Abbott Pain Manager II

System Operating Manual

For use with
List 13965-04

This manual is designed for use by healthcare professionals, caregivers, and patients. The Abbott Clinical Customer Support hotline is available 24 hours a day to provide consultation and technical assistance regarding the APM II.

Abbott Clinical Customer Support
1-800-338-7867

To order additional copies of this manual (List No. 13254-01) call
1-800-ABBOTT3

430-600032-001 (Rev. 6/95)

Contents

❑ Change History

Part Number	*Description of Change*	*Pages Changed*
430-600032-001 (Rev. 6/95)	Original Issue	
430-600032-A01 (Rev. 2/96)	Correct bolus cord list number; add note regarding priming before starting loading dose; add notes regarding delivery of bolus and loading doses with hour limit set; add Section 9, Installation Test; add CE Mark	Cover, v, vi, 1-3, 3-4 to 3-6, Section 9, back cover

1 Introduction

The Abbott Pain Manager II (APM™ II) is a single-channel infusion pump that delivers analgesia to patients in the hospital, in outpatient treatment centers, and in the home.

The pump is designed for pain management protocols, e.g., epidural, Patient Controlled Analgesia (PCA), and can also be used for other therapies that require infusion delivery schedules of continuous rates at or below 25 milliliters per hour (mL/hr), continuous with bolus, or bolus only.

Three programming options are available:

- Continuous
- Bolus or PCA Only
- Both Continuous and Bolus or PCA

The APM II infuses in three units of delivery: milliliters (mL), milligrams (mg), or micrograms (μg).

A loading dose may be set for delivery during programming, when programming is complete, or after the pump is started. Programmed bolus (or PCA) doses are delivered using the bolus cord.

A keypad lock option is available to control access to pump functions. Safety features include built-in alarms for an improperly installed cartridge, air or occlusion in the line, low power, and device malfunction. For a complete list of alerts and alarms, go to Section 7, *Alerts and Alarms*.

The pump maintains a timed history of each event (for example, bolus requests made and delivered) and any alarms that may occur that can be reviewed on the screen or printed.

The APM II has three power source options: two disposable 9-V batteries, an AC power adapter, or a rechargeable snap-in battery pack. A lockbox, pole clamp, and carrying case are available as accessories to allow the pump to be mounted on an IV pole or carried over a shoulder or around the waist.

The figure on the next page shows the APM II's operating controls.

SILENCE
- Silences various alarms

RUN/STOP
- Starts or stops delivery

HISTORY
- Accesses program, shift, and container information

PRINT
- Prints program, shift, and container information

RESET
- Resets the shift volumes or the current program to repeat the protocol
- Clears numeric entries during programming

REVIEW/CHANGE
- Reviews and changes program

PURGE
- Press and hold to purge the pump

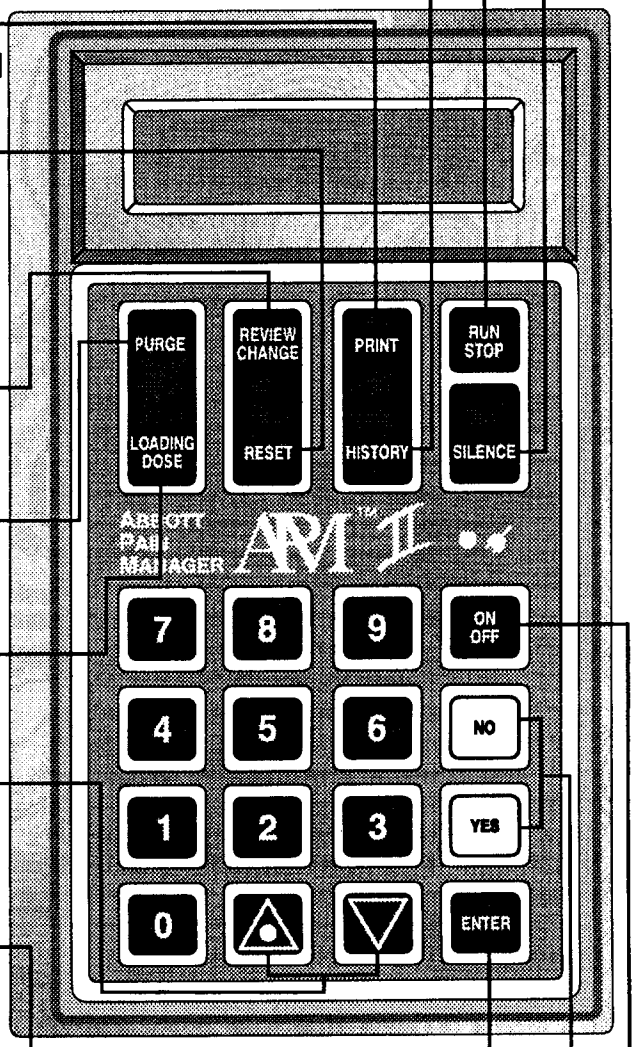
LOADING DOSE
- Enters and delivers a loading dose

UP and DOWN arrows
- Scroll through history log
- Up arrow enters decimal point in numeric values

ENTER
- Accepts values entered during programming
- Access various operating features

YES and NO
- Respond to questions during programming

ON/OFF
- Turns the power on or off



❑ The Abbott Quick-Load™ Pump Set

The APM II can be operated with an Abbott Quick-Load™ set (e.g., List No. 13580), which is a sterile, single-use, disposable set.

Contact an Abbott Laboratories representative for appropriate set configuration. The minimum elements required for use with the APM II pump include one of each of the following:

- Non-vented, collapsible fluid container
- Abbott Quick-Load pump set
- Patient access device

Accessories such as air eliminating filters and extension sets may be added to the line as required by the therapy. To use an Abbott Quick-Load set, follow directions included with the set.

❑ APM™ II Accessories

These accessories are available for use with the APM II:

- AC Power Supply, List 13036

  Powers the APM II. Do not use the power supply with other products.
- Battery Pack System, List 13886

  Two rechargeable Battery Packs and the Battery Charger.
- Battery Pack, List 13887

  Powers the APM II pump during periods of ambulation or when use of AC power is not desirable.
- Battery Charger, List 13888

  Charges the Battery Pack.
- Bolus Cord, List 13701

  Allows bolus requests to be made up to 6 feet away from the pump.
- Carrying Case, List 13959

  Carries a 250 mL or smaller container of solution and the APM II pump with batteries or battery pack installed.

- Lockbox, List 13955

  Secures the pump and 250 mL or smaller container of solution or 30 mL Abbott prefilled syringe. Access is provided for connection of bolus cord, AC Power Supply, and printer.
- Lockbox Key, List 13387

  Replacement key for Lockbox.
- Pole Clamp, List 13230

  Attaches the pump to an IV pole.
- Pole Clamp Adapter, List 13728
- Printer Cables, Lists 13007 and 13008

  13007 for Seiko® DPU411 printer
  13008 for Kodak Diconix® 150+ & 180si printers

  Allows the event history log to be printed.

❑ Indications for Use

The pump is suitable for intravenous (central line or peripheral access), arterial, subcutaneous, and epidural infusion. Pump users should be under the supervision of a healthcare professional and should be instructed in using and troubleshooting the pump. Instruction 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. Approved anesthetic drugs (e.g., Chloroprocaine Hydrochloride USP, Lidocaine Hydrochloride USP) and analgesic drugs (e.g., Morphine Sulfate Injection, Preservative-Free USP) can be administered epidurally through recommended device sets without Y-injection sites.

❑ Contraindications for Use

The pump should not be used by patients who do not have the mental and physical capability or emotional stability to receive infusion therapy with this device. Physicians or certified, licensed healthcare professionals should always oversee therapy. Drugs not compatible

with silicone rubber or PVC plastic, or not stable under infusion conditions should not be used with this system. The drug reservoir should preferably be a nonvented, collapsible container or syringe. If a vented fluid container is used, it should be suspended from an IV pole and used with a Universal Adapter Pin (List 17015-48).

❑ Warnings and Cautions

The following is a list of warnings and cautions that should be heeded when operating the APM II. Attention should be given to all alert messages.

General:

- Federal (USA) law restricts this device to sale by or on the order of a physician or other licensed practitioner.
- Manual references to specific values are approximate only unless indicated otherwise. Air-in-line sensitivity values are approximate only.
- For those patients who are likely to be adversely affected by unintended operations and failures, including interrupted medication or fluid delivery from the device, close supervision and provision for immediate corrective action should be provided.

Regarding Drugs Used, Cartridge Sets, and Containers:

- Never use drugs that are incompatible with silicone rubber or PVC plastic.
- To reduce loss of potency for drugs known to be absorbed by plastic and silicone, begin infusion as soon as practical after priming the set. Use of high flow rates during infusion will minimize drug absorption.
- Do not use medications which are unstable under infusion conditions.
- Always use connections with luer lock fittings.
- Use aseptic technique with all fluid path connections. Remove the protective coverings as assembly progresses.
- Always close the slide clamps before removing the cartridge from the pump.

- Arrange tubing, cords, and cables to minimize the risk of patient strangulation or entanglement.
- Never use vented fluid containers (e.g., glass or rigid plastic) unless suspended from a pole and a Universal Adapter Pin, List No. 17015-48, is in place.

Regarding Air-In-Line and Infusion:

- Stop infusion if signs or symptoms of infiltration occur.
- To reduce the risk of infusing air, use an air-eliminating filter when the air-in-line alarm is off.
- Always remove all air from the cartridge, tubing and injection site. Always disconnect the set from the patient prior to priming.

Regarding Epidural Administration

- The epidural route is recommended to provide anesthesia or administer analgesia for periods up to 96 hours.
- For epidural use, the administration of drugs is restricted to those anesthetic and analgesic drugs approved for continuous epidural administration: Chloroprocaine Hydrochloride USP, Lidocaine Hydrochloride USP and Morphine Sulfate Injection USP, (Preservative Free).
- For epidural administration, the following is recommended:

  - Nylon or Teflon® catheter

  - Pump sets without Y-sites

  - Epidural stickers for the pump indicating ongoing epidural administration

- Epidural administration of drugs should be limited to medical professionals 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 for side effects frequently in a fully equipped and staffed environment for at least 24 hours following completion of drug administration by the epidural route.

- **WARNING: 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 takes longer to return to normal. If over-delivery occurs during administration, observe the patient closely for compression on the spinal cord (disorientation, headache, transient neuralgias) and drug overdose.
- Epidural administration of anesthetics is limited to the continuous mode only.
- Epidural administration of analgesics may be delivered by continuous, bolus, or continuous/bolus.

Regarding Pump Operation:

- If the pump does not perform as stated in this manual, remove from service immediately.
- Always connect to grounded AC outlet when using the AC power supply.
- Do not use non-Abbott AC power supplies with the APM II as this may result in damage to the pump's circuitry.
- Pump performance may vary with use of batteries other than 9-volt Duracell® alkaline batteries. Installing batteries is recommended, regardless of the power source used, to provide continuing operation if AC power fails. Always **replace both batteries** with new batteries when a change is required.
- Always avoid sources of high intensity electromagnetic radiation (e.g., radio transmitters, MRI scanners, microwave ovens, X-ray machines, and CAT scanners).
- Possible explosion hazard exists if used in the presence of flammable anesthetics. Never use the pump in the presence of flammable or explosive vapors.
- 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 electronic noise generated by the infusion device. Proper setup and maintenance of the monitoring equipment should eliminate the artifact. Refer to the appropriate monitoring system documentation for setup and maintenance instructions.

Regarding Handling and Maintenance:

- Product damage may occur if proper care is not exercised during unpacking, installation, and use. Should the pump inadvertently be subjected to mishandling, check connections and programmed data to confirm no damage has occurred.
- Always avoid dropping or hitting the pump. If the pump is dropped or hit, always verify programmed data.
- Never use sharp objects (e.g., fingernails, pens, pencils or other probes) to program or clean the pump.
- To avoid mechanical or electronic damage, never submerge pump in water or other fluids and avoid fluid spills. If pump becomes wet, dry it immediately. Check connections and programmed data.
- Some cleaning and sanitizing compounds may slowly degrade components made from some plastic materials. Do not use compounds containing combinations of isopropyl alcohol and dimethyl benzyl ammonium chloride.
- Do not sterilize by heat, steam, ETO, or radiation. Apply disinfectants to the outside surface of the pump only. Do not use abrasive cleaners or materials on the pump. Using abrasive cleaners or cleaning solutions not recommended by Abbott Laboratories may result in product damage.
- Use only the AC power supply delivered with the APM II to charge the battery pack.
- Always remove batteries if pump is to be stored for an extended period of time.

2 Setup

This section describes how to set up the following elements of the APM II system:

- Power sources - batteries, battery pack, and AC power supply
- Bolus cord
- Cartridge set and container
- Accessories - lockbox, pole clamp, and carrying case

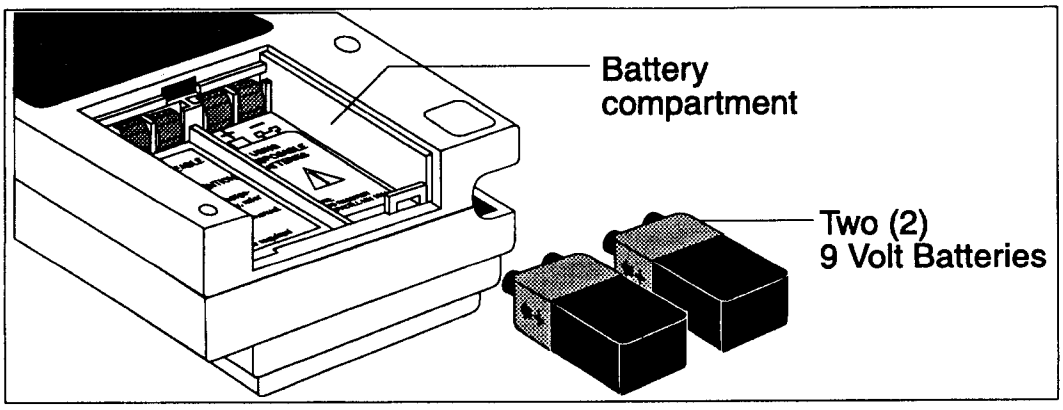
❑ Power Source(s) and Bolus Cord Setup

Install batteries, the battery pack, or the AC power supply before using the APM II. If bolus or PCA delivery is desired, connect the bolus cord.

○ Installing Disposable Batteries

To install batteries, complete the following steps:

- Turn the pump off and remove the battery door on the back of the pump.
- Insert two 9-V batteries into the compartment; be sure the positive and negative battery terminals are placed according to the diagram in the battery compartment.
- Replace the battery door.



CAUTION: To assure proper pump operation, always replace both batteries with fresh alkaline batteries when a change is required.

Installing batteries is recommended regardless of the power source used to provide continuing operation if AC power fails.

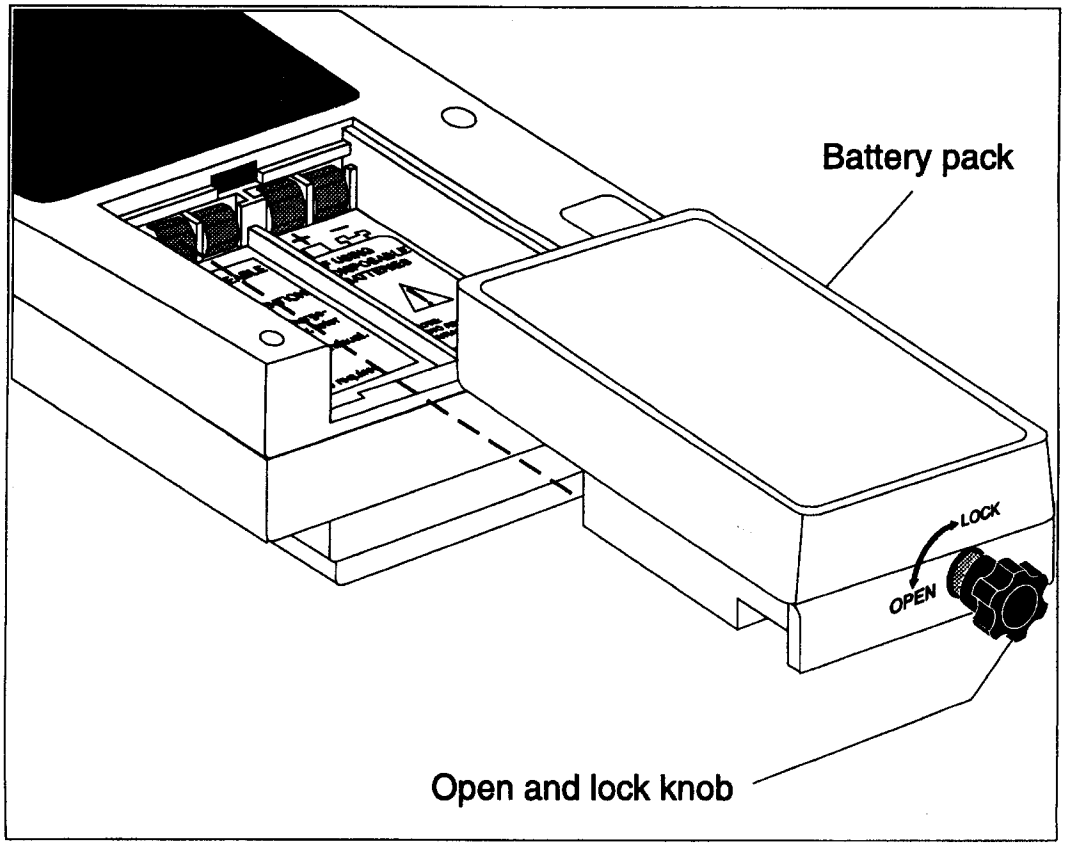
Installing the Battery Pack

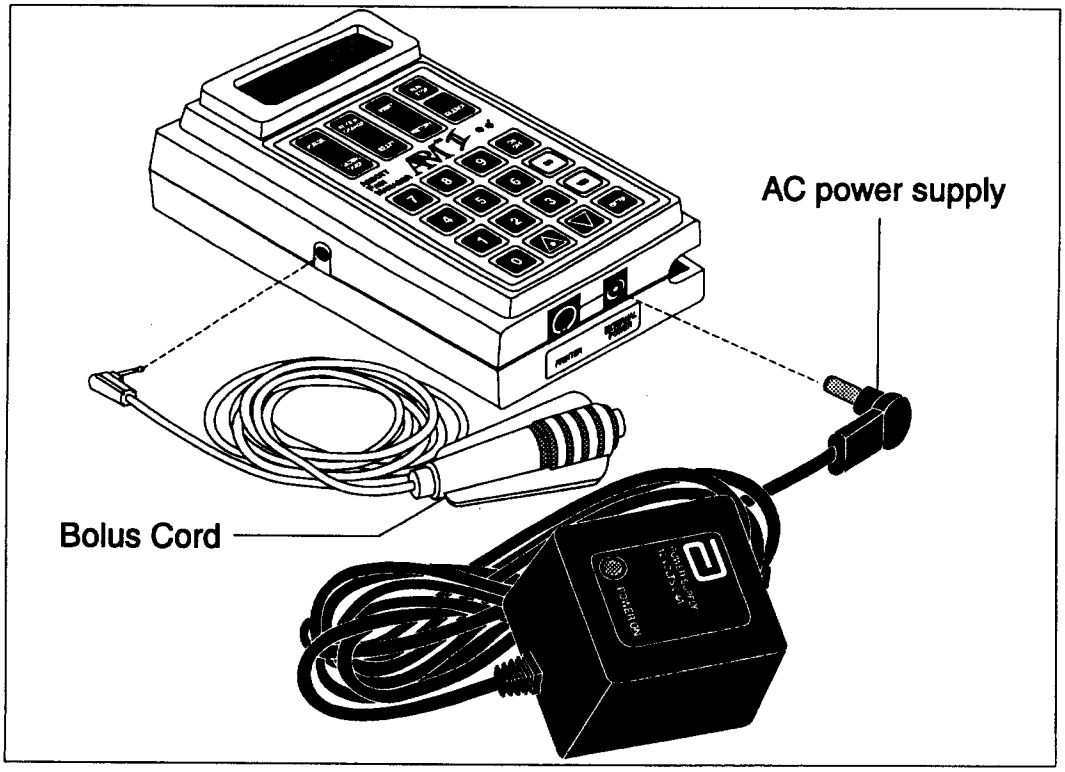
To install the battery pack, complete the following steps:

- Remove the battery compartment door.
- Remove the disposable batteries, if installed.
- Slide the battery pack into the battery compartment.
- While pressing the battery pack in place, rotate its knob clockwise to lock it into position.

To remove the pack, rotate its knob counter-clockwise and slide the pack out.

For charging instructions, go to page 6-3, *Battery Pack Recharging*.





○ Connecting the AC Power Supply

To connect the AC power supply, complete the following steps:

- Insert the pin connector into the port on the bottom of the pump.
- Plug the AC power supply into a standard wall outlet (grounded 110 volt).

CAUTION: Always connect to grounded AC outlet when using the AC power supply.

WARNING: Use of power adapters other than Abbott approved power adapter could damage the internal electronic components of the device which may cause a malfunction of the device.

○ Connecting the Bolus Cord

To connect the bolus cord, insert the pin connector into the port on the pump.

❑ Cartridge Set and Container Setup

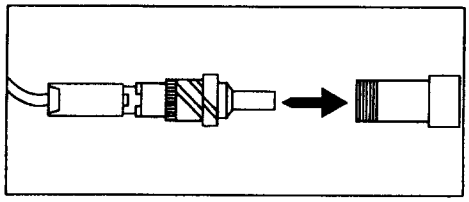
Before programming the pump, prepare the cartridge set and container for delivery, gravity prime the set, attach the anti-siphon valve extension set (if required), and load the cartridge in the pump.

CAUTION: To prevent contamination, use aseptic technique with all fluid path connections. Remove protective coverings as assembly progresses.

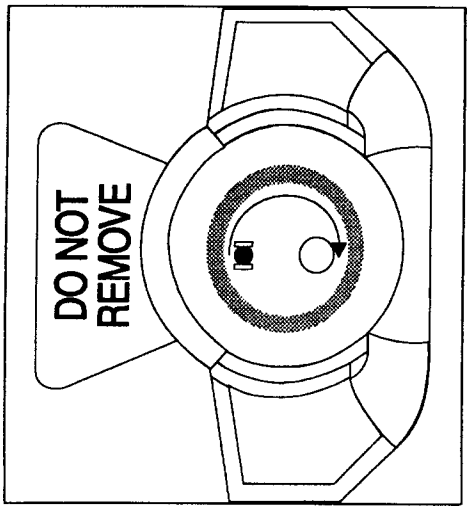
❍ Preparing the Cartridge Set and Container

- Open the delivery set package and remove the contents.

  If using a cartridge set with an anti-siphon valve extension, separate the cartridge set and extension set and return the extension set to the package.



- Loosen, but do not remove, the protective cover from the distal male adapter.

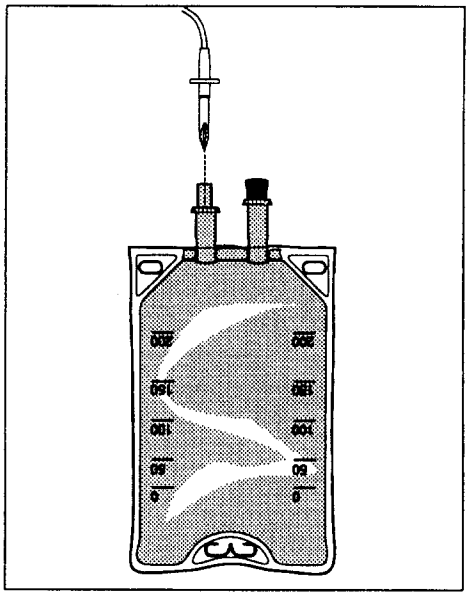


- Confirm that the cartridge is in the open position with the dot inside the parallel lines.

  The cartridge must be open to allow fluid to flow through the tubing.

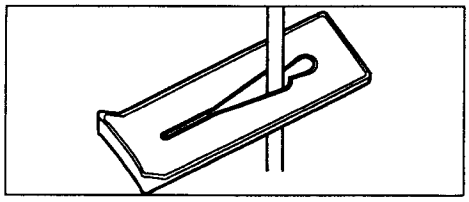
❍ Gravity Priming the Set

The set should be gravity primed before loading into the pump to eliminate air from the tubing.

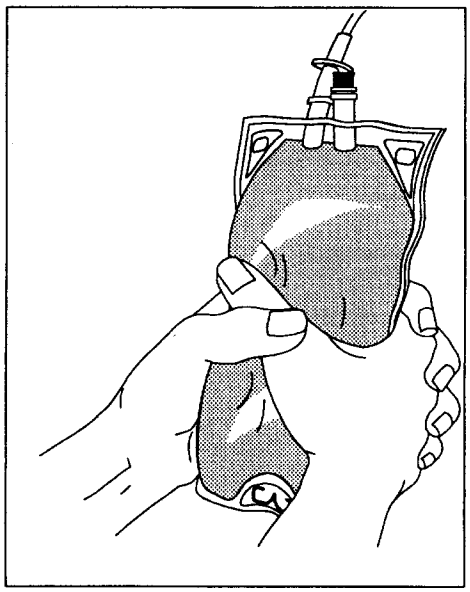


- Remove the protective covers from the fluid container administration port and the cartridge set piercing pin.

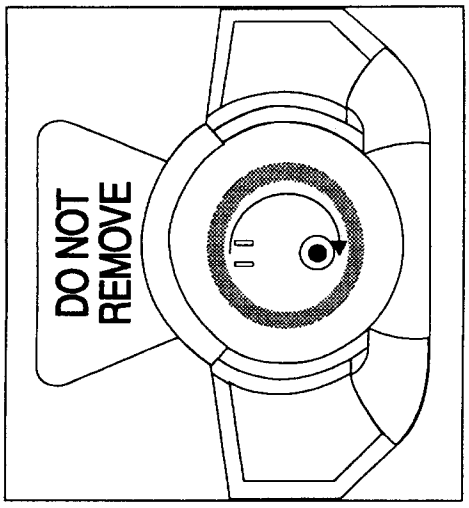
  Turn the flexible fluid container so port is toward the ceiling and insert the piercing pin.



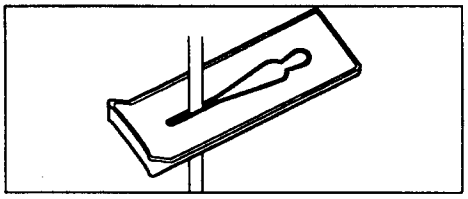
- Confirm that the slide clamp is open and allows fluid to flow through the tubing.



- Roll or squeeze the end of the fluid container to force fluid through the tubing and out of the distal (patient) end of the cartridge set.

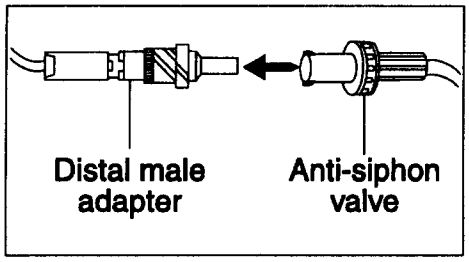


- Turn the control knob on the cartridge to the closed position. Confirm the dot is inside of the red circle.



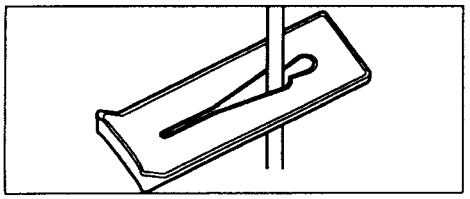
- Close the slide clamp.

Attaching the Anti-Siphon Valve Extension Set



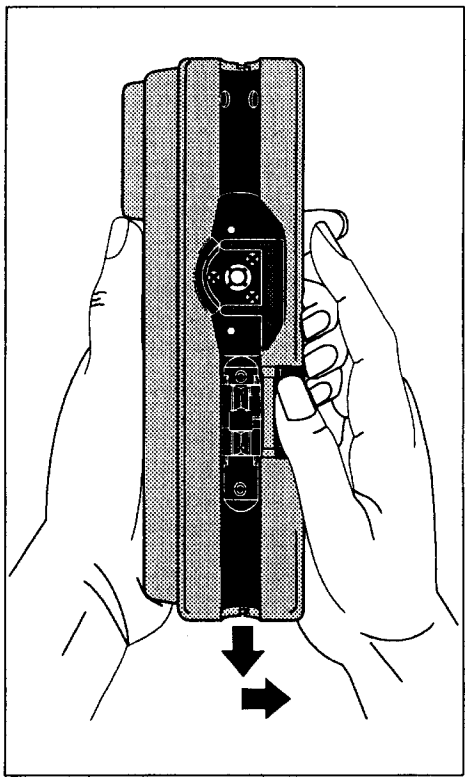
- Remove anti-siphon valve extension set from packaging.

  Remove protective covers from the male connector on the cartridge set and the anti-siphon valve extension set, then aseptically connect two sets.



- Confirm that the slide clamp on anti-siphon valve extension set is open.

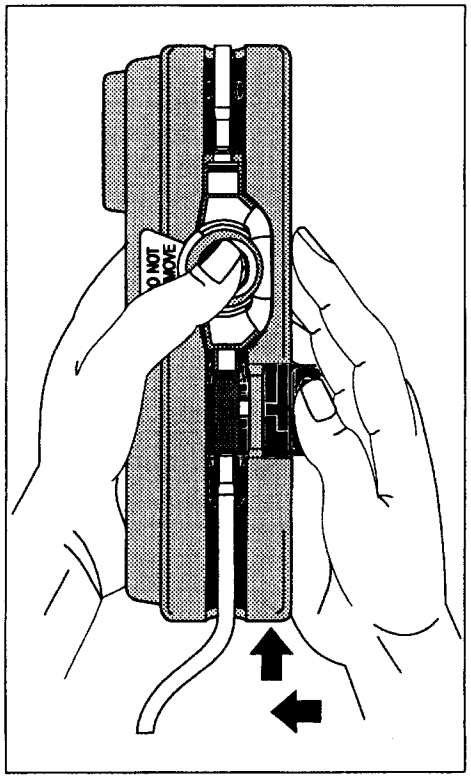
Loading the Cartridge



- Open the pump latch by sliding the latch down, then out.

  Confirm the cartridge is closed (dot is inside the red circle).

  Align the cartridge to fit the shape of the cartridge channel. The tab labeled DO NOT REMOVE should be to the left and the rotor should be positioned over the motor shaft.



- Push cartridge into cartridge channel until firmly seated.

  Close the pump latch by sliding the latch down, in and up.

  Confirm that the cartridge is locked into place.

❑ Purging the Complete Set

Purge the complete set (container, cartridge set, and anti-siphon valve extension set) before an infusion or between changes in medication bags.

WARNING: Remove air from the tubing before connecting the set to the patient.

PRESS RUN/STOP TO INFUSE	In the stop mode, press [PURGE].
PURGE NOW? YES OR NO	Press [YES].
DISCONNECT FROM PATIENT NOW	This message displays briefly. No response required.
TO PURGE, PRESS AND HOLD 'PURGE'	Press and hold [PURGE].

Note: The purge overuse alarm will activate if [PURGE] is held for **four minutes**.

Press [ENTER] + [▲] + [▲] to silence alarm and return to stop mode.

If purging will take more than four minutes to complete, release [PURGE] before alarm occurs, press [YES] to indicate purge is complete, then press [PURGE] again and follow the steps above.

PURGING 0.0 MG	This message flashes while purging is in process. Unit displayed (mL, mg, or μg) is based on program entered.

PURGE COMPLETE? YES OR NO

When [PURGE] is released this display appears. To continue purging, press [NO]. If purging is finished, press [YES] to return the pump to the stop mode.

The purged amount is limited to the amount delivered in four minutes.

Note: The volume purged is **not** added to the volume infused count, but is stored in the history event log.

❑ Using the Lockbox

The lockbox secures the pump with the cartridge and fluid reservoir in place. A key locks the lockbox door. A pole clamp attaches the lockbox to a vertical, round, or square IV pole 0.5-1.5 inches (1.3-3.8 cm) in diameter.

The lockbox provides access to the remote bolus port, the AC power port, and the printer port. The lockbox cannot secure the pump while the rechargeable battery pack is installed.

To secure the pump in the lockbox, complete the following steps:

- Open the lockbox door with the key.
- Place the fluid bag or syringe in the back of the lockbox.

  Note: Confirm the piercing pin and the tubing between the bag/syringe and the pump are not kinked. **The pump signals an occlusion only if the kink is between the pump and the patient.**
- Slide the pump with the installed cartridge from right to left in the front of the lockbox. Confirm that the tubing and cords emerge from the lockbox through the appropriate openings.
- Close the lockbox door and lock with the key.
- Secure the lockbox to the IV pole with the pole clamp.

Confirm that the lockbox is secure on the IV pole when the door is opened.

❑ Using the Pole Clamp

If a lockbox is not used, the pump can be secured to an IV pole by using the pole clamp package.

To attach the pump to the pole clamp, screw one half of the two piece pole clamp package into the large hole on the top left side of the back of the pump, then slide the pump onto the pole clamp.

❑ Using the Carrying Case

The pump and the fluid bag can be placed in the carrying case for transportation. The carrying case strap can be adjusted to carry the case over a shoulder or around the waist.

Note: Confirm that the tubing between the fluid bag and the pump is not kinked. **The pump signals an occlusion only if the kink is between the pump and the patient.**

To use the carrying case, proceed as follows:

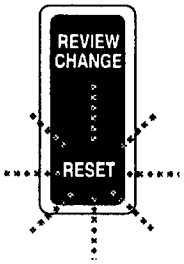
- Unzip the top of the case and release all Velcro® straps.
- Place the pump and installed cartridge in the lid so the back of the pump faces up and the display screen is visible through the clear window of the case.
- Secure the wide straps across the width of the pump and secure the long black strap across the length of the pump.
- Release the black retaining straps.
- Open the Velcro pocket flap in the bottom of the case.
- Insert the fluid container with the spike connection on the open side of the pocket.
- Secure the Velcro pocket flap and secure the black retaining straps over the pocket flap and the tubing in the Velcro tubing guides.
- Verify the patient side of the tubing and the remote bolus cord (if connected) emerges through the carrying case from the zipper gap, then zip the case closed.

3 Programming

❑ Programming Tips and Information

Use the number keys to make value selections and press [ENTER] to accept; e.g., press [2] + [0] + [ENTER] to enter 20.

Press [▲] to place a decimal point in a numeric value.



Press [RESET] before pressing [ENTER] to return an incorrect numeric value to zero.

'ENTER' IF DONE

About 5 seconds after selecting a numeric value you will be reminded to press [ENTER] to confirm that value.

AMOUNT TOO SMALL

If a value entered is too small, this message flashes; the pump defaults to zero.

AMOUNT TOO LARGE

If a value entered is too large, this message flashes; the pump defaults to zero.

ROUNDING

Volumes in mg or µg may be rounded down to the nearest 0.1 mL equivalent. The pump makes the calculation, then displays the rounded value for confirmation.

CONCENTRATION x xG/ML

Variable characters are shown in this manual as *x*. The actual displays you will see depend upon choices you make during programming.

❑ Turning On the APM II

UNIT SELF-TEST IN PROGRESS	Press [ON/OFF] to power on the pump. The pump begins a self-test. No response required.
PCA MODE CONTINUOUS ONLY	The current program mode displays, if it was not cleared before power-off.
TIME IS 9:20 AM THU, AUG 3, 95	The current time and date display for several seconds after the self-test. If the time or date are incorrect, program the pump, then change the setting. For instructions, go to page 4-6, *Changing the Clock*.
CLEAR HIST & Rx? YES OR NO	Press [YES] to clear and enter a new program and history or [NO] to keep the current program and history. If [NO] is pressed, the pump enters the stop mode. Press [RUN/STOP] to begin delivery. To retain history and enter a new program, refer to page 4-5, *Entering a New Program*.
CLEARING HISTORY AND Rx	If [YES] is pressed, this message appears indicating the pump is clearing the program and history; no response required.
HISTORY AND Rx CLEARED	The previous program and history are cleared. The pump automatically advances to the first programming screen.
KEYPAD LOCKED	If the keypad is locked and [YES] is pressed to clear the history, this message displays briefly. The pump automatically advances to the stop mode. For information, refer to page 4-8, *Locking the Keypad*.

❑ Programming the Pump

Step 1 - Choose delivery mode

EPIDURAL MODE YES OR NO

Press [YES] to program in the epidural mode. Press [NO] to advance to the PCA mode display screen.

PCA MODE YES OR NO

Press [YES] to program in the PCA mode.

Step 2 - Choose type of delivery

1 CONT 3 BOTH 2 BOLUS ONLY

Press [1], [2], or [3] to select type of delivery.

If PCA mode has been selected, the second line will display 2 PCA ONLY.

Step 3 - Choose unit of delivery

SELECT MG/ML YES OR NO

Press [YES] if programming in mg/mL. Press [NO] to scroll to next screen.

SELECT UG/ML YES OR NO

Press [YES] if programming in µg/mL. Press [NO] to scroll to next screen.

SELECT ML ONLY YES OR NO

Press [YES] if programming in mL. Press [NO] to scroll back to mg/mL screen.

The unit selected carries through the remaining steps automatically.

For continuous mL programming, go to Step 4; for bolus only mL, go to Step 5.

CONCENTRATION x xG/ML

Select the concentration of mg/mL or µg/mL. Press [ENTER].

For bolus only programming, go to Step 5.

Step 4 - Set continuous delivery rate

SET RATE x xx/HR

Select the rate. Press [ENTER].

Step 5 - Program loading dose

LOADING DOSE? YES OR NO

Press [YES] or [NO] to indicate if a loading dose is desired.

If [NO] is pressed, go to Step 6 for bolus or PCA programming or Step 7 for continuous programming.

SET LOAD DOSE x xx

Select the loading dose. Press [ENTER].

DEL. LOAD DOSE? YES OR NO

Press [YES] to begin loading dose immediately. Press [NO] to hold the loading dose for later delivery.

Note: The [PRIME] key can be used to prime the set before [YES] is pressed to deliver the loading dose.

TO INFUSE, PRESS 'LOADING DOSE'

If [YES] is pressed, this display appears. Press [LOADING DOSE] to begin delivery.

DEL. LOAD DOSE x xx

The amount infused displays while delivery is in progress.

When delivery is complete, go to Step 6 for bolus or PCA programming or Step 7 for continuous programming.

Step 6 - Program bolus or PCA dose

SET BOLUS DOSE x xx

Select the bolus dose amount (mL, mg, or µg). Press [ENTER].

If PCA mode has been selected, the pump will display SET PCA DOSE.

BOLUS LOCKOUT xxx MINUTES

Select the bolus lockout time (from 5 to 999). Press [ENTER].

If PCA mode has been selected, the pump will display PCA LOCKOUT.

4 OR 1 HR LIMIT? YES OR NO

Press [YES] to set a limit on the amount of drug the patient can be given in one or four hours. If no limit is desired, press [NO] and go to Step 7.

Note: In epidural mode, a default one-hour limit of 25 mL is set (or equivalent in mg or µg). If [NO] is pressed to bypass the limit option, this default remains active. This default limit can be raised or lowered by answering [YES] to set a limit.

Note: A bolus in progress will not be stopped until the individual bolus volume has been delivered, therefore, a bolus delivery initiated before the programmed limit has been reached may exceed the limit at the completion of the bolus.

Note: Loading doses are not included in the limit volume and a limit in effect does not prevent a delivery of a loading dose.

1 = 1 HOUR LIMIT 4 = 4 HOUR LIMIT

Press [1] or [4] to choose the length of limit.

SET x HOUR LIMIT x xx

Select the maximum volume (continuous plus bolus amount) that can be delivered over a one-hour or four-hour period. Press [ENTER].

Step 7 - Program container size

CONTAINER SIZE x xx

Select the container size. Press [ENTER].

Note: Volume that is used when purging the pump with the [PURGE] key is subtracted from the container but is not added to the amount infused.

Step 8 - Select air sensitivity

High = alarm at approx. 100 µL of air.

Low = alarm at approx. 300 µL of air.

Off = air alarm off.

AIR SENSITIVITY 1=HI 2=LOW 3=OFF

Press [1], [2], or [3] to select air alarm sensitivity setting.

The setting selected displays for several seconds, then the pump saves the program and enters the stop mode.

Go to page 2-8, *Purging the Complete Set*, for instructions.

CAUTION: To reduce the risk of infusing air, use an air-eliminating filter when the air-in-line alarm is off.

4 Operation

❑ Starting delivery

Before starting an infusion, confirm the following:

- All the set connections are secure.
- Air is removed from the container and the tubing.
- Slide clamps are open.
- Any clamps on the patient access device are open.

PRESS RUN/STOP TO INFUSE

In the stop mode, press [RUN/STOP].

TOTAL x xx / RATE x xx/HR

The pump enters the run mode. A bar icon (/) rotates while the pump is operating. The total increases as the infusion continues.

❑ Stopping delivery

TOTAL x xx / RATE x xx/HR

In the run mode, press [RUN/STOP].

PRESS RUN/STOP TO INFUSE

The pump enters the stop mode.

❑ Delivering a Loading Dose

If a loading dose is set during programming and not delivered at that time, it can be delivered at the start of the program or delayed for delivery during infusion.

PRESS RUN/STOP TO INFUSE	In the stop mode, press [RUN/STOP]. If a loading dose is available, the following message appears automatically.
DEL. LOAD DOSE? YES OR NO	Press [YES] to begin loading dose. Press [NO] to hold the loading dose for delayed delivery (see instructions below).
TO INFUSE, PRESS 'LOADING DOSE'	Press [LOADING DOSE] to begin delivery.
DEL. LOAD DOSE x xx	The amount infused displays while delivery is in progress.
TOTAL x xx / RATE x xx/HR	When the loading dose is complete, the pump automatically enters the run mode. The dose amount is logged to the history and the bolus lockout time is set (if applicable). Subsequent bolus requests are ignored until the lockout time has elapsed.

➢ Delayed Loading Dose Delivery

If a loading dose is held for delivery during infusion, the user will not be prompted again to deliver the loading dose.

To deliver the delayed loading dose, place the pump in the stop mode, press [LOADING DOSE], and follow the steps above.

After the loading dose completes, press [RUN/STOP] to begin delivery again — restart of infusion is not automatic if the loading dose is delivered after the start of the program.

❑ Delivering a Bolus (or PCA) Dose

To start a bolus delivery, press the button on the end of the bolus cord. The pump sounds three beeps and delivery begins. The amount infused accrues as the delivery progresses.

If the bolus delivery does not start, it may be locked out by one of the following conditions:

- Bolus lockout period is in effect.
- One-hour or four-hour amount limit is in effect.
- Loading or bolus dose delivery already is in progress.

After a bolus is delivered, the amount is added to the totals in the shift volumes and program volumes in the event history log and the bolus delivered count is incremented. When a bolus is requested the demand count is incremented.

❑ Clearing Amounts at Start of Shift

PRESS RUN/STOP TO INFUSE

In the stop mode, press [RESET].

1 NEW SHIFT TOTL 2 NEW CONTAINER

Press [1].

SHIFT RESET

No response required. The pump returns to the stop mode.

Note: When new shift totals are cleared, the Shift Information in the History Event Log is reset to zero; the program amounts continue to accumulate.

Refer to page 5-2 for an example of the History Event Log.

❑ Reviewing the Program

Press [REVIEW/CHANGE] from the run or stop mode to review the current program.

1 REVIEW 2 CHANGE

Press [1].

PROGRAM REVIEW ⇧ TO VIEW

Press [▲] or [HISTORY] to scroll through the program parameters. Press [▼] to scroll back to the previous screen.

REVIEW COMPLETED ⇩ TO VIEW

To end review, press any key other than [▲], [▼], or [HISTORY]. The pump returns to the mode it was in when the review was requested.

❑ Changing the Program

PRESS RUN/STOP TO INFUSE

In the stop mode, press [REVIEW/CHANGE].

1 REVIEW 2 CHANGE

Press [2].

1 CHANGE PROGRAM 2 NEW PROGRAM

Press [1]. A screen listing the mode and type of delivery displays briefly, followed by the first program parameter screen.

For each program parameter, **the current entry displays or flashes**. Press [ENTER] or indicated key, e.g., [YES], to accept parameter as shown or change entries as desired. Every parameter must be confirmed to complete the change program function. After the air sensitivity setting is confirmed the pump enters the stop mode.

❑ Repeating the Program

PRESS RUN/STOP TO INFUSE	In the stop mode, press [RESET].
1 NEW SHIFT TOTL 2 NEW CONTAINER	Press [2].
NEW CONTAINER	No response required. The pump returns to the stop mode.

❑ Entering a New Program

PRESS RUN/STOP TO INFUSE	In the stop mode, press [REVIEW/CHANGE].
1 REVIEW 2 CHANGE	Press [2].
1 CHANGE PROGRAM 2 NEW PROGRAM	Press [2].
CLEAR HISTORY? YES OR NO	Press [YES] to clear the history, or press [NO] to clear only the current program.
EPIDURAL MODE YES OR NO	The pump enters the programming mode. For instructions, Go to page 3-3, *Programming*.

❑ Displaying the Date and Time

PRESS RUN/STOP TO INFUSE

In the stop mode, press [ENTER], then press and hold [1].

TIME IS 9:40 PM THU, AUG 3, 95

The display will remain active as long as [1] is pressed.

❑ Changing the Clock

The clock operates up to one year with the power off or with the batteries removed. The clock, however, needs adjusting for time zones or for daylight saving time changes.

PRESS RUN/STOP TO INFUSE

In the stop mode, press [ENTER], then [2].

12-HOUR CLOCK? YES OR NO

Press [YES] for the 12-hour clock or [NO] if a 24-hour clock is desired.

24-HOUR CLOCK? YES OR NO

Press [YES] for the 24-hour clock or [NO] to return to the 12-hour display.

SET MONTH (arws) AUG 3,95 9:40P

Use the arrows keys to select the month. Press [ENTER].

Screens appear for the day, year, hour, minute, AM or PM (for the 12-hour clock only), and day of the week. Use the number or arrow keys as indicated to make changes. Press [ENTER] to accept each screen.

TIME IS 9:40 PM THU, AUG 3, 95

The changed time and date briefly display, then the pump returns to the stop mode.

❑ Changing the Air Sensitivity

To change the sensitivity setting, complete the following steps:

- Place the pump in the stop mode
- Press [ENTER], then [7].
- Follow the steps below (determined by the current setting).
- After a selection is made, the new setting displays briefly, then the pump returns to the stop mode.

If current setting is HIGH sensitivity:

LESS SENSITIVE ALARM? YES OR NO	Press [YES] to select LOW. Press [NO] to select OFF.
TURN OFF AIR ALARM? YES OR NO	If [NO] is pressed, this screen appears. Press [YES] to select OFF or [NO] to retain HIGH.

If current setting is LOW sensitivity:

MORE SENSITIVE ALARM? YES OR NO	Press [YES] to select HIGH. Press [NO] to select OFF.
TURN OFF AIR ALARM? YES OR NO	If [NO] is pressed, this screen appears. Press [YES] to select OFF or [NO] to retain LOW.

If current setting is OFF (no sensitivity):

HIGH SENSITIVITY ALARM? YES OR NO	Press [YES] to select HIGH. Press [NO] to select LOW.
LOW SENSITIVITY ALARM? YES OR NO	If [NO] is pressed, this screen appears. Press [YES] to select LOW or [NO] to retain OFF.

❑ Locking the Keypad

Locking the keypad restricts access to programming, purging, clearing the event history log, and setting the clock.

For convenience, two types of keypad lock are available:

➢ **Keypad Lock**

Allows the keypad to be locked and unlocked on an as needed basis.

➢ **Automatic Keypad Lock**

Requires the user to lock the keypad each time the pump is placed in the run mode. With this feature activated, the pump will not run unlocked.

The automatic lock may be a Full Lock or Container Lock, which allows the container and shift to be reset.

To access restricted functions, the user can unlock the keypad, but must reactivate the keypad lock before the pump will run.

Deactivating the automatic lock is a separate step from unlocking the keypad.

The following functions are available when the keypad is locked:

- Turning the pump on or off.
- Starting or stopping the pump.
- Delivering a bolus (if available).
- Silencing an alarm.
- Displaying the date and time.
- Displaying software version and system error status.
- Displaying and printing the shift information, container information, or history event log.
- Unlocking the keypad.
- **With Container Lock only:** all of the above plus resetting the container and shift totals.

Remove this page to secure the keypad lock.

❍ Locking the Keypad

PRESS RUN/STOP TO INFUSE	In the stop mode, press the following keys about <u>one per second</u> to lock the keypad: [ENTER] + [▼] + [▼] + [▼]
PRESS RUN/STOP KEYPAD LOCKED	Confirmation message appears briefly on the second line.

❍ Unlocking the Keypad

PRESS RUN/STOP TO INFUSE	In the stop mode, press the following keys about <u>one per second</u> to unlock the keypad: [ENTER] + [▲] + [▲]
PRESS RUN/STOP KEYPAD UNLOCKED	Confirmation message appears briefly on the second line.

❍ Activating the Automatic Keypad Lock

PRESS RUN/STOP TO INFUSE	In the stop mode, press [ENTER], then [8].
ACTIVATE AUTO KEYPAD LOCK? Y/N	Press [YES]. If [NO] is pressed the pump returns to the stop mode.
1=FULL LOCK 2=CONTAINER LOCK	Press [1] or [2] to choose the type of lock.

FULL KEYPAD LOCK ACTIVATED	Type of lock chosen displays briefly, then the pump returns to the stop mode.
LOCK KEYPAD NOW? YES OR NO	When [RUN/STOP] is pressed this message appears. Press [YES] to lock the keypad and start delivery. If [NO] is pressed the pump returns to the stop mode and does not begin delivery.
FULL KEYPAD LOCK IN EFFECT	This message appears briefly as the pump enters the run mode; no response required.
PRESS RUN/STOP TO INFUSE	To access restricted functions without deactivating the automatic lock, place the pump in the stop mode then press the following keys about one per second to unlock the keypad: [ENTER] + [▲] + [▲]

○ Deactivating the Automatic Keypad Lock

PRESS RUN/STOP TO INFUSE	In the stop mode, press [ENTER], then [8].
DEACTIVATE AUTO KEYPAD LOCK? Y/N	Press [YES].
AUTO KEYPAD LOCK DEACTIVATED	No response required. The pump returns to the stop mode.

5 Program History

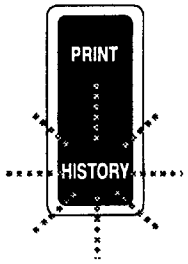
❑ History Review Tips and Information

The pump maintains a history event log that registers the type of event (bolus request, start delivery, etc.), time of event, and action resulting (e.g., bolus delivered or not delivered).

The log has a 256 event storage capacity. When the log limit is reached and not cleared, events continue to be registered; however, the oldest registered event is replaced by the newest event.

For convenience, the shift amounts delivered or container amounts delivered may be viewed independently of the entire history log.

A record can be printed that lists current program parameters, shift information, container information, and the event log (a sample is shown on the following page). To review the current program on screen, refer to page 4-4, *Reviewing the Program*.



The [HISTORY] key accesses the history menu and scrolls through the log. During a review, press and release [HISTORY] to scroll through the log one screen at a time or press and hold [HISTORY] to scroll quickly through the log.

You can also press and release or press and hold [▲] to scroll through the log.

Press and release the [▼] key to scroll back one screen or press and hold [▼] to scroll quickly back through the log.

To stop a review, press any other key. If no key is pressed for 30 seconds, the pump automatically returns to the mode it was in when [HISTORY] was pressed.

```
* * * * * * * * * * * * * * * * * * **
*              ABBOTT                 *
*         PAIN MANAGER PUMP           *
*           PATIENT RECORD            *
* * * * * * * * * * * * * * * * * * **

PATIENT NAME:
_____________________________________

PATIENT ID:
_____________________________________

DRUG ADMINISTERED:
_____________________________________

     PM 03:36  AUG 03, 95
     EPIDURAL MODE
     CONTINUOUS + BOLUS

     SETTINGS:

DRUG CONCENTRATION          1.0 MG/ML
DELIVERY RATE               5.0 MG/HR
LOADING DOSE                1.0 MG
BOLUS DOSE                  0.5 MG
BOLUS LOCKOUT               005 MINUTES
4 HOUR LIMIT               30.0 MG
CONTAINER SIZE            500.0 MG
AIR ALARM ON HIGH

SHIFT CLEARED  03:11PM  AUG 03

BOLUS DELIVERED            0000
BOLUS DEMANDS              0000
BOLUS TOTAL                 0.0 MG
LOADING DOSE                0.0 MG
SHIFT TOTAL                 2.0 MG
PROGRAM CLEARED 03:10PM  AUG 03

BOLUS DELIVERED            0000
BOLUS DEMANDS              0000
BOLUS TOTAL                 0.0 MG
LOADING DOSE                0.0 MG
VOLUME INFUSED              2.0 MG
VTBI                      498.0 MG

HISTORY CLEARED  3:10PM  AUG 03

     EVENT LOG:

PM   03:36 PRINT
PM   03:12 START INFUSION
PM   03:11 SHIFT CLEARED
PM   03:10 NEW CONTAINER
PM   03:10 HISTORY CLEARED
* * * * * * * * * * * * * * * * * * **
*            VERIFIED BY              *
* * * * * * * * * * * * * * * * * * **

* * * * * * * * * * * * * * * * * * **
*          END OF EVENT LOG           *
* * * * * * * * * * * * * * * * * * **
```

Pump Name

Space to Record Patient Identification and Medication Information

Current Program

Shift Information

Container Information

Event Log

❑ Displaying the History Event Log

In run or stop mode, press [HISTORY].

```
1 REVIEW HISTORY
2 VOLUME INFO
```

Press [1].

```
HISTORY CLEARED
 9:40 PM, AUG  3
```

Press [HISTORY] or [▲] to scroll through the log; press [▼] to scroll back. Press any other key to stop the review.

❑ Displaying the Amounts Delivered

In run or stop mode, press [HISTORY].

```
1 REVIEW HISTORY
2 VOLUME INFO
```

Press [2].

```
1 SHIFT
2 CONTAINER
```

Press [1] to display shift information or [2] to display container information.

```
 SHIFT CLEARED
 9:40 PM, AUG  3
```

Press [HISTORY] or [▲] to scroll through the log; press [▼] to scroll back. Press any other key to stop the review.

❑ Printing the Program History

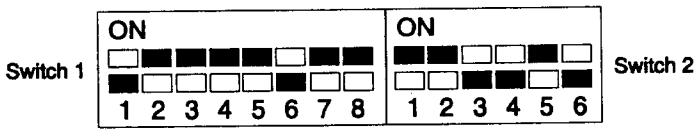
The history event log can be printed by connecting the pump to a printer. Two custom printer cables are available (refer to page 1-4 for list numbers). The cables are not interchangeable.

CAUTION: Printers should be operated on battery power when used with the APM II. Do not connect the AC power supply to a printer.

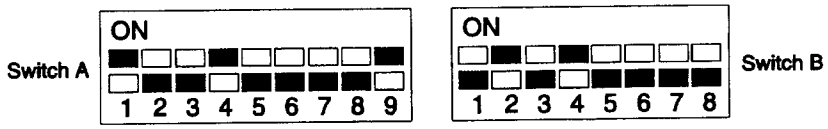
To print from the APM II, complete the following steps:

- Connect the cable to the printer per manufacturer's instructions.
- Insert the cable pin connector into the port on the bottom of the pump.
- Before the printer is powered on, set the dipswitches or printer settings as shown below.
- Load paper and place the printer ON LINE.
- In run or stop mode, press [PRINT] to start printing.

➢ Seiko DPU411 Dipswitch Settings



➢ Kodak Diconix 150+ Dipswitch Settings



➢ Kodak Diconix 180si Printer Settings

Generate the *Current Printer Settings* printout and confirm that they match the required settings.

(Sample default printout)		**Required Settings**
Current Printer Settings		
(1) Emulation	= SP Command Set	**Epson FX-85**
(2) Page Length	= 11 inches	11 inches
(3) Perforation Skip	= Off	**On**
(4) Character Set	= USA	USA
(5) Character Default	= Roman8	changes to **Set 1**
(6) Carriage Return	= CR	**CR+LF**
(7) Line Feed	= LF+CR	**LF**
(8) Graphic Print Dir	= Unidirectional	Unidirectional
(9) LF/Graphic/Pitch Mode	= Normal	Normal
(10) Protocol	= RDY/BUSY	RDY/BUSY
(11) Parity	= None	None
(12) Data Length	= 8 bits	8 bits
(13) Baud Rates (Stop Bits)	= 9600 (1)	**2400 (1)**

6 Maintenance

CAUTION: To avoid mechanical or electronic damage, do not immerse pump in any fluids or cleaning solutions.

Some cleaning and sanitizing compounds may slowly degrade components made from some plastic materials. Do not use compounds containing combinations of isopropyl alcohol and dimethyl benzyl ammonium chloride.

Do not sterilize by heat, steam, ETO, or radiation. Apply disinfectants to the outside surface of the pump only. Do not use abrasive cleaners or materials on the pump. Using abrasive cleaners or cleaning solutions not recommended by Abbott Laboratories may result in product damage.

To avoid pump damage, cleaning solutions should be used only as directed in the table on the following page. The disinfecting properties of cleaning solutions vary; consult the manufacturer for specific information.

Never use sharp objects such as pens, pencils, fingernails, paper clips, needles, etc., to clean the pump.

❑ Cleaning and Disinfection

The pump case exterior and cartridge channel should be kept clean and free of contamination. Establish a routine schedule for cleaning the APM II.

To clean the APM II, complete the following steps:

- Turn off the pump.
- Clean the exposed surfaces of the pump with a soft, lint-free cloth dampened with the appropriate cleaning solution listed in the table on the following page.

  The pump is not affected by the appropriate cleaning solutions.

Note: Not all cleaning solutions are disinfectants. Check product labeling.

- Wipe the solution from the pump surface with a moistened cloth.
- Dry the pump after cleaning.

Cleaning Solutions		
Cleaning Solution	***Manufacturer***	***Preparation***
Super Edisonite®	S. M. Edison Chemical Co.	Per manufacturer's recommendation
Vesphene® II se	Calgon Vestal Laboratories	Per manufacturer's recommendation
Manu-Klenz®	Calgon Vestal Laboratories	Per manufacturer's recommendation
Formula C™	Diversey Corp.	Per manufacturer's recommendation
Household bleach	Various	Per hospital procedures; do not exceed one part bleach in four parts water

❑ Cleaning the Optics

The area containing the optics surfaces, located in the cartridge channel, should be cleaned on a regular basis.

CAUTION: If the optics surfaces are not kept clean and free of detergent film, the pump's ability to detect air in the tubing or occlusion in the tubing between the pump and the patient may be impaired.

To clean the pump optics:

- Remove the cartridge, if installed.
- Use a moist cotton swab to clean the pump optics and cartridge channel.
- Dry the pump optics and cartridge channel after cleaning. Assure that the optics surfaces are free of detergent film.

❑ Battery Pack Recharging

Use the battery charger to recharge the battery pack. A battery pack will fully recharge in four to six hours. Unused battery packs should be charged on a monthly basis to ensure adequate charge for patient use.

Note: The battery charger is designed for use with the Abbott List 13887 only. Do not use the battery charger with other battery packs.

CAUTION: Use only the AC power supply delivered with the APM II to charge the battery pack.

To recharge the battery pack, complete the following steps:

- Plug the battery recharger into an AC power outlet.
- Insert the battery pack into the charger cup.

  Do not force the battery pack into the charger cup. The battery pack will fit into the charger cup one way only.
- When the battery pack is inserted, the charger's yellow light illuminates. When the battery pack is fully charged, the charger's green light illuminates.
- During charging, the battery pack is warm. If the battery pack becomes hot to the touch, remove it immediately and unplug the battery charger. Contact Abbott Clinical Support for assistance.

❑ Storage and Memory Protection

Store the APM II in a cool, dry place. Remove the disposable batteries or the battery pack before storing the pump.

Program and event history are protected in the software memory for at least one year when power is removed from the pump.

❑ Functional Testing

Abbott Laboratories recommends performing the tests outlined in the *APM II Installation Test Guide* (List No. 13965-04-65) every 12 months to verify that the pump is functioning properly.

❑ Repair

The APM II has no user-serviceable components, with the exception of disposable batteries.

Homecare Customers: Call your healthcare professional or homecare company regarding any required service or repairs. Do not attempt to repair the pump for any reason.

The APM II is covered by a manufacturer's warranty for one year after purchase (refer to page v). During this time, opening the pump case for any reason voids this warranty.

Refer all service to qualified and trained personnel only. An *APM II Technical Service Manual* is available to qualified service personnel.

7 Alerts & Alarms

This section contains information on audible and visual alarms that may occur with the APM II.

CAUTION: If the pump does not perform as stated in this manual, stop using it immediately.

❑ Customer Support

The healthcare professional should contact either an authorized Abbott representative or the Abbott Clinical Customer Support hotline, available **24 hours a day**, for consultation and technical assistance.

To return a pump for service, first contact Abbott Clinical Customer Support to receive a Returned Goods Authorization (RGA) number, then return the pump to Abbott AIS Technical Service.

Abbott Clinical Customer Support:

1-800-338-7867

Abbott AIS Technical Service
15330 Avenue of Science, Suite 100
San Diego, CA 92128

❑ Displaying Software Version

The software version can be displayed from the stop mode by pressing and releasing [ENTER], then pressing and holding [5].

```
VERSION-    X.XXX
ERR- X
```

Continue to hold [5] to retain the display. The stop mode display returns when [5] is released.

❑ Guide to Alerts and Alarms

○ Amount Too Large Alert

AMOUNT TOO LARGE

Message displays briefly after pressing [ENTER] when programming a value.

Program value has been requested that pump cannot deliver. Pump displays zero.

○ Amount Too Small Alert

AMOUNT TOO SMALL

Message displays briefly after pressing [ENTER] when programming a value.

Program value has been requested that pump cannot deliver. Pump displays zero.

○ Call Back or Start Alert

START

Intermittent beeping / Message alternates with PRESS RUN/STOP

Pump is programmed but has not been placed in run mode.

Press [SILENCE] to mute alarm for three minutes.

Press [RUN/STOP] to start pump.

○ 1 and 4 Hour Limit Alert

x HOUR LIMIT

No audible alarm
Message flashes

The 1 or 4 hour limit has been exceeded. No action required.

○ Almost Empty Alert

ALMOST EMPTY

Intermittent beeping
Message flashes

Delivery will complete in less than 30 minutes for rates above 1 mL/hr. For rates below 1 mL/hr, less than 1 mL remains to be delivered. For bolus or PCA only delivery, delivery will complete during the next bolus delivery.

Press [SILENCE] to silence alarm for 10-minute interval.

Press [RUN/STOP] to stop pump and clear the message.

○ Empty Alert

EMPTY

Intermittent beeping
Message flashes

Pump has completed delivery.

Press [SILENCE] to mute alarm for two minutes.

Press [RUN/STOP] to stop pump and clear the message.

○ Check Printer Alarm

CHECK PRINTER

Intermittent beeping
Message flashes

If no printer is attached, this alarm occurs when the print key has been pressed accidentally.

If a printer is attached, the printer is not responding.

Press [SILENCE] to mute alarm for two minutes.

Check connections, press [PRINT] to clear the alarm; then press [PRINT] again to begin printing.

Refer to printer manual as required.

○ Check Cartridge Alarm

CHECK CARTRIDGE

Intermittent beeping
Message flashes

Improperly installed cartridge.

Press [SILENCE] to mute the alarm for one minute.

Press [RUN/STOP] to stop pump and clear the alarm. Check cartridge for proper installation:

- Open pump latch.
- Remove cartridge and tubing.
- Align dot in red circle of cartridge.
- Reinsert cartridge in pump.
- Press [RUN/STOP].

If message reappears, change the cartridge.

○ Occlusion Alarm

OCCLUSION

Continuous alarm
Message flashes

Pump detects distal line occlusion.

Press [SILENCE] to mute alarm for one minute.

Press [RUN/STOP] to stop pump.

To clear the alarm, check for source of occlusion:

- Closed slide clamp
- Kinked tubing
- Clamped patient access device
- Clogged IV filter
- Other obstructions
- Check cartridge as described above in Check Cartridge Alarm

Correct problem to clear alarm message, then press [RUN/STOP] to resume therapy.

○ Air-in-Line Alarm

AIR IN LINE

Intermittent beeping
Message flashes

Air is detected in tubing.

Press [SILENCE] to mute the alarm for one minute. Press [RUN/STOP] to stop pump and clear the alarm.

Disconnect administration set from the patient. Purge pump to eliminate air. ***Note:*** To reduce the risk of infusing air, use an air-eliminating filter when air-in-line alarm is off.

○ Power Alarms

LOW BATTERY

Three beeps once a minute
Message flashes

Battery voltage is dropping.

Press [SILENCE] to mute alarm for two minutes.

Change batteries or battery pack as soon as possible or connect pump to AC power.

CHANGE BATTERIES

Intermittent beeping changing to continuous alarm as voltage drops

System cannot meet delivery cycle or has detected battery voltage below minimum.

Replace battery pack, connect AC power, or change disposable batteries.

ON BATTERIES

Three beeps in one minute
Message flashes

Pump has lost AC power and is now running on batteries.

Press [SILENCE] or [RUN/STOP] to clear audible and visual alarm. Restore AC power.

❍ Purge Overuse Alarm

PURGE OVERUSE

Continuous alarm

[PURGE] has been pressed for more than four minutes.

Press [ENTER] + [▲] + [▲] to silence the alarm and clear the message.

❍ Malfunction Alarm

13:01 INTERNAL MALFUNCTION XX

Continuous alarm

The system detects a mechanical or computer problem.

The alarm cannot be muted.

Note: Codes 1, 8, 9, 10, and 15 cannot be cleared by the user. If these codes appear, call Abbott Clinical Customer Support at 1-800-338-7867.

All other internal malfunction codes can usually be cleared by the user. To clear an internal malfunction code, complete the following steps:

- Press [ON/OFF] to turn the pump off.
- Disconnect AC power and/or remove batteries.

  For code 19 only: Verify that an Abbott approved power supply is in use. Allow one minute to elapse before reconnecting power supply to allow the fuse to reset.
- Reconnect power source(s).
- Press [ON/OFF] to turn the pump on.

If pump completes its self-test, the malfunction alarm is cleared. Verify program. Press [RUN/STOP] to resume therapy.

If problem persists, remove pump from service, **record malfunction code number and software version**, and call Abbott Clinical Customer Support at 1-800-338-7867.

Code	Possible Cause of Malfunction Alarm
1	Read Only Memory (ROM) or circular redundancy check (CRC) error. The program or the instructions are not functioning properly.
2	Random Access Memory (RAM) test error. The memory storage area is not functioning properly.
3	Stack overflow. The program is not executing properly.
4	Keypad active (key held down or pressed) when batteries were installed.
5	Motor runaway before power up test. Motor appears to be turning during power on when it should be off.
6	ROM check did not complete.
7	RAM check did not complete.
8	Non Volatile Random Access Memory (NVRAM) CRC error in program.
9	NVRAM CRC error in run time parameters.
10	NVRAM CRC error.
11	NVRAM CRC error - history.
12	Motor runaway. Motor appears to be turning during infusion when it should be off.
13	Voltage present on motor when it should be off. Motor appears to be on when it should be off.
14	Ext. NVRAM does not acknowledge message.
15	Error writing to internal NVRAM.
16	Clock chip error.
17	Clock chip error.
18	SLIM interface voltage level error.
19	Power supply voltage is too high.

❍ System Alarm

SYSTEM ALARM

Intermittent beeping
Message flashes

The system detects a problem with the motor circuit or the cartridge.

Press [SILENCE] to mute alarm for one minute. Press [RUN/STOP] to stop pump and clear the message.

Check cartridge for problem. For error code 5 or 7, replace the cartridge if it is difficult to rotate.

Verify that the system error codes have been cleared by pressing and releasing [ENTER], then pressing and holding [5]. If the code has cleared, the first number that appears after ERR- will be zero. The succeeding numbers indicate up to three prior system error codes. Verify program. Press [RUN/STOP] to resume therapy.

If problem persists, remove pump from service, **record system alarm number and software version**, and call Abbott Clinical Customer Support at 1-800-338-7867.

Code	Possible Cause of System Alarm
1	Motor speed incorrect. Motor not running at expected speed.
2	Motor is not turning when it should.
3	At high rates, the motor is not off when it should be.
4	At low rates, the motor is not off when it should be.
5	Excessive motor current while running.
6	While purging, the motor is not turning when it should be.
7	Excessive motor current while purging.
8	The pump is not running at the expected speed.
9	The pump may not be running at the expected speed or motor calculations were not done (may occur with occlusions).
10	Overuse of purge.

8 Specifications

Delivery Rate

Minimum: 0.1 mL/hr

Maximum: 25.0 mL/hr

Bolus, PCA, & Loading Dose Rate 125 mL/hr

Volume

Minimum: 0.1 mL or 0.1 mg or 1 µg

Maximum: 1000 mL or equivalent in mg or µg
(range: 0.1 to 9999.9 mg or 1.0 to 999999 µg)

Bolus & PCA

Minimum: 0.1 mL or 0.1 mg or 1 µg

Maximum: 25.0 mL equivalent mg or µg
(range: 0.1 to 9999.9 mg or 1.0 to 999999 µg)

Lockout Time: 5 to 999 minutes

Loading Dose

Minimum: 0.1 mL or 0.1 mg or 1 µg

Maximum: 25.0 mL or equivalent mg or µg

Dimensions & Weight 6.75H x 4.0W x 2.3D in. (17.1 x 10.2 x 5.8 cm)
Approximately two pounds (1.0 kg)

Power Sources

AC: Wall plug-in AC power supply List 13036 with 12 foot (3.6 meters) cord and molded plug
Input: 115 VAC, 60 Hz, 0.18A
Output: 12 VDC, 400 mA

Battery: Two 9-V Duracell batteries

Battery Pack: Rechargeable using Battery Charger List 13888

Power Capacity Two 9-V Duracell batteries provide at least 6.0 mL/hr for four days.
The battery pack provides at least 6.0 mL/hr for five days.

Environmental Conditions

Operating: +10° to +40° C; 10 to 90% relative humidity

Transportation & Storage: -20° to +60° C; 10 to 90% relative humidity

Pump Mechanism Microprocessor controlled eccentric-rotor peristaltic motor

Memory Protection At least one year when power is removed from the pump.

Operating Controls The keypad consists of 20 soft keys. The bolus jack is located on the side of the pump. The AC power port is located on the bottom of the pump.

Display Liquid crystal display (LCD) with backlight.

Air Sensitivity

HIGH: Pump alarms at approx. 100 µL of air.

LOW: Pump alarms at approx. 300 µL of air.

OFF: Air alarm off.

Real Time Clock A time of day clock allows logging of history event time and date. Accuracy of the clock is ±3 minutes per month or better.

Printer Port and Interface RS232C serial interface port; isolated interface circuit for use with Seiko DPU411, or Kodak Diconix 150+ or 180si Printers

Alerts and Alarms The following are screen displays for alarm and alert conditions. Go to Section 7, *Alerts and Alarms*, for a description of each condition.

ON BATTERIES	LOW BATTERY
CHANGE BATTERIES	START
AMOUNT TOO SMALL	AMOUNT TOO LARGE
CHECK CARTRIDGE	OCCLUSION
ALMOST EMPTY	EMPTY
PURGE OVERUSE	AIR IN LINE
1 HOUR LIMIT	4 HOUR LIMIT
SYSTEM ALARM	MALFUNCTION
CHECK PRINTER	