TRADEMARKS

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Welcome

Your VetLyte Electrolyte Analyzer is a powerful tool designed to help you quickly, accurately and efficiently conduct basic electrolyte testing in the convenience of your own laboratory.

This manual will help guide you through setting up your analyzer and will help you start running samples. As you become familiar with the operation of the unit, you may use the manual as a reference for day-to-day routines and as a guide for maintenance and troubleshooting.

How to Use This Manual

If you have an analyzer that is not yet set up, you should begin by reading Sections A and B. Information on analyzer operation and maintenance is contained in Sections C and D. Operator functions are described in Section E. Detailed service information and operating principles can be found in Sections F and H. Self-help procedures are outlined in Section G.
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Important Safety Instructions

Before you begin installing your VetLyte, carefully read the overview information in this section.

For your own safety and the proper operation of your equipment, always follow these precautions when working with your VetLyte:

- Keep the analyzer away from all sources of liquids such as sinks and wash basins.
- Don’t use ammonia-based or alcohol-based cleaners, which can chemically react with plastic, on or around the analyzer.
- Always handle blood samples and collection devices with care.
- Use approved protective gloves to avoid direct contact with sample.
- Aseptic procedures are required when cleaning the sampling probe to avoid contamination.
- Dispose of ISE Fluid Pack according to local regulations.
A-1. VetLyte Analyzer Major Components (external)
Analyzer Components

The VetLyte Electrolyte Analyzer is a fully automatic, microprocessor-controlled medical instrument that measures:

- Na+: Sodium
- K+: Potassium
- Cl⁻: Chloride

The analyzer consists of several major components that are important for you to know and understand while becoming familiar with the unit. See illustration A-1.

You communicate with the analyzer through a keypad with YES and NO keys. With these keys you can perform all analyzer functions, including: sample measurement, data input and quality control testing. See illustration A-2.

The analyzer communicates to you through a dot matrix display. This two line, alphanumeric readout allows up to 16 characters per line; displaying the activities of the analyzer, sample results and other programmed information. See illustration A-3.

Inside the unit are other components which are accessible by opening the main door. See illustrations A-4 and A-5.
A-5. VetLyte Analyzer Major Components (internal)
The measuring chamber consists of the movable left locking device that holds the electrodes in place, the electrodes, the right electrode holder with sample sensor connector, and the measuring chamber base. Electrodes are labeled:

- **Ref**: Reference
- **Na+**: Sodium
- **K+**: Potassium
- **Cl⁻**: Chloride

See illustration A-6.

A peristaltic pump is used to transport all liquids within the analyzer.
See illustration A-7.

Valves control the movement of the liquid within the analyzer.
See illustration A-8.

The sample probe mechanism is located behind the small door at the front of the unit.
See illustration A-9.
The self-contained ISE Fluid Pack uses an integral checkvalve to ensure that waste cannot spill out of the package. See illustration A-10.

The model and serial number is located on an identification plate above the probe mechanism. See illustration A-11.

The rear panel of the unit contains a serial number plate, as well as the power switch/power receptacle module and an RS232 interface port. See illustration A-12.

**Congratulations!**

You’ve just learned the basic components of the analyzer and are now ready to install your system.
Location is important for trouble-free operation of your analyzer. Before you begin setup, choose a site that is convenient for your sampling needs and meets the following physical requirements of the unit:

- Grounded electrical outlet, not shared with centrifuges, refrigerators, or microscopes.
- Away from direct sunlight
- Room temperature between 60°F and 90°F
- Maximum relative humidity of 85%
- Ample room to allow air to circulate freely around the unit. See illustration B-1.
- Away from strong electromagnetic fields, such as those created by electric motors and x-ray equipment.
- Away from explosive gases or vapors.

Now it’s time to unpack your VetLyte Electrolyte Analyzer. Carefully remove the unit from the box. DO NOT lift the analyzer by the foam packaging materials, which are provided for shipping only.

Before you begin installing your system, take a moment to look over the contents to ensure that you have everything you need to get your analyzer up and running. Check for these items:

- VetLyte Electrolyte Analyzer
- Accessory Kit:
  - Operator’s Manual
  - Power cord
  - Electrodes
  - ISE Fluid Pack
  - Cleaning Solution A
  - Electrode Conditioning Solution
  - Cable
- Trouble-Shooting Kit:
  - 1 12cc service syringe
  - 1 stylet
  - 4 fuses
  - 2 o-rings

You will also need a supply of lint-free tissues and disposable sample cups, which should be kept in a location convenient to the analyzer.
Setting Up

Now you’re ready to get your VetLyte Electrolyte Analyzer prepared to operate. Prior to beginning the actual installation, it is a good idea to completely read through this section to develop an understanding of the procedures that are required.

Begin by placing the analyzer on a secure table top that allows plenty of working space and is convenient to a power connection.

Open the analyzer main door. Locate and carefully remove the four red relief clamps from the valves by sliding out the clamps.

**Note:** Save the clamps for re-use to prevent damaging the tubes in the event the analyzer is later shut down for any reason. Store clamps in your troubleshooting kit.

See illustration B-2.

Slip the pump tubings around the analyzer pump rollers, being careful not to twist or cross them.

See illustration B-3.

**Electrodes And Measuring Chamber**

The next procedure involves preparing and installing the electrodes in the measuring chamber. Remove the reference housing and electrodes from their protective boxes and place them on a soft, clean surface. Check that each electrode has an o-ring in the left side of the electrode.

See illustration B-4.
Unscrew the red transport housing from the reference electrode and check that the o-ring on the electrode is properly seated. See illustration B-5.

**Note:** Save the transport housing for storage of the reference electrode during monthly maintenance and in the event the analyzer is taken out of service for any reason. Discard any reference solution remaining in the transport housing and store in your troubleshooting kit.

Carefully screw the reference electrode into the reference electrode housing and place it with the other electrodes. See illustration B-6.

Slide the measuring chamber forward until it locks in the front position. Unclamp the left electrode holder by moving the lever toward you. See illustrations B-7 and B-8.
Locate the sample sensor cable and ensure that it is securely inserted into the receptacle above the measuring chamber. Check that an o-ring is present in the right electrode holder. See illustration B-9.

Now install the electrodes in the measuring chamber, beginning on the right and working to the left (the reference electrode will be installed last). Check to make sure that the lettering on the measuring chamber matches the lettering on the electrode. Also, note that all electrodes have a lip on the bottom that rests on the flat edge of the measuring chamber to aid in proper positioning. See illustration B-10.

Close the left electrode holder by moving the lever away from you until it locks in the back position, and ensure that the electrodes are properly seated. See illustration B-11.

Slide the measuring chamber back until it snaps into position. See illustration B-12.
Plug the tubing connector of the reference housing assembly into the receptacle below the left side of the measuring chamber. Close the front cover of the analyzer.
See illustration B-13.

Preparing The Analyzer For Operation

Record the date of installation of the ISE Fluid Pack on the pack label. Remove the red protective strip from the Fluid Pack and slide the pack into position on the left side of the analyzer.
See illustrations B-14 and B-15.

Note: Once the protective strip is removed, be sure to keep the pack upright to avoid spillage. Save the protective strip to use to close the ports on the pack prior to disposal.
Connecting The VetLyte To The VetTest

Note: Do not plug in the VetTest before reading instructions regarding set-up of the VetTest. It is critical that the instructions found in the VetTest operator’s manual be followed in detail during this procedure.

Warning: Do not unplug or power OFF the VetLyte after initial set-up. Failure to leave the VetLyte plugged in with a fluid pack in place could cause damage to the system.

Connect only the RS232 cable from the VetLyte to the VetTest as shown.
See illustration B-16

Locate the power switch on the back of the VetLyte and make sure that it is in the OFF (O) position. Next, plug the power cord into the power receptacle module on the back of the VetLyte, then plug the cord into a grounded electrical outlet.
See illustration B-17.

Push the power switch to the ON (I) position.
The VetLyte will automatically begin to operate.
See illustration B-18.

Now that the VetLyte Electrolyte Analyzer is functioning, you will begin using the keypad interface to communicate with the instrument. Use the NO key to make changes, the YES key to accept the displayed values or information.
The analyzer will display a default date and time and will allow you to input the correct date and time.

Date:  01-JAN -80  
Time:  00:00

You enter the correct date as follows:

1. Press the NO key until the correct day is displayed. Press YES. The cursor will move to the month.
2. Press NO until the correct month is displayed. Press YES.
3. Press NO until the correct year is displayed. Press YES. The correct date should now be displayed.
4. Follow the same procedure to enter the correct time.
5. After entering the time, the analyzer will prompt: OK? Press YES, if the date and time you entered is correct, or press NO to make a change.
6. After entering YES, the system will enter a brief electronic warm-up period.

Note: By keeping the NO key depressed, the analyzer will automatically scroll through the numbers, first slowly, then fast.

Congratulations!

Your VetLyte Electrolyte Analyzer is now prepared for initial electrode maintenance.

Connecting the VetLyte to the VetLab
(See VetTest Appendix Q)
Initial Electrode Maintenance

Prior to performing your first calibration or running your first sample, the VetLyte Electrolyte Analyzer needs to undergo a simple cleaning and conditioning procedure that helps ensure the unit will perform properly.

The process involves cleaning and conditioning the sample path and electrodes, which prepares the VetLyte analyzer for calibration. You should have ready the bottles containing Cleaning Solution A and Electrolyte Conditioning Solution, along with a package of lint-free tissues that will be used to dry the probe.

**Note:** In some cases, when the unit prompts you for an action and you do not respond within a set period of time, an alarm will sound and the unit will discontinue its current operation.

To perform cleaning, you will communicate through the keypad interface. The prompt **Perform Weekly Cleaning?** will be displayed. Press YES to accept.

Pour a small amount of VetLyte Cleaning Solution A into a clean sample cup. The prompt **Open Sample Door/Introduce Sample** will be displayed.

Lift the sample door. Wait for the prompt **Introduce Sample** to be displayed. The pump will begin to aspirate. Introduce the cleaning solution to the probe. See illustration B-19.

Hold the solution under the probe until the prompt **Wipe Probe/Close Sample Door** is displayed. Use a lint-free tissue to wipe the probe, then close the door. See illustration B-20.

The analyzer will now display **Thank You!** and a brief countdown will begin, indicated by the clock in the lower right of the display. While the countdown is running, open the bottle of VetLyte Electrode Conditioning Solution and pour a small amount into a clean sample cup.
After the countdown is completed, the system will prompt **Perform Daily Conditioning?** Press YES. The prompt **Open Sample Door/Introduce Sample** will be displayed. Lift the sample door. Wait for the prompt Introduce Sample to be displayed. The pump will begin to aspirate. Now, introduce the conditioning solution to the probe. See illustration B-21.

Hold the solution under the probe until the prompt **Wipe Probe/Close Sample Door** is displayed. Use a lint-free tissue to wipe the probe and close the door. See illustration B-22.

The analyzer will now display **Thank You!** and a brief countdown will begin. Upon completion of the countdown, the prompt **Remain in Maintenance?** will be displayed. Press NO. The unit will prompt **Are You Sure?** Press YES.

The unit will display **Calibration in Process** while the analyzer prepares for automatic calibration. A countdown will be displayed as soon as the actual calibration cycle starts.

**Note:** Calibration is an automatic process. During this time, the analyzer is conducting measurement operations to ensure the accuracy of the instrument.

**Warning:** It is very important that the main door is closed during calibration, since it provides shielding from sources of electromagnetic interference.

When calibration is completed, the analyzer will display **ANALYZE SAMPLE?**, indicating that the instrument is now prepared for operation.

The unit is factory set to default to **Standby** after 3 hours in **ANALYZE SAMPLE?** mode.
The VetLyte Electrolyte Analyzer provides fast, convenient analysis of serum, plasma or anticoagulated whole blood.

Sample Preparation

Serum Sample

Draw patient blood into a syringe or vacuum collection tube. Do not heparinize syringe. If using syringe, remove needle and quickly transfer to a red top OR serum separator tube. Let tube sit for a minimum of 20 minutes. Make sure sample is fully clotted. (Clotting time may vary by sample.)
Centrifuge for 10 minutes in a standard centrifuge (8,000 rpm) OR for 120 seconds in a high speed (12,000 - 16,000 rpm) centrifuge.
Process immediately, or see sample storage guidelines.

Plasma Sample

Draw patient blood into a heparinized syringe or vacuum collection tube. If using syringe, remove needle and quickly transfer to a lithium heparin tube. Fill 1/2 to 3/4 full. Gently invert for 30 seconds to mix.

Centrifuge for 5 minutes in a standard centrifuge (8,000 rpm) OR for 90 seconds on a high speed (12,000 - 16,000 rpm) centrifuge. Process immediately, or see sample storage guidelines.

Note: Do not use anticoagulants such as EDTA, citrate, oxalate, etc.

Whole Blood Sample

Collect the blood in lithium heparin tube or heparinized syringe. Invert tube several times to mix, and mix well just before analyzing sample. Process immediately, or see sample storage guidelines.

Note: Do not use anticoagulants such as EDTA, citrate, oxalate, etc.

Sample Storage Guidelines

While we recommend that you process and analyze blood samples immediately after collection for best results, following are sample storage and testing guidelines.

For storage, the serum or plasma must be separated and removed from the blood cells. Do not attempt to pour off sample. Using a transfer pipette, carefully transfer to an untreated collection tube, taking care not to draw up any white or red blood cells. Cap tube tightly to avoid contamination and evaporation.

Storing serum/plasma

If you cannot perform analysis within four (4) hours of drawing and processing the sample, refrigerate at 2 to 8°C (36 to 46°F). If you cannot perform analysis for more than 48 hours, you should freeze serum/plasma at -18°C (0°F).
Analysis of Stored Samples

For samples stored between 2 and 8°C (36° and 46°F) and at -18°C (0°F):
Allow the sample to come to room temperature, between 19 and 27°C (66 and 81°F).
Mix gently but thoroughly by inversion. Do not shake!
Centrifuge sample to remove any fibrin particles that may have formed during storage.
Analyze sample immediately after centrifugation.

Storing whole blood

Whole blood samples should be analyzed as soon as possible within one hour after collecting the sample. If a brief storage is required, do not cool the sample as the erythrocytes could burst and release the intracellular potassium, creating an inaccurate value of potassium in the sample.

Operational Characteristics

With VetTest

The test results of the VetLyte will show in its display and will also printout on the VetTest or an external printer. Electrolyte reference ranges will show on the printout, along with the results. If results are beyond the reference ranges for any analyte, Hi or Lo indicators will be displayed and printed on the VetTest printout. Results above the linearity range of the analyzer will not print out on the VetTest, and will be displayed as dashes (---) on an external printer.

Sample measurement may be initiated on either the VetTest or the VetLyte. It is recommended that the sample be first presented to the VetTest, as the sample cycle time is longer than that of the VetLyte. Under these conditions, chemistry testing on the VetTest may be in progress while you begin sample aspiration on the VetLyte.

In this case, follow the prompts appearing on the displays of each analyzer. When each analyzer has completed its test run, the data for both the VetLyte and VetTest will be printed on the VetTest print-out under the patient number which was entered on the VetTest.

If the sample is entered on the VetLyte first, the VetLyte will prompt you to enter the patient species. It is important to note that if patient species and patient ID data is not entered on the VetTest, electrolyte data from the VetLyte will appear only in the VetLyte display and will not appear on the VetTest print-out or be combined with the VetTest chemistry results.

With VetLab

(See VetTest Appendix R)
Operating the VetLyte Individually

The operator can also run the VetLyte analyzer when the VetTest analyzer is turned off. In this case, the VetLyte test results will show only on the VetLyte analyzer display and will not be available from the VetTest.

Running A Sample With The VetLyte

The VetLyte provides fast, easy operation. Whenever **ANALYZE SAMPLE?** appears on the display, the unit is prepared to conduct sampling measurements.

The analyzer prompts you to open the sample door and introduce the sample. Lift the sample door. The prompt **Introduce Sample** will be displayed and the pump will begin to aspirate. Introduce the sample to the probe. See illustration C-1.

**Note:** *It is very important that the main door is closed during sampling, since it provides shielding from sources of electromagnetic interference.*

Hold the sample under the probe until **Wipe Probe** and **Close Sample Door** is displayed. Use a lint-free tissue to clean the probe, then close the sample door when prompted. See illustration C-2.

**Note:** *It is very important that the sample probe is carefully wiped clean each time following a sample introduction.*

The analyzer will display **Thank You!** and a brief countdown will begin. Upon completion of the analysis, the test results will be displayed on the VetLyte. If you entered the sample type and the patient number on the VetTest, the results will be displayed and printed on the VetTest.

**Note:** *Values that are higher or lower than the programmed normal range will be indicated by an arrow pointing up or down.*

View Last Patient Results

The last patient’s results will be displayed for one minute after analysis, or until the NO or YES key is selected.

If the last patient result is required, press NO from **Analyze Sample?** and press YES to **View Last Patient Results?** The results will be displayed for one minute.
Scheduled Maintenance:
Performing Electrode Maintenance
To ensure proper performance of the analyzer, a daily conditioning and weekly cleaning is required.

Weekly Maintenance Requirements
To begin weekly maintenance, press NO until the prompt **WEEKLY MAINTENANCE?** is displayed. Press YES to accept.

**Perform Weekly Cleaning?** will be displayed. Press YES to start the cleaning procedure.

Pour a small amount of VetLyte Cleaning Solution A into a clean sample cup.
The prompt **Open Sample Door Introduce Sample** will appear.

Lift the sample door. Wait for the prompt **Introduce Sample**. The pump will begin to aspirate. Introduce the cleaning solution to the sample probe.
See illustration D-1.

Continue holding the solution under the sample probe until the prompt **Wipe Probe/Close Sample Door** is displayed. Use a lint free tissue to wipe the probe, then close the door.
See illustration D-2.

The analyzer will now display **Thank You!**, and a brief countdown will begin.

After the countdown is completed, the system will prompt, **Perform Daily Conditioning?** To continue with the procedure, press YES.

Daily Maintenance Requirements
To begin daily maintenance, press NO until the prompt **Perform Daily Conditioning?** is displayed. Press YES to accept.

Open the bottle of VetLyte Electrode Conditioning Solution and pour a small amount into a clean sample cup.
The prompt **Open Sample Door Introduce Sample** will be displayed. Lift the sample door. Wait for the prompt **Introduce Sample**. The pump will begin to aspirate. Introduce the conditioning solution to the sample probe.

See illustration D-3.

Continue holding the solution under the sample probe until the prompt **Wipe Probe/Close Sample Door** is displayed. After wiping the probe and closing the sample door, the analyzer will display **Thank You!**

See illustration D-4.

Upon completion of the countdown, the prompt **Remain in Maintenance?** will be displayed. Press NO. The unit will prompt **Are You Sure?** press YES. The VetLyte Electrolyte Analyzer will automatically initiate a calibration cycle.

**Note:** It is very important that the main door is closed during calibration, since it provides shielding from sources of electromagnetic interference.

When calibration is completed, the analyzer will display **ANALYZE SAMPLE?**, indicating that the instrument is prepared to conduct electrolyte sampling.
Performing Monthly Maintenance

Monthly maintenance involves cleaning the reference electrode housing, and should be performed prior to daily maintenance. To complete this procedure, you will need a small amount of household bleach.

Begin monthly maintenance by pressing NO until **ELECTRODE MAINTENANCE?** is displayed. Press YES and **Perform Weekly Cleaning?** will appear. Press NO and **Perform Daily Conditioning?** will appear. Do not press any keys.

Open the front cover of the analyzer. Unplug the tubing of the reference electrode from the receptacle below the left side of the measuring chamber. See illustration D-5.

Slide the measuring chamber forward until it locks in the front position. See illustration D-6.

Unclamp the left electrode holder by moving the lever toward you. See illustration D-7.

Remove the reference electrode assembly from the analyzer. Unscrew the reference electrode from the reference housing.

**Warning:** It is important the reference electrode always be stored in reference solution and never allowed to become dry. DO NOT bleach reference electrode.

Pour some bleach into a small container, and submerge the reference housing into the bleach, insuring that no air bubbles remain in the housing.

**Note:** The reference connector and tubing do not need to be submerged.

Pour the reference solution from the reference electrode into the red transport housing or a sample cup. Store the reference electrode in the reference solution.

After 15 minutes, remove the reference housing from the bleach, thoroughly rinse the housing with tap water and dry.
Remove the reference electrode from the red transport housing or sample cup. Check that the o-ring on the electrode is properly seated.

Carefully screw the reference electrode into the reference electrode housing and place the assembly into the left side of the measuring chamber. Note that the reference electrode has a lip on the bottom that rests on the flat edge of the measuring chamber. See illustration D-8.

Close the left electrode holder by moving the lever away from you until it locks in the back position. Ensure the electrodes are seated properly. See illustration D-9.

Plug the tubing of the reference electrode into the receptacle below the left side of the measuring chamber. See illustration D-10.

Slide the measuring chamber back until it snaps into position, and close the front cover of the analyzer. See illustration D-11.

At this time, you perform daily conditioning by pressing YES. The prompt *Remain In Maintenance?* will appear. Press NO. The unit will prompt *Are You Sure?*. Press YES. A complete calibration cycle will be performed.
Performing 6-Month Maintenance

Every six months, the peristaltic pump tubing needs to be replaced.

To make sure that the pump does not turn on during this procedure, press NO until \textbf{ELECTRODE MAINTENANCE?} is displayed. Press YES and \textbf{Perform Weekly Cleaning?} will appear. Press NO. \textbf{Perform Daily Conditioning?} will appear. Do not press any keys.

To change the tubing, open the analyzer front cover and slip the pump tubing from the analyzer pump rollers. See illustration D-12.

Next, disconnect one tube at a time from the old pump winding plate and reconnect to the same place on the new pump tubing plate. See illustration D-13.

Install the new pump tubing plate and slip the new pump tubing over the analyzer pump rollers, being careful not to twist or cross them.

Press NO to \textbf{Perform Daily Conditioning?} Press NO to \textbf{Remain In Maintenance?} The unit will prompt \textbf{Are You Sure?} press YES. A calibration will be initiated.
Unscheduled Maintenance:

On a weekly basis, or whenever necessary, you should clean the sample fill port and sample probe, as well as the exterior analyzer surfaces.

To clean the sample fill port and probe, open the sample door and clean the fill port, probe and surrounding area with a damp cotton swab. When finished, close the sample door. The exterior surfaces should be wiped clean with a soft, damp cloth.

Note: Never use strong or abrasive cleaners on the VetLyte Electrolyte Analyzer. Use a slightly damp cloth to avoid getting fluid inside the analyzer.

Changing Electrodes

Slide the measuring chamber forward until it locks in the front position.
See illustration D-14.

Unclamp the left electrode holder by moving the lever toward you.
See illustration D-15.

Remove the used electrode from the measuring chamber.
See illustration D-16.

Remove the new electrode from its protective box and check for the presence of an o-ring in the left side of the electrode.
See illustration D-17.
Install electrode in its labeled position in the measuring chamber. Note that the electrode has a lip on the bottom that rests on the flat edge of the measuring chamber to aid in proper positioning. See illustration D-18.

Close the left electrode holder by moving the lever away from you until it locks in the back position. Ensure that the electrodes are seated properly. See illustration D-19.

Slide the measuring chamber back until it snaps into position. See illustration D-20.

After installing a new electrode, the VetLyte Electrolyte Analyzer needs to undergo Electrode Maintenance and calibration to verify the performance of the electrode.
Checking Reagent Fluid Level And Changing The ISE Fluid Pack

The VetLyte monitors the level of solutions in the ISE Fluid Pack and displays the amount remaining. At 5% fluid remaining, the unit will display the message **Fluid Pack Low** at **Analyze Sample?** and **Standby!** prompts. This message will go away only after the fluid counter has been reset to 100%.

To check the status of fluid remaining in the pack:

1. Press NO until the prompt, **Operator Functions?** is displayed. Press YES.
2. The prompt **Check/Change Reagent Pack?** will be displayed.
3. Press YES. The analyzer will display the amount of fluid remaining then the prompt **New Reagent Pack Installed?** will appear.

**Note:** If ample fluid remains in the pack and it is not necessary to change it, press NO to return to **Analyze Sample?**.

4. To change the pack, just grasp the extended portion of the pack and slide it out. If removal is difficult, press on the end of the fluid pack guide pin (protruding through the connector located to the left of the measuring chamber inside the front door). See illustration E-1.
5. Prepare the new ISE Fluid Pack by carefully removing the red protective strip.

**Note:** Once the protective strip is removed, be sure to keep the pack upright to avoid spillage. Save the protective strip to use to close the ports on the pack prior to disposal.

6. Slide the new pack into position on the left side of the analyzer. See illustration E-2.
7. Press YES to indicate that a new fluid pack is installed. The analyzer will prompt **Are You Sure?**.
8. Press YES, and the VetLyte Electrolyte Analyzer will automatically reset the fluid pack counter to 100% and commence system calibration.
Standby Mode

Your analyzer has been programmed to automatically enter Standby mode three hours after calibration. If no further sampling is required, you may place the analyzer in Standby mode.

To access this mode, follow the steps below:

1. Press NO until the prompt, Operator Functions? is displayed. Press YES.
2. Press NO until the prompt Go to Standby Mode? is displayed and press YES.
3. The analyzer will display Standby! to confirm that it has entered Standby mode.

To leave Standby and resume normal operation:

1. Press NO. The prompt Leave Standby Mode? will be displayed.
2. Press YES.

Setting Date And Time

The date and time of the VetLyte can be easily changed as necessary. To change the date and time, enter the Operator Functions? menu and press NO until Set Time / Date? is displayed.

1. Press YES to enter a change.
2. Press NO until the correct day is displayed. Press YES. The cursor will move to the month.
3. Press NO until the correct month is displayed. Press YES.
4. Press NO until the correct year is displayed.
   Press YES. The correct date should now be displayed.
5. Follow the same procedure to enter the correct time. The analyzer will prompt: OK?
   Press YES if the date and time you entered is correct, or press NO to continue making changes.

View Calibration Data

The most recent calibration data for each electrode can be viewed under this menu. Go to Operator Functions. Press NO until View Calibration Data? is displayed. Press YES and the 3 parameters will be displayed with the respective slope in mV. The number in parentheses shows the number of STD A aspirations. This number can be between 3 and 6. See Section F, page 1 to view voltage levels for each electrode.

Change Baud Rate

This menu option is for service use only.

Take Out Of Operation

Warning: If YES to Take Out of Operation? is selected accidentally, you must remove fluid pack and turn OFF analyzer for 30 seconds. Replace fluid pack and turn analyzer ON.
The take-out-of-operation routine assists you in performing a complete shutdown of the analyzer. A complete shutdown may be indicated to prepare the analyzer for shipping or in case the analyzer is not being used for an extended period of time. For this procedure, you will need a special shutdown kit (not supplied with the analyzer).

**Note:** Never attempt to turn the power off for an extended period of time without performing a complete shutdown of the analyzer.

**Note:** In case the analyzer is not being used for several days only, it is not recommended to perform a complete shutdown, but to put the analyzer in Standby Mode.

To perform the shutdown, you will need the following items:
- Two containers, one filled with at least 100 mL of water, the other one empty.
- Four solenoid relief clamps (supplied with analyzer)
- Two reference electrode transport housings (one supplied with the analyzer, the other supplied with the shutdown kit)
- One shutdown plug (supplied with the shutdown kit)
- Protective strip for fluid pack

To get started, go to **Operator Functions**. Press YES, then NO until **Take Out of Operation?** appears. Press YES.

Next the analyzer prompts **Shutdown Plug and Water Installed?**. First remove the ISE Fluid Pack and push the protective strip firmly onto the fluid pack ports. Insert the shutdown plug carefully into the fluid pack receptacle. Next, place the blue marked line into the disposable container filled with water. The line with the red mark is inserted into the empty container. Press YES. See illustrations E-3.

The analyzer will prompt **Transport Ref Housing Installed?** Pull the electrode holder forward and remove the reference electrode assembly.
Carefully unscrew the reference electrode from the reference electrode housing. Temporarily place the reference electrode on a clean, soft cloth. Next, pour the remaining reference solution in the reference housing into a transport housing. Then carefully screw the reference electrode into the filled transport housing.

Now the second transport housing is screwed into the reference housing. Place the reference housing back into the electrode holder and move the lever backwards, making sure all electrodes are seated properly. The electrode holder remains in the forward position. Press YES.

See illustrations E-4 and E-5.

The analyzer will take approximately one minute to flush all lines with water. Upon completion, you will receive the prompt **Remove Water and Press Yes**. Remove the line with the blue mark from the water and place it on a cloth, making sure it is not obstructed. The line with the red mark remains in its container. Press YES. During this cycle, all lines are purged of water. Upon completion, the prompt **All Electrodes & Plug Removed?** will appear.

See illustration E-6.

Unplug the reference connector below the left side of the electrode holder. Then move the lever on the left side forward and remove all electrodes, placing them on a soft cloth. Next, move the lever back and push the empty electrode holder into its back position.

Unscrew the transport housing from the reference housing. Empty the reference housing and place all electrodes in their protective boxes. Remove the line with the red mark from its container. Now the shutdown plug can be removed. Press YES.

See illustration E-7.

The display will prompt **All 4 Relief Clamps Inserted?** Install the red relief clamps making sure that they are snapped securely into position. Press YES.

See illustration E-8.

**Warning:** Never insert the solenoid relief clamps with the ISE Fluid Pack in place.
The prompt **Pump Windings Relieved?** appears. First, grasp the front winding close to the pump roller and gently pull it off the roller. Repeat the same procedure for the rear pump winding. Press YES. The analyzer will ask **Do You Wish to DELETE All Data?** Select NO.

**Warning:** If you press YES, conversion factors, date/time and ISE Fluid Pack volume are reset to default.

Then the analyzer will prompt **Shutdown Complete Turn Power Off.** After the power has been turned off, unplug the power cord and the cable from the receptacles. Close the main door. Clean all external surfaces of the analyzer as well as the areas accessible through the main door and the sample door.

For putting the analyzer back into operation, see Section B.
Service Functions

To aid in testing and troubleshooting your VetLyte, there are various built-in functions that you can access to evaluate the performance of the instrument. From the **ANALYZE SAMPLE?** display, press NO until the prompt **SERVICE FUNCTIONS?** appears. Press YES.

Test Electrodes

You can test the voltage levels of the electrodes by using standard solutions or an external sample. Press NO until the prompt **Test Electrodes?** is displayed. Press YES and the prompt **Test Standard A?** will be displayed. Press YES and the voltages for each electrolyte will appear. Record these values. Press NO to exit.

The prompt **Test Standard B?** will now be displayed. Press YES and the voltages for each electrolyte will appear. Record these values and compare in this manner:

<table>
<thead>
<tr>
<th>Electrode</th>
<th>Standard A</th>
<th>Standard B</th>
<th>Allowable Difference A-B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Na+</td>
<td>-600 to +2400</td>
<td>-1600 to +2200</td>
<td>+720 to +2000</td>
</tr>
<tr>
<td>K+</td>
<td>-700 to +1000</td>
<td>-2500 to +500</td>
<td>+520 to +1800</td>
</tr>
<tr>
<td>Cl⁻</td>
<td>-3100 to -100</td>
<td>-1100 to +1800</td>
<td>-520 to -1200</td>
</tr>
</tbody>
</table>

After testing the electrodes against the standard solutions, the VetLyte Electrolyte Analyzer will prompt **Test External Sample?** press NO to exit or to perform other service functions.

If you press YES, the instrument will prompt **Open Sample Door Introduce Sample.** Press YES

Introduce the sample to the probe until the prompt **Remove Sample/Wipe Probe** is received. After closing the sample door, the voltages will automatically appear. Check for stable readings. Press NO to exit and after a short **Please Wait** message, the prompt **Remain in Test Electrodes?** will appear. Press NO to exit or to perform other service functions.

Test Sample Sensor

The sample sensor must provide a reading of 80 - 120 when air is detected, and should indicate at least 40 higher when clear liquid is passed through the sensor.

For testing purposes, distilled water, Electrode Cleaning Solution A or Conditioning Solution may be used.

To check the sample sensor, from the **SERVICE FUNCTIONS?** display, press YES and then NO until **Test Sample Sensor?** appears. Press YES. The analyzer will display the normal range and the measured value. The measured value is ideally around 100.

Pour a small amount of clear liquid into a clean sample cup. Press YES, open the sample door and promptly introduce liquid into probe.
Wait a few seconds for liquid to be aspirated. Press NO to stop the pump. Wipe the probe and close the sample door. The analyzer will display the normal range of 80-120; clear liquid should read at least 40 units higher than the initial measured value. Press NO again to exit or to perform other service functions.

**Test Sample Door**

To check the positioning of the sample door from the SERVICE FUNCTIONS? display, press YES and then press NO until Test Sample Door? appears. Press YES.

Raise the sample door and the display should indicate that the door is open with an “O” in the upper right corner of the display. Close the door and the “O” should change to a “C” indicating the door is closed.

**Test Peristaltic Pump**

The peristaltic pump has four speeds of operation that can be automatically checked. From the SERVICE FUNCTIONS? display, press YES and then NO until Test Pump? appears. Open the front door and press YES.

The pump will progressively display Very Slow Speed, Slow Speed, Medium Speed and Fast Speed, and an audible change should be heard in the pump’s speed of operation. Close the front door and press NO to exit or perform other service functions.

*Note: The pump speed is electronically controlled and should not require any adjustment.*

**Test Pinch Valves**

The VetLyte Electrolyte Analyzer has four valves that function automatically during the operation of the instrument.

See illustration F-1.

Open the analyzer front door. From the SERVICE FUNCTIONS? display, press YES and then NO until Test Pinch Valves? appears. Press YES.

**Test Valve A:** YES/NO = ON/OFF will appear. When you press the YES button, you should see the valve move into the open position. The valve remains open for approximately 30 seconds and then automatically closes. Pressing NO will close the valve. Pressing NO again will move to the next successive valve. After testing all valves, close the front door and press NO to exit or perform other service functions.

*F-1. Fluid control valves*
**Test Amplifier**

This menu option is for service use only.

**Enter Service Codes**

The VetLyte can be programmed to increase the resolution of the measurement values by one additional decimal place. It can also be programmed to report results in flame-equivalence units.

To access either of these options, press NO until you reach the **SERVICE FUNCTIONS?** display. Press YES. Press NO until **Enter Service Code?** appears. Press YES. **Enter Code** will be displayed.

To increase resolution enter code DEC by selecting NO until desired letter is displayed. Select YES to accept.

**Note:** VetLyte results printed through your VetTest will automatically use the additional decimal place.

After entering the code, the analyzer will prompt **Code Accepted**, then it will display **Enter Another Service Code?** press YES to do so, NO to exit.

To change reporting units from ISE to flame-equivalence, enter code ESI by selecting NO until desired letter is displayed. Select YES to accept. After entering the code, the analyzer will prompt **Code Accepted**, then it will display **Enter Another Service Code?** Press YES to do so, NO to exit.

**Note:** If an incorrect code is entered during the process, the analyzer will prompt **Code Error Retry?** Press YES to correct the code or NO to exit.

To remove a service code, enter the reversed sequence of the code letters (example: DEC becomes CED and ISE become ESI).
Self Help

STATUS: NOT CALIBRATED
This message will be displayed when calibration has been interrupted.

Possible remedies:
• Perform system calibration to return the instrument to the ANALYZE SAMPLE? mode.

STANDARD A NOT DETECTED
As the analyzer aspirates a sample of Standard A, the solution is detected by the sample sensor, which must detect its presence without encountering any air bubbles. If the sample sensor is unable to properly detect the presence of Standard A solution in a programmed time period, the above error message will be displayed.

Possible remedies:
• Confirm the presence of the o-rings in the left side of all electrodes and in the right side electrode holder. See illustrations B-4 and B-9.
• Replace the ISE Fluid Pack.
• Clean the sample sensor by performing Weekly Maintenance. Perform the sample sensor test (see Section F, page 1). Ensure the sample sensor is securely plugged in. See illustration B-9.
• Replace the peristaltic pump tube set to ensure correct aspiration of Standard A.
• Check for clots or crystals that may have formed in the Standard A tubing or the electrode chamber. If clots or crystals are seen, contact technical support for assistance.

STANDARD B NOT DETECTED
The system for aspirating Standard B is like that of Standard A. If Standard A is aspirated properly, but Standard B is not detected, check Standard B tubing for crystallization. If Standard A is not aspirated either, check for leaks and blockages first.

Note: At the beginning of calibration, the analyzer checks for the presence of Standard B first. Therefore, a missing o-ring or a blockage in the sample path will result in a STANDARD B NOT DETECTED message.
CHECK SAMPLE SENSOR
The sample sensor is calibrated with air during each calibration. For proper functioning, the sensor must provide a reading of 80 - 120 units when air is detected. For transparent fluids (e.g. water) the reading should increase by at least 40 units. To check sample sensor response, perform Test Sample Sensor (see Section F, page 1). Then perform a calibration to remove the error message.

Possible remedies:
- Clean sample sensor by using the Weekly Maintenance procedure. Ensure the sample sensor is properly plugged in. See illustration B-9.
- Replace the peristaltic pump tube set.

CHECK REFERENCE HOUSING
When the analyzer fails to detect a flow of Reference Solution into the measuring chamber, CHECK REFERENCE HOUSING will be displayed. This test is performed at the beginning of each calibration cycle.

Possible remedies:
- Check the double reference tubing for large air bubbles. If seen, repeat calibration.
- Ensure that the double reference tubing is securely connected to the receptacle.
- Clean the reference housing (See Performing Monthly Maintenance in Section D).
- Replace the ISE Fluid Pack.
- Replace the peristatic pump tube set.

PLEASE CLOSE SAMPLE DOOR
This message occurs when the sample door is not closed within 20 seconds after the sample is in place, or when the door has been opened and no sample is detected.

Possible remedy:
- Close the sample door within time allowed.

NO SAMPLE
Under certain conditions, the analyzer may not detect the presence of a sample and an error message will occur. This could be caused by the sample door remaining open more than 20 seconds after sample is introduced or prompts are not followed. Also check for air bubbles in the sample, a highly lipemic or viscous sample, a sample volume too small to analyze, or no sample being aspirated through the sampling mechanism.

Possible remedies:
- First, repeat the sample to see if it is detected properly on a second trial.
- Close the sample door within time allowed.
- When you open the door, wait for the prompt Introduce Sample?
• Check sample aspiration and look for the presence of clots in the sampling system.
• Check for the presence of o-rings and for proper sealing of the electrodes.
• Ensure that the sample sensor is plugged in and perform TEST SAMPLE SENSOR to verify that it is operating correctly (see Section F, page 1).
• Replace pump windings.

CLEANING FLUID NOT DETECTED
Under certain conditions, the analyzer may not detect the presence of cleaning solution. This could be caused by prompts not being followed, air bubbles in the cleaning solution, too small a volume of cleaning solution, or the cleaning solution not being aspirated properly through the sampling mechanism.

Possible remedies:
• When you open door, wait for the prompt **Introduce Sample**.
• Check for the presence of o-rings and for proper sealing of the electrodes.
• Check for aspiration of cleaning solution and look for presence of clots in the sampling system.
• Check for the proper sealing of the pump windings.
• Ensure that the sample sensor is plugged in and perform **Test Sample Sensor** to verify that it is operating correctly (see Section F, page 1).

CONDITIONING FLUID NOT DETECTED
Under certain conditions, the analyzer may not detect the presence of conditioning solution. This could be caused by prompts not being followed, air bubbles in the conditioning solution, too small a volume of conditioning solution, or the conditioning solution not being aspirated properly through the sampling mechanism.

Possible remedies:
• When you open door, wait for the prompt **Introduce Sample**.
• Check for the presence of o-rings and for proper sealing of the electrodes.
• Check for aspiration of conditioning solution and look for presence of clots in the sampling system.
• Check for the proper sealing of the pump windings.
• Ensure that the sample sensor is plugged in and perform Test Sample Sensor to verify that it is operating correctly (see Section F, page 1).

CHECK ELECTRODES
If none of the electrodes passes the calibration, the Check Electrodes message will be displayed.

Possible remedies:
• Ensure that electrodes are properly plugged in. See illustrations B-7 through B-11.
• Perform Monthly Maintenance.
• Replace the ISE fluid pack.
CLOG IN SAMPLE PATH
If the unit is unable to clear the sample path, the message **CLOG IN SAMPLE PATH** will be displayed.

*Possible remedies:*
- Make sure that the electrode o-rings are present and seated properly. See illustration B-4.
- Perform weekly cleaning.
- Check the ISE Fluid Pack volume; if less than 5% is remaining, replace pack.

↑↑↑↑ ↓↓↓↓
In case the unit displays arrows up or arrows down instead of the sample results, the concentration of the sample is outside the measurement range (see specifications).

*Possible remedies:*
- Check for proper sample preparation (see Section C, page 1).
- Rerun sample. For high results, dilute sample 1:1 with sterile water and repeat.

**Warning:** Do not use saline for dilutions on the VetLyte.

**ERR.**
If the unit displays **ERR.** instead of the sample results, no valid voltage reading could be obtained from the electrode.

*Possible remedies:*
- Check for proper sample preparation (see Section C, page 1).
- Ensure electrodes are properly plugged in. See illustrations B-7 through B-11.
- Check for air bubbles in the sample.
The Measurement Principle

Your VetLyte Electrolyte Analyzer is a sophisticated instrument that uses the Ion Sensitive Electrode (ISE) measurement principle to precisely determine electrolyte values. Although the technology itself is quite complicated, understanding how the instrument performs sampling analysis is relatively simple. Basically, the analyzer compares an unknown value against a known value to compute the sample’s electrolyte level.

An ion-sensitive membrane undergoes a specific reaction with the type of electrolyte contained in the sample. The membrane is an ion exchanger, reacting to the electrical change of the ion causing a change in the membrane potential, or measuring voltage, which is built up in the film between the sample and the membrane.

A galvanic measuring chain within the electrode determines the difference between the two potential values on either side of the membrane. The galvanic chain is closed through the sample on one side by the reference electrode, the reference electrolyte and the “open terminal.” The membrane, inner electrolyte and inner electrode close the other side. See illustration H-1.

The different ion concentrations between the inner electrolyte and the sample causes an electrochemical potential to form on the membrane of the active electrode. The potential is conducted by the inner electrode to the input of an amplifier. The reference electrode is connected to ground as well as the second input of the amplifier.

Since the reference electrode is on ground, amplification of the electrode potential allows further signal processing.

The ion concentration in the sample is then determined and displayed by using a calibration curve determined by two measured points of standard solutions with precisely known ion concentrations (two-point calibration), and by using the measured voltage of the sample and the Standard A (one-point calibration).

Physical Principle

An ion-selective electrode is connected with a reference electrode to form a measuring system. When immersed in a solution that contains the relative ion, the Nernst equation applies:

1. \[ E = E' \pm \frac{R \cdot T}{n \cdot F} \cdot \ln a_i \]
   or

2. \[ E = E' \pm \frac{R \cdot T}{n \cdot F} \cdot \ln (f_i \cdot c_i) \quad (+) \text{ for cations,} \]
   \[ (-) \text{ for anions} \]
The equation can also be written:

3. \( E = E' \pm S \cdot \log (f_i \cdot c_i) \)

- \( E \): the measured electric potential
- \( E' \): the e.m.f. of the system in a standard solution
- \( f_i \): activity of the ion measured
- \( R \): the general gas constant (8.31 J/Kmol)
- \( T \): temperature
- \( n \): valence of the measured ion
- \( F \): Faraday constant 96.496 A.s/g equivalent
- \( c_i \): the concentration of the measured ion
- \( S \): the slope of the electrode

See illustration H-2.

If the ion concentration of one measuring solution is known, the ion concentration of the sample can be determined on the basis of the difference of two measured potentials.

4. \( E_{\text{sample}} = E' + S \cdot \log (f_i \cdot c_{\text{sample}}) \)

5. \( E_{\text{standard}} = E' + S \cdot \log (f_i \cdot c_{\text{standard}}) \)

6. \( E = E_{\text{sample}} - E_{\text{standard}} = S \cdot \log \frac{c_{i_{\text{sample}}}}{c_{i_{\text{standard}}}} \)

- \( E \): the difference between the measured potentials of the sample and the standard
- \( S \): the potential difference of the electrode, determined from the potential difference of two measured standard solutions
- \( c_{i_{\text{sample}}} \): concentration of the measured ions in the sample
- \( c_{i_{\text{standard}}} \): concentration of the measured ions in the standard solutions

The unknown ion concentration in the sample can now be determined by:

7. \( c_{i_{\text{sample}}} = c_{i_{\text{standard}}} \cdot 10^{(E/S)} \)

As demonstrated by these equations, the ion selective electrodes do not measure the ion concentration but the activity of the ions concerned. This activity is a criterion of the ion’s ability to interact with other ions, in which each ion binds a proportion of its energy.
The ion concentration is calculated on the basis of the ion activity. The correlation is affected by the total number of ions in the solution. Because sodium in whole blood and serum is the predominant ion, the known value of the sodium concentration makes it possible to ascertain and adjust for total ion effect and strength.

H-1. Measurement principle

H-2. Measurement system
Sodium Electrode Specifications

The Sodium Electrode is a glass capillary electrode used for in-vitro diagnostic measurement of sodium ions present in fluid samples. See illustration H-3. It is designated with a Na+ marking on the top surface of the housing.

Construction

Electrode housing: transparent acrylic plastic
Measuring capillary: sodium sensitive glass
Electrolyte chamber: airtight, filled with electrolyte solution for Na+ electrodes
Pin connector: silver, silver chloride (Ag/AgCl)

Use and Care

VetLyte Sodium Electrodes are manufactured for use in VetLyte Electrolyte Analyzer.

Proper care should be used in handling and storage of the electrode. Never use strong or abrasive cleaners such as alcohol or amphyl on the electrode. These will attack the plastic housing.

Store the electrode in a clean, dry place only after the electrode has been cleaned and rinsed with distilled water and dried with a lint-free cloth. The o-ring seal should be installed in the electrode during storage.
Potassium Electrode Specifications

The Potassium Electrode is a membrane electrode used for measurement of potassium ions present in fluid samples. See illustration H-4. It is designated with a K⁺ marking on the top surface of the housing.

Construction

Electrode housing: transparent acrylic plastic
Measuring membrane: potassium-ion sensitive
Electrolyte chamber: airtight, filled with electrolyte solution for K⁺ electrodes
Pin connector: silver, silver chloride (Ag / AgCl)

Use and Care

VetLyte Potassium Electrodes are manufactured for use in VetLyte Electrolyte Analyzer.

Proper care should be used in handling and storage of the electrode. Never use strong or abrasive cleaners such as alcohol or amphyl on the electrode. These will attack the plastic housing.

Store the electrode in a clean, dry place only after the electrode has been cleaned and rinsed with distilled water and dried with a lint-free cloth. The o-ring seal should be installed in the electrode during storage.
Chloride Electrode Specifications
The Chloride Electrode is a membrane electrode used for measurement of chloride ions present in fluid samples. See illustration H-5. It is designated with a Cl⁻ marking on the top surface of the housing.

Construction
Electrode housing: transparent acrylic plastic
Measuring membrane: chloride-ion sensitive
Electrolyte chamber: airtight, filled with electrolyte solution for Cl⁻ electrodes
Pin connector: silver, silver chloride (Ag / AgCl)

Use and Care
VetLyte Chloride Electrodes are manufactured for use in VetLyte Series Electrolyte Analyzer.

Proper care should be used in handling and storage of the electrode. Never use strong or abrasive cleaners such as alcohol or amphyl on the electrode. These will attack the plastic housing.

Store the electrode in a clean, dry place only after the electrode has been cleaned and rinsed with distilled water and dried with a lint-free cloth. The o-ring seal should be installed in the electrode during storage.
Reference Electrode Assembly Specifications

The Reference Electrode Assembly is a device used as an electrical junction between the sample and electrical ground.

Construction

The Reference Electrode Assembly consists of two parts: the Reference Electrode Housing and the Reference Electrode.

Reference Electrode Housing

In the reference electrode housing, reference electrolyte solution establishes the electrical contact between the reference electrode and the sample. At the beginning of each measurement, reference electrolyte is pumped into the housing. At the same time a glass capillary allows a small amount of reference electrolyte to pass into the measuring capillary, thus establishing electrical contact between the sample and the Reference Electrode. See illustration H-6.

Use and Care

VetLyte Reference Electrode Housings are manufactured for use in VetLyte Electrolyte Analyzer.

Proper care should be used in handling and storage of the electrode housing. Never use strong or abrasive cleaners such as alcohol or amphyl on the housing.

Store the Reference Electrode Housing in a clean, dry place only after the Reference Electrode has been removed and the housing cleaned and rinsed with distilled water and dried with a lint-free cloth.

The o-ring seals should be installed in the housing during storage.
Reference Electrode

The Reference Electrode completes the electrical circuit between the reference electrolyte and electrical ground. This is accomplished by a cotton wool (saturated with reference electrolyte)-calomel (Hg₂Cl₂)-mercury (Hg)-platinum wire-connecting pin junction. See illustration H-7.

Use and Care

VetLyte Reference Electrodes are manufactured for use in VetLyte Electrolyte Analyzer.

Proper care should be used in handling and storage of the Reference Electrode. Never use strong or abrasive cleaners such as alcohol or amphyl on the electrode.

Store the Reference Electrode in the transport housing provided with electrode at the time of purchase. Make sure that the transport housing is filled with reference electrolyte solution (you may use the reference electrolyte solution remaining in the Reference Electrode Housing at the time of disassembly).

Warning: Never rinse the Reference Electrode with distilled water. Never allow the reference electrode to become dry.
Technical Specifications

Electrodes
Sodium (Na⁺) Sensor  ion selective, flow-through, glass capillary electrode
Potassium (K⁺) Sensor  ion selective, flow-through, liquid membrane electrode
Chloride (Cl⁻) Sensor  ion selective, flow-through, liquid membrane electrode
Reference System  open liquid junction, flow-through, electrode

Measuring Ranges (mmol/L)
Whole blood, serum, plasma  
<table>
<thead>
<tr>
<th>Measuring Range</th>
<th>Na⁺ resolution 0.1 mmol/L</th>
<th>40 - 205</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>K⁺ resolution 0.01 mmol/L</td>
<td>1.5 - 15</td>
</tr>
<tr>
<td></td>
<td>Cl⁻ resolution 0.1 mmol/L</td>
<td>50 - 200</td>
</tr>
</tbody>
</table>
Reproducibility (within run)  
| Na⁺ CV 1.0% @ 140 - 160 mmol/L |
| K⁺ CV 1.5% @ 4 - 6 mmol/L    |
| Cl⁻ CV 1.0% @ 90 - 130 mmol/L|

Operating Parameters
Sample size  95 μL
Sample type  serum, plasma, anticoagulated whole blood
Sample application  sample cup and collection tube
Analysis time  (approx.) 30 sec.
Calibration  fully automatic 1- and 2-point calibrations
Diagnostic programs  user-controlled diagnostics, plain language display
Electronics  microprocessor-controlled
Display  dot-matrix, 2 lines, 16 characters per line
Computer interface  RS232C serial port
Power requirements  90 - 250 VAC 50/60 Hz
                     (self-adjusting) 1.4 amp max.
                     375 watts max.
Temperature  room temperature, 15° - 32° C; 60° - 90° F
Humidity  < 85% relative humidity, non-condensing
Dimensions  (HxWxD) 13.2 x 12.4 x 12.0”; 335 x 315 x 295 mm
Weight  (approx.) 13 lbs.; 6 kg

Data subject to change without notice. Technical information is supplied for general informational purposes only.
Appendix B

Program flow chart
## Maintenance log master

*Note: You may use this page as a master for duplicating.*

### VETLYTE MAINTENANCE SCHEDULE

**MONTH OF _______________**

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**DAILY**

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**WEEKLY**

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**MONTHLY**

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**EVERY 6 MONTHS**

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**UNSCHEDULED MAINTENANCE**

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Fluid Pack

`☐` Date _________ Initial _________

Electrode Replacement

`☐` Type _________ Date _________ Initial _________

Other ____________________

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**VetLyte**
IDEXX LABORATORIES, INC.
Limited Warranty for VetTest, VetLyte, VetCom and QBC® VetAutoread™ System

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