DOC316.52.93119

POLYMETRON Model 9240
Cationic Kit - Mounting Procedure

Upgrade Procedure

08/2015, Edition 4

Step-by-Step Installation Process

***Note:** The illustrations and steps in this procedure show the upgrade of a 9240 analyzer with enclosure. If the analyzer being upgraded is a panel mount version, then skip any steps specific to the enclosure model.*

1. Open the box. Verify that all the components illustrated below are present. If any are missing or damaged please refer back to your distributor or Hach Lange.

2. Next, ensure you have all the tools available that will be required to install the upgrade:

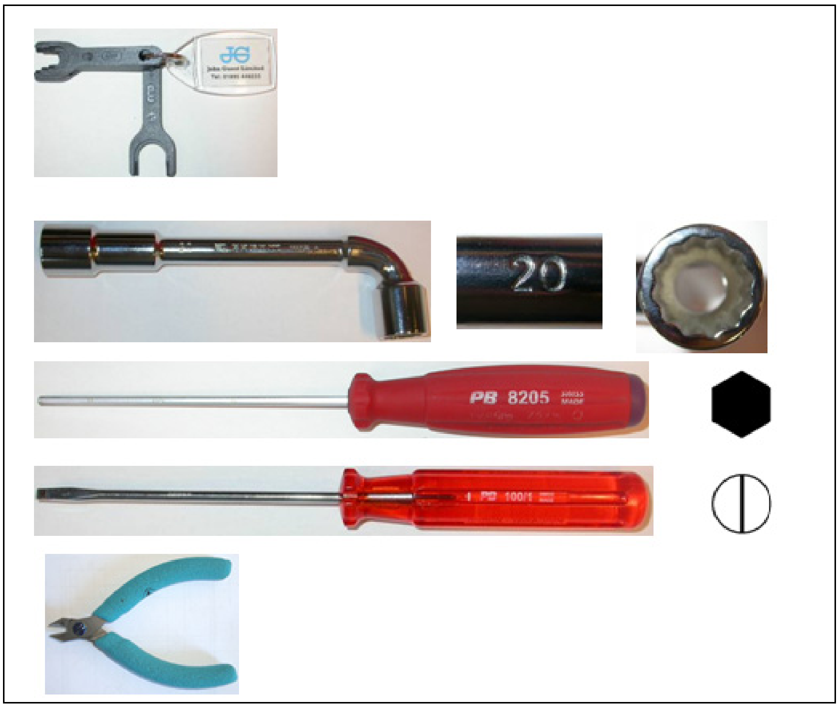
Set of John Guest connection wrenches

20 mm tube wrench

6-pan 2.5 mm and 3mm screwdrivers

Flat head N°0 and N°1 screwdrivers

Wire cutters

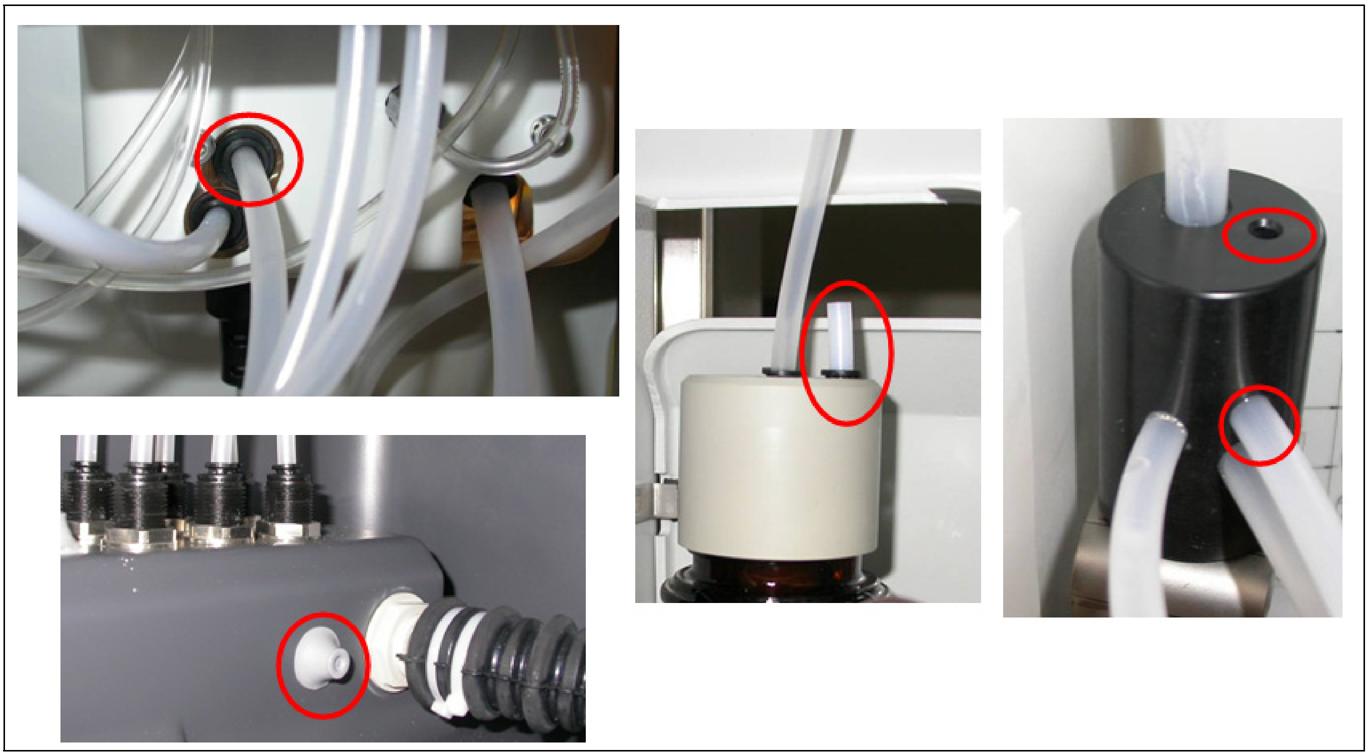


The following additional materials are also required:

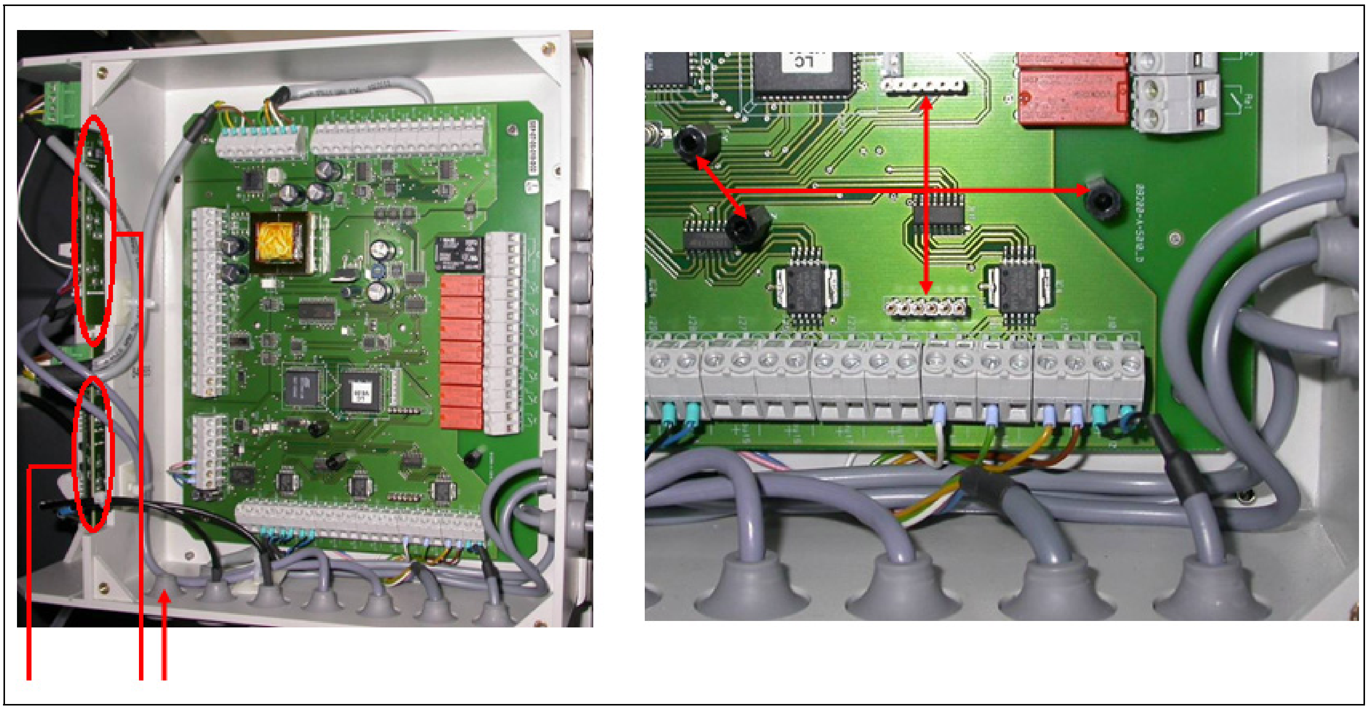
- Protective gloves, glasses, and paper towels
- Beaker (or graduated cylinder) of 200 mL
- Precision balance (1 mg accuracy)
- 0.3 meters of 4/6 mm PE tubing (part number 151575,00006)

WARNING
Before attempting the installation, disconnect the instrument from the mains power supply.

3. The images below show the hydraulic status prior to mounting the K-Kit. The elements requiring attention are circled:



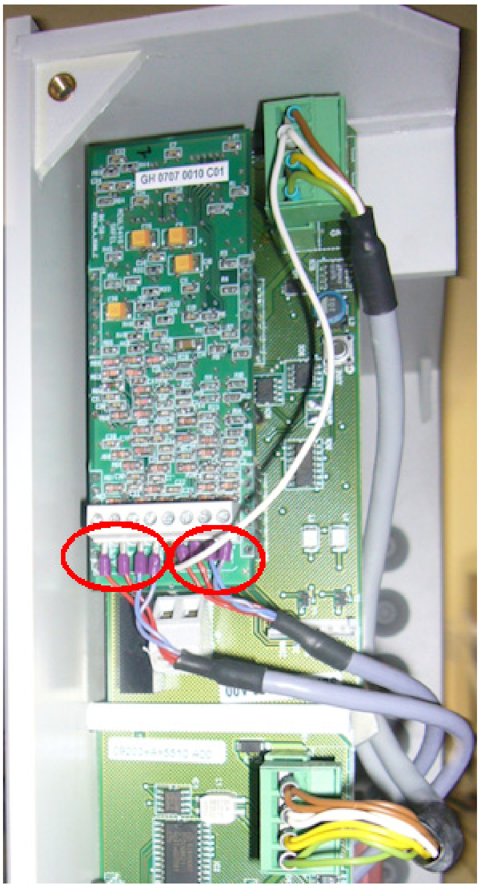
4. The images below show the electrical status prior to mounting the K-Kit. The elements requiring attention are indicated. The two boards indicated on the left will be worked on first:

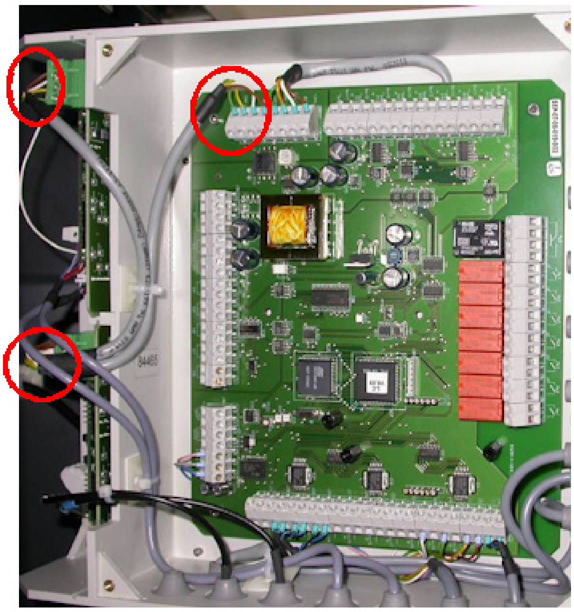


5. Before starting this step, determine the type of overflow vessel level detector installed in the analyzer:

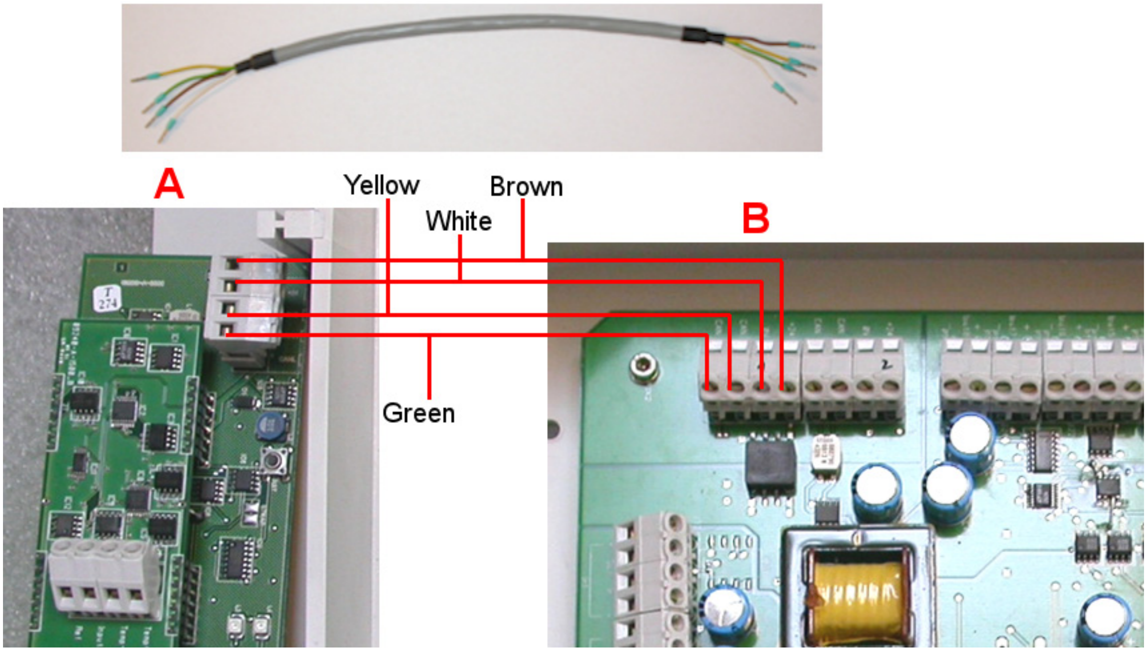
Figure 1 Floating Level Detector (left) or Conductivity Level Detector (right)

6. Using a N°0 flat head screwdriver, disconnect the conductivity sensor cable from the upper board (as indicated below left). Only if the **conductivity level detector** is installed (refer to Figure 1 above), disconnect the level detector cable (as indicated below left). Disconnect the communication cable between the upper board, the lower board, and the interface board (as indicated below right). This process is made easier by sliding out both upper and lower boards from their respective holders. On completion, the upper board and communication cable are no longer required and can be discarded:





7. Using the same screwdriver as above, connect the new communication cable (supplied) between the lower board (A) and the interface board (B) respecting the wire colors as indicated below:

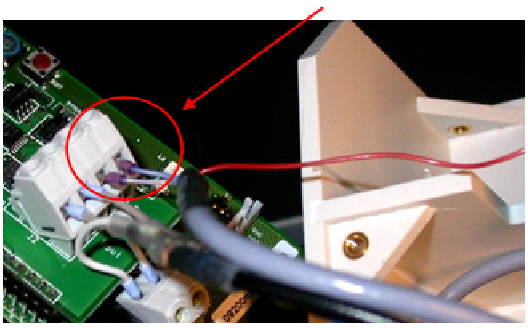
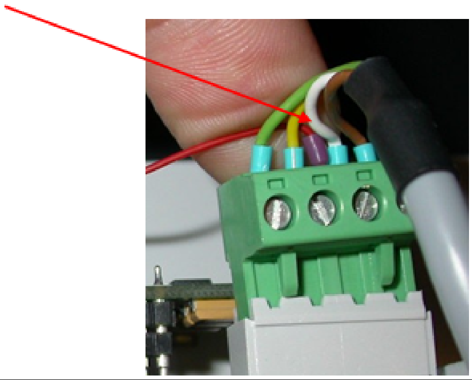


8. Unscrew the locking nuts on the conductivity sensor (below) and completely remove the two sensors and associated cables from the analyzer. Keep the locking nuts for use with the new sensors:

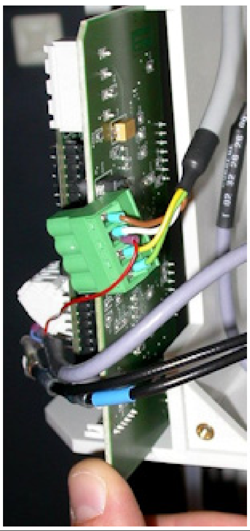
9. Install one of the new O-rings on the new conductivity sensor (part number 09240=C=0256 with 1015 mm of cable and three wire connector). Secure it in the measuring cell with the old locking nut. Attach the cable to the adjacent cable using a cable tie as indicated below right. Pass the cable through the cable gland used for the old sensor:



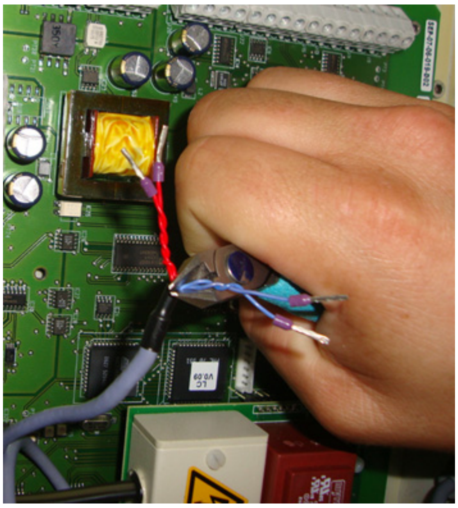
10. Use a N°0 flat head screwdriver to connect the two violet wires of the sensor cable to the measurement board (Temp+ and Temp-). Connect the red wire with the white wire from the communication cable on the lower board (illustrated on the right in Step 5.):

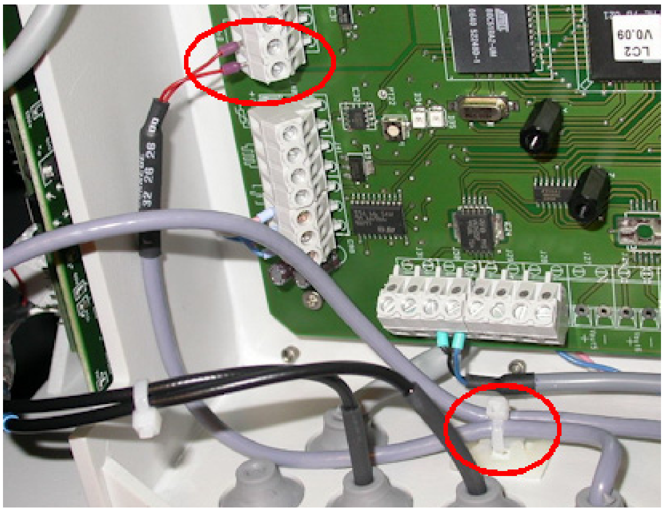
11. If the board had been removed in Step 5., slide it back into the lower slot, and ensure the connector is securely in place:



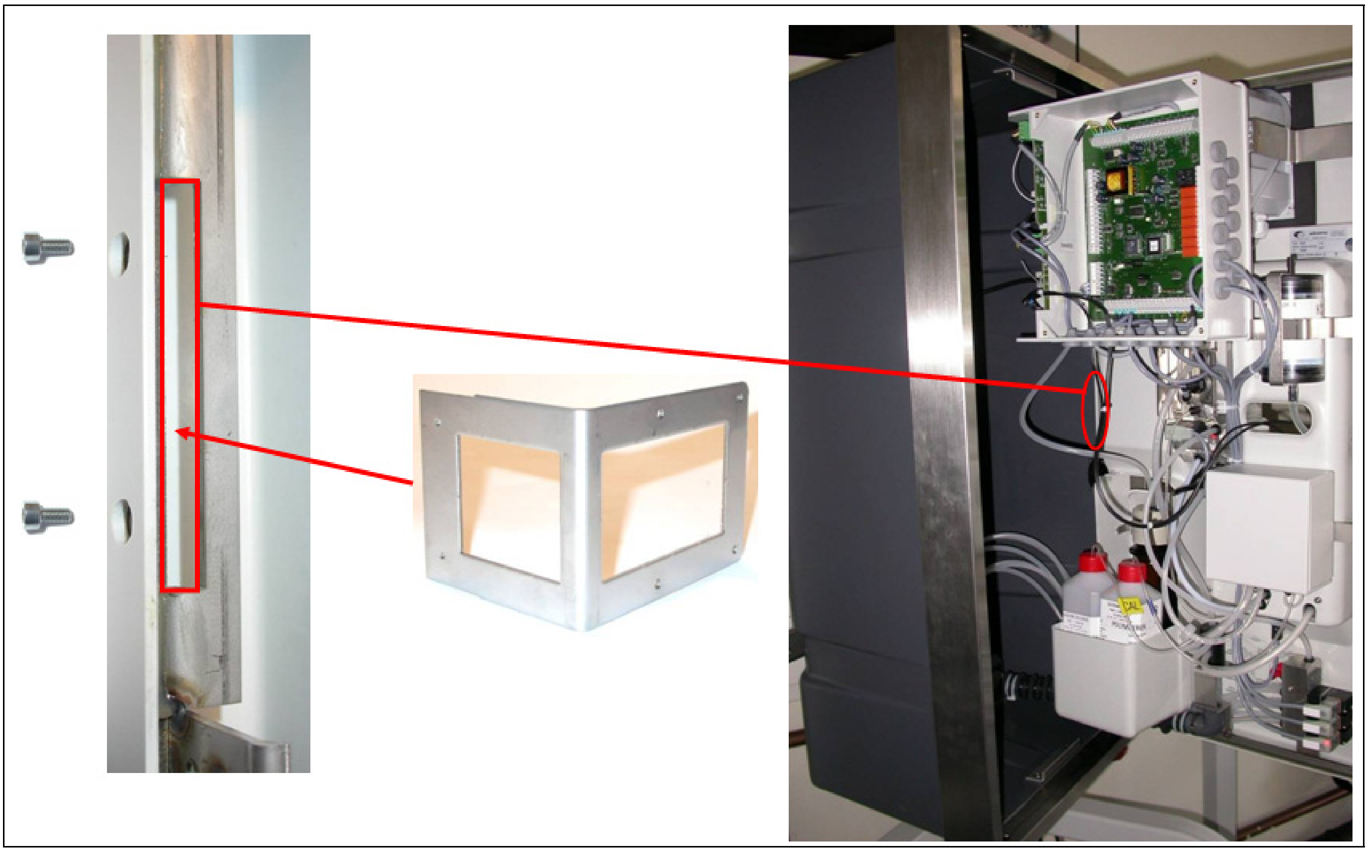

12. If the **floating level dectector** is installed (refer to Figure 1 on page 5) nothing is required, go straight to Step 13. If the **conductivity level detector** is installed (refer to Figure 1 on page 5) take the level detector cable and, using the wire cutters, cut the two blue wires at the end of the heat shrink tubing:



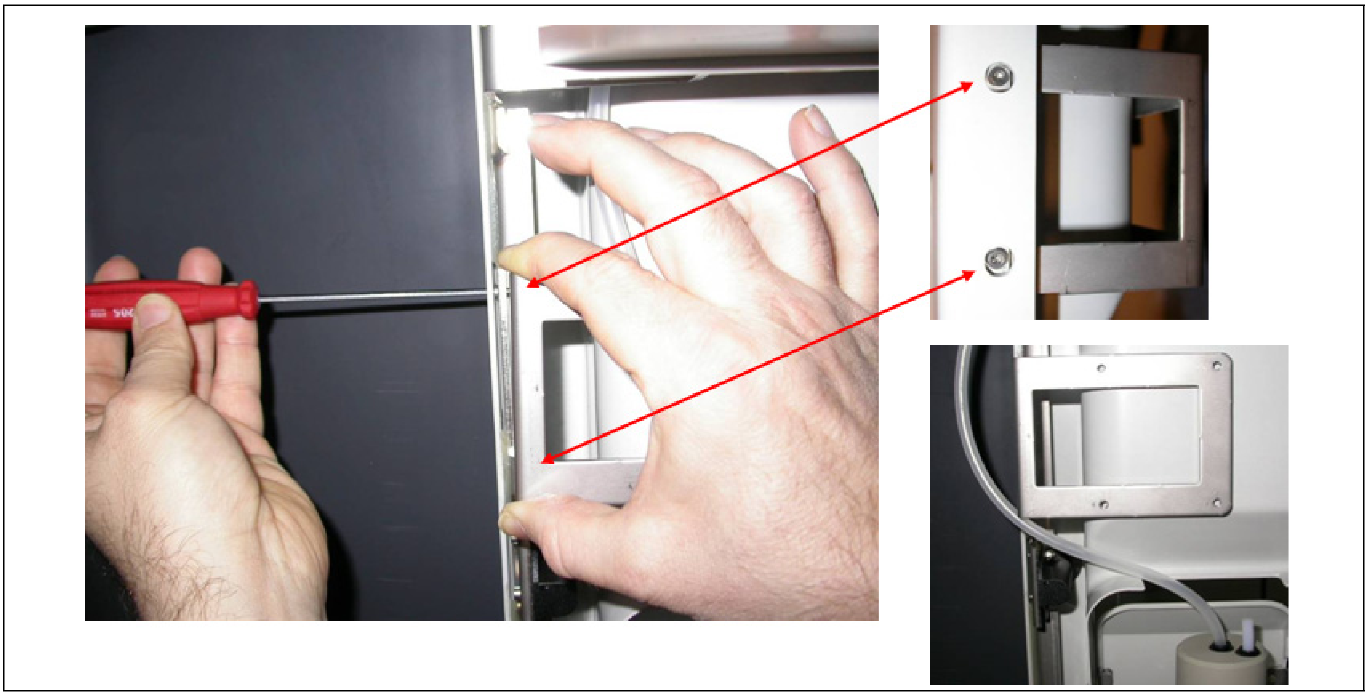
13. Using a N°0 flat head screwdriver, connect the level detector cable to terminal In8 on the interface board. Fix the two sensor cables together using a cable tie as indicated below:



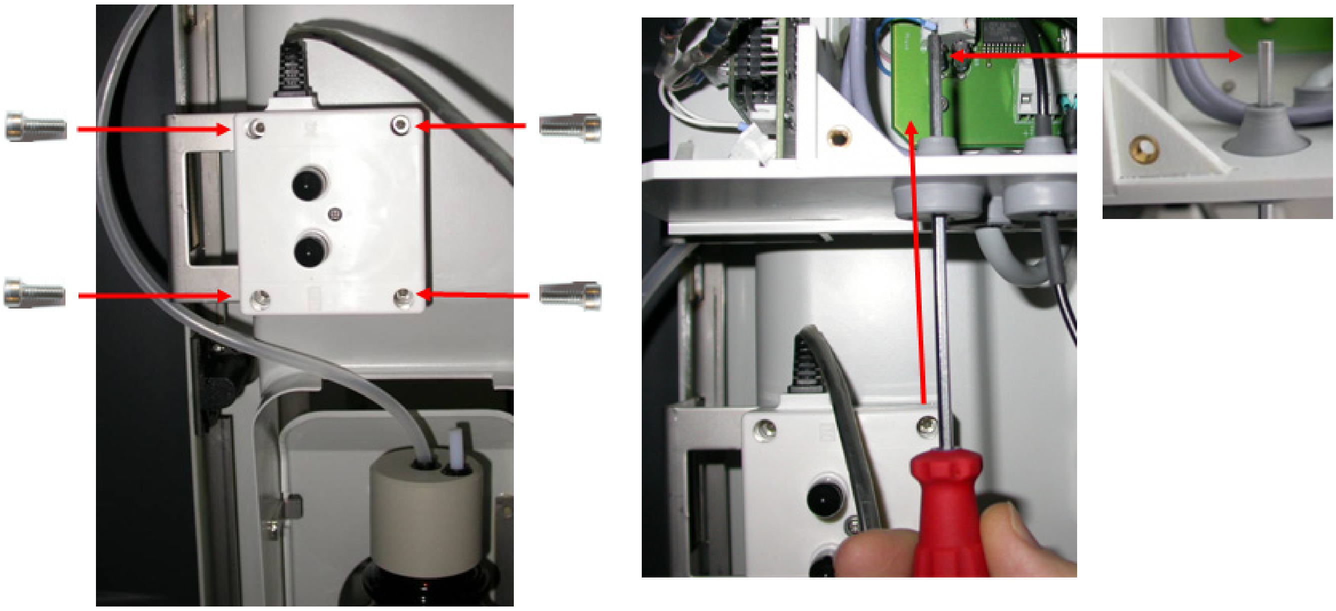
14. Install the K-Kit pump holder in the side slit and secure in place with the 2 M3x6 screws:



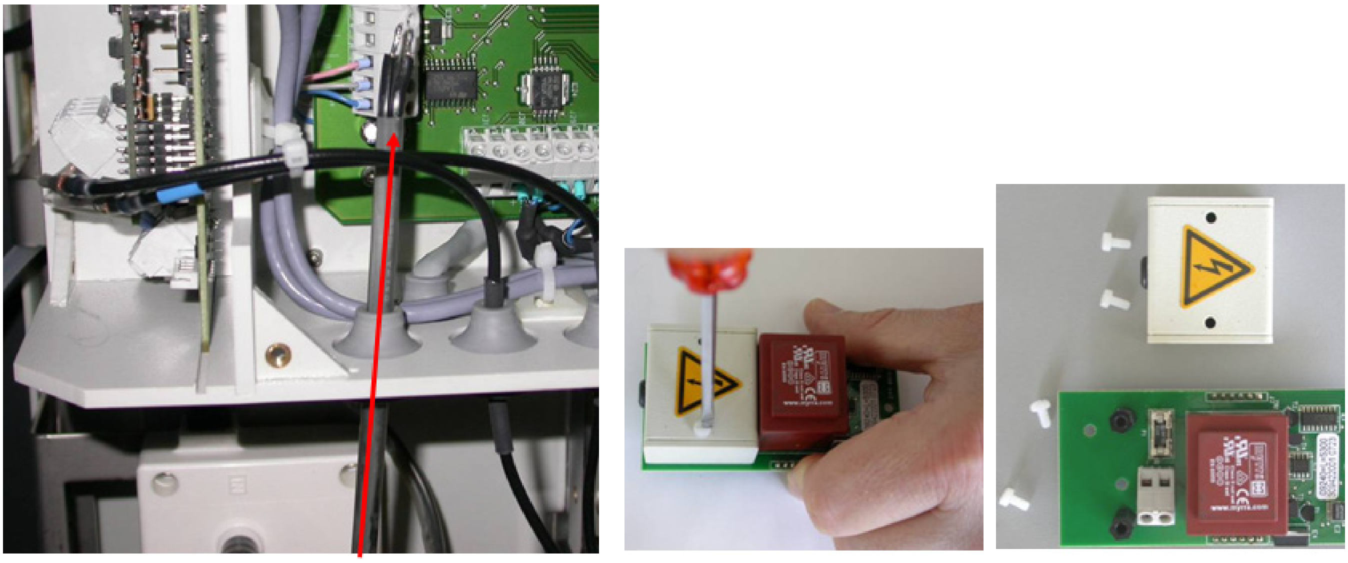
15. Tighten the screws firmly to secure the pump holder to the frame of the analyzer:



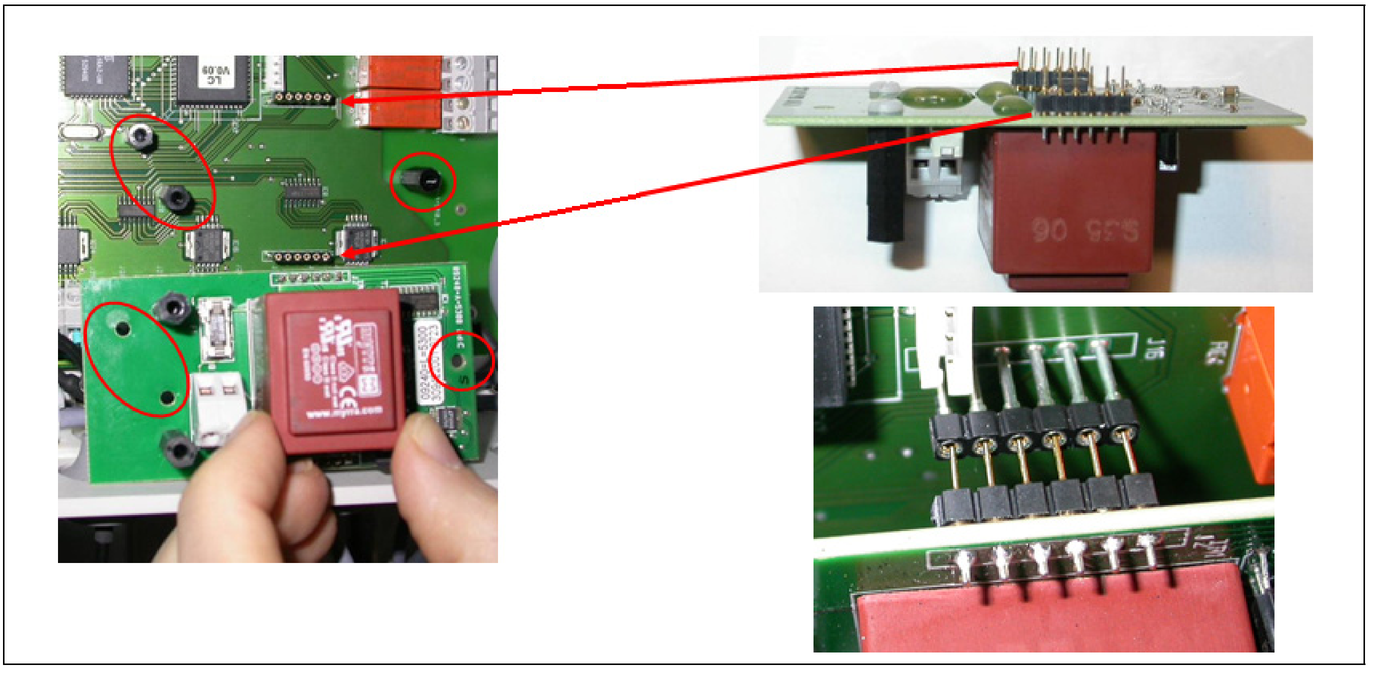
16. Screw the pump onto its support with the 4 M4x10 screws ensuring that the pump cable is above the pump (as shown below). Then, using a screwdriver, pierce the plastic gland just above the pump to allow the pump cable to pass through:



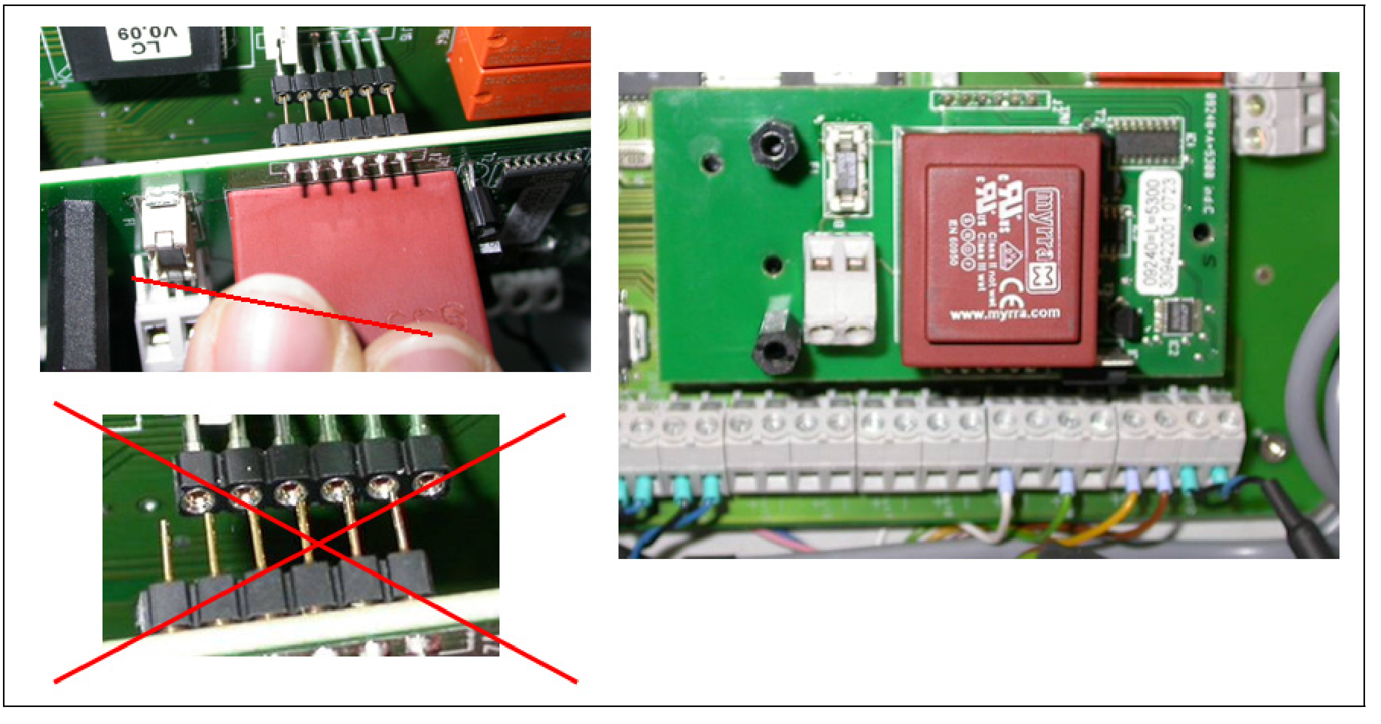
17. Pass the pump cable through the pierced gland. Then, unscrew the pump power supply connection cover:



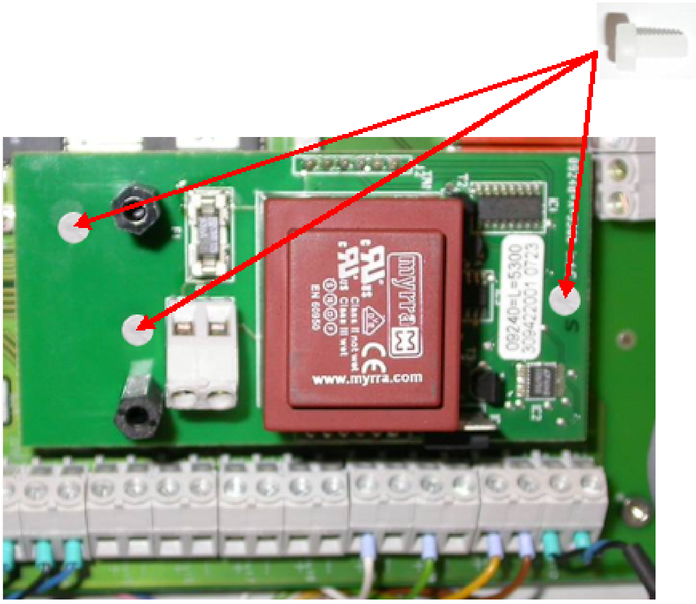
18. Insert the pump power supply board in line with the position of the screws (circled) and the connector pins (arrowed):



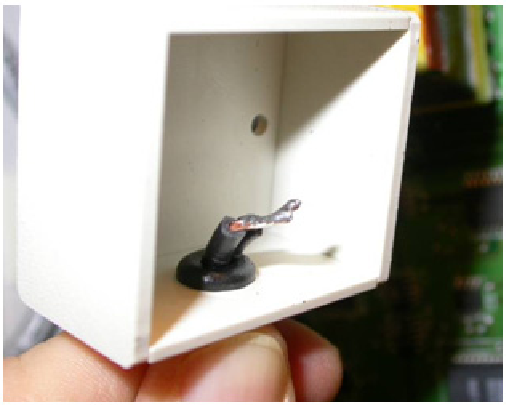
19. Be careful to align the board pins correctly. The board should be self-supporting once the pins are attached:

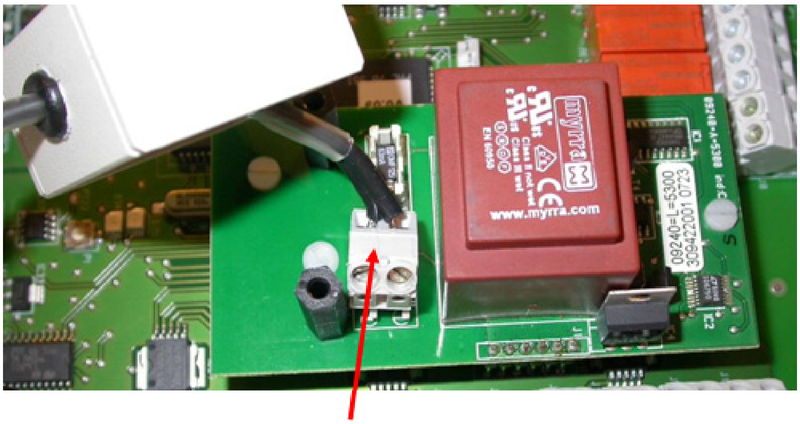


20. Secure the board in place with the 3 M3x6 nylon screws:

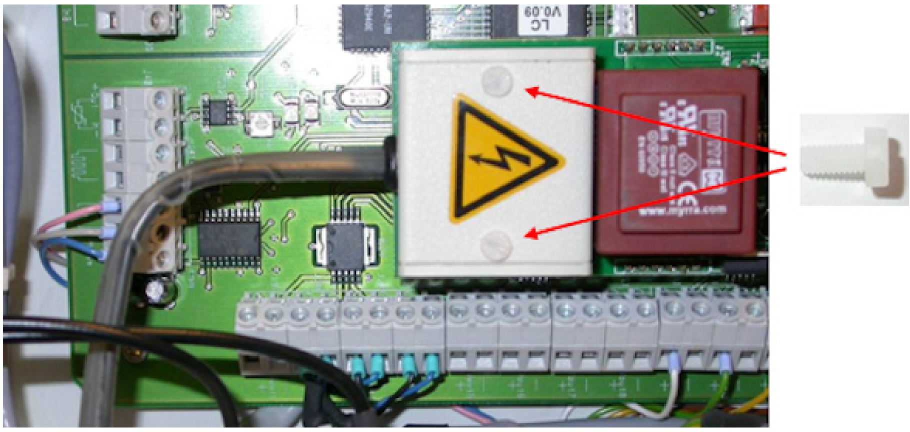


21. Pass the pump power cable through the white cover (if this proves difficult, putting some alcohol on the cable will help). To comply with UL regulations, ensure the cable does not move easily but is held tightly and securely. Now, connect the pump cable to the board:

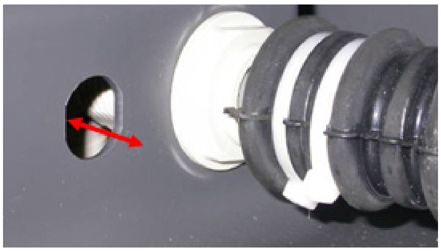




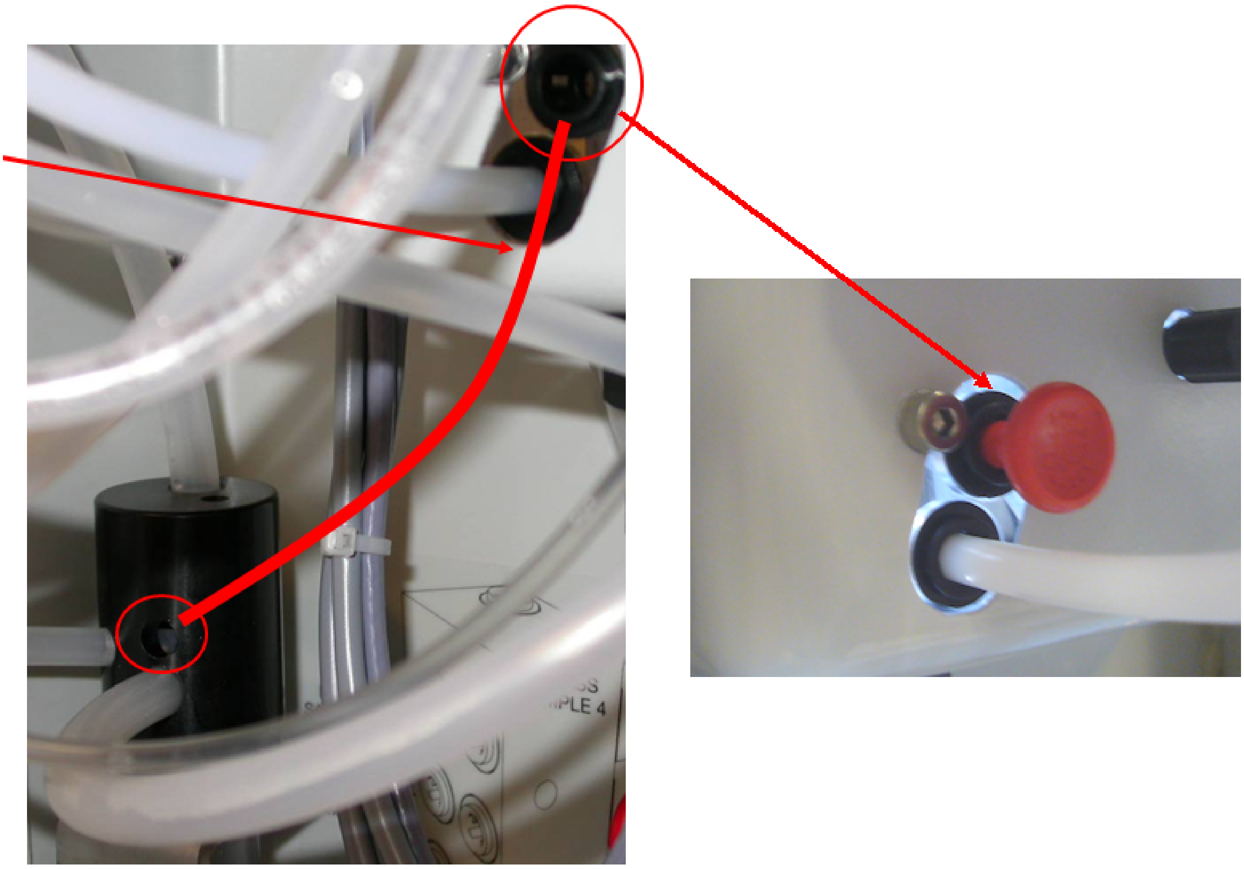
22. Fix the cover in place with the two nylon screws and install the cable:



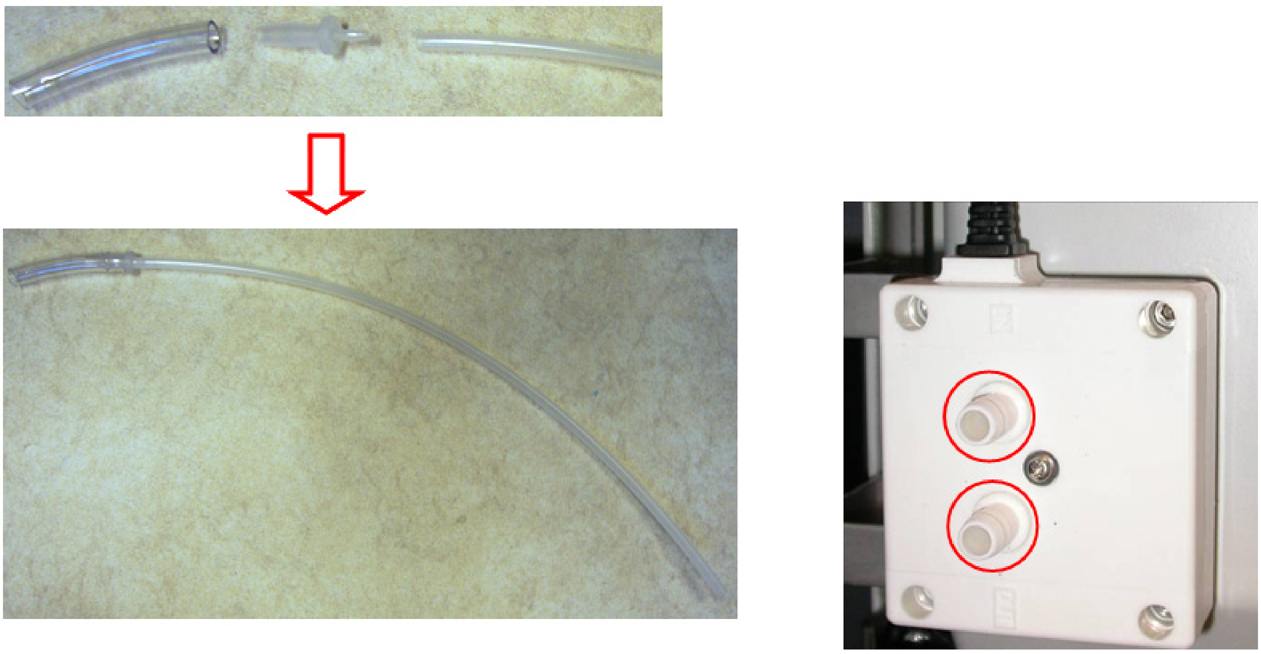
23. To change the hydraulic circuitry, first of all remove the plastic gland and install the quick fit connector. Tighten the quick fit connector with the 20 mm tube wrench:



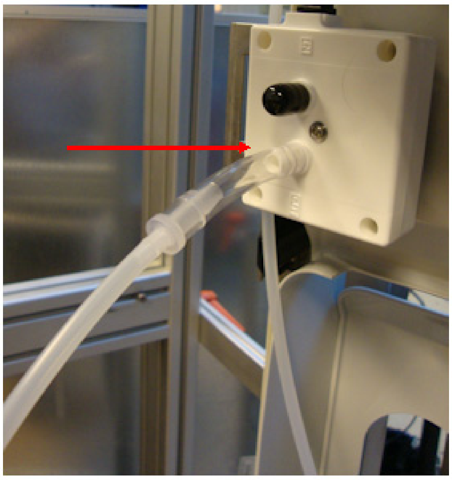
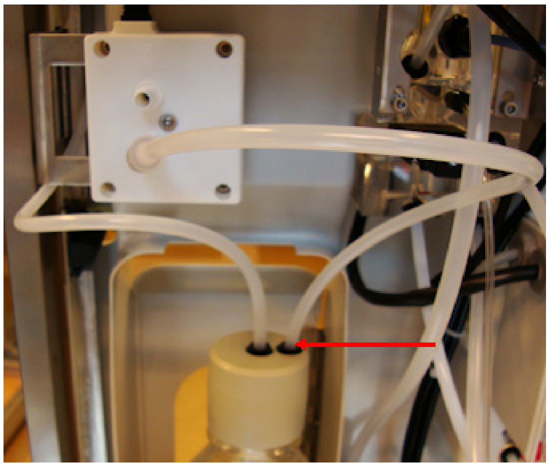
24. Remove the 6/4 mm PE tube as it is no longer used. Insert the red cap to avoid any leakage:



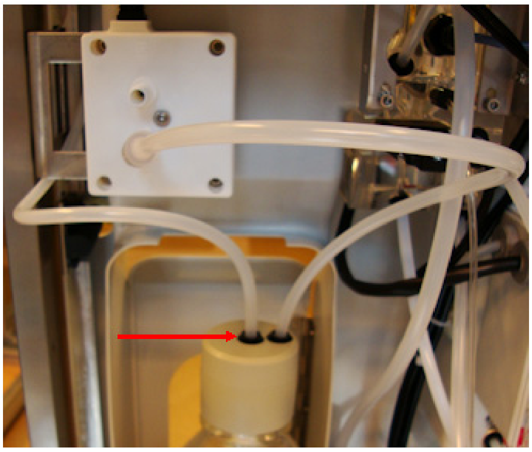
25. Insert the tubes on the size adapter and attach to the 4/6 mm PE tube (the shorter one with a length of 360 mm) as shown in the diagram. Remove the black covers from the pump inlet and outlet connectors:



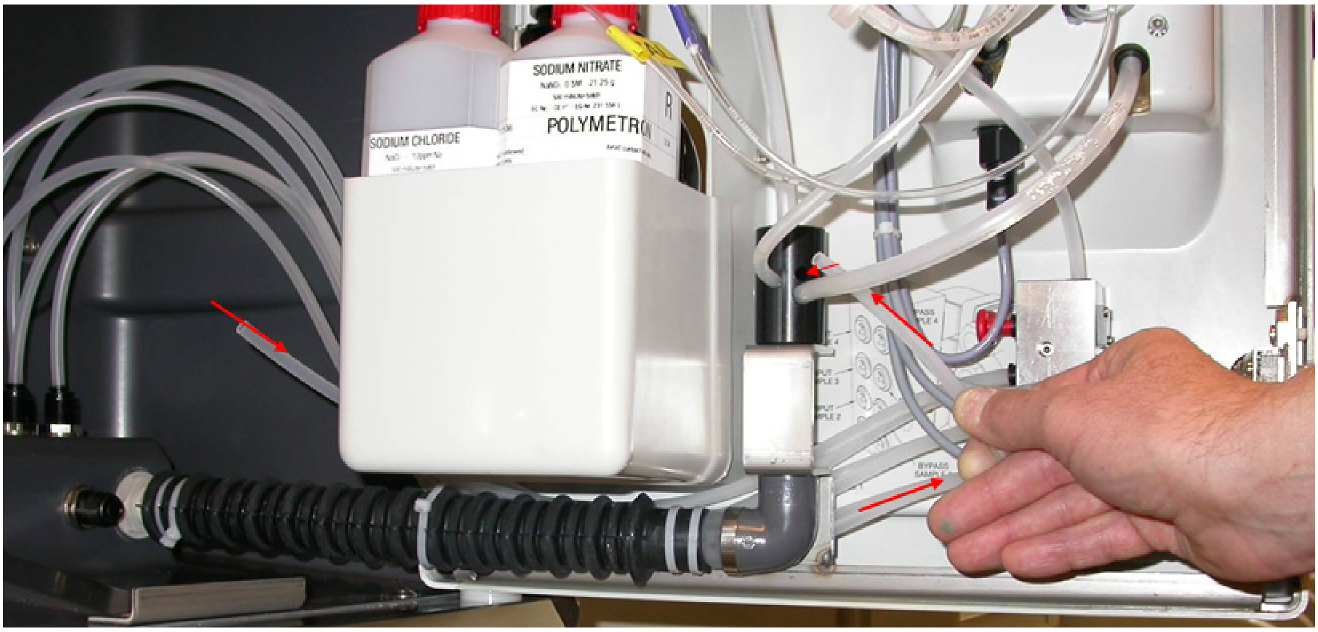
26. Remove the small tube from the conditioning bottle, insert the PE tube with the adaptor in the pump outlet (Out), and insert the 4/6 mm end in the side connector of the conditioning bottle:

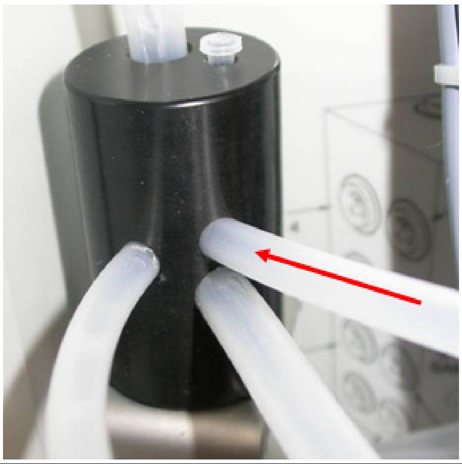
27. Make sure the 4/6 mm PE tubing is connected to the central quick connector of the conditioning bottle cap, and insert the small plastic cap on the top of the drain cap:



28. Take the longer 4/6 mm PE tube (600 mm), and pass it behind the reagents holder:



29. Connect one end to the free hole of the drain and the other end to the quick fit connector that was installed in Step 23.:

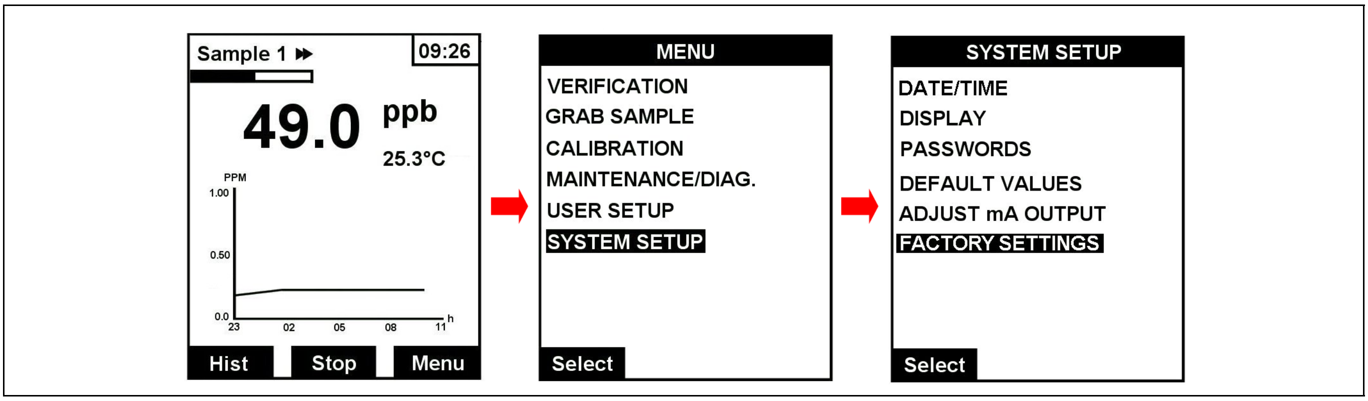


***Note:** This setup allows conditioning vapors to be extracted out of the analyzer enclosure. If vapors have to be extracted further out of the analyzer area, connect a 4/6 mm tubing (model 151075,0006 - not supplied) on the above quick fitting (on the outside of the 9240 enclosure) and conduct this tubing to a safe place.*

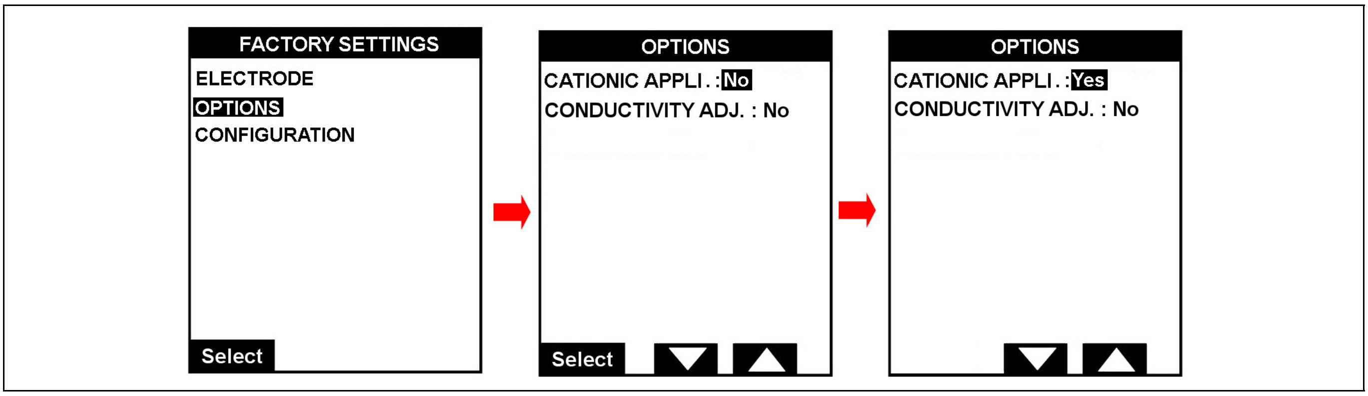
Programming update

1. Power up the analyzer
2. Access the main menu and then select **SYSTEM SETUP - FACTORY SETTINGS**:

***Note:** Access to the **FACTORY SETTINGS** menu is password protected and reserved exclusively for the use of qualified Hach Lange service personnel.*



3. Enter the system password to access the **FACTORY SETTINGS** menu.
4. Select **OPTIONS** and set the **CATIONIC APPLI.** parameter to **Yes**, the **CONDUCTIVITY ADJ.** parameter to **No**, and then press the **Enter** key to save the new values:



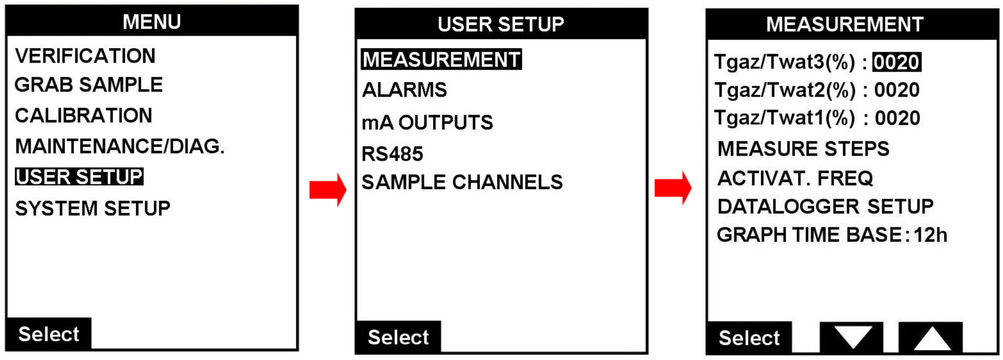
5. With a calibrated pH sensor, measure the pH of the sample for each channel outside of the analyzer. Note down these values.
6. The analyzer measurement sequence will be factory set depending on the number of configured channels (e.g. **1 2 3 4 *** for a 4-channel analyzer or **1 2 *** for a 2-channel analyzer). Verify this sequence is correctly setup in the **USER SETUP - SAMPLE CHANNELS - SEQUENCE** menu.
7. In the **USER SETUP - MEASUREMENT - MEASURE STEPS** menu, make a note of the current values for the **CYCLE TIME**, **ON LINE MEAS** and **SEARCH STAB** parameters, and then set them as follows:

   CYCLE TIME to **11 min**

   ON LINE MEAS to **8 min**

   SEARCH STAB to **No**.

8. From the main menu select **USER SETUP - MEASUREMENT**:



9. For each channel determine the gas injection time ratio depending on the sample pH. Enter this value into the analyzer. Extensive tests have been performed and prove that the 9240 analyzer equipped with a K-Kit option can easily compensate acidic sample down to 2 pH with a coefficient of 180. The following table (where DIPA is used as the conditioning solution) shows the ratio required for achieving a specific pH):

pH	Tgas/Twater Ratio
2	180%
2.3	80%
2.6	50%
2.9	30%
3.5	15%
4.0	10%

***Note:** Ammonia may be used as the conditioning solution, but the ratio is slightly different to those illustrated in the table above (for DIPA).*

10. Re-install the calibrated pH sensor in the center position of the measurement chamber.

11. Switch the analyzer off and on to begin the programmed sequence.

12. For each channel, measure the pH in the conditioned sample to check if the pump ratios are efficient enough to obtain a pH of around 11. If the value is less than 10.5, check the section entitled Incorrect pH value (< 10.5) after conditioning on page 22 for possible problem areas.

13. If necessary, update the ratios of each channel to maintain a final constant pH of 11.0 ± 0.2.

14. Set the values for the **CYCLE TIME**, **ON LINE MEAS** and **SEARCH STAB** parameters back to their original settings (as noted in Step 7. on the previous page). If necessary, refer back to the **Measurement Process** section of the **Analyzer Overview** chapter in the 9240 Operator Manual for more information regarding these parameters.

15. It is important to define the overflow vessel volume before doing a calibration. This procedure is defined in Define the overflow vessel volume on page 19.

16. When all the above steps have been completed successfully, it is important to perform a sensor calibration before using the analyzer for sample measurement.

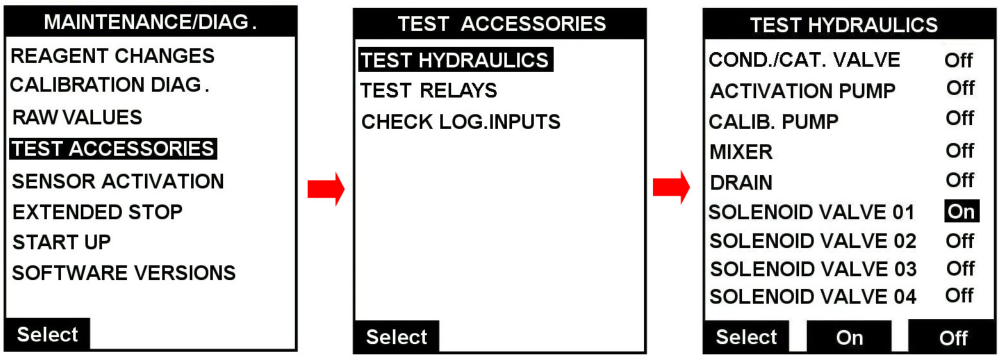
Define the overflow vessel volume

The accurate active volume of the overflow vessel is required for slope calculation during an AutoCal procedure. The overflow vessel volume is factory set and recorded in the menu **FACTORY SETTINGS**.

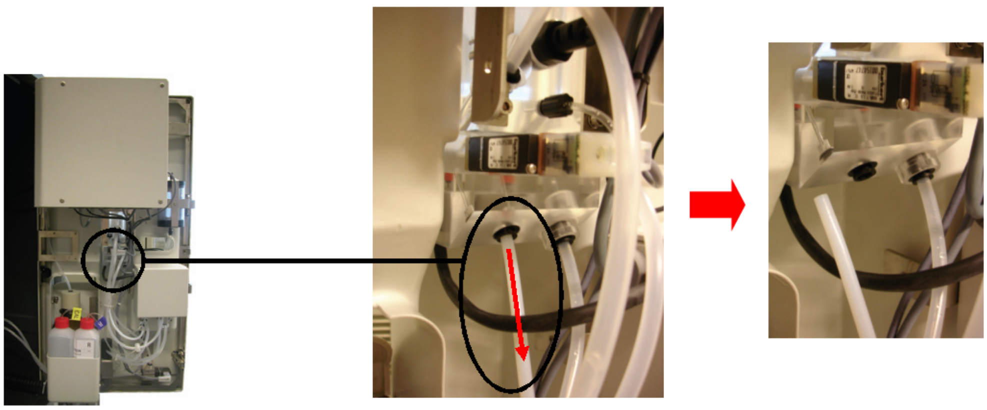
Note: *A reset of the 9240 analyzer (temporary interruption of power for 5-10 seconds) replaces the programmed overflow vessel volume by the default value. So the accurate active volume of the overflow vessel has to be reprogrammed after each reset procedure.*

It is imperative that this procedure is followed as the volume on a K-Kit version analyzer is different from that on the standard version.

1. Fill the overflow vessel completely by selecting **TEST ACCESSORIES - TEST HYDRAULICS** from the **MAINTENANCE/DIAG.** menu. Set the **SOLENOID VALVE 01** parameter to **On**:



2. When the sample starts to overflow, set the SOLENOID VALVE 01 parameter to “Off”.
3. In the same menu set the **COND/CAT. VALVE** parameter to **On**. This will reproduce the auto calibration preparation of the sample, before the automatic standard additions start. The valve switches off automatically after 80 ON/OFF cycles.
4. Disconnect the 2/6 mm tubing (overflow vessel to the electrodes cell) from the overflow vessel:



5. Connect the 4/6 mm tubing to the free port on the overflow vessel. It is essential to use the 4/6 mm tubing as any smaller diameter tubing prevents fully emptying the overflow vessel.

6. Insert the 4/6 mm tubing in an empty 200 mL vessel.
7. Set the **COND/CAT. VALVE** parameter to **On** to transfer the residual volume of the overflow vessel into the 200 mL vessel.

Note 1: *As the **COND/CAT. VALVE** switches off automatically, at least 6 complete cycles will be required to empty the overflow vessel.*

Note 2: *Ensure the 4/6 mm tubing is always below the liquid surface inside the beaker so that no dissolved DIPA evaporates.*

Note 3: *Visually ensure that the overflow vessel is empty before continuing with the next step.*

8. Weigh the 200 mL vessel full (**Weight 1**) and empty (**Weight 2**) and record these weights in the table below.

	Unit	Test 1	Test 2	Test 3
Weight 1	g			
Weight 2	g			
Overflow volume = (Weight 1 - Weight 2)	mL			

Average Overflow Volume (mL) = (Volume$_{\text{Test 1}}$ + Volume$_{\text{Test 2}}$ + Volume$_{\text{Test 3}}$) / 3

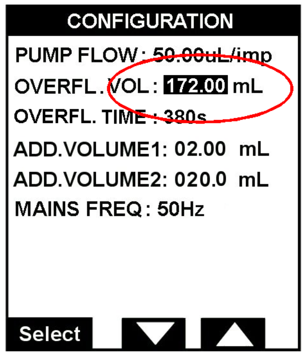
9. Repeat steps 1 to 8 to obtain three coherent volumes (160 mL ± 20 mL). During step 3, position the 4/6 mm tubing inside the 200 mL vessel to recover the flowing solution and empty the vessel after step 6.

10. Ensure the **COND/CAT. VALVE** parameter is set to **Off**.

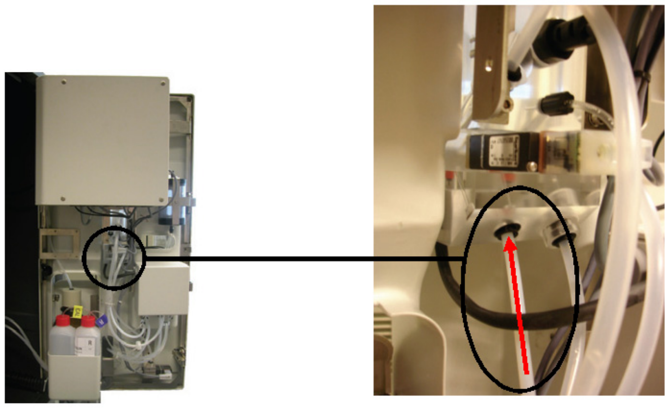
11. From the analyzer main menu select **SYSTEM SETUP - FACTORY SETTINGS**.

Note: *Access to the* ***FACTORY SETTINGS*** *menu is password protected and reserved exclusively for the use of qualified Hach Lange service personnel.*

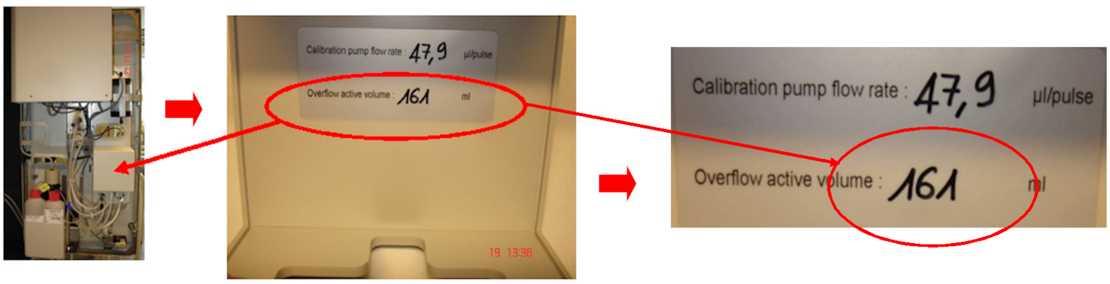
12. Enter the system password, select the **CONFIGURATION** option, and enter the average overflow volume (refer to the table in Step 8.) into the overflow volume parameter.



13. Reconnect the 2/6 mm tubing going from the overflow vessel to the electrodes cell back into its original position:



14. Record the new active volume on the sticker inside the cover of the pumps box:



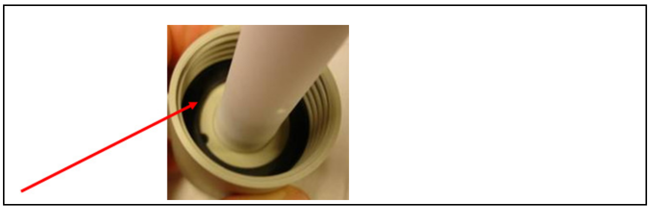
Incorrect pH value (< 10.5) after conditioning

A system that cannot reach the correct pH after conditioning is almost always linked to an air leak in the conditioning circuit.

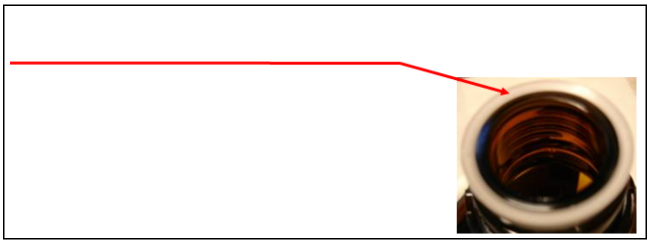
Check the following points:

- Check for the presence and good condition of the flat O-ring in the DIPA bottle cap.

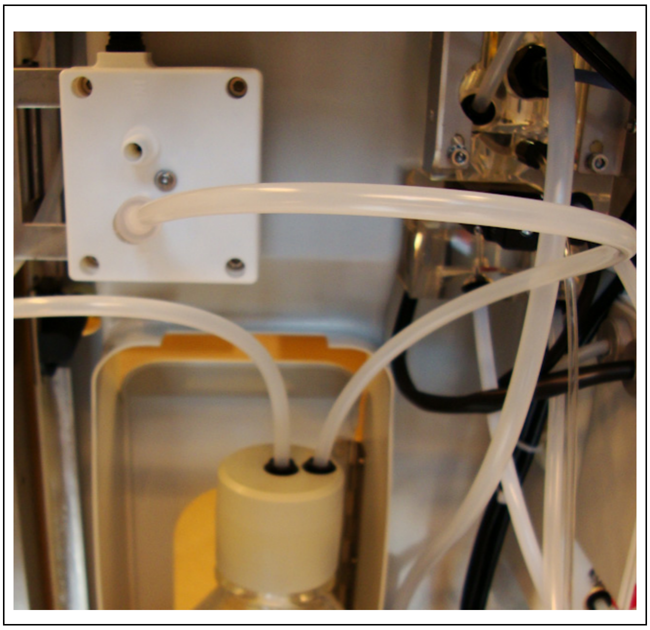
  (EDPM Ø44/32 mm, part number F1002318.99-A)



- Check that the isolation piece on top of the DIPA bottle is in place.
- Check that the cap is tightened securely on the bottle.



- Check that the different tubes between the K-Kit pump and the DIPA bottle, and then to the conditioning valve, are not leaking.



HACH COMPANY World Headquarters
P.O. Box 389, Loveland, CO 80539-0389 U.S.A.
Tel. (970) 669-3050
(800) 227-4224 (U.S.A. only)
Fax (970) 669-2932
orders@hach.com
www.hach.com

HACH LANGE GMBH
Willstätterstraße 11
D-40549 Düsseldorf, Germany
Tel. +49 (0) 2 11 52 88-320
Fax +49 (0) 2 11 52 88-210
info@de.hach.com
www.de.hach.com

HACH LANGE Sàrl
6, route de Compois
1222 Vésenaz
SWITZERLAND
Tel. +41 22 594 6400
Fax +41 22 594 6499