System Operating Manual

PLUM A+™

PLUM A+3™

For Infusion Systems with v11.3 Software

For use with Lists 12391-04 & 12618-04

Back Prime	A	B	Options/ Vol Inf
▲	▲	▲	▲

Hospira

Change History

Title	Description of Change	Pages Affected
430-95483-001 (Rev. 1/03)	First Release	All
430-95483-002 (Rev. 6/04)	Second Release	All

Contents

1) Descriptive Information

NOTE: In this manual, references to Plum A+ apply to both systems unless otherwise noted.

Plum A+^{TM}
List # 12391-04

Plum A+3^{TM}
List # 12618-04

CAUTION: THIS DEVICE IS TO BE USED WITH AN IV POLE WITH A 6-WHEEL BASE AND A SHELF TO HOLD THE PLUM A+3.

1) Descriptive Information

The Plum A+ and Plum A+3 Volumetric Infusion Systems are designed to meet the fluid delivery requirements of today's evolving healthcare environments. Both are cassette based multi-function infusion systems. The Plum A+ allows two lines in and one line out while the Plum A+3 allows six lines in and three lines out. Each pump can be used for standard, piggyback, or concurrent delivery. Therapy modes include:

- **Standard Infusions**
- **Multistep Programming**
- **Loading Dose**
- **Dose Calculation**

The Plum A+ and Plum A+3 are designed to deliver parenteral, enteral, or epidural infusions over a broad range of infusion rates from multiple fluid container types.

Both are designed to be used in most areas of patient care, including, but not limited to:

•*General Floor*	•*Labor/Delivery/ Post Partum*	•*Burn Unit*
•*Medical/Surgical*	•*OR/Anesthesia*	•*Hemodialysis*
•*ICU/CCU*	•*Post Op/ Recovery*	•*Oncology*
•*Pediatrics*	•*Cardiac Cath Lab*	•*Mobile Intensive Care*
•*Neonatolgy*	•*Emergency*	•*Nutritional*

1.1   Product Description

Each system includes a pumping module (hereafter called the pump) and an assortment of disposable IV sets (hereafter called a set), optional accessories, and this operator's manual.

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The optional Barcode Reader allows drug name identification by scanning a provided list of drug names located on the Flash Tips & Barcode Directory.

A computer data port is also provided to interface with a host computer.

> **NOTE:** Do not operate dataport while infusing.

1.2   Indications for Use

USER QUALIFICATION

The Plum A+ is intended for use at the direction or under the supervision of licensed physicians or certified healthcare professionals who are trained in the use of the pump and the administration of parenteral, enteral, and epidural fluids and drugs and whole blood or red blood cell components. The training should emphasize preventing related IV complications, including appropriate precautions to prevent accidental infusion of air. The epidural route can be used to provide anesthesia or analgesia.

WARNING

ADMINISTER ONLY ANESTHETICS/ANALGESICS APPROVED FOR EPIDURAL ADMINISTRATION (AS INDICATED OR ALLOWED BY THE DRUGS' FDA APPROVED LABELING). EPIDURAL ADMINISTRATION OF DRUGS OTHER THAN THOSE INDICATED FOR EPIDURAL USE COULD RESULT IN SERIOUS INJURY TO THE PATIENT.

1.3   Conventions

This section describes the conventions used throughout this manual, as follows:

CONVENTION	APPLICATION	EXAMPLE
Italic	Reference to a section, figure, or table	(*See Figure 3-1, Priming Cassette*)
	Function or mode specific instructions	*Primary Only:* Attach an empty container.
[BRACKETED ALL CAPS]	Keys or buttons on the device are displayed in [BRACKETED ALL CAPS] or with a graphic.	[START] or **(START)**
▲ *[Italic]*	Softkey Options	▲ *[Choose]*
Initial Caps lowercase	Screen displays and device labels (as appropriate)	Therapy Dose Calculation
Bold	Emphasis	...sets are supplied **Sterile** and are for....

WARNINGS, CAUTIONS, AND NOTES

Alert messages used throughout this manual are described below. Pay particular attention to these messages.

WARNING
> **A WARNING MESSAGE CONTAINS SPECIAL SAFETY EMPHASIS AND MUST BE OBSERVED AT ALL TIMES. FAILURE TO OBSERVE A WARNING MESSAGE IS POTENTIALLY LIFE THREATENING.**

> **CAUTION: A CAUTION** USUALLY APPEARS IN FRONT OF A PROCEDURE OR STATEMENT. IT CONTAINS INFORMATION THAT COULD PREVENT IRREVERSIBLE PRODUCT DAMAGE OR HARDWARE FAILURE. FAILURE TO OBSERVE A **CAUTION** COULD RESULT IN SERIOUS PATIENT OR USER INJURY.

NOTE: A Note highlights information that helps explain a concept or procedure.

This symbol directs the user to consult accompanying documents.

NOTE: Figures are rendered as graphic representations to approximate the actual product. Therefore, figures may not exactly reflect the product.

1.4   Precautions

The Plum A+ has been designed and manufactured to be safe, reliable, and easy to use. This section details precautions and possible hazards.

For safe operation of the Plum A+, observe the following precautions and hazards.

ARTIFACTS

- **Nonhazardous, low-level electrical potentials are commonly observed when fluids are administered using infusion devices. These potentials are well within accepted safety standards, but may create artifacts on voltage-sensing equipment such as ECG, EMG, and EEG machines. These artifacts vary at a rate that is associated with the infusion rate. If the monitoring machine is not operating correctly or has loose or defective connections to its sensing electrodes, these artifacts may be accentuated so as to simulate actual physiological signals. To determine if the abnormality in the monitoring equipment is caused by the infusion device instead of some other source in the environment, set the infusion device so that it is temporarily not delivering fluid. Disappearance of the abnormality indicates that it was probably caused by the electronic noise generated by the infusion device. Proper setup and maintenance of the monitoring equipment should eliminate the artifact. Refer to the appropriate monitoring equipment system documentation for setup and maintenance instructions.**

- **The Plum A+ system is designed to operate normally in the presence of most encountered electromagnetic interference (EMI) conditions. In the event of extreme levels of interference, such as encountered next to an electrosurgical generator, it is possible that the normal operation of a sensor or microcomputer might be disrupted. Even in this event, the outcome would likely be a false alarm or detected system malfunction and would not result in a hazard to patient or operator.**

- **Use of radio frequency emitting devices such as cellular telephones and 2-way radios in close proximity of this device may affect its operation.**

HEALTHCARE PROFESSIONALS AND PATIENT RELATED

- **In vitro studies have suggested that packed red blood cells with unusually high hematocrit be diluted with blood-compatible fluids, such as 0.9% sodium chloride injection, to decrease hemolysis and increase flow rate.**

- **Setting the primary rate greater than the secondary rate will result in a more rapid infusion of any residual secondary drug remaining in the line and the cassette.**

- **Consult drug labeling to confirm drug compatibility, concentration, delivery rates, and volumes are all suitable for secondary, concurrent and piggyback delivery modes.**

- **Arrange tubing, cords, and cables to minimize the risk of patient strangulation or entanglement.**

- **Before opening the door, close clamp on the primary line or remove the secondary container from the secondary port to prevent mixing of primary and secondary fluids.**

- **Although unlikely, failure of certain robust mechanical components such as the anti-free flow mechanism or valve control springs could cause fluid delivery limited to the contents of the fluid container. Single fault failure of certain electronic/motor control components would result in no more than 5 mL of unexpected fluid delivery.**

- **A small amount of fluid is expelled from the set (less than 0.05 ml) each time the door is**

opened or closed with a set installed. If potent drugs are being used, take appropriate action to guard against overmedication of the patient.

- **Before disconnecting a syringe from the cassette, pull up the plunger slightly to avoid spilling the fluid. For rigid containers, close the upper slide clamp, open the cassette door, then remove and invert the cassette (ports down).**

- **Air bubbles may form distal to the cassette as result of normal out-gassing of dissolved air in the fluid.   This may occur if chilled solution is in use, if the pump is mounted significantly above the patient, or when using certain fluids known to routinely outgas.   In these cases, an air eliminating filter may be used.**

- **Repeated opening and closing of the door may defeat the proximal air-in-line alarm and may cause a distal air-in-line alarm, requiring repriming.**

- **The screen displays the VTBI (volume to be infused) in integers when value is above 99.9. Any fraction of a milliliter delivered is not displayed, but is retained in memory.**

- **For Plum A+3 users, be aware that changing the weight on one device does NOT change the weight on the other two devices. Patient weight must be changed on each device when delivering weight-based therapy dependent on medication requirements.**

CONCURRENT FLOW

GUIDELINES

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When delivering short half-life critical drugs (*see Critical Drugs, this section*) using the Plum A+ in the Concurrent mode, the following delivery rate guidelines should be observed:

- **If the critical drug (with half-life less than 6 minutes) is to be infused at less than 2.0 mL/hr, the other infusion should be no faster than 5 times the critical drug's rate. Dopamine, for example, delivered at 1.5 mL/hr should not be accompanied by an infusion programmed any faster than 7.5 mL/hr.**

- **If the critical drug (with half-life less than 6 minutes) is to be infused at 2.0 to 5.0 mL/hr the other infusion should be no faster than ten times the critical drug's rate. Dopamine, for example, delivered at 3.5 ml/hr should not be accompanied by an infusion programmed any faster than 35 mL/hr.**

- **If the critical drug (with half-life less than 6 minutes) is to be infused at 5.1 mL/hr or greater, the other infusion can be programmed at any desired rate.**

NOTE: The total of the primary rate plus the secondary rate cannot exceed 500 mL/hr.

These guidelines apply *only* when infusing *short half-life critical drugs* in *Concurrent mode.* Individual patient responses may vary requiring adjustment of delivery rates.

DELIVERY RATE GUIDELINES	
SHORT HALF-LIFE (LESS THAN 6 MINUTES) CRITICAL DRUG INFUSION RATE	MAXIMUM RATE OF ACCOMPANYING INFUSION
0.5 - 1.9 mL/hr	5 Times the Critical Drug Rate
2.0 - 5.0 mL/hr	10 Times the Critical Drug Rate
5.1 or Greater	Any Desired Ratio

CRITICAL DRUGS

Examples of drugs with a short half-life (approximately 6 minutes or less when given IV) include:

Dobutamine	Lidocaine
Dopamine	Nitroglycerin
Epinephrine	Nitroprusside
Epoprostenol	Norepinephrine
Esmolol	Oxytocin
Isoproterenol	Procainamide

For these drugs, the concurrent flow guidelines should be followed when the infusion rate of the drug will be 5 mL/hr or less.

This list of critical drugs is not intended to be all-inclusive of critical drugs or drugs with a short half-life.

The clinician should become familiar with the pharmacodynamics of any critical drug before administration.

This information is presented to inform clinicians of a rare situation that could be misinterpreted if they are unfamiliar with this phenomenon.

EPIDURAL ADMINISTRATION

- **Recommended use of the epidural route is to provide anesthesia or analgesia for periods up to 96 hours.**

- **This device can be used to administer only those anesthetics/analgesics approved for epidural administration (as indicated or allowed by the drugs' FDA approved labeling). Epidural administration of drugs other than those indicated for epidural use could result in serious injury to the patient.**

- **For epidural administration, the use of Hospira catheters, pump sets without Y-sites, and "epidural" stickers indicating ongoing epidural administration are recommended.**

- **Administration of drugs via the epidural route should be limited to personnel familiar with associated techniques and patient management problems. Proper epidural placement of the catheter is essential since catheter migration could result in intravascular or intrathecal administration. Facilities practicing epidural administration must be equipped with resuscitative equipment, oxygen, naloxone, and other resuscitative drugs. Adequate monitoring equipment (e.g., Oximetry) is recommended for continuous monitoring of the patient during epidural administration. Patients must be observed frequently for side effects in a fully-equipped and staffed environment for at least 24 hours following completion of drug administration by the epidural route. DELAYED RESPIRATORY DEPRESSION**

FOLLOWING CONTINUOUS EPIDURAL ADMINISTRATION OF PRESERVATIVE-FREE MORPHINE SULFATE HAS BEEN REPORTED.

- **The epidural space has 58 openings through which fluid can exit. Pressure buildup during administration is transient. However, if a large volume of fluid is administered over a short time period, the pressure will take longer to return to normal. If overdelivery occurs during administration, observe the patient closely for signs of spinal cord compression (disorientation, headache, transient neuralgias) and drug overdose.**

BATTERY OPERATION

- **Do not operate the Plum A+ on patients with the battery removed. Use of a properly maintained and charged battery helps confirm proper operation.**

- **The battery may not be fully charged upon receipt. Connect the pump to AC power for at least six hours.**

- **Use AC power whenever possible. Connect to AC power during storage to ensure a fully charged battery for emergencies. If quality earth grounding source is in doubt, use battery power.**

- **If the low-battery alarm sounds, connect the pump to AC power immediately.**

SETS AND ACCESSORIES

- **Only compatible LifeCare Plum Sets can be used with the Plum A+. See individual set instructions for additional information.**

- **Administration sets should be changed per CDC guidelines or healthcare provider policy. Discard after use.**

- **LifeCare IV infusion sets with integral nonblood filters are not for use in the administration of blood, blood products, emulsions, suspensions, or any medications not totally soluble in the solution being administered. These medications may be administered through the lower Y-injection site, below the filter.**

- **When infusing at low delivery rates (5.0 mL/hr or less) the use of thick-walled microbore Plum sets is recommended. This will reduce the amount of the fluid bolus that may be delivered when a distal line occlusion is released.**

- **Syringes must be larger than 3 cc. Use syringe adapter (List 11986-48) when using syringes smaller than 10cc. Some 10cc syringes may require use of a syringe adapter. Syringes larger than 10cc may be attached directly to the secondary port of the cassette. Use of a syringe adapter may decrease the occurrence of proximal occlusion alarms.**

- **Use a 19-gauge or larger needle or catheter at the venipuncture site for viscous fluids if operating at rates greater than 500 ml/hr.**

See *Section 10 for information on sets and accessories.*

BACKPRIMING

- **Backpriming is not recommended for reconstituting secondary containers containing dry powders.**
- **To avoid pressurization when backpriming into a syringe, the user must confirm there is sufficient empty space to accept the backprimed fluid.**

GENERAL

- **Possible explosion hazard exists if used in the presence of flammable anesthetics.**
- **Do not place Plum A+ in service if it fails the self-test.**
- **Do not operate the Plum A+ with the case opened.**
- **Keep the cassette door securely closed while the pump is not in use, to avoid cassette door damage.**
- **The Plum A+3 is to be used with an IV pole with a 6-wheel base and a shelf.**

CLEANING

For more information on cleaning the pump, *see Section 8.*

- **To avoid mechanical or electronic damage, do not immerse the Plum A+ in any fluids or cleaning solutions.**
- **Do not spray cleaning solutions toward any opening in the instrument.**
- **Certain cleaning and sanitizing solutions may slowly degrade components made from some plastic materials. Using abrasive cleaners or cleaning solutions not recommended by Hospira may result in product damage. Do not use compounds containing combinations**

of isopropyl alcohol and dimethyl benzyl ammonium chloride.

- **Never use sharp objects such as fingernails, paper clips, or needles to clean any part of the pump.**

- **Do not sterilize by heat, steam, ethylene oxide (ETO), or radiation.**

- **To avoid pump damage, cleaning solutions should only be used as directed. The disinfecting properties of cleaning solutions vary; consult the manufacturer for specific information.**

Use the following procedure to avoid the administration of a bolus following a distal occlusion (i.e., a closed distal clamp):

- **If a secondary container is in use, clamp proximal tubing before opening cassette door.**

- **Open cassette door and remove the cassette.**

- **Open the flow regulator briefly to dissipate the pressure and then close it.**

- **Eliminate the source of occlusion (closed clamp).**

- **Reinsert the cassette and close the cassette door.**

- **Open all clamps and resume infusion.**

NOTE: When troubleshooting an occlusion where all clamps are in the OPEN position, use care to avoid delivery of a bolus by opening the flow regulator to release any built-up pressure. Close the clamp between the cassette and the patient before opening the flow regulator to relieve the pressure. *See Section 7, Alarms and Troubleshooting, for more information*.

NOTES

2) Principles of Operation

2.1 Features

The Plum A+ is a dual-line volumetric infusion system designed to meet the growing demand for hospital-wide, as well as alternate site and home healthcare, standardization. With it's primary line, secondary line, and piggyback fluid delivery capability, the Plum A+ is suited for a wide range of medical/ surgical and critical care applications. Full compatibility with LifeCare Plum Series administration sets and accessories and the LifeShield® and CLAVE® needleless protection systems, makes the Plum A+ a convenient and cost-effective infusion system.

THERAPIES

- **Dose Calculation**
- **Loading Dose**
- **Multistep Programming**

LINE PROGRAMMING OPTIONS

- **Therapy Selection**
- **Nurse Call Back**
- **Delayed Start Setting**
- **Drug Label Library**
- **Concurrent delivery**
- **Titration**
- **Micro 0.1-99.9 mL/hr (in 0.1 mL increments) flow rate range for both lines**
- **Macro 100-999 mL/hr (in 1 mL increments) flow rate range for both lines**
- **Automated Secondary drug delivery (Piggyback)**

- **Standby Setting**

PLUMSET CAPABILITIES

- **Anti Free-Flow Protection**
- **Direct Connection for syringe delivery**

AIR MANAGEMENT

- **Air Trap**
- **Air Removal/Backpriming**
- **Air Detection-Proximal**
- **Air Detection-Distal**

BATTERY

NOTE: The Plum A+3 utilizes three batteries.

- **Battery Gauge**
- **Six Hour Battery Recharge Time**
- **Long battery life (6 hours) for emergency backup and temporary portable operation**

BIOMEDICAL

- **Serial Communication**
- **Upgradability (Field- for List 12391 only)**
- **Variable Rate Cap**
- **Alarm History**
- **Plug-in Bar Code Reader for drug identification (Optional)**
- **Nurse Call Relay Connector**

OPTIONS

- **Volumes Infused (A, B, Total Volume)**

- **KVO at dose end (1.0 ml/hr or less depending on delivery rate) or Continue Rate (CR) to continue at the current rate**
- **Variable Distal Pressure Settings**

OTHER FEATURES

- **Nonpulsatile volumetric accuracy**
- **Microprocessor control**
- **Large liquid crystal display (LCD) screen**
- **Panel back illumination on mains power**
- **Lockout switch**
- **Standard syringe use**
- **Parenteral and nonparenteral (enteral) fluid delivery**
- **Blood and blood products delivery**
- **Wide range of Standard and Specialty administration sets**
- **Password protected keypad lock**

NOTES

3)   Equipment Description

Line A Flow
Indicator

Line B Flow
Indicator

Status
Region

Status Region

LCD

Working
Region

Working Region

Battery
Charge
Indicator
(2/3 full)

Message
Region

Message Region

Softkey Label

Back
Prime

A

B

Options/
Vol Inf

Numeric
Keys

Softkey
Selector

Start and
Stop Keys

START

1 2 3

(Up/Left)
Selection
Key
(Down/
Right)

STOP

4 5 6

SELECT

Charging/
Line
Indicator

CHARGE

7 8 9

ON/OFF
Key

ON/OFF

CLEAR

0

·

SILENCE

Silence
Key

Numeric Field
Clear Key

Decimal Point
Key

**Basic Layout of Front Panel Display and
Keypad**

3.1   Operating Keys

NOTE: For Plum A+3, all three pumps act as individual Plum A+'s.

The [ON/OFF] key is used to control the power of the Plum A+.

ON/OFF

NOTE: All deliveries must be stopped in order to turn the power off.

NOTE: To confirm proper shutdown of pump, do not unplug until **"double beep"** is heard (approximately 5 seconds). If **"double beep"** is not heard, the pump will turn itself back ON sensing the AC power was lost and revert to battery back-up power.

The [START] key is used to begin infusion and as final confirmation of programming.

START

The [STOP] key is used to stop the current delivery on one line; used in conjunction with soft keys to stop delivery on both lines.

The [SILENCE] key is used to silence an audible alarm during actions to correct its cause.

The [SELECT] key (or) is used to move the highlighting cursor between the programming fields.

The numeric keys are used to enter values for any highlighted field requiring numeric data.

The [CLEAR] key will cause a highlighted numeric field to be cleared in preparation for data entry.

The [DECIMAL POINT] key is used to manually enter numbers other than whole numbers (i.e., 1.2 mL).

Softkeys are located at the bottom of the main display and serve a variety of functions. What each key does is indicated by the text in the display above the actual softkey.

1	2	3
4	5	6
7	8	9
CLEAR	0	.

| Drug List | Standby | Enter | Cancel/ Back |
| ▲ | ▲ | ▲ | ▲ |

3.2   Indicators

The Charge/Line Indicator is illuminated to indicate the battery is currently charging.
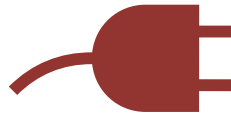
> **NOTE:** If the device is plugged into AC power, with a battery installed, and the Charge Indicator is not illuminated, contact technical support.

The fluid drop symbol, when flashing, indicates an active infusion on Line A and/or Line B.

Battery Capacity Symbol (located on right side of message region on display) indicates relative charge with number of white boxes from left to right.

This example indicates the battery is about two-thirds full.

3.3   Rear Case Controls

NOTE: For Plum A+3, each control applies to all three pumps.

The audio level rotary knob, located on the back, adjusts the alarm audio level.

Loud   Quiet
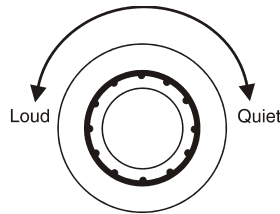
The toggle switch, located below the audio level control, activates the lockout function when the lever is placed in the "up" position, disabling all front panel keys except [STOP].

Locked
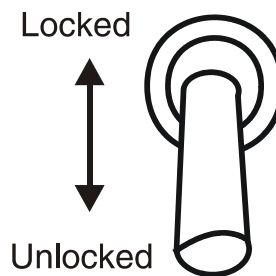
Unlocked

Password Protected Keypad Lock may also be used. It both locks and unlocks the keypad by pressing the decimal key, followed by 9, 6, & 3.

· 9 6 3

NOTE: For Plum A+3, keypad lock applies to individual pump in use.

NOTE: Pressing of a key while lockout is active results in the display of the lockout enabled message. This action is recommended to confirm each lockout activation.

NOTE: If the lockout switch is put in the "Locked" position while the pump is off, the [ON/OFF] key allows the unit to turn on.

The connector located below the lockout switch is the Nurse Call Relay Connector, for providing remote notification of a nurse call event.

The RS-232 DataPort is used to interface with a host computer.
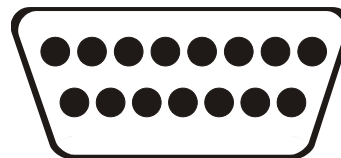
NOTE: Do not operate dataport while infusing.

Barcode Wand (optional) is used to scan desired drug names from the Hospira supplied drug list card. It plugs into the Barcode Wand Port, located in the back of the pump.
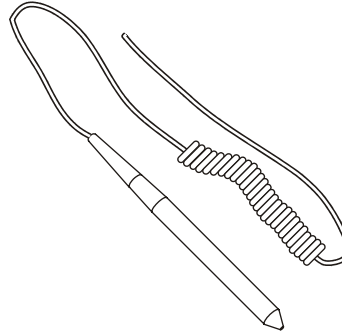
The Barcode Reader (BCR) is enabled whenever "Wand Active" is displayed. It should only be used after selecting ▲ [THERAPY], as an alternate method for drug selection.

To use the BCR, swipe tip of BCR wand across entire barcode, from dot to dot.

A	PROGRAM	
	Wand Active	
Rate	15.0	mL/hr
VTBI	50.0	mL
Duration	03:20	hr : min

Enter Value using keypad

Program Options		Therapy	Cancel/ Back
▲	▲	▲	▲
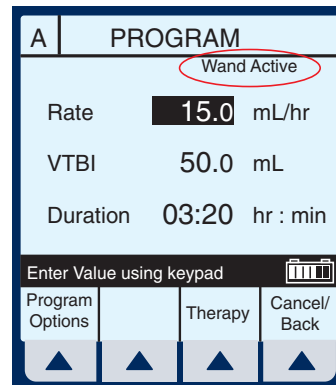
> **NOTE:** For Plum A+3, barcode wand is only operational on pump which displays "Wand Active" on screen.

3.4   Administration Sets

The Plum A+ is compatible with a wide range of LifeCare Plum series administration sets. Become familiar with the set components before preparing the administration set.
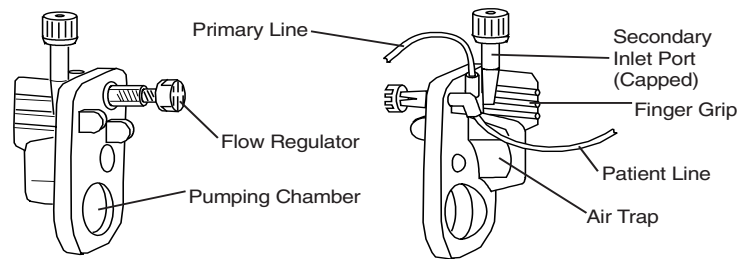
PREPARING THE ADMINISTRATION SET

> **NOTE:** For detailed instructions, see administration set packaging.

WARNING
ARRANGE TUBING, CORDS, AND CABLES TO MINIMIZE THE RISK OF PATIENT STRANGULATION OR ENTANGLEMENT.

Use the aseptic technique to prepare the administration set for priming, then proceed as follows:

Make sure flow regulator is closed.
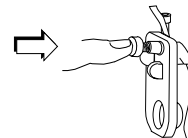
Insert piercing pin into container outlet with a twisting motion.
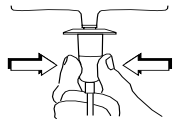
Fill Drip chamber to about 1/2 full or to the score mark. Do not completely fill.

NOTE: To avoid getting Distal Air Alarms, confirm the fluid bag is positioned higher than the pump. This should be set up prior to priming the cassette.

PRIMING THE ADMINISTRATION SET
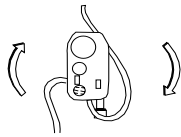
Invert the cassette.
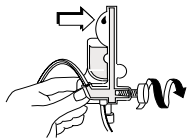
Turn the flow regulator counter-clockwise until a drop of fluid is seen in the pumping chamber.
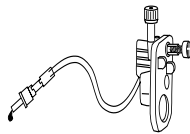
Turn the cassette upright, then prime the remainder of the administration set.

Push in the flow regulator to close. Confirm there is no flow.
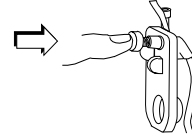
LOADING THE CASSETTE

To load the primed cassette into the plum A+, proceed as follows.

Open the cassette door by lifting up the handle.

Insert cassette into door guides. Close the cassette door. Confirm there is no flow and no kinks appear in tubing.
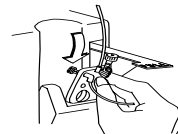
> **NOTE:** If flow is observed, close the tubing clamps and replace the administration set.

> **NOTE:** The administration set should be changed per CDC guidelines or healthcare provider policy. Discard after use.

PREPARING THE SECONDARY LINE

> **CAUTION:** CONSULT THE DRUG LABELING TO CONFIRM DRUG COMPATIBILITY, CONCENTRATION, DELIVERY RATES, AND VOLUMES ARE ALL SUITABLE FOR CONCURRENT DELIVERY OR PIGGYBACK DELIVERY (SECONDARY FOLLOWED AUTOMATICALLY BY PRIMARY) MODES.

The Plum A+ features concurrent or piggyback delivery modes when therapy requires administering more than one fluid.

In addition to standard containers, the Plum A+ can use syringes on the secondary port. The secondary line can be prepared without removing or repriming the cassette.

Before preparing the secondary line, observe the following guidelines:

- **Review the backpriming function.**
- **Attach the secondary container using an 18- or 19- gauge, 31 mm (or shorter) needle, if the cassette secondary inlet port has a piercing reseal.**
- **Syringes must be larger than 3 cc. Use syringe adapter (List 11986-48) when using syringes smaller than 10cc. Some 10cc syringes may require use of a syringe adapter. Syringes larger than 10cc may be attached directly to the secondary port of the cassette. Use of a syringe adapter may decrease the occurrence of proximal occlusion alarms.**
- **When using a syringe adapter, retract the plunger to draw approximately 1 mL of fluid into the syringe to clear air from the adapter filter.**

To prepare the secondary line, use aseptic technique and proceed as follows:
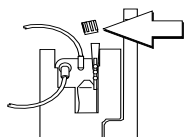
With cassette door closed: Loosen and remove white cap, then discard. Add secondary tubing or syringe.

Open all proximal clamps before pressing [START].

Set up per operating instructions. *(See Sections 4 and 5 of this manual.)*
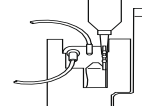
Syrige: **Secure the container to the cassette door using the optional container support arm** *(List 12095-03).*
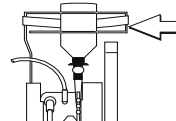
3.5 Discontinuing Electronic Flow Control & Setting Gravity Flow

CAUTION: B**EFORE OPENING DOOR, CLOSE CLAMP ON PRIMARY OR SECONDARY SET OR REMOVE SECONDARY CONTAINER FROM SECONDARY PORT TO PREVENT MIXING OF PRIMARY AND SECONDARY FLUIDS.**

If electronic flow needs to be stopped, the precision flow regulator on the cassette can be used to manually set and maintain fluid flow in a gravity mode *(see the following graphics).*

❶ PRESS STOP

STOP

❷ OPEN DOOR & REMOVE CASSETTE
NOTE: FLOW REGULATOR CLOSES AUTOMATICALLY WHEN DOOR IS OPENED TO PREVENT ACCIDENTAL FREE FLOW.

❸ SET GRAVITY RATE BY TURNING FLOW REGULATOR COUNTER-CLOCKWISE
NOTE: CASSETTE SHOULD BE IN UPRIGHT POSITION.
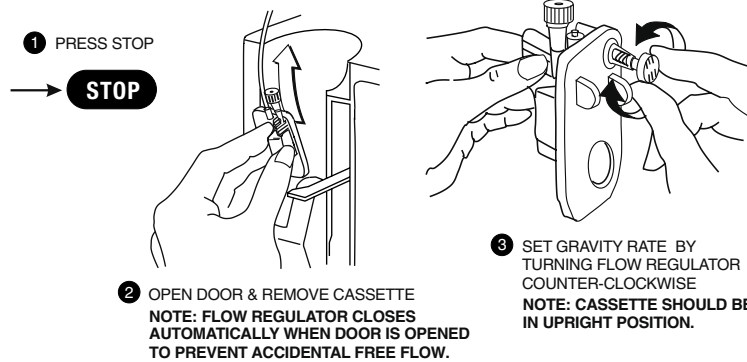
NOTE: IF DOOR OPEN ALARM OCCURS, TURN PUMP OFF.

3.6 Discontinuing Fluid Administration

1 PRESS STOP

STOP

3 CLOSE DOOR

2 OPEN DOOR, REMOVE CASSETTE

4 DISCARD SET AND FLUID CONTAINER PER HOSPITAL PROCEDURE
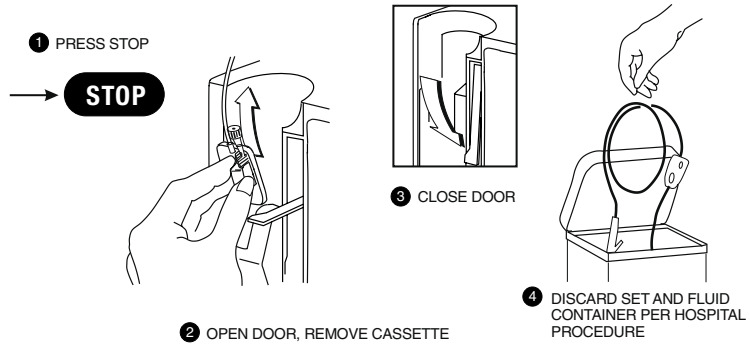
4) Basic Operation

4.1 Getting Started

UNPACKING

CAUTION: PRODUCT DAMAGE MAY OCCUR UNLESS PROPER CARE IS EXERCISED DURING UNPACKING AND INSTALLATION. DO NOT USE THE PLUM A+ IF IT APPEARS DAMAGED IN ANY WAY. THE BATTERY MAY NOT BE CHARGED UPON RECEIPT.

Inspect the Plum A+ packaging for possible shipping damage. If damage is found, contact the delivery company immediately.

Use care when unpacking the pump. Retain the packing slip and save all packing material in case the pump is damaged or fails the pump self-test and has to be returned to Hospira.

Inspect thoroughly for damage.

CAUTION: IF THE PLUM A+ APPEARS TO BE DAMAGED, CONTACT HOSPIRA.

To set up, connect the AC (mains) cord to a properly grounded receptacle, unless temporary battery operation is desired.

NOTE: Use AC (mains) power whenever possible. Store the pump connected to AC (mains) to confirm a fully charged battery for emergencies.

NOTE: If the quality of the earth grounding source is in doubt, use battery power.

CAUTION: THE PLUM A+ SYSTEM IS DESIGNED TO OPERATE NORMALLY IN THE PRESENCE OF MOST ENCOUNTERED ELECTROMAGNETIC INTERFERENCE (EMI) CONDITIONS. IN THE EVENT OF EXTREME LEVELS OF

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INTERFERENCE, SUCH AS ENCOUNTERED NEXT TO AN ELECTROSURGICAL GENERATOR, CELLULAR TELEPHONES, OR 2-WAY RADIOS, IT IS POSSIBLE THAT THE NORMAL OPERATION OF A SENSOR OR MICROCOMPUTER MIGHT BE DISRUPTED. OPERATION OF THE PUMP UNDER THESE CONDITIONS SHOULD BE AVOIDED.

TANDEM CARRIER INSTRUCTIONS

NOTE: The Plum A+3 is NOT to be used with the tandem carrier. It is only to be used with the Plum A+ and other single-channel devices.

The Plum A+ may be safely and conveniently mounted on an IV stand or on a tandem carrier mounted on an IV stand.
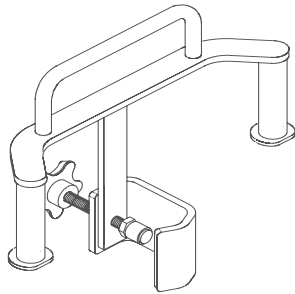
Always mount the tandem carrier (List# 12270-01) to the pole before attaching the pump(s) to the tandem carrier.

Make sure tandem carrier clamp is attached firmly to pole.

Make sure pumps are firmly attached to tandem carrier.

This section details the Plum A+ instrument setup procedures.

SYSTEM SELF-TESTS

The pump performs a suite of System Self-Tests when power is applied to confirm readiness for use.

Failure during the Self-Tests is reported as a Malfunction Condition.

CAUTION: DO NOT PLACE THE PLUM A+ IN SERVICE IF IT FAILS THE SYSTEM SELF-TESTS.

Connect the AC power (mains) cord to an AC power receptacle, then confirm that the Charging/Line indicator illuminates (above the [ON/OFF] key on the front panel).

A systematic self-testing of the processing, delivery, and safety systems is performed whenever the Plum A+ is turned on, to verify readiness for operation.

> **NOTE:** If the quality of earth grounding source is in doubt, use battery power.

Press the [ON/OFF] key to turn the power on. Check screen display and listen for a beep to indicate the audio is working. Wait for the self-tests to complete. If successful, put a fully primed macro cassette into the cassette door and close the door. See *Loading Cassette* in *Section 3* for details of correct procedure.

When the Charging/Line indicator is off and the battery symbol on the display is flashing, this indicates that the Plum A+ is operating on low battery power and should be recharged.

> **CAUTION:** DO NOT OPERATE THE PLUM A+ ON PATIENTS WITH THE BATTERY REMOVED. USE OF A PROPERLY MAINTAINED AND CHARGED BATTERY HELPS CONFIRM PROPER OPERATION.

To confirm battery is fully charged, connect the Plum A+ to AC (mains) power for a minimum of six hours while in the OFF mode.

If an alarm occurs during the power on self-test, identify the alarm message, then take corrective action (see *Section 7, Alarms and Troubleshooting*).

Turn pump OFF, then back ON. If the self-test alarm recurs, remove the pump from service and contact the local Hospira representative.

The pump performs a suite of System Self-Tests when power is applied to confirm readiness for use.

Failure during the Self-Tests is reported as a Malfunction Condition.

DATA RETENTION

Delivery program settings and programming option selections are retained in non-volatile memory. If the Plum A+ has been turned off for longer than four hours, all delivery settings are cleared and programming option selections are restored to their default selections for next use.

4.2   Power On

1)   **Press (ON/OFF) to turn on the Plum A+ and you will see the System Self-Tests screen.**

> ```
> ABBOTT Plum A+
>
>
> Release X.XX
> Copyright Abbott Laboratories
> 2002
>
> System Self Test
> In Progress
>
>                          ▯▯▯▯
>
>
>   ▲      ▲      ▲      ▲
> ```

CAUTION: THE PUMP MUST BE INITIALLY STARTED ON AC POWER, OTHERWISE THE DATAPORT MAY NOT OPERATE PROPERLY.

> **SCREENS SHOWN IN THIS MANUAL ARE EXAMPLES ONLY AND DON'T NECESSARILY REFLECT CURRENT CLINICAL PRACTICE**

After self-testing successfully completes, the display will proceed to the next screen.

Programming the pump may begin during the cassette check phase of the start-up testing.

NOTE: If battery is missing or defective, a "Battery not installed" message with a "Continue without battery" prompt will appear (AC power only).
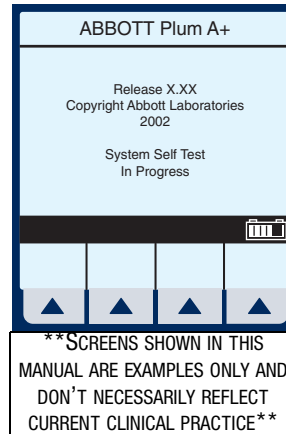
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2) To set up the Plum A+, insert selected Plum Set and close cassette holder door lever.

NOTE: If cassette is already inserted, this screen is skipped.

SETUP
Insert PLUM Set Close Lever
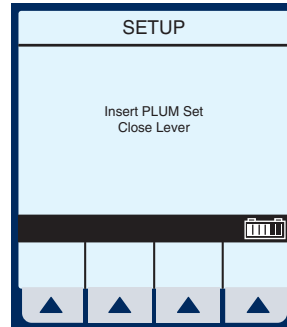
Example of Clear Settings Screen

3) The on-screen message "Clear Settings?" may appear. Select ▲ *[Yes]* to clear all settings.
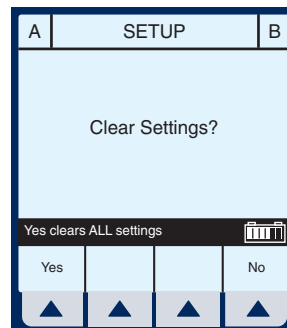
Clear ALL settings when changing patients or multiple programming parameters.

A	SETUP	B
	Clear Settings?	
Yes clears ALL settings		
Yes		No

NOTE: This clears all delivery parameters, such as Rate and VTBI on both lines, as well as setting items, such as the KVO and Nurse Callback options, to their default values.

NOTE: If no settings currently exist or all settings are zero, this screen will be bypassed.

4.3   Simple Delivery

Example of Main Delivery Screen (with cleared settings).

A	STOPPED	STOPPED	B
	0.0	Rate mL/hr	0.0
	0.0	Vol Inf mL	0.0
Back Prime	A	B	Options/ Vol Inf

SCREENS SHOWN IN THIS MANUAL ARE EXAMPLES ONLY AND DON'T NECESSARILY REFLECT CURRENT CLINICAL PRACTICE

NOTE: For clarity, whole number font sizes will appear larger than partial number font sizes (numbers on the right-side of the decimal).

1)   To Program a delivery rate, select ▲ *[A]*.

2)   To enter delivery rate, use numeric keypad.

3)   Use ▼ key to move down to the VTBI field.

A	PROGRAM
Rate	**0.0** mL/hr
VTBI	0.0 mL
Duration	00:00 hr : min
Enter Value using keypad	
Program Options		Therapy	Cancel/ Back

4) To enter VTBI amount, use keypad.

NOTE: While the VTBI is being entered, the duration is automatically computed. If the computed value is greater than 99:59, dashes (- -) appear in place of hours.

```
┌─────────────────────────┐
│ A │    PROGRAM          │
├─────────────────────────┤
│                         │
│  Rate        5.5  mL/hr │
│                         │
│  VTBI        0.0  mL    │
│                         │
│  Duration  00:00  hr:min│
│                         │
├─────────────────────────┤
│ Enter Value using keypad │
│ Program  │       │Cancel/│
│ Options  │Therapy│ Back  │
│   ▲   │  ▲  │  ▲  │  ▲   │
└─────────────────────────┘
```
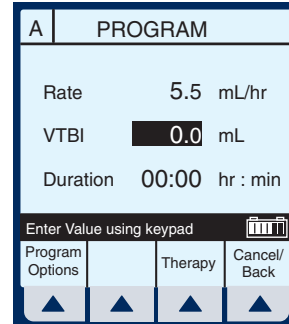
5) Use ▼ key to move down to the DURATION field.

6) Use keypad to change the hours part of duration if desired.

NOTE: When all parameters are displayed, changing any one parameter will result in other parameters automatically being computed. To understand the Automatic Calculation feature, *see Section 6.8 Examples of Automatic Calculation.*

```
┌─────────────────────────┐
│ A │    PROGRAM          │
├─────────────────────────┤
│                         │
│  Rate        5.5  mL/hr │
│                         │
│  VTBI        0.5  mL    │
│                         │
│  Duration  00:05  hr:min│
│                         │
├─────────────────────────┤
│ Enter Value using keypad │
│ Program  │       │Cancel/│
│ Options  │Therapy│ Back  │
│   ▲   │  ▲  │  ▲  │  ▲   │
└─────────────────────────┘
```
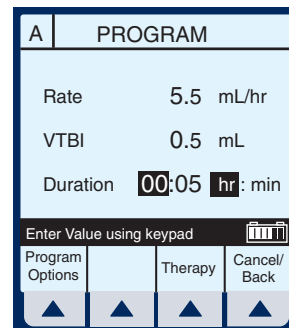
7) Use ▼ to change from hours to minutes.

NOTE: The maximum hours allowed is 99 and the maximum minutes is 59.

8) Use keypad to change minutes.

CAUTION: VERIFY **RATE, VTBI,** AND **DURATION** BEFORE PRESSING **[START].**

9) **Press (START) to begin infusion.**

Example of Main Delivery Screen just after being programmed and started.

NOTE: The Line A Fluid Flow Indicator also will flash to indicate pumping.

A	PUMPING	STOPPED	B

5.5	Rate mL/hr	0.0
0.1	Vol Inf mL	0.0

	A	B	Options/ Vol Inf
▲	▲	▲	▲

4.4   Titration

1)   Select Line ▲ *[A]* (or ▲ *[B]*) at the Main Delivery Screen.

A	PUMPING	PUMPING	B

25.0	Rate mL/hr	50.0
41.0	Vol Inf mL	20.0

	A	B	Options/ Vol Inf
▲	▲	▲	▲
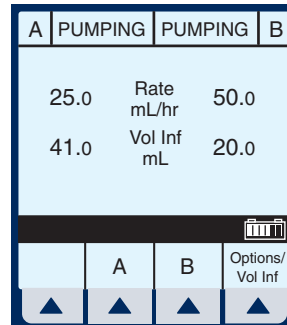
2)   Enter the desired Rate using the keypad.

NOTE: When Rate is changed, the duration is automatically recomputed using the current VTBI. To understand the Automatic Calculation feature, *see Section 6.8 Examples of Automatic Calculation.*

A	PROGRAM

Rate	15.0	mL/hr
VTBI	50.0	mL
Duration	03:20	hr : min

Enter Value using keypad

Program Options		Therapy	Cancel/ Back
▲	▲	▲	▲
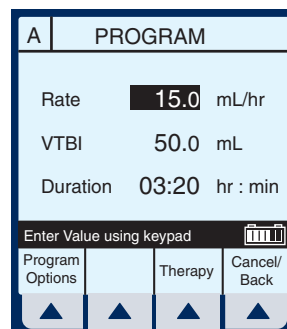
CAUTION: VERIFY RATE, VTBI, AND DURATION BEFORE PRESSING [START].

3)   After any change,

press (START) to initiate new Rate and return to the Main Delivery Screen.

NOTE: Volume Infused is an incrementing value which is cleared in ▲ *[Options/Vol Inf]*.

A	PUMPING	PUMPING	B

15.0	Rate mL/hr	50.0
41.6	Vol Inf mL	20.0

	A	B	Options/ Vol Inf
▲	▲	▲	▲
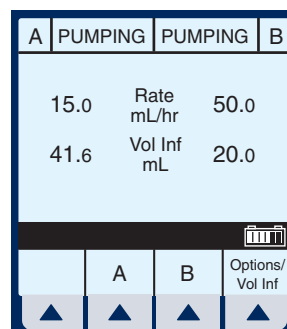
The following 3 screens are examples of changed values.

Example of changed rate.

4) **From the Main Delivery Screen, select ▲ [A].**

5) **Use keypad to change the RATE value.**

A	PROGRAM
Rate	**15.0** mL/hr
VTBI	50.0 mL
Duration	03:20 hr : min

Enter Value using keypad

Program Options		Therapy	Cancel/ Back
▲	▲	▲	▲

NOTE: The display time is only accurate to ± one minute. As shown in this example, the delivery shows 3 hours and 20 minutes (not 3 minutes and 20 seconds).

NOTE: [START] accepts the change. Delivery is changed to the new RATE and DURATION and display returns to Main Delivery Screen.

Example of Changed VTBI value.

6) **Use ▼ key to highlight the VTBI field.**

7) **Use the keypad to change the VTBI value.**

A	PROGRAM
Rate	15.0 mL/hr
VTBI	**100** mL
Duration	06:40 hr : min

Enter Value using keypad

Program Options		Therapy	Cancel/ Back
▲	▲	▲	▲

NOTE: When the VTBI is changed, the Duration is recomputed with respect to the current Rate. To understand the Automatic Calculation feature, *see Section 6.8 Examples of Automatic Calculation.*

NOTE: [START] accepts the change. Delivery is changed to the new VTBI and DURATION and display returns to Main Delivery Screen.

Example of changed DURATION field.

```
┌─────────────────────────┐
│ A │      PROGRAM        │
│                         │
│  Rate        15.0  mL/hr│
│  VTBI         100  mL   │
│  Duration  00:40  hr : min│
│                         │
│ Enter Value using keypad ▦│
│ Program        Therapy Cancel/│
│ Options                Back │
│   ▲      ▲      ▲      ▲ │
└─────────────────────────┘
```

8) **Use ▼ to highlight the Duration field, then use the keypad to change it's value.**
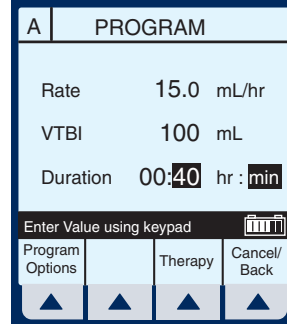
NOTE: When DURATION is changed, RATE is automatically recomputed using the current VTBI value. To understand the Automatic Calculation feature, *see Section 6.8 Examples of Automatic Calculation.*

NOTE: [START] accepts the change. Delivery is changed to the new DURATION and RATE and display returns to Main Delivery Screen.

CAUTION: VERIFY **RATE, VTBI, AND DURATION** BEFORE PRESSING **[START].**

4.5   Piggyback Delivery

PIGGYBACK DELIVERY- Infusion will stop Line A and infuse Line B until VTBI completes. Line A will automatically restart.

```
┌─────────────────────────┐
│ A │PUMPING│STOPPED│ B   │
│                         │
│   5.5     Rate    5.0   │
│          mL/hr          │
│  20.0    Vol Inf  0.0   │
│            mL           │
│                      ▦  │
│        A      B   Options/│
│                   Vol Inf│
│   ▲      ▲      ▲      ▲ │
└─────────────────────────┘
```

1) **With Line A pumping, to program a Piggyback delivery, select ▲ *[B]*.**
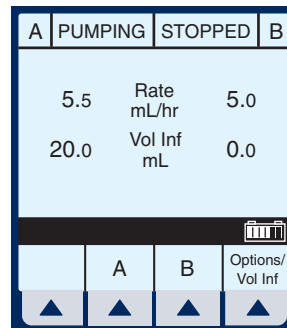
The Delivery Mode field is highlighted.

NOTE: If an entry was previously programmed, RATE is highlighted. If no previous entries, MODE is highlighted.

2)   **If field reads "Concurrent", select ▲ *[Change Mode]* to switch to "Piggyback".**

```
┌─────────────────────────┐
│   PROGRAM          │ B  │
├─────────────────────────┤
│  Mode    Piggyback      │
│  Rate           0.0 mL/hr│
│  VTBI           0.0 mL  │
│  Duration    00:00 hr:min│
├─────────────────────────┤
│ Change using Change Mode │
│ Program Change Therapy Cancel/│
│ Options  Mode          Back │
│   ▲      ▲     ▲      ▲  │
└─────────────────────────┘
```

3)   **Select ▼ to highlight the RATE field.**

4)   **To enter delivery rate, use numeric keypad.**

5)   **Use ▼ key to move down to the VTBI field.**

```
┌─────────────────────────┐
│   PROGRAM          │ B  │
├─────────────────────────┤
│  Mode    Piggyback      │
│  Rate           200 mL/hr│
│  VTBI           0.0 mL  │
│  Duration    00:00 hr:min│
├─────────────────────────┤
│ Enter value using keypad │
│ Program        Therapy Cancel/│
│ Options                Back │
│   ▲      ▲     ▲      ▲  │
└─────────────────────────┘
```

6)   **To enter VTBI amount, use keypad.**

NOTE: While the VTBI is being entered, the duration is automatically computed. If the computed value is greater than 99:59, dashes (- -) appear in place of hours. To understand the Automatic Calculation feature, *see Section 6.8 Examples of Automatic Calculation.*

```
┌─────────────────────────┐
│   PROGRAM          │ B  │
├─────────────────────────┤
│  Mode    Piggyback      │
│  Rate           200 mL/hr│
│  VTBI           100 mL  │
│  Duration    00:30 hr:min│
├─────────────────────────┤
│ Enter value using keypad │
│ Program        Therapy Cancel/│
│ Options                Back │
│   ▲      ▲     ▲      ▲  │
└─────────────────────────┘
```

7) Use ▼ key to move down to the DURATION field.

(Optional) Use keypad to change duration.

When all parameters are displayed, changing any one parameter will result in other parameters automatically being computed.

CAUTION: VERIFY RATE, VTBI, AND DURATION BEFORE PRESSING [START].

PROGRAM	B

Mode	Piggyback	
Rate	133	mL/hr
VTBI	100	mL
Duration	00:45	hr : min

Enter value using keypad

| Program Options | | Therapy | Cancel/ Back |
| ▲ | ▲ | ▲ | ▲ |
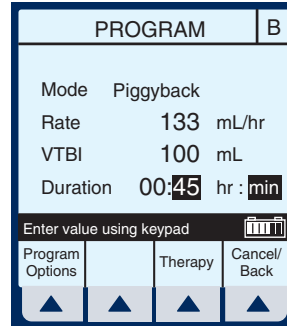
8) Press (START) to begin infusion.

NOTE: If Line A has a Delay Start remaining, a message will appear warning of a possible non-delivery *(see section 6.4)*.

9) Select ▲ *[Yes]* to continue.

Example of Main Delivery Screen just after being programmed and started.

A	DELAYED	PUMPING	B

	Rate mL/hr	
5.5		133
20.0	Vol Inf mL	0.1

| | A | B | Options/ Vol Inf |
| ▲ | ▲ | ▲ | ▲ |
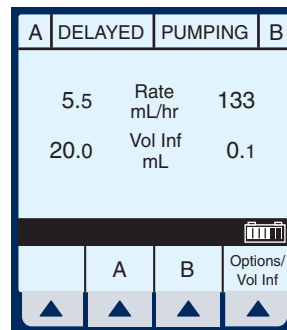
4.6   Concurrent Delivery

***CONCURRENT DELIVERY-
Simultaneous delivery of two
fluids at independent flow rates.***

CAUTION: CONSULT DRUG
LABELING TO CONFIRM DRUG
COMPATIBILITY, CONCENTRATION,
DELIVERY RATES, AND VOLUME ARE
ALL SUITABLE FOR CONCURRENT AND
PIGGYBACK DELIVERY MODES. *SEE
SECTION 8 FOR INFORMATION ON
CONCURRENT FLOW, SEE SECTION 9
FOR DELIVERY RATE RANGES.*

A	PUMPING	STOPPED	B
5.5	Rate mL/hr		0.0
0.1	Vol Inf mL		0.0
	A	B	Options/ Vol Inf

NOTE: In concurrent mode with certain alarm conditions, one
line may stop while the other line may continue to deliver.

**1)   With pumping started on line A, to program a
Concurrent delivery rate, select ▲ *[B]*.**

***The Delivery Mode field is
highlighted.***

NOTE: If an entry was previously
programmed, RATE is highlighted.
If no previous entries, MODE is
highlighted.

***If field reads "Piggyback",
select ▲ [Change Mode] to
switch to "Concurrent".***

PROGRAM	B
Mode	Piggyback
Rate	0.0 mL/hr
VTBI	0.0 mL
Duration	00:00 hr : min

Change using Change Mode

Program Options	Change Mode	Therapy	Cancel/ Back

Verify change to "Concurrent" mode.

```
┌─────────────────────────┐
│     PROGRAM        │ B  │
├─────────────────────────┤
│                         │
│  Mode  [Concurrent]     │
│  Rate          0.0  mL/hr│
│  VTBI          0.0  mL   │
│  Duration    00:00  hr : min│
│ Change using Change Mode ▥│
│ Program│Change│Therapy│Cancel/│
│ Options│ Mode │       │ Back  │
│   ▲   │  ▲   │  ▲   │  ▲    │
└─────────────────────────┘
```

2) **Use ▼ to highlight Rate field.**
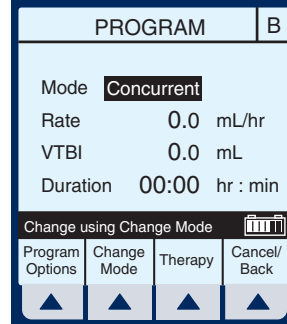
3) **To enter delivery rate, use numeric keypad.**

> **NOTE:** When Rate for Line A plus Rate for Line B is greater than valid rate ranges, a "Concurrency violation" message will explain why second line did not start. *See Section 9.3 for valid delivery rate ranges.*

```
┌─────────────────────────┐
│     PROGRAM        │ B  │
├─────────────────────────┤
│                         │
│  Mode  Concurrent       │
│  Rate        [10.0] mL/hr│
│  VTBI          0.0  mL   │
│  Duration    00:00  hr : min│
│ Enter value using keypad ▥│
│ Program│      │Therapy│Cancel/│
│ Options│      │       │ Back  │
│   ▲   │  ▲   │  ▲   │  ▲    │
└─────────────────────────┘
```
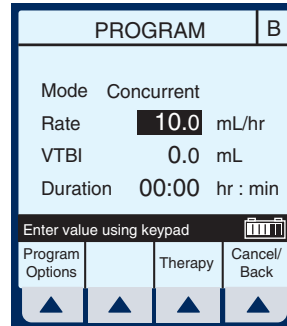
> **NOTE:** "Concurrency violation" may not be displayed if unit is displaying "VTBI Complete". The device will not start and an invalid keypress sound will occur when START is pressed.

4) **Use ▼ key to move down to the VTBI field.**

5) **To enter VTBI amount, use keypad.**

> **NOTE:** While the VTBI is being entered, the duration is automatically computed. While the computed value is greater than 99:59, dashes (- -) appear in place of hours. To understand the

```
┌─────────────────────────┐
│     PROGRAM        │ B  │
├─────────────────────────┤
│                         │
│  Mode  Concurrent       │
│  Rate         10.0  mL/hr│
│  VTBI          100  mL   │
│  Duration   [10]:00 [hr]: min│
│ Enter value using keypad ▥│
│ Program│      │Therapy│Cancel/│
│ Options│      │       │ Back  │
│   ▲   │  ▲   │  ▲   │  ▲    │
└─────────────────────────┘
```
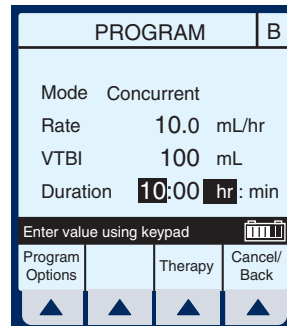
Automatic Calculation feature, *see Section 6.8 Examples of Automatic Calculation.*

6) **Use ▼ key to move down to the DURATION field.**

(Optional) Enter values for desired hours and minutes.

NOTE: When Duration is entered, Rate is automatically computed.

CAUTION: **V**ERIFY **RATE, VTBI,** AND **DURATION** BEFORE PRESSING **[START].**

7) **Press (START) to begin infusion and return to the Main Delivery screen.**

Example of a concurrent delivery.

A	PUMPING	PUMPING	B
5.5	Rate mL/hr	10.0	
20.4	Vol Inf mL	1.0	

	A	B	Options/ Vol Inf
▲	▲	▲	▲

4.7 Stop and Start with only 1 Line Pumping

1) **Press (STOP) at the Main Delivery Screen.**

    NOTE: If ▲ *[A]* (or ▲ *[B]*) is selected prior to [STOP], the line is stopped, the display will show the programming screen. Select ▲ *[Cancel/Back]* to return to the Main Delivery screen.

A	PUMPING	STOPPED	B
100	Rate mL/hr	0.0	
8.5	Vol Inf mL	0.0	

| Back Prime ▲ | A ▲ | B ▲ | Options/ Vol Inf ▲ |

Example of STOPPED delivery.

2) **To discontinue infusion, press (ON/OFF).**

3) **Clamp secondary tubing if connected.**

A	STOPPED	STOPPED	B
100	Rate mL/hr	0.0	
8.5	Vol Inf mL	0.0	

| Back Prime ▲ | A ▲ | B ▲ | Options/ Vol Inf ▲ |

4) **Open door, remove set and close door. Or, press (START) to resume infusion.**

4.8 Stop and Start with Both Lines pumping

1) **Press (STOP) at the Main Delivery Screen.**

A	PUMPING	PUMPING	B

25.0	Rate mL/hr	50.0
3.0	Vol Inf mL	20.4

	A	B	Options/ Vol Inf

2) **Select ▲ *[Stop A]*, ▲ *[Stop B]*, or ▲ *[Stop All]*.**

NOTE: If ▲ *[A]* (or ▲ *[B]*) is selected prior to [STOP], the display will show the programming screen. Select ▲ *[Cancel/Back]* to return to the Main Delivery screen.

A	PUMPING	PUMPING	B

25.0	Rate mL/hr	50.0
3.0	Vol Inf mL	20.4

Choose line(s) to stop:

Stop All	Stop A	Stop B	Cancel

Example of stopped infusion.

NOTE: This is an example using ▲ *[Stop All]*.

A	STOPPED	STOPPED	B
25.0	Rate mL/hr	50.0	
3.0	Vol Inf mL	20.4	

Back Prime	A	B	Options/ Vol Inf
▲	▲	▲	▲

CAUTION: VERIFY **RATE, VTBI,** AND **DURATION** BEFORE PRESSING **[START].**

3) To resume infusion, press (START).

4) Select ▲ *[Start A]*, ▲ *[Start B]*, or ▲ *[Start All]*. Or, to discontinue infusion, press (ON/OFF).

A	STOPPED	STOPPED	B
25.0	Rate mL/hr	50.0	
3.0	Vol Inf mL	20.4	

Choose line(s) to start:

Start All	Start A	Start B	Cancel
▲	▲	▲	▲

5) Clamp secondary tubing if connected.

6) Open door, remove set and close door.

4.9   Backpriming

B*ACKPRIMING- Removal of air or fluid from the proximal line and cassette airtrap.*

A	STOPPED	STOPPED	B
	5.5	Rate mL/hr	0.0
	8.9	Vol Inf mL	0.0

| Back Prime | A | B | Options/ Vol Inf |
| ▲ | ▲ | ▲ | ▲ |

1)   To initiate a backprime, select ▲ *[Back Prime]*.

NOTE: Backpriming is available only when all delivery is stopped. Secondary container is necessary to receive the air.

A	BACKPRIMING		B
	5.5	Rate mL/hr	0.0
	8.9	Vol Inf mL	0.0

Release Backprime to Stop

| Back Prime | A | B | Options/ Vol Inf |
| ▲ | ▲ | ▲ | ▲ |

2)   Select and hold ▲ *[Back Prime]* until fluid pumped from line A to line B has expelled the air from cassette air trap into Secondary container.

NOTE: Fluid flow is at maximum rate possible.

3)   Upon release of ▲ *[Back Prime]*, the cassette test is performed to confirm readiness for pumping. Pressing (START) will resume programmed delivery.

4.10   Clearing Program Settings

---

1)   Press (STOP) at the Main Delivery Screen.

Clear ALL settings when changing patients or multiple programming parameters.

Use ▲ [Clear Program] when changing ONLY Line A or B.

A	PUMPING	STOPPED	B
5.5	Rate mL/hr	0.0	
0.1	Vol Inf mL	0.0	

| | A | B | Options/ Vol Inf |
| ▲ | ▲ | ▲ | ▲ |
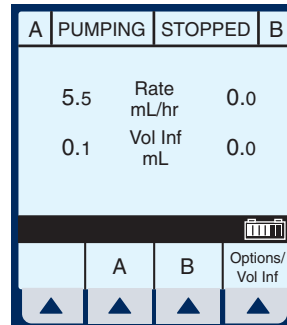
2)   Select Line A (or B if active) from the stopped Main Delivery Screen.

3)   Select ▲ [Clear Program].

NOTE: If Line A or B is programmed with a Therapy (i.e., Dose Calculation), Rate, VTBI and Duration will not display values. The values to be cleared may be viewed in applicable programming screen under ▲ [Therapy].

A	PROGRAM
Rate	5.5 mL/hr
VTBI	22.0 mL
Duration	03:20 hr : min

Enter Value using keypad

| Program Options | Clear Program | Therapy | Cancel/ Back |
| ▲ | ▲ | ▲ | ▲ |

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4)   Select ▲ *[Yes].*

      **Clear ALL settings when
      changing patients or
      multiple programming
      parameters.**

      Use ▲ *[Clear Program]*
      **when changing ONLY Line
      A or B.**

      **Example screen of
      "Cleared Program".**

5)   Select ▲ *[Cancel/Back]* **to
      return to the Main
      Delivery screen or
      program new settings.**

A	PROGRAM
	Clear Line A Settings?
Yes	No
▲ ▲ ▲ ▲	

A	PROGRAM
Rate	0.0 mL/hr
VTBI	0.0 mL
Duration	00:00 hr : min
Enter Value using keypad	
Program Options	Therapy	Cancel/ Back
▲ ▲ ▲ ▲	
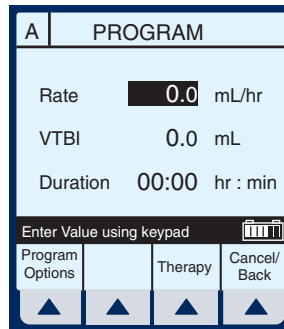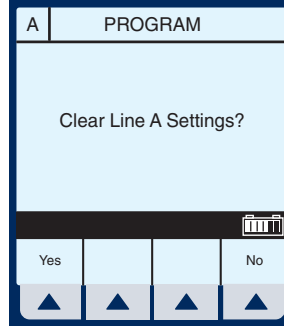
5) **Therapies** *(*For Advanced Users)*

* Advanced Users are those who have received additional training on programming and use of functions.

Dose Calculation	*Allows programming Dose Rates in alternative units of measure. Dose Calculation can be used in Simple Delivery, Loading Dose, and Multistep.*
Loading Dose	*Allows programming of an initial infusion rate for a specific volume, followed automatically by a maintenance rate from the same container (e.g., a fluid challenge). If Dose Calc is used, the Loading Dose and Maintenance Dose are in the same unit of measure, over the same period of time (mcg/min), from the same container.*
Multistep	*Allows a sequential program to deliver up to 10 steps; fluid volumes and delivery rates may be programmed for each step. The program may be entered based on Rate and Volume or Volume and Time. If Dose Calc is used, the delivery steps are in the same unit of measure, over the same period of time, from the same container.*

NOTE: During Therapy programming, user must identify desired drug with softkey drug list (or barcode wand) prior to setting program parameters.

Use drug manufacturer recommendations for IV administration when using the Plum A+ infusion pump.

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5.1   Dose Calc (mcg/kg/min on A)

DOSE CALCULATION- Allows programming Dose Rates in alternative units of measure. Dose Calculation can be used in Simple Delivery, Loading Dose, and Multistep.

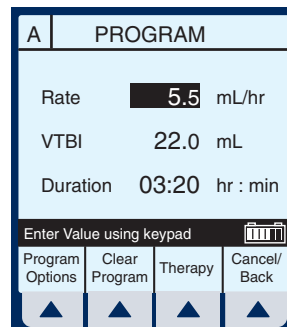*Clear ALL settings when changing patients or multiple programming parameters.*

Use ▲ [Clear Program] when changing ONLY Line A or B.

1)   **Select ▲ *[A]* at the Main Delivery Screen.**

| **SCREENS SHOWN IN THIS MANUAL ARE EXAMPLES ONLY AND DON'T NECESSARILY REFLECT CURRENT CLINICAL PRACTICE** |

A	STOPPED	STOPPED	B
0.0	Rate mL/hr		0.0
0.0	Vol Inf mL		0.0

| Back Prime | A | B | Options/ Vol Inf |

The Line A Programming screen appears.

2)   **Select ▲ *[Therapy]* for Dose Calculation programming.**

A	PROGRAM
Rate	0.0 mL/hr
VTBI	0.0 mL
Duration	00:00 hr : min

Enter Value using keypad

| Program Options | | Therapy | Cancel/ Back |

The Drug List Screen appears, in mainly alphabetical order.

NOTE: Default entry is "No Drug Selected". This selection may be used later to remove an incorrect or unwanted drug name from the display.

A	Program Drug List
	No Drug Selected
	Abciximab
	Acyclovir
	Albumin
	Aldesleukin
	Alfentanil
	Alteplase (rt-PA)
	Amikacin

Select, then Enter

Page Up	Page Down	Enter	Cancel/ Back
▲	▲	▲	▲

3) Use (SELECT) **to highlight desired drug name.**

When list does not contain desired generic drug name or group name select ▲ *[Page Down]* **(or** ▲ *[Page Up]*) ***until it shows, then***

use (SELECT) ***to highlight choice.***

A	Program Drug List
	Dexmedetomidine HCl
	Diltiazem
	Dobutamine
	Docetaxel
	Dopamine
	Doxorubicin
	Epinephrine
	Epoprostenol

Select, then Enter

Page Up	Page Down	Enter	Cancel/ Back
▲	▲	▲	▲
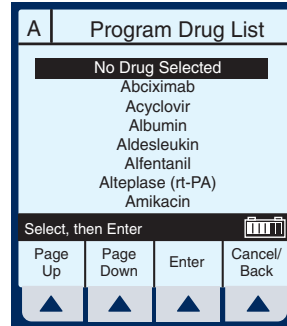
4) **Select** ▲ *[Enter]* **to indicate selection and advance to the Therapy selection screen.**

The Select Therapy screen for Line A appears.
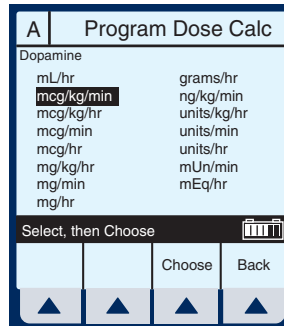
5) **Select** ▲ *[Choose]* **to select Dose Calculation and continue.**
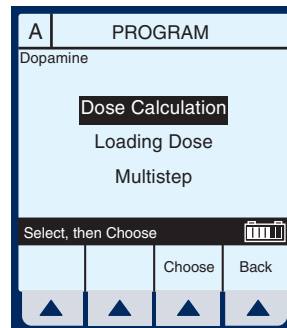
A	PROGRAM
Dopamine	
	Dose Calculation
	Loading Dose
	Multistep

Select, then Choose

		Choose	Back
▲	▲	▲	▲

***The Program Dose Calc
screen appears.***

NOTE: Cursor defaults to package
insert recommended dose units
associated with the selected drug.

A	Program Dose Calc
Dopamine	

mL/hr	grams/hr
mcg/kg/min	ng/kg/min
mcg/kg/hr	units/kg/hr
mcg/min	units/min
mcg/hr	units/hr
mg/kg/hr	mUn/min
mg/min	mEq/hr
mg/hr	

Select, then Choose

		Choose	Back
▲	▲	▲	▲
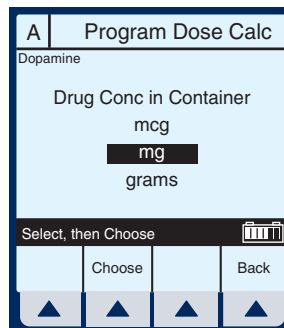
6)   Select ▲ *[Choose]* **to
continue. Or, use ⊕SELECT to
change the units to use in
the delivery.**

NOTE: Previously selected Drug Names and Delayed Start
entries will be cleared if entered prior to Therapy selection.

***The Container
Concentration Selection
screen appears whenever
the selected Dose Units
are gram-based (e.g.,
grams, mg, mcg, or ng)
otherwise this screen is
skipped.***

A	Program Dose Calc
Dopamine	

Drug Conc in Container
mcg
mg
grams

Select, then Choose

	Choose		Back
▲	▲	▲	▲

NOTE: Cursor defaults to package
insert recommended concentration
units associated with the selected
drug.

7)   Select ▲ *[Choose]* **to continue. Or, use ⊕SELECT to
change the Container Concentration units to
use in the delivery.**

WARNING

FOR PLUM A+3 USERS, BE AWARE THAT CHANGING WEIGHT ON ONE DEVICE DOES NOT CHANGE THE WEIGHT ON THE OTHER TWO DEVICES. PATIENT WEIGHT MUST BE CHANGED ON EACH DEVICE WHEN DELIVERING WEIGHT-BASED THERAPY DEPENDANT ON MEDICATION REQUIREMENTS.

The next page of the Program Dose Calc screen appears to provide for entry of delivery program parameters.

A	Program Dose Calc

Dopamine
Conc   400 mg   250 mL
Weight   **70.0** kg

Dose   0.000   mcg/kg/min
VTBI   0.0   mL
Duration   00: 00   hr : min
Rate   0.0   mL/hr

Enter value using keypad

Program Options   Cancel/ Back
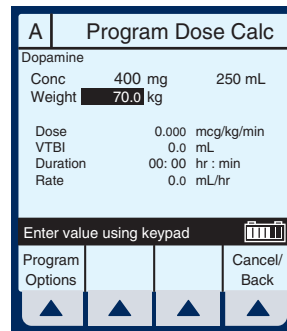
8)   **Use keypad to enter desired values. Once each value is entered, use ▼ to highlight the next programming field.**

NOTE: The Concentration elements and weight value must be entered before the [SELECT] key allows access to remaining fields.

9)   **Continue to enter values using the keypad, and advancing to the next field using ▼ .**

A	Program Dose Calc

Dopamine
Conc   400 mg   250 mL
Weight   70.0 kg

Dose   **10.0**   mcg/kg/min
VTBI   0.0   mL
Duration   00: 00   hr : min
Rate   26.3   mL/hr

Enter value using keypad

Program Options   Cancel/ Back
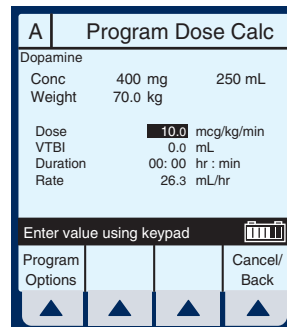
NOTE: As the Dose value is entered, the Rate is automatically calculated. To understand the Automatic Calculation feature, *see Section 6.8 Examples of Automatic Calculation.*

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10) **Use ▼ to scroll down to the VTBI field.**

11) **Enter a value for VTBI using the keypad.**

> **NOTE:** As the VTBI value is entered or changes, Duration is automatically updated.

A	Program Dose Calc

Dopamine

Conc	400 mg	250 mL
Weight	70.0 kg	

Dose	10.0	mcg/kg/min
VTBI	250	mL
Duration	09: 30	hr : min
Rate	26.3	mL/hr

Enter value using keypad

Program Options			Cancel/ Back
▲	▲	▲	▲

> **NOTE:** At this point, programming is complete unless ▲ [Program Options] are desired. *See Section 6, Additional Features, for more information.*
>
> **CAUTION:** VERIFY **DOSE, RATE, VTBI,** AND **DURATION** BEFORE PRESSING **[START].**

12) **After entering the desired VTBI value and any desired ▲ *[Program Options]*, press (START).**

> ***This will bring up the PROGRAM CONFIRMATION screen which appears for all units of measure except mL/hr.***

A	Program Dose Calc

Delivery will be:

Dose	10.0 mcg/kg/min	
Drug	Dopamine	
Conc	400 mg	250 mL
Weight	70.0 kg	

Confirm Program?

Yes			No
▲	▲	▲	▲

13) **If Dose, Drug, Conc., & Weight appear correct, select ▲ *[Yes]* to begin program.**

> **NOTE:** The Concentration drug amount or Diluent volume cannot be changed while a delivery is in progress.

***The Main Delivery screen
appears displaying the
information just entered.***

NOTE: The Therapy Type and
Drug are displayed as well as the
Dose Rate and Dose Units.

A	PUMPING	STOPPED	B

Dopamine
Dose Calculation

| 26.3 | Rate
mL/hr | 0.0 |
| 0.0 | Vol Inf
mL | 0.0 |

10.0
mcg/kg/min

| | A | B | Options/
Vol Inf |
| ▲ | ▲ | ▲ | ▲ |

5.2   Dose Calc (mg/min on B)

DOSE CALCULATION- Allows programming Dose Rates in alternative units of measure. Dose Calculation can be used in Simple Delivery, Loading Dose, and Multistep.

Clear ALL settings when changing patients or multiple programming parameters.

Use ▲ [Clear Program] when changing ONLY Line A or B.

1)   **Select ▲ [B] at the Main Delivery Screen.**

A	PUMPING	STOPPED	B

Dopamine
Dose Calculation

26.3	Rate mL/hr	0.0
0.0	Vol Inf mL	0.0

10.0
mcg/kg/min

	A	B	Options/ Vol Inf
▲	▲	▲	▲

The Line B Programming screen appears.

2)   **Select ▲ [Therapy].**

PROGRAM	B

Mode	Piggyback	
Rate	0.0	mL/hr
VTBI	0.0	mL
Duration	00:00	hr : min

Change using Change Mode

Program Options	Change Mode	Therapy	Cancel/ Back
▲	▲	▲	▲

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The Drug List Screen appears, in mainly alphabetical order.

NOTE: Default entry is "No Drug Selected". This selection may be used later to remove an incorrect or unwanted drug name from the display.

Program Drug List	B
No Drug Selected	
Abciximab	
Acyclovir	
Albumin	
Aldesleukin	
Alfentanil	
Alteplase (rt-PA)	
Amikacin	

Select, then Enter

Page Up	Page Down	Enter	Cancel/ Back
▲	▲	▲	▲

3) Use (SELECT) **to highlight desired drug name.**

When list does not contain desired generic drug name or group name select ▲** [Page Down] **(or ▲** [Page Up]**) until it shows, then use** (SELECT) **to highlight choice.

Program Drug List	B
Leucovorin	
Levofloxacin	
Lidocaine	
Lipids	
Lorazepam	
Magnesium Infusion	
Mannitol	
Mesna	

Select, then Enter

Page Up	Page Down	Enter	Cancel/ Back
▲	▲	▲	▲

4) Select ▲ [Enter] **to indicate selection and advance to the Therapy selection screen.**

The Select Therapy screen for Line B appears.

5) Select ▲ [Choose] **to continue.**

PROGRAM	B
	Lidocaine
Dose Calculation	
Loading Dose	
Multistep	

Select, then Choose

		Choose	Back
▲	▲	▲	▲

The Program Dose Calc screen appears.

NOTE: Cursor defaults to package insert recommended dose units associated with the selected drug.

Program Dose Calc	B
	Lidocaine

mL/hr	grams/hr
mcg/kg/min	ng/kg/min
mcg/kg/hr	units/kg/hr
mcg/min	units/min
mcg/hr	units/hr
mg/kg/hr	mUn/min
mg/min	mEq/hr
mg/hr	

Select, then Choose

		Choose	Back
▲	▲	▲	▲
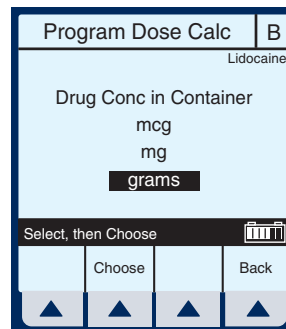
6)   **Select ▲ *[Choose]* to continue. Or, use SELECT to change the units to use in the delivery.**

The Container Concentration Selection screen appears whenever the selected Dose Units are gram-based (e.g., grams, mg, mcg, or ng) otherwise this screen is skipped.

Program Dose Calc	B
	Lidocaine

Drug Conc in Container

mcg

mg

grams

Select, then Choose

	Choose		Back
▲	▲	▲	▲

NOTE: Cursor defaults to package insert recommended concentration units associated with the selected drug.

7)   **Select ▲ *[Choose]* to continue. Or, use SELECT to change the Container Concentration units to use in the delivery.**

The next page of the Program Dose Calc screen appears to provide for entry of delivery program parameters.

```
┌─────────────────────────────┐
│ Program Dose Calc      │ B  │
│                     Lidocaine│
│ Conc        0.0  grams       │
│             0.0  mL          │
│ Mode        Piggyback        │
│                              │
│ Dose        0.000  mg/min    │
│ VTBI        0.0    mL        │
│ Duration    00: 00 hr : min  │
│ Rate        0.0    mL/hr      │
│                     ▭▯▯▯▯     │
│ Enter value using keypad     │
│ Program              Cancel/ │
│ Options              Back    │
│   ▲     ▲      ▲      ▲       │
└─────────────────────────────┘
```

8) **Use keypad to enter desired values. Once entered, use ▼ to highlight the next field.**

9) **To override the Piggyback Delivery Mode default, scroll down to Mode using ▼ , then select ▲ *[Change Mode]*.**

NOTE: Delivery Mode Option is available on Line B, its default is Piggyback, and the Weight field is gone.

10) **Continue entering desired values using the keypad. Use ▼ to advance to the next field.**

```
┌─────────────────────────────┐
│ Program Dose Calc      │ B  │
│                     Lidocaine│
│ Conc        2.0  grams       │
│             500  mL          │
│ Mode        Concurrent       │
│                              │
│ Dose        2.00   mg/min    │
│ VTBI        500    mL        │
│ Duration    16 : 40 hr : min │
│ Rate        30.0   mL/hr     │
│                     ▭▯▯▯▯     │
│ Enter value using keypad     │
│ Program              Cancel/ │
│ Options              Back    │
│   ▲     ▲      ▲      ▲       │
└─────────────────────────────┘
```
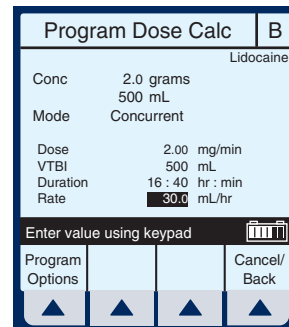
NOTE: When entering the RATE, with a VTBI value entered, the DOSE and DURATION fields are automatically updated. To understand the Automatic Calculation feature, *see Section 6.8 Examples of Automatic Calculation.*

NOTE: The Duration field temporarily changes to dashes when the computed value is larger than what can be displayed.

11) Continue entering the RATE value, if desired.

NOTE: As Rate is entered, the Duration and Dose are automatically adjusted as individual numbers are entered.

NOTE: If the Duration value is changed, the Rate and Dose are automatically adjusted.

NOTE: At this point, programming is complete unless ▲ *[Program Options]* are desired. *See Section 6, Additional Features, for more information.*

CAUTION: VERIFY DOSE, RATE, VTBI, AND DURATION BEFORE PRESSING [START].

12) To start the delivery, press (START).

This will bring up the PROGRAM CONFIRMATION screen which appears for all units of measure except mL/hr.

Program Dose Calc	B
Delivery will be:	

Dose	2.00 mg/min	
Drug	Lidocaine	
Conc	2.0 grams	500 mL
Weight	70.0 kg	

Confirm Program?

Yes			No
▲	▲	▲	▲

13) If Dose, Drug, Conc., & Weight appear correct, select ▲ *[Yes]* to begin program.

NOTE: The Concentration drug amount or Diluent volume cannot be changed while a delivery is in progress.

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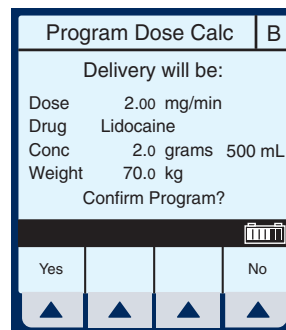
Upon (START), the Main Delivery Screen shows delivery status for both A and B lines.

NOTE: See *Delivery Rate Range* in *Section 9*. The ratio of concurrent rates has recommendations specified in *Section 1.4.*

A	STOPPED	PUMPING	B
Dopamine Dose Calculation		Lidocaine Dose Calculation	
26.3	Rate mL/hr	30.0	
1.0	Vol Inf mL	0.1	
mcg/kg/min	Dose	2.00 mg/min	

	A	B	Options/ Vol Inf
▲	▲	▲	▲

5.3   Loading Dose

LOADING DOSE- Allows programming of an initial infusion rate for a specific volume, followed automatically by a maintenance rate from the same container (e.g., a fluid challenge). If Dose Calc is used, the Loading Dose and Maintenance Dose are in the same unit of measure, over the same period of time (mcg/min), from the same container.

Clear ALL settings when changing patients or multiple programming parameters.

Use ▲ [Clear Program] when changing ONLY Line A or B.

1) **Select ▲ *[A]* (or ▲ *[B]*) at the Main Delivery screen.**

A	STOPPED	STOPPED	B
0.0	Rate mL/hr		0.0
0.0	Vol Inf mL		0.0

Back Prime	A	B	Options/ Vol Inf
▲	▲	▲	▲
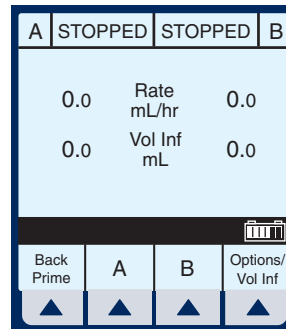
The selected Line (A or B) Programming screen appears.
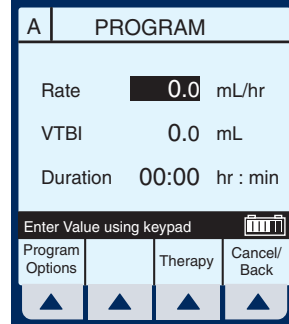
2) **Select ▲** *[Therapy]*.

```
┌─────────────────────────┐
│ A │    PROGRAM          │
├─────────────────────────┤
│                         │
│  Rate      0.0   mL/hr   │
│                         │
│  VTBI      0.0   mL      │
│                         │
│  Duration 00:00  hr : min│
│                         │
├─────────────────────────┤
│ Enter Value using keypad │
│ Program        Therapy Cancel/│
│ Options                Back  │
│   ▲      ▲      ▲      ▲  │
└─────────────────────────┘
```

The Drug List Screen appears, in mainly alphabetical order.

NOTE: Default entry is "No Drug Selected". This process will guide you through a "fluid challenge", so "No Drug Selected" will be entered.

```
┌─────────────────────────┐
│ A │  Program Drug List   │
├─────────────────────────┤
│    No Drug Selected      │
│       Abciximab          │
│       Acyclovir          │
│        Albumin           │
│       Aldesleukin        │
│       Alfentanil         │
│      Alteplase (rt-PA)   │
│        Amikacin          │
├─────────────────────────┤
│ Select, then Enter       │
│ Page   Page    Enter  Cancel/│
│ Up     Down          Back   │
│  ▲      ▲      ▲      ▲   │
└─────────────────────────┘
```

3) **Select ▲** *[Enter]* **to indicate selection and advance to the Therapy selection screen.**

The Select Therapy screen for Line A (or B) appears.

NOTE: This example shows line A being programmed.

```
┌─────────────────────────┐
│ A │    PROGRAM          │
├─────────────────────────┤
│                         │
│    Dose Calculation      │
│                         │
│     Loading Dose         │
│                         │
│       Multistep          │
│                         │
├─────────────────────────┤
│ Select, then Choose      │
│              Choose  Back │
│  ▲      ▲      ▲      ▲  │
└─────────────────────────┘
```
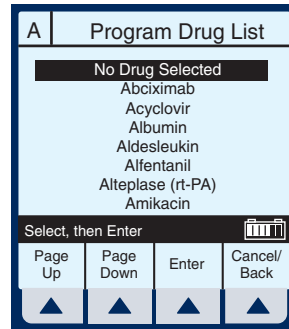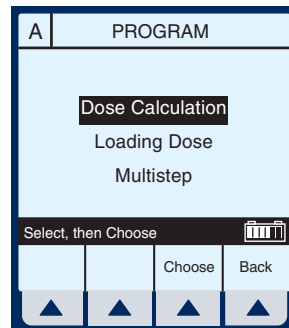
4)   Use ▼ to scroll down to Loading Dose.

5)   Select ▲ *[Choose]* to continue.

A	PROGRAM

Dose Calculation
Loading Dose
Multistep

Select, then Choose

		Choose	Back
▲	▲	▲	▲
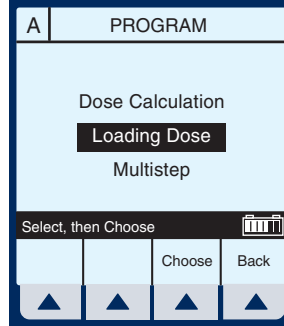
The next page of the Program Loading Dose screen appears.

6)   Select ▲ *[Choose]* to continue. Or, use ▼ to change the units to use in the delivery.

A	Program Loading Dose

mL/hr	grams/hr
mcg/kg/min	ng/kg/min
mcg/kg/hr	units/kg/hr
mcg/min	units/min
mcg/hr	units/hr
mg/kg/hr	mUn/min
mg/min	mEq/hr
mg/hr	

Select, then Choose

		Choose	Back
▲	▲	▲	▲
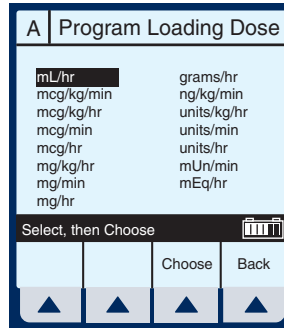
The Loading Dose Programming screen appears.

7)   The default field is Rate. Since a "fluid Challenge" is being performed in this example, press ▼ to advance to the VTBI field.

A	Program Loading Dose

	Rate mL/hr	VTBI mL	Duration hr : min
1	**0.0**	0.0	00 : 00
2	0.0	0.0	00 : 00

Enter value using keypad

Program Options			Cancel/ Back
▲	▲	▲	▲

8)   **Enter value using keypad.**

```
┌─────────────────────────────┐
│ A │ Program Loading Dose     │
│                             │
│       Rate   VTBI  Duration  │
│      mL/hr    mL    hr : min │
│   1   0.0    250   00 : 00   │
│   2   0.0    0.0   00 : 00   │
│                             │
│ Enter value using keypad  ▯▯▯│
│ Program              Cancel/ │
│ Options               Back   │
│   ▲      ▲      ▲      ▲     │
└─────────────────────────────┘
```
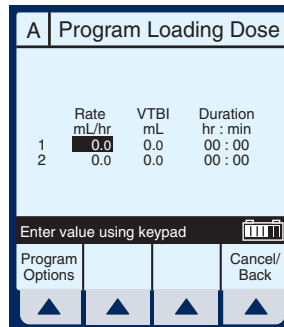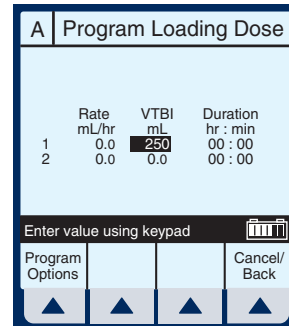
9)   **Use ▼ to highlight the next field.**
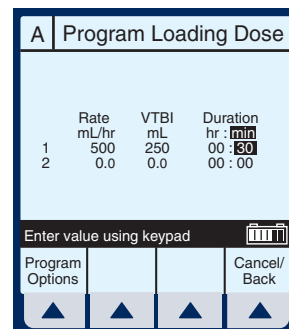
10)   **Enter Duration using keypad. The Rate value is automatically calculated. To understand the Automatic Calculation feature,** *see Section 6.8 Examples of Automatic Calculation.*

```
┌─────────────────────────────┐
│ A │ Program Loading Dose     │
│                             │
│       Rate   VTBI  Duration  │
│      mL/hr    mL    hr : min │
│   1   500    250   00 : 30   │
│   2   0.0    0.0   00 : 00   │
│                             │
│ Enter value using keypad  ▯▯▯│
│ Program              Cancel/ │
│ Options               Back   │
│   ▲      ▲      ▲      ▲     │
└─────────────────────────────┘
```

11)   **After the values for loading dose Step-1 are entered, use ▼ to highlight the maintenance dose, Step-2.**
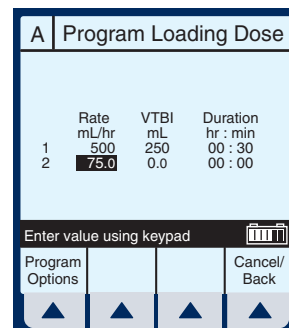
     NOTE: The Loading Dose therapy has two steps. The first is the loading dose followed by the maintenance dose. These words will appear on the main screen as each step is delivered.

```
┌─────────────────────────────┐
│ A │ Program Loading Dose     │
│                             │
│       Rate   VTBI  Duration  │
│      mL/hr    mL    hr : min │
│   1   500    250   00 : 30   │
│   2   75.0   0.0   00 : 00   │
│                             │
│ Enter value using keypad  ▯▯▯│
│ Program              Cancel/ │
│ Options               Back   │
│   ▲      ▲      ▲      ▲     │
└─────────────────────────────┘
```
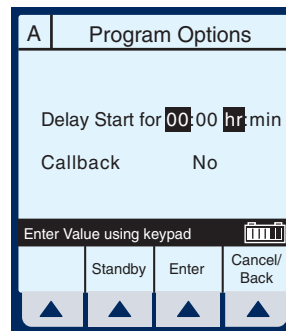
12) Enter the set of desired values for Step-2 of the program.

13) Select ▲ *[PROGRAM OPTIONS]* to select a *Delayed Start or Standby.*
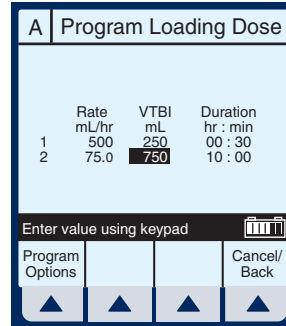
> **NOTE:** At this point, programming is complete unless ▲ *[Program Options]* are desired. *See Section 6, Additional Features, for more information.*

	Program Loading Dose
A	

	Rate mL/hr	VTBI mL	Duration hr : min
1	500	250	00 : 30
2	75.0	750	10 : 00

Enter value using keypad

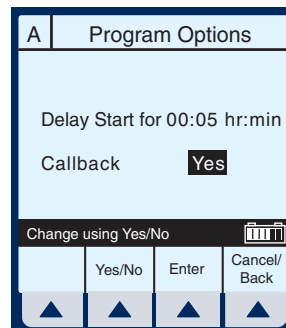| Program Options			Cancel/ Back
▲	▲	▲	▲

> **NOTE:** Nurse Callback enables an alarm when a change in the delivery on a line occurs such as completing Step-1 and starting Step-2. Or on line B, a piggyback delivery is completed and line A is starting its delivery.

A	Program Options

Delay Start for 00:00 hr:min

Callback   No

Enter Value using keypad

	Standby	Enter	Cancel/ Back
▲	▲	▲	▲

14) Enter a delay time (less than or equal to 24 hours) using the keypad.

> **NOTE:** Not available if a delivery is taking place on the line.

> **NOTE:** Nurse Callback cannot be changed while a delivery is taking place on the line.

A	Program Options

Delay Start for 00:05 hr:min

Callback   Yes

Change using Yes/No

|	Yes/No	Enter	Cancel/ Back
▲	▲	▲	▲

15) Select ▲ *[Enter]* to accept the changes and return to the Program Loading Dose screen.

NOTE: ▲ *[Cancel/Back]* returns the fields to their original value and displays the previous screen.

> **CAUTION: VERIFY RATE, VTBI, AND DURATION BEFORE PRESSING [START].**

The Main Delivery Screen appears.

NOTE: The words "DELAYED" and "Loading Dose" appear in the upper-left corner. These indicate the options which have been selected.

A	DELAYED	STOPPED	B

Loading Dose
500   Rate mL/hr   0.0
0.0   Vol Inf mL   0.0

	A	B	Options/ Vol Inf
▲	▲	▲	▲
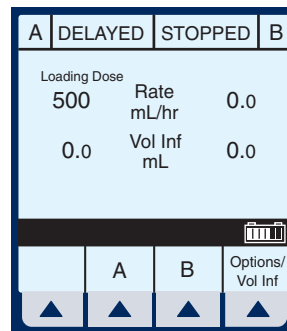
After the programmed delay period has expired, the Plum A+ starts "Pumping". This is indicated where "Delayed" previously was displayed.

A	PUMPING	STOPPED	B

Loading Dose
500   Rate mL/hr   0.0
0.0   Vol Inf mL   0.0

	A	B	Options/ Vol Inf
▲	▲	▲	▲
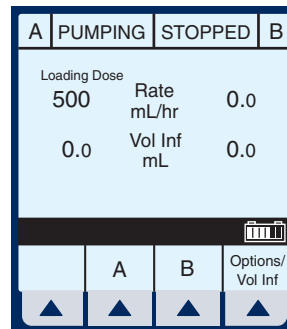
After the Step-1 has completed, the Main Delivery Screen changes to the second step.

A	PUMPING	STOPPED	B

Maintenance Dose

75.0	Rate mL/hr	0.0
250	Vol Inf mL	0.0

N105 Callback Line A

	A	B	Options/ Vol Inf
▲	▲	▲	▲

NOTE: A flashing "Callback Line A" message and the audio alarm sound indicates activation of that option.

16) The user should acknowledge the Callback message and stop the audio alarm by pressing (SILENCE).

Upon completion of delivery, the screen shows a flashing "Line A VTBI complete" message and the audible alarm sounds.

A	KVO	STOPPED	B

Maintenance Dose

1.0	Rate mL/hr	0.0
1000	Vol Inf mL	0.0

N161 Line A VTBI complete

	A	B	Options/ Vol Inf
▲	▲	▲	▲

NOTE: The KVO rate will change to the rate of 1.0 mL/hr or less depending on delivery rate and "Pumping" mode changes to "KVO". If Continue Rate option was selected, pumping continues at original rate.

17) Press (SILENCE) to stop alarm sound.

NOTE: Warning message continues to flash and audio alarm will return after a two minute period of silence, unless delivery is stopped or VTBI of last line is changed.

5.4   Multistep Programming

MULTISTEP- Allows a sequential program to deliver up to 10 steps; fluid volumes and delivery rates may be programmed for each step. The program may be entered based on Rate and Volume or Volume and Time. If Dose Calc is used, the delivery steps are in the same unit of measure, over the same period of time, from the same container.

Clear ALL settings when changing patients or multiple programming parameters.

Use ▲ [Clear Program] when changing ONLY Line A or B.

1)   **Select ▲ *[A]* at the Main Delivery screen.**

A	STOPPED	STOPPED	B

0.0	Rate mL/hr	0.0
0.0	Vol Inf mL	0.0

Back Prime ▲	A ▲	B ▲	Options/ Vol Inf ▲

The Line A Programming screen appears.

2)   Select ▲ *[Therapy]*.

A	PROGRAM
Rate	**0.0** mL/hr
VTBI	0.0 mL
Duration	00:00 hr : min

Enter Value using keypad

| Program Options | | Therapy | Cancel/ Back |
| ▲ | ▲ | ▲ | ▲ |

The Drug List Screen appears, in mainly alphabetical order.

NOTE: Default entry is "No Drug Selected". This selection may be used later to remove an incorrect or unwanted drug name from the display.

A	Program Drug List

No Drug Selected
Abciximab
Acyclovir
Albumin
Aldesleukin
Alfentanil
Alteplase (rt-PA)
Amikacin

Select, then Enter

| Page Up | Page Down | Enter | Cancel/ Back |
| ▲ | ▲ | ▲ | ▲ |

3)   Use [SELECT] to highlight desired drug name.

When list does not contain desired generic drug name or group name, select ▲ *[Page Down]* (or ▲ *[Page Up]*) until it shows, then use [SELECT] to highlight choice.

A	Program Drug List

Ticar-clavulanate
Tirofiban
Tobramycin
TPN
Urokinase
Vancomycin
Vecuronium
Verapamil

Select, then Enter

| Page Up | Page Down | Enter | Cancel/ Back |
| ▲ | ▲ | ▲ | ▲ |

4)   Select ▲ *[Enter]* to indicate selection and advance to the Therapy selection screen.

The Select Therapy screen for Line A (or B) appears.

NOTE: This example shows line A being programmed.

```
┌──────────────────────┐
│ A │    PROGRAM       │
│───┘                  │
│ TPN                  │
│                      │
│   Dose Calculation   │
│     Loading Dose     │
│      Multistep       │
│                      │
│ Select, then Choose ▥│
│          ┌──────┬────┤
│          │Choose│Back│
│  ▲   ▲   │  ▲   │ ▲  │
└──────────┴──────┴────┘
```

5) Use ▼ to scroll down to **Multistep.**

6) Select ▲ *[Choose]* to continue.

```
┌──────────────────────┐
│ A │    PROGRAM       │
│───┘                  │
│ TPN                  │
│                      │
│   Dose Calculation   │
│     Loading Dose     │
│     ▐Multistep▌      │
│                      │
│ Select, then Choose ▥│
│          ┌──────┬────┤
│          │Choose│Back│
│  ▲   ▲   │  ▲   │ ▲  │
└──────────┴──────┴────┘
```
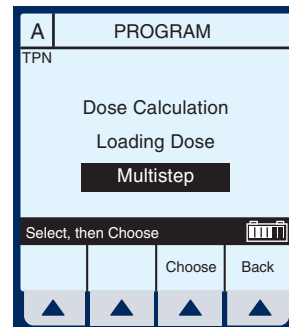
The Program Multistep screen appears.

NOTE: Cursor defaults to package insert recommended dose units associated with the selected drug.

```
┌──────────────────────────┐
│ A │  Program Multistep   │
│───┘                      │
│ TPN                      │
│ ▐mL/hr▌      grams/hr    │
│ mcg/kg/min   ng/kg/min   │
│ mcg/kg/hr    units/kg/hr │
│ mcg/min      units/min   │
│ mcg/hr       units/hr    │
│ mg/kg/hr     mUn/min     │
│ mg/min       mEq/hr      │
│ mg/hr                    │
│ Select, then Choose   ▥  │
│              ┌──────┬────┤
│              │Choose│Back│
│  ▲    ▲      │  ▲   │ ▲  │
└──────────────┴──────┴────┘
```

7) Use ⬡SELECT key to highlight the units to use in the delivery.

8) Select ▲ *[Choose]* to continue.
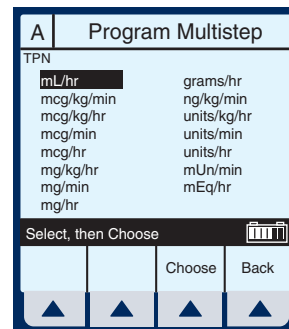
The Multistep Programming screen appears.

A	Program Multistep

TPN

	Rate mL/hr	VTBI mL	Duration hr : min
1	**50.0**	0.0	00 : 00
2	0.0	0.0	00 : 00
3	0.0	0.0	00 : 00
4	0.0	0.0	00 : 00

Enter value using keypad

Program Options		More Steps	Cancel/ Back
▲	▲	▲	▲

9)   Rate is the default field. Enter value using keypad.
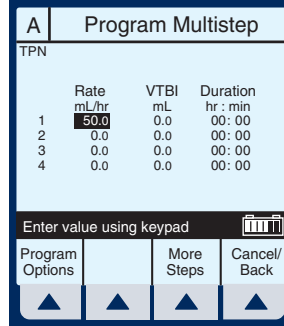
10)   Use ▼ to highlight the Duration or VTBI field.

NOTE: The VTBI value is automatically computed when the Duration value is entered. If VTBI is entered, the Duration value is automatically computed.

A	Program Multistep

TPN

	Rate mL/hr	VTBI mL	Duration **hr** : min
1	50.0	50.0	**01** : 00
2	0.0	0.0	00 : 00
3	0.0	0.0	00 : 00
4	0.0	0.0	00 : 00

Enter value using keypad

Program Options		More Steps	Cancel/ Back
▲	▲	▲	▲
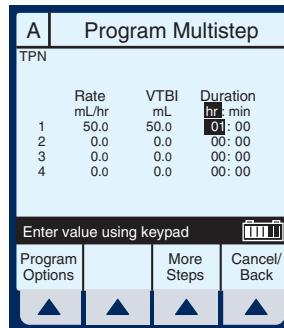
11)   Use ▼ to drop down to Step-2, Rate field.

12)   Enter the set of desired values for Step-2 of the program. Continue process for each additional Step.

A	Program Multistep

TPN

	Rate mL/hr	VTBI mL	Duration hr : min
1	50.0	50.0	01 : 00
2	**100**	0.0	00 : 00
3	0.0	0.0	00 : 00
4	0.0	0.0	00 : 00

Enter value using keypad

Program Options		More Steps	Cancel/ Back
▲	▲	▲	▲
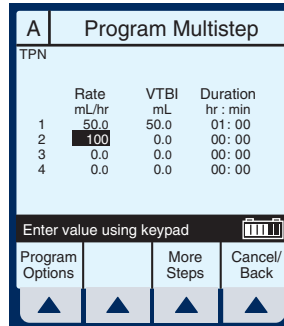
NOTE: When Step-4 is programmed, using [SELECT] to advance will highlight another item on this screen.

13) When Step-4 is programmed, select ▲ *[More Steps]* to program up to 10 Steps.
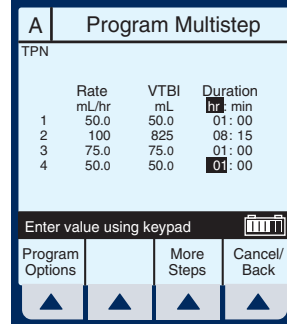
NOTE: Using [SELECT] will not advance you to the additional steps.

14) To set up Steps 5 through 10, enter desired values as performed for Steps 1 through 4.
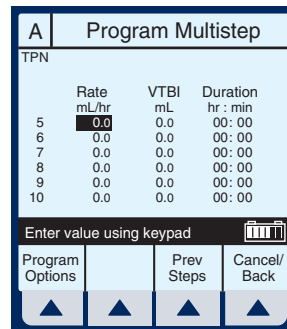
To see the previous steps, select ▲ [Prev Steps].

CAUTION: VERIFY RATE, VTBI, AND DURATION BEFORE PRESSING [START].

The Main Delivery Screen displays Step-1 in the upper-left corner.
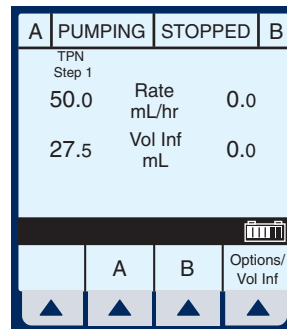
NOTE: In units other than mL/hr, the Dose rate and units also will be displayed.

Example of Multistep Screen Pumping on Step-2.

A	PUMPING	STOPPED	B

TPN
Step 2

100	Rate mL/hr	0.0
652	Vol Inf mL	0.0

	A	B	Options/ Vol Inf
▲	▲	▲	▲

15) **To change a program parameter while pumping, select ▲ *[A]*.**
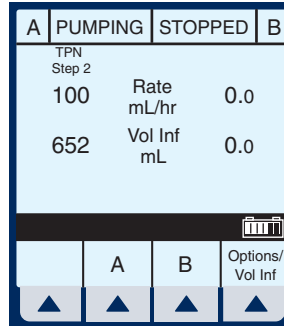
NOTE: The "*" in a Step number field indicates the step is delivering or "d" indicates each completed step.

A	Program Multistep

TPN

	Rate mL/hr	VTBI mL	Duration hr : min
d	50.0	50.0	01 : 00
*	100	825	08 : 15
3	75.0	75.0	01 : 00
4	50.0	50.0	01 : 00

Enter value using keypad

Program Options		More Steps	Cancel/ Back
▲	▲	▲	▲

16) **Enter a value using the keypad.**
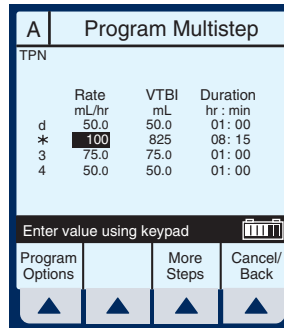
If Rate value is changed, the Duration will automatically change.

NOTE: Only the current delivering step and future steps can be changed.

CAUTION: VERIFY RATE, VTBI, AND DURATION BEFORE PRESSING [START].

A	Program Multistep

TPN

	Rate mL/hr	VTBI mL	Duration hr : min
d	50.0	50.0	01 : 00
*	125	825	06 : 36
3	75.0	75.0	01 : 00
4	50.0	50.0	01 : 00

Enter value using keypad

Program Options		More Steps	Cancel/ Back
▲	▲	▲	▲
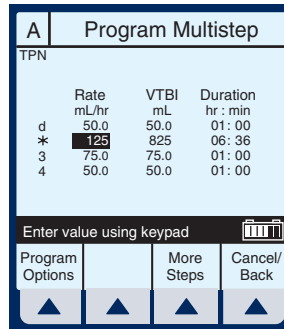
NOTE: The Values are now updated on the Main Delivery Screen.

The pump reverts to KVO when last Step completes.

The last step can be restarted by entering a new VTBI value.

A	PUMPING	STOPPED	B

TPN
Step 2

125	Rate mL/hr	0.0
658	Vol Inf mL	0.0

	A	B	Options/ Vol Inf
▲	▲	▲	▲

NOTES

6) Additional Features

6.1 Simple Delivery Using Drug List

1) **Select Line ▲ [A] (or ▲ [B]) at the Main Delivery Screen.**

SCREENS SHOWN IN THIS MANUAL ARE EXAMPLES ONLY AND DON'T NECESSARILY REFLECT CURRENT CLINICAL PRACTICE

A	STOPPED	STOPPED	B
	0.0	Rate mL/hr	0.0
	0.0	Vol Inf mL	0.0

Back Prime	A	B	Options/ Vol Inf
▲	▲	▲	▲

The Line A Programming Screen appears.

2) **Select ▲ [Program Options].**

A	PROGRAM
Rate	0.0 mL/hr
VTBI	0.0 mL
Duration	00:00 hr : min

Enter Value using keypad

Program Options		Therapy	Cancel/ Back
▲	▲	▲	▲

The default screen for Program Options appears.

3) **Select ▲ [Drug List].**

A	Program Options
Delay Start for 00:00 hr:min	
Callback	No

Enter Value using keypad

Drug List	Standby	Enter	Cancel/ Back
▲	▲	▲	▲

The Drug List Screen appears, in mainly alphabetical order.

NOTE: Default entry is "No Drug Selected". This selection may be used later to remove an incorrect or unwanted drug name from the display.

A	Program Drug List
	No Drug Selected
	Abciximab
	Acyclovir
	Albumin
	Aldesleukin
	Alfentanil
	Alteplase (rt-PA)
	Amikacin

Select, then Enter

Page Up	Page Down	Enter	Cancel/Back
▲	▲	▲	▲

4)   Use (SELECT) **to highlight desired drug name.**

When list does not contain desired generic drug name or group name select ▲ *[Page Down]* **(or** ▲ *[Page Up]*) **until it shows, then**

use (SELECT) **to highlight choice.**

A	Program Drug List
	Dexmedetomidine HCl
	Diltiazem
	Dobutamine
	Docetaxel
	Dopamine
	Doxorubicin
	Epinephrine
	Epoprostenol

Select, then Enter

Page Up	Page Down	Enter	Cancel/Back
▲	▲	▲	▲

5)   **Select** ▲ *[Enter]* **to indicate selection and return to the Program Options screen. Or, select** ▲ *[Cancel/Back]* **if no choice is acceptable.**

Drug name is now visible in the upper-left corner.

A	Program Options
Dopamine	

Delay Start for 00:00 hr:min

Callback   No

Enter Value using keypad

| Drug List | Standby | Enter | Cancel/ Back |
| ▲ | ▲ | ▲ | ▲ |

6) **Select ▲** *[Enter]* **or ▲** *[Cancel/Back]* **to return to the Line Programming screen.**

> **CAUTION:** Verify **RATE, VTBI,** and **DURATION** before pressing **[START].**

Notice the drug name remains in the upper-left corner.

A	PROGRAM
Dopamine	

Rate   5.0   mL/hr

VTBI   250   mL
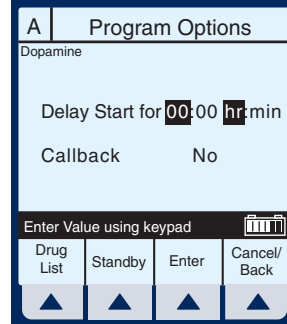
Duration   50:00   hr : min

Enter Value using keypad

| Program Options | | Therapy | Cancel/ Back |
| ▲ | ▲ | ▲ | ▲ |

7) **Enter a RATE using the keypad.**

8) **Use ▼ to highlight the VTBI field and enter a value. The DURATION will be automatically calculated.**
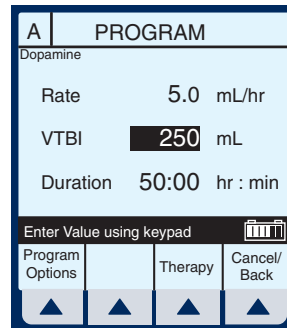
9) **Press (START) to confirm the programming, begin the delivery, and return to the Main delivery screen.**

A	PUMPING	STOPPED	B
	Dopamine		

5.0   Rate mL/hr   0.0

0.1   Vol Inf mL   0.0

| | A | B | Options/ Vol Inf |
| ▲ | ▲ | ▲ | ▲ |

Notice the drug name remains in the upper-left corner.
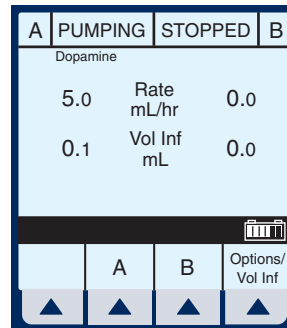
6.2   Simple Delivery Using Delayed Start

1)   Before or after entering the simple delivery program, select ▲ *[Program Options].*

NOTE: To program a Delayed Start using a Therapy (i.e., Dose Calc) you must first select which line you want (A or B), next select ▲ *[Therapy],* and then ▲ *[Program Options].* If you program the Delayed Start first, it will be cleared upon entry into Therapy mode.

PROGRAM	B

Mode   Concurrent
Rate   5.0   mL/hr
VTBI   250   mL
Duration   50:00 hr : min

Change using Change Mode

Program Options	Change Mode	Therapy	Cancel/ Back
▲	▲	▲	▲

The Default screen for Program Options appears.

Program Options	B

Delay Start for 00:00 hr:min

Callback   No

Enter Value using keypad

Drug List	Standby	Enter	Cancel/ Back
▲	▲	▲	▲

2) **Enter values for desired hours and/or minutes.**

3) **Select ▲ *[Enter]* to confirm delayed start.**

> **CAUTION:** V**ERIFY** **RATE, VTBI,** **AND** **DURATION** **BEFORE PRESSING [START].**

```
┌──────────────────────┬───┐
│   Program Options     │ B │
├──────────────────────┴───┤
│                          │
│  Delay Start for 01:00 hr:min │
│                          │
│  Callback        No      │
│                          │
├──────────────────────────┤
│ Enter Value using keypad  ▥▥│
├──────┬───────┬──────┬────┤
│ Drug │Standby│Enter │Cancel/│
│ List │       │      │ Back │
├──────┼───────┼──────┼────┤
│  ▲   │  ▲    │  ▲   │  ▲  │
└──────┴───────┴──────┴────┘
```
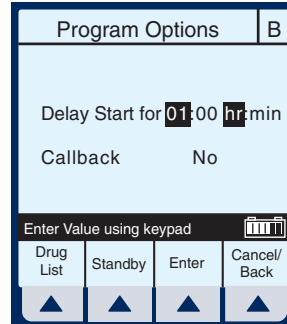
4) **Press (START) to confirm programming.**

Line B is delayed for the time entered.

NOTE: Delayed line drip indicator is solid, not flashing. It will begin flashing when actually pumping.

```
┌───┬─────────┬────────┬───┐
│ A │ PUMPING │ DELAYED│ B │
├───┴─────────┴────────┴───┤
│                          │
│   125    Rate      5.0   │
│          mL/hr           │
│                          │
│   850    Vol Inf   0.0   │
│           mL             │
│                          │
├──────────────────────────┤
│                       ▥▥ │
├──────┬───────┬──────┬────┤
│      │   A   │  B   │Options/│
│      │       │      │Vol Inf │
├──────┼───────┼──────┼────┤
│  ▲   │  ▲    │  ▲   │  ▲  │
└──────┴───────┴──────┴────┘
```
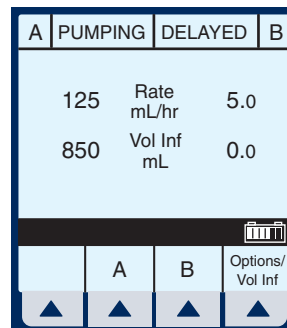
6.3 Piggyback with Nurse Callback

1) After programming in desired values for both lines, select ▲ *[Program Options]*.

> **NOTE:** To set a nurse callback, the pump must be stopped. This function can be selected either before or after entering the Piggyback delivery program.

```
┌─────────────────────────┐
│   PROGRAM        │ B │   │
├─────────────────────────┤
│                         │
│  Mode    Piggyback      │
│  Rate          200  mL/hr│
│  VTBI          100  mL   │
│  Duration    00:30  hr : min│
├─────────────────────────┤
│ Enter value using keypad  ▥│
│ Program │      │Therapy│Cancel/│
│ Options │      │       │ Back  │
│   ▲    │  ▲  │  ▲   │  ▲   │
└─────────────────────────┘
```

The default screen for Program Options appears.

Use ▼ to highlight "Callback" field and select ▲ [Yes/No], if necessary to obtain "Yes", then select ▲ [Enter].

```
┌─────────────────────────┐
│  Program Options  │ B │  │
├─────────────────────────┤
│                         │
│  Delay Start for 00:00 hr:min│
│                         │
│  Callback      Yes      │
│                         │
├─────────────────────────┤
│ Change using Yes/No      ▥│
│ Drug │ Yes/No│ Enter │Cancel/│
│ List │       │       │ Back  │
│  ▲  │  ▲  │  ▲   │  ▲   │
└─────────────────────────┘
```

NOTE: Callback default of Yes or No is a biomedical setting and must be configured as described in the Technical Service Manual.

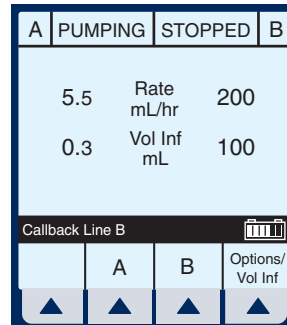**CAUTION:** VERIFY **RATE, VTBI,** AND **DURATION** BEFORE PRESSING **[START].**

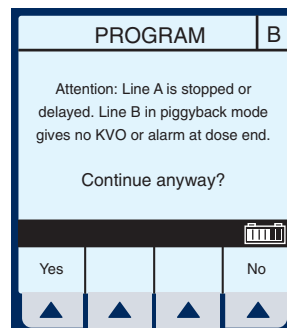**2) Press (START) to confirm program setting and return to Main Delivery screen.**

```
┌─────────────────────────┐
│  PROGRAM          │ B │
├─────────────────────────┤
│                         │
│  Mode    Piggyback      │
│  Rate        200  mL/hr │
│  VTBI        100  mL    │
│  Duration  00:30  hr : min │
├─────────────────────────┤
│ Enter value using keypad   ▥ │
│ Program        Therapy  Cancel/ │
│ Options                  Back │
│   ▲      ▲      ▲      ▲  │
└─────────────────────────┘
```
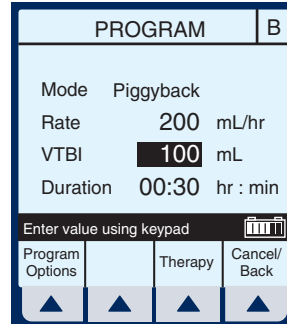
At end of Piggyback delivery, with Callback enabled for the line, Callback alarm is issued.

3) Press (SILENCE) to clear alarm.

```
┌─────────────────────────┐
│ A│ PUMPING │ STOPPED │ B │
├─────────────────────────┤
│          Rate            │
│   5.5    mL/hr    200     │
│                          │
│          Vol Inf         │
│   0.3     mL      100     │
├─────────────────────────┤
│ Callback Line B         ▥ │
│          A      B   Options/ │
│                     Vol Inf │
│   ▲      ▲      ▲      ▲  │
└─────────────────────────┘
```

6.4   Possible Non-Delivery Programmed

NOTE: Whenever a valid [START] key is pressed, the device checks the delivery program(s) for non-delivery conditions (such as Line B Piggyback without Line A or delayed start) that could permit a period of non-delivery. If so, the display presents this warning screen.

```
┌─────────────────────────┐
│  PROGRAM          │ B │
├─────────────────────────┤
│   Attention: Line A is stopped or │
│   delayed. Line B in piggyback mode │
│   gives no KVO or alarm at dose end. │
│                          │
│      Continue anyway?    │
│                       ▥  │
│ Yes                  No  │
│   ▲      ▲      ▲      ▲  │
└─────────────────────────┘
```

1) Select ▲ *[Yes]* to continue with delivery. Or, select ▲ *[No]* to cancel.

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6.5   Using the Standby Feature

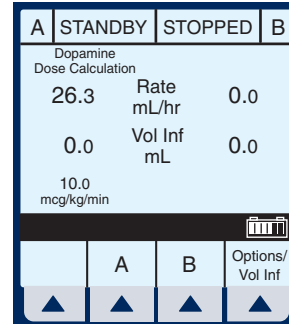*Standby is a feature that enables the clinician to program the pump up to 23: 59 minutes in advance of Starting.*

```
┌─────────────────────────────┐
│ A │   Program Dose Calc     │
├─────────────────────────────┤
│ Dopamine                    │
│ Conc        400 mg   250 mL │
│ Weight     70.0 kg          │
│                             │
│ Dose          10.0 mcg/kg/min│
│ VTBI          ▮250▮ mL      │
│ Duration    09: 30 hr : min │
│ Rate          26.3 mL/hr    │
│                             │
│ Enter value using keypad [▥]│
│ Program              Cancel/│
│ Options               Back  │
│   ▲      ▲      ▲      ▲     │
└─────────────────────────────┘
```

1)   **If Line A is infusing, select ▲ *[A]* or ▲ *[B]* to access program screen of line to be placed on Standby.**

2)   **Select ▲ *[PROGRAM OPTIONS].***

3)   **Select ▲ *[STANDBY].***

4)   **Confirm the information displayed is correct, then select ▲ *[YES]* to place program on Standby mode.**

```
┌─────────────────────────────┐
│ A │   Program Dose Calc     │
├─────────────────────────────┤
│      Delivery will be:      │
│ Dose       10.0 mcg/kg/min  │
│ Drug     Dopamine           │
│ Conc      400 mg    250 mL  │
│ Weight    70.0 kg           │
│   Put delivery in Standby?  │
│                          [▥]│
│ Yes                     No  │
│   ▲      ▲      ▲      ▲     │
└─────────────────────────────┘
```

NOTE: This example screen shows a Dose Calculation Program with a Standby. It looks similar to the Program Confirmation screen with the substitution of "Put delivery in Standby" replacing "Confirm Program". Selecting ▲ *[Yes]* confirms both the Program and the Standby.

5) **Press (START) to remove Standby and start the infusion.**

A	STANDBY	STOPPED	B

Dopamine
Dose Calculation

26.3   Rate   0.0
         mL/hr

0.0   Vol Inf   0.0
         mL

10.0
mcg/kg/min

| | | A | B | Options/Vol Inf |

6.6   Select Option- Volumes Infused, Pressure/Post Infusion Rate, and Lighting/ Contrast

1) **To select Options Screen, select ▲ *[Options/Vol Inf]*.**

A	PUMPING	STOPPED	B

5.5   Rate   0.0
         mL/hr

393   Vol Inf   0.0
         mL

| | | A | B | Options/Vol Inf |
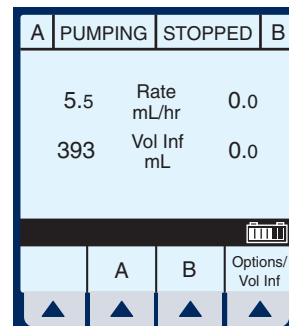
2) **Use (SELECT) to highlight an option.**

3) **Select ▲ *[Choose]* to select the Volumes Infused screen.**

A	OPTIONS	B

Release 11.0x - xx/xx/xx

Volumes Infused

Pressure/Post Infusion Rate

Lighting/Contrast

Select, then Choose

| | | Choose | Back |
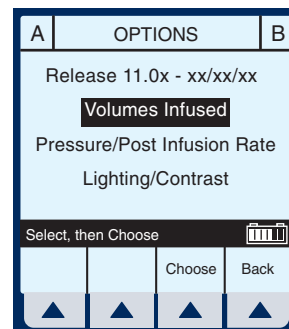
This will bring up the Volumes Infused screen which defaults to Total Volume.

A	OPTIONS	B

Volumes Infused

Line A	0.0	mL
Line B	0.0	mL
Total Vol	**393**	mL

Press CLEAR to clear value

| | | Enter | Cancel/Back |

4)   Use **SELECT** to scroll to Line A or B.

5)   **To reset Line A (or B) Volume Infused,**

   use **SELECT** to highlight and

   press CLEAR.

A	OPTIONS	B

Volumes Infused

Line A	**0.0**	mL
Line B	0.0	mL
Total Vol	393	mL

Press CLEAR to clear value

| | | Enter | Cancel/Back |

6)   **To restore the cleared quantity, select ▲** *[Cancel/Back]*.

7)   **To reset all volumes, use SELECT to highlight Total Vol,**

   then press CLEAR.

A	OPTIONS	B

Volumes Infused

Line A	0.0	mL
Line B	0.0	mL
Total Vol	**0.0**	mL

Press CLEAR to clear value

| | | Enter | Cancel/Back |

8)   **To restore all quantities, select ▲** *[Cancel/Back]* **softkey.**

9) **When clearing of quantities is completed, select ▲ *[Enter]* to return to the Main Delivery screen.**

10) **Select ▲ *[Options/Vol Inf]* from the Main Delivery screen to return to the Options screen.**

A	OPTIONS	B
	Release 11.0x - xx/xx/xx	
	Volumes Infused	
	Pressure/Post Infusion Rate	
	Lighting/Contrast	
Select, then Choose		▭▭▭
		Choose	Back
▲	▲	▲	▲
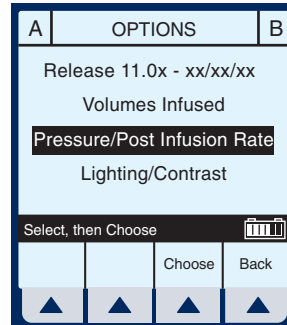
11) **Use ▼ to highlight the Pressure/Post Infusion Rate option.**

12) **Select ▲ *[Choose]* to continue.**

NOTE: Prior to changing Pressure/Post Infusion Rate, pump must be stopped.

13) **Use ⊕SELECT to highlight Continue Rate or Distal Pressure Limit field.**

A	OPTIONS	B
	Pressure/Post Infusion Rate	
	Continue Rate **KVO**	
	Distal Pressure Limit 6.0 psi	
	Distal Pressure 0.0 psi	
Change using KVO/Rate		▭▭▭
	KVO/Rate	Enter	Cancel/Back
▲	▲	▲	▲
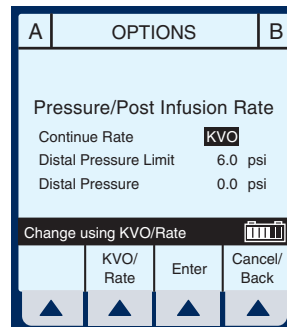
14) **Continue Rate allows a choice when VTBI is completed. Select ▲ *[KVO/Rate]*.**

- **KVO- The pump will revert to a fixed KVO of 1 mL/hr or the last programmed Rate, whichever is less.**
- **Rate- The pump will continue at the Rate programmed.**

NOTE: Option will be for both line A and line B selections.

15) To change Distal Pressure Limit when highlighted, enter value between 1.0 and 15.0 psi.

16) Select ▲ *[Enter]* to keep changes and return to the Main Delivery screen, or ▲ *[Cancel/Back]* to restore original values Options screen.

> **NOTE:** Continue Rate default of KVO or Rate is a biomedical setting and must be configured as described in the Technical Service Manual.

17) Select ▲ *[Options/Vol Inf]* from the Main Delivery screen to return to the Options screen.

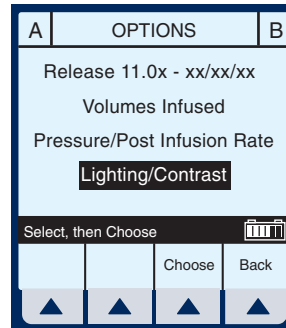| A	OPTIONS	B
	Release 11.0x - xx/xx/xx	
	Volumes Infused	
	Pressure/Post Infusion Rate	
	Lighting/Contrast	
Select, then Choose		
		Choose	Back
▲	▲	▲	▲

18) Use ▼ key to highlight Lighting/Contrast Option.

19) Select ▲ *[Choose]* to continue.

20) Press (SELECT) key to highlight Backlight Intensity or Display Contrast.

A	OPTIONS	B
	Lighting/Contrast	
Backlight Intensity	▮▯▯▯▯	
Display Contrast	▮▯▯▯▯	
Use Inc/Decrease Settings		
Decrease Setting	Increase Setting	Enter	Cancel/ Back
▲	▲	▲	▲

21) While viewing display for desired effect, select either ▲ *[Increase Setting]* or ▲ *[Decrease Setting]* to change level.
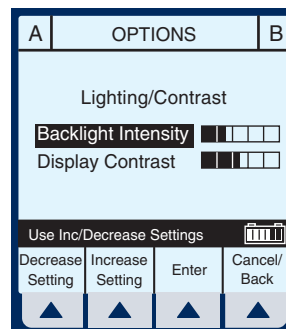
22)   Select ▲ *[Enter]* **to keep change(s) and return
      to the Main Delivery screen, or ▲** *[Cancel/Back]*
      **to restore previous settings and return to the
      Options screen.**

6.7   Variable Rate Cap

Variable Rate Cap is a biomed programmable item to set the
minimum and maximum rate values to be accepted by the device.
The clinician cannot change it once biomed has programmed it.

6.8   Examples of Automatic Calculation

AT STARTUP

Initial programming allows the clinician to enter two of the three
programming parameters (Rate, VTBI, or Duration) and the third
is automatically calculated. (*Refer to table below*)

1st Action	2nd Action	*[AUTOCALC]*
enter RATE	**enter VTBI**	*[DURATION]*
enter VTBI	**enter DURATION**	*[RATE]*
enter RATE	**enter DURATION**	*[VTBI]*

WHILE RUNNING *(TITRATION)*

Changing two parameters after startup of the infusion will allow
for the re-calculation of the third parameter.

NOTE: VTBI will not be re-calculated if the Rate and Duration are changed. VTBI must be cleared and then the new VTBI re-entered. The new VTBI will automatically calculate a new Rate.

1st Action	2nd Action	*[AUTOCALC]*
change RATE	**keep VTBI**	*[DURATION]*
change RATE	**change VTBI**	*[DURATION]*
change VTBI	**keep RATE**	*[DURATION]*
change DURATION	**keep VTBI**	*[RATE]*
change VTBI	**change DURATION**	*[RATE]*
change RATE	**change DURATION**	*Recalculates [RATE] based on previous VTBI and new DURATION*

AT KVO

Audible KVO alarm will sound, clinician will need to re-set the appropriate settings.

1st Action	2nd Action	*[AUTOCALC]*
enter VTBI	**keep RATE**	*[DURATION]*
enter DURATION	**keep RATE**	*[VTBI]*
change RATE	**enter VTBI**	*[DURATION]*
enter DURATION	**enter VTBI**	*[DURATION]*
enter VTBI	**enter DURATION**	*[RATE]*
change RATE	**change DURATION**	*[VTBI]*

7) Alarms and Troubleshooting

7.1   Warning Messages

MESSAGE	POSSIBLE CAUSE	CORRECTIVE ACTION
Stop delivery then turn off	Attempting to turn the pump off while a delivery is in progress.	Stop all lines, then turn pump off.
Warning: Battery Service	The battery capacity is greater than 200 mA/hr. The battery voltage is less than the depleted threshold and charge level is higher than the low charge threshold.	Replace battery.
Warning: Charger Service	The charging circuitry is not behaving as expected (charge voltage is not changing) and can reduce battery life.	Silence key is pressed.
Warning: Low Battery	Pump not plugged in to AC power.	Plug into AC power, only about 15 minutes of battery life remains.

NOTE: Other error and warning messages will occur when appropriate for the current selection context. For instance, when a change to a required parameter would result in clearing some delivery settings, the warning message will appear when that field is selected. When an input error has just been made, the three quick beeps of an Invalid Key Warning will sound and an appropriate

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warning message will be shown to explain the problem. All such messages will be cleared or replaced by another message upon the next valid input key press.

7.2   Response to Alarms

1. Disable Lockout by confirming back switch is in the down position or press the decimal key followed by 9, 6, & 3 on the keypad.
2. Press [SILENCE] key.
3. Identify/Observe Alarm condition.
4. Correct Alarm condition (see following tables).
5. Press [START] to resume infusion.

   NOTE: Alarm messages begin with an alphanumeric code for tracking purposes only. If troubleshooting does not correct the problem, record the code number and contact technical support.

GENERAL ALARMS

CODE	MESSAGE	POSSIBLE CAUSE	CORRECTIVE ACTION
N100	Unrecognized cassette	Attempting to use unrecognized cassette.	Turn off or insert recognized cassette.
N101	No Action Alarm	Pump programming incomplete.	Press [START] or continue programming.
N102	Infuser Idle 2 Minutes	Pump is ON without operator input. Standby time has elapsed.	Begin programming or turn pump OFF. Re-enter all programmed data.
N103	Memory Failure	The pump did not accept the previous programmed data.	Re-enter all programmed data.
N230	Prox Air, Backprime	When the total proximal air detected exceeds the limit.	Check for clamps, or empty containers on line A or B. Correct as necessary. Backprime into line B tubing or syringe.
N180, N181, N186	Distal Occlusion	Distal line kinked, IV site clotted or positional, pressure limit set too low.	Check distal tubing, check IV site, reset pressure limit. *See page 1-14 for detailed instructions for avoiding a bolus following a distal occlusion.*
N187	Neg Distal Occlusion	Pump too high above patient or defective set.	Lower pump or replace set.
N233, N234	Distal Air	When air is detected at the distal sensor and exceeds the limit.	Remove and reprime cassette using standard technique.

CODE	MESSAGE	POSSIBLE CAUSE	CORRECTIVE ACTION
N250	Door open while pumping	Pump door opened while operating.	Close door with cassette inserted.
N251	Cassette Test Failure	Faulty cassette, proximal or distal occlusion or air in cassette detected at start up.	Check clamps, manually reprime set, close door. Backprime into line B tubing or syringe if appropriate. If alarm recurs on retest, replace set. If alarm repeats, replace pump.
N252	Depleted Battery	Too much time on battery power.	Plug into AC (mains) power.
N253	Hard lockout Violation	The use of the [STOP] key during delivery, or opening the door, while lockout is enabled.	Unlock lockout switch.
N254	Hard lockout Enabled	Pressing of any key except [STOP] during delivery while any alarm is active and lockout is enabled.	Unlock lockout switch.
N255	Soft lockout Violation	The use of the [STOP] key during delivery, or opening the door, while lockout is enabled.	Unlock lockout by pressing the decimal key, followed by 9, 6, & 3 on the keypad.
N256	Soft lockout Enabled	Pressing of any key except [STOP] during delivery while any alarm is active and lockout is enabled.	Unlock lockout by pressing the decimal key, followed by 9, 6, & 3 on the keypad.

LINE A ALARMS

CODE	MESSAGE	POSSIBLE CAUSE	CORRECTIVE ACTION
N105	Callback Line A	Alarm programmed by user. Change in delivery for Loading Dose to Maintenance Step or for any step in "Multistep" therapy provided the step is not the last step.	Press [SILENCE].
N161	Line A VTBI complete	VTBI complete on line A.	Program new VTBI.
N185	Prox Occl A At Startup	Proximal line obstructed, line A container (or syringe) disconnected or obstructed during non-delivery (startup).	Examine line A for kinks or closed clamps. If there are closed clamps, open the clamps. Then, open and close door. Continue programming. Replace set if problem persists. If clamps are not opened prior to completion of cassette test, peak proximal occlusion may recur. For syringe, select ▲ [Backprime].

CODE	MESSAGE	POSSIBLE CAUSE	CORRECTIVE ACTION
N184, N190, N191	Prox Occl A / Air	Proximal line obstructed, line A container disconnect or obstruction.	Examine line A for kinks, closed clamps, or air in cassette.
N232	Prox Air A, Backprime	When proximal air detected exceeds the limit for the line.	Check for clamps, or empty container. Correct as necessary. Backprime into line B tubing or syringe.

LINE B ALARMS

CODE	MESSAGE	POSSIBLE CAUSE	CORRECTIVE ACTION
N104	Callback Line B	Alarm programmed by user. Change in delivery for piggyback delivery, Loading Dose to Maintenance Step, or for any step in "Multistep" therapy provided the step is not the last step.	Press [SILENCE].
N160	Line B VTBI complete	VTBI complete on line B.	Program new VTBI.
N183	Prox Occl B At Startup	Proximal line obstructed, line B container (or syringe) disconnected or obstructed during non-delivery (startup).	Examine line B for kinks or closed clamps. If there are closed clamps, open the clamps. Then, open and close door. Continue programming. Replace set if problem persists. If clamps are not opened prior to completion of cassette test, peak proximal occlusion may recur. For syringe, select ▲ [Backprime].

CODE	MESSAGE	POSSIBLE CAUSE	CORRECTIVE ACTION
N182, N188, N189	Prox Occl B / Air	Proximal line obstructed, line B container disconnected or obstructed.	Examine line B for kinks, closed clamps, or air in cassette. Occlusion caused by empty container, backprime into line B tubing or syringe.
N231	Prox Air B, Backprime	When proximal air detected exceeds the limit for the line.	Check for clamps, or empty container. Correct as necessary. Backprime into line B tubing or syringe.

MALFUNCTIONS

CODE	MESSAGE	POSSIBLE CAUSE	CORRECTIVE ACTION
E300 or higher	Malfunction	A failure has occurred in the pump's internal systems.	Record Malfunction error code. Pump must be turned OFF to clear malfunction. If alarm malfunction repeats, replace pump.

8)   Maintenance and Storage

8.1   Cleaning, Maintenance, and Storage

The cleaning, maintenance, and storage of the Plum A+ are
described in this section.

CLEANING AND SANITIZING

For proper maintenance of the Plum A+, observe the following
cleaning and sanitizing guidelines.

Establish a routine weekly schedule for cleaning the pump. To
clean, proceed as follows:

- **Turn the Plum A+ off using the [ON/OFF] switch**
- **Disconnect from AC (mains) power**

The exposed surfaces of the Plum A+ may be cleaned with a lint-
free cloth dampened by one of the recommended cleaning
solutions in the following list or mild, nonabrasive soapy water.

Clean the cassette door with a soft, lint-free cloth, dampened with
one of the cleaning agents listed in the following table, or a mild
solution of soapy water. Use a small non-abrasive brush to aid in
cleaning the infusion system housing and subsystem chassis
components. To thoroughly clean the cassette receptacle,
disengage the cassette door from the door latch by pressing the
door release tab.

> **CAUTION: DO NOT ALLOW CLEANING SOLUTIONS TO
> SATURATE THE AIR-IN-LINE DETECTORS OR ENTER THE DEVICE
> WHEN CLEANING THE AIR-IN-LINE DETECTORS.**

CLEANING SOLUTION	MANUFACTURER	PREPARATION
Coverage™HBV	Steris Corporation, A division of Calgon Vestal Laboratories	Per manufacturer's recommendation
Formula C™	Diversey Corporation	Per manufacturer's recommendation
Dispatch®	Caltech Industries	Per manufacturer's recommendation
Precise®	Caltech Industries	Per manufacturer's recommendation
Household bleach	Various	Per hospital procedures; do not exceed one part bleach in ten parts water
Manu-Klenz®	Calgon Vestal Laboratories	Per manufacturer's recommendation
Sporicidin®	Sporicidin International	Per manufacturer's recommendation
Super Edisonite®	S. M. Edison Co.	Per manufacturer's recommendation

The rubber pad on the Plum A+3 pole clamp, as well as the IV poles for both instruments, may be cleaned using isopropyl alcohol.

On a routine basis, clean all of the elements behind the cassette door using cotton-tipped swabs saturated with cleaning solution. The cassette door may be unlatched from the door handle to facilitate cleaning.

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To unlatch the cassette door from its handle, tilt the device back, open the cassette door, then push the door release tab to open the door fully.

CAUTION: TO AVOID MECHANICAL OR ELECTRONIC DAMAGE, DO NOT IMMERSE THE PLUM A+ IN ANY FLUIDS OR CLEANING SOLUTIONS.

CAUTION: DO NOT SPRAY CLEANING SOLUTIONS TOWARD ANY OPENING IN THE INSTRUMENT.

CAUTION: CERTAIN CLEANING AND SANITIZING SOLUTIONS MAY SLOWLY DEGRADE COMPONENTS MADE FROM SOME PLASTIC MATERIALS. USING ABRASIVE CLEANERS OR CLEANING SOLUTIONS NOT RECOMMENDED BY HOSPIRA MAY RESULT IN PRODUCT DAMAGE. DO NOT USE COMPOUNDS CONTAINING COMBINATIONS OF ISOPROPYL ALCOHOL AND DIMETHYL BENZYL AMMONIUM CHLORIDE.

CAUTION: NEVER USE SHARP OBJECTS SUCH AS FINGERNAILS, PAPER CLIPS, OR NEEDLES TO CLEAN ANY PART OF THE PUMP.

CAUTION: DO NOT STERILIZE BY HEAT, STEAM, ETHYLENE OXIDE (ETO), OR RADIATION.

CAUTION: TO AVOID PUMP DAMAGE, CLEANING SOLUTIONS SHOULD ONLY BE USED AS DIRECTED. THE DISINFECTING PROPERTIES OF CLEANING SOLUTIONS VARY; CONSULT THE MANUFACTURER FOR SPECIFIC INFORMATION.

BATTERY MAINTENANCE

CAUTION: DO NOT OPERATE THE PUMP ON PATIENTS WITH THE BATTERY REMOVED. USE OF A PROPERLY MAINTAINED AND CHARGED BATTERY HELPS CONFIRM PROPER OPERATION.

CAUTION: IF THE LOW-BATTERY ALARM SOUNDS, CONNECT TO AC (MAINS) POWER IMMEDIATELY.

The Plum A+ is battery powered for emergency backup and temporary portable operation. A fully charged, new battery provides six hours of operation at 125 ml/hr or 500 ml total volume delivered, whichever occurs first.

> **NOTE:** For optimum battery life, the Plum A+ should be operated on battery power for six continuous hours at least once every six months and then charged for a minimum of six hours.

The battery charges whenever connected to AC (mains) power. If the pump is switched OFF, recharge takes approximately six hours. Recharge takes longer if the pump is turned ON.

As a general rule, the more often the battery is partially discharged and recharged, the sooner it will need to be replaced. Consult a qualified biomedical technician for battery replacement if necessary.

To maintain maximum battery charge and to prolong battery life, connect the pump to AC (mains) power whenever possible.

STORAGE

To prolong the life of the Plum A+, observe the following storage precautions:

- **Store the away from excessive heat, cold, and humidity**
- **Store connected to AC (mains) power**
- **Switch the pump OFF using the [ON/OFF] key**

SERVICE

All servicing or adjustments to the Plum A+ should be referred to qualified technical personnel. A technical service manual may be ordered from the local Hospira sales office.

9) Specifications

NOTE: Specification information applies to both systems (Plum A+ & Plum A+3) unless otherwise noted.

PHYSICAL

Dimensions-

Plum A+:	Approximately 8" X 8" X 6", excluding pole clamp protrusion and power cord storage.
Plum A+3:	Approximately 19" X 15" X 14", including pole clamp, barcode wand holder, and power cord.
Weight- Plum A+:	Approximately 9.5 lbs. with battery.
Plum A+3:	Approximately 28 ibs. with (3) batteries.
Casing:	High-impact plastic.

ELECTRICAL

Power Requirements-

Plum A+:	120 V~, 50-60 Hz, 35 VA.
Plum A+3:	120 V~, 50-60 Hz, 120 VA.
Fuses:	F1, F2, 250V~, 0.5 A. (internal)
Power Cord:	Hospital-grade AC cord. 10 ft long, with transparent plug and retainer plate.
Battery- Plum A+:	One sealed, lead-acid, rechargeable 6 V battery, internal to device.
Plum A+3:	Three sealed, lead-acid, rechargeable 6 V batteries, internal to device.
Battery Life:	With a new fully charged battery, the infuser shall operate for a minimum of six hours at 125 mL/hr or less, or deliver 500 mL at 126 mL/hr or greater on one line.

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Recharge:	The batteries charge whenever the pump(s) is connected to AC power. The recharge time is approximately six hours with the device operating at 125 mL/hr on one line.
Electrical Leakage:	Meets ANSI/AAMI ES1-1993 standard: Safe Current Limits for Electro-medical Apparatus.
NURSE-CALL System:	NURSE-CALL alarm is factory set for Normally-Open (NO)
	Contact the Technical Services Center to make an internal adjustment to change the device from Normally-Open (NO) to Normally Closed (NC) system.
Circuitry Ratings:	Voltage-30 VDC Max
	Current- 0.25 Amps Max
	Contact Rating- 3 Watts Max

VTBI RANGE

VTBI Range:	0.1 to 99.9 mL (in 0.1 mL increments)
	100 to 9999 mL (in 1 mL increments)

ENVIRONMENT

Operating Temperature:	5° to 40° C
Storage Temperature:	-20° to 60° C
Atmospheric Pressure:	0 - 10,000 feet (0 - 3,000m) or equivalent pressure
Relative Humidity:	10 - 90% (40° C Max)

DELIVERY RATE RANGE

Lines A and B:	0.1 - 99.9 mL/hr (in 0.1 mL increments)
	100 - 999 mL/hr (in 1 mL increments)

Concurrent Delivery:	0.5 mL/hr minimum for each line
PlumSet:	500 mL/hr cumulative (A+B) maximum
KVO:	1.0 mL/hr or the last primary delivery rate, whichever is less

AIR-IN-LINE ALARM

PlumSet (Distal):	Bolus 0.1 mL (100 microliters) or larger for delivery rates less than 500 mL/hr.
	Bolus 0.5 mL (500 microliters) or larger for delivery rates equal to or greater than 500 mL/hr.
	Cumulative 0.25 mL out of 2.6 mL for delivery rates less than 500 mL/hr.
	Cumulative 0.50 mL out of 5.3 mL for delivery rates equal to or greater than 500 mL/hr.
PlumSet (Proximal):	Bolus at 0.5 mL, Total 1.0 mL

OCCLUSION ALARM AND LIMITS

Distal Occlusion:	The DISTAL OCCLUSION alarm sounds after the distal set tubing or set outlet fitting becomes occluded.
Proximal Occlusion:	The PROXIMAL OCCLUSION alarm sounds if the tubing proximal to the cassette becomes occluded.
Distal Pressure Limit (without alarm):	1 to 15 psig. The maximum pressure is user-selectable. Factory default setting is 6 psig.
Maximum Infusion Pressure:	20 psig

TIME TO DETECT DOWNSTREAM OCCLUSIONS

RATE	OCCLUSION ALARM PRESSURE SETTING	TYPICAL TIME TO ALARM (MACRO)	MAXIMUM TIME TO ALARM (MACRO)
25 mL/hr	6 psig	38 seconds	47 seconds
	15 psig	98 seconds	106 seconds
1 mL/hr	6 psig	17 minutes	22 minutes
	15 psig	45 minutes	49 minutes

* Baseline backpressure is 0 psig *

BOLUS VOLUME RELEASED AFTER DOWNSTREAM OCCLUSIONS ARE CORRECTED

RATE	OCCLUSION ALARM PRESSURE SETTING	TYPICAL BOLUS VOLUME (MACRO)	MAXIMUM BOLUS VOLUME (MACRO)
25 mL/hr	6 psig	0.23 mL	0.28 mL
	15 psig	0.55 mL	0.63 mL
1 mL/hr	6 psig	0.24 mL	0.30 mL
	15 psig	0.59 mL	0.70 mL

* Baseline backpressure is 0 psig *

DELIVERY ACCURACY

The Plum A+ Infusion pump was designed and manufactured to maintain a volumetric delivery rate error of the total fluid delivered of less than or equal to ± 5% over the course of 48 hours at a programmed rate of 1 to 999 mL/hr during normal operating conditions. For use of the device at rates below 1 mL/hr, the delivery rate error is less than or equal to ± 10%.

Backpressure Effect- Positive backpressure on the distal line may affect delivery accuracy by no more than 0.5% per psig (2% per

psig for rates between 0.1 and 0.9 mL/hr) for backpressures up to 15 psig. A typical deviation under these conditions is 0.3%. Negative backpressure may affect delivery accuracy no more than 2% for pressures up to -2 psig (56 inches of water). A typical deviation under these conditions is 0.3%.

Filling Head Effect- Variations in filling head (such as container height) may affect delivery accuracy by no more than 2% for variations in the range -15 to +28 inches. A typical deviation under these conditions is 0.5%.

Concurrent Delivery Effect- When both lines (A & B) are delivering, the ratio of delivery for the fluid with the lowest rate may be affected by as much as 5% for ratios up to 9 to 1.   For higher ratios, the absolute percentage of delivery for the lowest rate may be affected by no more than 0.5%. When air is present in the bubble trap, the absolute percentage of delivery for the lowest rate may be affected by up to 2.0%. When variations in container height are present, the absolute percentage of delivery for the lowest rate may be affected by up to 2.5% for up to 24 inches of container height differences.

ENTERAL & HIGH VISCOSITY FLUIDS EFFECTS

System delivery accuracy limits for each Enteral and High Viscosity Fluid, such as those listed in the following table, can be degraded by an additional maximum of 5%. System accuracy for Enteral Fluids is defined only for rates of 1 to 200 mL/hr, with no suspended air in the solution, and using a Hospira Plum enteral set.

ENTERAL/HIGH VISCOSITY FLUIDS
Dextrose 20% to 50% concentration
Isomil Powder
Similac Powder
Ensure Plus HN
Twocal HN
Jevity

TRUMPET CURVES

The Trumpet Curve Graphs following the Example show representative maximum and minimum percent flow rate deviation from the programmed rate over time. This information was developed in accordance with IEC 60601-2-24: 1998, Sub-Clause 50.102. Refer to this standard for detailed information.
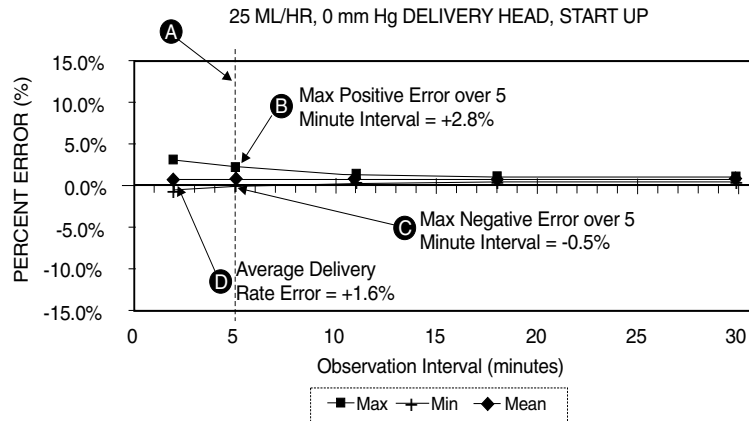
How to read a Trumpet Curve Graph (Refer to example on the following page): The graphs following the Example plot flow rates at 30 second intervals for the first 2 hours and for the 96th hour of delivery. The graph plots mean delivery rate error (Average of 3 pumps) for the 2nd hour and the 96th hour as a straight line. The graph also presents maximum and minimum average delivery rate error for this interval plotted by averaging delivery errors over intervals of 2, 5, 11, 19 and 31 minutes ("Trumpet Curve").

EXAMPLE

From the Trumpet Curve Graph sample that follows, find the 5 minute interval (A) at the horizontal axis and read the corresponding points (B) and (C) on the vertical axis. The values are approximately +2.8% and -0.5%.
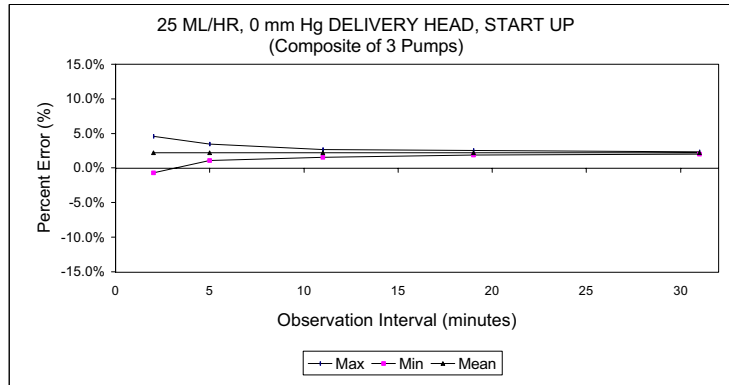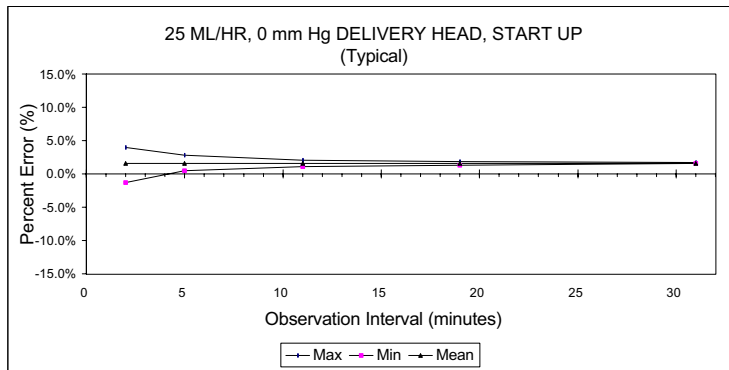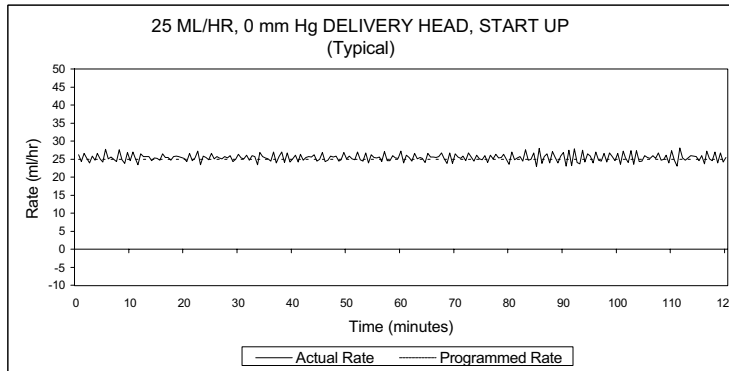
This means that at the rate of 25 mL/hr the average maximum flow rate fluctuation for any 5 minute time interval during the 2nd hour of operation was within the limits of +2.8% and -0.5% from the nominal rate. The average delivery rate error over the entire 2nd hour was +1.6% (D).
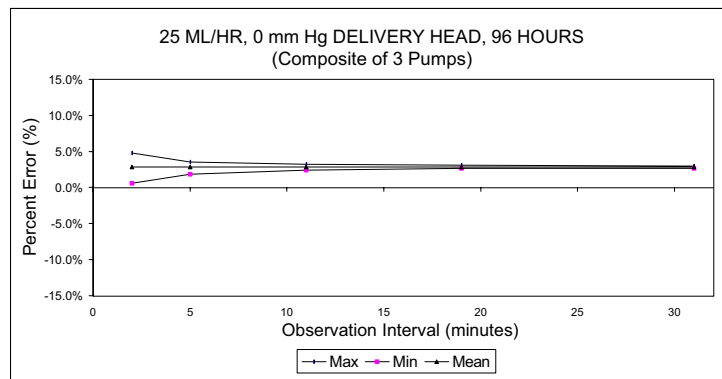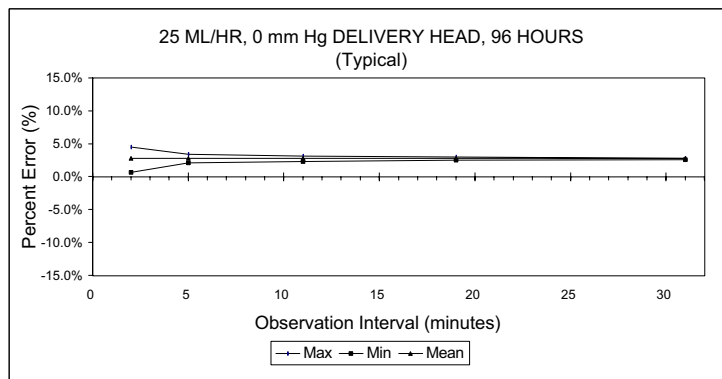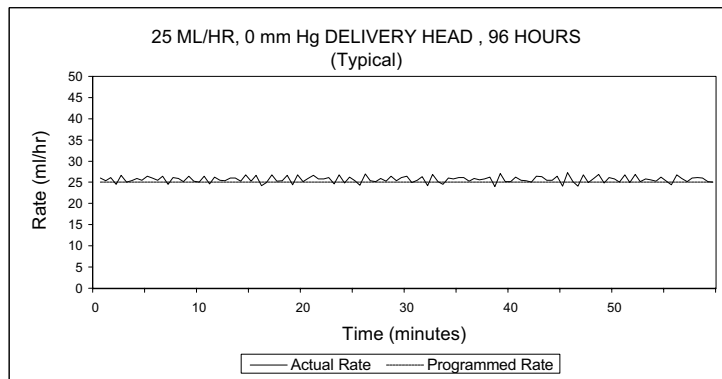
For other time intervals look at other points at the horizontal axis and determine corresponding limits as above.

25 ML/HR, 0 mm Hg DELIVERY HEAD, START UP
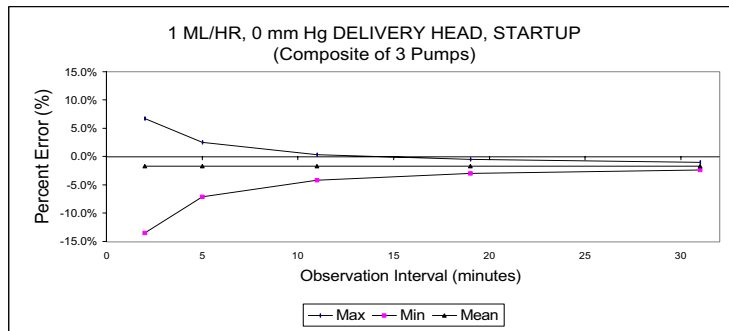
A Max Positive Error over 5 Minute Interval = +2.8%

B Max Negative Error over 5 Minute Interval = -0.5%

C Average Delivery Rate Error = +1.6%

D

PERCENT ERROR (%)

15.0%
10.0%
5.0%
0.0%
-5.0%
-10.0%
-15.0%

0   5   10   15   20   25   30

Observation Interval (minutes)

■— Max —+— Min —♦— Mean

A trained professional can use the resulting graphs to select a pump with the appropriate startup and flow characteristics to suit the clinical application.

> **NOTE:** As an example of how the trumpet curves can be used, consider the maximum and minimum deviations at the 5 minute average interval. The upper curve provides the maximum expected delivery rate error over a 5 minute interval, the lower curve provides the minimum expected delivery rate error over a 5 minute interval. An example would be Dopemine administered at 5 μgm/kg/min. At 5 minutes, the average drug delivery error would be within the range of +2.8% and -0.5% of the expected nominal rate.

25 ML/HR, 0 mm Hg DELIVERY HEAD, START UP
(Typical)

25 ML/HR, 0 mm Hg DELIVERY HEAD, START UP
(Typical)

25 ML/HR, 0 mm Hg DELIVERY HEAD, START UP
(Composite of 3 Pumps)

25 ML/HR, 0 mm Hg DELIVERY HEAD , 96 HOURS
(Typical)

Rate (ml/hr) vs Time (minutes)

Actual Rate ——— Programmed Rate --------

25 ML/HR, 0 mm Hg DELIVERY HEAD, 96 HOURS
(Typical)

Percent Error (%) vs Observation Interval (minutes)

—+— Max —■— Min —▲— Mean

25 ML/HR, 0 mm Hg DELIVERY HEAD, 96 HOURS
(Composite of 3 Pumps)

Percent Error (%) vs Observation Interval (minutes)

—+— Max —■— Min —▲— Mean

1 ML/HR, 0 mm Hg DELIVERY HEAD, START UP
(Typical)

1 ML/HR, 0 mm Hg DELIVERY HEAD, START UP
(Typical)

1 ML/HR, 0 mm Hg DELIVERY HEAD, STARTUP
(Composite of 3 Pumps)

1 ML/HR, 0 mm Hg DELIVERY HEAD, 96 HOURS
(Typical)

1 ML/HR, 0 mm Hg DELIVERY HEAD, 96 HOURS
(Typical)

1 ML/HR, 0 mm Hg DELIVERY HEAD, 96 HOURS
(Composite of 3 Pumps)

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NOTES

10) Supplies and Accessories

10.1 Administration Fluids

ADMINISTRATION FLUIDS

- **All parenteral fluids**
- **Whole Blood**
- **Blood fractions**

ENTERAL AND HIGH VISCOSITY FLUIDS

- **Dextrose 20% to 50% concentration**
- **Isomil Powder**
- **Similac Powder**
- **Ensure plus HN**
- **TwoCal HN**
- **Packed red cells**

CONTAINERS

- **Dual Chamber Parenteral flexible container (Nutrimix)**
- **Large Volume Parenteral flexible plastic containers, including premixed**
- **Large Volume Parenteral glass containers, including premixed and nutritional**
- **Part Fill Parenteral flexible plastic containers, including ADD-Vantage**
- **Part Fill Parenteral glass containers**
- **Small Volume Parenterals**
- **Syringes (may require special adapters)**
- **Top Filled Enteral bags**
- **Ready to hang Enteral solution containers**

10.2 Accessories

- **Syringe Adaptor- List# 11986-48**
- **Mini Pole- List# 12096-04-01**
- **Secondary Container Support- List# 12095-03**
- **Bar Code Reader (Available as a Field-Installed Infuser Option)- List# 11972-04-01**
- **Tandem Carrier- List# 12270-01**
- **Plum A+3 IV Pole (upright)- 12577-04-01**
- **Plum A+3 IV Pole (base)- 12576-04-01**

11) Warranty

Subject to the terms and conditions herein, Hospira, Inc., herein referred to as Hospira, warrants that (a) the product shall conform to Hospira's standard specifications and be free from defects in material and workmanship under normal use and service for a period of one year after purchase, and (b) the replaceable battery shall be free from defects in material and workmanship under normal use and service for a period of 90 days after purchase. Hospira makes no other warranties, express or implied, as to merchantability, fitness for a particular purpose, or any other matter.

Purchaser's exclusive remedy shall be, at Hospira's option, the repair or replacement of the product. In no event shall Hospira's liability arising out of any cause whatsoever (whether such cause be based in contract, negligence, strict liability, other tort, or otherwise) exceed the price of such product, and in no event shall Hospira be liable for incidental, consequential, or special damages or losses or for lost business, revenues, or profits. Warranty product returned to Hospira must be properly packaged and sent freight prepaid.

The foregoing warranty shall be void in the event the product has been misused, damaged, altered, or used other than in accordance with product manuals so as, in Hospira's judgment, to affect its stability or reliability, or in the event the serial number or lot number has been altered, effaced, or removed.

The foregoing warranty shall also be void in the event any person, including the Purchaser, performs or attempts to perform any major repair or other service on the product without having been trained by an authorized representative of Hospira and using Hospira documentation and approved spare parts. For purposes of the preceding sentence, "major repair or other service" means any repair or service other than the replacement of accessory items such as batteries and detachable mains power cords.

In providing any parts for repair or service of the product, Hospira shall have no responsibility or liability for the actions or inactions of the person performing such repair or service, regardless of whether such person has been trained to perform such repair or service. It is understood and acknowledged that any person other than an Hospira representative performing repair or service is not an authorized agent of Hospira.

12)   Drug List

NOTE: The information contained in this manual is current as of 11/01/02. User must assure themselves that drug prescribing information has not changed since the publication of this manual.

Use drug manufacturer recommendations for IV administration when using the Plum A+ infusion pump.

DRUG NAME	DEFAULT DOSE RATE	DEFAULT CONCENTRATION
No Drug Selected	mL/hr	N/A
Abciximab	mcg/kg/min	mg/mL
Acyclovir	mL/hr	N/A
Albumin	mL/hr	N/A
Aldesleukin	mL/hr	N/A
Alfentanil	mcg/kg/min	mcg/mL
Alteplase (rt-PA)	mg/kg/hr	mg/mL
Amikacin	mL/hr	N/A
Aminocaproic Acid	grams/hr	grams/mL
Aminophylline	mg/hr	mg/mL
Amiodarone	mg/min	mg/mL
Amphotericin B	mL/hr	N/A
Ampicillin-sublactam	mL/hr	N/A
Analgesic	mL/hr	N/A
Antibiotic	mL/hr	N/A
Atracurium	mL/hr	N/A
Azithromycin	mL/hr	N/A
Bleomycin	mL/hr	N/A
Blood Products	mL/hr	N/A

Drug Name	Default Dose Rate	Default Concentration
Bretylium	mg/min	mg/mL
Carboplatin	mL/hr	N/A
Cefazolin	mL/hr	N/A
Cefapime	mL/hr	N/A
Cefoperazone	mL/hr	N/A
Cefotaxime	mL/hr	N/A
Cefotetan	mL/hr	N/A
Cefoxitin	mL/hr	N/A
Ceftazidime	mL/hr	N/A
Ceftizoxime	mL/hr	N/A
Ceftriaxone	mL/hr	N/A
Cefuroxime	mL/hr	N/A
Chemotherapy	mL/hr	N/A
Cimetidine	mL/hr	N/A
Ciprofloxacin	mL/hr	N/A
Cisplatin	mL/hr	N/A
Clindamycin	mL/hr	N/A
Co-trimoxazole	mL/hr	N/A
Cyclophosphamide	mL/hr	N/A
Cyclosporine	mL/hr	N/A
Cytarabine	mL/hr	N/A
Dexmedetomidine HCl	mcg/kg/hr	mcg/mL
Diltiazem	mg/hr	mg/mL
Dobutamine	mcg/kg/min	mg/mL
Docetaxel	mL/hr	N/A
Dopamine	mcg/kg/min	mg/mL
Doxorubicin	mL/hr	N/A
Epinephrine	mcg/min	mg/mL

Drug Name	Default Dose Rate	Default Concentration
Epoprostenol	ng/kg/min	mg/mL
Eptifibatide	mcg/kg/min	mg/mL
Erythromycin	mL/hr	N/A
Esmolol	mcg/kg/min	mg/mL
Etomidate	mL/hr	N/A
Etoposide	mL/hr	N/A
Famotidine	mL/hr	N/A
Fentanyl	mL/hr	N/A
Fluconazole	mL/hr	N/A
Flumazenil	mL/hr	N/A
Fluorouracil	mL/hr	N/A
Furosemide	mL/hr	N/A
Gatifloxacin	mL/hr	N/A
Gentamicin	mL/hr	N/A
Heparin	units/kg/hr	units/mL
Hetastarch/NaCl	mL/hr	N/A
Hextend	mL/hr	N/A
Hydromorphone	mL/hr	N/A
Ifosfamide	mL/hr	N/A
Imipenem Cilastatin	mL/hr	N/A
Immune Globulin IV	mL/hr	N/A
Insulin	units/hr	units/mL
Isoproterenol HCl	mL/hr	N/A
Labetalol	mg/min	mg/mL
Lepirudin	mcg/kg/hr	mg/mL
Leucovorin	mL/hr	N/A
Levofloxacin	mL/hr	N/A
Lidocaine	mg/min	grams/mL

Drug Name	Default Dose Rate	Default Concentration
Lipids	mL/hr	N/A
Lorazepam	mL/hr	N/A
Magnesium Infusion	grams/hr	grams/mL
Mannitol	grams/hr	grams/mL
Mesna	mL/hr	N/A
Methohexital	mL/hr	N/A
Methotrexate	mL/hr	N/A
Methylprednisolone	mL/hr	N/A
Metoclopramide	mL/hr	N/A
Metronidazole	mL/hr	N/A
Midazolam	mL/hr	N/A
Milrinone	mcg/kg/min	mg/mL
Morphine	mg/hr	mg/mL
Nafcillin	mL/hr	N/A
Naloxone	mL/hr	N/A
Nitroglycerin	mcg/min	mg/mL
Nitroprusside	mcg/kg/min	mg/mL
Norepinephrine	mcg/min	mg/mL
Ofloxacin	mL/hr	N/A
Ondansetron	mL/hr	N/A
Oxacillin	mL/hr	N/A
Oxytocin	mUn/min	units/mL
Paclitaxel	mL/hr	N/A
Pancuronium	mg/kg/hr	mg/mL
Pantoprazole	mg/min	mg/mL
Penicillin	mL/hr	N/A
Pentobarbital	mL/hr	N/A
Phenylephrine	mcg/min	mg/mL

Drug Name	Default Dose Rate	Default Concentration
Piperacillin-bactam	mL/hr	N/A
Potassium Infusion	mEq/hr	mEq/mL
Procainamide	mg/min	grams/mL
Propofol	mcg/kg/min	mg/mL
Quinolone	mL/hr	N/A
Ranitidine	mL/hr	N/A
Streptokinase	units/hr	units/mL
Teniposide	mL/hr	N/A
Theophylline	mg/kg/hr	mg/mL
Ticar-calvulanate	mL/hr	N/A
Tirofiban	mcg/kg/min	mg/mL
Tobramycin	mL/hr	N/A
TPN	mL/hr	N/A
Urokinase	mL/hr	N/A
Vancomycin	mL/hr	N/A
Vecuronium	mL/hr	N/A
Verapamil	mL/hr	N/A
Vincristine	mL/hr	N/A

NOTES

Plum A+ Infusion Systems

For customer service within the United States, contact:

1-877-9HOSPIRA or 1-877-946-7747

For technical assistance, product return authorization, and to order parts, accessories, or manuals within the United States, contact Hospira Technical Support Operations:

1-800-241-4002

To order parts using the online eCatalog, download technical publications, technical training courses, and additional services, visit the website at:

WWW.HOSPIRA.COM

After authorization, ship prepaid product returns to the following address:

Hospira, Inc.
Technical Support Operations
755 Jarvis Drive
Morgan Hill, CA 95037

NOTE: Outside the U.S., contact your local Hospira sales office.

CAUTION: FEDERAL (USA) LAW RESTRICTS THIS PUMP TO SALE BY OR ON THE ORDER OF A PHYSICIAN OR OTHER LICENSED PRACTITIONER.

WARNING

POSSIBLE EXPLOSION HAZARD EXISTS IF THE PUMP IS USED IN THE PRESENCE OF FLAMMABLE ANESTHETICS.

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Plum A+ Infusion Pump is a registered trademark of Hospira. Plum A+3 is a trademark of Hospira. LifeShield and E.L.I. are trademarks of Hospira. CLAVE, Teflon, Formula C, Manu-Klenz, Super Edisonite, Coverage, Sporicidin, Dispatch, Isomil, Similac, Ensure plus HN, TwoCal HN, and Precise are not trademarks of Hospira, Inc.

Patents Pending

♥ Type CF	Equipment providing adequate degree of protection against electrical shock and suitable for application to patient
IPX1 Drip Proof Medical Equipment	Protected against dripping water
Class 1	Mains supply equipment using protective earth
ⓒSⓐ C US UL2601 ® CSA 601.1	CSA is a registered trademark of the Canadian Standards Association. The use of NRTL/C adjacent to the CSA mark indicates that the product has been certified by CSA to U.S. And Canadian standards. CSA has been accredited by the U.S. Occupational Safety and Health Administration (OSHA), as a Nationally Recognized Test Laboratory (NRTL).