

MTP® Operation Manual

Models: 1001 and 1001a

MEDICAL TECHNOLOGY PRODUCTS, INC.
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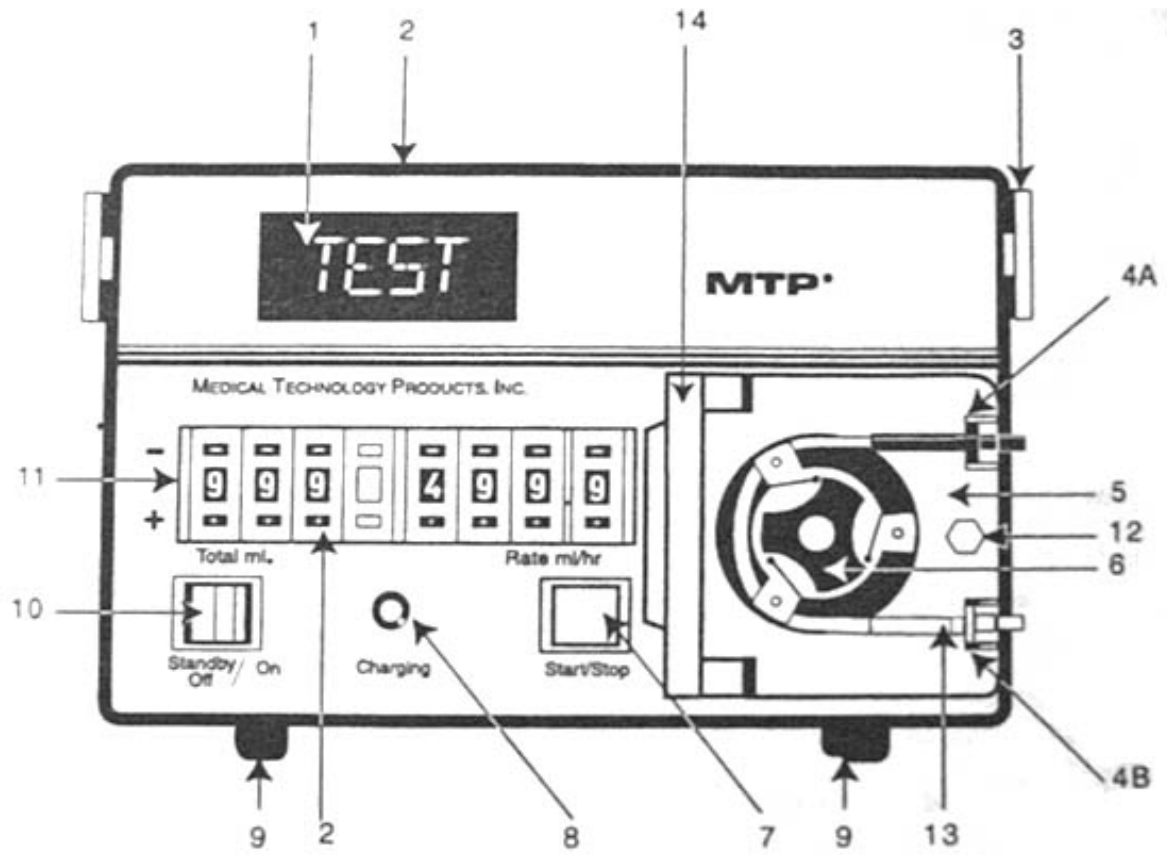
Revision F

November 1997



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DESCRIPTION NUMERICAL KEY

Front View

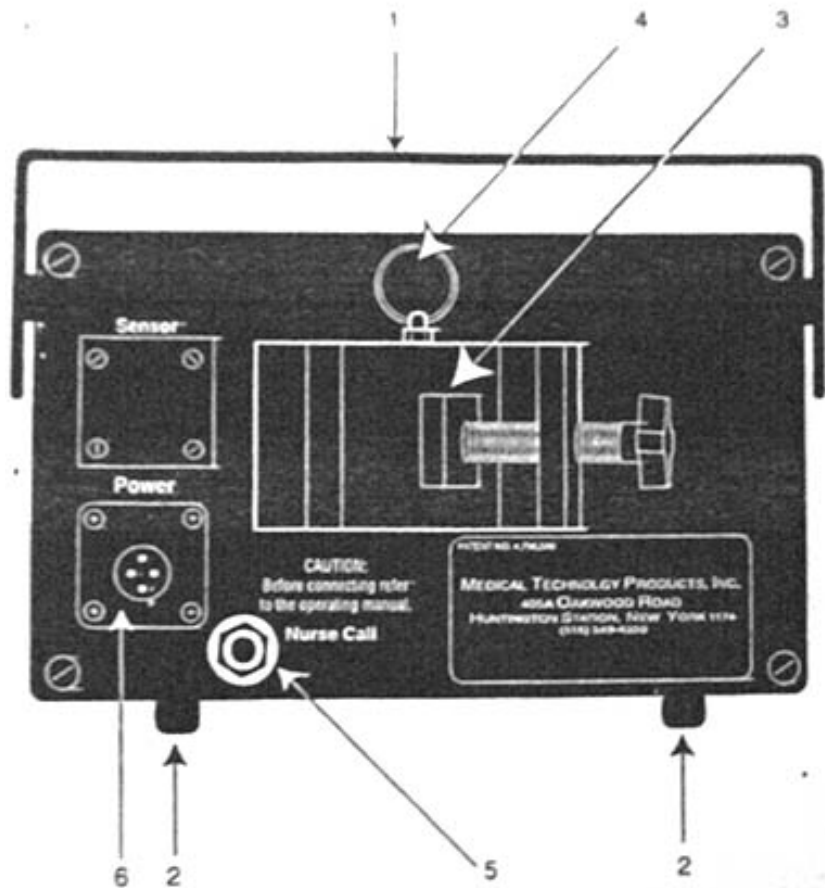
1. Alphanumeric Display – illuminated, light emitting diode (LED) display for TEST-OK-SET, Rate, Volume and all alarm modes.
2. Rate Switches – digital switches for entering infusion rates; MTP Model #1001 has 4 (000.1 to 499.9), MTP Model #1001a has 3 (000 to 499).
3. Carrying Handle – handle is shown in down position.
4. Pump Chamber Connector Slots – a. Blue pump chamber connector inlet slot.
b. Clear pump chamber connector outlet slot.
5. Rotor Panel – contains rotor and channel to hold silicone pump chamber tubing.
6. Rotor – black plastic rotor with three stainless steel rollers – rotates in counter-clockwise direction – rollers roll against and squeeze silicone rubber tubing to effect peristaltic pumping action.
7. Start/Stop Switch – used to start pump, stop pump, momentarily silence audible alarm and to restart pump once an alarm situation has been corrected.
8. Charging Light – when lit, the green LED light indicates AC operation and that the battery is charging and when unlit, indicates that the pump is operating on battery power.
9. Black Rubber Feet – allows pump to be positioned on a table or floor – feet contain 4 holding screws which, when unscrewed, allow pump case to be slid off the pump's chassis.
10. Standby-Off/On Power (Mains) Switch – main power switch to energize the pump.
11. Volume to be Infused Switches – digital switches for entering the total volume to be delivered.

MTP Model #1001 has 3 (001 to 999ml)
MTP Model #1001a has 4 (0001 to 9999ml)
12. Pump case – aluminum case – may be removed by unscrewing screws found in the four black rubber feet on the bottom of the pump.
13. Air Detector – air is sensed through the clear pump chamber connector which is positioned in front of air sensor and only when the clear connector is properly inserted into the outlet (4b) connector slot.
14. Mtp® Rotor Panel Door – (Shown in open position for picture clarity purposes.)

I. Description Numerical Key (continued)

Rear View

1. Carrying Handle – shown in raised position.
2. Black Rubber Feet – same as described in front view.
3. I.V. Pole Clamp – allows pump to be attached to any commercially available I.V. pole with a diameter up to 1¼ inches. Clamp is detachable and may be rotated.
4. Detachable pole clamp locking pin/release pin allows pole clamp to be repositioned or removed from pump.
5. Nurse Call Jack – allows pump to be interfaced to a hospital's nurse call system or the intercom system of an aircraft or emergency vehicle – voltage not to exceed 24 volts.
6. Power (Mains) Connector – allows pump to be connected to transformer/charger.



NOTICE

The MTP® Infusion Pump is a volumetric infusion pump designed to infuse (pump), with a positive pressure, intravenous solutions and medications.

The MTP Infusion Pump is designed to operate only with compatible Medical Technology Products, Inc. IV pump sets. For your convenience, please find at the back of this manual a descriptive listing of the IV pump sets which must be used with this pump.

The user is cautioned not to attempt to use regular gravity flow IV administration sets, or any other type of infusion set, with this infusion pump. To do so will cause the pump to malfunction and such improper usage will create a hazardous condition for the patient.

The IV pump sets that must be used with this pump are for single use only. They may be used for a period exceeding 48 hours, but not greater than 72 hours. The user is advised to consider the recommendations for IV pump set usage issued by the Centers for Disease Control.

This infusion pump is not designed, sold or intended for use except as indicated above. In addition, the user is further cautioned to keep all roller clamps closed when an IV pump set is not completely installed (mounting or dismounting) on the infusion pump. This procedure will prevent an inadvertent free flow of the IV solution. Failure to ensure that the pump set's, or administration set's, filtered air vent is open when administering fluid from an unvented glass I.V. solution bottle will have an adverse affect on the infusion pump's ability to accurately infuse solution at the flow rate selected on the pump's digital rate switches. No alarm will immediately activate to alert the operator of this condition. Only authorized and trained medical personnel, Or others who have been trained (i.e. basic intravenous therapy principles and MTP infusion pump operation procedure) and qualified by such medical personnel, should start, operate, adjust or terminate the use of this infusion pump.

This operation manual is written to provide the clinician with a description of the MTP Volumetric Infusion Pump, instruction for use, and routine maintenance procedures. To achieve satisfactory results and safe operation, the user must read and understand this manual thoroughly before attempting to use this infusion pump. The user is encouraged to review this manual, especially when the user is not a frequent operator of the infusion pump.

Changes to this manual, either in response to user input or to continuing product improvement, are accomplished through addendum, over-labeling or re-issue. If, in the normal use of this manual, errors, omissions, or incorrect data are noted, please address your comments to:

Technical Services Department
Medical Technology Products, Inc.
405A Oakwood Road
Huntington Station, New York 11746

MTP shown with Model #1009 Soft Carrying Case



The MTP infusion pump incorporates the latest available micro-electronics, including an INTEL® microcomputer. This permits the MTP to be compact and lightweight, yet offer more performance characteristics than larger and heavier I.V. pumps. The MTP infusion pump is easily programmed by the user to deliver I.V. solutions and blood at a flow rate range from .1 milliliter to 400.9 ml per hour, and to deliver a preset volume from 1 to 999 ml while reporting the volume delivered up to 9999 ml. Convenient digital switches allow the operator to set the flow rate and volume to be infused by the pump. The user programmed desired flow rate and total volume to be infused are displayed on the digital switches for convenient reference by the operator.*

When the pump's Standby Off/On and Start switches are pressed, the pump's microcomputer will automatically test itself, perform a pre-operational check, then register the flow rate and volume to be infused (entered on the digital switches) into its memory, and display the values entered.

The MTP infusion pump may be operated on AC electrical power, or battery. The unit must be connected to an AC or 12 volt DC electrical outlet for 18 – 24 hours prior to initial battery use or after complete battery discharge.

The operator is alerted to any interruption or change in the delivery of a solution by both visual, shown on the pump's display, and audible alarms. The following alarm conditions may occur in I.V. administration and are sensed by the MTP:

1. No flow due to an unopened post pump clamp, severe kink in the I.V. tubing or I.V. catheter.
2. Air present in the I.V. pump set's silicone pump chamber clear outlet connector.
3. Low Battery.
4. Tampering (authorized or un-intentional changes) with the switches for flow rate or total volume to be infused.

The pump has a receptacle that allows connection to most nurse call systems. This allows the nurse to be alerted, in the event of an alarm condition, at the nurse's station or while in, and by any internal vehicular or aircraft intercom system that does not exceed 24 volts, peak to peak. The sensor system of the MTP infusion pump will detect air bubbles in clear and opaque fluids.

Flow Rate Entered

KVO Flow Rate

499.9 ml/hr – 5 ml/hr
4.9 ml/hr or less

1 ml/hr
0.5 ml/hr (model 1001 only)

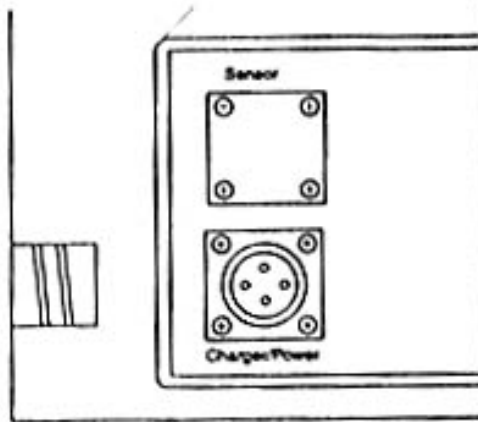
Once the total volume to be infused has been delivered, the pump will automatically switch to a "KVO" (Keep Vein Open) infusion rate. The pump's display will flash "KVO" alternately with the total volume infused. In addition, a repeating audible chime will sound once KVO status is reached. There are two KVO flow rates that are automatically programmed depending on the flow rate entered on the digital switches:

*NOTE Model 1001a has a flow rate range from 1 ml/hr to 499 ml/hr and will deliver a preset volume from 1 ml up to 9999 ml.

II. OPERATING PROCEDURE

A. Transformer Connections

For AC electrical power operation, connect the transformer/charger connector into the “Charger/Power” receptacle at the back of the pump. Plug the power transformer into an electrical power source. The pump must be connected to an electrical receptacle for 18 – 24 hours prior to initial battery use or when the battery is completely discharged. The pump’s internal battery will always be charging if the pump is plugged into an AC source and whether or not it is operating.

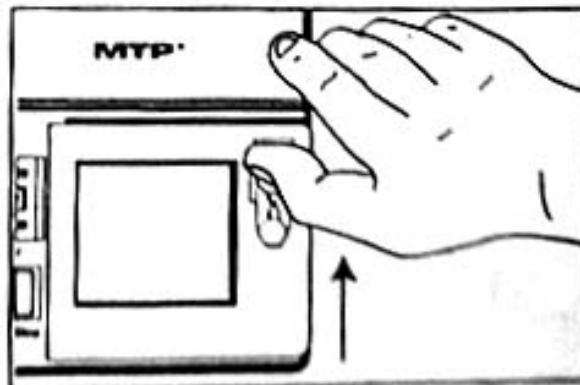


MTP Protective Door

The MTP has a black Delrin® plastic door, which protects the pump’s rotor and rotor panel, and supplements the securement of the pump’s chamber’s color coded plastic inlet and outlet connectors.

To open the door, lift the latch’s guide with your thumb, as illustrated in the picture below.

To secure the door closed, with your thumb, push the latch guide down until it completely engages the notched portion of the securement pin mounted on the pump’s rotor panel. A “SNAP” sound should be heard when the latch is fully engaged on the securement pin.



B. Installing the I.V. Pump Set Onto the Pump

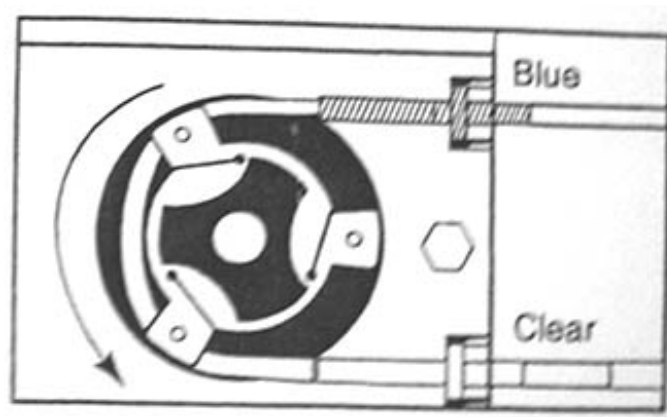
1. Select the desired MTP® pump set.
2. If a universal style pump set is to be used, connect the pump set to the solution container according to the instructions provided with the pump set. Check all connections for a secure fit before continuing.
3. Open all clamps to allow the solution to completely prime the I.V. pump set
4. Once all air has been eliminated from the fluid path, close the post-pump clamp and check the fluid pathway and connections for leaks. The pump set is now ready to be installed onto the pump rotor assembly.
5. Failure to ensure that the pump set's, or administration set's, filtered air vent is open when administering fluid from an unvented glass I.V. solution bottle will have an adverse affect on the infusion pump's ability to accurately infuse solution at the flow rate selected on the pump's digital rate switches. No alarm will activate to alert the operator of this condition.

NOTE: The pump chamber consists of a blue inlet connector, a silicone rubber tubing segment, and a clear outlet connector. The blue connector (solution container side) is to be installed in the upper slot of the rotor panel; the clear connector (patient side) is to be installed in the lower slot of the rotor panel. These connectors are designed to fit only into their respective slots. THIS ELIMINATES THE POSSIBILITY OF INSTALLING THE PUMP CHAMBER BACKWARDS. DO NOT TRY TO FORCE A CONNECTOR INTO THE WRONG SLOT AS DAMAGE MAY OCCUR.

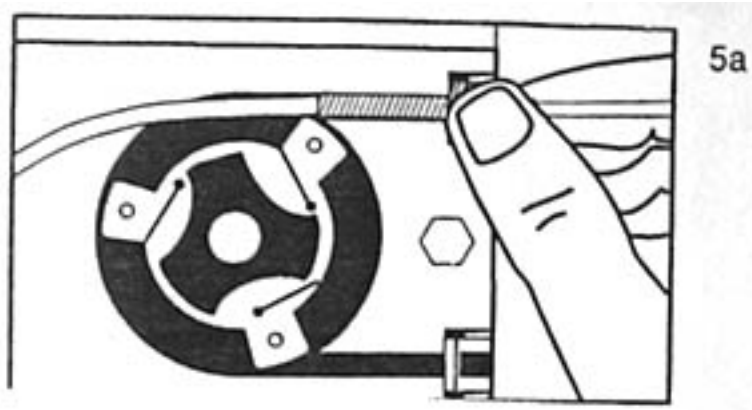
NOTE: As a transport infusion pump, the MTP will “operate” without an I.V. pump set mounted onto it. The Pump is designed this way so that the operator may “dry run” the pump in the field.

5. Install the pump chamber of the I.V. pump set into the rotor panel following these steps:
 - a. Grasp the blue inlet connector and press it into the upper slot of the rotor panel.

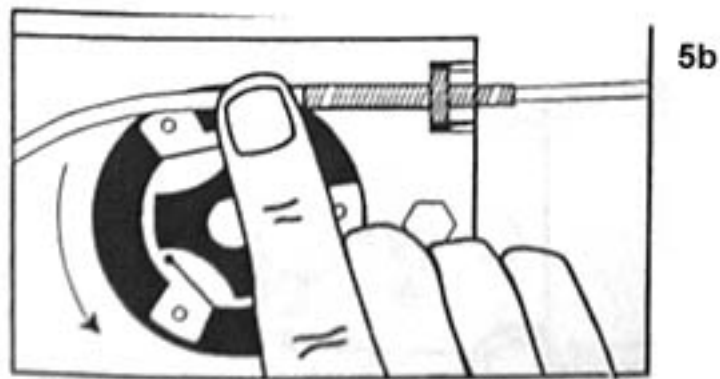
PRESS ONLY THE BLUE PLASTIC INLET CONNECTOR, DO NOT PRESS ON THE SILICONE RUBBER CHAMBER OR PLASTIC I.V. TUBING.



Refer to Figure 5a that illustrates the rotor panel, the positioning of the pump chamber and the installation of the blue inlet connector into the rotor panel.

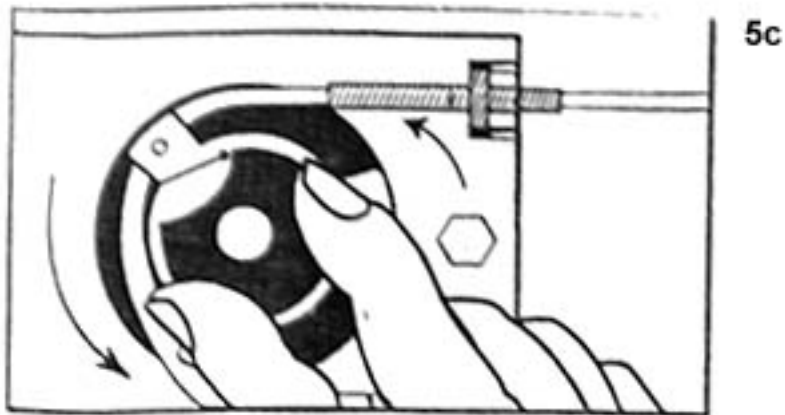


- b. After the blue inlet connector is firmly in place, gently tuck the first inch of the silicone rubber pump chamber tubing down into the tubing track. Refer to Figure 5b.

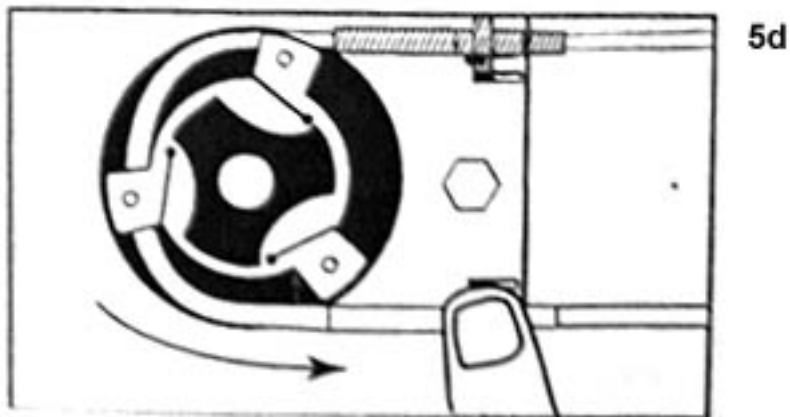


- c. Grasp the knob of the rotor and slowly rotate the rotor counterclockwise one-half turn as illustrated in Figure 5c. As the rotor pulls the silicone rubber pump chamber into the tubing track, gently guide the silicone tubing into the track with a finger. Avoid kinking or twisting the silicone rubber tubing or pinching it between the edge of the rotor and the wall of the tubing

track. The roller should roll freely over the silicone rubber tubing inside the track. Now, open the pump set's downstream clamp.



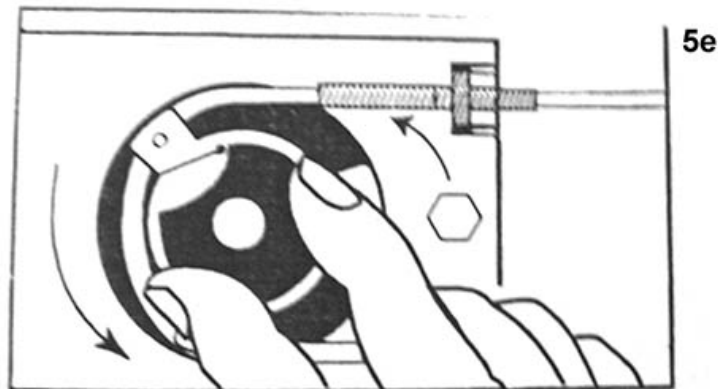
- d. Grasp the clear outlet connector and press it into the lower slot of the rotor panel. *See Figure 5d.*



PRESS ONLY THE CLEAR PLASTIC OUTLET CONNECTOR. DO NOT PRESS ON THE SILICONE RUBBER PUMP CHAMBER OR THE PLASTIC I.V. TUBING.

- e. Grasp the knob of the rotor and rotate it slowly one full turn counterclockwise. Check that the

Silicone rubber pump chamber is properly seated in the tubing track and is not kinked or twisted and that the rotor can rotate smoothly.



NOTE: IF THE SET'S PRE-PUMP CLAMP IS LEFT CLOSED, THE PUMP WILL OPERATE WITHOUT GOING INTO AN IMMEDIATE ALARM CONDITION AND AS A RESULT, FLUID WILL NOT BE INFUSED. THE SILICONE RUBBER PUMP CHAMBER WILL COLLAPSE AS AN INDICATION OF THIS CONDITION. THE AIR ALARM WILL THEN ACTIVATE AND THE PUMP WILL STOP.

C. Connecting the I.V. Pump Set to the Patient

1. Perform the appropriate venipuncture and assure that all air is eliminated from the I.V. pump set.
2. Connect the I.V. pump set to the patient access device.

D. Starting the Pump

1. The electrical power to the pump is controlled by the STANDBY-OFF/ON switch. Press this switch to turn the power on. The pump now conducts a self-diagnosis of its computer and performs a pre-operational check. When all systems are functional, the pump's display will read "TEST", "OK", and then, "SET". The operator may proceed to enter the desired flow rate and volume to be infused.

If during the operational check a problem is detected by the microcomputer, the pump will display the problem (e.g. "FIX", "AIR", "-BAT"). The operator must correct the problem before proceeding.

TEST

OK

SET

2. The flow rate is entered by pressing the digital switch (illustrated in Figure 2d). Note that the pump has the ability to infuse in increment of 0.1 ml/hr, Model 1001 only.



The total volume to be infused is similarly entered using the three or four digital switches labeled “TOTAL ML” (not illustrated).

NOTE: ENSURE ALL CLAMPS ON THE I.V. PUMP SET ARE OPEN.

3. Press the START/STOP switch to begin infusion. The pump's display will first display the word "RATE", then the entered flow rate. This provides the operator an opportunity to verify that the flow rate desired has been entered correctly. The pump's display will then show "TOTAL" and the entered total volume. If the entered rate or volume is not correct, press the START/STOP switch, then enter the correct rate or volume and again press the START/STOP switch. The pump will again "echo" the switch settings on the pump's display. The pump then begins to infuse at the rate indicated on the rotary switches.

NOTE: NEVER SET THE TOTAL VOLUME TO BE INFUSED GREATER THAN THE VOLUME THAT IS CONTAINED IN THE I.V. SOLUTION CONTAINER.

CAUTION: IF THE TOTAL VOLUME TO BE INFUSED IS SET AT 000, THIS OVERRIDES THE PUMP'S ABILITY TO GO INTO AN AUTOMATIC "KEEP VEIN OPEN" (KVO) RATE. HOWEVER, THE PUMP WILL SENSE AN EMPTY CONTAINER BY THE PRESENCE OF AIR IN THE PUMP CHAMBER. WHEN THE SOLUTION CONTAINER IS EMPTY, THE PUMP WILL AUTOMATICALLY STOP AND SOUND AN AUDIBLE ALARM. THE LED DISPLAY WILL FLASH "AIR >" ALTERNATELY WITH THE VOLUME INFUSED.

4. The pump will continue to infuse until the amount infused shown on the pumps display equals the entered volume on the TOTAL ML digital switches. Once these values are the same, the pump will automatically switch to a KVO infusion rate. pump's display will flash KVO alternately with the total amount infused. In addition, an audible chime will sound 3 times approximately every 15 seconds. The amount infused during the KVO mode will continue to be accumulated and added to the total volume infused. The KVO rates are automatic. However, the operator may select a different KVO rate by stopping the pump and pressing the orange START/STOP switch and entering the desired flow rate on the rate digital switches.

Rate TOTL

E. Resuming Infusion After KVO

To resume therapy after KVO has been reached, the pump must be stopped by pressing the START/STOP switch. The TOTAL ML switches must be increased by the additional amount to be infused. Example: 200 ml total volume infused + 100 ml volume to be added = 300 ml total

volume to be set on TOTAL ML digital switches. For continuous running the switches may be set to 000. (0000 – model 1001a only)

NOTE: If the TOTAL ML digital switches are set to less than the amount shown on the display, the display will show “ERR”.

ERR

CAUTION: IF THE TOTAL VOLUME TO BE INFUSED IS SET AT 000, THIS OVERRIDES THE PUMP’S ABILITY TO GO INTO AN AUTOMATIC “KEEP VEIN OPEN” (KVO) RATE. HOWEVER, THE PUMP WILL SENSE AN EMPTY CONTAINER BY THE PRESENCE OF AIR IN THE PUMP CHAMBER. WHEN THE SOLUTION CONTAINER IS EMPTY, THE PUMP WILL AUTOMATICALLY STOP AND SOUND AN AUDIBLE ALARM. THE LED DISPLAY WILL FLASH “AIR >” ALTERNATELY WITH THE TOTAL VOLUME INFUSED.

AIR >

The flow rate may be changed at this time if desired. After the total volume (and flow rate) switches have been changed, the infusion may be resumed by pressing the START/STOP switch.

F. Interrupting the Infusion

The operator may interrupt the infusion by pressing the START/STOP switch once. The pump will stop and the word “STOP” will appear in the pump’s display, alternating with the volume infused. To resume the infusion, press the START/STOP switch once. The pump will resume the infusion at the flow rate selected on the digital switches.

STOP

Sixty seconds after the pump is placed in a “STOP” mode, the audible alarm will chime to remind the user that the pump has not been restarted. The START/STOP switch may be pressed to silence the alarm, but if the pump is not restarted, the alarm will recur sixty seconds later. To resume infusion, press START/STOP switch once to silence the alarm and a second time to start the pump.

CHANGING FLOW RATE OR TOTAL VOLUME:

1. The infusion must first be stopped by pressing the START/STOP switch. Now the flow rate may be changed by simply using the digital switches as previously described.

The total volume may not be lower than that already infused and currently shown on the pump’s display except if set to all zeroes. If the entered value is less than the infused volume, “ERR” will be displayed. Once the new desired flow rate and/or total volume are entered, press the START/STOP switch to restart the infusion. “STOP” will no longer appear and the pump’s display will continue to update the amount being infused.

NOTE: If this procedure is not followed exactly, you will initiate the tamper alarm feature of the MTP infusion pump (see Section III).

2. To initiate a new infusion therapy and to erase the previous total volume infused from the pump’s display, the pump must be switched off by pressing the STANDBY-OFF/ON switch. This clears the microcomputer’s memory.

G. Terminating the I.V. Administration

1. Press the START/STOP switch to stop the pump.
2. CLOSE THE CLAMP(S) ON THE I.V. PUMP SET TO PREVENT LEFTOVER FLUID FROM FLOWING.
3. Disconnect the I.V. pump set from the patient.

on the

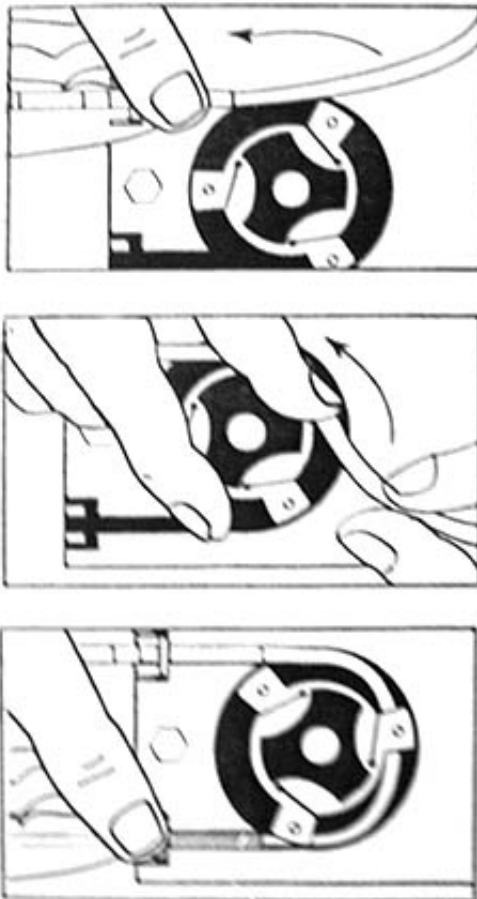
4. Note the total volume infused from the pump’s display and record the volume infused patient’s chart.

5. Remove the I.V. pump set from the rotor panel according to the following steps:

- a. Remove the blue inlet connector from the upper slot of the rotor panel.
- b. Pull the pump chamber carefully out of the track while rotating the counterclockwise.
- c. Remove the clear outlet connector from the lower slot of the rotor panel and remove the I.V. pump set completely from the pump.

rotor
panel and
grasp the blue and
the connectors
slots.

Note: In order to prevent pump set connector or rotor panel breakage, clear plastic connectors with your thumb and index fingers, and steadily pull from their respective slots. DO NOT jerk the connectors out from these



6. Press the STANDBY-OFF/ON switch. The pump is now switched off and the pump's

display will become blank.

7. Be sure to clean the pump and the rotor assembly prior to storage or further use. Use detergent solution only. Do not use solvents. Do not immerse the pump in any solution.

NURSE CALL CONNECTION

The MTP can be connected to a hospital nurse call system via the standard ¼ “phone jack located on the rear of the pump. To reduce the risk of fire or electrical shock, ensure the nurse call system voltage is less than 24 volts, peak to peak, and the current is less than 150 ma. The pump provides a momentary switch closure that occurs when the audible alarm is sounding during an alarm condition.

The nurse call can be tested by first connecting the pump to the hospital’s nurse call system and pressing the STANDBY-OFF/ON switch to the ON position. The nurse call will be activated during the alarm self test.

III. ALARM CONDITIONS

When the pump’s alarm system is activated, audible alarm will sound and the cause of the alarm will be reported on the pump’s display. The pump will switch to a KVO flow rate for a TAMPER and LOW BATTERY alarm and will stop infusion for all other alarms. Press the “START/STOP” switch to silence the audible alarm and perform the checks in the following paragraphs to determine the cause of the alarm. Once the alarm condition is corrected, pressing the “START/STOP” switch will restart the infusion.

The following alarm conditions: “AIR >”, “OCC” and TAMPER have an automatic recurring audible alarm. When an alarm is activated (both visual and audible), the audible portion may be silenced by depressing the “START/STOP” switch once. The visual portion will remain on the pump’s display, alternating with the volume infused. If the alarm condition is not corrected within 60 seconds, the audible alarm will be reactivated.

The audible alarm can again be silenced by pressing the “START/STOP” switch. However, the audible alarm will sound in another 60 seconds if the alarm condition has not been corrected and pumping resumed.

A. OCCLUSION ALARM “OCC”

OCC

NOTE; IF DURING TRANSPORT REPEATED AIR ALARMS OCCUR, THE OPERATOR MAY ALLEVIATE THIS PROBLEM BY KEEPING THE INFUSION PUMP SET'S DRIP CHAMBER COMPLETELY FULL. THIS WILL HELP PREVENT AIR BUBBLES FROM FORMING IN THE DRIP CHAMBER.

B. LOW BATTERY ALARM “-BAT”

-BAT

1. The “-BAT” alarm indicates a low battery condition. The audible alarm will be activated and the pump’s display will alternately flash “-BAT” and the accumulated volume infused.
2. To silence the audible alarm, press the START/STOP once. Press it a second time to resume the infusion. The pump will continue to infuse at the selected flow rate and alternately display the volume infused and “-BAT” for 10 minutes. If the pump is not plugged into a power source within this time period, the pump will automatically switch to the appropriate KVO flow rate **WITHOUT ACTIVATING THE AUDIBLE ALARM**, and the pump’s display will sequentially display “-BAT” – “KVO” – amount infused, (e.g. – “BAT” – KVO – 999).
3. If the pump is connected to power within ten minutes of the onset of the “-BAT” alarm, the alarm will automatically clear and the infusion rate will not be changed to a “KVO” rate.
4. To resume the selected infusion while the pump is in the “-BAT” “KVO” mode, the pump must be placed in the stop mode by pressing the START/STOP switch. The “-BAT” alarm will clear by plugging the pump into a power source. Pressing the START/STOP switch will then restart the infusion at the original flow rate selected.
5. If the low battery condition is not cleared, the pump will infuse at KVO flow rate until the battery charge is totally depleted and the pump will become inoperable. If the pump is connected to an electrical source before this occurs, the selected flow rate can be resumed using the previous step.
6. Once the pump is plugged into an electrical source, the pump will function and simultaneously charge the battery. After the pump has been in a “-BAT” condition, it should remain connected to the electrical source for 18 hours prior to being used in a battery mode and 24 hours to become fully charged.
7. If persistent “-BAT” alarms occur despite repeated full charges, it is advisable to change the battery. Please refer the pump to your qualified service personnel for battery change. Replace battery only with Part #613000, a 6 volt 3.4 amp/hr battery.

D. TAMPER ALARM

The MTP has an alarm feature that alerts you to tampering or unintentional changing of the RATE and/or TOTAL ML digital switches.

1. If the flow rate or total volume switches are pressed during infusion, the pump will automatically switch to a KVO rate and sounds an audible alarm. Its display will show either "RATE" and the flow rate that was originally entered or "TOTAL" and the total volume to be infused that was originally entered.
2. To correct the alarm condition, press the START/STOP switch once to silence the audible alarm. Reset the digital switches to the numbers shown on the pump's display.
3. Press the START/STOP switch again to restart infusion at the proper flow rate.

Secondary "Piggyback" Infusions

1. **CLOSE** the secondary I.V. administration set's clamp.
2. Using sterile technique, insert the secondary I.V. administration set's spike into the "piggyback" I. V. solution container (bag/bottle).
3. Suspend the "piggyback" solution container to be infused from an appropriate hanger and **RELEASE** the secondary set's clamp to prime the set and purge it of air. Once the set is completely primed and the set's drip chamber is 1/3 full, **CLOSE** the secondary set's clamp.
4. Using sterile technique, attach an appropriate (18 – 20 gauge) needle to the secondary set's needle adapter and insert the needle into the pump set's **UPPER** (pre-pump) "Y" injection site. Do not puncture the PVC tubing and ensure that the needle is securely positioned.
5. Put the infusion pump into the **STOP** (hold) mode by pressing the START/STOP switch **ONCE**.
6. **CLOSE** the I.V. pump set's roller clamp which is located between the pump set's drip chamber and upper "Y" injection site.

7. **RELEASE** the secondary I.V. set's clamp.
8. **SET** the infusion pump's RATE switches to the desired "piggyback" infusion rate.

NOTE: IF THE INFUSION PUMP'S AUDIBLE ALARM IS CHIMING, PRESS THE START/STOP SWITCH ONCE TO MOMENTARILY SILENCE THE ALARM.

9. If you wish to limit the amount of "piggyback" solution to be infused, you **MUST** use the infusions pump's TOTAL ML switches and the following procedure:
 - a. **ADD** the amount of "piggyback" solution to the amount of the primary solution already infused into the patient, which is displayed by the pump.
 - b. **SET** the pump's TOTAL ML switches to read the added amounts: e.g. 253 ml. primary already infused + 150 ml. "piggyback" to be infused = 403 ml. to be set on the pump's TOTAL ML switches.

NOTE: WHEN THE PRESET "PIGGYBACK" VOLUME HAS BEEN INFUSED, THE PUMP WILL INDICATE THE INFUSION IS COMPLETE BY ALTERNATELY DISPLAYING KVO, THE TOTAL AMOUNT INFUSED, AND IT WILL AUTOMATICALLY SWITCH THE INFUSION RATE TO THE APPROPRIATE KVO RATE (THE PUMP'S ROTOR REVOLUTIONS WILL DECREASE). THE PUMP WILL ALSO CHIME 3 OR 4 TIMES EVERY 15 SECONDS.

10. Press the START/STOP switch once to start the "piggyback" infusion.

NOTE: IF YOU DO NOT ADD THESE TWO AMOUNTS, YOU WILL CAUSE THE PUMP'S

MICROCOMPUTER TO REJECT THE VOLUME ENTERED AND YOU WILL BE ALERTED TO THIS BY THE PUMP'S DISPLAY OF THE MESSAGE "ERR". TO CLEAR THE "ERR" DISPLAY, PRESS THE START/STOP SWITCH ONCE, ENTER THE CORRECTLY ADDED VOLUMES AND THEN, PRESS THE START/STOP SWITCH TO START THE "PIGGYBACK" INFUSION.

If the TOTAL ML volume limiting function is not used, the pump will infuse all the solution in the "piggyback" container. The MTP transport infusion pump will empty the IV solution container and IV pump set so that the solution level will be approximately at the pump set's clear plastic pump chamber outlet connector. The pump's air sensor will detect the absence of solution (air) in the pump chamber's clear connector, thereby causing the pump to stop and activate its AIR alarm.

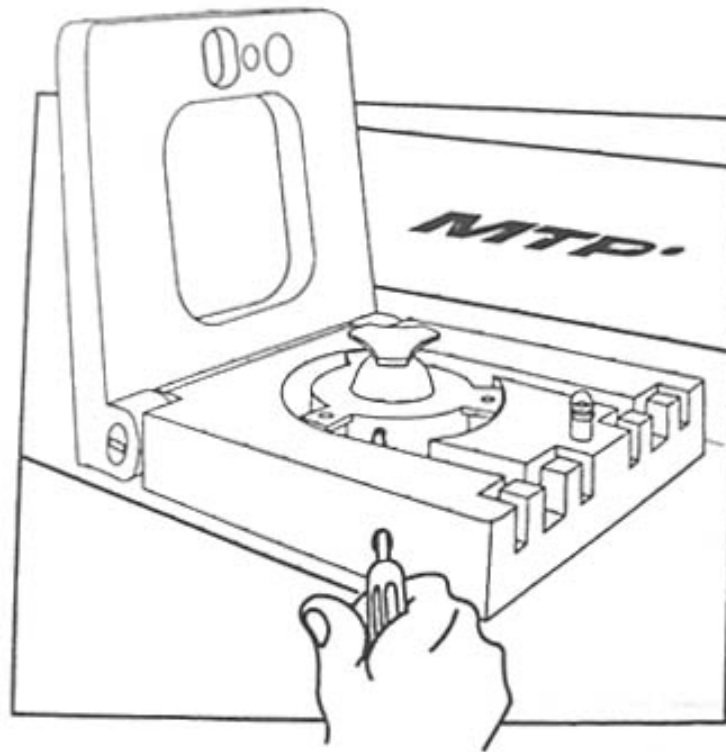
11. When you have finished the "piggyback" infusion and wish to return to the primary solution, follow this procedure:
 - a. STOP the pump by pushing the START/STOP switch only once.
 - b. CLOSE the clamp on the "piggyback" set.
 - c. OPEN the pump set's upper (pre-pump) roller clamp.
 - d. RESET the pump's TOTAL ML switches all to zero.
 - e. RESET the rate, if so desired.
 - f. START the pump to resume the primary infusion.

IV. ROUTINE MAINTENANCE

The MTP pump should be maintained in a clean condition. The pump case and the rotor assembly must be kept clean. They may be cleaned only with detergent solutions or warm water. Do not immerse the pump in any liquid. These components should not be cleaned with solvents. The pump must not autoclaved or gas sterilized.

ROTOR REMOVAL

1. Align the rotor as illustrated so that a hex screwdriver (slot type on older models) may fit into each of the set screws (3) on the side of the rotor. To remove the rotor, turn each screw counter – clockwise. An access hole for the screwdriver is provided at the bottom edge of the rotor panel.
2. Remove the rotor from the shaft by gently pulling on the rotor.
3. Soak the rotor in a warm, mild, water/detergent solution until cleaned.
4. To remount the rotor onto the pump’s motor shaft, slide the rotor onto the shaft and tighten one of the set screws. Turn the rotor counter-clockwise to align the next screw-hole. Do not over-tighten the screws. Do not jam the rotor against the rotor panel’s interior flat wall, and do not turn the rotor clockwise. Ensure that the rotor turns freely in a counter-clockwise direction and does not touch or rub against the rotor panel’s interior flat wall.
5. Turn each screw clockwise until a slight resistance is felt. Do not over-tighten the screw!



V. SERVICE

If the MTP infusion pump should require factory service, package it carefully and return it to the representative from whom you purchased this pump. If available, use the packaging material in which the pump was originally shipped. Please enclose a complete description of the problem. Be sure to include the transformer/charger when returning the MTP pump for service. The full system will be evaluated and re-qualified for use.

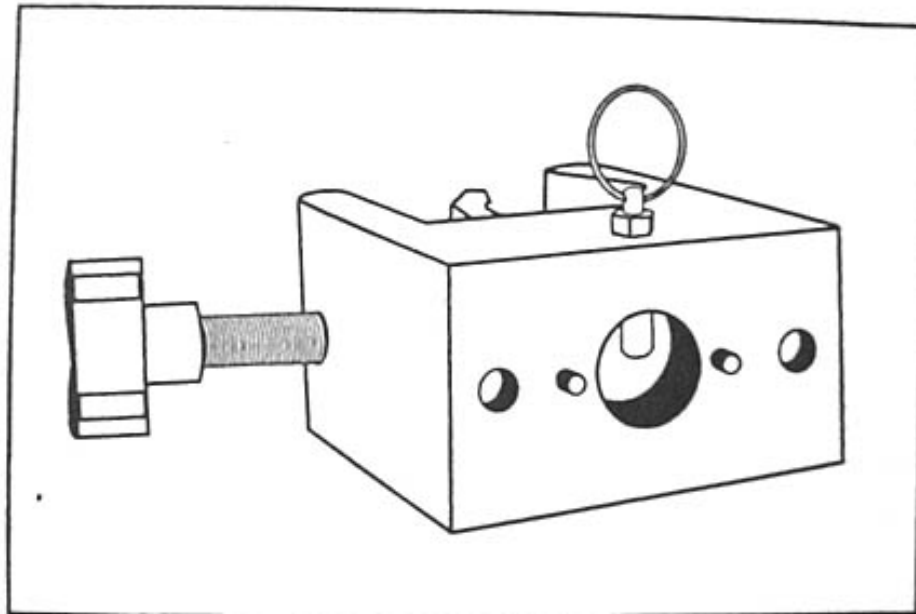
Detachable/Rotational IV Pole Clamp

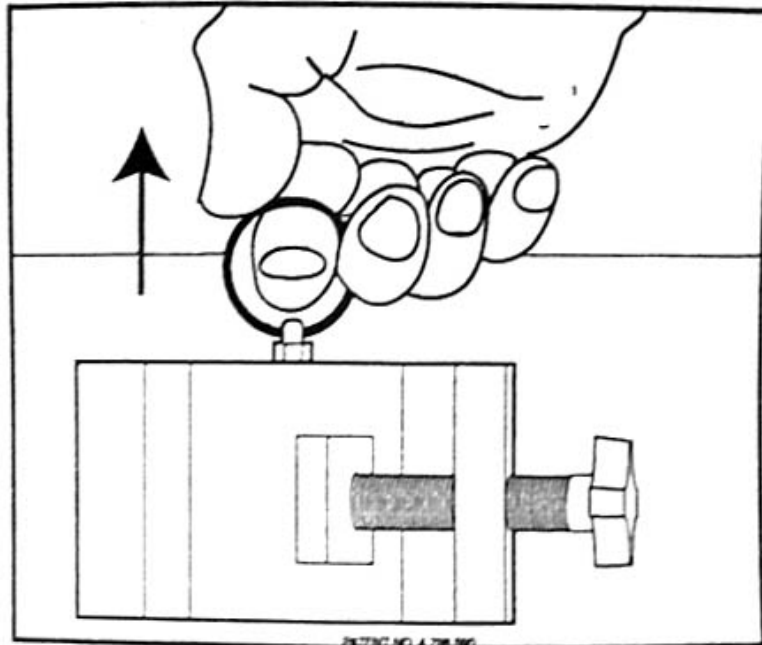
The MTP Infusion pump is equipped with a detachable (allows for placement and operation while the pump is placed in a specific or dedicated wall, bulkhead cabinet) IV pole clamp.

The pole clamp may also be rotated around the pump's clamp mounting stud by releasing the locking pin, and either twisting the pole clamp or completely removing it from the mounting stud. This allows the pump to be kept upright when it is mounted on the horizontal side rails or frame of a standard ambulance stretcher.

The detachable IV pole clamp will accommodate most commercially available standard and mini IV poles.

Please refer to the following drawings which illustrate the pole clamp and its locking pin, and the correct procedure for releasing the clamp's locking pin.





VI. PROBLEM CHECKLIST

NOTE: IF ANY PROBLEM ARISES THAT MIGHT CAUSE HARM TO THE PATIENT, STOP THE PUMP BY:

1. Press the START/STOP switch.
2. Pressing the STANDBY-OFF/ON switch to OFF position. Remove the I.V. pump set from the pump by **first** closing the set's roller clamp(s) and **secondly**, by disconnecting the pump set from the pump, as previously discussed. The I.V. pump set may be used as gravity infusion set

If any of the following occur, the accompanying steps should be performed:

MALFUNCTION

OCCLUSION detector activates with no

Air Detector alarm activates with no air in tubing.

Repeated "BAT" LOW BATTERY Replace battery: 6 volt 3.0 amp/hr, Part No. 613000. Alarms after complete charge.

Battery Characteristics:

The MTP transport infusion pump utilizes a 6 volt 3.4 ampere/hour sealed lead-acid type (sealed lead-calcium) battery for battery operation. This lead acid type battery is approved by the U.S. Department of Transportation as a "sealed" type of battery.

The battery, when new, should provide 200 – 250 "deep discharge" cycles. A deep discharge cycle occurs when the battery is discharged to its fullest (100 %) and no reserve capacity is left. This translates into approximately 8 hours of continuous battery operation without recharge for some provision for immediate electrical charging.

NOTE: THE BATTERY CHARGE MUST NOT BE "DUMPED", AS IS THE NORM WITH NICKEL-CADIUM (NI-CAD) BATTERIES, IN ORDER TO PREVENT "MEMORY" LEVEL SETTING. THERE IS NO "MEMORY LEVEL" IN A SEALED LEAD-ACID TYPE BATTERY.

Lead acid type batteries, if not kept on charge during idle periods, will lose 3 % of their charge per month. This is a normal characteristic and is preventable by charging. The MTP infusion pump has an internal battery charging regulator to prevent "overcharging".

CHECKLIST

- (a) Check to see if the silicone rubber pump stream, is not Twisted or kinked in the channel.
- (b) Check to see if the rotor's rollers roll freely.
- (c) Check to see if the rotor turns smoothly, with and without a pump chamber properly mounted on the pump.
- (d) Check to see if the pump's protective door is not touching the rotor.

Check to see if the detector's optical sensing eyes are clean and not broken.

VII. PHYSICAL SPECIFICATIONS

Approximate Dimensions:

4" deep X 4" high X 7" wide (11cm X 11cm X 18cm)

Approximate Weight:	4 lbs. (2.3 kgs.)
Voltage:	110 – 115 VAC or 220 VAC
Frequency:	60 Hz or 40 – 50 Hz
Internal Battery:	Rechargeable, sealed lead acid, 6 volts, 4 amp/hr. Up to 8 hours at any flow rate.
Fuse:	Type 1A, 6 volts DC, 5mm X 20mm.
UL Listed:	# 36C4

VIII. WARRANTY

This Medical Technology Products, Inc. MTP Miniature Volumetric Pump is warranted for one year from date of shipment to be free from defects in workmanship and material under normal use. The foregoing warranty is

in lieu of all other warranties expressed or implied, and no other warranties exist, including without limitation any warranty of merchant ability of fitness for nay particular purpose. If the pump does not conform to the warranty set forth herein, seller's sole liability and obligation shall be to repair the pump when it is returned with transportation charges prepaid, its case unopened, and protectively packaged. In no event shall seller be liable for property damage, for personal injury, or for any consequential damages. No representative of the seller may change any of the foregoing.

If information or service is not available for the representative from whom you purchased this product, write or call:

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