

# Troubleshooting

This section outlines procedures for troubleshooting problems with the operation of the system:

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## 4.1 System Error Messages

### Infusion pump errors:

P001	syringe failed to initialize
P002	invalid command
P003	invalid argument
P004	communication error
P005	invalid "R" command
P006	supply voltage too low
P007	device not initialized
P008	program in progress
P009	syringe overload
P010	valve overload
P011	syringe move not allowed
P012	cannot move against limit
P013	expanded NVM failed
P015	command buffer overflow
P016	use for 3-way valve only
P017	loops nested too deep
P018	program label not found
P019	end of program not found
P020	out of program space
P021	HOME not set
P022	too many program calls
P023	program not found
P024	valve position error
P025	syringe position corrupted
P026	syringe may go past home
P027	Non-Kloehn Kloehn error (includes communication errors or software bugs in the ink center code)

### Startup errors:

S001	Activating ioboard
S002	Activating ioboard
S003	Initializing Digital Sensors
S004	Initializing Analog Sensors
S005	Initializing Ink Nests
S006	Initializing Solenoids
S007	Initializing Pumps
S008	Initializing Needles
S009	Creating Pump Communications

S010	Checking Configuration
S011	Calibrating Sensors
S012	Initializing Chamber
S014	Initializing HP15/45 Station
S015	Activating Pump
S016	Activating Pump
S017	Creating Actors
S018	Syringe Cleanout
S019	Testing 5V DC Power

**Other errors:**

Tester Error:	
T001	Print Tester not responding to queries.
Vacuum Errors:	
V001	Vacuum measured at separator < 5in/hg
V002	Vacuum measured at separator < 14.4in/hg
V003	Vacuum measured at prep station > 3 before opening vacuum valve
Waste Error:	
W001	Waste Full Sensor reads "full" after running waste drain routine.

- **Note: always reboot the system first (Maintenance Tab) if it has not already been done. Many times a reboot will resolve the problem.**
- Notice that the first letter of the code indicates what area of the system is affected.
- The error codes listed above in **bold** are the ones most likely to be observed during troubleshooting or use of the machine.
- Startup error codes, or **S-codes**, may be related to regular error codes observed during normal use.
- Only the most common error codes are covered in detail in this manual. As always, if you have any questions, please call the support line.

### 4.1.1 Pump Errors

**P001/P009**

- These “P-codes” usually go together, although the P001 will not always be present with a P009.

- The cause is typically a syringe overload, and most often it is the black syringe that is the problem.

### **P027**

- This error is a “catch all” error that usually indicates that a previous error has occurred. The system cannot see the original error, so it assumes there is an error outside the pump assembly. In most cases, the pump is experiencing **P009** errors, syringe overloads. Please confirm with third level support in these cases.

## **4.1.2 Startup Errors**

### **S001**

- Activating I/O board error - typically occur when the system cannot communicate with the I/O board during startup.
- Check the LED on the I/O board for status. If the I/O board is working correctly, the LED will be blinking.
- Check the power to the I/O board; check connections between the I/O board and the touch screen assembly (system computer).
- If all other systems are working (power, control, communications) then replace the I/O board.

### **S019**

- Loss of 5V power to the system.
- Check the DC power supply for an output of 5V. Also check the 5A fuse on the AC/DC board, and the output of the AC/DC 5V line to the I/O board and to the tester electronics.

## **4.1.3 Tester Errors**

### **T001**

- Occurs when the system loses communication with the tester electronics.
- May be caused by a loss of power to the tester electronics (5/24V)
- Note: the operator can clear the error during normal operation. The tester is then not usable until the system is rebooted.

## 4.1.4 Vacuum Errors

### V001—Vacuum reading at the liquid separator < 5in/hg.

- Verify the vacuum pump is working. If the power cord is the removable type, make sure it's securely plugged in.
- Reboot the machine if not previously done by the operator to verify the problem is not software related.
- Remove the upper hood and check the fluid trap, the small glass jar. If full, empty and clean the jar, then place back into system. Make sure the plastic ball is in the jar before replacing.
- Drain the separator, then remove and clean the separator assembly if it has not been performed in the past month. Test the float assembly sensors by moving the float to the top most position, or if assembled, fill the liquid separator with water using the vacuum wand. After reassembly, perform separator vacuum leak check.
- If the error code still exists after reboot, check the vacuum system for a large vacuum leak or blockage.

### V002—Low vacuum at the liquid separator

- Check the vacuum wand for leakage. Cover the end of the wand with your finger and check the vacuum level of the separator in Tech Pane while running the vacuum pump. If the vacuum level goes up, then the leak is being caused by the wand - disassemble and clean the vacuum wand.
- Check all connections associated with the liquid separator vacuum system, including both vacuum manifolds, regulator, trap, vacuum fittings, and the separator itself.
- **NOTE:** There are two vacuum manifolds, both brass colored. One, the primary vacuum manifold, is mounted vertically and is located against the inside wall of the plumbing tower; the second manifold, the waste manifold, is mounted horizontally and is located on the back wall, below the grey fluid manifold. Both manifolds and all fittings must be checked when a vacuum leak is found in the system.
- Once the leak is repaired, check and adjust the separator vacuum level to a value between 15.1 - 15.3 in/Hg.

### V003—Premature vacuum at a prep station

- This error means that the system detected vacuum at a prep station before it required any vacuum. Check the solenoid valve seat at the waste manifold for the respective prep station. Typically there is some debris at the valve seat causing the valve to remain partially open.
- If the vacuum distribution manifold is not repairable onsite, replace the entire manifold assembly and retest.

## 4.2 Prep Station Troubleshooting

### 4.2.1 Adapter Not Detected at the Prep Station

- If this is a dual prep system, check the adapter at the other prep station.
- If the problem is only with one prep station or one adapter, try adjusting the prep station reed sensor (see “Prep Station Reed Sensor” on page 5-46).
- If this does not correct the problem, replace the reed sensor (see “Prep Station Reed Sensor” on page 5-46).
- Replace an adapter if it has any missing magnets.

### 4.2.2 Cartridge Not Detected (After Prep Process Starts)

- Make sure the correct fill adapter is being used for the cartridge.
- If this is only happening with one adapter, check the prep seal on the adapter and replace the adapter if necessary.
- Remove and clean the prep seal on the affected prep station. Replace if damaged or worn.
- Perform prep filter vacuum check: in Tech Pane turn on the vacuum pump and wait for the vacuum to come up to normal value (15.1-15.5). Open the vacuum valve for the prep station that is having problems. The fluid separator value should drop at least 5 inches - this indicates an unclogged, open filter. (For example: if the fluid separator value is at 15.1 before the vacuum valve is open, then it should drop below 10.1 in/hg if it is completely clear of obstructions.)
- If this happening on both prep stations, check the separator vacuum system for vacuum problems.

## 4.3 Fill Station Troubleshooting

### 4.3.1 Adapter Not Detected at the Fill Station

- Remove the adapter and reinsert it into the fill station. If it is occurring with all adapters, check and adjust the adapter sensor at the back of the fill chamber.
- If the problem is only with one adapter check for missing magnets and replace the adapter if necessary.
- Check and replace the RFID reader if defective.

### 4.3.2 Fill Process Does Not Start

- Check the adapter present sensor in Tech Pane when the adapter is inserted into the fill chamber. If not, the adapter may not be triggering the adapter present sensor. See “Adapter Not Detected at the Fill Station”.
- Check to make sure the software is working correctly. A reboot may be necessary.
- Make sure the correct injectors are in the adapter and that the unused injectors are in the holster.
- Test and adjust the injector proximity sensors. Replace if defective.

### 4.3.3 Vacuum Chamber Vacuum is Not Achieved

- Check the fill chamber door to make sure it’s sealing correctly. Press on the chamber door to improve the seal.
- Check for cracks in the vacuum chamber door inside the seal - cracks around the handle that do not go inside the seal do not affect the vacuum. If the door is cracked, cover the crack with scotch tape as a temporary fix if necessary. Remove and replace the vacuum chamber door (see “Vacuum Chamber Door” on page 5-59).
- Verify that all injector proximity sensors are properly tightened (see “Vacuum Chamber Injector and Door Sensors” on page 5-117).
- Check for air leaks at all vacuum chamber connectors (see “Vacuum Chamber” on page 5-52).
- From the Tech Pane, test the vacuum chamber vacuum (see “Fill Chamber Vacuum Leak Check” on page 6-5).
- Check for vacuum leaks in other parts of the system (see “Waste Level Sensor” on page 6-5).
- Perform a Syringe Leak Test to check the syringes, dispense lines, and valve bodies for leaks (see “Syringe Leak” on page 6-12).

### 4.3.4 Fill Process Does Not Stop

- Reboot the system to clear the error and perform another fill to check the system. Have third level support check the logs for other errors that could be causing the system to hang up the fill process.

- Replace the vacuum transducer if necessary.

### 4.3.5 Air in the Dispense Line

**Run a syringe leak test. Does the leak occur when the syringe is stationary (static leak) or moving (dynamic leak)?**

#### **Stationary leak**

- Check the dispense line connection to back of chamber.
- Check the dispense line connection to the distribution valve.

#### **Dynamic leak**

- Check the syringe connection to the distribution valve.
- Check the syringe plunger and replace if it is defective.

#### **Are the ink lines properly primed?**

- Check the ink line connection to the fluid distribution valve.
- Run a priming routine and recheck the lines.
- Add a sealing washer to any line that displays problems and check again.

### 4.3.6 Overflows in the Fill Chamber

**Is the source of the overflow a system component or a cartridge?**

- Verify that operators are properly screening refill cartridges.
- Check ink tracks from the cartridges.
- If the cartridges are not the source of the problem, continue.

**Is the vacuum chamber seal pad seated properly and in good condition?**

- If not, replace the seal pad (see “Fill Chamber Seal Plate” on page 5-71).
- If the seal pad is not the source of the problem, continue.

**Are overflows always with the same color of ink?**

- If the problem occurs with different colors of ink, the overflows are not likely to be caused by a system problem.
- If the overflows always occur with the same color of ink, continue.

### **Are air bubbles visible in the ink line during a fill process?**

- If air bubbles *are not* visible in the ink line, the overflows are not likely to be caused by a system problem.
- If air bubbles *are* visible in the line, continue.

### **Are the overflows the result of a vacuum fault in the fill chamber?**

- If proper vacuum levels *are not* achieved during the fill process, check the following components and service if necessary.
  - Vacuum chamber gasket (see “Vacuum Chamber Gasket” on page 5-102)
  - Vacuum chamber door (see “Vacuum Chamber Door” on page 5-59)
  - Vacuum chamber tubing connections
  - Vacuum chamber sensors (see “Vacuum Chamber Reed Sensor” on page 5-72)
- If proper vacuum levels *are* achieved during the fill process, continue.

### **Are the overflows the result of a prep station issue?**

- Check to see if the prep station vacuum filters are clogged. If necessary, clean the tubing (see “Cleaning the Prep Station Vacuum Lines” on page 7-12).
- Check the prep station fluid sensor PC board. If it is malfunctioning, remove and replace it (see “Fluid Sensor PC Board” on page 5-37).

### **Is the vacuum sensor scale off due to a transducer failure?**

- Replace the main vacuum manifold (see “Primary Vacuum Manifold Assembly” on page 5-209).

### **Are the overflows due to a valve problem?**

- Check the fluid distribution valve by running the syringe leak test. If it is malfunctioning or leaking, remove and replace it (see “Fluid Distribution Valve” on page 5-87).

## **4.3.7 One Ink Does Not Dispense**

### **Confirm the following:**

- Which ink fails to dispense
- Which cartridge type experiences the problem

- Visually confirm the problem by watching the ink line during a fill process (you can dispense ink into a jar for this test)
- Check the ink dispense lines for blockage from the valve to the injector lines.

**Follow the troubleshooting steps for air in the dispense lines (see “Air in the Dispense Line” on page 4-8)**

### **4.3.8 An Ink Drawer Will Not Open**

**Are all the drawers closed?**

- If not, close the open drawer and try again.
- If this does not fix the problem, continue.

**Can you open any other drawers?**

- If yes, close the drawer firmly and try the first drawer again.
- If this does not fix the problem, continue.

**Check for malfunctioning latch components.**

### **4.3.9 Ink Bottle Is Sucked Inward in the Ink Drawer**

**This problem is due to a clogged vent hole on the ink nest.**

### **4.3.10 Ink Leak**

**Is ink dripping from the tip of the injector onto the chamber shelf?**

- A small amount of dripping is normal.
- If a substantial amount is dripping, insert an O-ring into the injector and reinstall the ink line.
- If a substantial amount continues to drip, continue.

**Is the ink leaking at the connector between the injector and the dispense line?**

- Hand tighten the connector.

- Validate that the holster is clean.

### **Is the ink leaking from the syringe system?**

- Hand tighten the syringe to the fluid distribution valve.
- Check and hand tighten all lines coming into the fluid distribution valve.
- Clean up the ink.
- If the problem continues, run a **Syringe Leak Test** from the Tech Pane.
- Check all lines for obstructions or kinks.
- Any time a valve has been replaced or a line has been removed from a fluid distribution valve, run the **Prime Ink Syringes** process from the Tech Pane. When the process is finished, check to be sure ink is present in the ink lines at the connections to the fluid distribution valve.
- If ink is leaking from the weep hole located on the bottom left side of the fluid distribution valve, contact RIS technical services for further instructions.

### **Is the ink leaking around an ink nest?**

- If fluid is visible on the LED label on the top of the ink drawer, the leak is coming from the prep station. Check the connections on the prep station manifold (see “Prep Station Manifold” on page 5-42).
- If the ink is visible in the channel from the top of the ink nest, remove the ink bottle, clean up the spill, and check later to see if this fixes the problem.
- If no ink is visible on top of the drawer or on top of the ink nest, replace the ink nest (see “Ink Nest Assembly” on page 5-122).

## **4.3.11 Leaks at the HP45 Station**

### **Where is the ink visible?**

#### **Down the sides of the cartridge**

- Check the HP45 station seal for damage and proper positioning. Remove and replace it if necessary (see “HP45 Station Seal” on page 5-80).

#### **Below the station and not on the cartridge**

- Finger tighten the ink line fitting at the bottom of the HP45 station manifold.
- If tightening the fitting does not solve the problem, install a sealing washer and retest.

### 4.3.12 Cartridge Not Detected at the HP45 Station

From the I/O Board tab of the Tech Pane, check to see if the HP 45 station switch is faulty using the following procedure:

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TASK

1. Observe the **Cartridge Seated** box while you insert and latch a cartridge into the HP 45 station. When the cartridge is latched into the station, a check should appear in the box. The box should clear when the cartridge is unlatched.
  2. If the check does not appear when a cartridge is latched into the system or fails to clear when the cartridge is unlatched, replace the HP 45 station switch.
- If the switch is faulty, replace the HP15/45 station.

## 4.4 Tester Station Troubleshooting

### 4.4.1 Blank Test Pattern

#### **Is the ink cartridge drooling ink?**

- If it is drooling ink, run it through a recovery process.
- If the cartridge is not drooling ink, continue.

#### **Visually inspect the interconnect board for broken or stuck pins?**

- If the interconnect board is damaged, remove and replace it (see “Tester Interconnect PC Board” on page 5-139).
- If the interconnect board is not damaged, continue.

#### **Is does the problem occur with multiple cartridge families?**

- If the problem occurs with multiple cartridge families, and the affected adapters and the interconnect board have been replaced, remove and replace the tester board set (see “Tester PC Board Set” on page 5-170).

### 4.4.2 Adapter Not Detected at the Tester Station

#### **Reboot the system and insert the adapter again.**

- If the problem occurs after rebooting the system, continue.

#### **Check to see if the problem occurs with any other adapters.**

- If the problem occurs with only one adapter, replace that adapter.
- If the problem occurs with all adapters, continue.

#### **Visually inspect the interconnect board for broken or stuck pins.**

- If the interconnect board is damaged, remove and replace it (see “Tester Interconnect PC Board” on page 5-139).
- If the interconnect board is not damaged, continue.

**Visually inspect the tester latch for missing fasteners or a pin slipped out of position.**

- If the tester latch is damaged, remove and replace it (see “Tester Latch Assembly” on page 5-142).
- If the tester latch is not damaged, continue.

**Check the connections on the tester assembly and the tester board set.**

- Reseat all connectors and circuit boards on the tester and tester board set.

### **4.4.3 Cartridges for a Single Adapter Family Repeatedly Fail**

**Are multiple cartridges failing in the same way (for example, missing a portion of the test pattern or “bracing”)?**

- If yes, replace the adapter.

**Does the problem occur with cartridges from multiple families?**

- If the interconnect board is damaged, remove and replace it (see “Tester Interconnect PC Board” on page 5-139).
- If the interconnect board is not damaged, remove and replace the tester board set (see “Tester PC Board Set” on page 5-170).

## 4.5 Plumbing System Troubleshooting

### 4.5.1 Vacuum Wand Does Not Operate or Fails to Shut Off

#### Is the vacuum wand leaking?

- Clean the wand (see “Servicing the Vacuum Wand” on page 7-13).
- If this does not fix the problem, replace the wand.

#### Is the vacuum not working?

- Check to see if Vacuum is activated from the admin screen.
- If the vacuum is activated on the screen but there is no vacuum, check the system for vacuum leaks, etc...

### 4.5.2 The Liquid Separator Will Not Drain

- Make sure the maintenance drawer is fully extended.
- Use some canned air at the vacuum wand nozzle to create backpressure.
- Remove and clean/check the separator and float assembly.

### 4.5.3 Cleaning Fluid Leak

#### Complete the following steps

- Trace the fluid to its source.
- Run a process and observe the source of the leak.
- Tighten any loose fittings or replace any leaking components (see “Fluid system diagram” on page 1-39).