click to begin testing immediately).

🕼 Cardinal Health - Alaris® System Mai	intenance			_ 8 ×
File Options Help				
Perform Maintenance View Reports Config	ure Components			
Connected Devices		Tasks Edit	COM1 - PC Unit - 12583575	×
Device	Status	Check-in	V	CardinalHealth
My Computer		Preventive Maintenance	Instrument Inspection	
CDM1 · PC Unit · 12583575			Simultaneous Display	
A:SpO2 - 3683427	READY		UI Connectors	
B:Pump - 3647771	READY		Alarm	
CDM3 · PC Unit not detected	READY		Keypad	
			Nurse Call	
			Ground Leakage	
			Ground Resistance	
			Set PM Reminder Date	
		Start Selected Tasks		
		Abort Selected Tasks		
		Reset Selected Tasks		
🏂 Start 📕 Cardinal Health - Alari 🛙	ASMScreen prints PC	.U		« 🛒 🔂 🔞 4:23 PM

3. Follow the instructions displayed on the screen for each test.

NOTE

See PC Unit Tasks on page 170 for an explanation of each task.

4. Instrument Inspection:

Step 1 Clean any surfaces where solution or obstructions have accumulated.
 Examine the instrument for overall condition. Verify that The case is clean and free from residue, especially near moving parts. Keys, labels, and markings are free of damage and are clearly legible. No tape or other forcing material is on the side of the module. Visually inspect all IUI connectors for damage, bent pins, and signs of corrosion (green material). Replace if found. Case has no apparent damage. IUI latch moves treely. Each key is illuminated by backlight (you may need to cover the keys in order to see the backlight).
Next
Step 2 The pole clamp should be secure and functioning. If the instrument is mounted on a pole or stand, examine the condition of the mount the pole, and the stand. Examine the power cord assembly for: 1. Signs of damage, cuts, or deformities in the cord. 2. Integrity of hospital grade power plug. Attempt to winggle the blades to determine that they are secure. 3. Appropriate tension and connection if the IV pole has electrical receptacles for accessories. 4. Examine the strain reliefs at both ends of the line cord. Be sure they hold the cord securely. If any damage is suspected, replace the entire cord.
Step 3 Determine Pass/Fail Press the 'Pass' button if the test has successfully completed. If any errors have occurred, press the 'Fail' button.
Pass Fail

If the test failed, click **Abort Selected Tasks**—in the Tasks list—to discontinue testing. Correct the failure(s) before continuing with the tests.

Start	Selected Tasks
Abort	Selected Tasks
Rese	t Selected Tasks

5. Simultaneous Display:

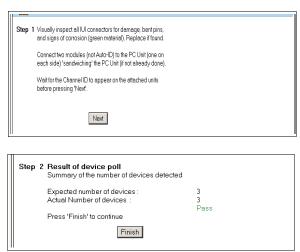
If you want the test to run continuously, click the Run test in continuous mode checkbox.

Step 1 This test will light all display elements on the LCD by	
displaying screens of solid colors.	
Current display settings Brightness	
Contrast	
Run test in continuous mode	
Run Stop	
While the test is running, check to make sure the device displays a series of solid screens, black, gray, white, red, green, and blue. Note that the test may take a few moments to complete after clicking 'Stop', If running the test in continuous mode, uncheck the continuous mode checkbox or press 'Stop' to stop the test.	
When ready to continue, press the 'Next' button.	
Next	

- Look for missing pixels (display elements) as each screen is displayed.
- The Model 8000 displays dark gray and light gray screens. The Model 8015 displays dark gray, light gray, white, red, green, and blue screens.
- If the screen brightness or contrast appears weak, check the contrast setting (refer to applicable Alaris[®] System DFU).

Step 2 Determine Pass/Fail
Press the 'Pass' button if the test has successfully completed. If any errors have occurred, press the 'Fail' button.
Pass Fail

6. IUI Connectors:



'Sandwiching'—the PC Unit has one module attached to each side.

7. Alarm:

- Alarm
Step 1 Do you hear the PC Unit speaker alarming?
Yes No
Step 2 A Pass result will be entered for this device.

If the audio is weak, check the audio volume setting (refer to applicable Alaris[®] System DFU).

8. Keypad:

NOTE

Press and hold the Tamper Switch (on back of PC Unit) for at least two seconds, until there is a response to the test.

test. To test When the te	CANCEL' twice in rapid succession will stop the st the tamper switch hold it in for at least 2 est is completed, or can't be finished for any e a key not registering), press the 'Next' button.				
	a key no	(registering), pre			
S1			S6		
S2			\$7		
\$3	TAME	PER SWITCH	S8		
S4			\$9		
S5			S10		
SILENCE					
OPTIONS					
S11	S12	S13	S14		
1	2	3	ARROW UP		
4	5	6	ARROW DOWN		
7	8	9	ENTER		
CLEAR	0	DECIMAL POIN	E CANCEL		
	-				
		Next			

Press each key one time.

- Green text—the key was pressed one time and passed the test.
- Red text—the key was pressed two times, or it was pressed one time and failed the test. If the text is red because you pressed the key more than one time, you can indicate that the test has passed.

	Step 2 Testhas passed, press the 'Finish' button
_	Finish

9. Nurse Call:

This test is performed only if a Nurse Call is installed and applies only to the Model 8000.



10. Ground Leakage:

The ground leakage test is not performed by the System Maintenance Software. The leakage current table provided below reflects IEC/UL 60601-1 requirements. The limits identified in the table are to be used in place of the 100 μ A leakage current limit specified by the software.

	G	round Leakage
Step	1	Use an Electrical Safety Analyzer to measure the ground leakage current. Refer to the test equipment operation manual for the proper measurement technique. Leakage current must be <= 100µA for normal and reversed line polarity.
		When ready to continue, Press 'Next'.

Use a Fluke Biomedical Model 232D or equivalent electrical safety analyzer to measure the ground leakage current. Refer to the test equipment's operation manual for the proper measurement technique.

The line voltage must be the same as the voltage that powers the tester and then passes to the instrument being tested.

Use the following table—in place of the requirements identified by the software—to determine the leakage current requirements for normal and reversed line polarity. The limits are 100 μ A below the IEC/UL 60601-1 standard limits to account for test variances.

	AC Supply	Leakage Current— Maximum
Japan	100 VAC	400 μΑ
North America	120 VAC	200 μΑ
Rest of World	230 VAC	400 μΑ
Australia New Zealand	240 VAC	400 μΑ

	Step 2 Determine Pass/Fail
	Press the 'Pass' button if the test has successfully completed. If any errors have occurred, press the 'Fail' button.
-	Pass Fail

11. Ground Resistance:

The ground resistance test is not performed by the System Maintenance Software. Use the following instructions and illustration to perform this test—in place of the instructions displayed by the software.

	Ground Resistance
Step	 Use a Electrical Safety Analyzer to measure resistance between the grounding pin on the power cord plug and the grounding point on the rear case. Refer to the test equipment operation manual for the proper setup and measurement technique. The resistance measured must be <= 0.20 Ohms. CAUTION: Do not connect the ground resistance probe to the pressure transducer. When ready to continue, Press 'Next'.

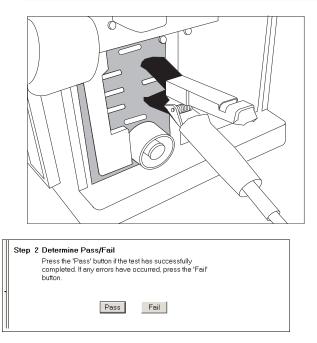
Use a Fluke Biomedical Model 232D, an Ohm Meter, or an equivalent electrical safety analyzer to measure the ground resistance between the ground pin on power cord plug or power cord receptacle, and the rear panel of the PC Unit. Refer to the test equipment's operation manual for the proper measurement technique.

The maximum allowable resistance is 1 Ohm.

The following illustration is a partial view of the rear of the PC Unit. In the illustrated example of a ground contact, a Kelvin Clip is clipped to a speaker slot on the rear panel. The only acceptable ground contact area is the rear panel—gold anodized color metal (shaded area in illustration).

NOTE

The following illustration reflects the use of the Kelvin Clip that is provided with the Fluke tester. If another tester or Ohm Meter is used, the test measures the resistance between the rear panel (shaded area in illustration) and the ground pin on the power cord plug or power cord receptacle.



12. Set PM Reminder:

- If **Enable Maintenance Reminder** is selected, a Data Set is loaded and the configuration option for the Data Set is set to **Disable**. The Data Set setting overrides the System Maintenance Software selection.
- The next maintenance reminder date defaults to 12 months. The reminder can be set to an earlier date but it cannot be set to a date past the 12-month default.



Pump Module

Test Equipment

Test Equipment	Manufacturer	Model/Part Number	Application
gauge, pressure, digital (peak hold)	 Either of the following: Heise (www.heise.com) Ashcroft (www.ashcroft.com) 	 PTE-1 (accuracy from 0.1 to 0.025% span) 2089, 2086, or 2084 (accuracy from ±0.05%, 0.10%, or 0.25% of span) or an equivalent gauge with: (a) unit of measure in mmHg (b) accuracy of ±1% (c) range of 0-1500 mmHg 	pressure test
hemostat	N/A	N/A	fluid-side occlusion test
IV pole, standard	CareFusion	903-0336 or equivalent	rate, pressure, and occlusion tests
 IV sets IV set, standard, without check valve IV set, calibration IV set, calibration 	CareFusionCareFusionCareFusion	 2210-0500 8100-RCS 8100-PCS 	rate and pressure tests
IV solution container (bag preferred)	N/A	N/A	rate and pressure tests
luer lock, female, 1/8"-27 NPT	Cole-Parmer (www.coleparmer.com)	K-45503-78 or equivalent	pressure test
reducer, female, 1/4" NPT (F) x 1/8" NPT (F)	Cole-Parmer (www.coleparmer.com)	K-06349-91 or equivalent	pressure test
scale, digital	Acculab (www.acculab.com)	VIC-212 (VICON Series) or equivalent with accuracy of ±0.01g	rate and pressure tests
tubing, silicone	CareFusion	303109 or equivalent	pressure test
T-fitting	CareFusion	303815 or equivalent	pressure test
valve, 3-way	CareFusion	97555 or equivalent	pressure test

- 1. In the Connected Devices pane, click the Pump Module to be tested.
- 2. Click **Preventive Maintenance** in the Tasks list (double-click to begin testing immediately).

🕼 Cardinal Health - Alaris® System Mai	ntenance			_ 🗆 🗙
File Options Help				
Perform Maintenance View Reports Config	ure Components	-1	and a fee	
Connected Devices Device	Status	Tasks Edit	A:Pump - 3647771	CardinalHealth
My Computer	Jadus	Preventive Maintenance Calibration	Instrument Inspection	
COM1 - PC Unit - 12583575	READY	Rate Accuracy	Simultaneous Display	
A:Pump - 3647771	READY		UI Connectors	
			Alarm	
			Keypad	
			Door Ajar-Flo-Stop Sensors	
			Air-In-Line Sensor	
			Rate Accuracy	
			Patient Side Occlusion	
			Fluid Side Occlusion	
			Set PM Reminder Date	
		·		
		Start Selected Tasks		
		Abort Selected Tasks		
		Reset Selected Tasks		
ಶ Start 🛛 🥭 💽 🕱 📝 👋 💆 D03	CA154H 🛅 Tech	Suppor 📑 CustomerDa 🧕 Inb	ox - Micr 📃 Screen Shot 🧊 SAP Logon 🛛 🐌 Cardinal H	I « 🧿 🥩 12:19 PM

3. Follow the instructions displayed on the screen for each test.

NOTE

See *Pump Module Tasks* on page 175 for an explanation of each task.

4. Instrument Inspection:

Step 1 Clean any surfaces where solution or obstructions have accumulated.
 Examine the instrument for overall condition. Verity that: The case is clean and free from residue, especially near moving parts. Keys, labels, and markings are free of damage and are clearly legible. No tape or other foreign material is on the side of the module. Visually inspect all IUI connectors for damage, bent pins, and signs of corrosion (green material). Replace if found. Case has no apparent damage. IUI latch moves treely. Each key is illuminated by backlight (you may need to cover the keys in order to see the backlight).
Next

Step 2 Interior Door Inspection	
Open door and verify: 1. Door Latch Spring Test. The latch stays up and does not sag. 2. Sear Spring Test When the sear is depressed and released, it springs back into place. 3. Platen Spring Test. The door/platen moves freely and stays open when the door is opened. 4. The mechanism seal is not tom or worn. After the inspection is complete shut the door.	
Step 3 Determine Pass/Fail Press the 'Pass' button if the test has successfully completed. If any errors have occurred, press the 'Fail' button. Pass Fail	

If the test failed, click **Abort Selected Tasks** to discontinue testing. Correct the failure(s) before continuing with the tests.

5. Simultaneous Display:

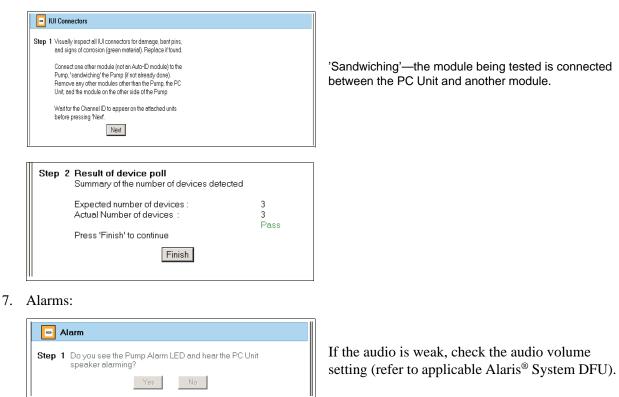
If you want the test to run continuously, select Run test in continuous mode.

🧧 Simultaneous Display				
Step 1 🔽 Run test in continuous mode				
Run Stop				
Verify: 1) Channel ID display. 2) Scrolling display. 3) Rate display 4) Lighthouse LED's 5) No missing pixels				
Note that the test may take a few moments to complete after clicking 'Stop'. If running the test in continuous mode, uncheck the continuous mode checkbox or press 'Stop' to stop the test.				
When ready to continue, press the 'Next' button.				
Next				

- Channel ID display—all segments must light.
- Scrolling display and Rate display—must flash dashes and zeros.
- **Lighthouse LED's**—all LEDs must light.

Step 2 Determine Pass/Fail
Press the 'Pass' button if the test has successfully completed. If any errors have occurred, press the 'Fail' button.
Pass Fail

6. IUI Connectors:



If the audio is weak, check the audio volume setting (refer to applicable Alaris® System DFU).

8. Keypad:



Finish

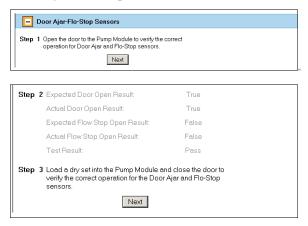
Step 2 A Pass result will be entered for this device

Press each key one time.

- Green text—the key was pressed one time and passed the test.
- Red text—the key was pressed two times, or it was pressed one time and failed the test. If the text is red because you pressed the key more than one time, you can indicate that the test has passed.

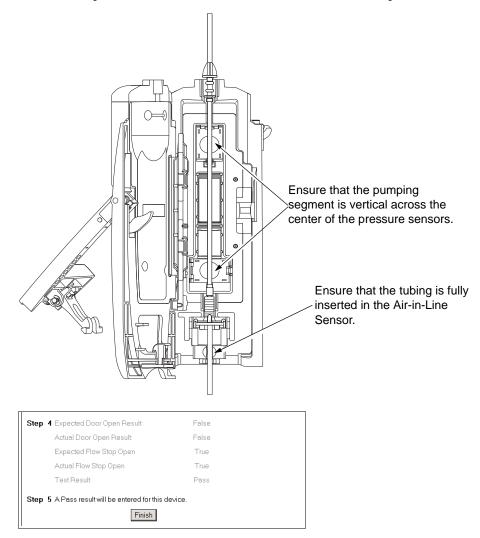
Step 2 Test has passed, press the 'Finish' button
Finish

9. Door Ajar-Flo-Stop Sensors:



Load Administration Set

Install an administration set as shown for any Pump Module test. Unless otherwise specified, in order to run a Pump Module test, the set must be loaded and the Pump Module door must be closed.



10. Air-in-Line Sensor:

Air-In-Line Sensor		
Step 1 Load an empty dry set into the P the door.	ump Module and close	
Chara 2 Evenented Connect (clust	True	
Step 2 Expected Sensor Value:		
Actual Sensor Value:	True	
Results of Sensor Test:	Pass	
Step 3 A Pass result will be entered for t	iis device.	
Finish		

11. Rate Accuracy:

CAUTION

If the Pump Module fails the rate accuracy test, calibration is required. Failure to perform calibration tests might result in improper operation.

Set up the Pump Module for the Rate Accuracy test.

Rate Accuracy Test Setup

CAUTION

- If the Pump Module fails the rate accuracy verification test, calibration is required. Failure to perform calibration tests might result in improper operation.
- To ensure accurate rate calibration, use only rate calibration sets. Rate accuracy calibration sets are valid for 60 calibrations and must be replaced after 60 uses.
- Use distilled water at room temperature of 41°F to 104°F (5°C to 40°C). If the water temperature is not within this range, the readings might be inaccurate.

Use this setup to perform the following tests:

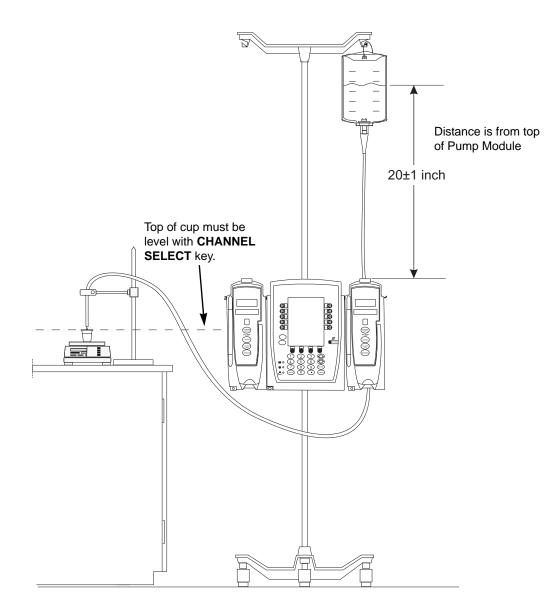
- Rate accuracy verification—Tasks: Rate Accuracy, Check-in, and Preventive Maintenance.
- Rate accuracy calibration pre-test—Task: Rate Accuracy Pre-Test.
- Rate accuracy calibration—Task: Rate Calibration.
- Rate accuracy calibration post-test—Task: Rate Accuracy Post-Test.

All tests use a standard set except for the rate accuracy verification (Task: Preventive Maintenance) and the rate accuracy calibration. These tests require the use of the Model 8100-RCS rate calibration set.

Verify that the scale is calibrated according to the manufacturer's instructions. Prime the fluid lines and keep them free of air bubbles while running the test.

If the rate accuracy calibration pre-test fails, perform the rate accuracy calibration. Following calibration, run the rate accuracy calibration post-test using a different rate calibration set to test the module with the newly calibrated parameters.

-See the test setup illustration on the following page.-



- I	Rate Accuracy			
Step	Enter the expected vo	on the packaging of the set.		
	Expected Volume :	12.00 grams Next		

Ensure that the set is properly loaded (see *Load Administration Set* on page 51). Ensure that there are no air bubbles in the set when priming is completed.

The **Expected Volume** is identified on the label attached to the characterized set.

Error message—first occurrence

If an error message appears after clicking Next, perform the following steps.

NOTE

If this is not the first occurrence of an error message and the following procedure has already been performed, perform *Error message—repeat occurrence*.

- a. Click **OK** and visually confirm that:
 - The set is properly loaded in the Pump Module.
 - There are no air bubbles in the set.
- b. Click **Yes** on the message that appears.

Rerun the failed test. 🛛 🔀			
?	The last task resulted in a Do you want to re-run th		
	Yes No		

- c. Detach and reattach the Pump Module with set installed.
- d. Repeat the rate accuracy test after the Pump Module reinitializes.

Error message—repeat occurrence

If an error message appears after clicking **Next**, manually connect to the Maintenance Mode and retest, as follows:

- a. Abort the selected task.
- a. Exit the System Maintenance Software.
- b. Turn off the PC Unit.
- c. Ensure that the serial cable is connected between the communications port on the PC Unit and the computer.
- d. Press and hold the Tamper Switch and the **System On** key on the PC Unit until the PC Unit beeps once and displays the **Maintenance Mode** screen.
- e. Press the Proceed soft key and then press the External Communications soft key.
- f. Start the System Maintenance Software.
- g. Perform Preventive Maintenance.

When performing the Rate Accuracy test, follow the instructions to ensure that the set is properly loaded and that there are no air bubbles in the set when priming is completed.

Step 2 Priming the line into the container				
	VTBI	4 ml		
	Rate	500 ml\h		
	Elapsed Time	3 secs		
	Infused Volume	0 ml		
[
Step 3 E	Balance the scale to t	he zero mark.		
Step 4	Rate measure in p	rogress		
	VTBI	12 ml		
	Rate	500 ml\h		
	Elapsed Time	7 secs		
	Infused Volume	0.5 ml		
[

Ensure that the distilled water is dripping into the cup and that the tubing is not resting on the scale.

Step 5 Enter actual weight reading from scale. Passing values are 11.59 to 12.41 grams.					
Actual weight : 12.0	grams				
Next	t				
Step 6 Summary of Test Results	Step 6 Summary of Test Results				
Pump Module Test Result: VPMR: VTBI: Rate: Expected Weight Actual Weight Acceptable Error Actual Error	Passed 175:3 12 ml 500 mlh 12.000 grams 12.0 grams +/-3.400% 0%				
Finis	h				

12. Patient-Side Occlusion:

Set up the Pump Module for the Patient-Side Occlusion test.

Patient-Side Occlusion Pressure Test Setup

CAUTION

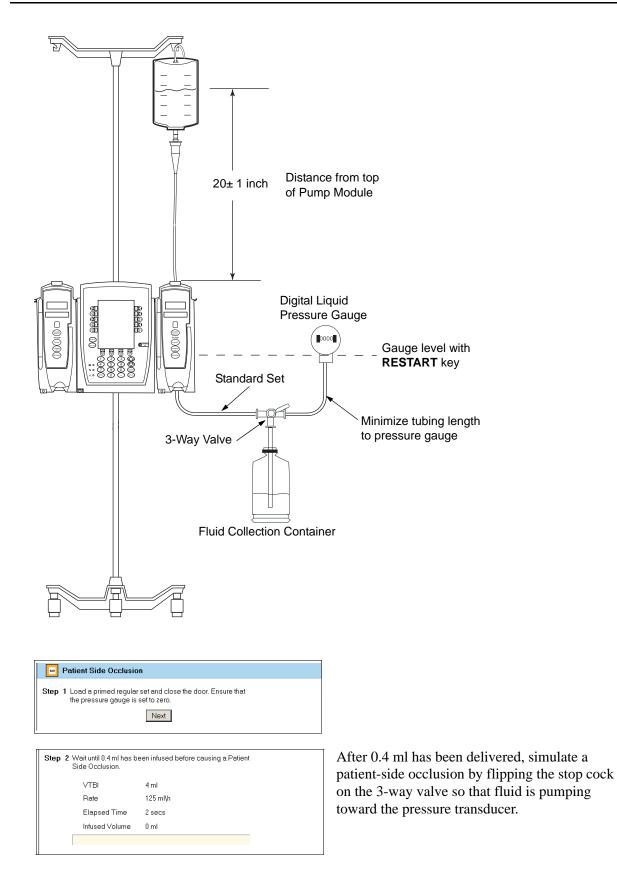
If a Pump Module fails the patient-side occlusion pressure test, calibration is required. **Failure to calibrate and retest** the instrument might result in improper instrument operation.

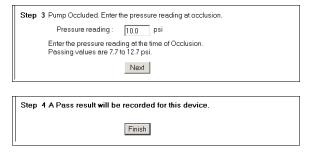
Use this setup to perform the following tests:

- Patient-side occlusion pressure test—Tasks: Patient-Side Occlusion, Check-in, and Preventive Maintenance.
- Occlusion pressure calibration pre-test—Task: Pressure Pre-Test. If this test fails, perform calibration—Task: Pressure Calibration. After calibration, run the calibration post-test—Task: Pressure Post-Test—with the newly calibrated parameters using the same standard set that was used to perform the pre-test.
- Occlusion pressure calibration post-test—Task: Pressure Post-Test.

All tests use a standard set.

-See the test setup illustration on the following page.-





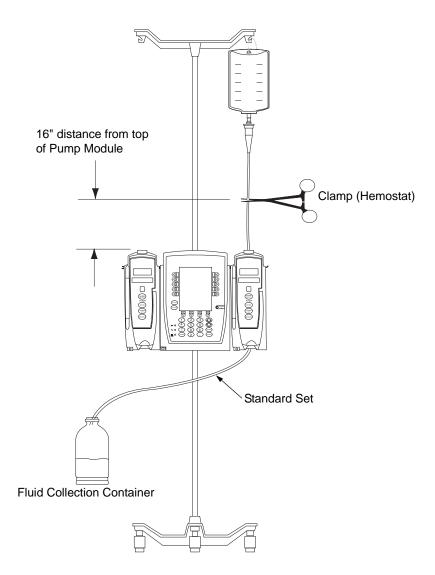
13. Fluid-Side Occlusion:

Set up the Pump Module for the Fluid-Side Occlusion test.

Fluid-Side Occlusion Test Setup

CAUTION

If the Pump Module fails the fluid-side occlusion test, the module is in need of repair.



- Fluid Side Occlusion		
	.oad a primed regular loor.	set into pump module and close
		Next
n		
	Wait until 0.4 ml has be Side Occlusion.	en infused before causing a Fluid
	VTBI	4 ml
	Rate	125 ml/h
	Elapsed Time	5 secs
	Infused Volume	0 ml
[
	Pump occluded. A F his device.	Pass result will be recorded for
		Finish

To simulate a fluid-side occlusion after 0.4 mL has been delivered, clamp the tubing 16 inches above Pump Module.

14. Set PM Reminder:

The next maintenance reminder date defaults to 12 months. The reminder can be set to an earlier date but it cannot be set to a date past the 12-month default.

Set PM Reminder Date		
Step 1 Next maintenance: 9/29/2010 -		
Finish		

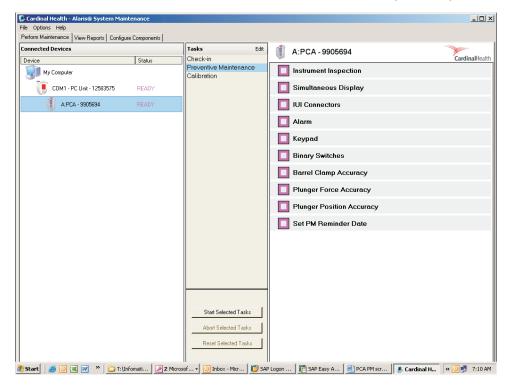
PCA Module

Test Equipment

Test Equipment	Manufacturer	Model/Part Number	Application
door key	CareFusion	10010964	lock and unlock PCA Module door.
Dose Request Cord	CareFusion	10013795	display test
gauge, syringe height	CareFusion	148181-100	plunger position calibration / verification
kit, calibration tools ^a	CareFusion	10010692	all tools required for calibration and verification
kit, force sensor	CareFusion	10010691	force sensor calibration / verification
kit, syringe sizer and height gauge	CareFusion	148182-100	plunger position / barrel size calibration / verification
kit, syringe sizer gauge	CareFusion	148180-100	barrel size calibration / verification

a. To check the spring cartridge verification, preload the cartridge with 0.50 ±0.05 lbs. Measure the deflection from the preload point after adding 19.5 lbs additional load (20 ±0.05 lbs total). Acceptable deflection is within 0.891-0.940 inches. Use of Instron or equivalent is recommended.

- 1. In the Connected Devices pane, click the PCA Module to be tested.
- 2. Click Preventive Maintenance in the Tasks list (double-click to begin testing immediately).



3. Follow the instructions displayed on the screen for each test.

NOTE

See *Syringe Module and PCA Module Tasks* on page 178 for an explanation of each task.

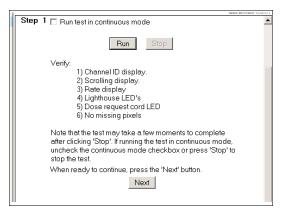
4. Instrument Inspection:

	Step 1 Clean any surfaces where solution or obstructions have accumulated.
	Examine the instrument for overall condition.
	Verify that: 1. The case is clean and free from residue, especially near moving parts. 2. Keys, labels, and markings are free of damage and are clearly legible. 3. No tape or other foreign material is on the side
	of the module. 4. Visually inspect all IUI connectors for damage, bent pins, and signs of corrosion (green material). Replace if found. 5. Case has no apparent damage. 6. IUI latch moves freely. 7. Each key is illuminated by backlight (you may
	need to cover the keys in order to see the backlight).
	Next
	Step 2 Examine the instrument for overall condition.
	Step 2 Examine the instrument for overall condition.
	Verify that: 1. The knob opens and closes freely and the claws
I	open and close with it.
I	The plunger head moves up and down freely when the knob is open.
I	 The knob, claws, plunger detect and force sensors
I	have no visible damage.
I	 The flange and flange sensor have no visible damage.
I	The barrel clamp has no visible damage and
	moves/rotates freely. 6. The key lock operates at all three detente
I	positions. 7. The door hinge moves freely and without binding.
I	With the key in the unlock position, the latch does
I	not wiggle freely. 9. With the door closed, and the key locked, rotating
	the key to the unlocked position causes the door to
	pop open. 10. The dose request button lights up when pressed.
	11. No other external damage is apparent.
	Next
I	
	Step 3 Determine Pass/Fail Press the 'Pass' button if the test has successfully
	completed. If any errors have occurred, press the 'Fail' button.
	Pass Fail
1	

If the test failed, click **Abort Selected Tasks** to discontinue testing. Correct the failure(s) before continuing with the tests.

5. Simultaneous Display:

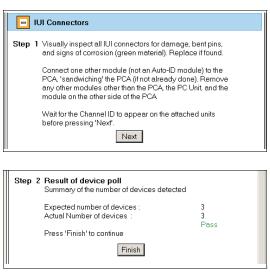
If you want the test to run continuously, click the Run test in continuous mode checkbox.



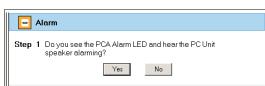
- Channel ID display—all segments must light.
- Scrolling display and Rate display—must flash dashes and zeros.
- Lighthouse LED's—all LEDs must light.
- Dose request cord LED—plug dose request cord into Auto-ID Module for this test.

Step 2 Determine Pass/Fail
Press the 'Pass' button if the test has successfully completed. If any errors have occurred, press the 'Fail' button.

6. IUI Connectors:



'Sandwiching'—the module being tested is connected between the PC Unit and another module. The other module cannot be a PCA Module. 7. Alarm:



If the audio is weak, check the audio volume setting (refer to applicable Alaris® System DFU).



8. Keypad:

	- Keypad		
Step 1 Please press every key and verify the key pressed.			
	When the test is completed, or can't be finished for any reason (like a key not registering), press the 'Next' button.		
	CHANNEL SELECT PAUSE CHANNEL OFF RESTART		
	Next		

Press each key one time.

- Green text—the key was pressed one time and passed the test.
- Red text—the key was pressed two times, or it was pressed one time and failed the test. If the text is red because you pressed the key more than one time, you can indicate that the test has passed.

Step 2 Test has passed, press the 'Finish' button
Finish

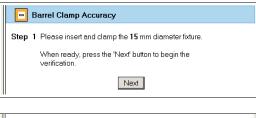
9. Binary Switches:

	В	inary Switches
Step	1	Please pull and turn the barrel clamp into the 'open' clamp position and press 'Next'. Next
Step	2	Barrel Clamp open position : Pass Please return the barrel clamp to the normal position and press 'Next'
Step	3	Barrel Clamp normal position: Pass Please insert a dose request cord firmly, depress the dose request button , and while keeping the dose request button depressed, press 'Next'.

Step 4 Dose request cord in: Pass Dose request button pressed: Pass Please release the dose request button and press 'Next'	
Step 5 Dose request button released: Pass Please remove the dose request cord and press 'Next' Next	
Step 6 Dose request cord out Pass Please close and lock the door and press 'Next' Next	The door key is needed to lock the door.
Step 7 Door closed: Pass Key locked: Pass Please unlock and open the door and press 'Next'	
Step 8 Door open: Pass Key unlocked: Pass Please press the flange detect switch and press 'Next' while holding it in.	
Step 9 Flange Detect in: Pass Please release the flange detect switch and press 'Next'. Next	
Step 10 Flange Detect out: Pass Please open the claws with the knob and press 'Next' while holding them open. Next	
Step 11 Knob open: Pass Split Nut open: Pass Please release the knob allowing the claws to close and press 'Next'. Next	
Step 12 Knob closed: Pass Split Nut closed: Pass Please press the plunger detect switch and press 'Next' while holding it in.	To access the plunger detect switch, open the knob and push the plunger detect switch up.

Step 13 Plunger Detect in: Pass Please release the plunger detect switch and press 'Next'.		
	Next	
Step 14 Plunger Flange Knob Split Nut Barrel Clamp Dose Request Cord Dose Request Button Door Key Lock Switch Sensor Test	Open: Pass Closed: Pass Locked: PassUnlocked: Pass	

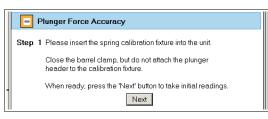
10. Barrel Clamp Accuracy:



Step 2 Please insert and clamp the 25 mm diameter fixture. When ready, press the 'Next' button to continue the verification.

	Step 3 Please remove the fixture
	Barrel Size Ver. Results Passed
	15 mm Verification: Passed
	25 mm Verification: Passed
	The device is functioning properly.
	Finish
l	

11. Plunger Force Accuracy:



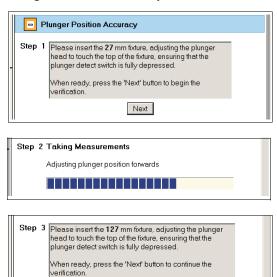
Insert the 15 mm diameter fixture behind the barrel clamp and close the barrel clamp on the fixture.

Remove the 15 mm diameter fixture, insert the 25 mm diameter fixture, and close the barrel clamp on the fixture. A popup alerts you if the correct size fixture is not installed.

IMPORTANT: To avoid damage to the plunger header, ensure that the plunger header is not attached to the calibration fixture.

Step 2	Please attach the plunger head to the calibration fixture.
	The second descent to the unit of a set of the line is
	To prevent damage to the unit, do not move the plunger head while the test is in progress until
	instructed to do so.
	When ready, press the 'Next' button to begin the
	verification.
	Next
-	
Step 3	Verification Progress
	· -····- · ····
1	Adjusting to starting position
11	
	When ready, press the 'Next' button to continue the verification.
	Next
Stop 5	Release all force from the system and
Step 5	remove the gauge
	Force Verification Results Passed
	11.6 lb Verification: Passed
	3.0 lb Verification: Passed
	The device is functioning properly.
	Finish

12. Plunger Position Accuracy:



Next

Step 4 Taking Measurements	
Adjusting plunger position forwards	

IMPORTANT: To avoid instrument damage, do not move the plunger head during this test.

Follow the instructions on the screen and then close the barrel clamp on the 27 mm fixture before pressing **Next**.

Remove the 27 mm diameter fixture, insert the 127 mm diameter fixture, close the barrel clamp on the fixture. A popup alerts you if the correct size fixture is not installed.

Step 5 Please remove the fixture.		
Plunger Position Ver. Resu	ilts Passed	
27 mm Calibration:	Passed	
127 mm Calibration:	Passed	
The device is functioning	properly.	

13. Set PM Reminder Date:

The next maintenance reminder date defaults to 12 months. The reminder can be set to an earlier date but it cannot be set to a date past the 12-month default.

Set PM Reminder Date	
Step 1 Next maintenance: 10/23/2010	
Finish	

Syringe Module

Test Equipment

Test Equipment	Manufacturer	Model/Part Number	Application
extension set, with pressure disc, small bore	CareFusion	10014917	pressure test
gauge, pressure, digital (peak hold)	 Either of the following: Heise (www.heise.com) Ashcroft (www.ashcroft.com) 	 PTE-1 (accuracy from 0.1 to 0.025% span) 2089, 2086, or 2084 (accuracy from ±0.05%, 0.10%, or 0.25% of span) or an equivalent gauge with: (a) unit of measure in mmHg (b) accuracy of ±1% (c) range of 0-1500 mmHg 	pressure test / calibration
gauge, syringe height	CareFusion	148181-100	plunger position calibration / verification
kit, calibration tools ^a	CareFusion	10010692	all tools required for calibration and verification
kit, force sensor	CareFusion	10010691	force sensor calibration / verification
kit, syringe sizer and height gauge	CareFusion	148182-100	plunger position / barrel size calibration / verification
kit, syringe sizer gauge	CareFusion	148180-100	barrel size calibration / verification
tubing, silicone	CareFusion	303109 or equivalent	pressure test
valve, 3-way	CareFusion	97555 or equivalent	pressure test

 To check the spring cartridge verification, preload the cartridge with 0.50 ±0.05 lbs. Measure the deflection from the preload point after adding 19.5 lbs additional load (20 ±0.05 lbs total). Acceptable deflection is within 0.891-0.940 inches. Use of Instron or equivalent is recommended.

- 1. In the Connected Devices pane, click the Syringe Module to be tested.
- 2. Click Preventive Maintenance in the Tasks list (double-click to begin testing immediately).

🕼 Cardinal Health - Alaris® System Main	itenance			<u>_ </u>
File Options Help				
Perform Maintenance View Reports Configure Components				
Connected Devices	Status	Tasks Edit Check-in	() A:Syringe - 12730300	CardinalHealth
My Computer	Jidus	Preventive Maintenance Calibration	Instrument Inspection	
COM1 - PC Unit - 12396458	READY		Simultaneous Display	
A:Syringe - 12730300	READY		IUI Connectors	
			Alarm	
			🔲 Keypad	
			Binary Switches	
			Barrel Clamp Accuracy	
			Plunger Force Accuracy	
			Plunger Position Accuracy	
			Pressure Disc Accuracy	
			Set PM Reminder Date	
		Start Selected Tasks		
		Abort Selected Tasks		
		Reset Selected Tasks		
🏄 Start 🛛 🥭 🧿 📧 😿 👋 🗁 J: \Ne	ancyW 🛛 🔎 2 Micros	:o 👻 🙆 Inbox - Mic 🛛 💋 SAP	Logon 🔁 v9 5 ASM D 💽 Cardinal H 📝 2 Microsof 🗸	« 🖂 🧿 🛃 10:01 AM

3. Follow the instructions displayed on the screen for each test.

NOTE

See *Syringe Module and PCA Module Tasks* on page 178 for an explanation of each task.

4. Instrument Inspection:

Step 1	any surfaces where solution or obstructions have nulated.
	ne the instrument for overall condition. rify that:
	 The case is clean and free from residue, especially near moving parts.
	 Keys, labels, and markings are free of damage and are clearly legible.
	 No tape or other foreign material is on the side of the module.
	 Visually inspect all IUI connectors for damage, bent pins, and signs of corrosion (green material). Replace if found.
	5. Case has no apparent damage.
	IUI latch moves freely.
	 Each key is illuminated by backlight (you may need to cover the keys in order to see the backlight).
	Next

Step 7	2 Examine the instrument for overall condition.
	Verify that:
	 The knob opens and closes freely and the claws open and close with it.
	The plunger head moves up and down freely when the knob is open.
	The knob, claws, plunger detect, and force sensors have no visible damage.
	 The barrel clamp has no visible damage and moves/rotates freely.
	5. The pressure sensor has no visible damage.
	No other external damage is apparent.
	 The flange and flange sensor have no visible damage.
	Next
Step 3	Determine Pass/Fail
	Press the 'Pass' button if the test has successfully completed. If any errors have occurred, press the 'Fail' button.
	[Pass] Eail

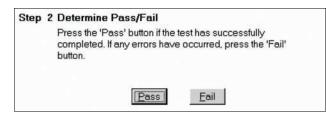
If the test failed, click **Abort Selected Tasks** to discontinue testing. Correct the failure(s) before continuing with the tests.

5. Simultaneous Display:

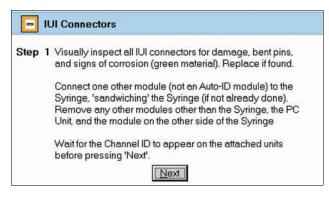
If you want the test to run continuously, select **Run test in continuous mode**.

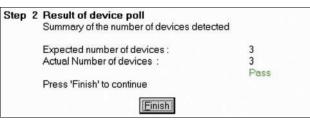
Simultaneous Display		
Step 1 🗖 Run test in continuous <u>m</u> ode		
<u>B</u> un Stop		
Verify: 1) Channel ID display. 2) Scrolling display. 3) Rate display 4) Lighthouse LED's 5) No missing pixels		
Note that the test may take a few moments to complete after clicking 'Stop'. If running the test in continuous mode, uncheck the continuous mode checkbox or press 'Stop' to stop the test.		
When ready to continue, press the 'Next' button.		

- Channel ID display—all segments must light.
- Scrolling display and Rate display—must flash dashes and zeros.
- Lighthouse LED's—all LEDs must light.

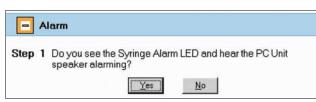


6. IUI Connectors:





7. Alarm:



If the audio is weak, check the audio volume setting (refer to applicable Alaris® System DFU).

Step	2	A Pass result will be entered for this device.
		Einish

'Sandwiching'—the module being tested is connected between the PC Unit and another module. 8. Keypad:



Press each key one time.

- Green text—the key was pressed one time and passed the test.
- Red text—the key was pressed two times, or it was pressed one time and failed the test. If the text is red because you pressed the key more than one time, you can indicate that the test has passed.

Step	2 Test has passed, press the 'Finish' button
	[<u>Finish</u>]

9. Binary Switches:

The Binary Switches test verifies that the buttons and switches on the Syringe Module are open/closed, on/off, pushed/not pushed, and so on.

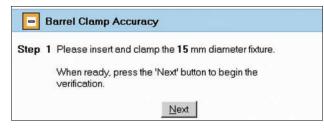
Step 1 Please pull and turn the barrel clamp into the 'open' clamp position and press 'Next'. Next Step 2 Barrel Clamp open position : Pass Please return the barrel clamp to the normal position and press 'Next'
Step 2 Barrel Clamp open position : Pass Please return the barrel clamp to the normal position
• Please return the barrel clamp to the normal position
Next
Step 3 Barrel Clamp normal position: Pass
Please insert a pressure disc and press 'Next'.
Next
Step 4 Pressure Disc in: Pass
Please remove the pressure disc and press 'Next'.
Next
Step 5 Pressure Disc out: Pass
Please press the flange detect switch and press 'Next' while holding it in.
Next

Step 6	Flange Detect in: Pass
	Please release the flange detect switch and press 'Next'.
	Next
Step 7	Flange Detect out: Pass
	Please open the claws with the knob and press 'Next' while holding them open.
	Next
Step 8	Knoblopen: Pass SplitNutlopen: Pass
	Please release the knob allowing the claws to close and press 'Next'.
	Next
Step 9	Knob closed: Pass Split Nut closed: Pass
	Please press the plunger detect switch and press 'Next' while holding it in.
	Next
•	

Step 10 Plunger Detect in: Pass	
Please release the plunger detect switch and press 'Next'.	
Next	

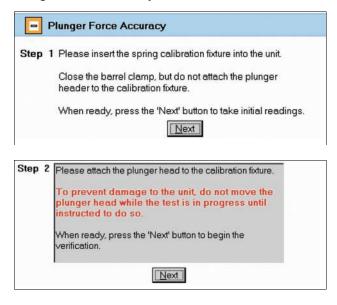
Flange Knob Split Nut	Present Pass Absent Pass Pressed: Pass Released: Pass Pressed: Pass Released: Pass Open: Pass Closed: Pass Open: Pass Closed: Pass Open: Pass Normal: Pass	
Switch Senso	r Test Results Pass	
	Finish	

10. Barrel Clamp Accuracy:



Step	2 Please insert and clamp the 25 mm diameter fixture.			
		When ready, press the 'Next' butto verification.	n to continue the	
		Next		
Step	3	Please remove the fixture	8	
		Barrel Size Ver. Results	Passed	
		15 mm Verification:	Passed	
		25 mm Verification:	Passed	
		The device is functioning	properly.	
		[<u>Finish</u>]		

11. Plunger Force Accuracy:



 Step 3 Verification Progress

 Adjusting to starting position

 Step 4 When ready, press the 'Next' button to continue the verification.

 Image: Step 5 Release all force from the system and remove the gauge

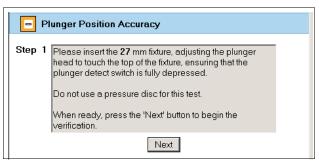
 Force Verification Results
 Passed

 11.6 lb Verification:
 Passed

Force Verification Results Passed 11.6 lb Verification: Passed 3.0 lb Verification: Passed The device is functioning properly. Finish IMPORTANT: To avoid damage to the plunger header, ensure that the plunger header is not attached to the calibration fixture.

IMPORTANT: To avoid instrument damage, do not move the plunger head during this test.

12. Plunger Position Accuracy:



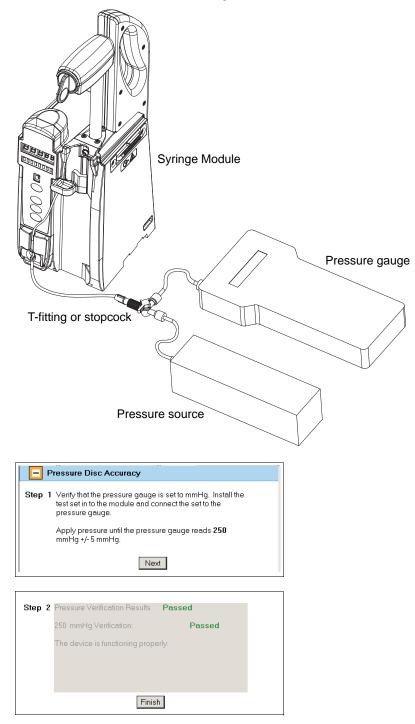
Step 2	Taking Measurements	
	Adjusting plunger position backwards	
- I		
Step 3	Please insert the 127 mm fixture, adjusting the plunger head to touch the top of the fixture, ensuring that the plunger detect switch is fully depressed. When ready, press the 'Next' button to continue the verification.	
	Next	
Step 4	Taking Measurements	
	Adjusting plunger position backwards	
1		
Step 5	Please remove the fixture.	

Step 5 Please remove the fixture	
Plunger Position Ver. Res	ults Passed
27 mm Calibration: 127 mm Calibration:	Passed Passed
The device is functioning	properly.
Finish	

13. Pressure Disc Accuracy:

Set up the Syringe Module for the pressure test.

Pressure Test/Calibration Setup



14. Set PM Reminder Date:

The next maintenance reminder date defaults to 12 months. The reminder can be set to an earlier date but it cannot be set to a date past the 12-month default.

🖃 Set	Set PM Reminder Date		
Step 1 N	Vext maintenance: 9/29/2010 💌		
	Finish		

SpO₂ Module

Test Equipment

Test Equipment	Manufacturer	Model Number	Application
Analyzer, electrical	Fluke BioMedical	232D or equivalent	patient lead electrical leakage
Cable, Masimo® Simulator	Clinical Dynamics	SS-MAS	pulse rate/saturation
Cable, Nellcor [®] Oximax [®] Simulator	Clinical Dynamics	SS-NEL	pulse rate/saturation
SpO ₂ simulator	Clinical Dynamics	SmartSat Pulse Oximetry Analyzer SS-100A, or equivalent	pulse rate/saturation

- 1. In the Connected Devices pane, click the SpO_2 Module to be tested.
- 2. Click Preventive Maintenance in the Tasks list (double-click to begin testing immediately).

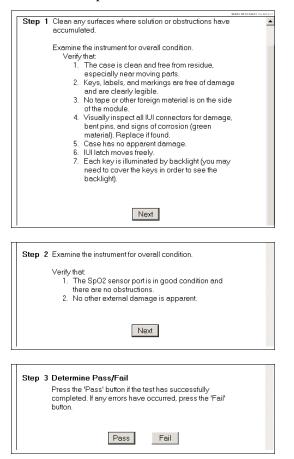
🕼 Cardinal Health - Alaris® System Maintenance			1×
File Options Help			
Perform Maintenance View Reports Configure Components			
Connected Devices Device Status	Tasks Edit	I A:Sp02 - 4014552	alth
My Computer	Preventive Maintenance	Instrument Inspection	
COM1 - PC Unit - 12583575 READY		Simultaneous Display	
A:Sp02 · 4014552 READY		UI Connectors	
		Alarm	
		🔲 Keypad	
		Pulse Rate/Saturation	
		Patient Cable Alarm	
		D Speaker	
		Dewer On Self Test	
		Patient Lead Electrical Leakage	
		Set PM Reminder Date	
	Start Selected Tasks Abort Selected Tasks		
	Abort Selected Tasks Reset Selected Tasks		
2 Start 🛛 🥭 🧿 🗷 📝 👋 🕞 TechSuppo 🗖 Custor	merD	Logon 💽 Cardinal H 😒 D03CA154 🔯 Document1 🔍 🥶 🧿 💇 12:03	 3 PM

3. Follow the instructions displayed on the screen for each test.

NOTE

See SpO₂ Module Tasks on page 182 for an explanation of each task.

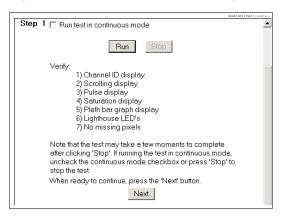
4. Instrument Inspection:



If the test failed, click **Abort Selected Tasks** to discontinue testing. Correct the failure(s) before continuing with the tests.

5. Simultaneous Display:

If you want the test to run continuously, click the Run test in continuous mode checkbox.



- Channel ID display—all segments must light.
- Scrolling display, Pulse display, and Saturation display—must flash dashes and zeros.
- Pleth bar graph display—all segments must light.
- Lighthouse LED's—all LEDs must light.



6. IUI Connectors:

	IUI Connectors	
Step	1 Visually inspect all IUI connectors for damage, bent pins and signs of corrosion (green material). Replace if found Connect one other module (not an Auto-ID module) to the Sp02; 'sandwiching' the Sp02 (if not already done). Remove any other modules other than the Sp02, the PC Unit, and the module on the other side of the Sp02 Wait for the Channel ID to appear on the attached units before pressing 'Next'. Next	
Step	2 Result of device poll	
	Summary of the number of devices detected	
	Expected number of devices : 3 Actual Number of devices : 3 Pass	
	Press 'Finish' to continue	
	Finish	

'Sandwiching'—the module being tested is connected between the PC Unit and another module.

7. Alarm



If the audio is weak, check the audio volume setting (refer to applicable Alaris® System DFU).

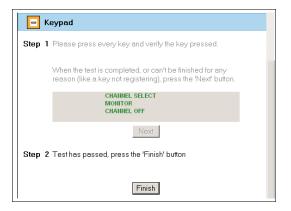
Step 2 A Pass result will be entered for this device.

8. Keypad:

😑 Keypad	
Step 1 Please pr	ess every key and verify the key pressed.
	test is completed, or can't be finished for any <e 'next'="" a="" button.<="" key="" not="" press="" registering),="" th="" the=""></e>
	CHANNEL SELECT MONITOR CHANNEL OFF
	Next

Press each key one time.

- Green text—the key was pressed one time and passed the test.
- Red text—the key was pressed two times, or it was pressed one time and failed the test. If the text is red because you pressed the key more than one time, you can indicate that the test has passed.



9. Pulse Rate/Saturation:

If the Clinical Dynamics SmartSat is being used, with a direct feed into the device, connect it before starting the test.

	Pulse Rate/Saturation		
Step	Attach the finger clamp end of the SpO2 sensor to the optical finger of the SpO2 simulator and turn the simulator on. Set the pulse rate to 75 bpm, and the saturation to 100 %. Refer to the manufacturer's manual for instructions on how to set the parameters.		
H			
Step	 Please wait for the readings to stabilize before going to the next step. 		
	Expected pulse rate: 75 bpm Acceptable range: 71 - 79 bpm Actual pulse rate: 75 bpm		
	Expected saturation: 100 % Acceptable range: 98 - 100 % Actual Saturation: 100 %		
	Sensor status: SpoSteady		
	Next		
		•	
Step	Step 3 Set the simulator pulse rate to 55 bpm, and the saturation to 90 %. Refer to the manufacturer's manual for instructions on how to set the parameters.		
	Next		
Step	Please wait for the readings to stabilize before going to the next step.		
	Expected pulse rate: 55 bpm Acceptable range: 51 - 59 bpm Actual pulse rate: 55 bpm		
	Expected saturation: 90 % Acceptable range: 88 - 92 % Actual Saturation: 90 %		
	Sensor status: SpoSteady Next		

Step 5 The overall F be entered fo	ASSED status and the following details will r this device.	
Reading 1 Pulse Saturation	- PASSED - PASSED	
Reading 2 Pulse Saturation	- PASSED - PASSED	
	Finish	

10. Patient Cable Alarm:

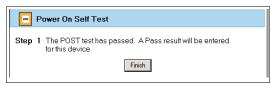
If the Clinical Dynamics SmartSat is being used, use a finger sensor instead of the patient cable.

P	atient Cable Alarm
Step 1	Connect the patient cable to the SpO2.
	Next
Step 2	Waiting for the SpO2 to Initialize
Step 3	Disconnect the patient cable.
	Next
1	
Step 4	Re-connect the patient cable.
	Next
1	
Step 5	Initialization Passed Disconnect Passed
	Connect Passed
	The preceding information will be entered into the database.
	Finish

11. Speaker:

= Speaker	
Step 1 Is the SpO2 speaker sounding?	
Yes No	
Step 2 A Pass result will be entered for this device.	
Finish	

12. Power On Self Test:



13. Patient Lead Electrical Leakage:

The System Maintenance Software is not used to perform this test. The test can be performed before beginning Preventive Maintenance testing or at this point in the testing.

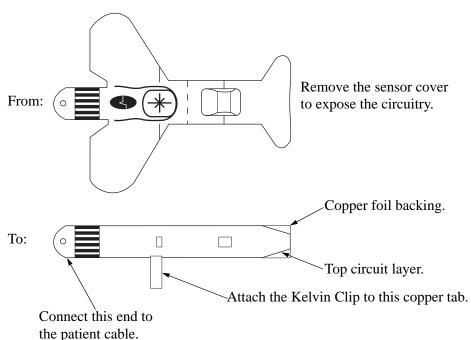


Use a Fluke Biomedical Model 232D or equivalent electrical safety analyzer to measure the electrical leakage current. Refer to the enclosure or case leakage instructions in the test equipment's operation manual for the proper measurement technique.

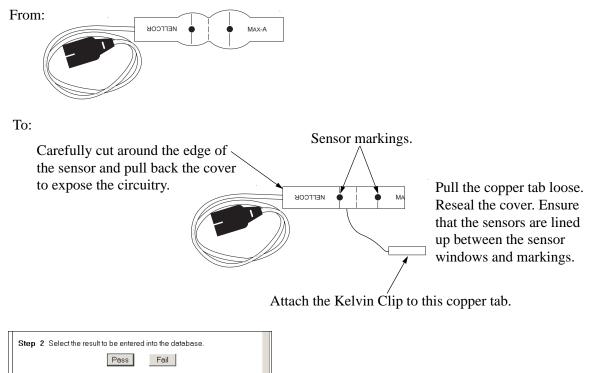
Use the following illustration to modify and use a disposable SpO_2 Sensor for the test. The maximum allowable leakage current is 100 μ A, for normal and reversed line polarity.

Disposable SpO₂ Sensor Modification and Test Point

Masimo[®] Sensor



Nellcor® Sensor



1. Set PM Reminder Date:

The next maintenance reminder date defaults to 12 months. The reminder can be set to an earlier date but it cannot be set to a date past the 12-month default.

Set PM Reminder Date	
Step 1 Next maintenance: 10/23/2010	
Finish	•

EtCO₂ Module

Test Equipment

Test Equipment	Manufacturer	Model Number	Application
EtCO ₂ pod (disposable)	Microstream®	007768	flow test/calibration
flow meter	Dwyer (www.dwyer-inst.com.au)	VFA-22, or equivalent	flow test/calibration
gas	Scott Medical	0304653SROBD, or equivalent gas with CO_2 content of 4-6%	flow test/calibration
pressure transducer simulator/tester	Utah Medical	Delta-Cal 650-95,0 or equivalent	leak-down test
tubing, silicone	CareFusion	303109 or equivalent	pressure test
valve, 3-way	CareFusion	97555 or equivalent	pressure test

- 1. In the Connected Devices pane, click the $EtCO_2$ Module to be tested.
- 2. Click Preventive Maintenance in the Tasks list (double-click to begin testing immediately).

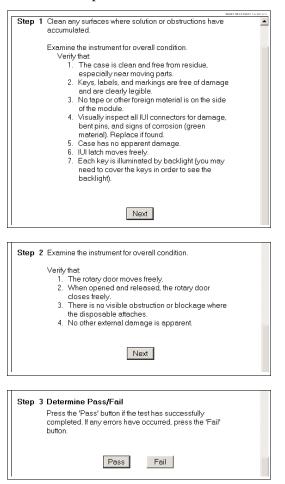
🕼 Cardinal Health - Alaris® System Maintenance		
File Options Help		
Perform Maintenance View Reports Configure Compone	·	
Connected Devices	Tasks Edit	A:EtCO2 - 9872801
Device Status	Preventive Maintenance Calibration	Instrument Inspection
COM1 - PC Unit - 12583575 READ		Simultaneous Display
A:EtC02 - 9872801 READ	C	UI Connectors
		Alarm
		E Keypad
		🔲 Leak Down
		CO2 Sensor Calibration
		CO2 Sensor Accuracy
		Set PM Reminder Date
	Charle Calculated Tartha	
	Start Selected Tasks Abort Selected Tasks	
	Reset Selected Tasks	
🕽 Start 🛛 🙈 🗿 🕱 📝 👋 🛅 TechSupportD	. CustomerData O Inbox - Micros	SAP Logon 710

3. Follow the instructions displayed on the screen for each test.

NOTE

See *EtCO*₂ *Module Tasks* on page 183 for an explanation of each task.

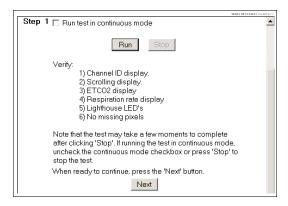
4. Instrument Inspection:



If the test failed, click **Abort Selected Tasks** to discontinue testing. Correct the failure(s) before continuing with the tests.

5. Simultaneous Display:

If you want the test to run continuously, click the Run test in continuous mode checkbox.



- **Channel ID display**—all segments must light.
- Scrolling display, ETCO2 display, and Respiration rate display—must flash dashes and zeros.
- Lighthouse LED's—all LEDs must light.



6. IUI Connectors:

-	IUI Connectors			
Ster	Step 1 Visually inspect all IUI connectors for damage, bent pins, and signs of corrosion (green material). Replace if found. Connect one other module (not an Auto-ID module) to the EtCO2, 'sandwiching' the EtCO2 (if not already done). Remove any other modules other than the EtCO2, the PC Unit, and the module on the other side of the EtCO2 Wait for the Channel ID to appear on the attached units before pressing 'Next'.			
Step	2 Result of device poll Summary of the number of devices detected			
	Expected number of devices : Actual Number of devices :	3 3 Pass		
	Press 'Finish' to continue			

'Sandwiching'—the module being tested is connected between the PC Unit and another module.

7. Alarm:

- A	Narm
Step 1	Do you see the EtCO2 Alarm LED and hear the PC Unit speaker alarming?
	Yes No

Finish

If the audio is weak, check the audio volume setting (refer to applicable Alaris[®] System DFU).



8. Keypad:

- Keypad	
Step 1 Please press every key and verify the key pressed.	
When the test is completed, or can't be finished for any reason (like a key not registering), press the 'Next' button.	
CHANNEL SELECT MONITOR CHANNEL OFF	
Next	

Press each key one time.

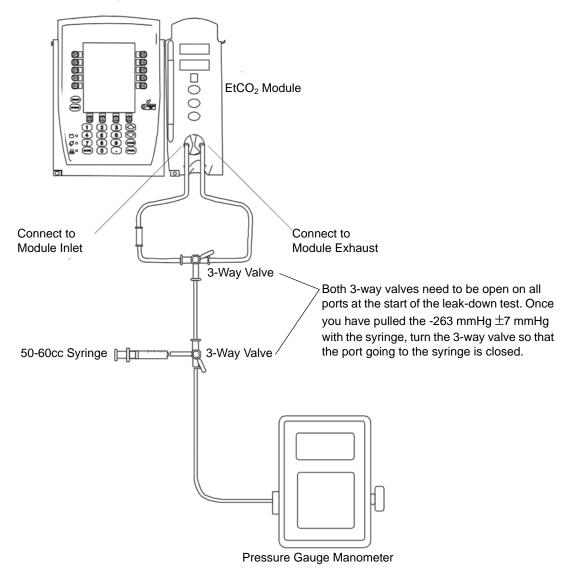
- Green text—the key was pressed one time and passed the test.
- Red text—the key was pressed two times, or it was pressed one time and failed the test. If the text is red because you pressed the key more than one time, you can indicate that the test has passed.

Step 2 Test has passed, press the 'Finish' button	
Finish	

9. Leak Down:

Leak-Down Test

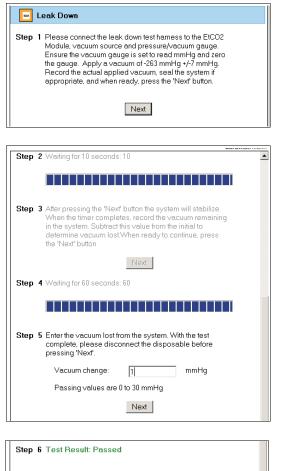
Ensure that the vacuum gauge is set to mmHg. Create a test harness to match the components that are used in the facility.



If you get a vacuum leak, pinch off the tubing at the

inlet and at the exhaust, to ensure that the leak is not

in the setup.



The **Vacuum change** entry is the value calculated in step 3 and rounded to a whole number.

10. CO2 Sensor Calibration:

Set up the EtCO₂ Module for the flow test/calibration.

Finish

Gas EtCO2 Module with an EtCO2 pod (disposable) \Box 1000 3-way Valve-Ò Open to air Flow meter CO2 Sensor Calibration Step 1 Reminder: Do not calibrate this unit unless it has been 500 mL/min is equivalent to 0.5 liters per minutes. warming up for at least 20 minutes. Vent the flow meter to open air. Please connect a disposable and attach the gas source. When instructed, start the gas flowing and leave it flowing until instructed to stop. Caution: The gas flow rate must be above 500 mL/min. Use of a flow meter is recommended. Next Step 2 Enter the percentage of CO2 in the calibration gas (there should be 21 % O2 and the balance should be N2). % CO2 5 Valid values are 4% to 6% Next Step 3 Start the gas flow Do not turn off the gas flow until instructed to in Next step 5. Step 4 Running calibration. Keep the gas flowing. Step 5 Calculating... Please turn off the gas source

Flow Test/Calibration Setup

Step 6 Test Result:Passed		
Finish		

11. CO2 Sensor Accuracy:

CO2 Sensor Accuracy	
Step 1 Please connect a disposable and attach the gas source. When instructed, start the gas flowing and leave it flowing until instructed to stop. Caution: The gas flow rate must be above 500 mL/min. Use of a flow meter is recommended.	
Next	
Step 2 Enter the percentage of CO2 in the verification gas (there should be 21% O2 and the balance should be N2).	
<mark>5 %</mark> Valid ∨alues are 4% to 6%	
Next	
Step 3 Start the gas flow	
Next	
Step 4 CO2 sensor reading: 4,95	
0	
Step 5 Stop the gas and press 'Finish'	
Expected Actual CO2 Sensor value: 5.0% 4.35% Acceptable rance: 4.71% - 5.29%	

500 mL/min is equivalent to 0.5 liters per minutes. Vent the flow meter to open air.

Do not turn off the gas flow until instructed to in step 5.

12. Set PM Reminder Date:

Acceptable range: TEST PASSED

The next maintenance reminder date defaults to 12 months. The reminder can be set to an earlier date but it cannot be set to a date past the 12-month default.

Set PM Reminder Date			
Step 1	Next maintenance:	10/23/2010	•
		Finish	

Finish

Auto-ID Module and Handheld Scanner

- 1. In the Connected Devices pane, click the Auto-ID Module to be tested.
- 2. Click Preventive Maintenance in the Tasks list (double-click to begin testing immediately).

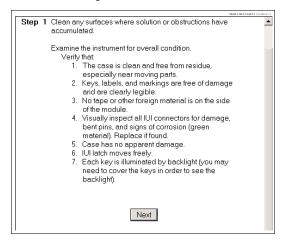
Cardinal Health - Alaris® System Main File Options Help	tenance			_ 🗆 ×
Perform Maintenance View Reports Configu	re Components			
Connected Devices		Tasks Edit	Auto-ID - 12394241	~
Device	Status	Check-in Preventive Maintenance	-	CardinalHealth
Wy Computer		Prevenuve Maintenance	Instrument Inspection	
COM1 - PC Unit - 12583575	READY		IUI Connectors	
Auto-ID - 12394241	READY		Keypad	
			LED	
			Scanner Functionality	
			2-D Scan	
			Set PM Reminder Date	
		Start Selected Tasks		
		Abort Selected Tasks		
		Reset Selected Tasks		
Start 🛛 🙈 💽 🕱 📝 👋 📑 Tech	Summer 1 = Cu	nterrer Data I 🖉 Calendar Mire	SAP Logon 710	

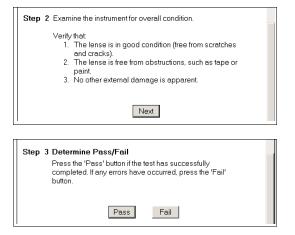
3. Follow the instructions displayed on the screen for each test.

NOTE

See *Auto-ID Module and Handheld Scanner Tasks* on page 184 for an explanation of each task.

4. Instrument Inspection:





If the test failed, click **Abort Selected Tasks** to discontinue testing. Correct the failure(s) before continuing with the tests.

5. IUI Connectors:

UI Connectors	
Step 1 Visually inspect all IUI connectors for dam and signs of corrosion (green material). Re Connect one other module (not an Auto-ID Auto-ID, 'sandwiching' the Auto-ID (if not all Remove any other modules other than the Unit, and the module on the other side of th Wait for the Channel ID to appear on the at before pressing 'Next'.	eplace if found. module) to the ready done). Auto-ID, the PC ie Auto-ID
Step 2 Result of device poll Summary of the number of devices detect	ed
Expected number of devices : Actual Number of devices :	2 2 Pess
Press 'Finish' to continue	

6. Keypad:

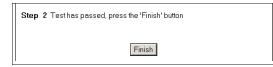
E Keypad	
Step 1 Please press every key and verify the key pressed.	
When the test is completed, or can't be finished for any reason (like a key not registering), press the 'Next' button.	
SCAN/CANCEL	
Next	

Finish

Press each key one time.

- Green text—the key was pressed one time and passed the test.
- Red text—the key was pressed two times, or it was pressed one time and failed the test. If the text is red because you pressed the key more than one time, you can indicate that the test has passed.

'Sandwiching'—the module being tested is connected between the PC Unit and another module.



7. LED:



- Red LEDs—Camera lens.
- Green LEDs—Ready.

Γ	Step 2 Determine Pass/Fail
	Please select 'Pass' if all six LEDs were observable, otherwise press the 'Fail' button.
	Pass Fail

8. Scanner Functionality:

📃 Sca	anner Functionality
Step 1 E	Examine the instrument for proper function
1 2 3 4	/erify that:) The two module lights are illuminated) Pressing the module button scans a barcode label)) The speaker beeps for the key press (low pitch))) The speaker beeps for the scan (high pitch))) After the scan the two module lights turn off
	Next
0.00	
Step 2 L	Determine Pass/Fail
	lease select 'Pass' if you followed the instructions and bserved the expected results, otherwise select 'Fail'.
	Pass Fail

9. 2-D Scan:

See *Auto-ID Module and Handheld Scanner Tasks* on page *184* to locate the 2-D barcode label. For the best results when scanning the barcode, hold the barcode at an approximate 45 degree angle to the scanner.



Step 2 Scan Status	
First	Passed
Second	Passed
Third	Passed
Step 3 A Pass result	t will be entered for this device.
	Finish

10. Set PM Reminder Date:

The next maintenance reminder date defaults to 12 months. The reminder can be set to an earlier date but it cannot be set to a date past the 12-month default.

- S	et PM Reminder D	ate
Step 1	Next maintenance:	10/23/2010
		Finish

Chapter 7 Data Sets and Alerts

Transfer a Data Set

A Data Set can be transferred to a PC Unit through a wireless or serial network.

Use this procedure to transfer a Data Set to a PC Unit. Creating and editing a Data Set is beyond the scope of this manual (see the user manual for the Editor Software).

CAUTION

Users of the Auto-ID Module must download the Data Set wirelessly for the system to properly read and decode bar code labels. Users who do not use the Auto-ID Module can use the following procedure or download the Data Set wirelessly if they are a network user.

- 1. Associate a Data Set with a configuration package.
 - a. Click the Configure Components tab.
 - b. Click the **Configuration Packages** subtab.
 - c. Click New.
 - d. Click Data Set File.

Cardinal Health - Alaris® System Maintenance File Options Help		
Perform Maintenance View Reports Configure Compor	ents	
Components	Component Details	
Configuration Packages Task Groups	Configuration Packages > Package 1 > Data Set File	
Configuration Packages Package 1 Wetwork Settings	Data Set File: C\Documents and Settings\contractor\Desktop\yingS3testdratt gre Brow	50
Firmware Files	Accept Changes Reset For	m
Data Set File		

- 2. Click Browse and select an existing Data Set file.
- 3. Click Accept Changes.

This allows the System Maintenance Software to determine which Data Set should be transferred to the PC Unit. Note that the application can maintain multiple packages, each of which is associated with a Data Set. Each Data Set can contain multiple profiles, which are typically used for different types of patients.

At any time, only one Data Set is active on a PC Unit; however, two Data Sets can exist on a PC Unit: the current Data Set and a pending Data Set. A current Data Set is active and used with a current patient. When a new Data Set is transferred to a PC Unit, it becomes a pending Data Set and is not used until you specify that a new patient is being served (by using front panel interface of the PC Unit) and power the PC Unit off and on.

- 4. To transfer the Data Set, click the **Perform Maintenance** tab and then click the PC Unit in the Connected Devices pane.
- 5. If **Transfer Data Set** task is not available in the Tasks list, click **Edit** (see *Tasks List* on page *168* for detailed procedures on how to edit the Tasks list).

6. In the Alter PCU Task List dialog box, click Transfer Data Set.

Alter PC Unit Task List				×
⊤ Master Task List			Current Task List	-
🗂 Keypad		l	🛨 📉 Check-in	
Network Connectivity			+ 🛐 Preventive Maintenance	
\min Nurse Call			-	
Power Supply				
🕺 Sequential Display				
\min Set PM Reminder Date				
\min Simultaneous Display		Add ->		
Transfer Auto-ID Configuration				
Transfer Auto-ID Configuration (Silent)		<-Remove		
Transfer Data Set	Γ			
Transfer Network Configuration				
Transfer Network Configuration (Silent)				
🝈 Voltage Display				
🕂 📉 Upgrade	•	l		
	_			
			0K Cancel	1

7. Click Add and then click OK.

You can now run the **Transfer Data Set** task for the PC Unit and transfer the Data Set specified earlier in the **Configuration Packages** tab.

🕼 Cardinal Health - Alaris® System Mair	ntenance			_ 0 ×
Elle Options Help				
Perform Maintenance View Reports Configu	re Components			
Connected Devices		Tasks Edit	🍯 COM3 - PC Unit - 8	
Device	Status	Check-in Preventive Maintenance		CardinalHealth
My Computer		Upgrade	Transfer Data Set	
COM3 - PC Unit - 8	COMPLETE	Transfer Data Set		
DOM4 - PC Unit not detected	READY			
		Start Selected Tasks		
		Abort Selected Tasks		
		Reset Selected Tasks		

8. In the Tasks list, click **Transfer Data Set** and then click **Start Selected Tasks**.

If you are using a Data Set that has not been released, the following warning message is displayed.

Transfer	Confirmation 🔀
	WARNING
	You are about to transfer a "Not for Human Use" data set to the PC Unit.
	This data set is NOT FOR USE on patients.
	Do you wish to proceed?
	Yes No

NOTE

If the Data Set is not compatible with the embedded software, an error message appears.

As the Data Set is transferred to the PC Unit, a progress bar indicates the transfer status. Transfer usually only takes a few seconds.

	С	0M3 - PC Unit - 8		CardinalHealth
-	т	ransfer Data Set		
Step	1	Data Set Name: Data Set ID:	yingS3test 00c6239bd-D	
		Sending data set		Cancel

Download Alerts

Alerts are stored in the CQI log on the PC Unit. Typically, you need to periodically download these alerts to the CQI database. The general topic of CQI alerts is beyond the scope of this manual. Refer to the software user manual for CQI Reporter.

You should first determine if you wish to manually or automatically clear the CQI log stored on the PC Unit after downloading the alerts from it. The PC Unit has a limit on the number of CQI alerts it can store. Therefore, it is important to clear the CQI log after you download alerts from it, unless you are downloading for testing purposes and want to retain the alerts on the device.

1. On the main menu, click **Options > Application Settings**.

Application Setting	; 🔀	
 Flash Allow serial number update Default Sp02 model for Flash General Beep for user input Beep on finished task Enable task list edit button Show only connected ports Log Downloading Clear downloaded CQI logs Clear downloaded logs Package Components Ignore incomplete packages 	False Unspecified True True True True True True True	 The default setting to clear downloaded logs is True. This setting <i>automatically clears</i> the logs during the log download. To allow the logs to be <i>manually cleared</i> after downloading, change the setting to False.
Show only connected ports If true, only COM ports that are curr will be displayed in the Connected D	ently connected to PC Unit modules evices window.	
	Close	

- 2. Click **True** to automatically clear logs during download or **False** if logs are to be manually cleared after download.
- 3. If not previously done, set up the connection to CQI database.

a. On the main menu, click **Options > Database Settings**. Click the CQI tab in the dialog box.

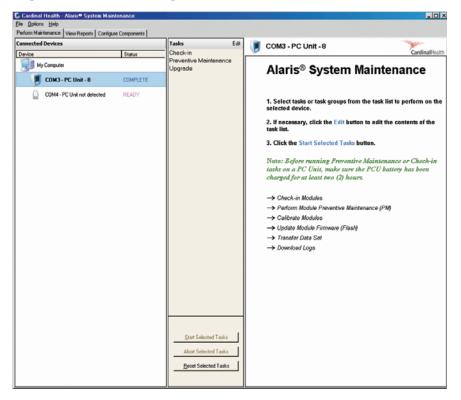
QL Server	Database	Authentication	1.1
	CQI	SqlServer	Login cqiuse
			<u>,</u>
Delete	Set Defau	lt	nection
	Delete	Delete Set Defau	Delete Set Default Lest Com

b. If you need to add a different CQI database, click Add.

		_
SQL Server	AITOEC	~
Database name		~
Test Connection	ОК	Cancel

- c. Select the desired SQL Server from the drop-down menu.
- d. From the **Database name** drop-down menu, select the database name for the CQI database.
- e. To verify the connection to the database, click **Test Connection**.
- f. Click OK.

4. To perform the download operation, click the desired PC Unit in the Connected Devices pane.



- 5. If the Download CQI Log task is not available in the Tasks list, you might want to add it.
 - a. Click Edit.

aster Task List		Current Task List	
Battery Conditioning	-	🕀 🏠 Check-in	
Battery Runtime		Preventive Maintenance	
Battery Status		🕀 🏠 Upgrade	
Clear Auto-ID Configuration			
Clear Battery Log			
🗂 Clear CQI Log			
🗂 Clear Data Set	Add	19	
Clear Error Log			
Clear Event Log	-K-Ber	nove	0
Clear Network Configuration			
Download Battery Log			
Download CQI Log			
Download Enor Log			
Download Event Log	<u>.</u>		

b. In the Alter PCU Task List dialog box, click Download CQI Log, click Add, and then click OK.

🕼 Cardinal Health - Alaris® System Mair	lenance			_ O ×
Ele Options Help				
Perform Maintenance View Reports Configu	re Components			
Connected Devices		Tasks Edit	📕 COM3 - PC Unit - 8	1
Device	Status	Check-in Preventive Maintenance	-	CardinalHealth
My Computer		Upgrade	Download CQI Log	
COM3 - PC Unit - 8	COMPLETE	Download COI Log		
DOM4 - PC Unit not detected	READY			
		Start Selected Tasks		
		Abort Selected Tasks		
		Reset Selected Tasks		

6. You can now select the **Download CQI Log** task for this PC Unit and then click **Start Selected Task**. Step 1:

😑 Download CQI Log				
Step 1	Facility ID:	Next		

If your facility has multiple sites, facility IDs distinguish one facility from another. This is not a required field but providing an ID for your facility site allows you to either see the CQI Report for a single site or to compare reports between sites. Type in the **Facility ID** or leave the field blank, and then click **Next**.

Step 2:

The download operation starts. It usually only takes a few seconds to complete.

Step 2	Download CQI Log complete
	<u>C</u> ancel

- 7. If you did not select Clear Downloaded CQI Logs, then you should now manually clear the CQI log on the PC unit.
 - a. At the top of the Tasks list, click Edit.
 - b. In the Alter PCU Task List dialog box, click **Clear CQI Log**.

laster Ta	sk List			Current Task List	
0000000	Alam Battery Conditioning Battery Runtime Battery Status Clear Auto ID Configuration Clear Battery Log Clear Call Log Clear Data Set		5	Check-in Deck-in Download CQI Log	0
7000	Clear Data Set Clear Error Log Clear Event Log Clear Network Configuration	<u></u>	Bemover,		0
8	Download Battery Log Download Error Log Download Event Log	-			

c. Click **Add** and then click **OK** to save the changes.

The Clear CQI Log task is now available.

Ile Options Help Perform Maintenance View Reports Configure Components			<u>. [1] -</u>
Connected Devices	Tasks Edit	🚺 COM3 - PC Unit - 8	~
Device Status	Check-in Preventive Maintenance	<u> </u>	CardinalHealt
My Computer	Upgrade	Clear CQI Log	
DOM3 - PC Unit - 8 READY	Download CQI Log Clear CQI Log		
COM4 - PC Unit not detected READY	Start Selected Tasks		
	Abort Selected Tasks <u>R</u> eset Selected Tasks		

8. Click Clear CQI Log in the Tasks list and then click Start Selected Tasks.

9. Click the + icon to the left of **Clear CQI Log** to view the "Clear CQI complete" message.

	COM3 - P	C Unit - 8
	Clear CQI	Log
Step	1	Clear CQI Log complete
		Cancel
		Cancel

You have successfully downloaded the CQI log to the CQI database and cleared the log on the PC Unit.

Chapter 8 Flash Firmware

Flash Firmware

PC Unit 8000 (PCU1.0)

- 1. Configure the application so that it can access the flash file(s) that will be used to upgrade modules.
 - a. Click the **Configure Components** tab.
 - b. Click the **Configuration Packages** subtab.
 - c. Click Firmware Files in the menu.

🖟 Cardinal Health - Alaris® System Maintenance						
Eile Options Help						
Perform Maintenance View Reports Configure Components						
Components	Component Details					
Configuration Packages Task Groups	Configuration E	Poskagas > Poskaga 1 > Eirmurara Eilas				
New Import Export Copy	Conliguration P	Packages > Package 1 > Firmware Files				
Configuration Packages	Please select the system disk with the flash content and provide the path to the firmware manifest file.					
Package 1	You may also choose the o	ptions for updating a device when using a PC unit to flash devices. Intes firmware only when a newer version is found. You may choose				
Network Settings		applicable in the PC Unit 1.5 flash process, for transfer of files only:				
Auto-ID Settings	Select Firmware Flash File	J:VilashFilesWasisFiles.xml Browse				
Firmware Files	PC Unit 1.5	Newer Version V				
Data Set File	PC Unit 1.0	Newer Version v				
	Pump	Newer Version				
	Syringe	Newer Version T				
	PCA	Newer Version •				
	EtCO2	Newer Version 💌				
	SpO2	Newer Version				
	Auto-ID	Newer Version				
		Accept Changes Reset Form				

- 2. If necessary, choose a file for the Select Firmware Flash File box by clicking Browse.
 - a. Create a folder on your computer and copy the contents of the "Guardrails[®] Point-of-Care Software, Operating System Software, Guardrails[®] Software Suite MX" CD into that folder.

b. In the **Look in** drop-down menu find and select the folder you created. Double-click **ASMFlashPackage**.

Open					? ×
Look in:	9114		•	3 🕫 🛤 🖬	•
My Recent Documents Desktop My Documents D03CA154H3J X0D1 Local PC	ASMFlashPac Auto-ID CIB CIBBoot EtCO2 CVP PCA PCU1.0 PCU1.5 SpO2 Syringe	kage			
CardinalHealth Network	File name:			•	Open
HERWOIK	Files of type:	Manifest files (*.xml)		•	Cancel

c. Double-click PCU1.0.

Open							? ×
Look in:	C ASMFlashF	'ackage		•	00	• 📰 💙	
My Recent Documents	PCU1.0						
Desktop							
My Documents							
D03CA154H3J X0D1 Local PC							
CardinalHealth Network	File name:					•	Open
	Files of type:	Manifest files	(*.sml)			•	Cancel

d. Double-click FlashPackage.xml.

Open				? ×
Look in	CU1.0	•	G 👂 📂 🖽	•
My Recent Documents Desktop My Documents D03CA154H3J X0D1 Local PC	Auto-ID EtCO2 PCA Point-of-Care I Point-of-Care I Point-Of-Car			
CardinalHealth Network	File name: Files of type:	Manifest files (*.xml)	•	Open Cancel

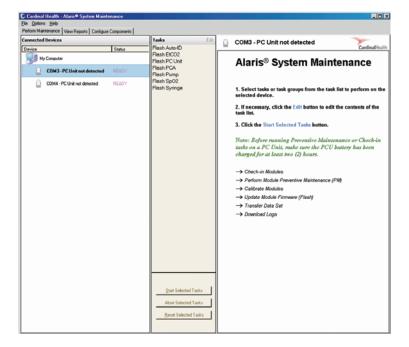
e. Click Accept Changes.

Configuration	n Packages > Package 1 > Firmware Files
You may also choose t	em disk with the flash content and provide the path to the firmware manifest file. he options for updating a device when using a PC unit to flash devices. verwrites firmware only when a newer version is found. You may choose 'Never' overwrite.
Note: The 'Newer' optic transfer of files only.	on is applicable in the PC Unit models 8015 and 8500 flash process, for
Select Firmware Flash	File C:\9_1 software\S3FlashPackage\PCU1.0\FlashPackage.xml Browse
PC Unit 8500	Newer Version 🔹
PC Unit 8015	Newer Version
PC Unit 8000	Newer Version
Pump	Newer Version
Syringe	Newer Version 💌
PCA	Newer Version
EtCO2	Newer Version
SpO2	Newer Version
Auto-ID	Newer Version
	Accept Changes Reset Form

- 3. From the drop-down menus, select the conditions under which you wish to upgrade each module.
 - **Newer Version**—Whenever the user performs an upgrade operation, the module should only be upgraded if the specified firmware version is more recent than the firmware that currently resides on the module.
 - Always—The module should always be upgraded with specified firmware file whenever an upgrade operation is performed.
 - **Never**—The module should never be upgraded with specified firmware file whenever an upgrade operation is performed.

4. Click Peform Maintenance tab.

The following window is displayed. It shows available tasks for a PC Unit that is not currently flashed. Note that the task list only includes flash operations.



5. Click Flash PC unit and then click Start Selected Tasks.

Ele Options Help Perform Maintenance View Reports Configu	e Components			
Connected Devices		Tasks Edit	COM3 - PC Unit not detected	-
Device	Status	Flash Auto-ID Flash EtC02		CardinalHeal
My Computer		Flash PC Unit	Flash PC Unit	
COH3 - PC Unit not detected	READY	Flash PCA Flash Pump		
COH4 - PC Unit not detected	READY	Flash Springe		
		<u>Start Selected Taska</u> Abort Selected Taska <u>B</u> eart Selected Taska		

6. Follow the instructions on the screen. To turn the PC Unit off, press the **EXIT** soft key twice. To turn the PC Unit back on, press the **SYSTEM ON** key.

	COM3 - PC Unit - 1000000	CardinalHealth
	Flash Pump	
Step	Press 'Next', turn off the Alaris® PC Unit, if it is not alreat switched off. Power the PC Unit back on when a connecting message appears on the next step. Note: Ensure that only the module that you wish to flas	-
	connected to the PC Unit.	
	Baud Rate MAXIMUM	

7. Click Next.

If a connection is successfully established, the following window is displayed.

	COM3 - PC Unit not detected
-	Flash PC Unit
Step	Press 'Next', turn off the Alaris® PC Unit, if it is not already switched off, and power it back on again. Note: Ensure that only the module that you wish to flash is connected to the PCU.
	Baud Rate MAXIMUM
Step	2 Connected
	Model Type Alaris® PC Unit
	Serial Number 8
	Update Elash

8. Click **Flash** to begin flash operation. If this operation fails at the maximum baud rate, try again using a lower baud rate until the process is successful.

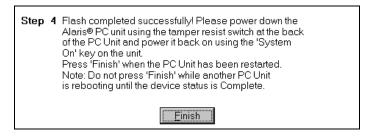
The old flash image is erased.

Step 3 Erasing]			
	Elapsed time:	0:02	mins.	

The new flash image is programmed into the device. This step can take several minutes to complete.

Step 3 Programm	ning			
	Elapsed time:	1:31	mins.	

9. When the operation is complete, click **Finish**.



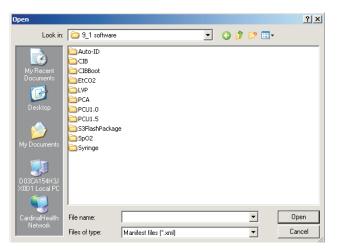
PC Unit 8015 (PCU1.5)

- 1. Configure the application so that it can access the flash file(s) that will be used to upgrade modules.
 - a. Click the Configure Components tab.
 - b. Click the Configuration Packages subtab.
 - c. Click Firmware Files in the menu.

🕼 Cardinal Health - Alaris® System Maintenance					
Ele Options Help	1				
Perform Maintenance View Reports Configure Components	1				
Components	Component Details				
Configuration Packages Task Groups	Configuration				Files
New Import Export Copy	Configuration F	ackages > Fa	аскаде		Files
Configuration Packages	Please select the system disk with the flash content and provide the path to the firmware manifest file. You may also choose the options for updating a device when using a PC unit to flash devices.				
Package 1	The default selection overwrites firmware only when a newer version is found. You may choose to 'Always' overwrite or 'Never' overwrite.				
Network Settings	Note: The 'Newer' option is	applicable in the PC Ur	nit 1.5 flash p	process, for transfer of file	is only:
Auto-ID Settings	Select Firmware Flash File	J:\FlashFiles\AlarisFiles.xml			Browse
Firmware Files	PC Unit 1.5	Newer Version	٣		
Data Set File	PC Unit 1.0	Newer Version	*		
	Pump	Newer Version	*		
	Syringe	Newer Version	*		
	PCA	Newer Version	*		
	EtCO2	Newer Version	×		
	SpO2	Newer Version	*		
	Auto-ID	Newer Version	*		
				Accept Changes	Reset Form

- 2. If necessary, choose a file for the Select Firmware Flash File box by clicking Browse.
 - a. Create a folder on your computer and copy the contents of the "Guardrails[®] Point-of-Care Software, Operating System Software, Guardrails[®] Software Suite MX" CD into that folder.

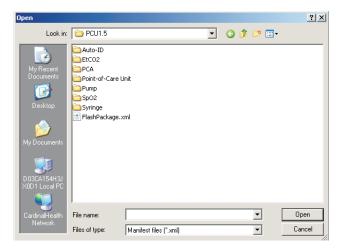
b. In the **Look in** drop-down menu find and select the folder you created. Double-click **S3FlashPackage**.



c. Double-click PCU1.5.

Open					? ×
Look in:	🗀 S3FlashPack	kage	•	G 🦸 🖻 🖽	•
My Recent Documents Desktop My Documents	PCU1.0				
X0D1 Local PC	File name:			•	Open
Network	Files of type:	Manifest files (*.xml)		•	Cancel

d. Double-click FlashPackage.xml.



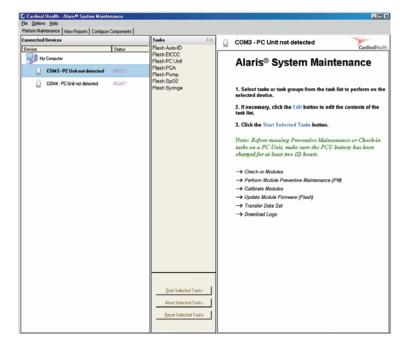
e. Click Accept Changes.

	ackages > Package 1 > Firmware Files
You may also choose the o	ptions for updating a device when using a PC unit to flash devices. rites firmware only when a newer version is found. You may choose
Note: The 'Newer' option is transfer of files only:	applicable in the PC Unit models 8015 and 8500 flash process, for
Select Firmware Flash File	C:\9_1 software\S3FlashPackage\PCU1.5\FlashPackage.xml Browse
PC Unit 8500	Newer Version
PC Unit 8015	Newer Version
PC Unit 8000	Newer Version
Pump	Newer Version 💌
Syringe	Newer Version
PCA	Newer Version
EtCO2	Newer Version
SpO2	Newer Version
Auto-ID	Newer Version
	Accept Changes Reset Form
	Acceptionanges ResetPorm

- 3. From the drop-down menus, select the conditions under which you wish to upgrade each module.
 - **Newer Version**—Whenever the user performs an upgrade operation, the module should only be upgraded if the specified firmware version is more recent than the firmware that currently resides on the module.
 - Always—The module should always be upgraded with specified firmware file whenever an upgrade operation is performed.
 - **Never**—The module should never be upgraded with specified firmware file whenever an upgrade operation is performed.

4. Click Peform Maintenance tab.

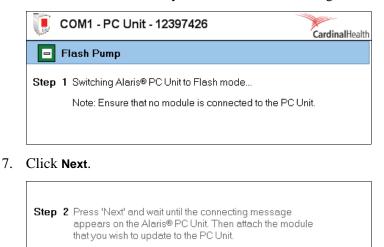
The following window is displayed. It shows available tasks for a PC Unit that is not currently flashed. Note that the task list only includes flash operations.



5. Click Flash PC unit and then click Start Selected Tasks.

Bite Derivers Fashs Connected Derivers Status July Computer S	
Device Status Pash Auto-ID COMS - PC Unit Not detected Computer If My Computer Pash PC Unit Pash PC Unit Pash PC Unit Pash PC Unit COM3 - PC Unit word detected ROLEY Pash PC Unit Pash PC Unit Pash PC Unit COM3 - PC Unit word detected ROLEY Pash PC Unit Pash PC Unit Pash PC Unit	
Plash ECUge Plash ECUge Plash ECUge Plash PCUnit Plash PCUnit CoH3 - PCUnit and detected Plash Pump Plash Pump Plash Sp02	ardinalHealth
COM3 - PC Unit word elected REX/DY Plash PCA Plash PCA Plash PCA Plash PCA Plash Spog Plash Spog	ardinalmeard
COM-PC Unit not detected READY Flash Pump COM-PC Unit not detected READY Flash Sp02	
<u>Start Selected Tanka</u> Abort Selected Tanka	

6. The software is establishing a connection with the PC Unit and transferring to flash mode. If a connection is successfully established, the following window is displayed.



<u>N</u>ext

8. After the connection is complete, the following connection is displayed. Click **Flash** to begin flashing the device.

Step 3 Connected	
Model Name	Pump
Serial Number	1225555
Update	Elash

9. The following window is displayed as the flashing process is executed.

Step 4	Transferring Files Please W	/ait.
	Model Name	Pump
	Serial Number	1225555
	Elapsed time:	0:01 mins.

10. When the operation is complete, click **Finish**.

Step	5 Flash completed successfully! Note: Do not press 'Finish' while another PC Unit is rebooting until the device status is Complete.
	<u> </u>

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Chapter 9 Configure Components

Configuration Packages

Configuration Packages contain the configuration settings that can be transferred to the PC Unit and modules, as well as the configuration information that is used solely on the System Maintenance Software that is running on the personal computer. Multiple Configuration Packages can be defined, as shown below.

Components	Component Details
New Recots Configure Components Congruents Configure Into Peckages Task Groups New Inport Export Casy Package 1 Package 1 Package 1 Pothe 1 Package 2 Profile 1 Package 2 Package 2 Pothogs 2	
Vetwork Settings Auto-ID Settings Firmware Files Data Set File	Key Index 2: Key Index 3: Accept Changes Reset Form

One Configuration Package is designated as the active package. The active package is used whenever you transfer configuration information to a PC Unit, or otherwise use the configuration information within the System Maintenance Software. In the example above, Package 1 is the active package, as indicated by the icon of an open box.

To start, click the **Configure Components** tab. To make a package the active package, right-click the package name and then click **Set as Active Package**.



Components of a Configuration Package

Configuration Packages are comprised of the following components:

Network Settings	 Used by the Transfer Network Configuration task, the Transfer Network Configuration (Silent) task, and the Network Connectivity task. Network Settings specify the network configuration that is used to connect the PC Unit to Information Server, including: Network security profile IP addresses DNS information Application-level communication protocol information Defining network profiles should only be performed by Network Administrator or other qualified personnel. System Maintenance Software can define and save up to eight Network Profiles on a PC Unit. These profiles are used when a PC Unit connects to a network, allowing a facility to create a large network with multiple access points. If a PC Unit is moved, it cycles through available profiles to find an optimum profile for that location.
Auto-ID Settings	Used by the Transfer Auto-ID Configuration task and the Auto-ID Configuration (Silent) task. Contains configuration information for the Auto-ID Module.
Firmware Files	Used by individual flash tasks that updates the firmware on the PC Unit and modules. Identifies firmware file to use for updating the PC Unit and modules, and contains settings on how to apply updates to specific modules.
Data Set File	Used by the Transfer Data Set task. Specifies the Data Set to transfer to non-networked PC Units.

Add a New Configuration Package

To add a new configuration package to the list of available configuration packages:

- 1. On the main window, click the **Configure Components** tab.
- 2. In the Components window, click the Configuration Packages tab.
- 3. Click the Configuration Packages item and click New (or right-click the Configuration Packages item and click Add New Package).

A new package is added to the list of available packages.

4. Complete the Component Details dialog box:

Configuration Packages > Package 1					
Name Author Description	Package 1	Date Tuesday , February 13, 2007 <mark>⊮</mark>			

- a. Name: Give the configuration package a unique name.
- b. Date: Select a creation date (defaults to today's date).
- c. Author: Name of person creating configuration package.
- d. Description: A description for configuration package.
- 5. Click Accept Changes to save details or Reset Form to discard changes.
- 6. Select each configuration package component (Network Settings, Auto-ID Settings, Firmware Files, and Data Set File) and fill in the information.

Delete a Configuration Package

All information in the configuration package will be deleted. If you wish to save the information for later retrieval, export the configuration package before deleting it.

To delete a configuration package:

- 1. On the main window, click the Configure Components tab.
- 2. In the Components window, click the Configuration Packages tab.
- 3. Right-click the name of the configuration package that you want delete and click **Delete**. A confirmation dialog box is displayed.
- 4. To delete the package, click **Yes**.

Export a Configuration Package

You can export a configuration package or components of a configuration package.

1. In the list of Configuration Packages, click the name of a configuration package to highlight it.

- 2. Click **Export** (or right-click the name of the configuration package and click **Export**). The Save As dialog box is displayed.
- 3. Name the export file.

The default name contains the configuration package name and the date and time it was saved.

Exported configuration packages must have a file extension type of .zip.

Import a Configuration Package

You can import a configuration package or components of a configuration package. The imported data will overwrite any data already in the selected configuration package. If you do not want to overwrite the data, first create a new configuration package and then import a configuration package into it.

To import a configuration package:

- 1. In the list of **Configuration Packages**, click the name of a configuration package to highlight it.
- 2. Click Import (or right-click the name of the configuration package and click Import).

The Open dialog box is displayed.

3. Select a . zip file (or a . cfg file if you are importing from a previous version) to import and click **Open**.

Data is imported into the selected configuration package.

NOTE

When a .cfg file is imported, any Private Key file, User Certificate file, or CA Certificate file used to create the Network profile being imported must be copied to the same location.

4. Accept any changes in the selected configuration package by clicking Accept Changes.

Export or Import Components of a Configuration Package

You can export or import parts of a configuration package by selecting the package at the component level (for example, Auto-ID Module settings) instead of selecting the configuration package name. Then export the configuration package (see *Export a Configuration Package* on page *120*) or import it (see).

When importing, you can only import configuration data to overwrite data of the same type in the selected configuration package.

NOTE

The default name of an exported file will include the component type unless it contains a complete configuration package. For example, a complete configuration package might be named Home_Package1_3_30_2006_12_00_00_PM.zip, while a package named Home_Package1_NetworkSettings_3_30_2006_12_00_00_PM.zip contains only network settings.

Copy a Configuration Package

You can copy the contents of a configuration package into another package. Data in the target configuration object will be overwritten.

- 1. In the **Configuration Packages** list, click a configuration package name to highlight it.
- 2. Click **Copy** (or right-click the name of the configuration package and click **Copy**).

The Copy Configuration Object dialog box is displayed.

Copy Configuration Object		
 Target Configuration Object Create a new object: Select an exsiting object: 	Package 3	~
	(OK	Cancel

- 3. Click **Create a new object** and enter a new object name in which to copy the configuration package, or click the **Select an existing object** radio button and then click the object name from the drop-down menu.
- 4. Click **OK**.
- 5. Accept changes in target configuration package by clicking Accept Changes.

Copy a Component of a Configuration Package

You can copy a component of a configuration package into another package. Data in the target configuration object will be overwritten.

- 1. In the Configuration Packages list, click a component of a configuration package to highlight it.
- 2. Click **Copy** (or right-click the name of the component and click **Copy**).

The Copy Configuration Object dialog box is displayed.

Copy Configuration Object		X
Select the target package: Target Configuration Object	Package 1	~
 Select an exsiting object: 	Network Settings	~
	ОК	Cancel

- 3. Select the target configuration package from the drop-down menu.
- 4. Click **OK**.

The configuration component is copied into the target configuration package.

5. Click Accept Changes in the target configuration package.

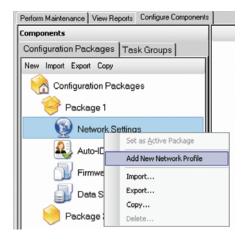
Specify Network Settings

Create a Network Profile

The System Maintenance Software can define and save up to eight network profiles on a PC Unit. These profiles are used when the PC Unit connects to the Information Server. If a PC Unit is moved, it cycles through the available profiles to find the optimum profile to use to connect to the server from that location.

To create a new profile:

- 1. On the main window, click **Configure Components** tab.
- 2. In the Components window, click **Configuration Packages** tab.
- 3. Click **NEW** or right-click **Network Settings** under the desired package.
- 4. Click Add New Network Profile.



The profile is displayed in the Component Details pane.

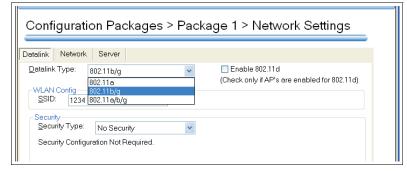
Cardinal Health - Alaris® Syste	m Maintenance	
File Options Help Perform Maintenance View Reports Configure Component		
Components	Component Details	
Comporents Configuration Packages Task Groups Pow Import Export Copy Configuration Packages Package 1 Profile 1 Profile 1 Profile 1 Profile 1 Profile 1 Profile 2 Profile 2 Package 2 Pac	Component Details Configuration Packages > Package 1 > Network Settings Detaink Network Server Detaink Type: 802.11b/g MAN Config SSID: Security Security Security Security Security Configuration Not Required. AcceptChanges ResetForm	

Datalink Settings

The Datalink tab allows you to specify the wireless security settings for this profile.

Due to incompatibility of the driver for the RF card, WPA2 security will not work with an Alaris[®] System that is using the LA-4137 Wireless Networker CompactFlash Radio Card from Motorola (sometimes called the Symbol "b" RF card, previously manufactured by Symbol Technologies).

1. Choose the appropriate Datalink Type.

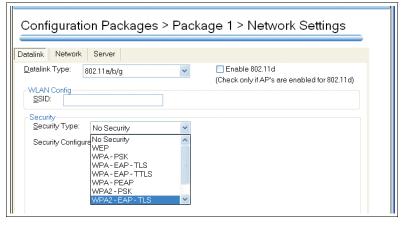


2. Leave 802.11d unchecked (for the U.S. wireless standard); if you want to enable wireless standards for other countries or international country-to-country roaming, check this parameter.

NOTE

If you enable the 802.11d parameter, the international regulatory wireless domain will be activated. The WLAN equipment (wireless controller and access points) have to be configured for 802.11d. If they are not, the wireless PC Units that have network profile 802.11d enabled will not be able to connect to the wireless network.

- 3. Enter the SSID.
- 4. Select the appropriate security type.



5. Enter the security settings that apply to the selected security type, as follows:

Security Settings for WEP on page 125 Security Settings for WPA or WPA2—with PSK on page 125 Security Settings for WPA or WPA2—with EAP-TLS on page 126 Security Settings for WPA or WPA2—with EAP-TTLS on page 127 Security Settings for WPA or WPA2—with PEAP on page 127

Security Settings

Security Settings for WEP

WEP Configuration:					
Authentication:	Open	*			
Key Length:	40	~	Transmission Key Index:	0 🗸	
Key Index 0:					
Key Index 1:					
Key Index 2:					
Key Index 3:					
					1

- 1. Authentication—Select the type of wireless network authentication from the drop-down: Open System or WEP Shared Key.
- 2. Key Length—Select 40-bit or 128-bit encryption type.
- 3. Transmission Key Index—Select one of the four WEP keys to use as the transmission key.
- 4. **Key Index**—If WEP encryption is enabled, enter the WEP key in the **Key Index 0** field. If needed, up to three additional WEP keys can be entered—one in each of the remaining Key Index fields.

NOTE

Do not click **Accept Changes** until all required entries under the Datalink, Network, and Server tabs are completed.

Security Settings for WPA or WPA2—with PSK

Security Security Type:	WPA-PSK
Encryption:	
Type:	AES 🗸
WPA PSK:	
Passphrase:	Hex
	Accept Changes Reset Form

- 1. Encryption—Select TKIP (for WPA-PSK) or AES (for WPA2-PSK).
- 2. Passphrase—Enter a passphrase key in ASCII or Hex format.

3. **Hex**—If the passphrase key was entered in Hex format, click the **Hex** checkbox.

NOTE

Do not click **Accept Changes** until all required entries under the Datalink, Network, and Server tabs are completed.

Security Settings for WPA or WPA2—with EAP-TLS

Encryption: Type: WPA2 EAP TLS: Identity: Private Key: User Certificate: CA. Certificate:	AES	Format	Passohrase
---	-----	--------	------------

- 1. Encryption—Select TKIP (for WPA-EAP-TLS) or AES (for WPA2-EAP-TLS).
- 2. **Identity**—Enter the identity name.
- 3. **Private Key**—Import the private key from a file.
- 4. **Format** (for Private Key)—Select the format: BER, DER, or PKCS12.
- 5. **Passphrase** (for Private Key)—If the PKCS12 format is selected, enter the passphrase key.
- 6. User Certificate—Import the user certificate from a file.
- 7. Format (for User Certificate)—Select the format: BER, DER, or PKCS12.
- 8. **Passphrase** (for User Certificate)—If the PKCS12 format is selected, enter the passphrase key.
- 9. Validate Server Certificate (optional)—If server validation is required on the network, click the Validate Server Certificate box to enable server validation.
- 10. CA. Certificate—If Validate Server Certificate is enabled, import the CA certificate from a file.
- 11. Format (for CA. Certificate)—Select the format: BER, DER, or PKCS7.

NOTE

Do not click **Accept Changes** until all required entries under the Datalink, Network, and Server tabs are completed.

Security Settings for WPA or WPA2—with EAP-TTLS

Encryption: Type:	AES 🗸		
	AL3		
WPA2 EAP TTLS:		٦	
Identity:			
	Validate Server Certificate	_	
	File	Format	
CA. Certificate:			
Inner Authentication:			
Туре:	*		
User Name:			
Password:			

- 1. Encryption—Select TKIP (for WPA-EAP-TTLS) or AES (for WPA2-EAP-TTLS).
- 2. **Identity**—Enter the identity name.
- 3. Validate Server Certificate (optional)—If server validation is required on the network, click the Validate Server Certificate box to enable server validation.
- 4. CA. Certificate—If Validate Server Certificate is enabled, import the CA certificate from a file.
- 5. Format (for CA. Certificate)—Select the format: BER, DER, or PKCS7.
- 6. Inner Authentication Type—Select MSCHAPv2 or PAP.
- 7. **User Name**—Enter a valid user name (for example, "jsmith"). Most of the time the user name and identity are the same.
- 8. **Password**—Enter the correct user name password.

NOTE

Do not click **Accept Changes** until all required entries under the Datalink, Network, and Server tabs are completed.

Security Settings for WPA or WPA2—with PEAP

Security Security Type:	VPA2 - PEAP	
Encryption:		
Type:	AES 🗸	
WPA2 EAP PEAP: Identity:		
	Validate Server Certificate	
	File Format	
CA. Certificate:		
Inner Authentication:	:	
Type:	¥	
User Name:		
Password:		
	Accept Changes	Reset Form

- 1. Encryption—Select TKIP (for WPA-PEAP) or AES (for WPA2-PEAP).
- 2. **Identity**—Enter the identity name.
- 3. Validate Server Certificate (optional)—If server validation is required on the network, click the Validate Server Certificate box to enable server validation.
- 4. CA. Certificate—If Validate Server Certificate is enabled, import the CA certificate from a file.
- 5. Format (for CA. Certificate)—Select the format: BER, DER, or PKCS7.
- 6. Inner Authentication Type—Select MSCHAPv2.
- 7. User Name—Enter a valid user name (for example, "jsmith"). Most of the time the user name and identity are the same.
- 8. **Password**—Enter the correct user name password.

NOTE

Do not click **Accept Changes** until all required entries under the Datalink, Network, and Server tabs are completed.

Network Settings

btain an IP address auto	matically	*		
Static IP address				
IP Address:				
S <u>u</u> bnet Mask:				
<u>D</u> efault Gateway:				
IP Address Range:				
Start IP Address:				
End IP Address:				
btain DNS server addres	ss automaticall	у 🛩		
Preferred DNS Server:				
Alternate DNS Server:				

The **Network** tab allows you to specify the Internet Protocol (IP) information for connecting to the wireless network. In the drop-down menu, choose one of the following options:

- **Obtain an IP Address Automatically**. The PC Unit will automatically receive an IP address from the Dynamic Host Configuration Protocol (DHCP) server on the network. Note that the system also automatically configures **Obtain DNS Server Address Automatically** as the default setting (the Preferred DNS Server and Alternate DNS Server will automatically receive an IP address from the DHCP server on the network).
- Use Static IP Address. The PC Unit will be assigned a static IP address. If you choose this option, you must enter an IP Address, Subnet, and Default Gateway. Note that the system automatically configures Use Static DNS IP Address as the default setting.
 - Static IP Address—The IP address has to be entered or assigned manually on each PC Unit.

• **IP** Address range—The auto-assign option helps ensure that multiple PC Units are not given the same IP address. Enabling auto-assign provides a range of IP addresses to use for a subnet and the software automatically assigns an IP address to a connected PC Unit when it is updated on that subnet. The software maintains a table of IP addresses for this purpose.

When a PC Unit is updated on the network, the System Maintenance Software confirms that the PC Unit has an IP address assigned to it for each auto-assigned subnet. If an IP address is not assigned for a subnet, the System Maintenance Software applies the next available IP address in the configured range and assigns it to the PC Unit.

NOTE

Do not click **Accept Changes** until all required entries under the Datalink, Network, and Server tabs are completed.

Server Settings

Datalink Network Server	
Server Type: Dcmp	
Alaris® Server Information:	
AES Encryption: 128	
Encryption Key:	Import
Host Name:	
Server Port 1	
	Accept Changes Reset Form
	Accept onlyinges Resett Unit

The Server tab allows you to specify the application-level communication protocol settings that will be used between the PC Unit and the Alaris[®] Server.

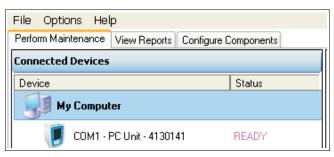
- 1. Server Type—Select Dcmp from the drop-down menu.
- 2. AES Encryption—Select an encryption length of 128-bit.
- Encryption Key—If you do not use a server information file exported from the Alaris[®] Server, enter an encryption key with the correct number of hexadecimal characters (32 characters for 128-bit).
 When entered, the encryption key is displayed as asterisks (*). If the key is imported from the Alaris[®] Server file, it is always displayed as asterisks.
- 4. Host Name—Enter the fully-qualified domain name (FQDN) or the IP address of the Alaris[®] Server.
- 5. **Server Port**—Enter the server port for the Alaris[®] Server that the device will be connecting to (Example: 3613).
- 6. Click Accept Changes to save the network profile configuration.

Wireless Network Setting on PC Unit—Disable, Enable, View Status

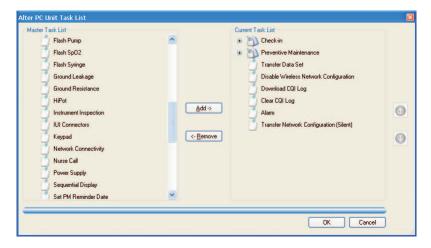
Enable Wireless Network

If your PC Unit will be operating in a wireless environment and the wireless network was disabled using the Maintenance Software, perform the following procedure to enable the connection:

1. Click the Perform Maintenance tab.



- 2. In the Connected Devices pane, click the PC Unit that is to have the Wireless Network Configuration enabled.
- 3. If **Transfer Network Configuration (Silent)** is in the Current Task List, proceed to step 6; otherwise, continue with the next step.
- 4. Click **Edit** in the Tasks list.
- 5. Click Transfer Network Configuration (Silent) in the Tasks list and click Add.



6. Click **OK** to save the change.

7. Click Transfer Network Configuration (Silent) in the Tasks list.

🖡 Cardinal Health - Alaris® System Mai	ntenance		- 8 🔀
File Options Help			
Perform Maintenance View Reports Configure Components			
Connected Devices	Tasks Edit	COM1 - PC Unit - 4130141	Card and Unable
Device Status	Check-in Preventive Maintenance		CardinalHealth
My Computer	Transfer Data Set	Transfer Network Configuration (Silent)	
COM1 - PC Unit - 4130141 READY	Disable Wireless Network Co Transfer Network Configuration		
COM9 - PC Unit not detected READY	Download COI Log Clear COI Log Alarm		
	<		
	Start Selected Tasks		
	Abort Selected Tasks		
	- Pour Calculation		
	<u>R</u> eset Selected Tasks		
🛃 start 🔰 🖉 🖻 🖾 🖬 🖉 🔮 🏷 🇭 🎐	😂 🖟 C 🛛 🗳	Search Desktop 🔎 🗖 🖉 🖓 🖓 🖓 🖓 🏷	∕ ĕ ∂∕≦ 10:58 AM

- 8. Click Start Selected Tasks to enable the wireless network configuration on the PC Unit.
- 9. Click the + icon to the left of **Transfer Network Configuration (Silent)** to view when "Uploading Network Configuration to the PC Unit" is complete.



10. If desired, verify that the network settings have been transferred. Refer to the System Options, Network Status section in the Alaris[®] System DFU and use password **32221** to view the wireless status.

Disable Wireless Network

If your PC Unit will be operating in a non-wireless environment, you can disable the wireless network. The connection can be temporarily disabled by changing the System Options setting on the PC Unit or the Maintenance Software can be used to permanently disable the wireless network configuration setting. To permanently disable the wireless network on the PC Unit, perform the following procedure:

- 1. In the Connected Devices pane, click the PC Unit that is to have the Wireless Network Configuration disabled.
- 2. If **Disable Wireless Network Configuration** is in the Current Task List, proceed to step 6; otherwise, continue with the next step.
- 3. Click **Edit** in the Tasks list.

4. Click **Disable Wireless Network Configuration** in the Tasks list. Click **Add** to add it to the Current Task List.

aster Task List Flash Syringe Ground Leakage	<u>^</u>	Current Task List	
Ground Resistance HiPot Instrument Inspection IUI Connectors Keypad	Āq	dd ->	
Network Connectivity Nurse Call Power Supply Sequential Display Set PM Reminder Date	< <u>· B</u> e	emove	0
Simultaneous Display Transfer Auto-ID Configuration	~		

- 5. Click **OK** to save the change.
- 6. Click Disable Wireless Network Configuration in the Tasks list.

١	Cardinal Health - Alaris	0 System Ma	intenance		_ # X
	Eile Options Help				
Γ	Perform Maintenance View Reports Configur	e Components			
	Connected Devices		Tasks Edit	COM1 - PC Unit - 12345678	-
	Device	Status	Check-in	~	CardinalHealth
	Wy Computer		Preventive Maintenance Transfer Data Set	Disable Wireless Network Configuration	
	COM1 - PC Unit - 12345678	READY	Disable Wireless Network Co Transfer Network Configuration		
	A.Pump - 4107379	READY			
	COM9 - PC Unit not detected	READY			

- 7. Click Start Selected Tasks to disable the wireless network configuration on the PC Unit.
- 8. Click the icon to the left of **Disable Wireless Network Configuration** to view when "Disabling Network connectivity on the PC Unit" is complete.



- 9. If desired, verify that the wireless network has been disabled.
 - a. Refer to the System Options, Wireless Connection section in the Alaris® System DFU.
 - b. If the **Wireless Connection** soft key is grayed out, wireless communication has been disabled.

Specify Auto-ID Module Settings

- 1. Click Configure Components tab.
- 2. Click Configuration Packages tab.
- 3. Click Auto-ID Settings under the desired package.
- 4. Use the Component Details pane on the right to define the Auto-ID Module configuration.

Formatting Rules

The following sections identify and explain the Auto-ID settings.

ID Type:

The **ID Type** displays the current rule for identifying Patient and Clinician fields on the bar code labels. Click the **Patient** or **Clinician** button to edit or define its related **ID Format** and **ID Locators**.

NOTE

The screens illustrated in the following sections have **Patient** selected as the **ID Type**. The options for **Clinician** are the same as for **Patient** but the settings must be different.

ID Format:

The **ID** Format is used to select the rule for parsing an ID and to enter corresponding data. Data fields change depending on the rule selected. The **Description** and **Example** fields display information that explains the selected rule.

• None—No rule is associated with the Selected Type. Entries in the Data and ID Locators fields are not needed.

	rackages > F	-аскаде Т > А	uto-ID Settings
Selected Type	Current Rule		
Patient Olinician	Entire String None		
ID Format			
Rule: 💿 None	C Entire String	 Field Delimited 	Character Length
	🔿 Tag Length	 Tagged 	O HL7
Data:			
Description:			
Example:			
ID Locators		ID Min Long	46.
ID Locators Label Min Length:		ID Min Leng	
ID Locators Label Min Length: Label Max Length:		ID Min Leng ID Max Leng	
ID Locators Label Min Length:		-	
ID Locators Label Min Length: Label Max Length:		-	

• Entire String—The entire string is the ID with no delimiters or field tags. Entries in the Data fields are not required.

ID Type	Current Dula		
Selected Type Patient Clinician	Current Rule Entire String None		
ID Format			
Rule: 🔿 None	⊙ Entire String ○ Tag Length	○ Field Delimited ○ Tagged	○ Character Length ○ HL7
Data:			

• **Field Delimited**—The ID is embedded in a delimited string and is Xth field. A **Delimiter** entry in the **Data** field is optional. The **Field** entry must be a numeric value.

) Type i elected Type) Patient) Clinician	Current Rule Entire String None		
ID Format Rule: O None	○ Entire String ○ Tag Length	 ● Field Delimited ○ Tagged 	 ○ Character Length ○ HL7
Data: Delimiter			Field

• **Character Length**—The ID starts at the Xth character and is Y characters in length. **Index** (Xth character) and **Length** (Y characters) must be entered in the **Data** fields. The **Length** value must be within the minimum and maximum ID length range. The **Index** value plus the **Length** value must not be greater than the **Label Max Length**. (*ID Locators:* on page *136* for explanations of the minimum and maximum length values.)

О Туре			
elected Type	Current Rule		
) Patient	Entire String		
) Clinician	None		
D Format			
ule: 🔘 None	🔘 Entire String	Field Delimited	💿 Character Length
	🔘 Tag Length	🔘 Tagged	🔘 HL7
ata:			Index
ala.			index
			Length

• **Tag Length**—The ID is prefixed with a tag and is X characters long. **Tag** characters and **Length** (X characters) must be entered in the **Data** fields. The **Tag** field has a 32-character limit. The **Length** entry must be a numeric value in the range of 1 to 32767.

Type elected Type Patient	Current Rule Entire String		
) Clinician	None		
D Format Rule: O None	 ○ Entire String ③ Tag Length 	○ Field Delimited ○ Tagged	 Character Length HL7
)ata: Tag		L	.ength

• **Tagged**—The ID has a **Beginning Tag** and an **Ending Tag**, which must be entered in the **Data** fields. The **Data** fields have a 32-character limit.

Configuration Packages > Package 1 > Auto-ID Settings				
Туре	Current Rule Entire String None			
○ None	 Entire String Tag Length 	○ Field Delimited	○ Character Length ○ HL7	
Beginning Tag Ending Tag				
	Type None Beginning Tag	Type Current Rule Entire String None Entire String None Entire String Tag Length Beginning Tag	Type Current Rule Entire String n None None Entire String Field Delimited Tag Length Tagged	

HL7—The ID is represented in an HL7 format. Tag and Field values must be entered in the Data fields. The Tag field has a 32-character limit. The Field entry must be a numeric value in the range of 1 to 32767. A Delimiter entry in the Data field is optional.

D Туре ——				
Selected Type	•	Current Rule		
Patient		Entire String		
🕽 Clinician		None		
D Format				
Rule: 🔿 N	lone	🔘 Entire String	🔘 Field Delimited	🔘 Character Length
		🔘 Tag Length	🔘 Tagged	HL7
D-4 T				
Data: Tag				Field
Deli	miter			

ID Locators:

Before attempting to extract data from a bar code label, the label data is subjected to validation. The **ID Locators** fields control that validation.

- Label Min Length—The minimum number of characters displayed on a label must be at least 1.
- Label Max Length—The maximum number of characters displayed on a label must be equal to or greater than the minimum label length.
- **ID Min Length**—The minimum number of characters that make up an ID must be at least 1.
- **ID Max Length**—The maximum number of characters that make up an ID must be equal to or greater than the minimum ID length.
- Label Prefix—An ID prefix has a 200-character limit and is optional.

• Label Suffix—An ID suffix has a 200-character limit and is optional.

ID Locators Label Min Length: Label Max Length: Label Prefix: Label Suffix:	ID Min Length: 1 ID Max Length: 1	
	Accept Changes Beset Form	1

Specify Firmware Files

- 1. Use the Files dialog box to identify the Release Manifest File for upload to the PC Unit and modules.
 - a. Firmware Flash File: Use **Browse** to find the correct XML file to be used to update the Alaris[®] System.
 - b. Device drop-down menu: Choose options from the drop-down menu next to each applicable device, to select what should happen when a PC Unit or module is flashed with contents of the Release Manifest File.
 - Always: Always overwrite the contents of the device with content from the Release Manifest File.
 - **Newer Version:** Only overwrites the contents of the device when the Release Manifest File contains a newer version than the one that already existing on the device.
 - Never: Do not update the device with the Release Manifest File.
- 2. Click Accept Changes to save edits.

Specify a Data Set File

Use the Data Set File dialog box to select the Guardrails® data set.GRE file type for transfer to the PC Unit.

- 1. Use Browse to select the file on the PC workstation.
- 2. If you click **Always Overwrite Dataset**, whenever you transfer a Data Set to a PC Unit, the old Data Set is overwritten, even if the Data Sets are exactly the same. If you do not click **Always Overwrite Dataset**, the old Data Set is only overwritten if CRC codes for the two Data Sets are different.
- 3. Click Accept Changes.

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Chapter 10 Calibration

Introduction

Calibration can be performed on connected modules by selecting from a list of automated tasks. The calibration task group applies to the Pump Module, PCA Module, Syringe Module, and EtCO₂ Module.

To perform calibration, see the procedure in this section that applies to the module being tested:

Pump Module Calibration on page 141 PCA Module Calibration on page 148 Syringe Module Calibration on page 154 EtCO₂ Module Calibration on page 161

Pump Module Calibration

Test Equipment

Test Equipment	Manufacturer	Model/Part Number	Application
gauge, pressure, digital (peak hold)	 Either of the following: Heise (www.heise.com) Ashcroft (www.ashcroft.com) 	 PTE-1 (accuracy from 0.1 to 0.025% span) 2089, 2086, or 2084 (accuracy from ±0.05%, 0.10%, or 0.25% of span) or an equivalent gauge with: (a) unit of measure in mmHg (b) accuracy of ±1% (c) range of 0-1500 mmHg 	pressure test
hemostat	N/A	N/A	fluid-side occlusion test
IV pole, standard	CareFusion	903-0336 or equivalent	rate, pressure, and occlusion tests
 IV sets IV set, standard, without check valve IV set, calibration IV set, calibration 	CareFusionCareFusionCareFusion	 2210-0500 8100-RCS 8100-PCS 	rate and pressure test
IV solution container (bag preferred)	N/A	N/A	rate and pressure test
luer lock, female, 1/8"-27 NPT	Cole-Parmer (www.coleparmer.com)	K-45503-78 or equivalent	pressure test
reducer, female, 1/4" NPT (F) x 1/8" NPT (F)	Cole-Parmer (www.coleparmer.com)	K-06349-91 or equivalent	pressure test
tubing, silicone	CareFusion	303109 or equivalent	pressure test
T-fitting	CareFusion	303815 or equivalent	pressure test
valve, 3-way	CareFusion	97555 or equivalent	pressure test

- 1. Click Perform Maintenance tab.
- 2. In the Connected Devices pane, click the Pump Module to be tested.
- 3. Click Calibration in the Tasks list (double-click to immediately begin first task).

💭 Cardinal Health - Alaris® System Maintenance								
File Options Help								
Perform Maintenance View Reports Configure Components								
Connected Devices Device Status	Tasks Edit	A:Pump - 3647771	CardinalHealth					
My Computer	Preventive Maintenance Calibration	Rate Calibration						
COM1 - PC Unit - 12583575 READY	Combration	Rate Accuracy Post-Test						
A:Pump - 3647771 READY		Pressure Calibration						
		Pressure Post-Test						
	Start Selected Tasks							
	Abort Selected Tasks							
	Reset Selected Tasks							
🎒 Start 🛛 🧑 💽 🕱 🍿 🔌 🖉 2 Microsof 🔻 🗿 Inbox -	 • Micr 🖂 Your EIT Ca 🔂 2 S	AP Log + 🖙 C:\ 🚺 Cardinal H	🐨 LVP Cal scre 🛛 < 💿 🛃 8:50 AM					

4. Click the calibration task that needs to be performed and follow the instructions displayed on the screen.

NOTE

See *Pump Module Tasks* on page 175 for an explanation of each task.

5. Rate Calibration:

F	ate Calibration		
Step 1	Enter the expected vo	on the packaging of the set.	ł
	Expected Volume :	12.00 grams Next	C
Step 2	Priming the line into	o the container	1
	VTBI	4 ml	
	Rate	500 ml\h	
	Elapsed Time	6 secs	
	Infused Volume	0.5 ml	

- a. Set up the Pump Module for Rate Calibration (see *Rate Accuracy Test Setup* on page 52).
- b. Enter the Expected Volume identified on the label attached to the characterized set.
- c. Click **Next** to prime the set.

Step 3 Balance the scale to	the zero mark.		
	Next		
Step 4 Rate measure in p	rogress		Ensure that the distilled water is dripping into the cu
VTBI	12 ml		
Rate	500 ml\h		and that the tubing is not resting on the scale.
Elapsed Time	13 secs		
Infused Volume	1.5 ml		
Step 5 Enter actual weight re are 11.59 to 12.41 gra	ading from scale. Passing values		
Actual weight :			
Actual weight.	11.51 grams		
	Next		
Step 6 Summary of Test F		<u> </u>	
Pump Module Test P VPMR:	tesult: Failed 175.3		
VTBI:	12 ml		
Rate: Expected Weight	500 ml\h 12.000 grams		
Actual Weight	11.51 grams		
Acceptable Error	+/-3.400%		
Actual Error	-4.0833%		
Pump Module Calibr	ated		
Old VPMR	175.3		
New VPMR	168.1		
	Calibrate		
	Finish		
	- molt		

6. Rate Accuracy Post-Test:

Set up the Pump Module for Rate Calibration (see *Rate Accuracy Test Setup* on page 52).

Rate Accuracy Po	ist-Test
Enter the expected characterization la	eed set and prime it with distilled water. J volume provided by the bel on the packaging of the set. e 11.640 to 12.360 mL. : 12.00 grams Next
Π	m
Step 2 Priming the line	into the container
VTBI	4 ml
Rate	500 ml\h
Elapsed Time	6 secs
Infused Volume	9 0.5 ml
	I
Step 3 Balance the scale	to the zero mark.

The **Expected Volume** is identified on the label attached to the characterized set.

Step 4 Rate measure in	progress
VTBI	12 ml
Rate	500 ml\h
Elapsed Time	13 secs
Infused Volume	1.5 ml
Step 5 Enter actual weight r are 11.59 to 12.41 gr	reading from scale. Passing values rams.
Actual weight :	11.95 grams
	Next
Step 6 Summary of Test	Doute
Pump Module Test VPMR:	Result Passed 1681
VTBI:	12 ml
Rate:	500 ml\h 12.000 grome
Expected Weight Actual Weight	12.000 grams 11.95 grams
Acceptable Error	+/-3.400%
Actual Error	-0.4167%
	Finish
	Finish

Ensure that the distilled water is dripping into the cup and that the tubing is not resting on the scale.

If the Pressure Calibration and Pressure Post-Test tasks do not need to be performed, click **Finish** and then click **Abort Selected Tasks**.

7. Pressure Calibration:

Pressure Calibration	
Step 1 Load a dry screened cal Please pressurize the se	ibration set, then close the door. t to 0 psi on the patient side.
Enter Set Serial Numb	er: 2200
	Next

The set serial number is identified on the label attached to the 8100-PCS set. It is the number that follows the most recent date on the label. When entering the serial number, do not enter the decimal point.

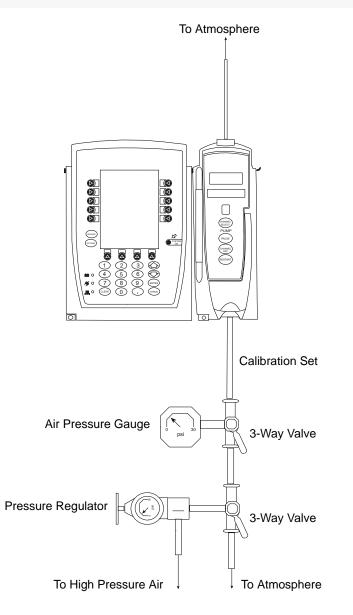
Patient-Side Occlusion Pressure Calibration Setup—Pump Module

Use the Model 8100-PCS pressure calibration set and the following setup to perform the patient-side occlusion pressure calibration (Task: Pressure Calibration).

Do not use the pressure gauge in peak hold mode during pressure calibration. Use the peak hold mode only during occlusion pressure tests.

CAUTION

- Pressure calibration sets are valid for 20 calibrations. Replace pressure calibration sets after 20 uses.
- To ensure accurate pressure calibration, use only pressure calibration sets.



s	Step	2	System Acclimation
			System acclimation takes 30 seconds: 2
I			l
s	Step	3	Please enter the pressure reading from the gauge. Acceptable range for the pressure is -0.1 to 0.1 psi. Enter reading : 0.009 psi
			Next
5	Step	4	Summary of the pressure parameters
			Acceptable Upstream voltages: 1.835-2.830 volts Actual Upstream voltage: 2.293 volts Upstream sensor Passed
			Acceptable Downstream voltages: 1.803-2.674 volts Actual Downstream voltage: 2.1526 volts Downstream stream sensor Passed
			Pump Module Passed
			Next
- :	Step	5	Please pressurize the set to 10 psi on the patient side and then enter the pressure reading from the gauge. Acceptable range for the pressure is 9.8 to 10.2. Enter reading : 10.05 psi Next
	_	_	
S	Step	6	Summary of the pressure parameters Expected Downstream System Gain values: 0.1048-0.1464 volts/psi Actual Downstream System Gain value: 0.1277 volts/psi The Downstream System Gain is within the acceptable range.
			Next
			NEX
_			
S	Step	7	Summary of results
			Upstream pre-load voltage: 2.293 volts Downstream pre-load voltage: 2.1526 volts Downstream System Gain value: 0.1277 volts/psi Calibration Complete.
			Next
1			
s	Step	8	A Pass result will be recorded for this device. Finish

Release the pressure and remove the 8100-PCS set.

8. Pressure Post-Test:

Set up the Pump Module for the test (see Patient-Side Occlusion Pressure Test Setup on page 55).



	Step 2 Wait until 0.4 ml has been infused before causing a Patient Side Occlusion.					
	∨тві	4 ml				
	Rate	125 ml\h				
	Elapsed Time	13 secs				
	Infused Volume	0.4 ml				
L	I					
	Step 3 Pump Occluded. Enter	the pressure reading at occlusion.				
	Pressure reading : 9.5 psi					
Ĩ	Enter the pressure reading at the time of Occlusion. Passing values are 7.7 to 12.7 psi.					

Next Step 4 A Pass result will be recorded for this device.

•

Finish

After 0.4 ml has been delivered, simulate a patientside occlusion by flipping the stop cock on the 3-way valve so that fluid is pumping toward the pressure transducer

PCA Module Calibration

Test Equipment

Test Equipment	Manufacturer	Model/Part Number	Application	
gauge, syringe height	CareFusion	148181-100	plunger position calibration / verification	
kit, calibration tools ^a	CareFusion	10010692	all tools required for calibration and verification force sensor calibration / verification	
kit, force sensor	CareFusion	10010691		
kit, syringe sizer and height gauge	CareFusion	148182-100	plunger position / barrel size calibration / verification	
kit, syringe sizer gauge	CareFusion	148180-100	barrel size calibration / verification	

a. To check the spring cartridge verification, preload the cartridge with 0.50 ±0.05 lbs. Measure the deflection from the preload point after adding 19.5 lbs additional load (20 ±0.05 lbs total). Acceptable deflection is within 0.891-0.940 inches. Use of Instron or equivalent is recommended.

- 1. Click Perform Maintenance tab.
- 2. In the Connected Devices pane, click the PCA Module to be tested.
- 3. Click **Calibration** in the Tasks list (double-click to immediately begin first task).

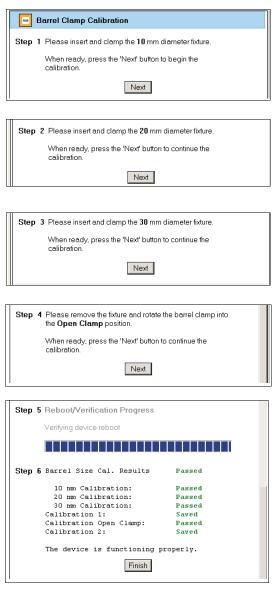
🕼 Cardinal Health - Alaris® System Mair	ntenance			_ 🗆 ×					
le Options Help									
	Perform Maintenance View Reports Configure Components								
Connected Devices		Tasks Edit	1 A:PCA - 9905694	CardinalHealth					
Device My Computer	Status	Check-in Preventive Maintenance Calibration	Barrel Clamp Calibration	Cardinaineaim					
COM1 - PC Unit - 12583575	READY	Calibration	Plunger Force Calibration						
() A:PCA - 9905694	READY		Plunger Position Calibration						
			Barrel Clamp Accuracy						
			Plunger Force Accuracy						
			Plunger Position Accuracy						
		Start Selected Tasks							
		Abort Selected Tasks							
		Reset Selected Tasks							
ಶ Start 🗍 🥭 🙆 📧 📝 👋 🖾 C:\	C TechS	uppo 🔲 CustomerD 搅 SAP	.ogon 🗿 Inbox - Mic 🚺 📕 Cardinal H 📑 Document1 .	🛛 🔍 😡 😏 2:09 PM					

4. Click the calibration task that needs to be performed and follow the instructions displayed on the screen.

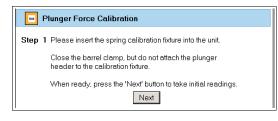
NOTE

See *Syringe Module and PCA Module Tasks* on page 178 for an explanation of each task.

5. Barrel Clamp Calibration:



6. Plunger Force Calibration:



IMPORTANT: To avoid damage to the plunger header, ensure that the plunger header is not attached to the calibration fixture.

Insert the 10 mm diameter fixture behind the barrel clamp and close the barrel clamp on the fixture.

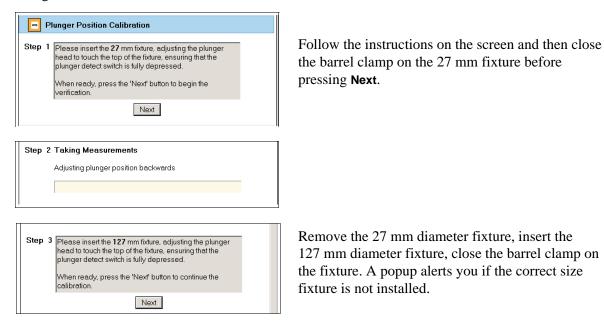
Remove the 10 mm diameter fixture, insert the 20 mm diameter fixture, and close the barrel clamp on the fixture. A popup alerts you if the correct size fixture is not installed.

Remove the 20 mm diameter fixture, insert the 30 mm diameter fixture, and close the barrel clamp on the fixture. A popup alerts you if the correct size fixture is not installed.

Step 2 Please attach the plunger head to the calibration fixture. To prevent damage to the unit, do not move the plunger head while the test is in progress until instructed to do so. When ready, press the 'Next' button to begin the calibration. Next	
Step 3 Calibration Progress Adjusting to starting position	
	_
Step 4 Please open the claws and lift the plunger head off of the calibration fixture. When ready, press the 'Next' button to continue the calibration.	
Next	
I	
Step 5 Reboot/Verification Progress	
Verifying device reboot	
Step 6 Force Calibration Results Passed 19.3 1b Calibration: Passed 5.9 1b Calibration: Passed 0.0 1b Calibration: Passed Force Calibration Results Saved	
The device is functioning properly.	
Finish	

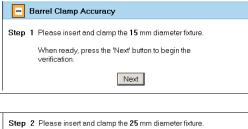
IMPORTANT: To avoid instrument damage, do not move the plunger head during this test.

7. Plunger Position Calibration:



Step 4 Taking Measurements		
Adjusting plunger position backward:	s	
Step 5 Please remove the fixture.		
Plunger Position Cal. Resul	ts Passed	
	Passed	
127 mm Calibration:	Passed	
Force Calibration Results	Saved	
The device is functioning p	roperly.	
Finish		

8. Barrel Clamp Accuracy:

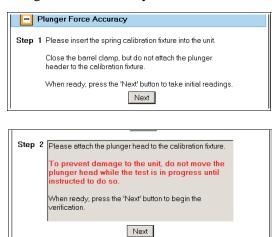


Insert the 15 mm diameter fixture behind the barrel clamp and close the barrel clamp on the fixture.

Step 2 Please insert and clamp the 25 mm diameter fixture. When ready, press the 'Next' button to continue the verification.

Step 3 Please remove the fixture	
Barrel Size Ver. Results	Passed
15 mm Verification:	Passed
25 mm Verification:	Passed
The device is functioning	properly.
Finish	

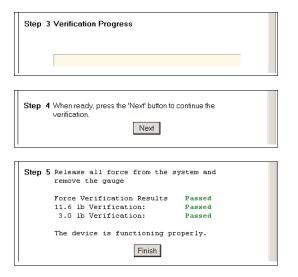
9. Plunger Force Accuracy:



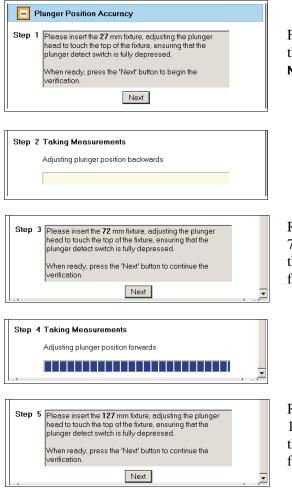
Remove the 15 mm diameter fixture, insert the 25 mm diameter fixture, and close the barrel clamp on the fixture. A popup alerts you if the correct size fixture is not installed.

IMPORTANT: To avoid damage to the plunger header, ensure that the plunger header is not attached to the calibration fixture.

IMPORTANT: To avoid instrument damage, do not move the plunger head during this test.



10. Plunger Position Accuracy:



Follow the instructions on the screen and then close the barrel clamp on the 27 m fixture before pressing **Next**.

Remove the 27 mm diameter fixture, insert the 72 mm diameter fixture, close the barrel clamp on the fixture. A popup alerts you if the correct size fixture is not installed.

Remove the 72 mm diameter fixture, insert the 127 mm diameter fixture, close the barrel clamp on the fixture. A popup alerts you if the correct size fixture is not installed.

Step (6 Taking Measurements	
	Adjusting plunger position backwards	
Step 3	7 Please remove the fixture.	
	Plunger Position Ver. Results	Passed
	27 mm Calibration:	Passed
	72 mm Calibration:	Passed
	127 mm Calibration:	Passed
	The device is functioning pro	perly.
	Finish	

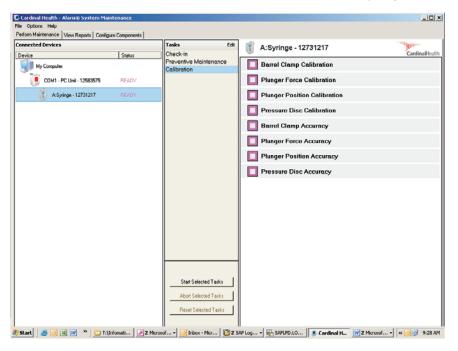
Syringe Module Calibration

Test Equipment

Test Equipment	Manufacturer	Model/Part Number	Application
gauge, syringe height	CareFusion	148181-100	plunger position calibration / verification
kit, calibration tools ^a	CareFusion	10010692	all tools required for calibration and verification
kit, force sensor	CareFusion	10010691	force sensor calibration / verification
kit, syringe sizer and height gauge	CareFusion	148182-100	plunger position / barrel size calibration / verification
kit, syringe sizer gauge	CareFusion	148180-100	barrel size calibration / verification
tubing, silicone	CareFusion	303109 or equivalent	pressure test
valve, 3-way	CareFusion	97555 or equivalent	pressure test

a. To check the spring cartridge verification, preload the cartridge with 0.50 ±0.05 lbs. Measure the deflection from the preload point after adding 19.5 lbs additional load (20 ±0.05 lbs total). Acceptable deflection is within 0.891-0.940 inches. Use of Instron or equivalent is recommended.

- 1. Click Perform Maintenance tab.
- 2. In the Connected Devices pane, click the Syringe Module to be tested.
- 3. Click Calibration in the Tasks list (double-click to immediately begin first task).



4. Click the calibration task that needs to be performed and follow the instructions displayed on the screen.

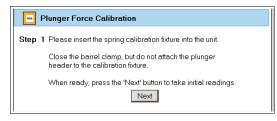
NOTE

See *Syringe Module and PCA Module Tasks* on page 178 for an explanation of each task.

5. Barrel Clamp Calibration:

Barrel Clamp Calibration
Step 1 Please insert and clamp the 10 mm diameter fixture.
When ready, press the 'Next' button to begin the
calibration.
Next
Step 2 Please insert and clamp the 20 mm diameter fixture.
When ready, press the 'Next' button to continue the calibration.
Next
Step 3 Please insert and clamp the 30 mm diameter fixture.
When ready, press the 'Next' button to continue the calibration.
Next
Step 4 Please remove the fixture and rotate the barrel clamp into the Open Clamp position.
When ready, press the 'Next' button to continue the calibration.
Next
Step 5 Reboot/Verification Progress
Rebooting device
Step 6 Barrel Size Cal. Results Passed
10 mm Calibration: Passed 20 mm Calibration: Passed
30 mm Calibration: Passed
Calibration 1: Saved Calibration Open Clamp: Passed
Calibration Open Clamp: Passed Calibration 2: Saved
The device is functioning properly.
Finish

6. Plunger Force Calibration:



IMPORTANT: To avoid damage to the plunger header, ensure that the plunger header is not attached to the calibration fixture.

Step 2	Please attach the plunger head to the calibration fixture.
	To prevent damage to the unit, do not move the plunger head while the test is in progress until instructed to do so.
	When ready, press the 'Next' button to begin the
	calibration.
	Next
1	
Step 3	Calibration Progress
	Adjusting to starting position
Step 4	Please open the claws and lift the plunger head off of the calibration fixture.
	When ready, press the 'Next' button to continue the calibration.
	Next
1	
Step 5	Reboot/Verification Progress
	Verifying device reboot
Stop 6	Force Calibration Results Passed
Step 0	19.3 lb Calibration: Passed
	5.9 lb Calibration: Passed 0.0 lb Calibration: Passed
	Force Calibration Results Saved
	The device is functioning properly.
	Finish
1	

7. Plunger Position Calibration:

- P	lunger Position Calibration
Step 1	Please insert the 27 mm fixture, adjusting the plunger head to touch the top of the fixture, ensuring that the plunger detect switch is fully depressed. Do not use a pressure disc for this test. When ready, press the 'Next' button to begin the verification.
Step 2	Taking Measurements Adjusting plunger position backwards
Step 3	Please insert the 127 mm fixture, adjusting the plunger head to touch the top of the fixture, ensuring that the plunger detect switch is fully depressed.
	When ready, press the 'Next' button to continue the calibration.

IMPORTANT: To avoid instrument damage, do not move the plunger head during this test.

Step 4 Taking Measurements	
Adjusting plunger position	backwards
Step 5 Please remove the f	ixture.
Plunger Position Ca	l. Results Passed
27 mm Calibration	: Passed
127 mm Calibration	: Passed
Force Calibration R	esults Saved
The device is funct	ioning properly.
[Finish
1	

8. Pressure Disc Calibration:

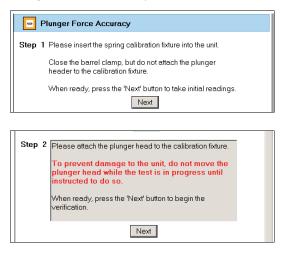
Set up the Syringe Module for pressure calibration (see Pressure Test/Calibration Setup on page 75).

Pressure Disc Calibration
Step 1 Verify that the pressure gauge is set to mmHg. Install the test set in to the module and connect the set to the pressure gauge.
Apply pressure until the pressure gauge reads 1000 mmHg +/- 5 mmHg.
Next
Step 2 Reduce the pressure until the pressure gauge reads 400 mmHg +/- 5 mmHg.
Next
Step 3 Reduce the pressure until the pressure gauge reads 50 mmHg +/- 2 mmHg.
Next
Step 4 Reboot/Verification Progress
Verifying device reboot
Step 5 Pressure Calibration Results Passed
1000 mmHg Calibration: Passed
400 mmHg Calibration: Passed 50 mmHg Calibration: Passed Calibration: Saved
The device is functioning properly.
Finish

9. Barrel Clamp Accuracy:

	Barrel Clamp Accuracy
Step	1 Please insert and clamp the 15 mm diameter fixture.
	When ready, press the 'Next' button to begin the verification.
	Next
Step	2 Please insert and clamp the 25 mm diameter fixture.
	When ready, press the 'Next' button to continue the verification.
	Next
Step	3 Please remove the fixture
	Barrel Size Ver. Results Passed
	15 mm Verification: Passed
	25 mm Verification: Passed
	The device is functioning properly.
	Finish

10. Plunger Force Accuracy:



Step 3 Verification Progress	
Adjusting to starting position	
	_
Step 4 When ready, press the 'Next' button to continue the verification.	
INCA	
-	
Step 5 Release all force from the system and remove the gauge	
Force Verification Results Passed	
11.6 lb Verification: Passed	
3.0 lb Verification: Passed	
The device is functioning properly.	
Finish	

IMPORTANT: To avoid damage to the plunger header, ensure that the plunger header is not attached to the calibration fixture.

IMPORTANT: To avoid instrument damage, do not move the plunger head during this test.

11. Plunger Position Accuracy:

P	lunger Position Accuracy
Step 1	Please insert the 27 mm fixture, adjusting the plunger head to touch the top of the fixture, ensuring that the plunger detect switch is fully depressed.
	Do not use a pressure disc for this test.
	When ready, press the 'Next' button to begin the verification.
	Next
1	
Step 2	Taking Measurements
	Adjusting plunger position backwards
I	
Step 3	Please insert the 72 mm fixture, adjusting the plunger head to touch the top of the fixture, ensuring that the plunger detect switch is fully depressed.
	When ready, press the 'Next' button to continue the verification.
	Next
I	
Step 4	Taking Measurements
	Adjusting plunger position forwards
Step 5	Please insert the 127 mm fixture, adjusting the plunger head to touch the top of the fixture, ensuring that the plunger detect switch is fully depressed.
	When ready, press the 'Next' button to continue the verification.
	Next
I	
Step 6	Taking Measurements
	Adjusting plunger position backwards
1	
Step 7	Please remove the fixture.
	Plunger Position Ver. Results Passed
	27 mm Calibration: Passed
	72 mm Calibration: Passed 127 mm Calibration: Passed
	The device is functioning properly.
	Finish

12. Pressure Disc Accuracy:

Set up the Syringe Module for the pressure test (see Pressure Test/Calibration Setup on page 75).

	Ρ	ressure Disc Accuracy								
Step	Step 1 Verify that the pressure gauge is set to mmHg. Install the test set in to the module and connect the set to the pressure gauge.									
	Apply pressure until the pressure gauge reads 500 mmHg +/- 5 mmHg.									
		Next								
Step	2	Preduce the pressure until the pressure gauge reads 250								
		mmHg +/- 5 mmHg.								
		Next								
Step	3	Pressure Verification Results Passed								
		500 mmHg Verification: Passed								
		250 mmHg Verification: Passed								
		The device is functioning properly.								
		Finish	•							

EtCO₂ Module Calibration

Test Equipment

Test Equipment	Manufacturer	Model Number	Application
EtCO ₂ pod (disposable)	Microstream®	007768	flow test/calibration
flow meter	Dwyer (www.dwyer-inst.com.au)	VFA-22, or equivalent	flow test/calibration
gas	Scott Medical	0304653SROBD, or equivalent gas with CO_2 content of 4-6%	flow test/calibration

- 1. Click Perform Maintenance tab.
- 2. In the Connected Devices pane, click the EtCO₂ Module to be tested.
- 3. Click **Calibration** in the Tasks list (double-click to begin testing immediately).

💭 Cardinal Health - Alaris® System Mainte	nance			
File Options Help				
Perform Maintenance View Reports Configure I	Components			
Connected Devices		Tasks Edit Check-in	A:EtCO2 - 9872801	CardinalHealth
Device	Status	Cneck-in Preventive Maintenance	-	Cardinaineau
My Computer		Calibration	CO2 Sensor Calibration	
COM1 - PC Unit - 12583575	READY		CO2 Sensor Accuracy	
A:EtCO2 - 9872801	READY			
		Start Selected Tasks		
		Abort Selected Tasks		
		Reset Selected Tasks		
🍠 Start 🛛 🥭 💽 🗷 📝 👋 😂 T:\Info	mation c 🛛 🔎 2 Mic	rosoft O + O Inbox - Microso	2 SAP Logon f 🗸 👜 ASM EtCO2 cal	📕 Cardinal Healt 🔍 💽 🛃 7:10 AM

4. Follow the instructions displayed on the screen for each test.

NOTE

See *EtCO*₂ *Module Tasks* on page *183* for an explanation of each task.

5. CO2 Sensor Calibration:

Set up the EtCO₂ Module for the flow test/calibration (see *Flow Test/Calibration Setup* on page 89).

CO2 Sensor Calibration Step 1 Reminder: Do not calibrate this unit unless it has been warming up for at least 20 minutes. Please connect a disposable and attach the gas source. When instructed, start the gas flowing and leave it flowing until instructed to stop. Caution: The gas flow rate must be above 500 mL/min. Use of a flow meter is recommended. Next	Ensure that the module has been warming up for at least 20 minutes before performing calibration. 500 mL/min is equivalent to 0.5 liters per minute. Vent the flow meter to open air.
Step 2 Enter the percentage of CO2 in the calibration gas (there should be 21 % O2 and the balance should be N2). % CO2 % CO2 Valid values are 4% to 6%	Do not turn off the cos flow until instructed to in
Step 3 Start the gas flow Next	Do not turn off the gas flow until instructed to in step 5.
Step 1 Running calibration. Keep the gas flowing. Step 5 Calculating Please turn off the gas source	
Step 6 Test Result:Passed	
CO2 Sensor Accuracy:	
CO2 Sensor Accuracy	
Step 1 Please connect a disposable and attach the gas source. When instructed, start the gas flowing and leave it flowing until instructed to stop. Caution: The gas flow rate must be above 500 mL/min. Use of a flow meter is recommended. Start the gas flow meter is recommended.	500 mL/min is equivalent to 0.5 liters per minute. Vent the flow meter to open air.
Next	
Step 2 Enter the percentage of CO2 in the verification gas (there should be 21% O2 and the balance should be N2).	

6.

Step 5 Stop the gas and press 'Finish'

CO2 Sensor value: Acceptable range: TEST PASSED

Step 3 Start the gas flow
Next
Step 4 CO2 sensor reading: 4.95

Expected 5.0% 4.71% - 5.29%

Finish

Actual 4.95% Do not turn off the gas flow until instructed to in step 5.

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Chapter 11 Tasks

Task Groups

Create a New Task Group

Custom task groups can be defined and then added to the Task list. You cannot edit the standard task groups, which will always display in the Task list.

- 1. On the main window, click the **Configure Components** tab.
- 2. In the Components window, click the Task Groups tab.
- 3. At the top of the device type list, select a device type and click **New** (or right-click the device and click **New**).
- 4. Enter a name for the task group and press Enter.

The Component Details window is displayed.

Alarm Analog Sensors Barrel Clamp Accuracy Binary Switches Clear Event Log Download Event Log Instrument Inspection IUI Connectors Keypad Plunger Force Accuracy Pressure Disc Accuracy Sequential Display Set PM Reminder Date	Add->	Selected Tasks	C
---	-------	----------------	---

- 5. If you wish to add a task, select the task from the Available Tasks list and click Add to add it to the Selected Tasks list for the device.
- 6. If you wish to remove a task, select the task in the **Selected Tasks** list and click **Remove** to remove it from the list.
- 7. Continue selecting tasks until you have collected all the needed tasks.
- 8. Use the up and down arrows to change the list order, if required.



9. Click **Save** to save changes.

The Task group name is added to the list of task groups in the Components window.

Delete a Task Group

Do not delete all task groups from the Tasks list. At least one task group must remain in the Tasks list.

- 1. On the main window, click the **Configure Components** tab.
- 2. In the **Components** window, click the **Task Groups** tab.
- 3. Right-click the name of a task group and click **Delete**.
- 4. Click **Yes** to confirm the deletion.

Rename a Task Group

- 1. On the main window, click the **Configure Components** tab.
- 2. In the Components window, right-click the name of a task group and click Rename.
- 3. Enter the new name in the dialog box and press Enter.

Tasks List

Edit Tasks List

You can edit the Tasks list to display tasks in addition to the standard task groups. The task list edit button must be enabled in Application Settings to be able to edit the tasks lists. You cannot edit the standard task groups, which always display in the Tasks list.

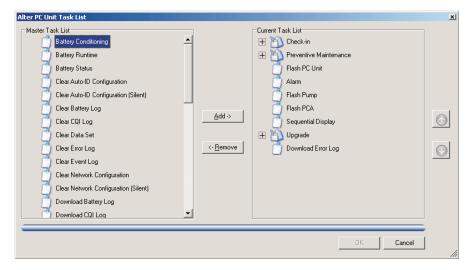
NOTE

For information on configuring task groups, see Task Groups on page 166.

- 1. On the main window, click the Perform Maintenance tab and select a device.
- 2. Click **Edit** in the Tasks list.



The Alter Task List dialog box is displayed for the selected device.



- 3. To add a task, select it in the Master Task List and click Add (or double-click it). To remove a task, select it in the Current Task List and click **Remove** (or double-click it).
- 4. Click **OK** to save the changes.

Change Tasks List Order

You can change the display order of tasks in a device Task list.

- 1. On the main window, click the **Perform Maintenance** tab and select a device.
- 2. Click **Edit** in the Tasks list.

The Alter Task List dialog box is displayed for the selected device.

3. Select a task in the Current Task List and use the arrows to move it up and down in the list.



4. Click **OK** to save changes.

Task Information

The following tables contain descriptions of tasks available for the PC Unit and any attached modules. The table also lists which standard task group each task is in.

PC Unit Tasks

PC Unit Tasks

Task	Standard Task Group	Description						
Alarm	Check-in Preventive Maintenance	Tests audio and visual alarm prompts. You should be able to hear an audible tone from the PC Unit and see a flashing red light at the top of the attached module.						
Battery Conditioning	(not in a standard task group)	Performs a sequence of battery drains and charges to condition the battery. This test can take eight hours or more to complete. It can be run overnight without being connected to the personal computer.						
Battery Runtime	(not in a standard task group)	Tests the time a battery charge lasts (manually timed test). Nickel Metal Hydride (NiMH) batteries lose capacity over tim (depending on usage factors, such as frequency and depth of discharge). Since the rate of loss increases as the capacity diminishes, CareFusion recommends replacing or reconditionin batteries if runtime for four channels is less than four hours (operating at 25 mL/h).						
		Battery conditioning should be run to recondition the NiMH battery if the PC Unit has reduced battery capacity (for example, after repeated battery alarms).						
Battery Status	(not in a standard task group)	Provides battery status information.						
Clear Auto-ID Configuration	(not in a standard task group)	Clears Auto-ID Module configuration from PC Unit.						
Clear Auto-ID Configuration (Silent)	(not in a standard task group)	Clears Auto-ID Module configuration (silent) from PC Unit.						
Clear Battery Log	(not in a standard task group)	Clears battery log from PC Unit.						
Clear CQI Log	(not in a standard task group)	Clears alerts stored in PC Unit.						
Clear Data Set	(not in a standard task group)	Clears Data Set from PC Unit.						
Clear Error Log	(not in a standard task group)	Clears error log.						
Clear Event Log	(not in a standard task group)	Clears event log.						
Clear Network Configuration	(not in a standard task group)	Clears network configuration from the PC Unit.						
Clear Network Configuration (Silent)	(not in a standard task group)	Clears network configuration (silent) from the PC Unit.						
Disable Wireless Configuration	(not in a standard task group)	Disables the wireless feature permanently on the PC Units. Th is for PC Units that will be operating in a non-wireless environment.						

PC Unit Tasks (Continued)

Task	Standard Task Group	Description
Download Battery Log	Upgrade	Downloads battery log from PC Unit. If logs are not downloaded and cleared regularly, storage space on the Alaris [®] System can be filled and older data will be overwritten as new events occur.
Download CQI Log	Upgrade	Downloads alerts stored in PC Unit to CQI database when wireless network is not available.
Download Error Log	Upgrade	Downloads error log that contains a log of abnormal device conditions due to hardware or software error. If you do not download and clear logs regularly, storage space on the Alaris [®] System can be filled and older data will be overwritten as new events occur.
Download Event Log	Upgrade	PC Unit and its modules create event logs, providing a history of key presses. These logs can be downloaded periodically to provide a database of module-specific events. If you do not download and clear logs regularly, storage space on the Alaris [®] System can be filled and older data will be overwritten as new events occur.
Flash Auto-ID	(not in a standard task group)	Updates module firmware from the Release Manifest File according to the overwrite setting.
Flash EtCO ₂	(not in a standard task group)	Updates module firmware from the Release Manifest File according to the overwrite setting.
Flash PC unit	Upgrade	Updates PC Unit firmware from the Release Manifest File according to the overwrite setting.
Flash PCA	(not in a standard task group)	Updates module firmware from the Release Manifest File according to the overwrite setting.
Flash Pump	(not in a standard task group)	Updates module firmware from the Release Manifest File according to the overwrite setting.
Flash SpO ₂	(not in a standard task group)	Updates module firmware from the Release Manifest File according to the overwrite setting.
Flash Syringe	(not in a standard task group)	Updates module firmware from the Release Manifest File according to the overwrite setting.
Ground Leakage	Check-in Preventive Maintenance	Tests that ground leakage is within accepted limits. See <i>Ground Leakage:</i> on page 45.
Ground Resistance	Check-in Preventive Maintenance	Tests that ground resistance is within accepted limits. See <i>Ground Resistance:</i> on page 45.
HiPot	(not in a standard task group)	Standard dielectric test of device insulation.
Instrument Inspection	Check-in Preventive Maintenance	Describes what to look for while examining a device. Description varies depending on module type selected.

PC Unit Tasks (Continued)

Task	Standard Task Group	Description					
IUI Connectors	Check-in Preventive Maintenance	Tests the proper functioning of IUI connectors that connect devices and PC Unit. You must connect a device to each connector of the PC Unit to test it. Connections can be tested one at a time or both at once.					
Keypad	Check-in Preventive Maintenance	 Verifies that keys on the device keypad are functioning properly. Test instructions vary depending on module type selected. Starting text for each key will be black. When a key press is registered, the text on the test for that key becomes bold and changes color to green. If a second key press is registered for that key, the text changes to red. If you see red text, rerun the test to verify the key is not stuck. 					
Network Connectivity		Tests that the PC Unit can communicate wirelessly with the Alaris [®] network. You have the choice of testing the network parameters present on the PC Unit or temporary parameters, which runs test with the first parameter set configured in active configuration package.					
		Use temporary parameters option to test a new parameter set before updating the PC Unit. The parameter set imported or created in current maintenance session is sent temporarily to the PC Unit. (After testing, clear parameters by power cycling unit or by rerunning the test.) This option runs only the first of the parameter sets to be tested. If you know that a particular set works with an Alaris [®] Server from the personal computer, make sure this parameter set					
		appears first when defining network parameters.					
Nurse Call	Check-in Preventive Maintenance	Verifies if a nurse call unit is installed. If one is installed, the test prompts you to press the Nurse Call button and verify that the nurse call is signaled.					
Power Supply	(not in a standard task group)	Displays the results of the Power On Self Test (POST) from the power supply processor. During normal operation, if POST elements fail, the PC Unit does not power up. However, in Maintenance Mode, the device can power up to allow this test to isolate problems in the power supply processor.					
Sequential Display	(not in a standard task group)	Tests the device display and status lights in sequence.					
Set PM Reminder Date	Check-in Preventive Maintenance	Prompts you for a maintenance date and sets it for the selected device.					
Simultaneous Display	Check-in Preventive Maintenance	Tests the device display and all status lights simultaneously.					
Transfer Auto-ID Configuration	(not in a standard task group)	Transfers the Auto-ID Module configuration saved in the active configuration package to the PC Unit.					
Transfer Auto-ID Configuration (Silent)	Upgrade	Transfers the Auto-ID Module configuration saved in the active configuration package to the PC Unit, in the Silent mode.					

PC Unit Tasks (Continued)

Task	Standard Task Group	Description
Transfer Data Set	Upgrade	Transfers a Data Set to a PC Unit when it is not connected to the wireless network.
		Draft Data Sets and Approved Data Sets can be transferred for training or clinical interface testing purposes. When a Draft Data Set or an Approved Data Set is loaded, the message "This Device is Not for Human Use" is displayed on the PC Unit screen.
		Released Data Sets are only used after they are approved by the facility and are ready for human use.
		WARNING
		Unreleased Data Sets are transferable only for user interface testing and/or training and are not for use on patients.
		CAUTION
		 If you have not yet downloaded the alerts from the Alaris[®] System, download them before you transfer the Data Set.
		• The new Data Set will not become active until you power- cycle the PC Unit and select New Patient.
Transfer Network Configuration	(not in a standard task group) For error handling, see <i>Transfer</i> <i>Network Configuration—Error</i> <i>Handling</i> on page 174.	Transfers the network configuration (parameter sets and Alaris [®] Server information) that are saved in the active configuration package to the PC Unit. Allows you to view, clear, and export the network configuration settings currently on the PC Unit.
Transfer Network Configuration (Silent)	Upgrade For error handling, see <i>Transfer</i> <i>Network Configuration—Error</i> <i>Handling</i> on page 174.	Transfers the network configuration (parameter sets and Alaris [®] Server information) to the PC Unit in a single step. The additional features that are available when using the Transfer Network Configuration task cannot be accessed when using this task.
Voltage Display	(not in a standard task group)	Shows the power supply and system voltage information and identifies values outside the acceptable range.

Transfer Network Configuration—Error Handling

PC Unit Main				802.11d 802.11a			WPA	WPA2	PS	к	Encry	ption	Compa	atibility
Processor & Wireless Main Version	Wireless RF Card		802.11a		WEP	WPA PSK, TLS, TTLS, PEAP	SK, PSK, S, TLS, LS, TTLS,	ASCII	Hex	TKIP	AES	Partially Incompatible	Completely Incompatible	
v9.1.x	Any supported brand of RF card or no RF card	N ¹	N^1	Y	Y	N ¹	Y	N ¹	Y	N ¹	¹ Error popup: ¹ embedded Wirele version v9.1.X de profile: Profile X Configuration wi transferred to the PC Unit.	ess Main software besn't support . Network Il not be		
v9.5.x	Symbol b	N ²	N^2	Y	Y	N ²	Y	Y	Y	N ²	² Information popup:	² Error popup: RF Card on		
	AmbiCom b/g	N^2	N^2	Y	Y	Y	Y	Y	Y	Y	Settings for Profile X are	connected PC Unit is not		
	Motorola a/b/g	Y	Y	Y	Y	Y	Y	Y	Y	Y	not supported for this particular device RF card.	supported or is not compatible with Network Configuration Provided. Network Configuration will not be transferred to the connected PC Unit.	not compatible with Network Configuration Provided. Network Configuration will not be transferred to the connected	
	No RF card	n/a ⁰	n/a ⁰	n/a ⁰	n/a ⁰	n/a ⁰	⁰ Error popup: ¹ detected on this F Configuration wi transferred to the PC Unit.	PC Unit. Network vill not be						

N—No (not compatible). Y—Yes (compatible).

•

X—Represents the software version or profile number that appears in the popup message.

 n/a—Not Applicable.
 Partially Incompatible—At least one of the network profiles is supported. When you click the OK button, the supported network settings are transferred to the PC Unit.
 Completely Incompatible—The network profile is not supported. The network settings will not be transferred to the PC Unit. •

Pump Module Tasks

Unless otherwise specified, a disposable set must be loaded and the Pump Module door must be closed to run any Pump Module test. For instructions, see *Load Administration Set* on page 51.

Pump Module Tasks

Task	Standard Task Group	Description
Air-in-Line Sensor	Check-in Preventive Maintenance	Verifies Air-in-line detection and also that a dry set is detected.
Air-in-Line Sensor (Wet and Dry)	(not in a standard task group)	Air-in-line detection is verified using a wet set to detect sensing of wet or dry.
Alarm	Check-in Preventive Maintenance	See Alarm on page 170.
Analog Sensor	(not in a standard task group)	Displays readings from sensors that transmit analog measurements in real-time. Shows analog-to-digital readings of sensors with variable outputs. This view includes display of voltage outputs from pressure sensor strain gauges.
Binary Sensors	(not in a standard task group)	Shows 1 or 0 states of sensors that can be either ON or OFF.
Clear Error Log	(not in a standard task group)	See Clear Error Log on page 170.
Clear Event Log	(not in a standard task group)	See Clear Event Log on page 170.
Door Ajar-Flo-Stop Sensor	Check-in Preventive Maintenance	Tests sensor to verify that a door ajar and Flo-Stop conditions are detected.
Download Error Log	(not in a standard task group)	See Download Error Log on page 171.
Download Event Log	(not in a standard task group)	See Download Event Log on page 171.
Fluid-Side Occlusion	Check-in Preventive Maintenance	Tests that an occlusion in the fluid-side of the installed set is detected. For a diagram of the test setup, see <i>Fluid-Side Occlusion Test Setup</i> on page 57. CAUTION If the Pump Module fails the fluid-side occlusion test, it must be repaired.
Infuse Without Alarms	(not in a standard task group)	Runs an infusion at a user-defined rate and VTBI without activating alarms. During this test you can view the pumping mechanism with the door open to observe operation. While the infusion is running, open the door to examine infusion components and remove the set fitments or entire IV set.
Instrument Inspection	Check-in Preventive Maintenance	See Instrument Inspection on page 171.
IUI Connectors	Check-in Preventive Maintenance	See IUI Connectors on page 172.
Keypad	Check-in Preventive Maintenance	See <i>Keypad</i> on page 172.
Maximum Pressure	(not in a standard task group)	Determines the Pump Module's maximum mechanical pumping pressure by running an infusion to occlusion without activating a pressure alarm. Measured peak pressure is stored in the database.

Pump Module Tasks (Continued)

Task	Standard Task Group	Description
Patient-Side Occlusion	Check-in Preventive Maintenance	Tests that an occlusion in the patient side of the installed set is detected at a pressure that falls within calibration limits. For information about how to run the patient-side occlusion pressure test (including a diagram of the test setup), see <i>Patient-Side</i> <i>Occlusion Pressure Test Setup</i> on page 55. CAUTION If the Pump Module fails the fluid-side occlusion test, it must be repaired.
Power On Self Test	(not in a standard task group)	Invokes a power-on self test.
Pressure Calibration	Calibration	 Pressure calibration is only required if the Pump Module fails the pressure calibration pre-test or after you replace the Pump Module. For information about running the pressure calibration test (including a diagram of the test setup), see <i>Patient-Side Occlusion Pressure Calibration Setup—Pump Module</i> on page 145. CAUTION To ensure accurate pressure calibration, use only pressure calibration sets. Pressure calibration sets are valid for 20 calibrations. Replace pressure calibration sets after 20 uses.
Pressure Post-Test	Calibration	Verifies that the calibration was successful.
Pressure Pre-Test	Calibration	Verifies that calibration is required.
Rate Accuracy	Check-in Preventive Maintenance	 Checks that the accuracy of a module's rate of infusion falls within calibration limits. For more information about the rate accuracy test, including a diagram of the test setup, see <i>Rate Accuracy Test Setup</i> on page 52. Use the setup shown to perform the rate accuracy verification. Verify that the scale is calibrated according to the manufacturer's instructions. Prime the fluid lines and keep them free of air bubbles while running the test. CAUTION If the Pump Module fails the rate accuracy verification tests, it must be calibrated. Failure to perform calibration tests might result in improper operation. Use distilled water at room temperature of 41°F to 104°F (5°C to 40°C). If water temperature is not within this temperature range, the readings might be inaccurate.
Rate Accuracy Post- Test	Calibration	Verifies that the calibration was successful.
Rate Accuracy Pre- Test	Calibration	Verifies that calibration is required.

Pump Module Tasks (Continued)

Task	Standard Task Group	Description
Rate Calibration	Calibration	Rate accuracy calibration is only required if the Pump Module fails the rate accuracy calibration pre-test or after the pump component is replaced.
		Test the primes line to prevent an air-in-line warning from interrupting the test. For accurate results, ensure that the air is cleared from the line.
		For more information about running rate accuracy calibration tasks, including a diagram of the test setup, see <i>Rate Accuracy Test Setup</i> on page 52.
		CAUTION
		 To ensure accurate rate calibration, use only a rate calibration set.
		 Use distilled water at room temperature of 41°F to 104°F (5°C to 40°C). If water temperature is not within this temperature range, the readings might be inaccurate.
		• A rate accuracy calibration set is valid for 60 calibrations. After 60 uses, replace the set.
Sequential Display	(not in a standard task group)	See Sequential Display on page 172.
Set Loaded	(not in a standard task group)	Tests the sensor to verify proper set loading detected.
Set PM Reminder Date	Check-in Preventive Maintenance	See Set PM Reminder Date on page 172.
Simultaneous Display	Check-in Preventive Maintenance	See Simultaneous Display on page 172.
Time to Occlusion	(not in a standard task group)	Tests occlusions are detected within specified time limit.

Syringe Module and PCA Module Tasks

Task	Standard Task Group	Description
Alarm	Check-in Preventive Maintenance	See Alarm on page 170.
Analog Sensors	(not in a standard task group)	 Enables the display readings of four sensors that transmit analog measurements from sensors in real-time. During the analog sensor test, you can move the head up and down to see height readings from the plunger position sensor, and open and close the clamp to see readings from the barrel size sensor. This test also loads a syringe, runs an infusion, and displays readings from the pressure and force sensors. This test displays sensor readings results: Pressure Sensor displays pressure readings in millimeters of mercury (mmHg). Force Sensor displays current force applied to drive head in pounds (lbs). Barrel Size Sensor displays outer diameter measurement of a loaded syringe in millimeters (mm). Plunger Position Sensor displays syringe plunger height in millimeters (mm). An occlusion warning alarm can occur if the selected rate is too high for the syringe and set. Larger diameter tubing offers less resistance and is therefore less likely to occlude during this test.
Barrel Clamp Calibration	Calibration	Requires three metal fixtures (10, 20, and 30 mm wide). Values returned by the calibration are flashed into the barrel size sensor. If the calibration fails, you are prompted to return the Syringe Module for repair.
Barrel Clamp Accuracy	Calibration Check-in Preventive Maintenance	 This verification test uses a series of fixtures of a known diameter. Insert the fixtures according to on-screen instructions. Ensure that the fixtures seat vertically upright under the clamp and that the clamp rests snugly against the side of the fixture. Failing a verification test does not affect the calibration status of a Syringe Module or a PCA Module. To determine the calibration status, run the calibration settings test.

Syringe Module and PCA Module Tasks

Syringe Module and Pe	CA Module Tasks	(Continued)
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Task	Standard Task Group	Description
Binary Sensors	(not in a standard task group)	 Displays the readings from six module sensors in real-time. During the binary sensors test you can insert, remove, push, pull, open, and close the working parts of the syringe and see in real-time what the Syringe Module detects. This test displays sensor readings results: Pressure Disc indicates the presence or absence of a pressure disc (Syringe Module only). Flange indicates whether the syringe flange is detected. Knob indicates whether the syringe plunger grippers (claws) are open or closed. Split Nut indicates whether the drive head is in contact with a loaded syringe. Clamp indicates whether the barrel clamp is open or closed.
Binary Switches	Check-in Preventive Maintenance	Displays readings from six module switches in real-time. During the binary switches test you can insert, remove, push, pull, open, and close the working parts of the syringe and see in real- time what the Syringe Module detects. Switches are the same as listed for the Binary Sensors test.
Clear Error Log	(not in a standard task group)	See Clear Error Log on page 170.
Clear Event Log	(not in a standard task group)	See Clear Event Log on page 170.
Download Error Log	(not in a standard task group)	See Download Error Log on page 171.
Download Event Log	(not in a standard task group)	See Download Event Log on page 171.
Instrument Inspection	Check-in Preventive Maintenance	See Instrument Inspection on page 171.
IUI Connectors	Check-in Preventive Maintenance	See IUI Connectors on page 172.
Keypad	Check-in Preventive Maintenance	See <i>Keypad</i> on page 172.

Syringe Module and PCA M	Module Tasks (Continued)
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Task	Standard Task Group	Description
Plunger Force Accuracy	Calibration Check-in Preventive Maintenance	 Tests force the sensor to verify that the module detects an occlusion alarm accurately. To generate force, the test moves drive head down against a spring calibration fixture. CAUTION To avoid damage to the module, ensure that the plunger grippers (claws) surround the top of the spring calibration fixture when instructed to attach them. To avoid damage to the module and possible injury, do not open the grippers or attempt to raise the drive head while the test is running. Open the grippers only when prompted by the software.
Plunger Force Calibration	Calibration	Measures force readings at 3 points from 0 to about 20 lbs of force. Values returned by three- point calibration are flashed into the syringe force sensor. If the calibration fails, you are prompted to return the Syringe Module to the service depot for repair. CAUTION To avoid damage to the module and possible injury, do not open the grippers or attempt to raise the drive head while the test is running. Open the grippers only when prompted by the software.
Plunger Position Accuracy	Calibration Check-in Preventive Maintenance	Uses fixtures to verify that the system correctly recognizes the plunger position by seating it on fixtures of known heights.
Plunger Position Calibration	Calibration	Requires two metal fixtures (27-mm and 127- mm lengths). When prompted, load each fixture as a syringe. The test moves the drive head down onto the top of each fixture to a preload that ensures firm contact has been made. The sensor is adjusted for the actual height of each fixture.
Pressure Disc Accuracy Verification (Syringe Module only)	Calibration Check-in Preventive Maintenance	Determines whether the Syringe Module pressure sensor requires calibration. It uses a digital pressure gauge and a pressure source to generate a known pressure in the Syringe Module, and then reads the pressure sensor at verification point(s).
Pressure Disc Calibration (Syringe Module only)	Calibration	Calibrates the Syringe Module pressure sensor. It uses a digital pressure gauge and a pressure source to generate a known pressure in the Syringe Module, and then reads the pressure sensor at the calibration points.

Syringe Module and PCA Module Tasks (Continued)

Task	Standard Task Group	Description
Sequential Display	(not in a standard task group)	See Sequential Display on page 172.
Set PM Reminder Date	Check-in Preventive Maintenance	See Set PM Reminder Date on page 172.
Simultaneous Display	Check-in Preventive Maintenance	See Simultaneous Display on page 172.

SpO₂ Module Tasks

SpO₂ Module Tasks

Task	Standard Task Group	Description
Alarm	Check-in Preventive Maintenance	See Alarm on page 170.
Clear Error Log	(not in a standard task group)	See Clear Error Log on page 170.
Clear Event Log	(not in a standard task group)	See Clear Event Log on page 170.
Download Error Log	(not in a standard task group)	See Download Error Log on page 171.
Download Event Log	(not in a standard task group)	See Download Event Log on page 171.
Instrument Inspection	Check-in Preventive Maintenance	See Instrument Inspection on page 171.
IUI Connectors	Check-in Preventive Maintenance	See IUI Connectors on page 172.
Keypad	Check-in Preventive Maintenance	See <i>Keypad</i> on page 172.
Patient Cable Alarm	Check-in Preventive Maintenance	Tests that the Patient Cable Alarm is functioning. Attach the patient cable and remove it when the test tells you to do so.
Patient Lead Electrical Leakage	Check-in Preventive Maintenance	Test for electrical leakage in patient lead.
Power On Self Test	Check-in Preventive Maintenance	Invokes a power on self test.
Pulse Rate/Saturation	Check-in Preventive Maintenance	Simulates known pulse rates and blood oxidation levels using the SpO ₂ Module finger simulator.
Sequential Display	(not in a standard task group)	See Sequential Display on page 172.
Set PM Reminder Date	Check-in Preventive Maintenance	See Set PM Reminder Date on page 172.
Simultaneous Display	Check-in Preventive Maintenance	See Simultaneous Display on page 172.
Speaker	Check-in Preventive Maintenance	Causes the speaker on the SpO_2 Module to beep.

EtCO₂ Module Tasks

EtCO₂ Module Tasks

Task	Standard Task Group	Description
Alarm	Check-in Preventive Maintenance	See Alarm on page 170.
Ambient Pressure Sensor	(not in a standard task group)	Compares the ambient pressure sensor reading with an outside source. Requires an accurate source of barometric pressure.
Clear Error Log	(not in a standard task group)	See Clear Error Log on page 170.
Clear Event Log	(not in a standard task group)	See Clear Event Log on page 170.
CO ₂ Sensor Accuracy	Calibration Check-in Preventive Maintenance	To run this test, enter the percentage of CO_2 gas in verification gas supply between 4% and 6%. Verify that gas flow is greater than 0.5 liters/ minute. CAUTION The flow rate out of the gas source and into the EtCO ₂ Module must be greater than 0.5 liters/minute to ensure accurate readings. It is recommended that you attach a flow meter to the breather line.
CO ₂ Sensor Calibration	Calibration Preventive Maintenance	A verifiable gas source is required to run this calibration. CAUTION The flow rate out of the gas source and into the EtCO ₂ Module must be greater than 0.5 liters/minute to ensure accurate readings. It is recommended that you attach a flow meter to the breather line.
Disposable Connected	(not in a standard task group)	Verifies that the system can detect a disposable connection.
Download Error Log	(not in a standard task group)	See Download Error Log on page 171.
Download Event Log	(not in a standard task group)	See Download Event Log on page 171.
Instrument Inspection	Check-in Preventive Maintenance	See Instrument Inspection on page 171.
IUI Connectors	Check-in Preventive Maintenance	See IUI Connectors on page 172.
Keypad	Check-in Preventive Maintenance	See <i>Keypad</i> on page 172.
Leak Down	Check-in Preventive Maintenance	Tests for leakage from the gas pathway. For a diagram of the test setup, see <i>Leak-Down Test</i> on page 87.

Task	Standard Task Group	Description
Sequential Display	(not in a standard task group)	See Sequential Display on page 172.
Set PM Reminder Date	Check-in Preventive Maintenance	See Set PM Reminder Date on page 172.
Simultaneous Display	Check-in Preventive Maintenance	See Simultaneous Display on page 172.

EtCO₂ Module Tasks (Continued)

Auto-ID Module and Handheld Scanner Tasks

Auto-ID Module and Handheld Scanner Tasks

Task	Standard Task Group	Description
2-D Scan	Check-in Preventive Maintenance	
Instrument Inspection	Check-in Preventive Maintenance	See Instrument Inspection on page 171.
IUI Connectors	Check-in Preventive Maintenance	See IUI Connectors on page 172.
Keypad	Check-in Preventive Maintenance	See <i>Keypad</i> on page 172.
LED	Check-in Preventive Maintenance	Verifies that LEDs on the module are functioning properly.
Linear Scan	(not in a standard task group)	
Scanner Connector	(not in a standard task group)	Checks the handheld scanner connector on the Auto-ID Module.
Scanner Functionality	Check-in Preventive Maintenance	Verifies proper scanner operation by performing a number of scans under controlled conditions. A minimum number of scans must be successful in order for a test to pass.
Set PM Reminder Date	Check-in Preventive Maintenance	See Set PM Reminder Date on page 172.

Test Equipment

Test Equipment	Manufacturer	Model/Part Number	Application
analyzer, electrical safety	Fluke BioMedical	232D or equivalent	PC Unit: AC wiring / instrument grounding and leakage tests. SpO ₂ patient lead electrical leakage test.
cable, Masimo [®] Simulator	Clinical Dynamics	SS-MAS	SpO ₂ pulse rate/saturation
cable, Nellcor [®] Oximax [®] Simulator	Clinical Dynamics	SS-NEL	SpO ₂ pulse rate/saturation
door key	CareFusion	10010964	PCA Module: lock and unlock PCA Module door
Dose Request Cord	CareFusion	10013795	PCA Module display test
EtCO ₂ pod (disposable)	Microstream®	007768	EtCO ₂ flow test/calibration
extension set, with pressure disc, small bore	CareFusion	10014917	Syringe Module pressure test
flow meter	Dwyer (www.dwyer- inst.com.au)	VFA-22, or equivalent	EtCO ₂ flow test/calibration
gas	Scott Medical	0304653SROBD, or equivalent gas with C0 ₂ content of 4-6%	EtCO ₂ flow test/calibration
gauge, pressure, digital (peak hold)	 Either of the following: Heise (www.heise.com) Ashcroft (www.ashcroft.com) 	 PTE-1 (accuracy from 0.1 to 0.025% span) 2089, 2086, or 2084 (accuracy from ±0.05%, 0.10%, or 0.25% of span) or an equivalent gauge with: (a) unit of measure in mmHg (b) accuracy of ±1% (c) range of 0-1500 mmHg 	Pump Module pressure test and Syringe Module pressure test / calibration
gauge, syringe height	CareFusion	148181-100	PCA Module and Syringe Module plunger position calibration / verification
hemostat	N/A	N/A	Pump Module fluid-side occlusion test
IV pole, standard	CareFusion	903-0336 or equivalent	Pump Module rate, pressure, and occlusion tests
IV setsIV set, standard, without check valve	CareFusion	• 2210-0500	Pump Module rate, pressure, and occlusion tests
 IV set, calibration IV set, calibration	CareFusionCareFusion	8100-RCS8100-PCS	
IV solution container (bag preferred)	N/A	N/A	Pump Module rate and pressure tests

Test Equipment	Manufacturer	Model/Part Number	Application
kit, calibration tools	CareFusion	10010692	PCA Module and Syringe Module: all tools required for calibration and verification
kit, force sensor	CareFusion	10010691	PCA Module and Syringe Module: force sensor calibration / verification
kit, syringe sizer and height gauge	CareFusion	148182-100	PCA Module and Syringe Module: plunger position / barrel size calibration / verification
kit, syringe sizer gauge	CareFusion	148180-100	PCA Module and Syringe Module: barrel size calibration / verification
luer lock, female, 1/8"-27 NPT	Cole-Parmer (www.coleparmer.com)	K-45503-78 or equivalent	Pump Module pressure test
pressure transducer simulator/tester	Utah Medical	Delta-Cal 650-95,0 or equivalent	EtCO ₂ leak-down test
reducer, female, 1/4" NPT (F) x 1/8" NPT (F)	Cole-Parmer (www.coleparmer.com)	K-06349-91 or equivalent	Pump Module pressure test
scale, digital	Acculab (www.acculab.com)	VIC-212 (VICON Series) or equivalent with accuracy of ±0.01g	Pump Module rate and pressure tests
SpO ₂ simulator	Clinical Dynamics	SmartSat Pulse Oximetry Analyzer SS-100A, or equivalent	SpO ₂ pulse rate/saturation test
T-fitting	CareFusion	303815 or equivalent	Pump Module pressure test
tubing, silicone	CareFusion	303109 or equivalent	Pump Module, Syringe Module, and EtCO ₂ Module pressure test
valve, 3-way	CareFusion	97555 or equivalent	Pump Module, Syringe Module, and EtCO ₂ Module pressure test

Chapter 12 Reports and Logs

Reports

This section describes the report types and provides a procedure on how to run the reports.

Report Types

A number of maintenance reports are available from data stored in the System Maintenance Software database and/or the Maintenance Log database.

Activity	Reports on all activity performed on selected devices including tests, firmware updates, Data Set transfers, and Alert log downloads.
Asset	Reports on all device types in the database, showing serial number, PM due date, last calibration date, when firmware was last updated, and version numbers of installed firmware.
Log—Battery	Reports internal and external events relating to the battery, such as charging state and other battery status conditions.
Log—Error	Reports on abnormal events, such as internal software and hardware malfunctions.
Log—Event	Reports all operating events, such as keyboard presses, alarms, module attachments, external communications, plus infusion starts and stops. It might also contain additional information in coded form about changes that occurred on the display screen and other internal software events.
PM Due	Charts when selected module types are due for preventive maintenance.
Test—All	Reports on all tests performed on selected devices.
Test—Check-in	Reports on check-in activity on selected devices.
Test—PM	Reports on preventive maintenance activity on selected devices.

Run Reports

To run reports from the System Maintenance Software database:

- 1. On the main window, click the View Reports tab.
- 2. Select report type in the **Reports** pane.
- 3. Select devices by clicking the **Select Devices** button. In the Device Selection dialog box, you can use the following techniques:
 - Ctrl-click multiple devices to select them.
 - Shift-click a range of devices to select them.
 - Click Filter to select specific model numbers or PM Due dates for display.
 - Click Serial Search to display devices with serial numbers starting with number sequence entered.

- 4. Click Select.
- 5. If required, enter a start and end date for the report.

The start date defaults to the earliest entry in the database and the end date defaults to today's date.

Delete the report.

6. Click Create Report.

The report is generated and displayed.

Export as an Excel or PDF file.

File Options Help					
Perform Maintenance View Rep	orts Configure Con	Charlos Constraints			
Reports		Use Download Date Start Date Friday . May 05.2006 💌			
Reports	Select Dev	5/8/2006 4	End Date Friday .	May 05.2006 💌	
	Select Dev	ice	Filter	Create Report	
Activity					
Report	14 4 1	of 1 > >	1 • • • • • • • • • • • • • • • • • • •	Pind I Next	
Asset	Batt	ery Log	Report		
-	and the second				
Log - Battery	8000 - Alaris® PC Unit, Serial Number: 1000000 CardinalHealth 5/5/2006 - 5/5/2006				
Report	Seg \$	Log Date :	Description	Details :	
	Seq +				-
Log - Error	0	5/5/2006 2:34:33 PM	TRICKLE_CHAROING	ChargeAccumulated=3400	
Report	1	5/5/2006 1:40:35 PM	TOP_OFF_CHARGING	ChargeAccumulated=3060	
		1.40.00 1 14			
C Log - Event	2	5/5/2006	BATT START TEMP HIGH	ChargeAccumulated=3060	3
-	2	5/5/2006 12:45:29 PM	BATT_START_TEMP_HIGH	ChargeAccumulated=3060	
Log - Event	2	12:45:29 PM 5/5/2006	BATT_START_TEMP_HIGH FULL_CHARGE_DETECTED	ChargeDetector=TEMP_AT_MAX_SLOPE;	
-		12:45:29 PM 5/5/2006 12:45:28 PM	FULL_CHARGE_DETECTED	ChargeDetector=TEMP_AT_MAX_SLOPE; ChargeAccumulated=2613	
Report		12:45:29 PM 5/5/2006		ChargeDetector=TEMP_AT_MAX_SLOPE;	-
PM Due		12:45:29 PM 5/5/2006 12:45:28 PM 5/5/2006	FULL_CHARGE_DETECTED	ChargeDetector=TEMP_AT_MAX_SLOPE; ChargeAccumulated=2613	
PM Due Test - Check-in	3	12:45:29 PM 5/5/2006 12:45:28 PM 5/5/2006 10:46:26 AM 5/5/2006 10:46:11 AM	FULL_CHARGE_DETECTED	ChargeDetector=TEMP_AT_MAX_SLOPE; ChargeAccumulated=2613 ChargeAccumulated=0	-

Generated reports are added to the **Report** list.

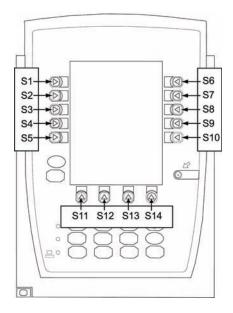
Click the arrows in the column headings to sort the report by column. Shift-click a second heading to choose it as a secondary sort column.

Logs

This section describes how to read the System Maintenance Software logs. There are three types of logs:

- **Battery Log:** Contains internal and external events relating to the battery, such as the charging state and other battery status conditions.
- **Event Log:** Contains a complete record of operating events, such as keyboard presses, alarms, module attachments, external communications, and infusion starts and stops. The log might also contain additional information in coded form about changes that occurred on the display screen and other internal software events.
- **Error Log:** Contains a record of any abnormal events, such as internal software and hardware malfunctions.

System Maintenance Software logs refer to the soft keys on the PC Unit:



Log Definitions

System Maintenance Software logs can include these entries:

Log Definitions

Log Entry	Definition
AIL	Air-in-Line
AIU	PC Unit
АКВ	(AIU) PC Unit keyboard (keypad) processor
ATOD	Analog to digital converter
ATTACHED_UNIT_FAULT	A malfunction from an attached module, also logged in PC Unit error log
AVA	Audio/visual event

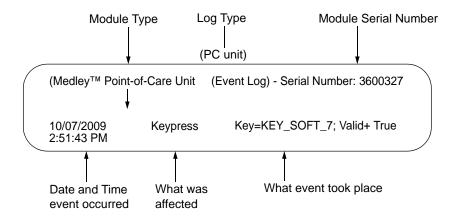
Log Definitions (Continued)

Log Entry	Definition
BFD	Big file download
BLOCK_STEP_COMPLETE	Indicates an infusion step (delay, bolus, keep vein open [KVO], and so on) is complete
CALLSTACK_DATA	Software execution history logged for debugging purposes
CBIT	Continuous built-in test
CIB, CI	Communication Board
СОММ	Communications
CPU	Central processing unit
DATASET_I_D	The ID of the loaded Data Set
DEBUG_DATA / DEBUG_EVENT	Miscellaneous data logged for debugging purposes
DRAM	Dynamic RAM
EMI	Electromagnetic interference
ETC	EtCO ₂ Module
EXT_RAM	External RAM
FD	Fluid delivery domain
FORM_REQUEST	A new page or combination of pages is displayed on the PC Unit
INF	Infusion
INT_RAM	Internal RAM
INVALID_TRANSITION_FAULT	Illegal state machine event
KEY_0, KEY_1, etc	Numeric or other "hard-labeled" keys on device
KEY_SOFT_1	Software-labeled or "soft" keys whose meaning is determined by which page is displayed
LB3	Low Battery Event 3: all devices pause, low battery alert
LB4	Low Battery Event 4: battery completely discharged, system powers down, backup alarm
LTI	Log table invariant, a tag used to mark special data, such as end of a log
LVP	Pump Module
MALFUNCTION	Hardware error
MMS	Medication Management System
NET	Network
OEM	Original equipment manufacturer
OS	Operating system

Log Definitions (Continued)

Log Entry	Definition
PATIENT_ASSOC	A patient associated with PC Unit
PATIENT_I_D	Patient identification
РМ	Preventive maintenance
PCU	PC Unit. The central programming and power supply module of the Alaris [®] System
POST	Power on self test
PROGRAM	A complete sequence of infusion steps, including delay, primary, secondary, bolus, KVO, and so on
PROGRAM_COMPLETE	Indicates all programmed steps are complete
PSP	Power supply processor
PUMP	Infusion component of Alaris® System
PWR	Power domain
RAM	Random access memory
ROM	Read-only memory
RTC	Real-time clock
SAFETY_SWITCH	An element that can turn off power to motor any time
SHUTDOWN_COMPLETE	Shutdown tasks complete, ready to power down
SKB	SpO ₂ Module keyboard processor
SOFTWARE_FAULT	Software error
SPO, SP_O2	SpO ₂ Module (pulse oximetry module of Alaris [®] System)
SPR	Safety processor
SRAM	Static RAM
SS	Subsystem
STEP	A single infusion step (delay, primary, secondary, bolus, KVO, and so on)
STRING	General event for a log string
SYRINGE_SELECTION	User selected syringe
UI	User interface
UNINIT_INTERRUPT_FAILURE	Un-initialized interrupt failure, an illegal interrupt occurrence
VPMR	Volume per mechanical revolution
VTBI	Volume to be infused
WD	Watchdog

Example Log



The following table shows an example Event log. In this example:

- two Pump Modules are attached to the PC Unit (Pump Module A and Pump Module B).
- Pump Module B is set to run at a rate of 125 ml/h and VTBI of 125 ml.
- the Pump Module door opened, causing an alarm, and then it closed.
- the Pump Module is restarted and then turned off.

An explanation of each log entry is in shaded text.

Example Log

Log Time	Category ID	Details	
10/11/2009 7:27:16 AM	POWERED_ON	ModelNumber=8000; SerialNumber=3600327; SwVersionNumber=1.10.2.0	
Device powered on. Serial number and software version of PC Unit.			
10/11/2009 7:27:17 AM	PUMP_IDLE	Serial Number=3647764	
Pump Module is no	t running. Pump Module serial	l number.	
10/11/2009 7:27:17 AM	UNIT_ADDED	Model Number=8100; Serial Number=3647764; UnitLabel=A	
Module has responded to PC Unit. First Pump Module detected is designated as module A.			
10/11/2009 7:27:17 AM	PUMP_IDLE	SerialNumber=3648579	
Pump Module is not running. Pump Module serial number.			
10/11/2009 7:27:17 AM	UNIT_ADDED	ModelNumber=8100; SerialNumber=3648579; UnitLabel=B	
Module has responded to PC Unit. Second Pump Module detected is designated as module B.			
10/11/2009 7:27:17 AM	FORM_REQUEST	Form=NEW_PATIENT; FormRequest=FORM_REQUEST	
NEW PATIENT? screen is displayed on PC Unit.			

Log Time	Category ID	Details		
10/11/2009 7:27:18 AM	AVA_EVENT	SourceType=POWER_MANAGEMENT; SourceContext=0; EventType=PWR_BATTERY_OK		
Audio/visual event: PC Unit battery power check OK.				
10/11/2009 7:27:19 AM	PUMP_IDLE	SerialNumber=3647764		
Pump Module is no	ot running. Serial number ident	ifies module A.		
10/11/2009 7:27:19 AM	PUMP_IDLE	SerialNumber=3648579		
Pump Module is no	ot running. Serial number ident	ifies module B.		
10/11/2009 7:27:21 AM	KEYPRESS	Key=KEY_SOFT_7; Valid=True		
Key press on PC U	nit: soft key 7. (Soft key 7 on 1	NEW PATIENT? screen corresponds to No.)		
10/11/2009 7:27:24 AM	UNIT_KEYPRESS	DeviceAddress=3648579;Key=KEY_UNIT_SELECT; Valid=True		
Key pressed on mo	dule: serial number identifies l	Pump Module B CHANNEL SELECT key.		
10/11/2009 7:27:24 AM	GUARDRAIL_START	SerialNumber=3648579; ProfileIndex=255; IsAnesthesiaMode=False		
Guardrails® softwa	re starts, performs check on Pu	Imp Module B (identified by serial number).		
10/11/2009 7:27:24 AM	FORM_REQUEST	Form=BASIC_INFUSION; FormRequest=FORM_REQUEST		
PC Unit displays In	fusion Setup screen for most r	recently identified Pump Module (module B).		
10/11/2009 7:27:26 AM	KEYPRESS	Key=KEY_SOFT_1; Valid=True		
Key press on PC U	nit: soft key 1. (Soft key 1 on 1	Infusion Setup screen corresponds to RATE.)		
10/11/2009 7:27:27 AM	KEYPRESS	Key=KEY_1; Valid=True		
Key press on PC U	nit: numeric key 1 (RATE is 1)).		
10/11/2009 7:27:28 AM	KEYPRESS	Key=NUM_2; Valid=True		
Key press on PC U	Key press on PC Unit: numeric key 2 (RATE is 12).			
10/11/2009 7:27:28 AM	KEYPRESS	Key=KEY_5; Valid=True		
Key press on PC U	nit: numeric key 5 (RATE is 1)	25).		
10/11/2009 7:27:29 AM	KEYPRESS	Key=KEY_SOFT_2; Valid=True		
Key press on PC U	nit: soft key 2 (soft key 2 on Ir	fusion Setup screen corresponds to VTBI).		

Log Time	Category ID	Details			
10/11/2009 7:27:29 AM	KEYPRESS	Key=KEY_1; Valid=True			
Key press on PC U	Key press on PC Unit: numeric key 1 (VTBI is 1).				
10/11/2009 7:27:30 AM	KEYPRESS	Key=NUM_2; Valid=True			
Key press on PC U	nit: numeric key 2 (VTBI is 12	2).			
10/11/2009 7:27:30 AM	KEYPRESS	Key=KEY_5; Valid=True			
Key press on PC U	nit: numeric key 5 (VTBI is 12	25).			
10/11/2009 7:27:33 AM	KEYPRESS	Key=KEY_SOFT_14; Valid=True			
Key press on PC U	nit: soft key 14 (soft key 14 on	Infusion Setup screen corresponds to START).			
10/11/2009 7:27:33 AM	PROGRAM_DATA	ProgramID=1; ProgramType=PRIMARY_INFUSION; NumSteps=2			
PC Unit program: p	primary infusion.				
10/11/2009 7:27:33 AM	BLOCK_STEP_DATA	StepNum=0; Rate=125; VTBI=125; InfuseAll=False; FracRate=False			
Infusion step: rate=	125, VTBI=125.				
10/11/2009 7:27:33 AM	BLOCK_STEP_DATA	StepNum=1; Rate=1; VTBI=0; InfuseAll=True; FracRate=False			
Infusion step: when	primary infusion is complete,	KVO to run at rate=1, VTBI=0.			
10/11/2009 7:27:33 AM	GUARDRAIL_END	Type=0			
Guardrails® softwa	re check complete: no problem	is detected.			
10/11/2009 7:27:33 AM	PROGRAM_START	SerialNumber=3648579; ProgramID=1; ProgramType=PRIMARY_INFUSION			
Program start: prim	ary infusion on Pump Module	B.			
10/11/2009 7:27:33 AM	BLOCK_STEP_DATA	StepNum=0; Rate=125; VTBI=125; InfuseAll=False; FracRate=False			
Infusion step: rate=	125, VTBI=125.				
10/11/2009 7:27:33 AM	FORM_REQUEST	Form=BASIC_INFUSION; FormRequest=CANCEL_FORM			
PC Unit displays sc only Pump Module	reen: basic infusion screen disj B is operating, VTBI =125).	plays modules operating and VTBI of each (in this example,			
10/11/2009 7:27:34 AM	PUMP_INFUSING	SerialNumber=3648579			
Pump infusing: Pump Module B.					

Log Time	Category ID	Details		
10/11/2009 7:27:35 AM	AVA_EVENT	SourceType=INFUSOR; SourceContext=3648579;EventType=INFUSOR_START ED		
Audio/visual event:	nt: Pump Module B starts (INFUSING indicator lights).			
10/11/2009 7:27:40 AM	PUMP_ALARMED	SerialNumber=3648579		
Pump Module alarr	n: Pump Module B (ALARM	indicator lights, pump stops running).		
10/11/2009 7:27:40 AM	AVA_EVENT	SourceType=INFUSOR; SourceContext=3648579;EventType=INFUSOR_DOOR_ OPENED		
Audio/visual event:	Pump Module B door open.			
10/11/2009 7:27:43 AM	PUMP_ALARMED	SerialNumber=3648579		
Pump Module alarr	n: Pump Module B.			
10/11/2009 7:27:43 AM	AVA_EVENT	SourceType=INFUSOR; SourceContext=3648579; EventType=INFUSOR_DOOR_CLOSED		
Audio/visual event:	Pump Module B door closed.			
10/11/2009 7:27:44 AM	UNIT_KEYPRESS	DeviceAddress=3648579; Key=KEY_PUMP MODULE_RESTART; Valid=True		
Module key press: 1	Module key press: Pump Module B RESTART key.			
10/11/2009 7:27:44 AM	PUMP_INFUSING	SerialNumber=3648579		
Pump Module infus	sing: Pump Module B.			
10/11/2009 7:27:45 AM	AVA_EVENT	SourceType=INFUSOR; SourceContext=3648579; EventType=INFUSOR_STARTED		
Audio/visual event:	Pump Module B starts (INFU	SING indicator lights).		
10/11/2009 7:28:04 AM	UNIT_KEYPRESS	DeviceAddress=3648579; Key=KEY_PUMP MODULE_PAUSE; Valid=True		
Module key press: 1	Pump Module B PAUSE key.			
10/11/2009 7:28:04 AM	PUMP_PAUSED	SerialNumber=3648579		
Pump Module paused: Pump Module B.				
10/11/2009 7:28:04 AM	AVA_EVENT	SourceType=INFUSOR; SourceContext=3648579; EventType=INFUSOR_PAUSED		
Audio/visual event:	Pump Module B STANDBY	indicator lights.		
10/11/2009 7:28:41 AM	UNIT_KEYPRESS	DeviceAddress=3648579; Key=KEY_UNIT_CHANNEL_OFF; Valid=True		
Module key press: l	Module key press: Pump Module B CHANNEL OFF key.			

Log Time	Category ID	Details
10/11/2009 7:28:42 AM	PUMP_IDLE	SerialNumber=3648579
Pump Module is not running: Pump Module B.		
10/11/2009 7:28:42 AM	PROGRAM_COMPLETE	SerialNumber=3648579; ProgramID=1; ProgramType=PRIMARY_INFUSION
Program complete: primary infusion has stopped on Pump Module B.		
10/11/2009 7:28:43 AM	AVA_EVENT	SourceType=INFUSOR; SourceContext=3648579; EventType=INFUSOR_STOPPED
Audio/visual event: Pump Module B stopped.		
10/11/2009 7:28:43 AM	FORM_REQUEST	Form=POWERING_DOWN; FormRequest=FORM_REQUEST
PC Unit display: Flashes a "Powering Down" message for about three seconds.		

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Glossary

$A \mid C \mid D \mid E \mid F \mid I \mid N \mid P \mid S \mid T \mid W$

Α

Alaris[®] Server

The server that manages wireless communication with Alaris® products.

ASM

Alaris® System Maintenance

Auto-ID Module

The bar code component (Model 8600) of the Alaris® System.

С

communication (comm) board (CB)

An optional wireless network card (sometimes integrated in the motherboard). It is installed in the PC Unit and allows communication with the Alaris[®] Server.

D

Data Set

Created using the Editor Software authoring tool and then transferred to the PC Unit. A Data Set reflects the facility's best-practice guidelines for IV drug administration and includes: Profile Drug Libraries, Clinical Advisories, instrument configurations, and channel Label Libraries.

delimiter

A character that marks the beginning or end of a unit of data.

DFU

Directions for Use.

Ε

EtCO₂ Module

The capnograph component (Model 8300) of the Alaris® System.

F

flash

The process of electronically reimaging the Operating System.

IUI Connector

The inter-unit interface connector that connects the PC Unit and modules.

Ν

network configuration package

A package that contains up to eight WSec (wireless security) Network Profiles.

Ρ

PCA Module

The Patient Controlled Analgesia (PCA) component (Model 8120) of the Alaris® System.

PC Unit

The central programming, monitoring, and power supply component of the Alaris® System.

preventive maintenance

The set of tasks that are performed a minimum of once a year to ensure proper functioning of a module.

Pump Module

A large volume infusion component (Model 8100) of the Alaris® System.

S

SpO₂ Module

The pulse oximetry components (Models 8210 and 8220) of the Alaris® System.

Syringe Module

The syringe infusion component (Model 8110) of the Alaris® System.

Т

transfer

Copy hospital-created data from the personal computer to a PC Unit.

W

wireless card

The connection device that allows the Alaris[®] Server to communicate with the communications board on a PC Unit.

WSec

Wireless security.

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Alaris[®] System Maintenance v9.5.X Software User Manual