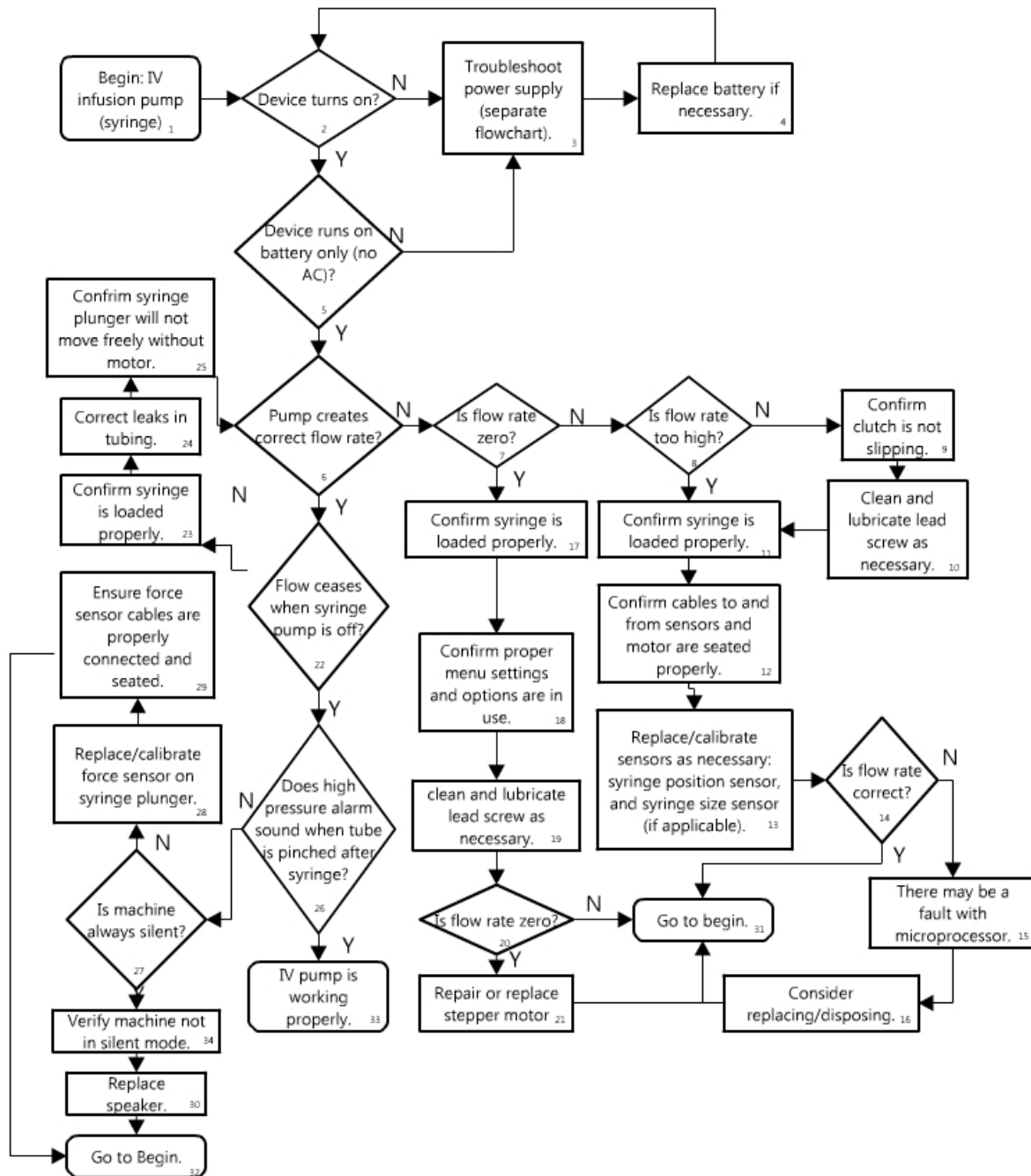


Infusion Pump Troubleshooting

Diagnostic flowchart (Syringe Pumps)

Syringe pumps use a syringe driven by a lead screw to deliver precise amounts of liquid medication intravenously.

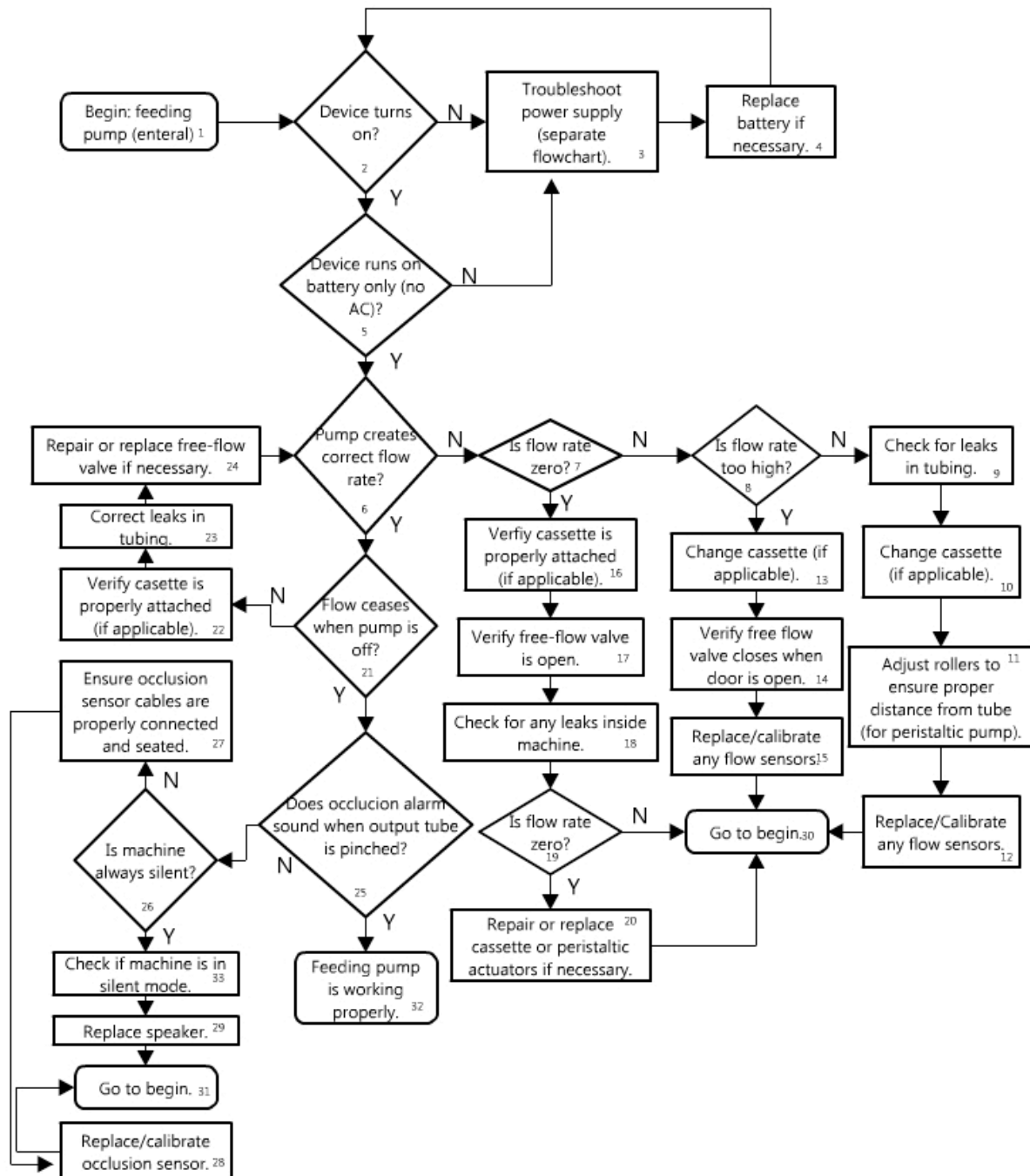


#	Text box	Explanation or Comment
1	Begin: IV infusion pump (syringe)	Start the diagnostic process.
2	Device turns on?	Displays, lights, and sounds indicate the machine has turned on.
3	Troubleshoot power supply (separate flowchart).	Syringe pumps generally have an AC-DC power supply.
4	Replace battery if necessary.	Old batteries are a common problem with syringe pump batteries.
5	Device runs on battery only (no AC)?	Check if the machine will run on battery when power is unplugged. This is a safety feature on many syringe pumps.
6	Pump creates correct flow rate?	Measure the flow rate using a container of known-volume to collect the fluid and a stopwatch. For small flow rates, it may be necessary to use a precision scale to measure the fluid output. Flow rate is volume divided by time.
7	Is flow rate zero?	Check if the machine will generate any output of fluid.
8	Is flow rate too high?	Compare the measured flow rate to the amount programmed in the machine.
9	Confirm clutch is not slipping.	Low flow can be caused by a clutch slipping on the lead screw. Repair if necessary.
10	Clean and lubricate lead screw as necessary.	See BTA skills on cleaning and lubrication.
11	Confirm syringe is loaded properly.	Incorrect flow rate can be caused by improperly loaded syringe.
12	Confirm cables to and from sensors and motor are seated properly.	See BTA skills on electric connections and connectors.
13	Replace/calibrate sensors as necessary: syringe position sensor, and syringe size sensor (if applicable).	Faulty sensors can cause faults in controlling the flow rate.
14	Is flow rate correct?	Measure the flow rate using a container of known-volume to collect the fluid and a stopwatch. For small flow rates, it may be necessary to use a precision scale to measure the fluid output.
15	There may be a fault with microprocessor.	Possible problem with the microprocessor or computing software.

16	Consider replacing/disposing.	If the problem lies with the microprocessor, the machine may need to be disposed and replaced.
17	Confirm syringe is loaded properly.	Incorrect flow rate can be caused by improperly loaded syringe.
18	Confirm proper menu settings and options are in use.	User error may be a problem if machine is reported for lack of flow.
19	Clean and lubricate lead screw as necessary.	See BTA skills on cleaning and lubrication.
20	Is flow rate zero?	Check if the machine will generate any output of fluid.
21	Repair or replace stepper motor.	If corrective measures don't start fluid output, there may be a problem with the motor that drives the syringe.
22	Flow ceases when syringe pump is off?	Verify that the flow ends when the pump is turned off or the control panel is used to end the flow.
23	Confirm syringe is loaded properly.	An incorrectly loaded syringe could leak fluid when flow is turned off by controls.
24	Correct leaks in tubing.	See BTA skills on plumbing leaks.
25	Confirm syringe plunger will not move freely without motor.	If plunger moves independently of machine controls, check mechanical connections.
26	Does high pressure alarm sound when tube is pinched after syringe?	If the output tube is occluded, the machine should emit a high pressure alarm.
27	Is machine always silent?	Investigate if machine makes noises due to any other inputs or alarms.
28	Replace/calibrate force sensor on syringe plunger.	High pressure alarm is not sounding. Check the force sensor that measures the force applied to the syringe plunger.
29	Ensure force sensor cables are properly connected and seated.	See BTA skills on electric connections and connectors.
30	Replace speaker.	Machine is not in silent mode, but it does not make noise. Replace the speaker.
31	Go to begin.	Restart the diagnostic process to see if the corrective measures have repaired the machine.
32	Go to begin.	Restart the diagnostic process to see if the corrective measures have repaired the machine.
33	IV pump is working properly.	Return the machine to service via the appropriate clinical personnel.
34	Verify machine not in silent mode.	Silent mode may be preventing the alarm. Turn off silent mode and check alarm again.

Diagnostic flowchart (Feeding Pumps)

Feeding pumps are a type of infusion pump that delivers higher volumes of nutritional fluid enterally. This chart includes enteral pumps working with two basic mechanisms: a peristaltic pump using actuated “fingers” to pump fluid through a flexible tube and a cassette pump, in which the pumping is achieved by a cassette as part of a circuit that detaches from the machine.



#	Text box	Explanation or Comment
1	Begin: feeding pump (enteral)	Start the diagnostic process for a work order on a feeding pump.
2	Device turns on?	Lights, displays, and sounds are signs the device is powered on.
3	Troubleshoot power supply (separate flowchart).	Feeding pumps generally have an AC-DC power supply.
4	Replace battery if necessary.	Old batteries are a common problem with feeding pumps. Test battery's ability to receive and hold a charge.
5	Device runs on battery only (no AC)?	Check if the machine will run on battery when power is unplugged. This is a safety feature on many feeding pumps.
6	Pump creates correct flow rate?	Measure the flow rate using a container of known-volume to collect the fluid and a stopwatch. Flow rate is volume divided by time.
7	Is flow rate zero?	Check if the machine will generate any output of fluid.
8	Is flow rate too high?	Compare the measured flow rate to the amount programmed in the machine.
9	Check for leaks in tubing.	Tubing leaks can cause low flow rate. See BTA skills on plumbing leaks.
10	Change cassette (if applicable).	Some feeding pumps use a cassette or pump set as an accessory that must be changed and refilled periodically. Sometimes the cassette must be "primed" or "reset" after refilling. Use the menu options on the machine to reset the cassette.
11	Adjust rollers to ensure proper distance from tube (for peristaltic pump).	For peristaltic feeding pumps, incorrect flow rates can result from rollers that are either too far or too close to the tube.
12	Replace/calibrate any flow sensors.	Incorrect flow rates can be caused by faulty or disconnected flow sensors. See BTA skill on electrical connections and connectors.
13	Change cassette (if applicable).	Some feeding pumps use a cassette or pump set as an accessory that must be changed and refilled periodically. Sometimes the cassette must be "primed" or "reset" after refilling. Use the menu options on the machine to reset the cassette
14	Verify free flow valve closes when door is open.	Some feeding pumps, especially peristaltic feeding pumps, have a free-flow valve that closes to prevent flow when the machine case is open. Ensure the valve is working properly and clean it or adjust it mechanically if necessary.

15	Replace/calibrate any flow sensors.	Incorrect flow rates can be caused by faulty or disconnected flow sensors. See BTA skill on electrical connections and connectors.
16	Verify cassette is properly attached (if applicable).	An improperly loaded cassette or pump set can prevent any fluid output.
17	Verify free-flow valve is open.	The free-flow valve must be open to allow fluid output. Insure the valve is working properly and clean it or adjust it mechanically if necessary.
18	Check for any leaks inside machine.	A leak in the tubing can cause a spill and prevent flow. See BTA skills on plumbing leaks.
19	Is flow rate zero?	Check if the machine will generate any output of fluid.
20	Repair or replace cassette or peristaltic actuators if necessary.	Some feeding pumps use a cassette or pump set as an accessory that must be changed and refilled periodically. Sometimes the cassette must be “primed” or “reset” after refilling. Use the menu options on the machine to reset the cassette. Peristaltic pumps use rollers that are controlled and moved by electromechanical actuators. Lubricate or replace the actuators as necessary.
21	Flow ceases when pump is off?	When the flow is turned off by unplugging the machine or with user controls, verify that the fluid output stops.
22	Verify cassette is properly attached (if applicable).	An improperly loaded cassette or pump set might leak fluid after the device is turned off.
23	Correct leaks in tubing.	See BTA skill on plumbing leaks.
24	Repair or replace free-flow valve if necessary.	Insure the free-flow valve is working properly and clean or adjust the free flow valve mechanically as necessary.
25	Does occlusion alarm sound when output tube is pinched?	When the output tube is occluded, the machine should sound.
26	Is machine always silent?	Investigate if machine makes noises due to any other inputs or alarms.
27	Ensure occlusion sensor cables are properly connected and seated.	See BTA skills on electric connections and connectors.
28	Replace/calibrate occlusion sensor.	See BTA skills on electric connections and connectors. Consider replacing sensor if it cannot be repaired.
29	Replace speaker.	Machine is not in silent mode, but it does not make noise. Replace the speaker.
30	Go to begin.	Restart the diagnostic process to see if the corrective measures have repaired the machine.

31	Go to begin.	Restart the diagnostic process to see if the corrective measures have repaired the machine.
32	Feeding pump is working properly.	Return the machine to service via the appropriate clinical personnel.
33	Check if machine is in silent mode.	Silent mode may be preventing the alarm. Turn off silent mode and check alarm again.