Title: Baxter AS50. Syringe Pump	DATE: June 4, 2016
File = Baxter-AS50.doc	**DISCLAIMER: THIS PROCEDURE PROVIDED "AS IS" AND WITH POSSIBLE FAULTS. USER MUST VERIFY BEFORE USE. NEITHER PROVIDER NOR WEBSITE ASSUMES ANY RESPONSIBILITY FOR ITS USE.**

1. General
    Applies to the Baxter Model "AS50 syringe pump.

2. Reference Documents
    Auto Syringe® AS50 Infusion Pump Operator's Manual
    Auto Syringe® AS50 Infusion Pump Service Manual
    (Pump Catalog Code # 1M8550)

3. Tools / Fixtures / Labels
    60cc Syringe, Charger HHD 12-250 (12.6V, 250mA)

4. Setup/Notes
    Water: 1 gm = 1cc @ 4 deg C.
    Battery: 6 volt, 1.5 amp hour Nickel Metal Hydride (ex: Unipower B11056)

5. Basic PM Procedure

5.1. **Power On Self Test** (On/Off switch is on left side of pump)
    The pump sounds a high-low beep;
    All segments of the LCD and the LEDs momentarily turn on;
    The pump sounds one short beep;
    An identifier (AS50**)** is momentarily displayed at the bottom of the display

5.2. **Date and Time Update**
    To activate the Configuration Set mode, press the key sequence 9,8,0,5 following completion of the POST, when the display shows CONFIG. At this point you need to review and address multiple subsections before coming to CLOCK. Enter the current time and date using the <EDIT> as an "Enter", followed by a final <CONFIRM>

5.3. **Keypad Check** -- Press and briefly hold down the START and STOP keys one at a time. The pump should sound repeated beeps while each key is held down. Press every key, except the arrow keys, in any order, one key at a time. Each key press should result in a short beep. More checks can be found in the service manual.

5.4. **Range of Motion Check** -- Check that the plunger seats properly and that the plunger driver does not slip on the leadscrew when the plunger is fully closed.
    Check that both barrel clamp release levers operate properly. Check the tab lock to be sure it opens when the barrel clamp is fully opened and closes when the barrel clamp is fully closed

Note: The barrel unlock lever is right next to the On-Off switch. See photo showing how syringe flange is gripped by the mechanism after the clamp is pressed onto the barrel.

5.5.   **Accuracy Quick Check**: (see volume tables in Appendix for measurement options.) Instead of measuring a volume of fluid delivery, the unit can be programmed using settings from Table 2, and then measuring the syringe travel as listed.

5.6.   **Normal Accuracy Test** (per factory)
1. Install an empty B-D® or Monoject® 60 mL syringe in the pump. Set the plunger at the 60 mL mark on the syringe. This setup uses/checks the full travel of the lead screw.
2. Program the pump as follows: MODE: mL/hr mode; MFG: B-D® or Monoject®; SIZE: 60 mL; RATE: 200 mL/hr; VOL LIMIT: 60 mL;
3. Record start volume from the syringe. Use the graduations on the syringe to determine the volume.
4. Set the timer for 15 minutes. Simultaneously start the timer and press the START key on the pump to start the infusion process.
5. During the infusion, the pump emits 5 beeps, the ALERT LED flashes and "< 10 MIN VOL LIM" appears on the display.

5.7.   **Results** After 15 minutes, press the STOP key on the pump. Record the stop volume on the syringe. Subtract the stop volume from the start volume and record the result as the volume delivered. The volume delivered must be between 48.5 cc and 51.5 cc. (i.e. +/- 3%).

5.8.   **Battery / Charger Check**   (~6 volts, 5 NiMH AA cells)
Pressing <CONFIRM> while the pump is on-but-stopped normally displays battery voltage. With no charger, a "pumped stopped" voltage of 6.1 or less indicates low battery. Baxter defines a charged battery good if v >= 6.5v. Battery charging is indicated by the "ON CHARGE" LED even with the pump switched off. Access the bat by removing the pole clamp and the 3 small screws holding the battery cover.

5.9.   **Occlusion PSI Test**: (occurs at 10 to 12 psi)
1. Fill a B-D® or Monoject® 60 mL syringe with 60 mL of distilled water.
2. Attach a 60 inch High Flow Rate Extension Set or equivalent to the end of the syringe and manually purge the air from the syringe and tubing.
3. Install the syringe on the pump and connect the distal end of the tubing set to a calibrated pressure gauge (optional).
4. Turn on pump. If there is a message like "Select Library", hit the <down arrow> to change the display to "NONE". Then press <CONFIRM>. Then press the <down arrow> enough times to display ML/HR.
5. Program the pump as follows:
MODE= mL/hr mode; B-D® or Monoject® SIZE: 60 mL; RATE: 100 mL/hr; VOL LIMIT: 60 mL. See table below for other testing options.
5. Press START.   Verify that the pump displays RUNNING at the bottom of the display for approximately two seconds and the run LEDs are flashing in descending order (top to bottom).
7. If a pressure gauge is not attached to the extension set, block off the end of the extension set to simulate an occlusion. If a pressure gauge is attached to the extension set, wait for an occlusion to occur
8. Verify that, as the pump senses the occlusion, LINE OCCLUDED is displayed,
ALERT and STANDBY LEDs flash, and the pump beeps continuously.
9. Press CONFIRM to silence the alarm.   Remove the syringe from the pump. Disconnect pressure gauge if necessary.

5.10.   **Near End Alarm Test**:
1. Install an empty B-D® or Monoject® 60 mL syringe in the pump. Set the plunger at the 60 mL mark on the syringe.
2. Program the pump as follows: MODE: mL/hr mode; MFG: B-D® or Monoject® SIZE: 60 mLRATE: 280 mL/hr; VOL LIMIT: 50 mL; 3. Press START.

4. Verify that the pump displays RUNNING at the bottom of the display for approximately 2 seconds and the run LEDs are flashing in descending order (top to bottom).

5. Verify that during the infusion, the pump emits 5 beeps, the ALERT LED flashes and <10 MIN VOL LIM appears on the display.

6. Allow the pump to continue infusing until the volume limit is reached. Verify VOLUME LIMIT is displayed, ALERT and STANDBY LEDs flash, and the pump beeps continuously.

7. Press CONFIRM to silence the alarm.End of Syringe Alarm - The End of Syringe Alarm occurs when approximately 1 mL is remaining in the syringe. To check the alarm, place a syringe (no syringe is required if operator pushes down on the cradle clamp while infusing) with the plunger located at approximately 3 mL in the pump. Initiate an infusion (turn knob from *off* to *infuse*) and check for:

 * Flashing Infusion Light with the LCD incrementing in milliliters.

 * Audible Alarm when End of Syringe occurs. The pumping operation should cease and the Attention light should flash. The display should flash EOS.

5.11. **Shutdown Alarm Test** (disconnecting the battery deletes the current time/date):

1. Remove the pole clamp and the battery from the pump (refer to Chapter 7 for details) but DO NOT disconnect the battery at this time.

2. Ensure that the AC charger is NOT plugged into the pump.

3. Switch the pump "ON" and allow the pump to remain on for a minimum of 1 minute.

4. Disconnect the battery stack from the pump.

5. The pump will then begin to alarm, alternating from 2 high beeps to 2 low beeps. Ensure that the pump continues to alarm for a minimum of 3 minutes. There should be nothing on the display and no LEDs will be lit.

5.12. **Seriel Communications**

On the back of the pump, behind a small cover, is a DB9 connector for RS232 communications. No other public information is available.

APPENDIX

Table 1 INFUSION VOLUME ACCURACY				
The figures shown are mL and/or gms. Max rate = 438.				
	T I M E (min)			
	6 min	**10 min**	**15 min**		
RATE				
200	20 mL		50 mL		
240	20 mL	40 mL			

Table 2 Volume vs Travel for a 60 cc Monoject Syringe					
Milliliters	10	20	30	40	50
Travel (cm)	1.786	3.572	5.358	7.144	8.930

SUMMARY CHECKLIST	
Pusher Block Ease of Travel	
Syringe Holder Integrity	
End of Syringe Alarm	
Occlusion Alarm	
Input Switches	
Infusion Volume Accuracy	
Battery Quality	