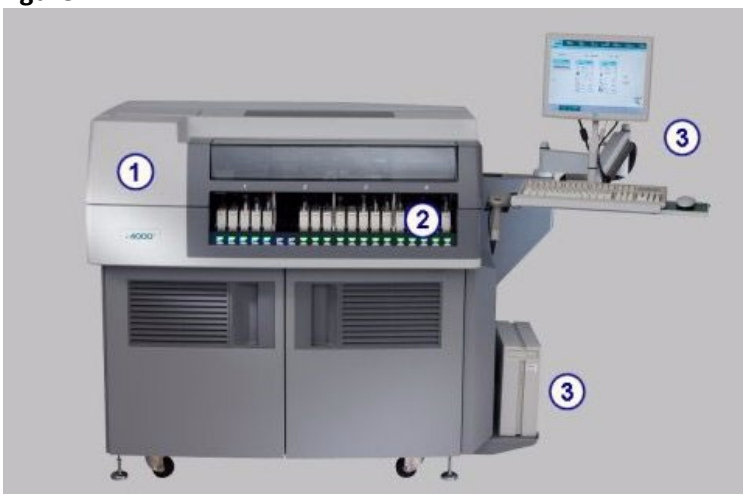
CHEM.ARCH.2.0 ARCHITECT c SYSTEM MAINTENANCE

PRINCIPLE
The Architect *c* System is an open, fully-automated clinical chemistry system allowing random and continuous access and priority processing

SCOPE
The *c* System consists of 3 components (see Figure 1):

① *c* System processing module - Performs sample processing using potentiometric and photometric methods.
② RSH (Robotic sample handler) - Presents samples to the processing modules for analysis and retesting.
③ SCC (System control center) - Provides user control of the processing module(s) and related components through a centralized interface.

Figure 1:



DOCUMENT OWNER
Manager, Regional Chemistry

SPECIMEN
Refer to individual Architect *c* System assay procedures.

REAGENTS
Refer to individual Architect *c* System assay procedure for test specific reagents.

CALIBRATION
See CHEM.ARCH.5.0, Architect System Calibration procedure.

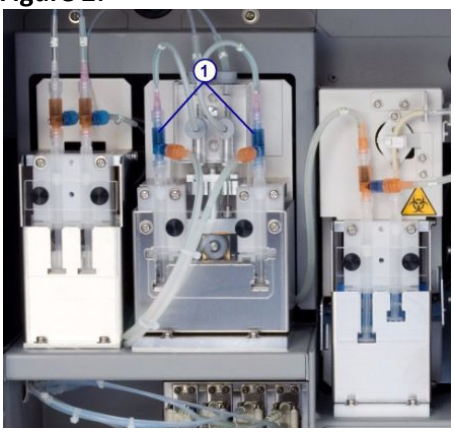
QUALITY CONTROL
Refer to lab quality control policy and procedures.

PROCEDURE

A. Daily Maintenance

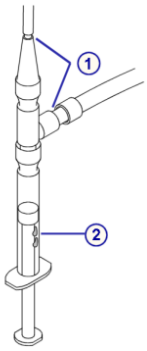
1. 6024: Check 1 mL syringes (cuvette washer syringes)
   a. Perform this daily maintenance procedure to ensure
      1) The pump syringe connections on the wash solution pump do not leak.
      2) The syringe plunger interiors do not show evidence of leakage.
   b. View these daily maintenance procedure graphics (Figures 2 and 3) to:
      1) Locate the wash solution pump 1 mL syringes.
      2) Inspect the connections and interior of the 1 mL syringe for leaks.

Figure 2:



① 1 mL syringes for wash solution pump

Figure 3:



① Connections
② Syringe plunger interior

Estimated Time	Materials Needed	Required Module Status
2 minutes	None	Stopped or Ready

2. 6028: Check DI water purity
   a. Perform this daily maintenance procedure to check the required purity of the water supply to facilitate accurate patient results.

Estimated Time	Materials Needed	Required Module Status
2 minutes	None	Stopped or Ready

3. 6070: Daily Maintenance

CAUTION: CHEMICAL HAZARD

a. Perform this daily maintenance procedure to :
   1) Flush sample and reagent lines
   2) Change water in bath
   3) Add water bath additive
   4) Wash ICT probe with ICT cleaning fluid and ICT reference solution
   5) Drain and fill ICT reference cup

Estimated Time	Materials Needed	Required Module Status
15 minutes	ICT Cleaning Fluid ICT Sample Diluent Water Bath Additive	Ready

4. 9101: Record water resistivity

B. Weekly Maintenance

1. 6019: Check ICT Components

WARNING: POTENTIAL BIOHAZARD

CAUTION: CHEMICAL HAZARD

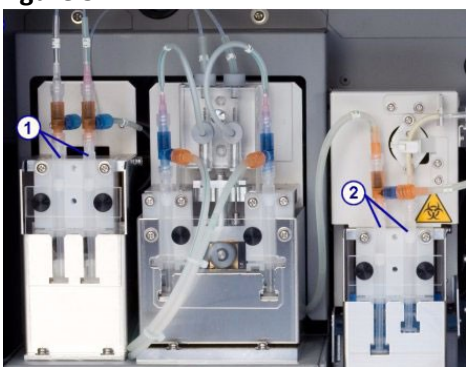
a. Perform this weekly maintenance procedure to ensure:
   1) The ICT probe does not drip
   2) No bubbles are in the ICT tubing
   3) The pump syringe connection on the ICT aspiration pump and the ICT reference solution pump do not leak.

b. View this weekly maintenance procedure graphic to:
   1) Check ICT tubing for bubbles (Figure 4)
   2) Inspect the connections and interior of the ICT 1 mL syringes for leaks (Figure 5).

Figure 4:

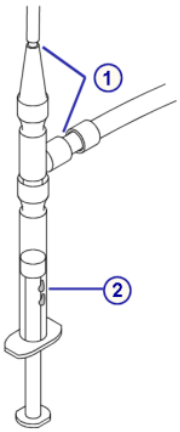
① ICT tubing

Figure 5:



① 1 mL syringe for ICT reference pump
② 1 mL syringe for ICT aspiration pump

Figure 6:



① Connections
② Syringe plunger interior

Estimated Time	Materials Needed	Required Module Status
2 minutes	None	Ready

2. 6021: Clean Mixers

 **WARNING: POTENTIAL BIOHAZARD**

 **CAUTION: CHEMICAL HAZARD**

a. Perform this weekly maintenance procedure to ensure mixers are free of protein buildup.

Estimated Time	Materials Needed	Required Module Status
3 minutes	70% Isopropyl Cotton Swabs DI Water	Stopped or Ready

3. 6023: Clean Sample /Reagent Probes

 **WARNING: POTENTIAL BIOHAZARD**

 **WARNING: PROBE STICK**

 **CAUTION: CHEMICAL HAZARD**

a. Perform this weekly maintenance procedure to ensure:
   1) The exterior of the sample and reagent probes are free of protein buildup
   2) The probes are not damaged, leaking or dripping.

Estimated Time	Materials Needed	Required Module Status
5 minutes	Detergent A Cotton Swabs Purified Water Nozzle Cleaning Wire (optional)	Stopped or Ready

4. 6056: Clean Cuvettes with Detergent

 **CAUTION: CHEMICAL HAZARD**

a. Perform this weekly maintenance procedure to ensure cuvettes are free of protein buildup and reagent residue.

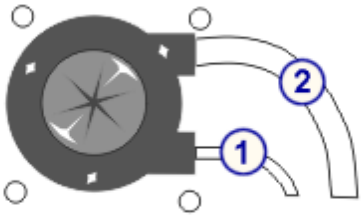
Estimated Time	Materials Needed	Required Module Status
25 minutes	Detergent A	Ready

5. 6308: Check HC waste pump tubing

 **CAUTION: CHEMICAL HAZARD**

a. Perform this weekly maintenance procedure to ensure high concentration waste tubing is free of blockage.

Figure 7:



① Input tubing from pump cuvette washer
②Output tubing to the high concentrated waste (NOTE: Waste pump can have bubbles)

Estimated Time	Materials Needed	Required Module Status
2 minutes	None	Stopped or Ready

6. 9100: Change detergent cartridges

C. Monthly Maintenance

1. 6016: Check Dispense Component

WARNING: POTENTIAL BIOHAZARD

WARNING: PROBE STICK

CAUTION: CHEMICAL HAZARD

a. Perform this monthly maintenance procedure to ensure:
   1) Air bubbles are not being introduced into the sample and/or reagent syringes or the sample and/or reagent tubing
   2) Probe and grounding wire screws are tight
   3) Reagent probe tubing is not discolored

Estimated Time	Materials Needed	Required Module Status
2 minutes	Large Slotted screwdriver	Stopped or Ready

2. 6018: Clean Cuvette Washer Nozzles

WARNING: POTENTIAL BIOHAZARD

CAUTION: CHEMICAL HAZARD

a. Perform this monthly procedure to ensure nozzles are clean and clear of debris to facilitate optimal operation.

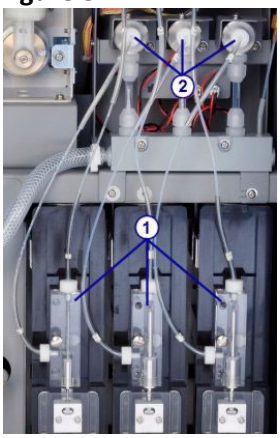
Estimated Time	Materials Needed	Required Module Status
5 minutes	Nozzle Cleaning Wire	Stopped or Ready

3. 6026: Check Syringes and Valves

CAUTION: CHEMICAL HAZARD

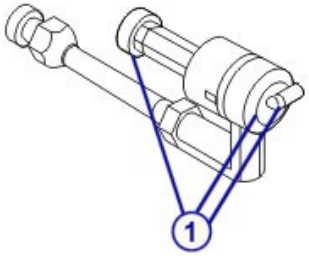
a. Perform this monthly maintenance procedure to ensure the syringes, solenoid valves, and their connections do not leak.

Figure 8:



① Syringes
②Solenoid valves

Figure 9:



① Solenoid valve connections

Estimated Time	Materials Needed	Required Module Status
3 minutes	None	Stopped or Ready

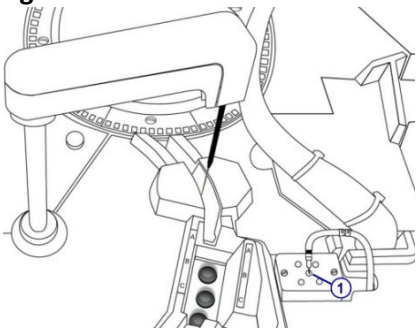
4. 6300: Clean ICT Drain Tip

WARNING: POTENTIAL BIOHAZARD

CAUTION: CHEMICAL HAZARD

a. Perform this monthly maintenance procedure to ensure ICT aspiration drain tip is free of debris and salt buildup.

Figure 10:



① ICT drain tip

Estimated Time	Materials Needed	Required Module Status
1-2 minutes	Lint-Free Tissue DI Water	Stopped or Ready

D. Quarterly Maintenance

1. 1003: Change Lamp

WARNING: ELECTRIC SHOCK HAZARD

WARNING: HOT SURFACE

CAUTION: CHEMICAL HAZARD

a. Perform this quarterly maintenance procedure to change the lamp.

b. Replacing the lamp or lamp plate consists of the following steps: Removal, Replacement, and Verification

c.

Prerequisite	Estimated Time	Materials Needed	Replacement Parts
Power off Processing module	15 Minutes NOTE: Time does Include lamp warm up (30 minutes)	Phillips Screwdriver Gloves	LN 09D4S-02 – Lamp

1) Removal

a) Prepare for removal

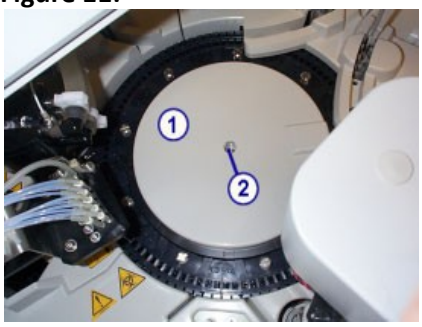
i. Power off the processing module by using the main circuit breaker located at the rear of the module.

b) Remove the covers

WARNING: Wait at least 5 minutes after turning the power off to allow the lamp and housing unit to cool.

NOTE: The lamp can be accessed from the back of the processing module.

Figure 11:

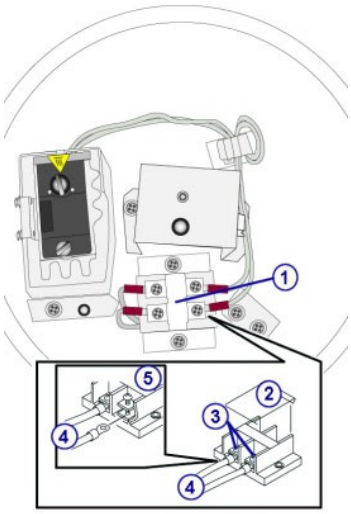


i. Open the rear processing module cover. Locate the lamp housing cover (①) positioned in the center of the reaction carousel.

ii. Remove the Phillips screw (②) and remove the cover.

c) Remove the terminal cable connectors.

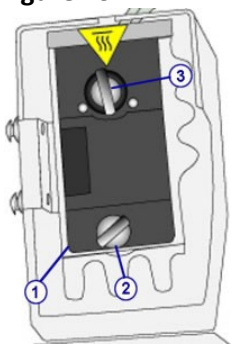
Figure 12:



i. Locate the terminal block (①).
ii. Remove the transparent cover (②) from the terminal block by grasping both ends and lifting up.
iii. Using the Phillips screwdriver, completely loosen the two captive screws (③) securing the two lamp cables on the terminal block.
iv. Raise the screws and lower the lamp cables completely to allow you to disengage the cable from the bottom of the screws (④).

d) Remove the lamp.
WARNING: Wait 5 minutes for it to cool completely.

Figure 13:

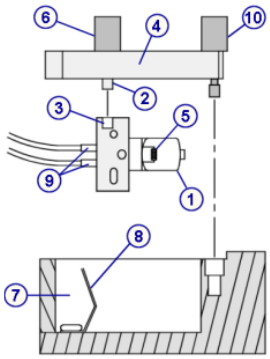


i. Completely loosen the lamp plate thumb screw (②) located towards the rear of the processing module.
ii. Lift the lamp plate (①) and loosen the other thumb screw (③).
iii. Remove the lamp and cable from the lamp housing.

2) Replacement
a) Install the lamp plate and lamp. IMPORTANT: Wear gloves when you perform the following steps. Residual oil on the glass

surface of the lamp shortens the lamp life. The glass surface may be cleaned with ethanol, if needed.

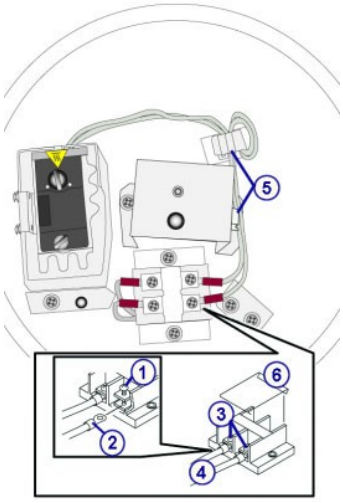
Figure 14:



i. Insert the replacement lamp (①) fitting the pins (②) into the pin holes (③) on the lamp plate (④).
ii. Verify the filament (⑤) is perpendicular to the lamp plate (④).
iii. Tighten the thumb screw (⑥) on the lamp plate while the lamp is fully inserted into the pin holes.
iv. Insert the lamp assembly into the housing (⑦) pressing it against the leaf spring (⑧) and down in the housing. Ensure the lamp assembly is properly seated in the housing.
v. Verify the lamb cables (⑨) are through the slot behind the lamp plate.
vi. Tighten the thumb screw (⑩) to secure the lamp in place.

b) Install the terminal cables.

Figure 15:



i. Raise the screws (①) and insert the cables (②) under the screws.

ii. Use the Phillips screwdriver to tighten the two captive screws (③), securing the two lamp cables (④) on the terminal block.
iii. Route the cable through the two plastic cable clamps (⑤) to ensure the cable does not interfere with the rotation of the reaction carousel.
iv. Replace the transparent cover (⑥) on the terminal block.
v. Power on the processing module. The system center power must be on prior to turning on the processing module to ensure the proper initialization.
vi. Check for stray light around the lamp housing center.

c) Install the processing module cover.
i. Replace the lamp housing cover.
ii. Close the rear processing module cover.

d) Prepare for operation
i. Start the processing module and/or sample handler to change the status of the processing module and sample handler from Stopped to Ready.

IMPORTANT: The lamp must warm up for 30 minutes prior to running assays

ii. Perform quarterly maintenance procedure 1003 change lamp to document the lamp change in the maintenance log.

3) Verification
a) Run QC

Estimated Time	Materials Needed	Required Module Status
15 minutes NOTE: Time does Not include lamp Warm up (30 minutes)	Lamb Phillips Screwdriver Gloves Lint-Free Tissue (optional) Ethanol (optional)	Stopped or Ready

2. 6301: Sample Syringe Maintenance

WARNING: POTENTIAL BIOHAZARD

CAUTION: CHEMICAL HAZARD

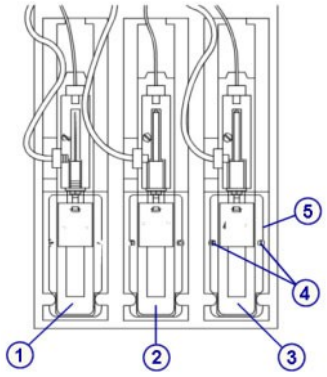
a. Perform this quarterly maintenance procedure to replace sample syringe O-rings and seal tips 1 and 2.
b. Replacing the sample or reagent syringe O-ring and seal tips 1 and 2 consists of the following steps: Replacement, Removal, and Verification.

Prerequisite	Estimated Time	Materials Needed	Replacement Parts
Processing module must be in the Ready status	15 Minutes	Phillips Screwdriver	LN 09DS2-02–Sample/wash
		Slotted Screwdriver	Solution syringe O-ring
		10 mm Wrench	LN 09D37-02–Sample/wash
		Cotton Swabs	solution seal tip #1
		Absorbent Towel	LN 09D38-02–Sample/wash
			Solution syringe seal tip #2
			LN09D53-02–Reagent Syringe O-ring
			LN 09D39-02–Reagent syringe seal tip #1
			LN 09D40-02–Reagent syringe seal tip #2
			NOTE: The O-rings and seal tips #1 and 2 for the sample and reagent syringes are different sizes. Be sure to install the correct part in the appropriate syringe

1) Removal

a) Locate the syringe and remove the plunger shield.

Figure 16:



i. Open the supply center door

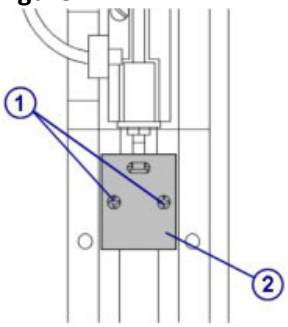
ii. Locate the appropriate syringe
(①) Sample syringe
(②) R1 syringe
(③) R2 syringe

iii. Remove the two Phillips screws (④) securing the shield.

iv. Remove the shield (⑤).

b) Remove the syringe bracket.

Figure 17:

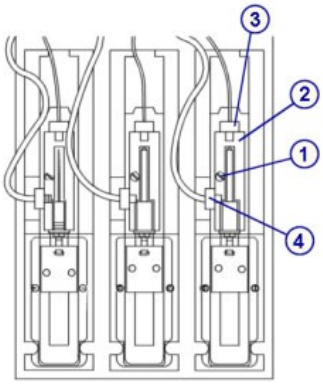


Remove the syringe bracket holding the syringe plunger to the drive block by removing the two Phillips screws (①) on the syringe bracket (②).

NOTE: Notice that these two screws are shorter than the screws from the clear plunger shield. Do not interchange the two sets of screws.

c) Remove the syringe bracket.

Figure 18:



i. Use the slotted screwdriver to loosen the slotted screw (①) securing the syringe block (②) in place. The screw is captive and cannot be completely removed.

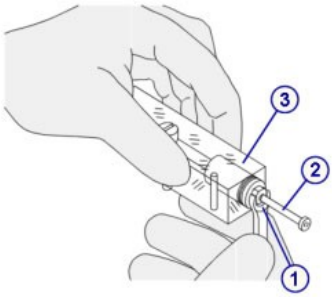
ii. Place an absorbent towel under the syringe drive to absorb any liquid.

iii. Disconnect the tubing at the top (③) and side (④) of the syringe block by unscrewing the knurled connections.

iv. Ensure the black seal remains in the syringe block once the tubing is disconnected.

d) Remove the syringe plunger.

Figure 19:

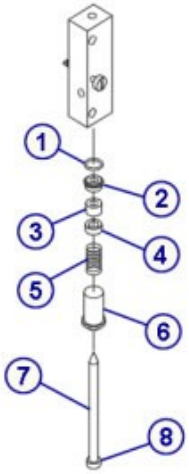


i. Use the 10mm wrench to loosen the nut (①) securing the syringe plunger (②) on the bottom of the syringe block (③).

ii. Turn the nut by hand, once loosened, until the syringe plunger can be removed from the syringe block.

e) Remove the O-ring and seal tips 1 and 2.

Figure 20:



i. The plunger assembly includes the following parts:
(①) O-ring
NOTE: The O-ring may have remained in the syringe block when removing the plunger assembly.
(②) Seal tip 2
(③) Spacer
(④) Seal tip 1
(⑤) Spring
(⑥) Nut
(⑦) Plunger
(⑧) Plunger flange

ii. Remove the following; set aside or discard (except the spacer) if being replaced:
(①) O-ring
(②) Seal tip 2

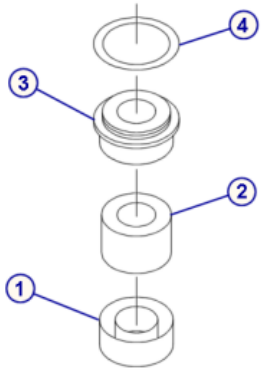
(③) Spacer
(④) Seal tip 1
NOTE: Do not remove the spring.

iii. Dry the interior of the syringe barrel with a cotton swab and dry the plunger completely with an absorbent towel if liquid is present.

2) Replacement

a) Install the O-ring and seal tips 1 and 2.

Figure 21:



i. Install seal tip 1 (①) onto the plunger so that it sits above the spring with the open side away from the spring.

ii. Install the spacer (②) so that it fits into the open side of the seal tip 1.

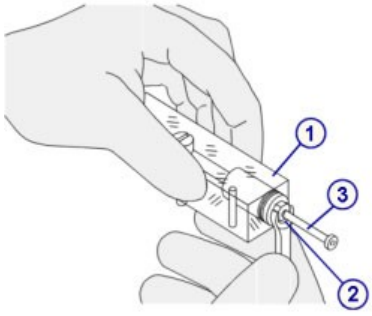
iii. Install seal tip 2 (③) on top of the spacer with the open side toward the spacer.

iv. Install the O-ring (④) so that it fits into the groove of seal tip 2. Do not push the O-ring out of alignment. The O-ring must sit flat against the inside of the syringe block.

v. Press lightly to push all the components together.

b) Install the syringe plunger.

Figure 22:



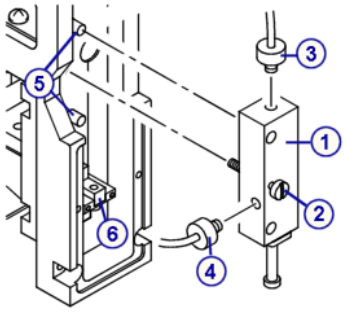
i. Install the plunger assembly into the syringe block (①).

ii. Tighten the nut (②) holding the plunger assembly into the syringe block until finger-tight.
NOTE: The nut must be flush with the plunger assembly. If the nut binds when tightening, do not apply excessive force. Back the nut out a turn, then while pushing in to apply pressure against the spring, continue to tighten the nut.

iii. Use the 10mm wrench to further tighten the nut (②) securing the plunger (③).

c) Install the syringe block.

Figure 23:



i. Hold the syringe block (①) so that the slotted screw (②) faces you.

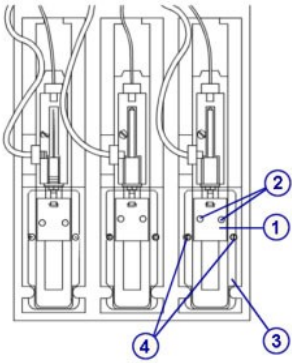
ii. Ensure the black seal remains in place in each port. Reconnect the tubing coming from the pipettor to the top (③) of the syringe block and the tubing from the syringe valve to the side (④) by screwing the knurled connections.

iii. Align the syringe block to the pins (⑤) on the syringe holder, verifying that the plunger flange is above the drive block (⑥). Move any tubing out of the way.

iv. Hold the syringe block against the alignment pins and tighten the screw (②) by hand until finger-tight. Secure the screw with a slotted screwdriver.

d) Install the syringe bracket and plunger shield.

Figure 24:



i. Attach the syringe bracket (①) to connect the drive block and syringe plunger.
ii. Use the Phillips screwdriver to install the screws (②).
NOTE: Verify the shorter screws are used in the bracket. Do not use the longer screws for the plunger shield.
iii. Attach the clear plunger shield (③) by tightening the two Phillips screws (④).
iv. Remove the absorbent towel from the syringe drive.

e) Prepare for operation
i. Perform ***as-needed*** maintenance procedure "2132 Flush Water Lines" to remove any air that may be present.
ii. Visually check for leaks while performing the flush. If drips are observed, repeat the installation procedure.
iii. Perform ***quarterly*** maintenance procedure "6301 Sample Syringe Maintenance" or "6303 Reagent Syringe Maintenance" to document sample or reagent syringe O-ring and seal tips in the maintenance log.
NOTE: Only perform this maintenance procedure if you replaced the O-ring and seal tips in both the R1 and R2 syringes.

3) Verification
Run QC

3. 6302: Wash Syringe Maintenance

WARNING: POTENTIAL BIOHAZARD

CAUTION: CHEMICAL HAZARD

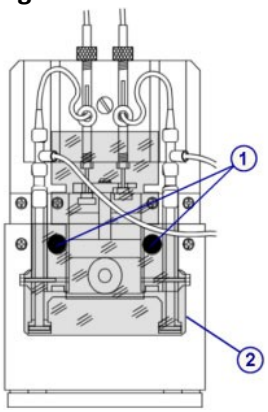
a. Perform this quarterly maintenance procedure to replace wash solution syringe O-rings and seal tips 1 and 2.

Prerequisite	Estimated Time	Materials Needed	Replacement Parts
Processing module must be in the Ready status	15 Minutes	Phillips Screwdriver Slotted Screwdriver 10mm Wrench Cotton Swabs Absorbent Towel	LN 09DS2-02–Sample/wash solution syringe O-ring LN 09D37-02–Sample/wash solution seal tip #1 LN 09D38-02–Sample/wash Solution syringe seal tip #2

1) Removal

a) Remove the clear outer plunger shield.

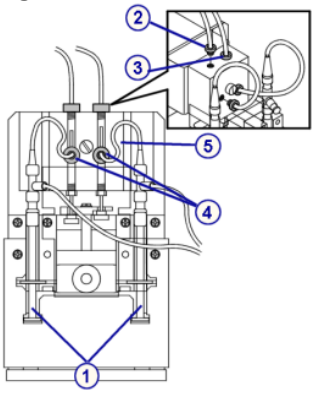
Figure 25:



i. Open the supply and pump center door.
ii. Locate the wash solution pump.
iii. Loosen and remove the black knobs (①) securing the clean outer plunger shield (②).
iv. Remove the shield.

b) Disconnect the wash solution syringe block tubing.

Figure 26:



i. Place an absorbent towel under the pump area to absorb any liquid.
ii. Slide the 1 mL syringes (①) out of their drive block; do not disconnect them.

iii. Unscrew the top-left grey knurled connection (②) from the top of the syringe block.
NOTE: The tubing labeled "2" coming from the instrument connects to the top-left connection (②). The tubing labeled "3" coming from the instrument connects to the top-right connection (③). Do not interchange the tubing.

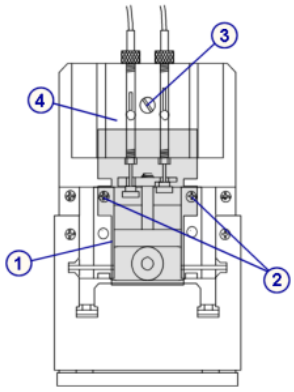
iv. Unscrew the top-right grey knurled connection (③).

v. Unscrew the grey knurled connections (④) from the front of the syringe block (⑤).
NOTE: The tubing coming from the 1 mL syringe on the left connects to the left-front connection. The tubing coming from the 1 mL syringe on the right connects to the right-front connection. Do not interchange the tubing.

vi. Ensure the black seals remain in the syringe block when the grey knurled connections are disconnected.

c) Remove the clear inner plunger shield (①) by removing the two Phillips screws (②) securing the shield.

Figure 27:



i. Use the slotted screwdriver to loosen the slotted screw (③) securing the clear syringe block (④) in place. The screw is captive and cannot be completely removed.

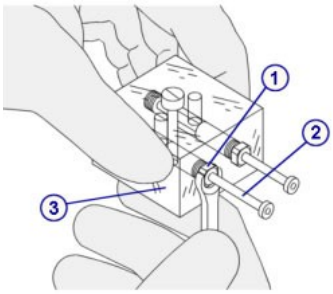
ii. Pull the syringe block forward to allow the plungers to clear the syringe drive.

iii. Lift the syringe block up to remove it from the module.

iv. Identify the syringe needing the new O-ring and seal tips.

d) Remove the syringe plunger.

Figure 28:

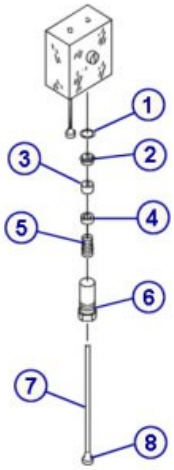


i. Use the 10 mm wrench to loosen the nut (①) securing the syringe plunger (②) on the bottom of the syringe block (③).

ii. Once loosened, turn the nut by hand until the syringe plunger can be removed from the syringe block.

e) Remove the O-ring and seal tips 1 and 2.

Figure 29:



i. The plunger assembly includes the following parts:
(①) O-ring
NOTE: The O-ring may have remained in the syringe block when removing the plunger assembly.
(②) Seal tip 2
(③) Spacer
(④) Seal tip 1
(⑤) Spring
(⑥) Nut
(⑦) Plunger
(⑧) Plunger flange

ii. Remove the following; set aside or discard (except the spacer) if being replaced:
(①) O-ring
(②) Seal tip 2
(③) Spacer

(④) Seal tip 1

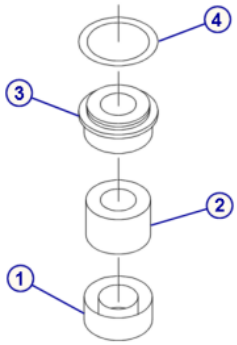
NOTE: Do not remove the spring.

iii. Dry the interior of the syringe barrel with a cotton swab and dry the plunger completely with an absorbent towel if liquid is present.

2) Replacement

a) Install the O-ring and seal tips 1 and 2.

Figure 30:



i. Install seal tip 1 (①) onto the plunger so that it sits above the spring with the open side away from the spring.

ii. Install the spacer (②) so that it fits into the open side of seal tip 1.

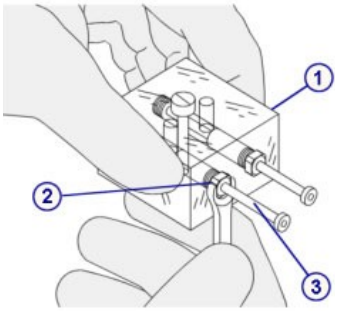
iii. Install the seal tip 2 (③) on top of the spacer with the open side toward the spacer.

iv. Install the O-ring (④) so that it fits into the groove of the seal tip 2. Do not push the O-ring out of alignment. The O-ring must sit flat against the inside of the syringe block.

v. Press lightly to push all the components together.

b) Install the syringe plunger.

Figure 31:



i. Install the plunger assembly into the syringe block (①).

ii. Tighten the nut (②) holding the plunger assembly into the syringe block until finger-tight.

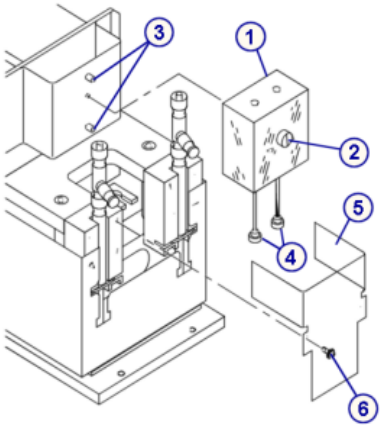
NOTE: The nut must be flush with the plunger assembly. If the nut binds when tightening, do not apply excessive force. Back

the nut out a turn, then, while pushing in to apply pressure against the spring, continue to tighten the nut.

iii. Use the 10mm wrench to further tighten the nut (②) securing the plunger (③). Do not over tighten.

c) Install the syringe block and attach the clear inner plunger shield.

Figure 32:



i. Ensure a black seal remains in each of the tubing ports in the syringe block.

ii. Hold the syringe block (②) so the slotted screw (②) faces you.

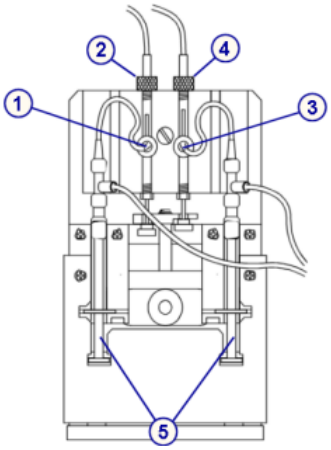
iii. Align the syringe block to the pins (③) on the syringe holder, verifying that both plunger flanges (④) are below the U-shaped holders.

iv. Hold the syringe block against the alignment pins and tighten the screw by hand until finger-tight. Secure with a slotted screwdriver.

v. Attach the clear inner plunger shield (⑤) and tighten the Phillips screws (⑥).

d) Connect the wash solution syringe block tubing.

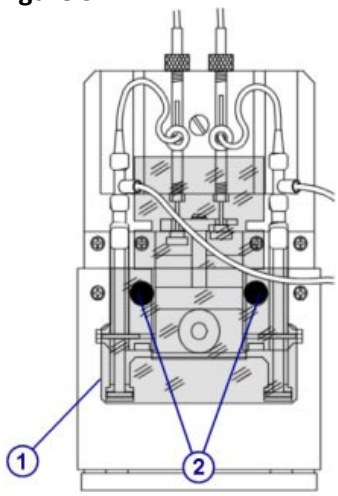
Figure 33:



i. Connect the grey knurled connection labeled “2” from the 1 mL syringe to the left-front port (①).
ii. Connect the grey knurled connection labeled “2” coming from the instrument to the left-top port (②).
iii. Connect the grey knurled connection labeled “3” from the syringe to the right-front port (③).
iv. Connect the grey knurled connection labeled “3” from the instrument to the right-top port (④).
v. Verify the 1 mL syringe tubing connections did not loosen during the removal and replacement procedure.
vi. Reinstall the 1 mL syringes (⑤) into the syringe holder.
vii. Ensure the plunger flange is below the U-shaped holder and that the bottom of the syringe barrel is in the groove at the bottom of the syringe holder.

e) Install the clear outer plunger shield.

Figure 34:



i. Attach the clear outer plunger shield (①) and tighten the black knobs (②) until finger-tight.
ii. Remove the absorbent towel from the pump area.

f) Prepare for operation.
i. Perform ***as needed*** maintenance procedure “2132 Flush Water Lines” to remove any air that may be present.
ii. Visually check for leaks while performing the flush. If you observe drips or leaks, repeat the installation procedure.
iii. Perform ***quarterly*** maintenance procedure “6302 Wash Syringe Maintenance” to document was solution O-ring and seal tips 1 and 2 replacement in the maintenance log.

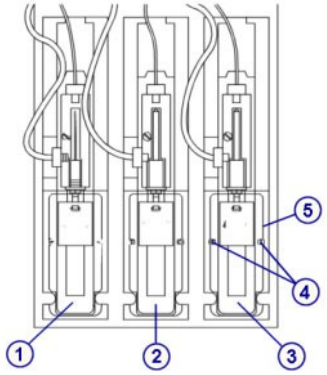
3) Verification
a) Run quality control.
i. Run quality control to verify performance prior to reporting patient results.

4. 6303: Reagent Syringe Maintenance
   a. Perform this quarterly maintenance procedure to replace reagent syringe O-rings and seal tips 1 and 2.

Prerequisite	Estimated Time	Materials Needed	Replacement Parts
Processing module must be in the Ready status	15 Minutes	Phillips Screwdriver Slotted Screwdriver 10mm Wrench Cotton Swabs Absorbent Towel	LN 09DS2-02–Sample/wash solution syringe O-ring LN 09D37-02–Sample/wash solution seal tip #1 LN 09D38-02–Sample/wash Solution syringe seal tip #2 LN 09D53-02–Reagent syringe O-ring LN 09D39-02–Reagent syringe seal tip #1 LN 09D40-02–Reagent syringe seal tip #2 NOTE: The O-rings and seal tips 1 and 2 for the sample and reagent syringes are different sizes. Be sure to install the correct part in the appropriate syringe.

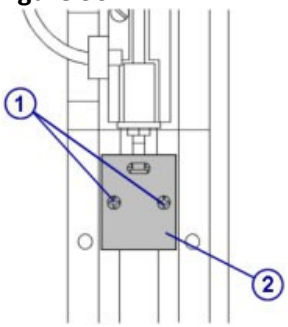
1) Removal
   a) Locate the syringe and remove the plunger shield.

Figure 35:



   i. Open the supply center door.
   ii. Locate the appropriate syringe:
      ① Sample syringe
      ② R1 syringe
      ③ R2 syringe
   iii. Remove the two Phillips screws (④) securing the shield.
   iv. Remove the shield (⑤).
   b) Remove the syringe bracket.

Figure 36:

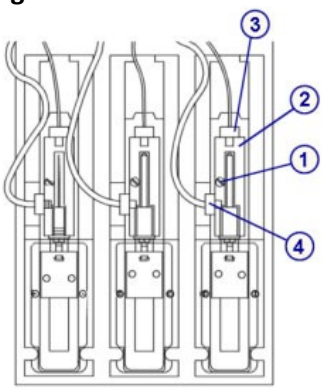


Remove the syringe bracket holding the syringe plunger to the drive block by removing the two Phillips screws (①) on the syringe bracket (②).

NOTE: Notice that these screws are shorter than the screws from the clear plunger shield. Do not interchange the two sets of screws.

c) Remove the syringe block.

Figure 37:



i. Use the slotted screwdriver to loosen the slotted screw (①) securing the syringe block (②) in place. The screw is captive and cannot be completely removed.

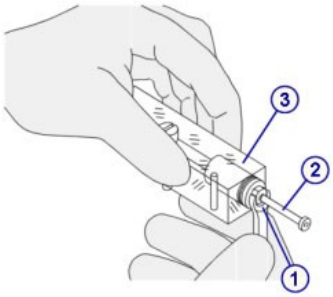
ii. Place an absorbent towel under the syringe drive to absorb any liquid.

iii. Disconnect the tubing at the top (③) and side (④) of the syringe block by unscrewing the knurled connections.

iv. Ensure the black seal remains in the syringe block once the tubing is disconnected.

d) Remove the syringe plunger.

Figure 38:

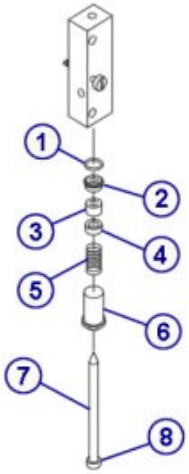


i. Use the 10mm wrench to loosen the nut (①) securing the syringe plunger (②) on the bottom of the syringe block (③).

ii. Turn the nut by hand, once loosened, until the syringe plunger can be removed from the syringe block.

e) Remove the O-ring and seal tips 1 and 2.

Figure 39:



i. The plunger assembly includes the following parts:
(①) O-ring
NOTE: The O-ring may have remained in the syringe block when removing the plunger assembly.
(②) Seal tip 2
(③) Spacer
(④) Seal tip 1
(⑤) Spring
(⑥) Nut
(⑦) Plunger
(⑧) Plunger flange

ii. Remove the following. Set aside and discard (except for the spacer) if being replaced:
(①) O-ring
(②) Seal tip 2

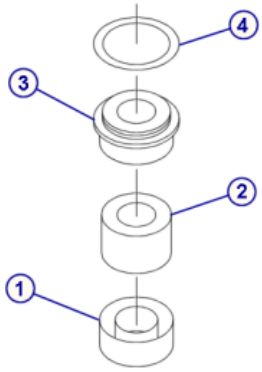
(③) Spacer – set aside; do not discard
(④) Seal tip 1
NOTE: Do not remove the spring.

iii. Dry the interior of the syringe barrel with a cotton swab and dry the plunger completely with an absorbent towel if liquid is present.

2) Replacement

a) Install the O-ring and seal tips 1 and 2.

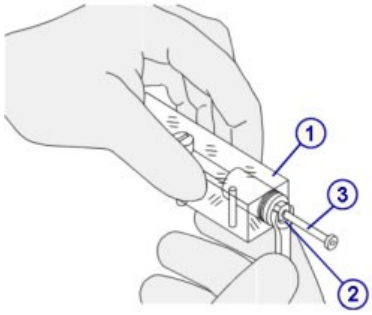
Figure 40:



i. Install seal tip 1 (①) onto the plunger so it sits above the spring with the open side away from the spring.
ii. Install the spacer (②) so it fits into the open side of seal tip 1.
iii. Install seal tip 2 (③) on top of the spacer with the open side toward the spacer.
iv. Install the O-ring (④) so it fits into the groove of seal tip 2. Do not push the O-ring out of alignment. The O-ring must sit flat against the inside of the syringe block.
v. Press lightly to push all the components together.

b) Install the syringe plunger.

Figure 41:



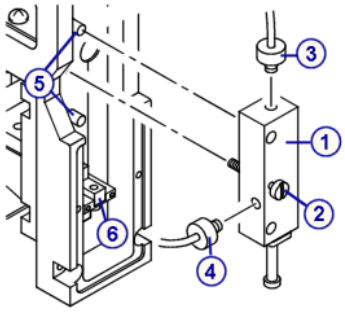
i. Install the plunger assembly into the syringe block (①).
ii. Tighten the nut (②) holding the plunger assembly into the syringe block until finger-tight.
NOTE: The nut must be flush with the plunger assembly. If the

nut binds when tightening, do not apply excessive force. Back the nut out a turn, then, while pushing in to apply pressure against the spring, continue to tighten the nut.

iii. Use the 10mm wrench to further tighten the nut (②) securing the plunger (③).

c) Install the syringe block.

Figure 42:



i. Hold the syringe block (①) so the slotted screw (②) faces you.

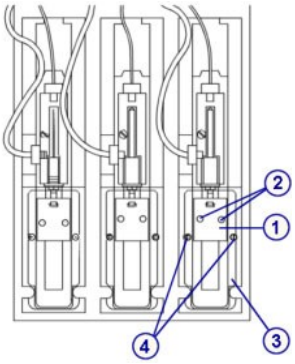
ii. Ensure the black seals remain in place in each port. Reconnect the tubing coming from the pipettor to the top (③) of the syringe block and the tubing from the syringe valve to the side (④) by screwing the knurled connections.

iii. Align the syringe block to the pins (⑤) on the syringe holder, verifying that the plunger flange is above the drive block (⑥). Move any tubing out of the way.

iv. Hold the syringe block against the alignment pins and tighten the screw (②) by hand until finger-tight. Secure the screw with a slotted screwdriver.

d) Install the syringe bracket and plunger shield.

Figure 43:



i. Attach the syringe bracket (①) to connect the drive block and syringe plunger.

ii. Use the Phillips screwdriver to install the screws (②).
NOTE: Verify the shorter screws are used in the bracket. Do not use the longer screws for the plunger shield.

iii. Attach the clear plunger shield (③) by tightening the two Phillips screws (④).

iv. Remove the absorbent towel from the syringe drive.

e) Prepare for operation.

i. Perform ***as needed*** maintenance procedure "2132 Flush Water Lines" to remove any air that may be present.

ii. Visually check for leaks while performing the flush. If drips or leaks are observed, repeat the installation procedure.

iii. Perform ***quarterly*** maintenance procedure "6301 Sample Syringe Maintenance" or "6303 Reagent Syringe Maintenance" to document sample or reagent O-ring and seal tops in the maintenance log.
NOTE: Only perform this maintenance procedure if you replaced the O-ring and seal tips in both the R1 and R2 syringes.

3) Verification

a) Run quality control.

i. Run quality control to verify performance prior to reporting patient results.

5. 6304: Change 1 mL Syringes

WARNING: POTENTIAL BIOHAZARD

CAUTION: CHEMICAL HAZARD

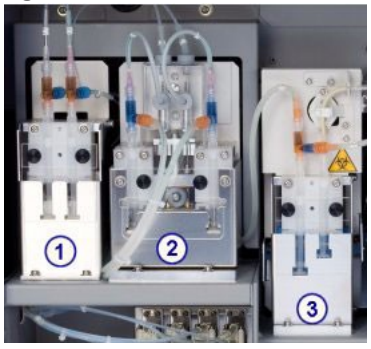
a. Perform this quarterly maintenance procedure to replace 1 mL syringes on: ICT reference pump, wash solution pump, and ICT aspiration pump.

Prerequisite	Estimated Time	Materials Needed	Replacement Parts
Processing module must be in the Ready status	20 Minutes	Absorbent Towels	LN 09D41-02–1 mL syringe NOTE: The same 1 mL syringe is used for the ICT reference pump, the ICT aspiration pump, and the wash Solution pump

1) Removal

a) Locate the 1 mL syringe to be replaced.

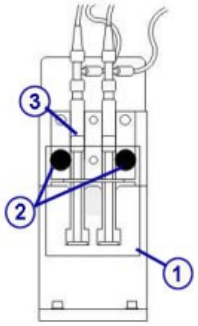
Figure 44:



i. Open the supply center door. Open the pump center door.
ii. Locate the 1 mL syringe to be replaced:
① ICT reference pump
② Wash solution pump
③ ICT aspiration pump

b) Remove the plunger shield and the 1 mL syringe.

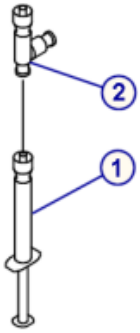
Figure 45:



i. Remove the clear plunger shield (①) by removing the two black knobs (②).
ii. Pull the 1 mL syringe (③) forward to remove it from the syringe holder.

c) Detach and replace the 1 mL syringe.

Figure 46:

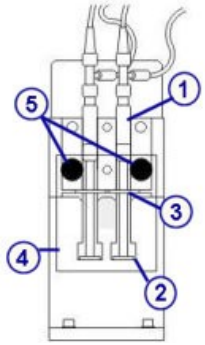


i. Place an absorbent towel under the pump area to absorb any liquid.
ii. Unscrew the syringe assembly (①) from the check valve (②).
iii. Screw the new syringe assembly (①) onto the check valve (②).
NOTE: Be sure to replace the syringe and plunger (components of the syringe assembly) as a pair.

2) Replacement

a) Reinstall the 1 mL syringe and plunger shield.

Figure 47:



i. Reinstall the syringe (①).
ii. Verify the plunger flange (②) is below the U-shaped holder and the bottom of the syringe barrel is in the groove at the bottom of the syringe holder (③).
iii. Reinstall the clear plunger shield (④) and secure it with the black knobs (⑤).
iv. Remove the absorbent towel from the pump area.

b) Prepare for operation.
i. Perform the following ***as needed*** maintenance procedures to remove any air that may be present:
– "6063: Flush ICT Module" for the ICT reference and ICT aspiration pumps.
– "2155: Flush Bulk Solutions" for the wash solution pump.
ii. Visually check for leaks while performing the flush. If you observe drips or leaks, repeat the installation procedure.

3) Verification
a) Run quality control.
i. Run quality control to verify performance prior to reporting patient results.

6. 6305: Change the ICT Asp Check Valve.

WARNING: POTENTIAL BIOHAZARD

CAUTION: CHEMICAL HAZARD

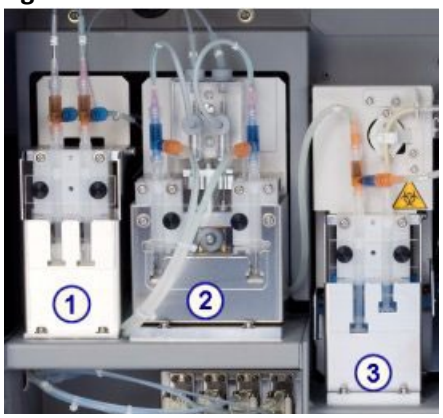
a. Perform this quarterly maintenance procedure to replace the ICT aspiration check valve

Prerequisite	Estimated Time	Materials Needed	Replacement Parts
Processing module must be in the Ready status	15 Minutes	Absorbent Towels	LN 09D35-02–ICT Reference or ICT Aspiration Check Valve LN 09D34-02–Wash Solution Check Valve NOTE: The ICT reference and aspiration pumps use the same list number. The wash solution pump uses a different list number. ensure the correct part is used.

1) Removal

a) Locate the check valve to be replaced.

Figure 48:



i. Open the supply center and pump center doors.

ii. Locate the check valve to be replaced.

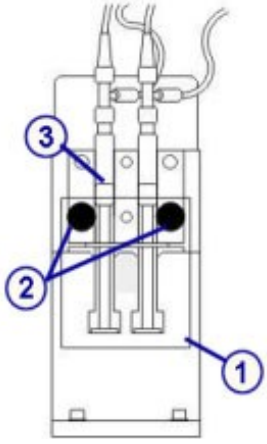
① ICT reference pump

② Wash solution pump

③ ICT aspiration pump

b) Remove the plunger shield and the 1 mL syringe.

Figure 49:

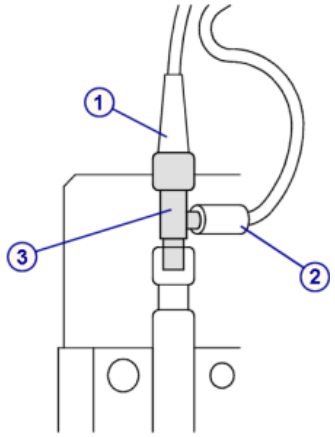


i. Remove the clear plunger shield (①) by removing the two black knobs (②).

ii. Pull the 1 mL syringe (③) forward to remove it from the syringe holder.

c) Remove the check valve tubing.

Figure 50:



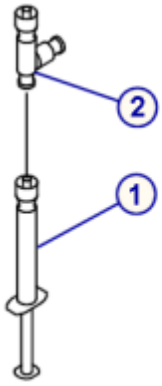
i. Place absorbent towels under the pump area to absorb any liquid.

ii. Disconnect the top (①) and side (②) tubing from the check valve (③).

2) Replacement

a) Replace the check valve.

Figure 51:

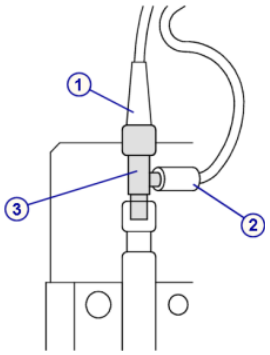


i. Unscrew the syringe body (①) from the check valve (②).

ii. Install the new check valve onto the syringe and finger-tighten.

b) Reinstall the check valve tubing.

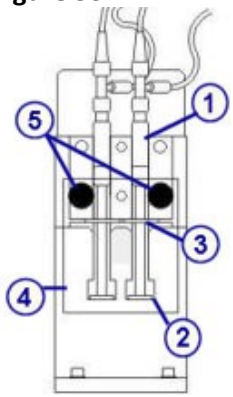
Figure 52:



i. Reattach the top (①) and side (②) tubing to the check valve (③).

c) Reinstall the 1 mL syringe and plunger shield.

Figure 53:



i. Reinstall the 1 mL syringe (①).

ii. Verify the syringe plunger flange (②) is below the U-shaped holder and the bottom of the syringe barrel is in the groove at the bottom of the syringe holder (③).

iii. Reinstall the clear plunger shield (④) and tighten the black knobs (⑤) finger-tight.

iv. Remove the absorbent towel from the pump area.

d) Prepare for operation.

i. Perform the following ***as needed*** maintenance procedures to remove any air that may be present.
   - "6063: Flush ICT Module" for the ICT reference and ICT aspiration pumps.
   - "2155: Flush Bulk Solutions" for the wash solution pump.

ii. Visually check for leaks while performing the flush. If you observe drips or leaks, repeat the installation procedure.

iii. Perform ***quarterly*** maintenance procedure "6305: Change ICT Asp Check Valve" to document the ICT aspiration check valve replacement in the maintenance log.

3) Verification
   a) Run quality control
      i. Run quality control to verify performance prior to reporting patient results.

7. 6306: Check ICT Ref Check Valve.

 **WARNING: POTENTIAL BIOHAZARD**

 **CAUTION: CHEMICAL HAZARD**

a. Perform this quarterly maintenance procedure to evaluate ICT reference solution check valves and ensure they are functioning.

Estimated Time	Materials Needed	Required Module Status
3 minutes	Clamp or Large Hemostats Absorbent Towel Beaker DI Water	Stopped or Ready

8. 6307: Check/Clean HC Waste Sensor.

 **WARNING: POTENTIAL BIOHAZARD**

 **CAUTION: CHEMICAL HAZARD**

a. Perform this quarterly maintenance procedure to check the high concentration waste sensor and clean the high concentration waste sensor with a diluted bleach solution.

Estimated Time	Materials Needed	Required Module Status
10 minutes	Absorbent Towel Beaker large enough to Accommodate high Concentration waste sensor 0.5% sodium hypochlorite	Stopped or Ready