

TRIPLE INFUSION PUMP WITH AUTOMATIC CYCLING TIMER

PHM-102 / PHM-102A

USER'S MANUAL

DOC-183

Rev. 2.1

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CHAPTER 1 | INTRODUCTION

The PHM-102 Triple Infusion Pump with Automatic Cycling Timer is designed to provide infusions at user-defined intervals. The CYCLE pushbutton switches are used to set the interval between infusions and the INFUSION pushbutton switches set the duration of the infusion(s). The function of these switches is covered in greater detail in the User Interface section of this manual. The pump is also equipped with LEDs on the face panel that indicates whether the pump is cycling or infusing.

This pump uses a 3.33-RPM motor and is intended to be used with 30 mL BD Plastipak™ syringes.

Specifications

Motor Speed: 3.33 RPM

Infusion Rate*: 143 mL/hr (2.4 mL/min)

Syringe Type: 30 mL Becton-Dickinson Plastic

Infusion Durations: PHM-102: 1 – 99 sec
PHM-102A: 0.1 – 9.9 sec or 1 – 99 sec

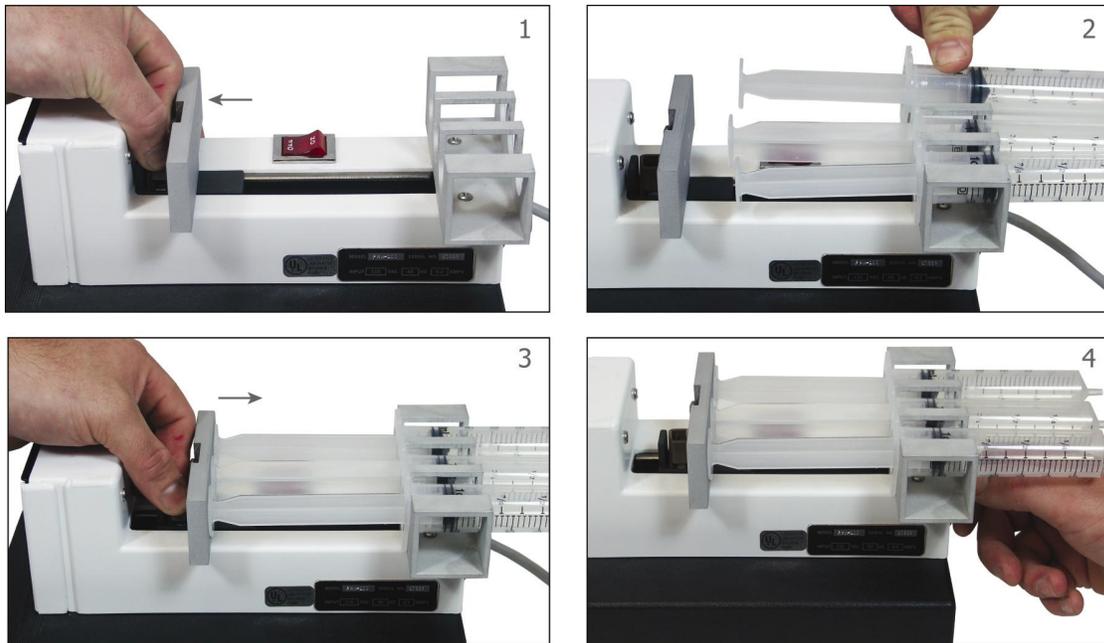
Infusion Intervals: PHM-102: 1 – 99 min
PHM-102A: 1 – 99 min or 1 – 99 hrs

* Assuming a 30 mL Becton-Dickinson Plastic syringe is used.

CHAPTER 2 | SYRINGE PLACEMENT

Care should be exercised that the syringe barrel is positioned firmly in the syringe clamp. If a gap exists between the tabs and the clamp, accurate flow rates cannot be assured, as the entire syringe (both barrel and plunger) may move forward. It is advised that a visual check be performed turning the knob on the front of the pump and observing the plunger move in relation to the barrel. Figure 1 shows the procedure for loading a syringe into the pump.

Figure 1 - Syringe Loading Procedure



1. Move the slide to rear (toward motor section) by squeezing the jaws.
2. Insert syringe(s) into the triple syringe clamp by placing the syringe barrel into the clamp and pressing down firmly. Be sure that the tabs on the syringe are pressed against the clamp, as shown.
3. Move the slide to the end of the syringe plunger(s).
4. Rotate the knob so that the slide makes contact with the plunger(s) and the syringe tabs contact the clamp.

Priming the Line

Once the syringe is installed, the line should be primed until liquid drips out of the syringe or tubing. This ensures that fluid will be infused properly when the pump is activated.

To prime the infusion line set the **FLUSH** switch to the on, or “down”, position for as long as required (Until liquid drips from the distal end of the infusion line). The settings of the **CYCLE** and **INFUSION** pushbutton switches are not recognized when the **FLUSH** switch is on. The pump will operate at 3.33 RPM until the **FLUSH** switch is set to the off or “up” position.

CHAPTER 3 | USER INTERFACE

The User Interfaces of the PHM-102 and the PHM-102A operate in the much the same way. The PHM-102A has two additional switches that allow the user to select the unit of time for the Cycle and Infusion. The function of all of these buttons and switches is described in detail below.

Figure 2 - PHM-102 User Interface

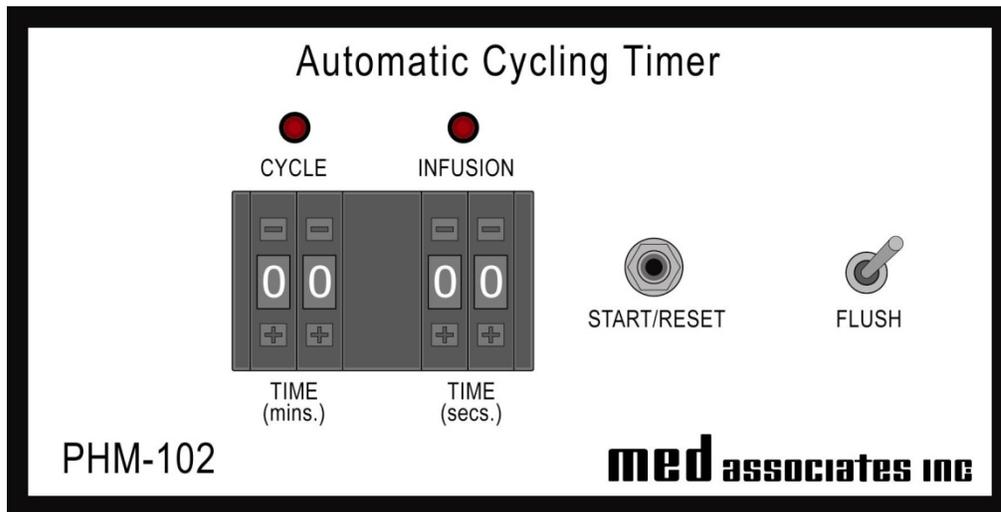
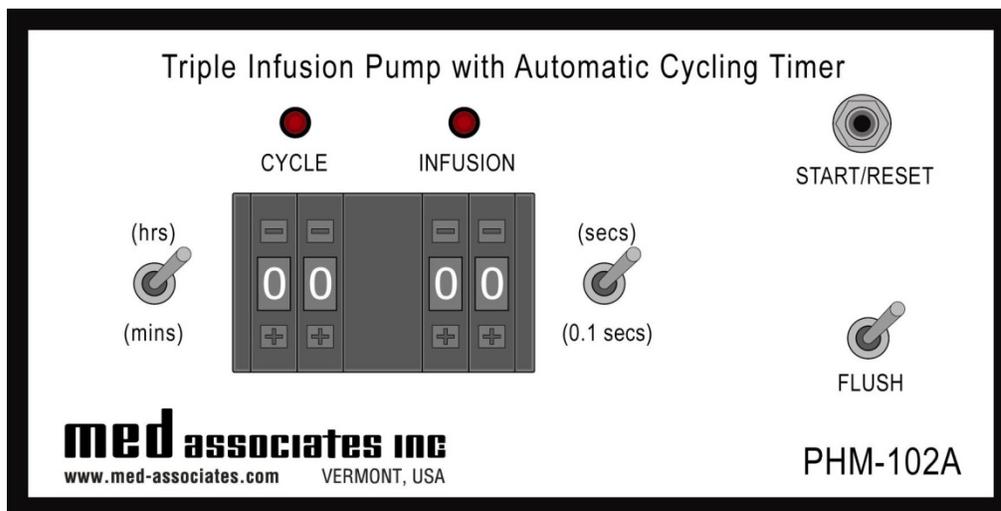


Figure 3 - PHM-102A User Interface



START/RESET Button

Pressing **START/RESET** will start the pump. It will run according to the user-defined CYCLE and INFUSION durations. If the **START/RESET** button is pressed while the pump is running it will stop the pump and reset the timer.

FLUSH Switch

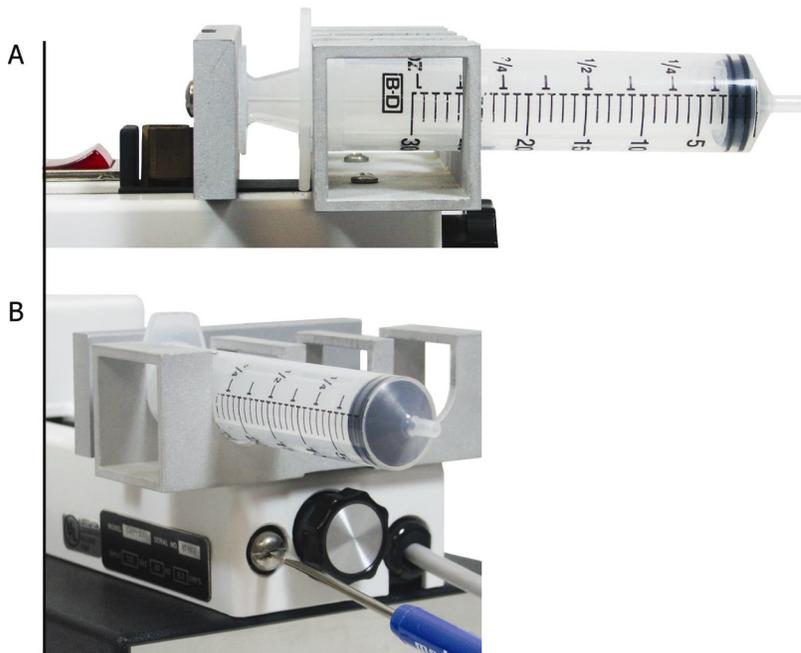
When the FLUSH switch is on or “down” the pump will infuse until it is switch off or “up”. The settings of the CYCLE and INFUSION switches are not recognized when the FLUSH switch is on. The FLUSH switch will operate at any time during all phases of pump operation.

Automatic Shut-Off Switch

The automatic shut-off switch is activated when the pump reaches the end of the syringe, causing the pump motor to cease operation. The automatic shut-off switch uses an internal micro-switch that detects when the slide assembly reaches a certain point. This point is adjustable so that the pump can accommodate various sizes and brands of syringes.

To adjust the automatic shut-off switch, insert an empty syringe with the plunger at the desired shut-off position. Move the slide assembly to the rear of the plunger (Figure 4A). With the pump turned on, switch the **FLUSH** switch on and rotate the adjustment screw (Figure 4B) until the pump stops operating. Each clockwise $\frac{1}{2}$ turn of the adjustment screw will cause the switch to activate .025 inches further, and each counterclockwise $\frac{1}{2}$ turn of the adjustment screw will cause the switch to activate .025 inches sooner. In order to reset this switch and resume pump operation the slide must be moved back until the Automatic Shut-Off Switch is deactivated.

Figure 4 - Automatic Shut-Off Switch Adjustment



PHM-102

Cycle Pushbuttons

The **CYCLE** pushbutton switches are used to set the cycle time. The unit of the cycle time is minutes. (Range of the cycle is 1-99 minutes).

Cycle LED

If the pump is cycling, the CYCLE LED will blink on for 0.5 seconds and off for 0.5 seconds.

Infusion Pushbuttons

The **INFUSION** pushbutton switches are used to set the infusion time. The unit of the infusion time is seconds. (Range of the infusion time is 1 – 99 seconds).

Infusion LED

If the pump is infusing the INFUSION LED will blink on for 0.5 seconds, then off for 0.5 seconds.

PHM-102A

Cycle Controls

The **CYCLE** pushbutton switches are used to set the cycle time. The units of the cycle time may be changed from hours to minutes using the **hrs/mins** toggle switch. This means that the range of the cycle time is 1 – 99 minutes or 1 – 99 hours, depending on the position of the **hrs/mins** switch.

Cycle LED

If the pump is cycling, the CYCLE LED will be flashing. If the **hrs/mins** switch is set to hours the CYCLE LED will blink on for one second, then off for one second and if it is set to minutes it will blink on for 0.5 seconds and off for 0.5 seconds.

Infusion Controls

The **INFUSION** pushbutton switches are used to set the infusion time. The units of the infusion time may be changed from seconds to tenths of seconds using the **sec/0.1 secs** toggle switch. This means that the range of the infusion time is 0.1 – 9.9 seconds or 1 – 99 seconds, depending on the position of the **sec/0.1 secs** toggle switch.

Infusion LED

If the pump is infusing the INFUSION LED will be flashing. If the **sec/0.1 secs** switch is set to seconds the INFUSION LED will blink on for 0.5 seconds, then off for 0.5 seconds and if it is set to tenths of seconds it will blink on for 0.1 second and off for 0.1 second.

START/RESET Button

Pressing **START/RESET** will start the pump. It will run according to the user-defined CYCLE and INFUSION durations. If the **START/RESET** button is pressed while the pump is running it will stop the pump and reset the timer.

CHAPTER 4 | OPERATING INSTRUCTIONS

Load the syringe(s) according to the instructions. Connect the power cord to a standard wall outlet and power the pump on using the red **ON/OFF** switch. If the pump is plugged in and powered on, the red **ON/OFF** switch will be illuminated.

Manual Operation

The pump can be operated manually to flush the lines or to provide an untimed infusion by simply turning the **FLUSH** switch on or “down” for as long as required. The **FLUSH** switch will operate at any time during all phases of operation.

Single Timed Infusion

A single timed infusion can be produced by setting the **INFUSION** switches to the desired duration and the **CYCLE** pushbutton switches to “00”. When the **START/RESET** button is pressed the pump will run for the set infusion time and then stop. Once the infusion is complete the **START/RESET** button must be pressed again to produce another infusion.

Continuous Cycling Operation

For continuous cycling, set the **CYCLE** and **INFUSION** switches to the desired settings. It is important to note that the cycle time is dependent on the relationship between the **CYCLE** and **INFUSION** settings. If the **CYCLE** time is less than or equal to the **INFUSION** time, then the **CYCLE** time will be completed before the **INFUSION** time starts. If the **CYCLE** time is greater than the **INFUSION** time then the **INFUSION** time will be subtracted from the **CYCLE** time. This is illustrated in Figure 5 and Figure 6.

Figure 5 - If $CYCLE\ Time \leq INFUSION\ Time$

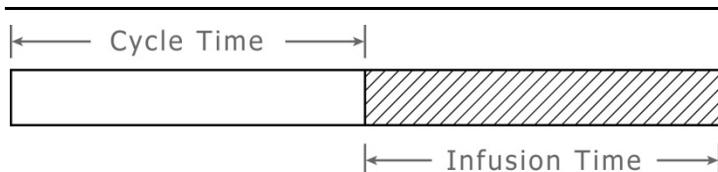
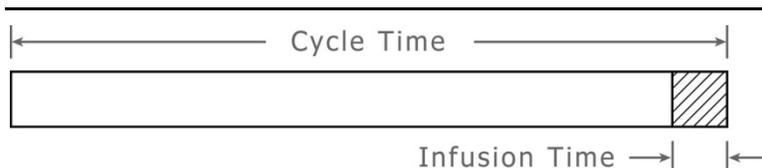


Figure 6 - If $CYCLE\ Time > INFUSION\ Time$



Once the pushbuttons switches are set to the desired **CYCLE** and **INFUSION** times, press the **START/RESET** button to begin continuous operation. The pump will begin with the **CYCLE** time, then start the **INFUSION**, and will repeat infusions at equal time intervals thereafter. The **CYCLE** and

INFUSION LEDs will indicate what phase of operation the pump is currently in. The User Interface section of this manual describes the function of these LEDs in detail.

To stop the cycling operation at any time press the **START/RESET** button. This will stop the operation of the pump and reset the timer.

Example of CYCLE Time ≤ INFUSION Time

For example, if the toggle and pushbuttons switches on the PHM-102 are set as shown in Figure 7, then the cycle and infusion times are equal (CYCLE is set to one minute and INFUSION is set to 60 seconds). This means that the cycle time will be completed before the infusion time begins, as illustrated in Figure 8.

When the START/RESET button is pressed, the cycle will begin. The CYCLE LED will be blinking on for 0.5 seconds and off for 0.5 seconds. The cycle will last for one minute, and then the INFUSION will begin. The INFUSION LED will be blinking on for 0.5 seconds then off for 0.5 seconds. Once this infusion is complete another cycle will start unless the START/RESET button is pressed, which will stop the operation of the pump and reset the timer.

Figure 7 – PHM-102 Pump Settings with CYCLE Time ≤ INFUSION Time

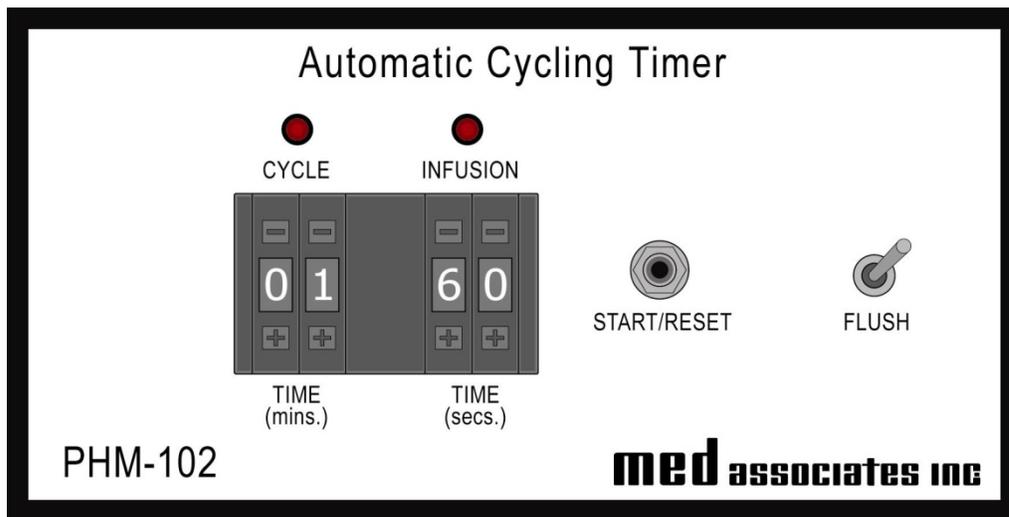
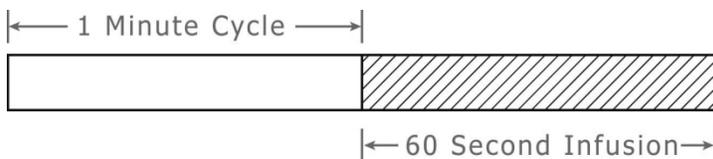


Figure 8 - Illustration of Example



Example of CYCLE Time > INFUSION Time

If the toggle and pushbutton switches on a PHM-102A are set as shown in Figure 9, then the cycle time is greater than the infusion time (CYCLE is set to five hours and INFUSION is set to 0.5 seconds). This means that the infusion time will be subtracted from the cycle time, as illustrated in Figure 10.

When the START/RESET button is pressed, the cycle will begin. The CYCLE LED will be blinking on for 1 second and off for 1 second. The cycle will last for four hours, 59 minutes and 59.5 seconds and then the 0.5-second INFUSION will begin. The INFUSION LED will be blinking on for 0.1 second then off for 0.1 second. Once this infusion is complete another cycle will start unless the START/RESET button is pressed, which will stop the operation of the pump and reset the timer.

Figure 9 – PHM-102A Pump Settings with CYCLE Time > INFUSION Time

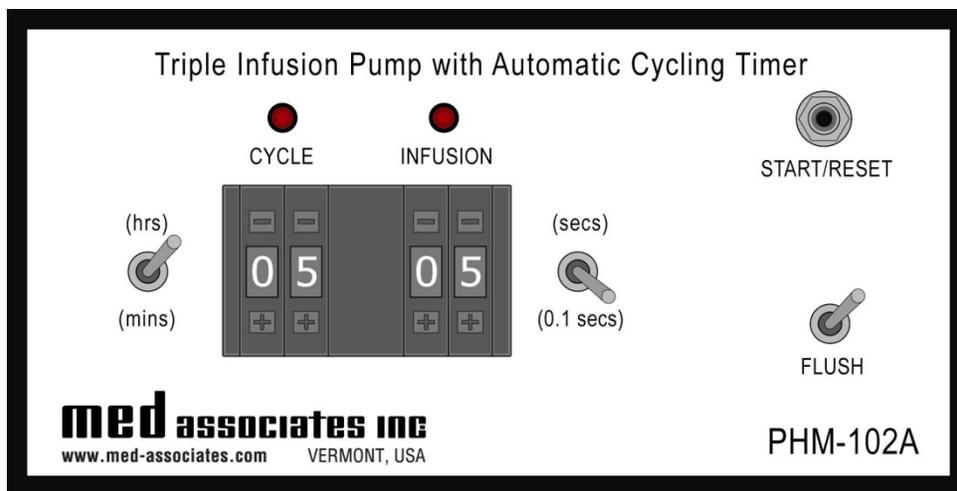
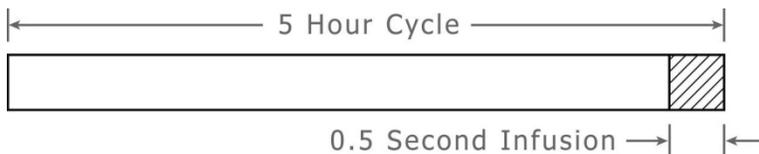


Figure 10 - Illustration of Example



APPENDIX A | CONTACT INFORMATION

Please contact Med Associates, Inc. for information regarding any of our products.

For Technical questions, email support@med-associates.com.

For Sales questions, email sales@med-associates.com.

Visit our website at www.med-associates.com.