CADD-Solis VIP™
Ambulatory Infusion Pump Model 2120
Quick Reference Card for Pharmacy and Clinical Experts

**icu**medical
human connections

Description of the CADD-Solis VIP Pump

The CADD-Solis VIP ambulatory infusion pump provides measured drug therapy to patients in hospital or outpatient settings. Therapy should always be overseen by a physician or a certified, licensed healthcare professional. As appropriate, the caregiver and patient should be instructed in using the pump.
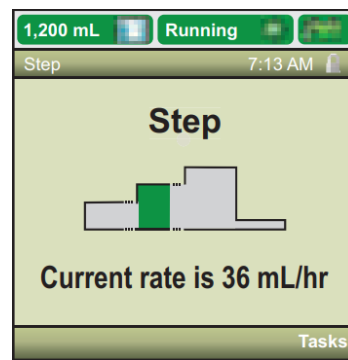
Indications

The CADD-Solis VIP ambulatory infusion pump is indicated for intravenous, intra-arterial, subcutaneous, intraperitoneal, perineural, surgical site, epidural space, or subarachnoid space infusion.

› **PCA** (patient controlled analgesia) delivery is used for therapies that require a continuous rate of infusion, patient-controlled demand doses, or both, such as patient controlled analgesia

› **Continuous** delivery allows the infusion of drug/fluid at a constant, programmed rate

› **Intermittent delivery** allows the infusion of a specific volume of drug/fluid at a regular, programmed interval
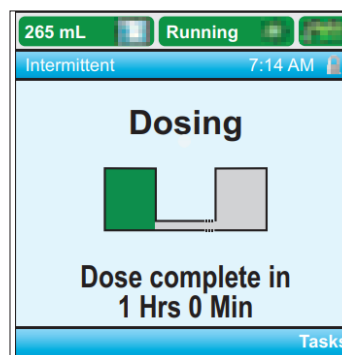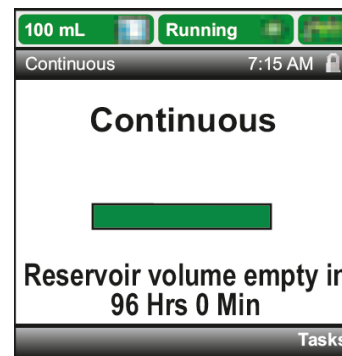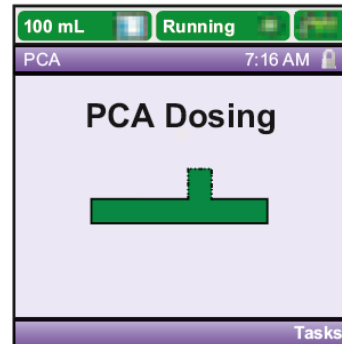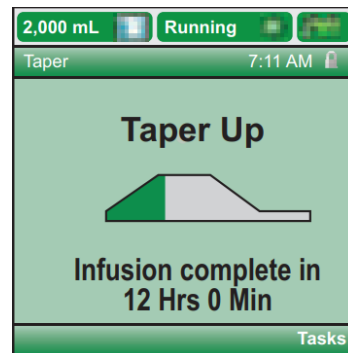
Indications

› **Step delivery** allows an incremental increase in infusion rate to a specified maximum infusion rate for a specified total infusion volume

› **Taper delivery** allows a plateau rate of infusion with the option of tapering at the beginning and/or end and has a programmable KVO rate at the end of the infusion

Pump Diagram

Battery Compartment

Display

Indicator Lights
Amber
Green

USB Port

Blue AC Power Light

AC Power Jack

Remote Dose Cord Jack

Keypad

Power Switch

Cassette/ Keypad Lock (Unlock/Lock)

Cassette Latch

Serial Number

Cassette
(The part of the CADD™ medication cassette reservoir or CADD® administration set that attaches to the pump)
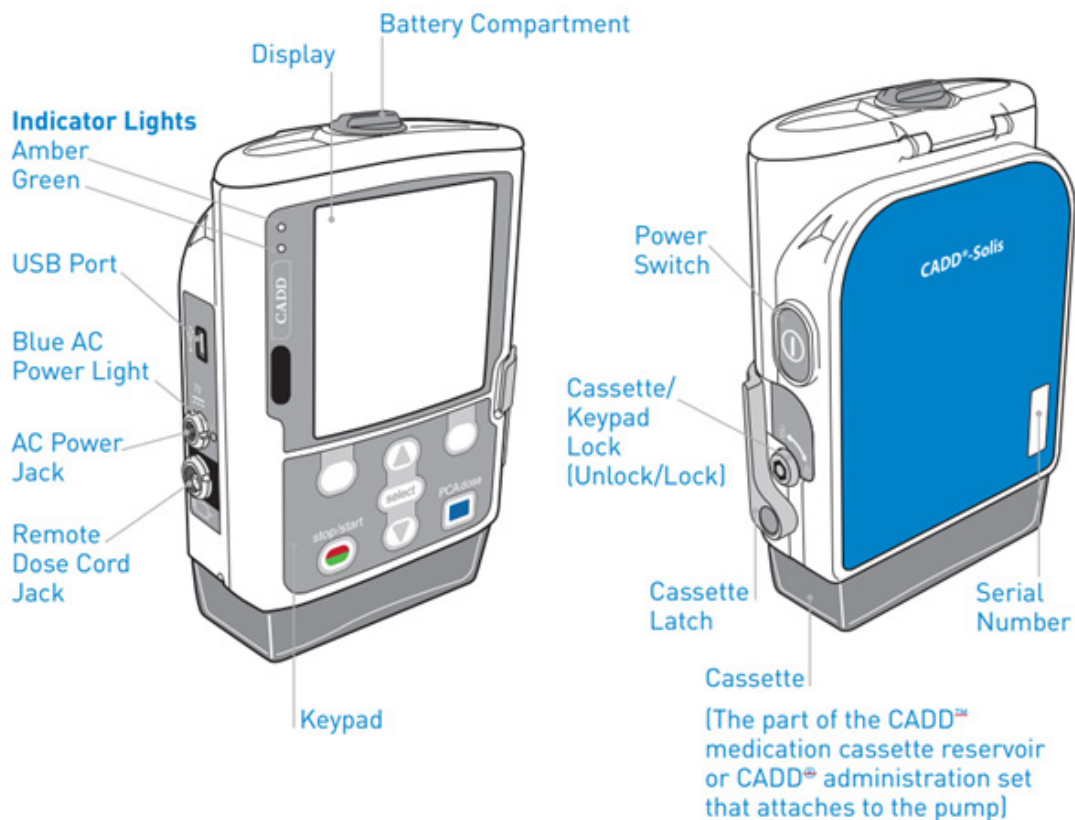
Pump Descriptions

Indicator Lights

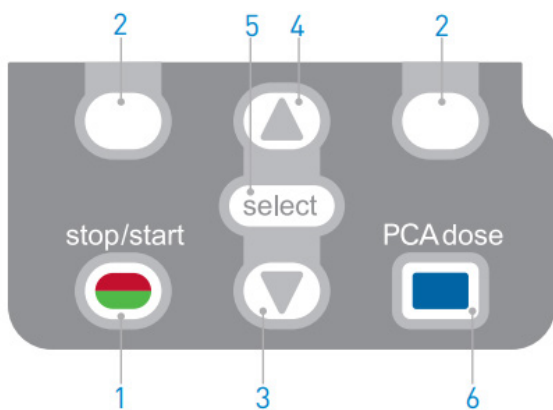- › **Green:** Flashes when the pump is running and delivering fluid as programmed

- › **Amber:** Flashes when the pump is stopped, an alarm condition exists, or the battery or the reservoir volume is low. It stays on continuously when the pump is inoperable

Note: If both lights flash the pump is running but there is a condition that needs attention.

Keypad

1. **stop/start:** Start and stops pump delivery

2. **soft keys:** Answer questions on the pump's display or navigate through pump screens

3. ▼ : Navigates through the pump menus, scrolls down or decreases values

4. ▲ : Navigates through the pump menus, scrolls up or increases values

5. **select:** Selects a menu item

6. **PCA dose:** Requests a PCA dose if the remote dose cord is not connected and the PCA dose option is available

USB Port: A mini-B USB cord can be attached to the USB port for communication with the CADD-Solis medication safety software.

Remote Dose Cord Jack: Used for attaching the remote dose cord to the pump.

Battery Compartment: Four AA batteries or the rechargeable battery pack fit into this compartment. The batteries are the primary source of power or serve as a back-up when the AC adapter is in use.

Display with Backlighting: The display shows rogramming information and messages. If no keys are pressed after a period of time, the backlight turns off and the display goes blank to save battery power (except during an alarm or when the AC adapter is in use). Press any key to turn the display back on except the PCA dose key when in PCA mode.

Power Switch: Turns the pump on or off. Press and hold the switch.

Power Jack: The AC adapter can be plugged into the power jack. When the AC adapter is plugged in, the blue power light turns on. The light is on regardless of the pump's on or off status.

Cassette Latch: Used to attach the cassette to the pump.

Cassette / Keypad Lock: Secures the cassette to the pump using the pump key. The cassette latch must be closed before it can be locked.

Air Detector: The air detector can be turned on or off, depending on facility or therapy requirements. If it is turned on and air is detected in the part of the tubing that passes the air detector sensor, an alarm sounds and delivery stops.

Downstream Occlusion Sensor: When a downstream occlusion (between the pump and the patient) is detected, an alarm sounds, delivery stops and the display shows a message.

Upstream Occlusion Sensor: When an upstream occlusion (between the pump and the reservoir) is detected, an alarm sounds, delivery stops and the display shows a message.

Pump Screens

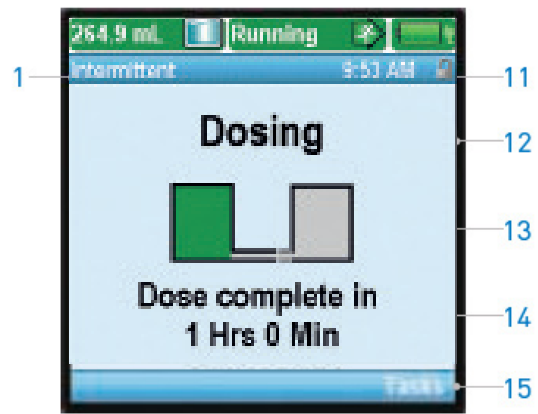The sample screens shown below are only examples of what might be displayed. The protocols and all associated pump settings will be established by your facility.
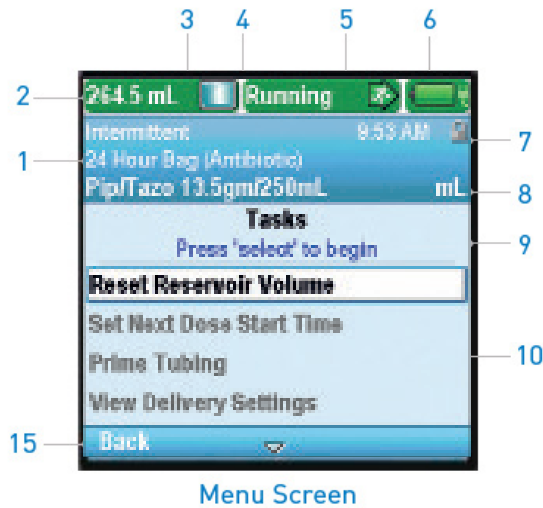
Menu Screen

Home Screen

1. The therapy, qualifier and drug inthe current protocol. On a home screen, only the therapy is listed
2. The status bar shows the status of the pump. It may also display messages and alerts
3. Current reservoir volume
4. The screen color is unique for each therapy
5. Delivery status of the pump stopped or running
6. The type of battery in use, the approximate amount of life remaining and if an AC adapter is in use

AA batteries

AA batteries with AC adapter

Rechargeable battery pack

Rechargeable battery with AC adapter

7. Keypad lock status – lockedor unlocked
8. Units of measurement and concentration (if applicable) for the drug or solution used in the current protocol
9. Screen name and blue help text, if any

10. The work area/contents for the displayed screen
11. The current time
12. The current status of the programmed infusion
13. Graphic that identifies which therapy is programmed and the status of the infusion
14. Information indicating important upcoming events
15. Options for navigating the pump that change depending on the screen and the functions being performed

Security Settings

Security settings are used to limit patient and unauthorized access to certain programming and operating functions of the pump. Pump functions are protected by three different security codes that can be customized.

Keypad Code: The keypad code is for clinicians who need to modify and review patient-specific parameters and manage air and occlusion parameter settings.

Clinician Code: The clinician code allows access to all the functions the keypad code allows. In addition, it allows users to modify most advanced task settings, format the time and date, change delayed start and priming security options, and select new protocols.

Administrator Code: The administrator code allows access to all pump functions and allows users to change protocol ranges for delivery settings, reset the pump to factory defaults, and select manual mode protocols.

Security Levels

Pump Operations and Tasks	Available Without a Security Code		Available with Keypad Code		Available with Clinician Code	
	Running	Stopped	Running	Stopped	Running	Stopped
Stop/Start	✓	✓	✓	✓	✓	✓
PCA Dose (PCA only)	*		*		*	
Reset Reservoir Volume		✓		✓		✓
Taper Down Now (Taper Only)	✓		✓		✓	
Taper Down Period of Taper Down Now (Taper Only)			✓		✓	
Set Delayed Start (Not Available in Intermittent)		*		✓		✓
Next Dose Start Time (Intermittent Only)		*		✓		✓
Prime Tubing		*		✓		✓
View Delivery Settings	✓	✓	✓	✓	✓	✓
Edit Delivery Settings (Therapy Type Determines Which Submenus Appear)				✓		✓
Display and Sound Settings Menu	✓	✓	✓	✓	✓	✓
Backlight Intensity	✓	✓	✓	✓	✓	✓
Alarm Volume	✓	✓	✓	✓	✓	✓
Sound Theme	✓	✓	✓	✓	✓	✓
Key Beep On/Off	✓	✓	✓	✓	✓	✓
Numeric Format						✓
Change Time and Date Menu		✓		✓		✓
Current Time		✓		✓		✓
Current Date		✓		✓		✓
Time Format						✓
Date Format						✓
View Reports	✓	✓	✓	✓	✓	✓
View Advanced Tasks (See Security Levels, Advanced Tasks on Page 20)	✓	✓	✓	✓	✓	✓

TABLE KEY   ✓ Yes   ☐ No   * Availability based on facility protocol

The administrator code allows access to all of the above operations and tasks, while stopped.

Security Levels

Advanced Tasks	Available Without a Security Code		Available with Keypad Code		Available with Clinician Code	
	Running	Stopped	Running	Stopped	Running	Stopped
Step Down (Step Only)	✓	✓	✓	✓	✓	✓
Step Up (Step only)			✓	✓	✓	✓
Give Clinician Bolus (PCA only)					✓	
Patient Permissions						✓
Air and Occlusion Settings				✓		✓
Alarm Settings						✓
Security Settings Menu						✓
Keypad Security						✓
Keypad Code						✓
Clinician Code						✓
Admin Code						
Manual Programming Security						
Start New Patient						✓
Select a Manual Mode Protocol						*
Start New Protocol Same Patient						✓
Select a Manual Mode Protocol						*
Delivery Hard and Soft Limits Menu (Therapy Type Determines Which Submenus Appear)						
Reset to Factory Settings						

TABLE KEY ✓ Yes   ☐ No   * Availability based on facility protocol

The administrator code allows access to all of the above operations and tasks, while stopped.

Security Levels

Autolock

The autolock feature reduces the chance of unauthorized pump
programming. When the keypad is unlocked with a security code and left unlocked, the software automatically locks the keypad. When the pump is on the home screen, the autolock feature takes effect 30 seconds after the last key press. Autolock takes longer on programming or task screens when you typically need more time to perform an action. Depending on which screen was on the pump last, and if the pump is not alarming, it can take up to four minutes after the last key press before the pump reverts to the home screen and autolocks immediately. When the pump is alarming, autolock does not take effect.

Note: The keypad can be re-locked by pushing the right soft key twice from the home screen or once from the Tasks or Advanced Tasks menu. As a recommended safety precaution, always manually lock the pump using this feature.

Entering Security Codes

Press ▲ or ▼ to scroll to the correct digit. Press Select or Accept Value to advance to the next digit. Once the complete code has been entered, press Select or Accept Value.
If an incorrect code is entered, a wrong code error appears. Select Retry to enter the code again.

Note: If you enter a code that you believe is correct and receive a wrong code message, check the screen to see if the code has been customized. Depending on the level of security required and how the security settings have been programmed, you may be able to use the pump key to unlock the keypad. To unlock the keypad with the pump key, turn the key counterclockwise.

Programming the Pump

Start New Patient - Single Protocol

To start a new patient using the
single protocol that was downloaded
to the pump:

1. Power on the pump. The pump will display the home screen
2. Attach a cassette. (see page 25 for instructions)
3. You will be prompted to prime the tubing. (see page 26 for instructions)
4. Depending on your facility's policies and procedures, one of two messages will appear on the screen:

a. "Review pump settings"may appear on the screen

› Press the right soft key Review
› Unlock the keypad, if required, the delivery settings will appear
› Review and accept each delivery setting by pressing the right soft key Accept Value
› If any of the delivery setting values need to be edited, press the Select key
› Once all the values have been accepted, press the right soft key Next
› "Start Pump?" appears, choose Yes

b. "Start Pump?" may appear on the screen Choose No. The home screen will appear. To review the delivery settings before starting the infusion:

› Press the right soft key Tasks
› Scroll to highlight View Deliver Settings, press Select
› Review each setting by scrolling through each parameter
› Press Select to edit any specific parameter. Unlock keypad if required
› When all parameters have been reviewed, press the left soft
› key Back until you return to thehome screen
› Now press the Stop/Start key, "Start Pump?" appears Choose Yes

Start New Patient – Protocol Library

To Start a New Patient Using a Protocol From a Library on the Pump:

1. Make sure the pump is stopped
2. In the Advanced Tasks menu, press ▲ or ▼ to highlight Start New Patient or Start New Protocol Same Patient and press Select
3. The next screen informs you completing this task will overwrite all delivery settings. Press continue to unlock the keypad and continue programming the pump

Note: To edit individual settings rather than starting a new patient or protocol, see page 11 for more information on editing delivery settings.

4. Unlock the keypad
5. Press ▲ or ▼ to highlight a therapy and press Select
6. Press ▲ or ▼ to highlight a qualifier and press Select
7. Press ▲ or ▼ to highlight a drug and press Select
8. A screen appears with a summary of your selections. Review them to confirm they are correct. Select Yes
9. The "Review pump settings" screen appears. Select Review
10. Press ▲ or ▼ to scroll through and review all the settings. Press Accept Value if the highlighted setting is correct or press Select to edit the value. Then press Save
11. When the review is complete, select Next
12. If a cassette is attached, latched and locked (if using the PCA therapy), the "Prime tubing?" screen may appear. The "Start pump?" screen appears. Select Yes to start the pump immediately or No start the pump at a later time

Manual Mode Programming

You can manually program the CADD-Solis VIP pump if the physician's orders do not match the single protocol or any of the protocols in the library or if the patient's therapy requires wider programming ranges than available in a standard protocol. Unlike protocols that are created and downloaded into the pump by the CADD-Solis medication safety software, manual programming does not contain any programming limits. For more information, see the Operator's Manual or your CADD-Solis system administrator

Delayed Start / Next Dose Start Time

Delayed Start

Note: This task is available for all therapies except intermittent. The Set Delayed Start task allows you to delay the start of an infusion by up to 96 hours by selecting the date and time the infusion should begin. If the Set Delayed Start task is programmed, the start time is displayed as the last delivery setting. This is the time the next infusion will begin. The pump must be running on the selected date and time in order for delivery to begin. If the Set Delayed Start is programmed, the KVO rate is active until the infusion begins.

Delayed Start / Next Dose Start Time

Note: In step and taper therapies, you may not set a delayed start after an infusion has been started.

To Set a Delayed Start:

1. From the Tasks menu, press ▲ or ▼ until Set Delayed Start is highlighted, then press Select
2. Unlock the keypad, if required
3. Press ▲ or ▼ until the desired start time appears on the screen and select Confirm
4. Confirm the new start time by selecting Yes

Next Dose Start Time

Note: This task is available for intermittent therapies only. A Next Dose Start Time may be programmed to delay the start of the next dose of an infusion. However if a dose is in progress, this cancels the remainder of the current dose. To avoid interrupting the dose in progress, adjust the next dose start time when the pump is in KVO.

Note: During dosing, the home screen shows "Dosing". If a dose is stopped in progress, the home screen shows "Interrupted." If the infusion is in KVO, "Between Doses" appears on the home screen. The Next Dose Start Time may also be set to delay delivery of the first dose of the infusion by up to 96 hours. The pump must be running on the selected date and time in order for delivery to begin.

To Set the Next Dose Start Time:

1. Stop the pump if it is running. If a dose was delivering when the pump was stopped, the "Interrupted" screen appears

Note: If a dose is in progress, this cancels the remainder of the dose.

2. From the Tasks menu, press ▲ or ▼ until Set Next Dose Start Time is highlighted, then press Select
3. Unlock the keypad, if required
4. Press ▲ or ▼ until you reach the time that you want the next dose to begin. The length of the delay is listed below the time. Select Confirm
5. Confirm the new start time and length of the delay. Select Yes

Edit / View Delivery Settings

The delivery settings are patientspecific parameters of a therapy that are directly related to the drug being infused and can be edited within limits established in the protocol. The CADD-Solis system administrator establishes the initial values of the parameters, any applicable programming units and drug concentration, other parameter limits, and which parameters can be viewed and/or edited. A security code (or the pump key, if enabled) are required to edit the parameters.

Note: Editing individual delivery settings in Step or Taper mode will reset the infusion back to the beginning.

Editing Delivery Settings

To view and edit delivery settings:

1. Stop the pump if it is running
2. In the Tasks menu, press ▲ or ▼ until View Delivery Settings is highlighted, then press Select
3. Press ▲ or ▼ until the desired setting is highlighted, then press Select
4. If requested, unlock the keypad
5. Press ▲ or ▼ until the desired value appears on the screen, then select Save

Note: If the new value is above the maximum soft limit or below the minimum soft limit, the value appears in amber on the screen. To select a value above the maximum soft limit or below the minimum soft limit, select Confirm and then select Yes. Change any additional settings by scrolling through the remaining delivery settings and press Select to edit each setting as necessary.

Review Pump Settings

When starting a new patient or a new protocol for the same patient, or after adjusting any delivery settings, the pump settings must be reviewed and accepted as accurate.

To Review Pump Settings:

1. When the "Review pump settings" screen appears, select Review
2. Press ▲ or ▼ to scroll through and review all the settings. If the highlighted setting is correct, press Accept Value. If the highlighted setting is incorrect, press Select to edit the setting. Press ▲ or ▼ to modify the setting and then press Save or Confirm
3. When the review is complete, select Next

PCA Delivery Mode

PCA (patient-controlled analgesia) delivery is used for therapies that require a continuous rate of infusion, patient-controlled demand doses, and/or a clinician-activated bolus.
The delivery methods available are:
› Continuous rate
› PCA dose, a demand dose activated by the patient
› Clinician bolus, a dose activated by the clinician

PCA Delivery Mode

Home Screen

The delivery mode and status of the infusion are indicated on the home screen with messages appearing in text, a graphic in a shape unique to the therapy, and with the colors green, red, and grey. Examples specific to the PCA delivery mode are:

› The pump is stopped with a programmed delayed start

› The pump is running and delivering at a continuous rate

› The pump is running and delivering a PCA bolus

Programming Screens

› Continuous Rate

   The desired continuous rate of medication delivery

› PCA Dose

   The amount of drug delivered when the patient requests a PCA dose by either pressing the PCA dose key or using the remote dose cord button. The PCA dose key on the pump is inactive when the remote dose cord is connected to the pump

› PCA Lockout

   The minimum time that must elapse between the time one PCA dose starts and the time that the next PCA dose is available

› Delivery Limit

   Restricts the amount of drug delivered to the patient within a specified time frame. The programmable range is 1 hour to 12 hours. The limit includes the continuous rate and PCA doses, but does not include clinician boluses

› Max Doses/Hr

   The maximum number of PCA doses allowed in a one-hour period. The frequency of available doses is limited by the programmed PCA lockout time. If the PCA Lockout is one hour or greater, this setting will not appear in the menu

› KVO Rate

   The KVO or "keep vein open" rate is calculated by the pump. It allows the delivery of a minimal amount of drug to help maintain catheter patency. If a continuous rate is programmed, it will display as 0.1 mL/hr (or the mg or mcg equivalent). If no continuous rate is programmed, the KVO rate will display 0 mL/hr (or the mg or mcg equivalent).

› Reservoir Volume

   The volume of fluid contained in the reservoir. The reservoir volume value decreases as the pump is primed or delivers fluid

› Start Time

   The time the next infusion will begin. It is displayed only if the delayed start is programmed. The pump must be running on the selected date and time in order for the infusion to begin

Giving a Clinician Bolus

A clinician bolus may be delivered only when the pump is running. It allows delivery of a specific amount of drug, such as a loading dose. A clinician bolus cannot be started while a PCA dose is in progress. The clinician bolus increases the given amount, but does not add to the dose counters or to the delivery limit. A clinician bolus may be stopped in progress.

Note: The maximum clinician bolus may be limited by the settings in the protocol, which is determined by the CADD-Solis system administrator.

To start a clinician bolus:

1. Make sure the pump is running

2. From the View Advanced

3. Tasks menu, press ▲ or ▼ to highlight Give Clinician Bolus and press Select

4. Unlock the keypad Press ▲ or ▼ to change the value of the clinician bolus. Select Deliver

5. If you enter a value outside the soft limit, a screen appears asking you to confirm the soft limit override. Select Confirm to deliver the bolus

6. The screen shows the decreasing amount as the bolus is delivered. You may stop the bolus at any time by selecting Stop Bolus

7. When the bolus has been delivered, the screen says, "Clinician bolus complete." Select OK

PCA Delivery Mode

Start a PCA Dose

If a PCA dose is programmed, the patient may start a PCA dose while the pump is running. The amount delivered is added to the amount provided by the continuous rate. Each time the patient requests a PCA dose, the pump automatically adds it to the Given and PCA Dose Counters report.

The remote dose cord can be attached to the pump and provided to the patient as an alternative to pushing the PCA dose key when requesting a PCA dose. The LED on the remote dose cord indicates PCA dose status:

› Off: A PCA dose is not available

› Flashing: A PCA dose is available

› On: A PCA dose has been requested and delivery has started

Notes:

› A PCA dose cannot be started while another PCA dose or a clinician bolus is in progress

› The PCA dose key on the pump is inactive when the remote dose cord is connected to the pump

› If the display has automatically blanked, pressing the PCA dose key turns the display back on and delivers a PCA dose, if available

To Start a PCA Dose:

Press the PCA dose key on the pump or the remote dose cord. If a dose is available, it will start infusing.

Stopping a Clinician Bolus or PCA Dose

To Stop a Clinician Bolus:

While the clinician bolus is delivering, the Clinician Bolus screen appears on the pump and shows the decreasing amount of the bolus remaining to be delivered. You may stop the clinician bolus from the screen by selecting Stop Bolus.

To Stop a PCA Dose:

From the "PCA dose started" screen you may stop the PCA dose while it is delivering by selecting Stop Dose.
Or If the pump is on the home screen, press the Stop/Start button. You will first be asked if you want to stop the dose, select Yes. Then you will be asked if you want to stop the pump, select No.
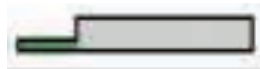
Continuous Delivery Mode

Continuous delivery allows the infusion of drug fluid at a constant, programmed rate.

Home Screen

The delivery mode and status of the infusion are indicated on the home screen with messages appearing in text, a graphic in a shape unique to the therapy, and with the colors green, red, and grey. Examples specific to the continuous delivery mode are:

› The pump is running with a programmed delayed start

› The pump is stopped. It will deliver at a continuous rate once it is started

Programming Screens

› Continuous Rate

The desired continuous rate of medication delivery. Rates above 250 mL/hr require a CADD high volume administration set

› KVO Rate

The KVO or "keep vein open" rate is optional. It allows the delivery of a minimal amount of drug to help maintain catheter patency. If a KVO rate is programmed, it will only be active if a delayed start is programmed. The pump will infuse at the KVO rate until the programmed infusion begins

› Reservoir Volume

The volume of fluid contained in the reservoir. The reservoir volume value decreases as the pump is primed or delivers fluid

› Start Time

The time the next infusion will begin. It is displayed only if the delayed start is programmed. The pump must be running on the selected date and time in order for the infusion to begin

Intermittent Delivery Mode

Intermittent delivery allows the infusion of a specific volume of drug at a regular, programmed interval and over a specified duration. A dose may be repeated in a cycle up to 96 hours.

Home Screen

The delivery mode and status of the infusion are indicated on the home screen with messages appearing in text, a graphic in a shape unique to the therapy, and with the colors green, red, and grey. Examples specific to the intermittent delivery mode are:
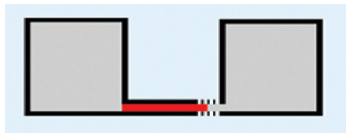
› The pump is running with a manually programmed next dose start time

› The pump is running and delivering a dose

› The pump is stopped between doses while at the KVO rate

Programming Screens

› Dose Volume

The volume of the dose cannot be programmed to a value that would cause the rate of delivery for the programmed dose duration to exceed the dose rate maximum of 500 mL/hr. Therefore, programming the dose volume may result in the automatic lengthening of the dose duration to accommodate the maximum dose rate

› Dose Duration

The length of time required to deliver the dose. The dose duration cannot be programmed to a value that would cause the rate of delivery for the programmed dose volume to exceed the maximum dose rate of 500 mL/hr

› Dose Cycle

The time from the start of one dose to the start of the next dose. The programmable values for the dose cycle are dependent on the dose duration. There must be at least five minutes between the end of one dose and the start of the next dose. Therefore, the minimum programmable cycle is the dose duration plus five minutes

› Dose Rate

This setting is for review only and shows the rate at which the dose is delivered based on the programmed dose volume and dose duration. The maximum allowable rate is 500 mL/hr. Rates above 250 mL/hr require a CADD high volume administration set

› Next Dose

The time the next dose is scheduled to begin. The pump must be running on the selected date and time in order for the dose to begin. The next dose time can be programmed at any time to delay the start of the next dose, but if a dose is in progress, this cancels the remainder of the dose

› KVO Rate

The KVO or "keep vein open" rate is optional. It allows the delivery of a minimal amount of drug to help maintain catheter patency. The KVO rate is active between doses or until a dose begins if the next dose start time has been set to a value other than "immediate"

› Reservoir Volume

The volume of fluid contained in the reservoir. The reservoir volume value decreases as the pump is primed or delivers fluid

› Stopping the Pump During an Infusion

Stopping the pump between doses does not affect the start time of subsequent doses. Stopping the pump while a dose is in progress shifts all subsequent doses by the amount of time the pump is stopped

› Resuming the Dose

To resume delivery of a dose stopped in progress, simply restart the pump by pressing stop/start

› Resetting the Cycle

To reset the cycle, stop the pump between doses, and reprogram the next dose start time. When a dose is stopped in progress, the "Interrupted" screen appears. To cancel the current dose and reset the cycle, reprogram the next dose start time through the Tasks menu. The next cycle will start at the time you select

Step Delivery Mode

Step delivery allows the infusion of a specified volume of drug at an initial rate with linear step increases up to a plateau rate. Multiple steps down may also be applied, reducing the continuous rate as low as the initial rate. An optional KVO rate may be delivered at the end of the infusion, depending on protocol settings.

Home Screen

The delivery mode and status of the infusion are indicated on the home screen with messages appearing in text, a graphic in a shape unique to the therapy, and with the colors green, red, and grey.Examples specific to the step delivery mode are:

> The pump is running with a programmed delayed start

> The pump is stopped and has not yet reached the plateau

> The pump is running at the plateau rate

> The pump is running at continuous hold after a manual step down

> The infusion is complete

Programming Screens

> ### Infusion Volume

The total volume of fluid to be delivered. The reservoir volume must be large enough to support the entire infusion volume. Therefore, programming the infusion volume may result in an automatic increase in the reservoir volume. Entering a new infusion volume resets the infusion so that delivery starts at the beginning

> ### Initial Rate

The initial rate of medication delivery. Entering a new initial rate resets the infusion so that delivery starts at the beginning

> ### Rate Increment

The amount that you want medication delivery to increase by for each step. Entering a new rate increment resets the infusion so that delivery starts at the beginning

> ### Plateau Rate

The maximum rate at which you want the medication to be delivered. The pump begins at the initial rate, and increases by the rate increment until the plateau rate is reached. The pump runs at the plateau rate until the infusion volume is fully delivered. Entering a new plateau rate resets the infusion so that delivery starts at the beginning

> ### Step Duration

The length of time programmed for each step during medication delivery. After infusion occurs for the step duration, the rate increases by the rate increment unless the current rate is equal to the plateau rate. Entering a new step duration resets the infusion so that delivery starts at the beginning

> ### Infusion Duration

The time required to deliver the infusion volume. It is calculated by the pump based on the initial values programmed for infusion volume, initial rate, rate increment, step duration, and plateau rate. It appears on the screen for review only

> ### KVO Rate

The KVO or "keep vein open" rate is optional. It allows the delivery of a minimal amount of drug to help maintain catheter patency. If a delayed start is programmed, the KVO rate is active until the infusion begins. It is also active after the infusion volume is delivered if the reservoir volume is programmed greater than the infusion volume

Step Delivery Mode

› **Reservoir Volume**

The volume of fluid contained in the reservoir. The reservoir volume value decreases as the pump is primed or delivers fluid. The reservoir volume should not be The reservoir volume should not be programmed or edited to be less than the programmed infusion volume. Entering a new reservoir volume resets the infusion so that delivery starts at the beginning

› **Start Time**

The time the next infusion will begin. It is displayed only if the delayed start is programmed. The pump must be running on the selected date and time in order for the infusion to begin

Note: In the Step therapy, you may not set a delayed start after an infusion has started.

Starting Each Infusion

When a new cassette is attached to the pump at the beginning of the infusion, the reservoir volume should be reset. This also resets the infusion. When the pump is started, delivery will start at the beginning of the infusion.

Stopping and Restarting the Pump During an Infusion

If you stop the pump before a step infusion was fully delivered and then restart the pump, you may choose to either restart the infusion from where delivery left off, or you may reset the infusion. When you press stop/start to restart the pump, a screen appears with the message, "Infusion was interrupted before completion. Finish interrupted infusion or start from beginning with new bag." Select New Bag to reset the reservoir volume and reset the infusion. Or, select Finish to resume the infusion from the point it was at when it was last running.

Step Up

This option allows you to increase the rate of infusion at a time other than what is programmed. You cannot step up to a higher rate than the plateau rate. To step up from the current rate:

1. In the Advanced Tasks menu, press ▲ or ▼ to highlight Step Up and press Select
2. Unlock the keypad
3. The pump displays a screen that tells you the current rate, and asks you if you want to step up to the next step rate. Select Yes

Step Down

This option allows you to reduce the rate of infusion at any time. You cannot step down lower than the initial rate. Once the step down task has been performed successfully, the automatic step increases after each step duration are cancelled. Delivery continues at the step down (hold) rate. The step up task can be used to restart the automatic step increases.
To step down from the current rate:

1. In the Advanced Tasks menu, press ▲ or ▼ to highlight Step Down and press Select
2. The pump displays a screen that tells you the current rate, and asks you if you want to step down to the previous step rate and hold at that rate. Select Yes
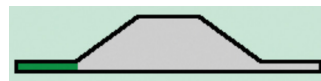
Taper Delivery Mode

Taper delivery allows the infusion of nutritional solutions (TPN, total parenteral nutrition) or other fluids, with optional tapering. Delivery can be gradually increased, or tapered up, at the beginning of the infusion, and it can be gradually decreased, or tapered down, at the end of the infusion. An optional KVO rate may be delivered at the end of the infusion, depending on protocol settings.

Home Screen

The delivery mode and status of the infusion are indicated on the home screen with messages appearing in text, a graphic in a shape unique to the therapy, and with the colors green, red, and grey. Examples specific to the taper delivery mode are:

› The pump is running with a programmed delayed start

› The pump is stopped at the plateau rate

› The pump is running at the plateau rate. No taper up was programmed

Taper Delivery Mode

› The pump is running at taper up

› The pump is running at taper down

› The infusion is complete and running at KVO

Programming Screens

Entering a new infusion volume, taper up, taper down, infusion duration or reservoir volume resets the infusion so that delivery starts at the beginning of the infusion duration.

› Infusion Volume: The total volume of fluid to be delivered. The reservoir volume must be large enough to support the entire infusion volume. Therefore, programming the infusion volume may result in an automatic increase in the reservoir volume. Entering a new infusion volume resets the infusion so that delivery starts at the beginning

› Taper Up: The duration for the taper up period. The maximum programmable taper up is limited by a combination of the plateau rate, infusion duration, infusion volume, and taper down. You cannot select a taper up duration that would cause the plateau rate to exceed the maximum allowable rate. Entering a new taper up duration resets the infusion so that delivery starts at the beginning

› Taper Down: The duration for the taper down period. The maximum programmable taper down is limited by a combination of the plateau rate, infusion duration, infusion volume, and taper up. You cannot select a taper down duration that would cause the plateau rate to exceed the maximum allowable rate. Entering a new taper down duration resets the infusion so that delivery starts at the beginning

› Infusion Duration: The time required to deliver the infusion volume. The minimum programmable infusion duration is limited by a combination of the plateau rate, infusion volume, taper up, and taper down. You cannot select an infusion duration that would cause the plateau rate to exceed the maximum allowable rate. Entering a new infusion duration resets the infusion so that delivery starts at the beginning

› Plateau Rate: The maximum rate at which medication is delivered during the plateau portion of the infusion. It appears on the screen for review only and is calculated by the pump based on the infusion volume, infusion duration, and any programmed tapering. Rates above 250 mL/hr require a CADD high volume administration set

› KVO Rate: The KVO or "keep vein open" rate is optional. It allows the delivery of a minimal amount of drug to help maintain catheter patency. If a delayed start is programmed, the KVO rate is active until the infusion begins. It is also active after the infusion volume is delivered if the reservoir volume is programmed greater than the infusion volume

› Reservoir Volume: The volume of fluid contained in the reservoir. The reservoir volume value decreasesas the pump is primed or delivers fluid. The reservoir volume should not be programmed or edited to be less than the programmed infusion volume. Entering a new reservoir volume resets the infusion so the delivery starts at the beginning

› Start Time: The time the next infusion will begin. It is displayed only if the delayed start is programmed. The pump must be running on the selected date and time in order for the infusion to begin

Note: In the Taper therapy, you may not set a delayed start after an infusion has started.

Starting Daily Infusion

When a new cassette is attached to the pump at the beginning of the infusion, the reservoir volume should be reset. This also resets the infusion.

Stopping and Restarting the Pump During an Infusion

If you stop the pump and then restart it before a taper infusion was fully delivered, you may choose to either restart the infusion from where delivery left off, or you may reset the infusion. When you press stop/start to restart the pump, a screen appears with the message, "Infusion was interrupted before completion. Finish interrupted infusion or start from beginning with new bag." Select New Bag to reset the reservoir volume and reset the infusion. Or, select Finish to resume the infusion from the point it was at when it was last running.

Taper Delivery Mode
Taper Down Now

This task allows you to stop an infusion early by immediately tapering down. The following conditions are necessary for Taper Down Now:

› The pump must be running

› The pump must be delivering at the plateau rate or already be in taper down

Access the Taper Down Now option:

1. From the Tasks menu, press or until Taper Down Now is highlighted, then press Select

Note: If a taper down was not programmed, you can edit the setting by pressing Select. Enter the security code, and then press ▲ or ▼ to set the taper down duration. Press Confirm to accept the change.

2. Select Yes to continue with taper down now or press Select to edit the taper down period. Editing the taper down now period only affects the period for this immediate taper. It has no effect on the taper period of the protocol that is seen in the delivery settings

Note: Once you select Yes, you can not restart delivery at the plateau rate without resetting the infusion period.

3. When "Beginning Taper Down…." appears, select OK

Operating the Pump
Power Sources

AA Batteries

To power the CADD-Solis VIP pump, it is recommended that four AA, 1.5 volt non-rechargeable alkaline batteries are used or the CADD-Solis pump rechargeable battery pack.

Note: Mixing new and used batteries is not recommended because it may affect low battery alarm times. Always use four new batteries when replacing depleted batteries. The pump retains all programmed values when the batteries are removed, but the batteries must be in place during delivery. If the batteries are removed while the pump is delivering, and an AC adapter is connected, delivery stops. If an AC adapter is not connected and the batteries are removed, delivery stops and the pump loses power.

AC Adapter

The AC adapter can be used as an alternate source of power for the pump and/or to recharge the rechargeable battery pack. The pump requires AA batteries or the rechargeable battery pack to be installed as a backup while using the AC adapter.
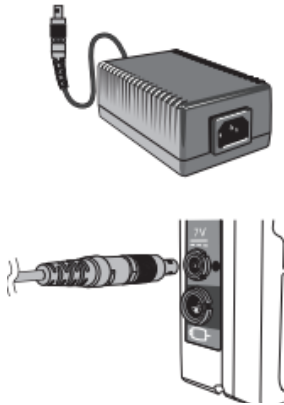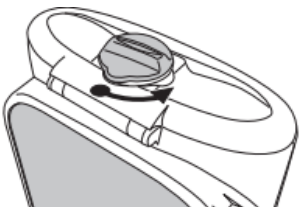
Rechargeable Battery Pack

The rechargeable battery pack is an alternative to using four AA batteries. The rechargeable battery pack can be recharged with the AC adapter, either inside or outside of the pump.
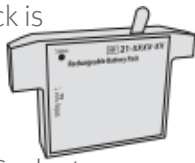
#### Installing Batteries or a Battery Pack

1. Make sure the pump is stopped and powered off. Using your fingers, the pump key, or a coin, turn the knob on the battery door counterclockwise to open the battery door

2. Hold the pump at an angle and place four AA batteries in the pump, from the bottom up. Match the + and – markings on the new batteries with the markings on the pump

   Or

   If using a rechargeable battery pack, insert it into the pump as shown

   Or
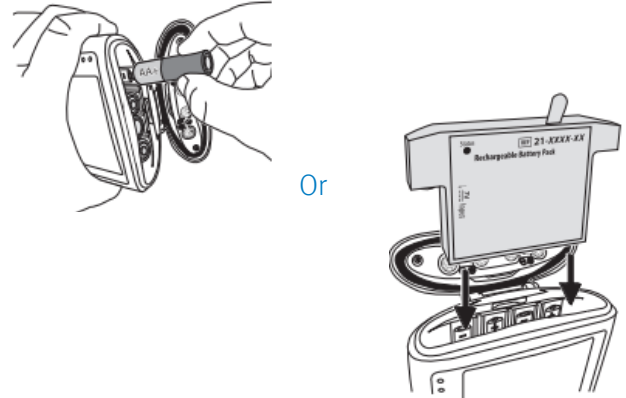
3. Close the battery door and using your fingers, the pump key, or a coin, turn the knob on the battery door clockwise to lock it

Note: If you put the batteries in backwards, the pump will not power up. Check the batteries, making sure to match the + and – markings.
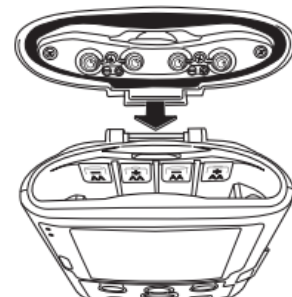
AA batteries

AA batteries with AC adapter

Rechargeable battery pack

Rechargeable battery with AC adapter

Replacing The Battery Door

If the battery door is removed or needs replacing, simply snap the door onto the bar that is located on the pump.

Power Up

Press and hold the power switch to turn the pump on. The pump starts the power up sequence during which it performs various self-tests and tests for alarm conditions.

› If any issues are found while the pump is performing the self tests, alarms will sound

› If you believe there is a problem, remove the pump from service and contact Smiths Medical Customer Service

Caution: If the power up results in an error message indicating that the protocol library was lost, do not proceed with using the pump. Follow your facility's procedures for downloading protocol libraries.

Power Down

Press the power switch to turn the pump off. You must acknowledge the "Power down?" prompt by selecting Yes. The pump then powers down.
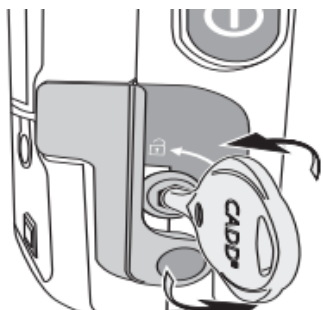
Cassettes

The cassette is part of the CADD medication cassette reservoir or CADD administration set that attaches to the bottom of the pump.

Notes:

› A CADD administration or extension set with free-flow protection must be used

› A CADD high volume administration set is required for rates above 250 mL/hr

Removing a Cassette

1. Make sure the pump is stopped before removing the cassette

2. Close the tubing clamp

3. If locked, insert the pump key and turn the cassette/keypad lock counter-clockwise into the unlocked position. "Cassette Unlocked" briefly appears in the status bar

Note: Only PCA infusions require the cassette to be locked in order to run the pump.

4. Push down on the cassette latch until cassette detaches
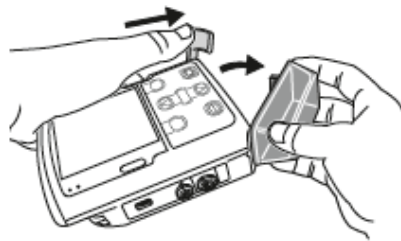

Attaching a Cassette

Obtain a new, filled CADD medication cassette reservoir or CADD administration set attached to a flexible IV bag. Before attaching a new cassette, make sure the pump is powered on. Once the cassette is attached, the pump automatically displays screens that allow you to verify the cassette type, prime the fluid path, reset the reservoir volume, review pump settings, and/or start the pump.

1. Clamp the tubing

2. Make sure the cassette latch is unlocked then open the latch
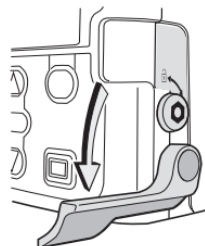
3. Insert the cassette hooks into the hinge pins on the bottom of the pump, then swing the cassette to the latch position
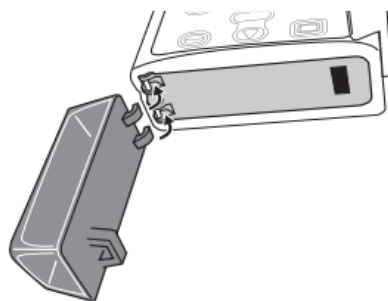
4. Place the pump upright on a firm, flat surface, and then press down on the latch side of the pump so the cassette fits tightly against the pump
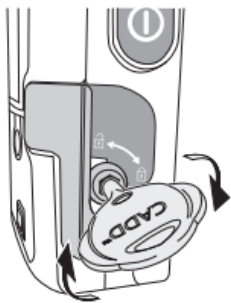
Cassettes

5. Lift the cassette latch handle into the closed position. If you experience resistance when lifting the cassette latch handle, do not force the latch. If the pump doesn't latch easily, unlatch the cassette and repeat the process. A message briefl y appears in the status bar so you can verify the type of cassette you have attached

6. Verify the cassette is attached correctly. Looking from left to right, the top of the cassette should line up evenly with the bottom of the pump and be securely attached. If an uneven gap exists, unlatch the cassette and repeat the process

7. If you wish to lock the cassette, insert the pump key into the cassette/keypad lock and turn clockwise into the locked position. "Cassette Locked" appears briefly in the status bar

Note: For PCA infusions, the cassette must be locked in order to start the pump.

Prime Tubing

When priming the fl uid path, the tubing downstream of the pump is filled with fl uid, removing any air bubbles. Prime the tubing before connecting it to the patient's infusion set or indwelling catheter. Fluid delivered by priming is subtracted from the reservoir volume, but is not added to the amount given because this fl uid is not delivered to the patient. Priming is not allowed with the reservoir volume is 0 mL.

Notes:

› The air detector is disabled while the pump is priming

› If the fl uid path contains an air eliminating fi lter, it is acceptable for air bubbles to be present on the vent side of the filter

Prime Tubing After Changing a Cassette

Note: If you are not changing the cassette but wish to prime the fluid path, use the Prime Tubing, No Cassette Change task.

1. When a cassette is attached after the pump is powered on, a "Prime Tubing?" screen always appears

2. Select Yes
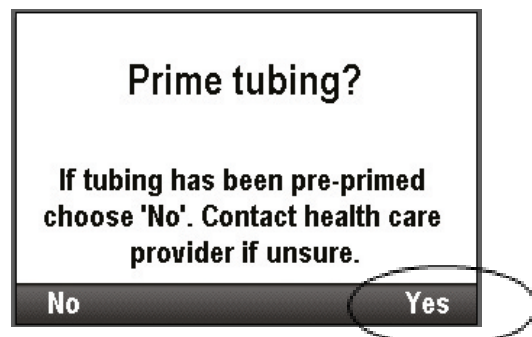
3. Unlock the keypad, if required

Prime Tubing

4. If you have not already done so, disconnect the tubing from the patient, open the clamps and select Prime

Disconnect tubing from patient, open clamps. Then press 'Prime'.

Exit   Prime

5. Stop priming at any time by selecting Stop Priming. Priming automatically stops after 10 mL (or 20 mL if a high volume set is attached) are primed. Continue priming as needed
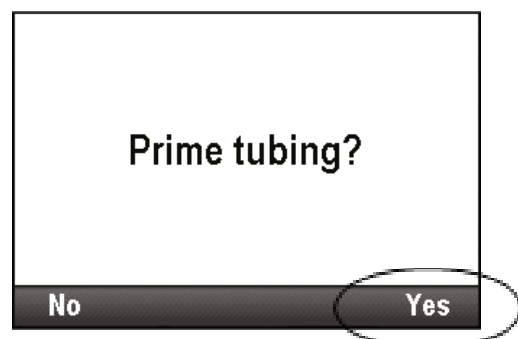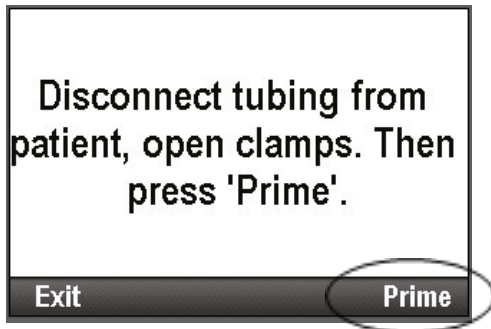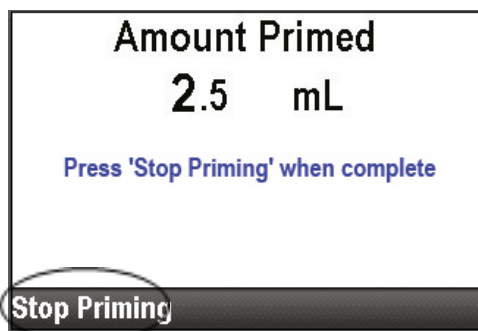

Amount Primed
2.5   mL

Press 'Stop Priming' when complete

Stop Priming

Prime Tubing, No Cassette Change

1. Stop the pump if it is running

2. In the Tasks menu press ▲ or ▼ until Prime Tubing is highlighted, and then press Select

3. Unlock the keypad, if required

4. If you have not already done so, disconnect the tubing from the patient, open the clamps, and select Prime

5. Stop priming at any time by selecting Stop Priming. Priming automatically stops after 10 mL (or 20 mL if a high volume set is attached) are primed. Continue priming as needed

Start The Pump

Infusion begins when the pump starts. When the pump is running, "Running" appears on the status bar, the graphic on the home screen is green, and the green indicator light flashes. If the pump will not start, a message appears on the display.

Note: Before starting the pump, be sure the tubing is primed and the pump is connected to the patient according to your facility's standards of practice.

1. Press Stop/Start

Note: If the delivery settings have not been reviewed and the values have not been accepted, you must do so before the pump will run. (See instructions to review pump settings on page 12.) If a step or taper infusion was previously stopped and delivery was not completed (the infusion was not fully delivered), a screen appears with the message, "Infusion was interrupted before completion. Finish interrupted infusion or start from beginning with new bag." Select New Bag to reset the reservoir volume and reset the infusion. Or, select Finish to resume the infusion from the point it was at when it was last running.

2. When "Start Pump?" appears, select Yes

3. The pump begins running. The red "Stopped" message in the status bar changes to a green "Running" message, and "Infusion is starting now..." appears briefly on the screen.

If a delayed start was programmed, the display turns green and a message that the infusion is delayed appears briefly on the screen. Then the "Delayed Start" screen appears along with the time remaining until the infusion starts. The pump infuses at the programmed KVO rate

Stop The Pump

Stopping the pump stops delivery. After the pump is stopped, "Stopped" appears in red on the status bar, the graphic on the home screen is red, the amber indicator light flashes, and the green indicator light

is off.

1. Press Stop/Start. In a PCA protocol, if a PCA dose is in progress, "Stop PCA dose?"appears. Select Yes to stop the dose. In a PCA protocol, if a clinician bolus is in progress, "Stop clinician bolus?" appears. Select Yes to stop the bolus. A confirmation screen appears stating, "Clinician bolus stopped." Select OK to continue. In a taper protocol, "Taper down instead?" appears. Select No to stop the infusion

2. When "Stop Pump?" appears, select Yes

3. The pump stops running. The green "Running" message in the status bar changes to a red "Stopped" message, and "Pump is stopping..." appears briefly on the screen

Reset Reservoir Volume

The reservoir volume setting indicates the amount of fluid contained in the reservoir. Once this number is set, the pump keeps track of how much fluid has been delivered and adjusts the reservoir volume setting accordingly.

Note: If you are running a step or taper therapy, resetting the reservoir volume also resets the infusion. When you restart the pump, delivery starts at the beginning of the infusion duration. To reset the reservoir volume after attaching a new cassette:

1. The pump displays a question asking if you wish to reset the volume to the default amount.If this screen does not appear, the reservoir volume may already be reset

2. If you are running a step or taper therapy, you also see, "Infusion will be reset". Select Yes to reset the volume and infusion. Select No to keep the reservoir volume at the current setting

To reset the reservoir volume without changing the cassette:

1. Stop the pump if it is running

2. In the Tasks menu, press ▲ or ▼ until Reset Reservoir Volume is highlighted, and then press Select

3. The pump displays a screen asking you to confirm that you want to reset the reservoir volume. Select Yes

Tasks and Advanced Tasks

Tasks Menu Overview

The Tasks menu leads to most of the pump's operating functions. Some items in the Tasks menu will require a security code to view/edit the item.

Task Menu Function	Description on Page
Reset Reservoir Volume	21
Taper Down Now (Taper therapy)	16
Set Delayed Start (all therapies except Intermittent)	8
Set Next Dose Start Time (intermittent therapy)	9
Prime Tubing	19
View Delivery Settings	9
Display and Sound Settings	22
View Reports	24
View Advanced Tasks	24

Display And Sound Settings

The Display and Sound Settings menu allows you to adjust various factors such as the intensity of the backlight on the screen, alarm volumes, sound themes, key beeps, and numeric formats. This change is for the current protocol only and remains in effect until the Start New Patient or Sae Patient New Protocol task is selected. To view or change any of these settings:

› In the Tasks menu, press ▲ or ▼ to highlight Display and Sound ettings and press Select

› Press ▲ or ▼ to highlight the setting you wish to view or change and press Select

› Unlock the keypad, if required

› Edit the setting, if appropriate, and press Save or press Don't Save to exit the task

The items in the Display and Sound Settings menu are:

Backlight Intensity

The backlight intensity feature allows you to adjust the screen backlight intensity within the range of 1 to 10, with 1 being low and 10 being high.

Note: Increasing the backlight intensity shortens the battery life.

Alarm Volume

The alarm volume feature allows you to set the volume of the alarms in the therapy. You may choose between three volumes: low, medium, and high.

Sound Theme

The Sound Theme setting allows you to choose between three different sound themes for the alarms and beeps that the pump makes. The three themes are standard, intense, and distinctive. You may preview the sound themes in the menu. The alarms and beeps that use the sound theme are:

› High Priority Alarm

› Medium Priority Alarm

› Low Priority Alarm

› Informational Alarm

To preview/choose a sound theme:

1. In the Display and Sounds Settings menu, press ▲ or ▼ to highlight Sound Theme and press Select

2. Press ▲ or ▼ to highlight Standard, Intense, or Distinctive, and press Select to preview the theme, or select Save to save the theme without a preview

3. To preview the theme, press ▲ or ▼ to scroll through the alarms and beeps. Press Select to listen to each alarm or beep. Continue until you have decided which one to apply. To exit, select Back

Sound Theme

3. Highlight the desired theme and select Save

Key Beep On/Off

The key beep on/off feature allows you to turn on or off the audible beep that accompanies each key press. This feature does not turn off any audible alarms associated with alarm or alert conditions of the pump.

Note: If the key beep feature is turned on, the key beeps will not sound while any alarm screens are being displayed or when entering a security code.

Numeric Format

The numeric format setting allows you to select the character or space used to indicate the decimal point and thousands units separators. This will be determined by your CADD-Solis system administrator when the protocol library is created. Contact your CADD-Solis system administrator or see the Operator's Manual for more information.

Time And Date

The Change Time and Date setting allows you to edit the time and date, and to choose a time and date format. The time and date options should reflect the current time and date. The clock is powered by a separate, internal battery, which retains the time and date even when the 4 AA batteries or the battery pack is removed. The pump uses this feature to record the time and date of events in the delivery and event logs, and in other reports. It is also used to determine when delayed starts and next dose start times begin, and when preventative maintenance alarms occur.

Note: The internal battery is rechargeable and automatically recharges when the pump is powered on. If the pump is off for a long period of time, it may not show the correct time and date when it is powered on. Check the time and date, and edit these settings if necessary.
In the Tasks menu, press ▲ or ▼ to highlight Change Time and Date and press Select.

Current Time

To set the current time:

1. In the Change Time and Date menu, press ▲ or ▼ to highlight Current Time and press Select
2. Press ▲ or ▼ to scroll to the correct hour and press Select to navigate to the minutes
3. Press ▲ or ▼ to scroll to the correct minutes and press Select to navigate to the am or pm field
4. Press ▲ or ▼ to scroll between am and pm and press Select when the correct setting appears. If you are using a 24-hour clock, the am/pm field does not appear. Select Save

Current Date

To set the current date:

1. In the Change Time and Date menu, press ▲ or ▼ to highlight Current Date and press Select
2. Press ▲ or ▼ to scroll to the correct month and press Select to navigate to the day
3. Press ▲ or ▼ to scroll to the correct day and press Select to navigate to the year
4. Press ▲ or ▼ to scroll to the correct year and select Save

Time Format

The time format setting allows you to select either a

12-hour or 24-hour clock format, and to set the character used for indicating the hours, minutes and seconds separators. This will be determined by your CADD-Solis system administrator when the protocol library is created. Contact your CADD-Solis system administrator or see the Operator's Manual for more information.

Date Format

The date format option allows you to select 1 of 3 formats for indicating the day, month, and year. This will be determined by your CADD-Solis system administrator when the protocol library is created. Contact your CADD-Solis system administrator or see the Operator's Manual for more information.

Daylight Savings Time

The pump time and date do not automatically update for daylight savings time. If you live in a geographical area that follows daylight savings time, you must manually update the time and date. You may choose to change the time while the pump is currently being used by a patient, or wait until the patient is finished with the infusion. However, because delivery of some therapies is affected by a time and/or date change, it is recommended that you wait until the infusion is complete.

Note: If you update the time while the pump is in use, the timestamps in the event and delivery logs are not updated to reflect daylight savings time prior to the change. All events record the reported time from when the event actually occurred. For your reference, the event log records the time when it was changed.

Reports

The reports screen is used to view a variety of reporting and record-keeping functions. The reports available are:

› Total Given
› (not available for PCA therapies)
› Given and PCA Dose Counters
› (PCA therapies only)
› PCA Dose Graph
› (PCA therapies only)
› Delivery History and Pie Chart
› Delivery Log
› Event Log
› Protocol Library Summary
› Device Information

The reports can be viewed at any time, with the pump running or stopped. In the Tasks menu, press ▲ or ▼ to
highlight View Reports and press Select. For details on what each report contains, see the Operator's Manual.

The following functions are in the Advanced Tasks menu:

Advanced Tasks Menu Overview

Most pump configurations are set up by a CADD-Solis system administrator. Protocol libraries consisting of herapies, qualifiers, and drugs are created using the CADD-Solis medication safety software. The Advanced Tasks menu allows you to select a standard therapy protocol created by the CADD-Solis system administrator, or make changes to an individual protocol for single use, or to manually program a protocol.

Notes:

› When creating or editing a protocol under Advanced Tasks, it is important to note that the edits made affect only the protocol currently in use
› The Advanced Tasks screens revert to the home screen if there is a four minute delay between button presses. Make certain you are still in the Advanced Tasks menu after any delays
› Most of the advanced tasks require a security code to unlock the keypad. This step is necessary only if the keypad is not already unlocked

Advanced Task Menu Function Description on Page	Description on Page
Give Clinician Bolus (PCA Therapy)	10
Step Up (Step therapy)	14
Step Down (Step therapy)	14
Patient Permissions	25
Air and Occlusion Settings	See Operator's Manual
Alarm Settings	See Operator's Manual
Security Settings	4
Start New Patient	8
Start New Protocol Same Patient	8
Delivery Hard and Soft Limits	See Operator's Manual
Reset to Factory Defaults	See Operator's Manual

Advanced Tasks Menu Overview

To access any item in the Advanced Tasks menu:

1. From the home screen, select Tasks

2. Press ▲ or ▼ to highlight View Advanced Tasks and press Select

3. Press ▲ or ▼ to highlight the Advanced Tasks you wish to view/edit and press Select

4. Unlock the keypad, if required

5. View/edit the setting and press either Save to confirm the edit or Don't Save to exit the task

Patient Permissions

Security levels are used to limit unauthorized access to certain programming and operating functions. In some cases, the default security settings may be changed to allow patients additional access to pump functions. Do not reduce security settings without providing proper training to patients. The Patient Permissions task allows you to control a patient's access to two specific tasks: priming and setting a delayed start. Setting the permission to "Off" allows the patient to access one or both tasks without having to enter a security code. Setting the permission to "On" restricts the patient's access to one or both tasks because a security code is required.

There are two items under patient permissions:

Priming Security On/Off: Setting this value to "Off" allows the patient/caregiver to prime the tubing on the pump without having to enter a security code. If this value is set to "On", the pump will ask for a security code before allowing the user to use the priming function on the pump.

Delayed Start Security On/Off: Setting this value to "Off" allows the patient/caregiver to set Delayed Starts or Next Dose Start Times without having to enter a security code. If this value is set to "On", the pump will ask for a security code before allowing the user to enter and complete this task.

References and Troubleshooting

Alarms And Messages

The pump can sound multiple alarms. For many of the alarms, you have the option to "acknowledge" or "silence."

› Acknowledge—the alarm clears from the screen

› Silence—the alarm stays on the screen, but is silenced for 2 minutes before it sounds again

The alarm continues until it is acknowledged or resolved. The alarms may have different sounds depending on the sound theme selected. There are three different sound themes for the alarms and beeps that the pump makes: standard, intense, and distinctive.

Types of Alarms

› System Fault Alarm

If this screen appears, an unrecoverable error may have occurred, such as a hardware or software fault. The amber indicator light is continuously illuminated during these conditions and is accompanied by an audible two-tone alarm. To clear this alarm, remove power from the pump by opening the battery door, and if necessary, removing the AC power. Close the battery door and turn the pump back on. If the error code does not repeat, Customer Service may suggest continued use of the pump. If the error is persistent, the pump must be returned for service.

Note: Document the error numbers displayed on the system fault screen to help Customer Service identify the problem.

› High Priority Alarm

A high priority alarm always pauses or stops the pump if it is running. The alarm is accompanied by a red screen, and it persists until acknowledged by the press of a key on the pump or until the condition that triggered the alarm goes away (for example, high pressure going down). The alarm can be silenced with a key press and will sound again after two minutes if the alarm condition still exists

› Medium Priority Alarm

A medium priority alarm does not stop the pump if it is running. The alarm is accompanied by an amber screen, and it persists until acknowledged by the press of a key on the pump or until the condition that triggered the alarm goes away. The alarm can be silenced with a key press and will sound again after two minutes if the alarm condition still exists

› Low Priority Alarm

A low priority alarm does not stop the pump if it is running. The alarm is accompanied by a blue screen, and it persists for five seconds unless it is acknowledged by the press of a key or the condition that triggered the alarm goes away before the five seconds have passed. (Some low priority alarms persist for longer than five seconds)

› Informational Message

An informational priority message does not stop the pump if it is running. This message appears in the status bar, and does not display a new alarm screen. It persists for five seconds and may be silent, requiring no acknowledgment.

Some informational examples are "Cassette Locked," and "Cassette Unlocked"

Alarm Help Screens

Additional information may be displayed when certain alarms occur. The help screens describe what you can do to try to solve the current problem that is causing the alarm.

1. When an alarm occurs, select Silence to quiet the alarm

2. If help screens are available for the alarm, "Help" appears above the right soft key. To view the help screens, select Help

3. Follow the applicable instructions provided on the help screen. To page through all available help screens, press Next repeatedly. Press Acknowledge at any time to exit Help

4. "Retry Help" appears when no additional help steps are available. To page through the help screens again, press Retry Help. The Alarm screen reappears as in Step 2 above. Repeat Steps 2 and 3. When the alarm clears, the help screens will no longer be displayed

Troubleshooting

Issue	Posible Solution
A continuous two-tone alarm is sounding, and the amber light is lit or flashing.	Delivery has stopped. Read the message on the display and refer to the list of messages in the table below. If the display is blank or contains random characters, the 4 AA batteries or the rechargeable battery pack may be depleted. Install 4 new AA batteries or a rechargeable battery pack.
The pump is sounding 2 beeps every 2 seconds, and the amber light is flashing.	Look at the message on the display and refer to the list of messages in the table below.
Three beeps sound every 5 minutes.	This is a reminder that the pump is stopped.
After installing 4 new AA batteries and powering up the pump, no screen appears and no beep sounds.	The batteries may be installed incorrectly. Review the procedure for installing batteries. Be sure to match the polarity (+ and –) markings inside the battery door with the markings on the batteries. If there is still no power, the batteries may be completely depleted.

Alarms And Messages, Alphabetical List

A more detailed list of alarms and messages is included in the Operator's Manual.

Alarm/Message	Alam Priority	Description / Corrective Action
(Screen is blank and alarm is sounding)	High	The pump was delivering and the batteries were removed or the battery door was opened. The pump lost power and is no longer delivering. Clear the alarm by turning the pump back on, or the alarm will stop after the power has been off for a minimum of 2 minutes.
A setting was edited, but not saved, and the edit was lost.	Medium	A parameter was being manually edited, but it was not saved and the pump reverted to the home screen. Select Acknowledge to clear the alarm and if appropriate, edit the parameter and save.
Air in-line detected. Press Acknowledge then prime tubing.	High	The air detector has detected air in the fluid path. The fluid path may contain air bubbles. The pump was delivering and is now stopped and will not run. Select Acknowledge to clear the alarm. If the fluid path contains air bubbles, close the clamps and disconnect the fluid path from the patient. Follow the instructions in the Operator's Manual for removing air by priming. Restart the pump.
Battery depleted. Pump stopped.	High	The pump was delivering but is now stopped and the battery power is too low to operate the pump. If the AC adapter is attached, select Acknowledge to clear the alarm. Remove the batteries. Install 4 new AA batteries or a rechargeable battery pack. To start delivery, good batteries must always be installed even when an external source of power is connected. If appropriate, Restart the pump.
Battery low. Replace battery.	Low	The rechargeable battery pack or the 4 AA batteries are low but the pump is still operable. Select Acknowledge to clear the alarm, or the alarm will automatically clear after 5 seconds.Recharge or change the rechargeable battery pack or replace the 4 AA batteries soon.

Alarms And Messages, Alphabetical List

Alarm/Message	Alam Priority	Description / Corrective Action
Battery removed. Pump will not run.	Medium	The pump is stopped and the rechargeable battery pack or the 4 AA batteries were removed, but the pump is still powered by the AC adapter. Select Acknowledge to clear the alarm. Install a fully charged rechargeable battery pack or 4 new AA batteries. To start delivery, good batteries must always be installed, even when an external source of power is connected.
Cannot start pump with a depleted battery.	Medium	The battery power is too low to operate the pump. To start delivery, good batteries must always be installed even when an external source of power is connected. Select Acknowledge to clear the alarm. Install 4 new AA batteries or a fully charged rechargeable battery pack. If appropriate, start the pump.
Cannot start pump with a reservoir volume of zero.	Medium	The reservoir volume in the pump is set to zero. Select Acknowledge to clear the alarm. Edit or reset the reservoir volume to the correct value. If appropriate, start the pump. See page 32 for more information about resetting the reservoir volume.
Cannot start pump without a latched cassette.	Medium	The pump will not start without a cassette attached. Select Acknowledge to clear the alarm. Make sure a cassette is properly attached, then start the pump. Note: This alarm has associated help screens.
Cassette not attached properly. Reattach cassette.	High	The cassette is not properly attached. Close the tubing, remove the cassette, then reattach. If the alarm persists, replace the cassette. Note: You must remove the cassette to continue.
Cassette was partially unlatched. Fully remove and reattach the cassette.	Medium	The cassette was not completely removed from the pump before it was reattached and the pump's sensors are not able to detect the cassette type. Remove the cassette and reattach it, then verify the cassette type in the pump display. If the alarm persists, replace the cassette. Note: You must remove the cassette to continue.
Check for empty tubing or reservoir. Pump stopped.	High	The tubing beneath the pump may not contain fluid, or the fluid container may be empty. The pump is stopped and will not run. Select Acknowledge to clear the alarm. Check to see if the fluid container is empty. If fluid is present in the reservoir, clamp the tubing, remove the cassette, and check for air in the tubing. If the alarm persists, remove the pump from service and contact Customer Service to return the pump for service.
Dose is now overdue. Pump is stopped.	Medium	The pump is stopped and a dose is overdue for its scheduled delivery. Select Acknowledge to clear the alarm, and then start the pump.

Alarms And Messages, Alphabetical List

Alarm/Message	Alam Priority	Description / Corrective Action
Downstream occlusion. Clear occlusion between pump and patient.	High	The pump has detected high pressure, which may be resulting from a downstream blockage, a kink in the fluid path, or a closed tubing clamp. Delivery is paused and will resume if the occlusion is removed. Remove the obstruction to resume operation. Or select Stop Pump to stop the pump and silence the alarm for 2 minutes, then remove the obstruction and restart the pump. Note: To reduce the potential for a bolus delivery after an occlusion, perform the following: 1. Select Stop Pump to stop the pump 2. Close the distal clamp. If the distal clamp is the cause of obstruction, keep it closed and continue with step 4 3. Remove the obstruction 4. Detach the CADD medication cassette reservoir or CADD administration set from the pump 5. Open the Flow Stop feature, if present 6. Wait 10 seconds 7. Close the Flow Stop feature, if present 8. Reattach the CADD™ medication cassette reservoir or CADD administration set to the pump 9. Open the distal clamp 10. Review the pump program 11. Restart the pump Note: This alarm has associated help screens.
High flow admin set required. Remove cassette.	High	The delivery-specific parameters are programmed to values that cause the maximum rate of delivery to exceed 250 mL/hr. Note: You must remove the standard volume cassette to continue.
High volume admin set not allowed. Remove cassette.	High	The CADD high volume administration set cannot be used. The pump is stopped and will not run. Note: Remove the administration set to continue.
Infusion is now overdue. Pump is stopped.	Medium	The pump is stopped and the infusion is overdue for its scheduled delivery. Select Acknowledge to clear the alarm, and then start the pump.
Lock cassette to start pump.	Medium	PCA mode only. The cassette must be locked onto the pump before beginning delivery. Lock the cassette to clear the alarm and the pump will automatically start. Note: This alarm has associated help screens.
Pump does not have a protocol library.	Medium	The pump had a protocol library the last time it was powered on, but now it does not. This may happen if the pump was manually reverted to the factory default, recently had a software update, or if an attempt to install a protocol library failed. Select Acknowledge to clear the alarm and contact the CADD-Solis system administrator to download a new protocol library.

Alarms And Messages, Alphabetical List

Alarm/Message	Alam Priority	Description / Corrective Action
Pump settings and patient data lost.	Medium	The pump reverted to the factory default. The pump was either manually reverted to this default, recently had a software update, or has not been in use for some time. Select Acknowledge to clear the alarm and contact the CADD-Solis system administrator to reprogram the pump.
Pump stopped by an alarm that has since cleared.	High	The pump was stopped by another high priority alarm. That alarm was not acknowledged, but the problem has since cleared. Select Acknowledge to clear the alarm and if appropriate, restart the pump. The event log recorded the alarm that stopped the pump. For information on accessing the event log, see page 21.
Reservoir volume is zero. Pump stopped.	High	The reservoir volume is 0.0 mL. The pump was delivering, but is now stopped and will not run. Select Acknowledge to clear the alarm. Attach a new reservoir, and reset or edit the value of the reservoir volume, if appropriate.
Reservoir volume low.	Medium Low	Medium: The programmed reservoir volume trip point has been reached, indicating the level of fluid in the reservoir is low. Select Acknowledge to clear the alarm. Low: The programmed reservoir volume trip point has been reached, indicating the level of fluid in the reservoir is low. Select Acknowledge to clear the alarm, or the alarm will automatically clear after 5 seconds. Prepare to install a new reservoir, and reset or edit the value of the reservoir volume, if appropriate.
Upstream occlusion. Clear occlusion between pump and reservoir.	High	Fluid is not flowing from the fluid container to the pump, which may be due to a kink, closed clamp, or air bubble in the tubing between the fluid container and pump. Delivery is paused and will resume if the occlusion is removed. Remove the obstruction to resume operation. The alarm will clear when the occlusion is removed. You must acknowledge this alarm after it clears if it has occurred and cleared more than 3 times within 15 minutes. Note: This alarm has associated help screens.

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