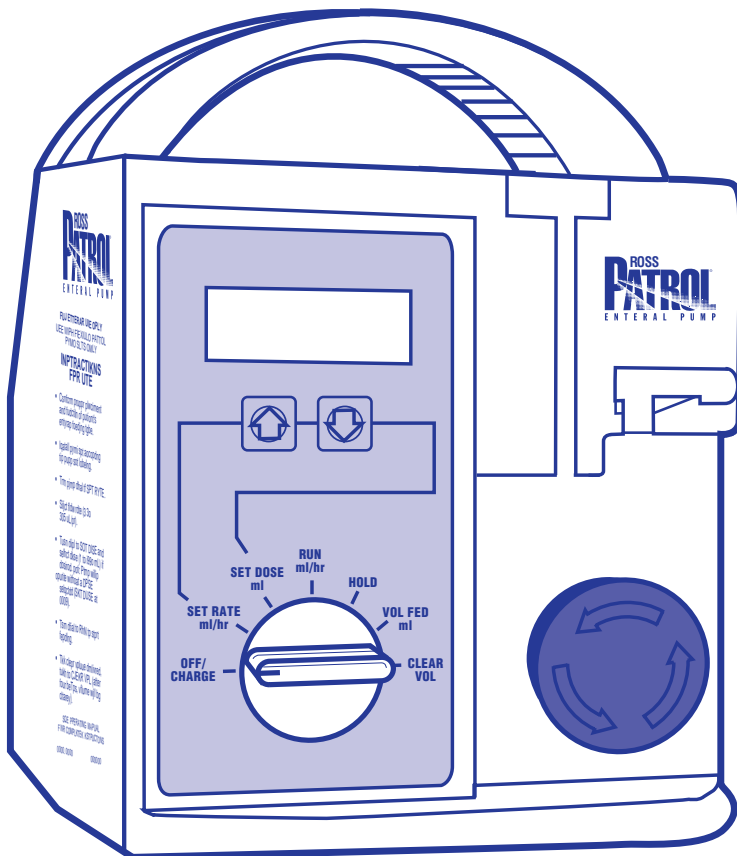


# ROSS PATROL<sup>®</sup>

## ENTERAL PUMP

### OPERATING MANUAL

For Enteral Use Only  
Not For IV Use



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# PUMP CHARACTERISTICS

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The Ross Patrol® Enteral Pump is a microprocessor- (computer-) controlled, rotary peristaltic pump that provides for accurate, controlled enteral feeding in a safe, user-friendly system. It has a large, easy-to-read display and simple controls. The Patrol Pump uses a specially designed feeding set, which includes a bolus-prevention feature to provide safe, accurate control of enteral feeding.

**PRECAUTION:** This pump is designed to deliver liquid enteral feeding products only (standard liquid products, infant formulas, or reconstituted powder products that have been thoroughly mixed into solution).

## The Patrol Pump offers these features:

1. Alarms for free-flow
2. Flow-rate selection from 1 to 300 mL/hr in 1 mL/hr increments
3. Accuracy to  $\pm 10\%$  or  $\pm 0.5$  mL/hr, whichever is greater (refer to CHECKING PUMP ACCURACY, page 12)
4. Dose setting
5. Volume-fed accumulation
6. 8-hour battery operation at 125 mL/hr, when fully charged
7. Alarms:
  - **FrEE FLO** (free flow)
  - **no FLO** (no flow)
  - **doSE FEd** (dose fed)
  - **LO bAt** (low battery)
  - **SEL rAtE** (invalid rate, select rate)
  - **SEL run** (inactivity, select run)
  - **E1 to E9** (failed pump self-test)
8. Programmable **HOLD** timer
9. Lock-out feature
10. System self-check
11. User-friendly operating controls
12. Simple set-up
13. Memory—Automatic retention of the following values until turned off and disconnected from AC power:
  - **VOL FED** (volume accumulation)
  - **RATE**
  - **DOSE**

# INDICATIONS FOR USE

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The Ross Patrol® Pump can be used for adult and pediatric patients provided the patients can tolerate a feeding range within the pump operational specifications. Those specifications are:

- The flow rate range is 1 to 300 mL/hr in 1 mL/hr increments.
- The flow rate accuracy is  $\pm 10\%$ , or  $\pm 0.5$  mL/hr, whichever is greater.
- Pumps against 18 psi nominal back pressure before no FLO alarm.

**If these specifications are not appropriate for a given patient, the Patrol Pump should not be used.**

# PRECAUTIONS

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- All enteral pumps have the potential to bolus-feed or overdeliver, which is an important consideration in feeding volume-sensitive patients. In these patients, a volume of product no more than four times the hourly feeding rate should be hung.

**NOTE:** Do not rely on free-flow alarm as a criterion for use with volume-sensitive patients.

- **NOT FOR IV USE**

- Confirm proper placement and function of patient's enteral feeding tube (nasogastric, nasojejunal, gastrostomy, etc). Failure to do so may result in vomiting and/or aspiration. Verify the following before initiating feeding:
  1. Only a Ross Patrol Pump Set is being used.
  2. Pump set tubing is properly stretched counterclockwise under rotor and blue connector is secured in the pump.
  3. If the feeding set is damaged in any way (eg, broken, cut, torn, parts separated), replace the set immediately.
  4. Flow rate is set at the prescribed mL/hr (**DIAL: SET RATE**, refer to page 7).

Pump set and container should be replaced as needed, or at least every 24 hours, to avoid fluid-contamination problems. For single-patient use only.

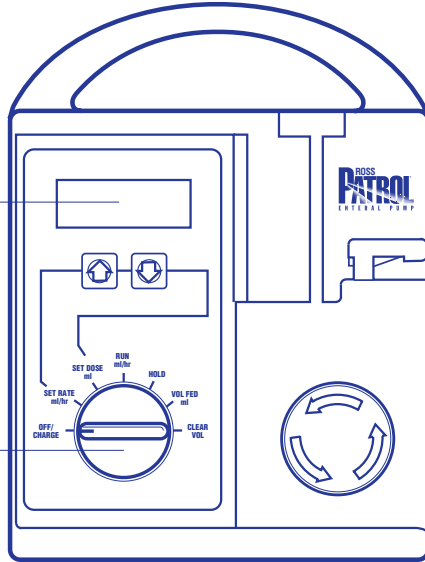
# PANEL DISPLAYS

Here is a simple explanation of the panel features. Understanding them is necessary for successful operation of the pump.

## FRONT PANEL

Feeding Display

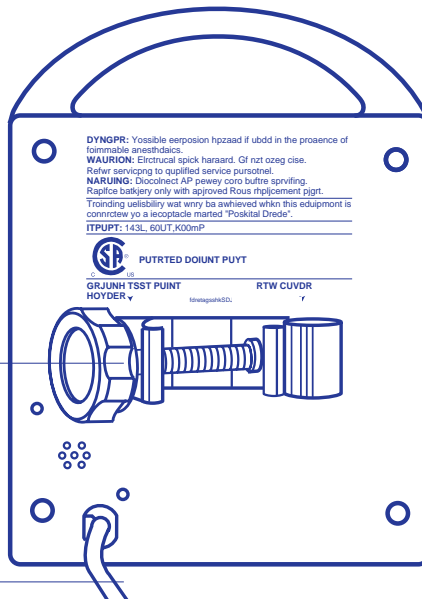
Pump Dial



## BACK PANEL

Pole Clamp with Set Cover Holder

Hospital-Grade Power Cord



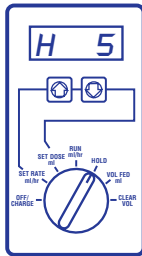


# CONTROL DIAL SETTINGS (continued)

## DIAL

## FUNCTION

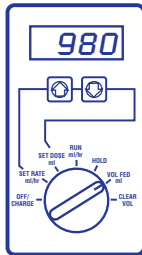
### HOLD



Stops pumping action and audio alarms. **HOLD** is used when correcting an alarm condition or whenever pumping action is temporarily interrupted (such as when connecting a new feeding container). If pump is left on **HOLD** for more than 5 minutes, an alarm will sound and the message **SEL run** (select RUN) will be displayed.

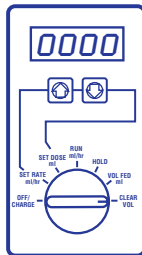
**NOTE:** The **HOLD** timer may be programmed for a duration of 1-90 minutes (in 1-minute intervals) by depressing the keypad arrows either up or down when the dial is in the **HOLD** position.

### VOL FED



Stops pumping action. The display will show the volume delivered. Pump accumulates volume delivered up to 9999 mL unless the volume is reset to zero by turning to **CLEAR VOL** (or the pump is unplugged while in the **OFF/CHARGE** mode). Upon exceeding the maximum volume allowed on the display, the value turns to zero and a new accumulation begins. This is not accompanied by an alarm.

### CLEAR VOL



Stops pumping action and resets the volume fed to zero.

**NOTE:** The pump will “beep” four times before clearing the volume to alert users that the dial has been turned to **CLEAR VOL**. The user must turn dial away from **CLEAR VOL** (to any other setting) before the fourth beep to avoid an unintentional loss of accumulated volume.

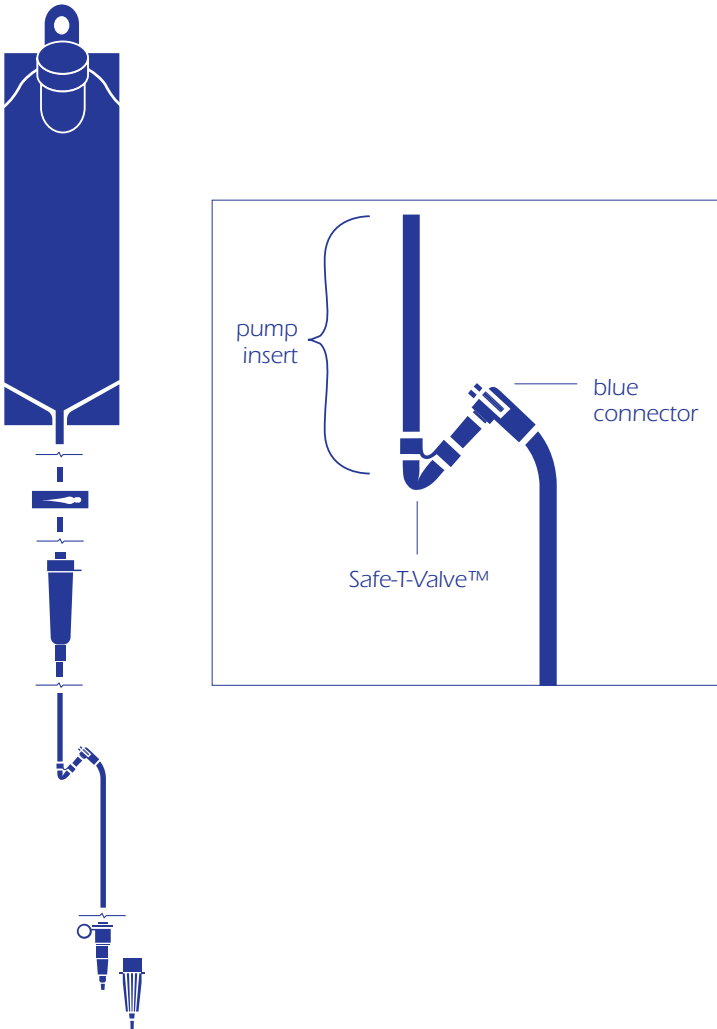
# PUMP SETS

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The Ross Patrol® Pump offers a wide choice of feeding sets.

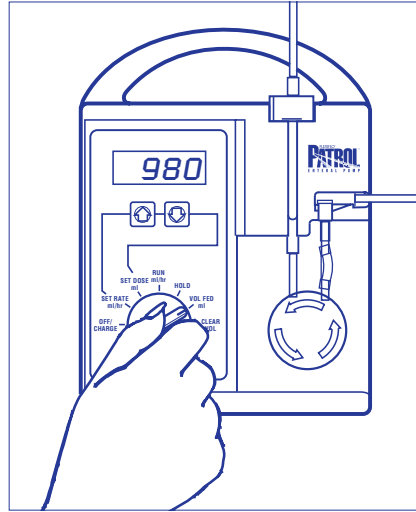
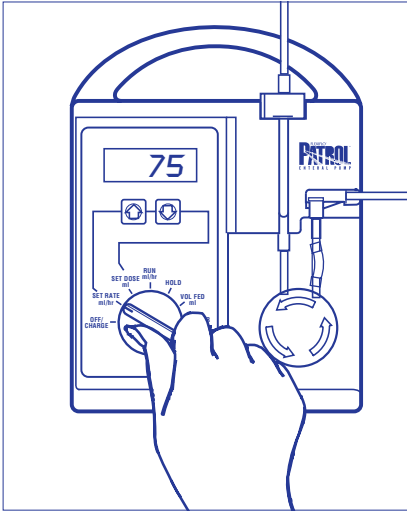
## **PUMP SET EXAMPLE SHOWN:**

Ross Top-Fill Enteral Nutrition Bag  
With Preattached Patrol Pump Set





# INSTRUCTIONS FOR USE (continued)



## TO START PUMP:

13. Turn pump dial to **SET RATE**. Pump will initiate system self-check procedure.
14. Select flow rate, from 1 to 300 mL/hr, by pressing the arrows and observing the entry on the display. Holding down an arrow will cause the numbers to scroll. Never use sharp objects such as pens, pencils, fingernails or paper clips to depress the keypad arrows.
15. If desired, turn dial to **SET DOSE** and select dose by pressing the arrows.  
**NOTE:** Pump will operate without a **DOSE** selected (SET DOSE at 0000).
16. Turn dial to **RUN** to start feeding.

17. To see feeding volume delivered, turn dial to **VOL FED**.
18. To clear the volume delivered, turn dial to **CLEAR VOL**. (This occurs after four beeps.)
19. When feeding is complete, turn pump dial to **OFF**.

**NOTE:** If alarm sounds, turn pump dial to **HOLD**. Correct alarm condition indicated by visual display, then turn dial to **RUN** to restart feeding. (For explanation of alarms, see pages 13 and 14.)

**PRECAUTION:** The pump set and container should be replaced as needed, or at least every 36 hours, to avoid fluid-contamination problems. For single-patient use only. Do not store for prolonged periods at extreme temperatures.

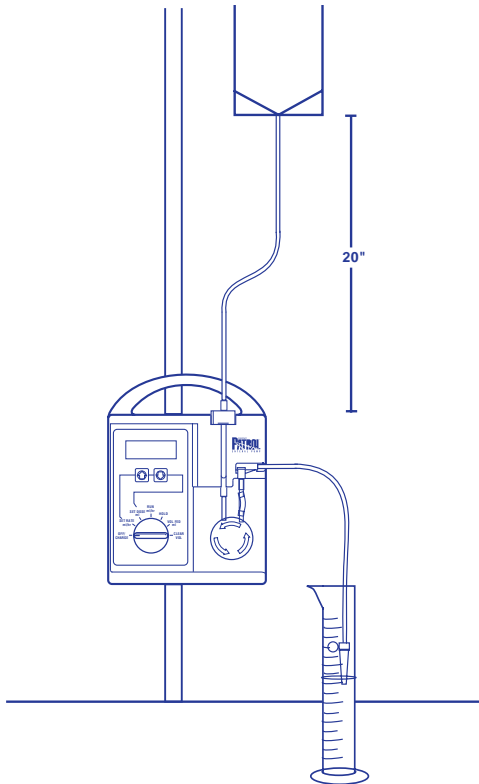
# CHECKING PUMP ACCURACY

Fluid head height and viscosity are two variables that can affect flow rate. To check flow rate, use the following procedure:

**Select a new pump set for this test.** Be sure to use a graduated cylinder for volume measurement—not an enteral container or other uncalibrated vessel. Using Ensure® Complete, Balanced Nutrition®, Osmolite® Isotonic Liquid Nutrition or tap water, fill the feeding container and set up pump according to instructions. Suspend bag to side of or behind and 20 inches above pump (see illustration). With the test pump connected to AC power, start the pump and let it run for 15 minutes. Then run fluid into the graduated cylinder for 30 minutes and compare to **SET RATE** on pump:

<b>SET RATE</b>	<b>Amount Expected in Graduated Cylinder @ 30 minutes</b>
76 mL/hr	= 34.2 mL to 41.8 mL
150 mL/hr	= 67.5 mL to 82.5 mL

If amount in graduated cylinder is incorrect based on **SET RATE**, try a new pump set and repeat procedure.



# TROUBLESHOOTING

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The Ross Patrol® Enteral Pump is designed to be highly reliable. As with any electromechanical device, however, problems may occur. Intermittent audio alarms are accompanied by messages on the front panel indicating the cause of the alarm for all alarm conditions. The following tips will help correct problems that may arise:

<b>VISUAL DISPLAY</b>	<b>CONDITION OR PROBLEM</b>	<b>EXPLANATION OR CORRECTIVE ACTION</b>
<b>no FLO</b>	Flow has stopped due to occlusion or empty container	<ul style="list-style-type: none"><li>▪ Turn dial to <b>HOLD</b>.</li><li>▪ Clear obstruction/check for kinked tubing or empty container.</li><li>▪ Refill container, if necessary.</li><li>▪ Be sure sight chamber is not overfilled or covered with a film of product.</li><li>▪ Turn dial to <b>RUN</b> to start pump.</li></ul>
<b>doSE FEd</b>	Dose complete— <b>VOL FED</b> is equal to the <b>SET DOSE</b>	<ul style="list-style-type: none"><li>▪ Turn dial to <b>HOLD</b>.</li><li>▪ Turn dial to <b>SET DOSE</b> and<ul style="list-style-type: none"><li>▪ depress up arrow to increase dose</li><li>OR</li><li>▪ depress down arrow to zero the dose setting</li><li>OR</li><li>▪ turn dial to <b>CLEAR VOL</b> (after four beeps, volume fed will be cleared).</li></ul></li><li>▪ Turn dial to <b>RUN</b> to start pump.</li></ul>
<b>FrEE FLO</b>	Free-flow alarm	<ul style="list-style-type: none"><li>▪ Remove from service immediately.</li><li>▪ Verify pump set is properly installed. Replace set if necessary.</li><li>▪ Confirm no drops fall when in <b>HOLD</b>.</li><li>▪ Check accuracy per page 12.</li></ul>
<b>SEL rAtE</b>	Dial turned to <b>RUN</b> without selecting a rate	<ul style="list-style-type: none"><li>▪ Turn dial to <b>SET RATE</b>.</li><li>▪ Enter a rate using the up or down arrow.</li></ul>

# TROUBLESHOOTING (continued)

VISUAL DISPLAY	CONDITION OR PROBLEM	EXPLANATION OR CORRECTIVE ACTION
<b>SEL run</b>	<b>HOLD</b> time-out	Turn dial to <b>RUN</b> .
<b>E1 - E9</b>	Electronics error	Remove pump from patient immediately and contact Ross.
<b>LO bAt</b>	Approximately 30 minutes of battery operation remain	<ul style="list-style-type: none"><li>▪ Turn dial to <b>HOLD</b>, then <b>RUN</b>.</li><li>▪ Plug power cord into AC outlet for 12 hours, then continue feeding.</li></ul> <b>NOTE:</b> After 30 minutes, pump alarms continuously for one minute and then shuts down.
<b>H5</b>	<b>HOLD</b> countdown	<ul style="list-style-type: none"><li>▪ Turn dial to <b>HOLD</b>.</li><li>▪ If desired, program the <b>HOLD</b> timer for 1-90 minutes by depressing the up or down arrow.</li></ul>
<b>LOC</b>	Lock-out disables <b>SET RATE</b> , <b>SET DOSE</b> and <b>CLEAR VOL</b> dial settings	<ul style="list-style-type: none"><li>▪ Turn dial to <b>SET RATE</b>.</li><li>▪ Depress up and down arrows simultaneously to deactivate.</li><li>▪ Repeat steps to activate.</li></ul>
<b>8888</b>	Display test	All segments should be illuminated.

# CLEANING

There are no routine calibration or adjustment procedures required with the Patrol® Pump. All servicing or adjustments should be referred to qualified technical personnel (refer to Service Manual).

For trouble-free operation, check the pump daily and clean immediately after spills occur.

**While cleaning, pump should be turned off and unplugged. Do not submerge, autoclave, heat, steam, ETO or radiation sterilize the pump.**

THE PUMP CAN BE CLEANED AS FOLLOWS:

## HOUSING

- Do not spray water or cleaning solution into pump.
- Clean outside surface only. Use soft cloth and warm, soapy water.
- For general cleaning, use dishwashing detergent (nonchlorine-based) or isopropyl alcohol.
- For general disinfecting, use 70% concentration isopropyl alcohol.
- For disinfecting after exposure to AIDS or hepatitis, use 10% concentration of 5.25% sodium hypochlorite (household bleach). This solution may discolor the pole clamp. After exposure to tuberculosis, use 70% concentration isopropyl alcohol. These recommendations are not substitutes for official procedures that may differ among institutions.

## DROP DETECTOR

- Clean the drop sensors with a soft brush, soft lint-free cloth or cotton swab and warm, soapy water. Then rinse the drop sensors with cotton swab and warm water. Be sure no soapy film or residue is left on lenses. Dry thoroughly. **DO NOT CLEAN WITH ALCOHOL.**

## ROTOR ASSEMBLY

- Clean the pump with a soft, lint-free cloth to avoid damaging the surface. Be especially careful with the operator's panel and drop detector area. If necessary, mild warm, soapy water may be used sparingly. Avoid the use of **all** strong solvents or cleaners as these will damage the pump.

Detach the pump rotor from the pump by loosening the Allen screw. The pump rotor can then be immersed in mild warm, soapy water or detergent and rinsed under a faucet. Dry excessive moisture from the pump rotor before reassembly.

After cleaning, plug the pump into an AC grounded electrical outlet to maintain battery charge.

## STORAGE

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- The pump should be stored away from excessive heat, cold or humidity.
- Be sure pump dial is in the **OFF** position.

## SERVICE

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- The Ross Patrol® Enteral Pump is designed to be highly reliable. As with any electromechanical device, however, minor problems may occur. In the event of a pump malfunction or for technical assistance or parts, please contact Ross Products Division, Abbott Laboratories.
- OPERATING INSTRUCTIONS VIDEOTAPE  
An instructional videotape in VHS format assists caregivers and medical professionals in learning procedures for operating the Ross Patrol enteral delivery system. This videotape is available for your use through a Ross representative.

# SPECIFICATIONS

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## Power

Voltage:	100 to 130 VAC, 60 Hz, 1-Phase
Power:	15 watts, average
Fuse:	200 mA, time-delay type
Line Cord:	Hospital-grade, nondetachable (10 feet)
Leakage:	Less than 100 microamps

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## Mechanical

Height:	8.5 inches
Width:	6.5 inches
Depth:	4.8 inches
Weight:	6.6 lbs

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## Operational Specifications — Flow Rates

Range:	1-300 mL/hr
Increments:	1 mL/hr
Accuracy:	$\pm 10\%$ or $\pm 0.5$ mL/hr, whichever is greater (refer to CHECKING PUMP ACCURACY, page 12)
Pressure:	Pumps against 18 psi nominal back pressure before no FLO alarm. Refer to PATROL® MAINTENANCE AND REPAIR MANUAL for test procedure.

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## Battery Operation

Type:	Rechargeable sealed lead acid
Voltage:	6 V; the pump will fully recharge in a maximum of 4.5 hours while pump is off, or 12 hours if the pump is operating.
Expected Life:	When fully charged, 8 hours at 125 mL/hr.

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## Standards

Designed and manufactured to meet requirements of



CSA Standard C22.2 No. 125

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## LIMITED WARRANTY PLAN

Ross Products Division of Abbott Laboratories warrants the Patrol® Enteral Pump against defects in material and workmanship for a one (1) year period from date of delivery. This warranty is valid only to the original purchaser and does not extend to any product, or part thereof, which has been subjected to accident, alteration, damage, misuse, repair by other than Ross authorized representatives, or has not been operated and maintained in the manner prescribed in the Operating Manual or which at the time of pump failure was being used with pump sets or containers other than Ross pump sets and containers. Examples of damage or misuse include, but are not limited to, pumps that have been dropped, have had fluid spilled into or onto the casing or have been submerged.

In no event shall Ross be liable for any incidental, indirect or consequential damages in conjunction with the purchase or use of the pump, even if advised of the possibility of the same.

Ross reserves the right to repair or replace (at its option) any pump that fails to meet the foregoing warranty.

THE WARRANTIES HEREUNDER ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THE WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR A PARTICULAR PURPOSE.

**NOTE:**

When repairs on the unit are made under warranty because of faulty material or workmanship within one year from the date of delivery to the customer, the customer will not be billed for parts repaired or replaced. Also, the customer will not be charged for labor involved in connection with the installation of such parts furnished under warranty.

Shipping costs for units returned to Ross, including loaners, shall be paid by the customer. The units should be promptly returned properly packaged. Loss or damage in return shipment to Ross shall be at the customer's risk. Ross authorization should be obtained to return the unit.



**ROSS** ROSS PRODUCTS DIVISION  
ABBOTT LABORATORIES INC.  
COLUMBUS, OHIO 43215-1724 USA