pm
product manual

element POC
Blood Gas & Electrolyte Analyzer

HESKA

Element POC [epoc®] Blood Gas & Electrolyte Analyzer

The Element POC® portable device consists of the blood analyzer (Reader), mobile computer (Host), and disposable Test Cards. Lab results are available in less than a minute on whole blood samples as small as 100 microliters. This User Manual describes the proper use and operation of the epoc Blood Gas & Electrolyte Analyzer system for veterinary samples.

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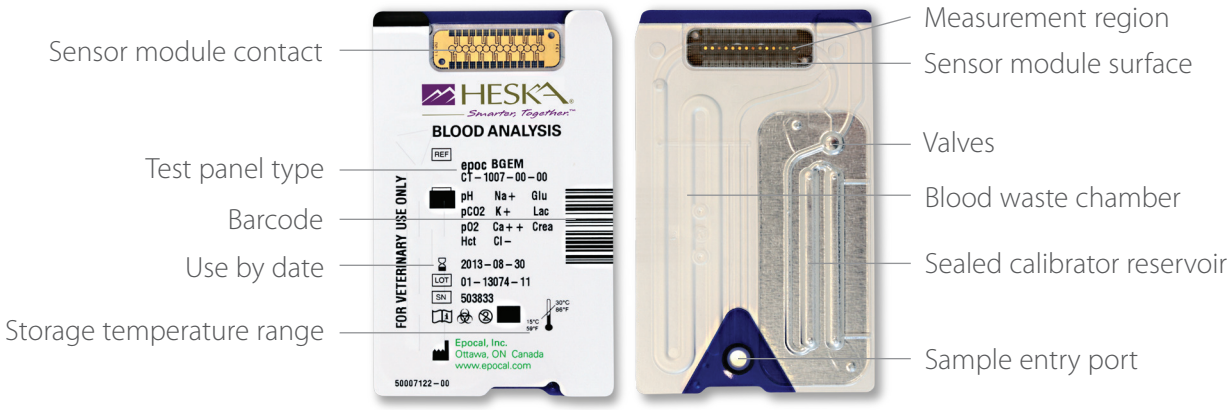
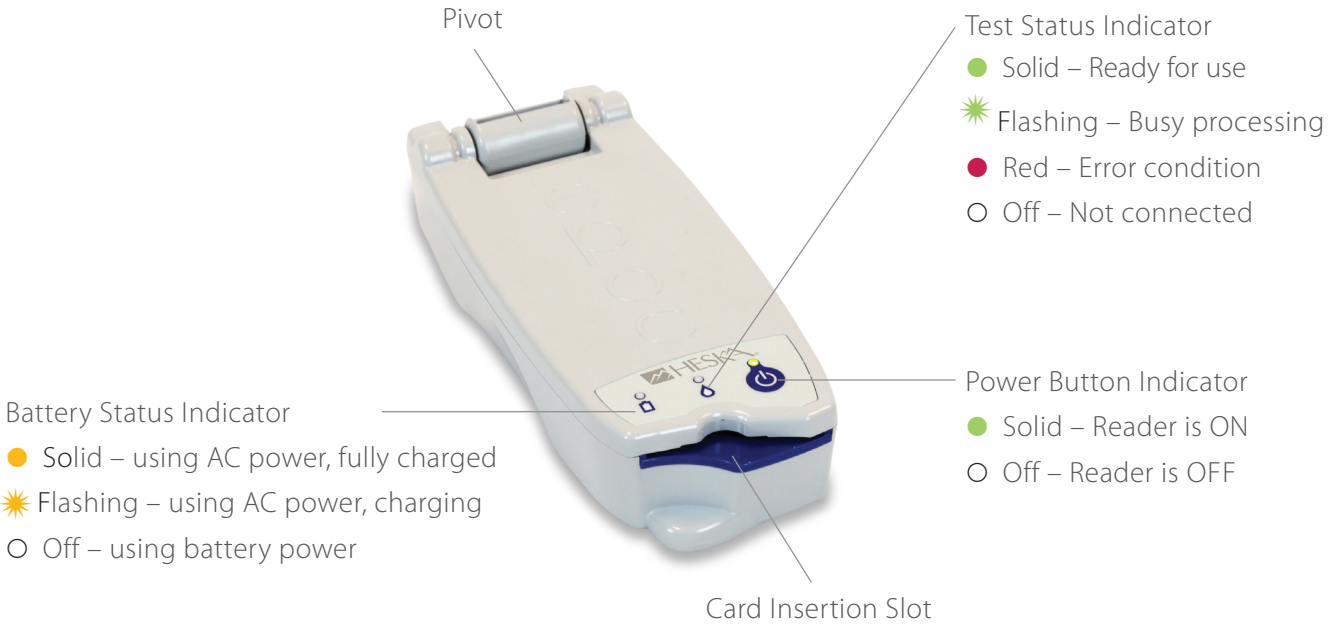
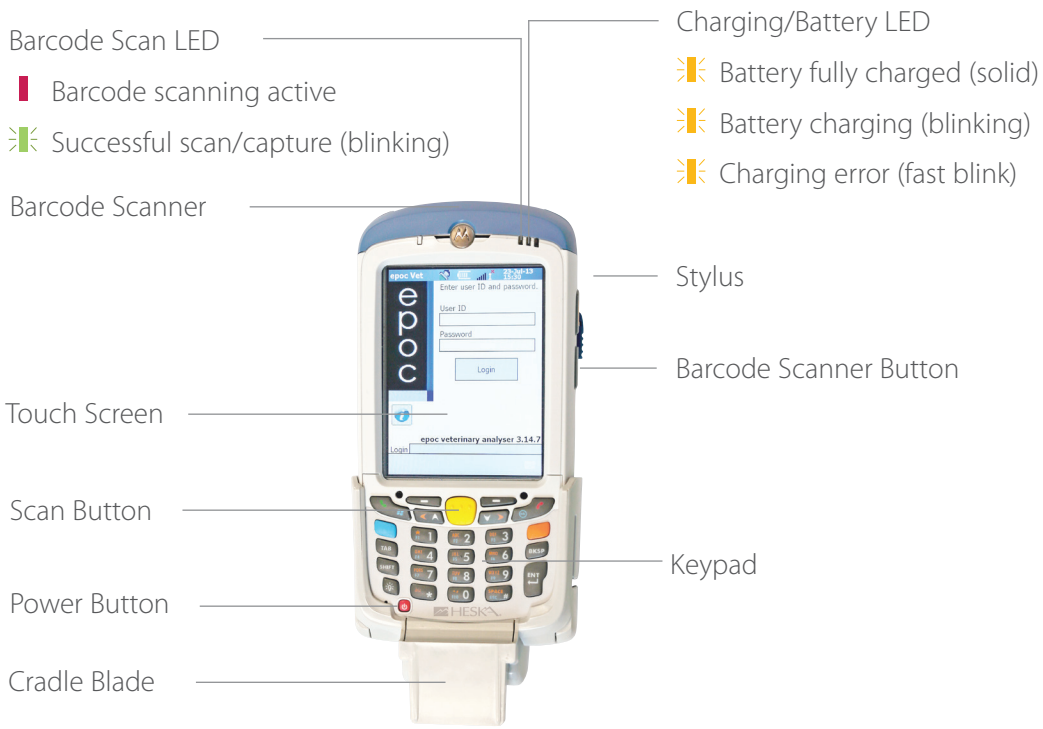
1.1 Test Cards



1.2 Reader



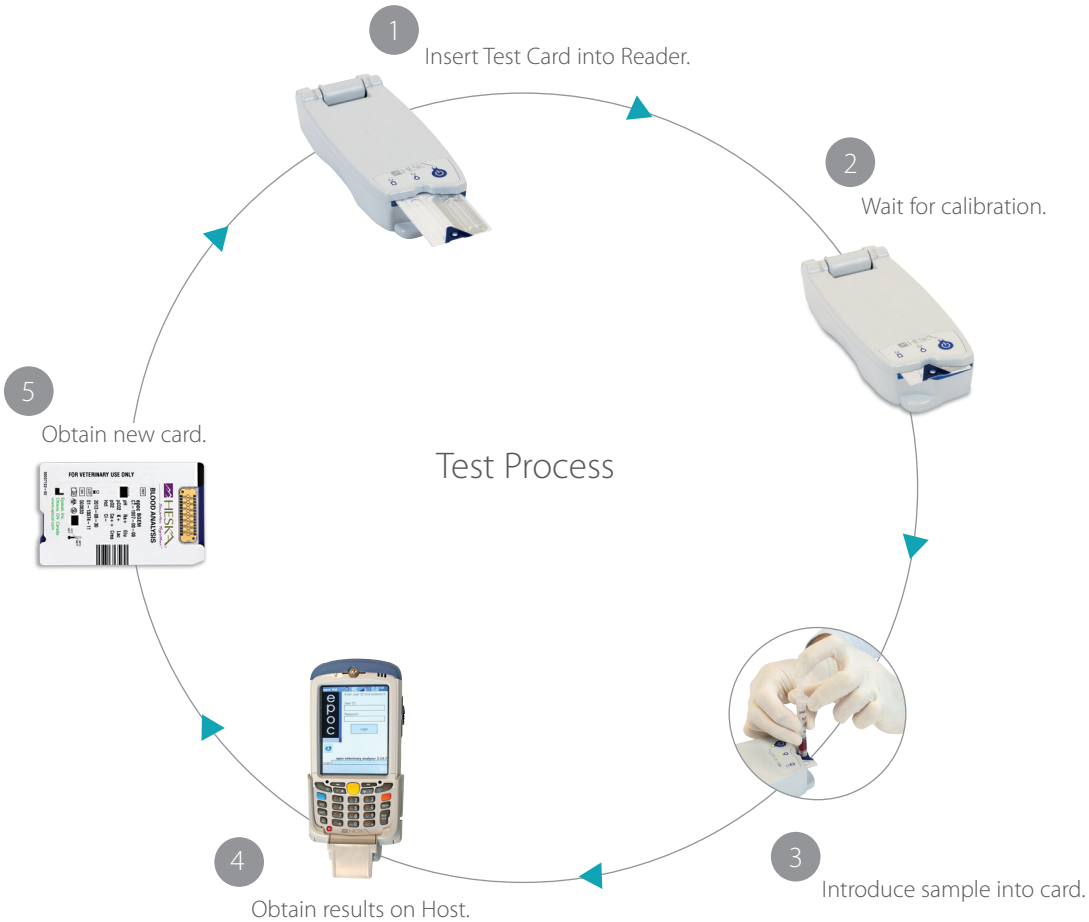
1.3 Host



1.4 System Assembled

2.1 Test Process Overview

1. The initiation of a test starts with establishing a communications link between the Host and Reader.
2. A Test Card is removed from its card pouch.
3. The Test Card should be inserted immediately into the Reader.
4. During the 2.75 minute (165 seconds) calibration period, the user acquires a blood sample for the test.
5. After calibration is complete, the Reader and Host indicate that the Test Card is ready to receive a blood sample. The sample can be introduced at any time thereafter, within 7.5 minutes. After 7.5 minutes (450 seconds), the sample introduction period times-out, and the Test Card can no longer accept a sample.
6. Approximately 35 seconds after sample introduction the Host displays analytical test results.
7. The Test Card should be removed from Reader and discarded as biohazard waste.



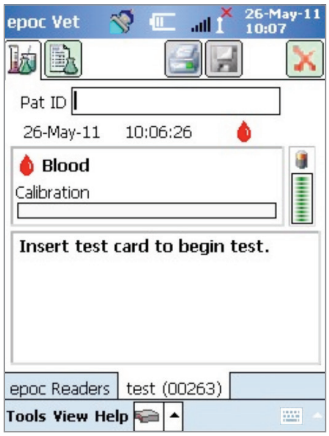
3.1 User Interface

The Host has a simple, intuitive user interface.

The tabs within the software allow the user to navigate to different parts of the application using the stylus.

The buttons perform actions and enable fields for text input.

An example screen shot shows the basic elements of the user interface.



The user interface is context dependent and changes depending on where and what a user is doing.

There is always a **tool bar**  at the bottom of the screen that contains menu items and tool bar buttons. The text input button is located in the bottom right corner of the screen  .

Select different screens by pressing **screen tabs**  at the bottom of the screen. Screens are available for each connected Reader and for each opened test record.

Navigate multiple pages within each screen by pressing **page tabs**  across the upper left corner of the screen.

Additional buttons print and save  are located in the upper right area of the screen.

The interface varies depending on whether the user is in an operator or administrator account.

4.1 Storage and Handling

⚠ CAUTION

Always store Test Cards at room temperature 59°F–86°F (15°C–30°C). Never refrigerate or allow Test Cards to freeze.

⚠ CAUTION

The shipping boxes are not to be used for storage. It is the responsibility of the customer facility to constantly maintain the temperature above 59°F and below 86°F (15°C and below 30°C).

⚠ CAUTION

Test Card pouches provide a low humidity environment for card storage. The card pouch should be opened and the Test Card removed only when conducting blood or QA testing. Never store Test Cards outside of the card pouch or near intense light or heat sources.

⚠ CAUTION

Never use a Test Card if the card pouch seal has been compromised in any way. The low humidity threshold within the pouch may have been exceeded.

⚠ CAUTION

For a blood or QA test, a Test Card must be taken directly from the card pouch. Do not touch sensor contacts or sample entry port. Ensure Test Card is free of animal hair or other debris which may interfere with analysis.

⚠ CAUTION

Test Cards brought from a warmer or colder storage environment (even within the same building) must be allowed to adjust to the same temperature as the testing room ambient temperature before use. The testing environment, Reader, and epoc Test Cards must all be at the same temperature before conducting any testing.

⚠ CAUTION

Strong mechanical shocks to the card container may induce bubbles in the Test Cards. Never drop or otherwise mechanically stress the Test Cards or pouches.

4.2 Shelf Life

⚠ CAUTION

All epoc Test Cards have a limited shelf life. Test Cards must be used by the "Use By" date printed on each Test Card.

⚠ CAUTION

The "Use By" date is encoded into the barcode on each Test Card. The Reader will reject any Test Card past the "Use By" date on the Test Card. The "Use By" date is based upon continuous storage of the Test Cards between 59°F and 86°F (15°C and 30°C).

4.3 epoc BGEM Test Card Specifications

Test Name	Acronym	Measured	Calculated	Units	Measurement Range
pH	pH	√		pH units	6.5–8.0
Carbon Dioxide Partial Pressure	pCO_2	√		mm Hg kPa	5–250 0.7–33.3
Oxygen Partial Pressure	pO_2	√		mm Hg kPa	5–750 0.7–100
Sodium	Na^+	√		mmol/L mEq/L	85–180
Potassium	K^+	√		mmol/L mEq/L	1.5–12.0
Ionized Calcium	Ca^{++}	√		mmol/L mg/dL mEq/L	0.25–4.0 1.0–16.0 0.5–8.0
Chloride	Cl^-	√		mmol/L	65–140
Glucose	Glu	√		mmol/L mg/dL g/L	1.1–38.5 20–700 0.20–7.00
Blood Urea Nitrogen	BUN	√		mg/dL	3–120
Lactate	Lac	√		mmol/L mg/dL g/L	0.30–20.0 2.7–180.2 0.03–0.18
Creatinine	Crea	√		mg/dL µmol/L	0.30–15.00 26–1326
Hematocrit	Hct	√		% PCV L/L	10–75 0.10–0.75
Hemoglobin	cHgb		√	g/dL mmol/L g/L	3.3–25 2.0–15.5 33–250
Actual Bicarbonate	$cHCO_3^-$		√	mmol/L	1–85
Total Carbon Dioxide	TCO_2		√	mmol/L	5–50.0
Base Excess of Extra Cellular Fluid	BE(ecf)		√	mmol/L	(–30)–(+30)
Base Excess of Blood	BE(b)		√	mmol/L	(–30)–(+30)
Oxygen Saturation	cSO_2		√	%	0–100
Anion Gap, K+	AGapK		√	mmol/L	(–10)–(+99)

CAUTION

Veterinary Test Cards must be used in veterinary blood analyzers.

5.1 Sample Handling

The epoc System is designed for point-of-care blood analysis. It is recommended to test samples immediately after the blood draw to obtain results that represent the patient's status with the greatest accuracy.

Sample Type: Fresh whole blood from arterial, venous, or capillary sources.

Sample Volume: > 92 µL, non-volumetric quantity.

Sample Collection: 23 gauge or larger needle.
(See table below for details on sample tubes and syringes.)

Anticoagulant: When needed use Li, Na or balanced heparin only.
(See table below for restrictions on Heparin use. Cat blood has a higher probability of clotting problems if untreated.)

IV or Indwelling Line: Avoid using line if possible. If using, draw and discard 3–6 times the volume of the line to avoid contamination of sample.

⚠ WARNING

Always wear protective gloves when handling blood samples.

⚠ CAUTION

Blood samples must be collected according to the facility's policies and procedures.

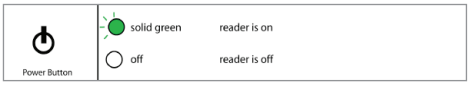
5.2 Sample Collection Method

Options for specific tests and sample collection methods:

Test	Syringes	Evacuated Tubes
pO2	• 1 or 3 ml plastic, non-iced • Test in less than 30 min	• Not recommended
pH/pCO2	• 1 or 3 ml plastic • Test in less than 30 min	• Without anticoagulant • With Li or Na heparin
Ionized Calcium (Ca++)	• 1 or 3 ml plastic • Without anticoagulant • With Li or Na heparin only if < 10 IU/ml • With balanced heparin only if < 70 IU/ml	• Without anticoagulant • With Li or Na heparin only if < 10 IU/ml
Hematocrit (Hct)	• 1 or 3 ml plastic • Immediate testing is recommended in order to avoid RBC settling. (**NOTE**: Re-suspension of RBC requires an air bubble of significant volume within the syringe prior to inverting syringe to mix.)	• Without anticoagulant • With Li or Na heparin only (do not use EDTA).
All other tests	• 1 or 3 ml plastic	

6.1 Power Up Host and Reader

1. Turn ON Reader.



- Press **POWER** to turn ON the Reader.

INFORMATION

The power indicator will turn green indicating the Reader is ON and ready for use. Press and hold **POWER** for several seconds to turn OFF the Reader when not in use in order to conserve battery power.

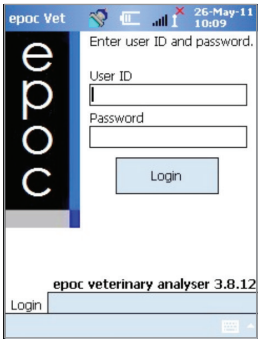
INFORMATION

The Reader can be operated on battery power or while the battery is being charged using the AC adapter provided with the Reader.

2. Turn ON Host.

- Press **POWER** to wake up the Host if the screen is blank.

3. Login to Host software.



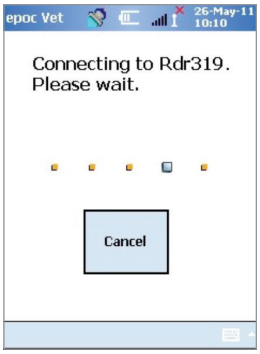
- Enter a valid user ID and password and press the **LOGIN** button.

INFORMATION

If no user ID and password have been assigned, users can login by inputting any character into user ID field.

6.2 Begin a Test

1. Establish connection between Host and Reader.



When there is a single dedicated Reader:

- The Host will automatically connect to its dedicated Reader.
- The Host—Reader connection can be cancelled by pressing **CANCEL**.

INFORMATION

Only Readers that are turned ON will be located by the Host.

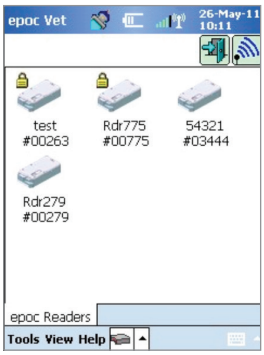
INFORMATION

If the system administrator has configured the system to connect with a single Reader, the Host will automatically connect to that Reader only.

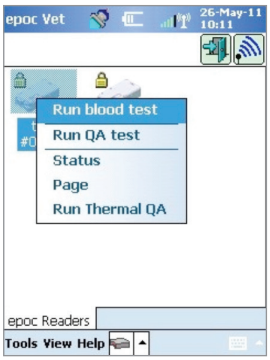
INFORMATION

The discovery icon can also be pressed to find ("discover") more Readers. Pressing the discovery icon when inactive will initiate this discovery process. Pressing the discovery icon while discovering will end the discovery process.

2. When there are multiple Readers:
   If the system administrator has configured the system for multiple Readers, all Readers available for connection are shown.
   The Reader icon displays the Reader name above and the serial number below.

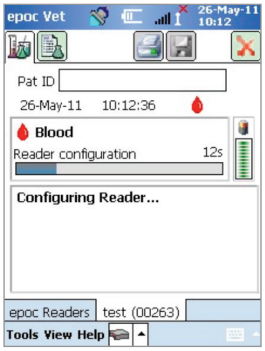


3. Once the desired Reader is displayed:
   - Press and hold the Reader icon to select it for testing. A drop down menu is displayed.
   - For a blood test, select: [Run blood test].
     OR
   - For a QA test (if authorized), select: [Run QA test].

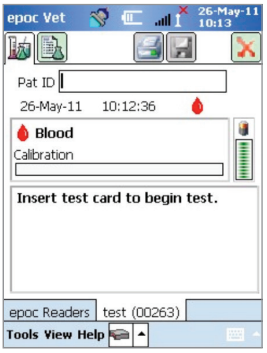


6.3 Initialization of Test Cycle

- A two-level internal electronic QC test of Reader is run automatically.
- Configuration data is sent by the Host to the Reader.
- The motorized mechanism inside the Reader can be heard as it resets.
- Reader information (name, serial number) is displayed on the bottom tab.
- The test status indicator of the Reader turns on and stays green.



8 Hour Electronic QC Check



INFORMATION

The Host checks that the electronic QC test of the Reader has been run within the past 8 hours.

If the Host has been connected to the Reader continuously for 8 hours or more, the Host will disconnect from the Reader and inform the user they must reconnect to the Host so that another electronic QC test can be performed.

6.4 Check Test Information

The Host screen displays:

- The patient ID or lot number field;
- Current date and time;
- The type of test: blood test or QA test;
- The battery charge level of the Reader.

INFORMATION

If running Test Cards on the "Use By" date, allow sufficient time to complete the test before midnight. Test results do not display after midnight of the "Use By" date.

INFORMATION

Additional tabs are accessible for other test information entries that may be used to ensure a complete test record.

CAUTION

Always verify that current date and time are correct before running a test. The date and time displayed become part of the test record. To change the date and/or time, see *Section 7.1*.

6.5 Obtain Test Card

Open Pouch

1. Select a properly stored veterinary Test Card.
2. Starting at the notch, tear open the card pouch as shown.

CAUTION

The card pouch should be opened only when conducting blood or QA testing to assure a low humidity environment for the Test Card.

6.6 Remove Test Card from Pouch

1. Carefully (read cautions below) remove the Test Card from the card pouch.
2. Place the Test Card directly into the Reader's card insertion slot.
3. Discard the empty pouch.

CAUTION

Always take the Test Card directly from the pouch before inserting it into the Reader.

⚠ CAUTION

Never touch the sensor module's contact surface or blood sample entry port.

⚠ CAUTION

Never place the Test Card on any surface before running a test. Ensure Test Card is free of animal hair and other debris which can interfere with analysis.

6.7 Insert Test Card Into Reader

THIS SIDE UP

Position the Test Card with the blue label side facing upwards and the sensor module towards the Reader.

ℹ Test Cards are keyed using a notch in the corner to ensure correct card orientation during insertion.

⚠ CAUTION

The Reader must be placed on a stable horizontal surface, such as a tabletop, prior to inserting the Test Card. Never insert anything except a Test Card into the Reader's card insertion slot.

1. Insert Test Card swiftly and smoothly, immediately after removing from package. Continue inserting the Test Card until slight resistance is felt.
2. Push the Test Card past this point to "lock" it into place. This is the final Test Card position.
3. The Reader beeps once, and the test status indicator turns solid green to notify the user that the Test Card has been successfully inserted.

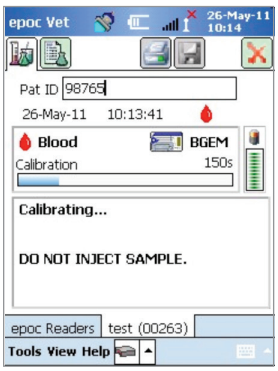
ℹ Insertion of a Test Card causes the barcode Reader in the Reader to turn ON. Avoid abrupt stops or unevenness in speed during Test Card insertion in order for the barcode to be successfully read.

ℹ Any problem reading the barcode (or any other error) causes the test status indicator to turn solid red. Check the Host for an error message and completely remove the Test Card from the Reader.

ℹ Upon correct Test Card insertion, the Reader is configured for the card type indicated by the Test Card barcode. The Reader performs a series of card integrity checks.

6.8 Test Card Calibration

1. The motorized mechanism in the Reader can be heard as calibration fluid is released over the sensors within the Test Card.
2. The test status indicator on the Reader flashes green to indicate the start of the test calibration sequence.
3. The Host confirms the start of the test by entering the calibration mode and displays the calibration progress.



ℹ The calibration process takes approximately 2.75 minutes (165 seconds) to complete.

ℹ During the calibration sequence, the user can prepare the patient and obtain the blood sample.

⚠ CAUTION

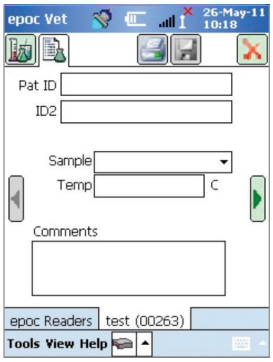
The Reader must rest on a flat horizontal surface without movement for the duration of the test.

⚠ CAUTION

Read information on sample collection method in, *Section 5: Sample Collection*, to ensure that blood samples are properly collected and handled for testing.

6.9 Enter Test Information

Test information can be entered at any time during the test. The patient ID may be entered using the stylus and text input display accessible from the bottom of the screen, or using the barcode scanner (see below).



For a blood test:

1. Select the test information tab on the Reader screen to enter the patient ID, species type, and related information.
2. Using the arrow ▶, additional settings related to respiratory therapy may be entered.

For a QA test (not shown):

1. Select the test information tab on the Reader screen to enter the QA fluid lot number to identify the test results for the card under test.

ⓘ Exercise care when entering the patient IDs and other information. Ensure the correct Reader is selected by verifying that the Reader name corresponds with the Reader used to conduct the test.

ⓘ Patient information entered prior to completion of the test is saved automatically with the test results when the test is complete. Patient information entered after the test is complete, but before the next test starts, must be saved by pressing SAVE.

6.10 Using Barcode Scanner

1. Press the stylus in the patient ID field. A cursor will appear.
2. Activate the barcode scanner by pressing BARCODE on the left or right side of the Host or in the center of the keypad. The barcode icon at the top of the screen indicates when the barcode scanner is ready to scan.
3. Point the light coming from the top of the scanner towards the desired barcode until a beep is heard. The scanner turns off. The scanned text appears in the field where the cursor was left.

⚠ WARNING

Do not look directly at the laser light. Point the laser at a barcode and away from the eyes at all times.

6.11 Sample Introduction Window

The Host displays the message, "Inject sample …"

The screen has a bar indicating the time remaining to introduce a sample. The blood sample must be introduced into the card during this 7.5 min (450 sec) period.

⚠ CAUTION

Introducing the sample too soon or too late will cause an error and abort the test. In this case, a new Test Card must be inserted and the test procedure started again.

6.12 Sample Introduction Method

1. Confirm there are no air bubbles in sample syringe.
2. Hold the syringe barrel vertically between finger tips and thumb (Figure 1).

Figure 1

⚠ CAUTION

Keep the syringe vertical and perpendicular to the Test Card to avoid sample spillage.

Complete steps 3 and 4 below in one continuous motion to ensure best performance of sample introduction.

3. Using slight downward pressure, secure the syringe luer's tip into the center recess of the sample entry port of the Test Card. Rotate the syringe ¼ turn to ensure a good seal (Figure 2).
   The user should feel the syringe tip engage with the rubber seal of the Test Card sample entry port. Press the syringe with enough downward force to engage syringe tip with blue rubber seal.

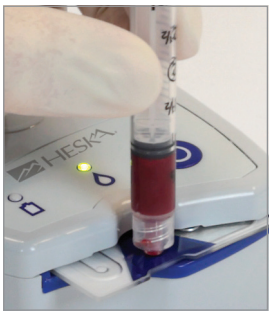


Figure 2

4. While maintaining downward pressure, use the index finger of your other hand to steadily depress the syringe plunger smoothly until prompted to stop, approximately 1 second (Figure 3).
5. Adequate sample has been injected when calibration fluid is seen in the sample path at bottom left of the card. Visualization of this fluid should coincide with audio beep and flashing green status indicator on reader.

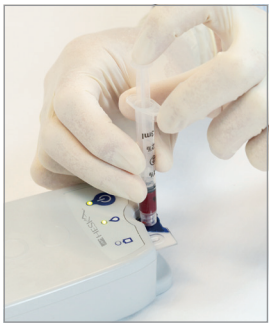


Figure 3

ℹ INFORMATION

Learn to use the audio and visual feedback to perform this step easily and reliably. A normal dispense operation takes about 1 second or less.

⚠ CAUTION

Sample introduction should never exceed 2 seconds. Failure to heed the audio or visual prompts may cause the sample to flow from the vent hole at the end of the Test Card waste chamber and possibly into the Reader. Avoid overfilling Test Card, as excess sample may contaminate Reader and interfere with analysis.

⚠ CAUTION

Avoid rapid sample introduction because it can cause fluid segmentation. This condition is detected by the system. The test is aborted, and the Host displays an error message.

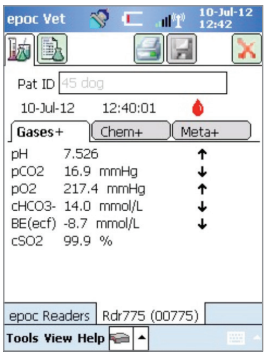
6.13 Sample Analysis

The Reader automatically analyzes the test sample. The analysis process takes about 35 seconds.

6.14 Test Completion

Once the analysis is complete:

1. The Host displays the test results from the Reader screen (tab on left). Test results can be viewed in three (3) sub-tabs "Gases+," "Chem+," and "Meta+".
2. The test status indicator on Reader will flash green, indicating the Test Card can be removed. Motorized mechanism is heard briefly as the calibration fluid plungers are disengaged.
3. Remove the Test Card from the Reader and dispose of it using appropriate biohazard precautions.



INFORMATION

The patient ID must be entered before the test results are displayed. Once saved, the patient ID text box and SAVE are disabled again.

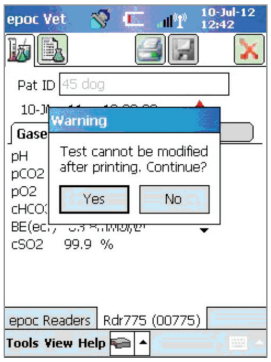
CAUTION

Always wear protective gloves when removing a Test Card from the Reader.

6.15 Print Results (optional)

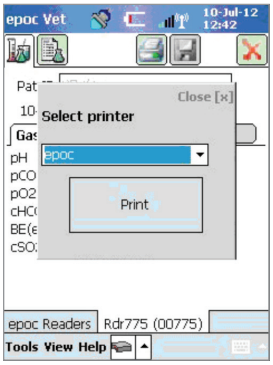
To print a test result:

1. Ensure all desired data fields have been completed.
2. Press **PRINT**.
3. Follow the on-screen instructions.



Select a printer from the drop-down list, and press **PRINT**.

Results will be printed along with any flags, and the appropriate reference ranges for the species selected.



6.16 Running Another Test

After a used Test Card is removed, the Reader's test status Indicator will turn solid green, indicating that the Reader is ready to perform another test. Repeat same procedure to complete another test.

CAUTION

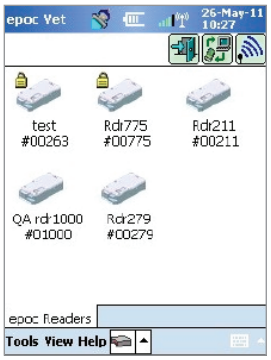
Never reuse a Test Card. Test Cards are designed for single use only.

CAUTION

Starting a new test permanently saves the previous test record. Changes to that test are no longer possible.

6.17 Close Test and Disconnect Reader

When all testing with a Reader is complete and all data entries are made, the test is closed by pressing **CLOSE** in the top right corner to close the Reader screen for that Reader. Disconnecting a Reader does not affect the connection or test status of other Readers already discovered or connected.



CAUTION

Closing the test and disconnecting the Reader permanently saves the test, and changes to that test are no longer possible.

6.18 EDM Synchronization

For epoc Data Manager (EDM) users only:

1. Disconnect all Readers from running the tests;
2. Press **EDM SYNCHRONIZATION** on the Host. Synchronizing with the EDM may also be accessed from the TOOLS menu, lower left corner. The Host also retrieves configuration information such as operator lists by using this feature.

It is possible to configure the Host to synchronize upon closing a test. In this configuration, the EDM synchronization procedure occurs immediately after the Reader screen is closed at the end of a test. Contact Heska's Technical Support Services for more information.

6.19 Log Out and Turn Power OFF

Log out of the Host application when finished testing and viewing test results.

1. Select [Tools] ▶ [Logout] on the menu at the bottom left corner of the screen, or press **LOGOUT**.
2. Press **POWER** to turn the Host device OFF.

The Reader automatically powers OFF after 20 minutes of idle time to conserve battery power, but only if:

a. The Reader is NOT plugged in AND,
b. The Reader is NOT connected to a Host.

7.1 General Cleaning Methods

Wipe epoc Reader and epoc Host using a damp soft cloth or gauze pad with one of the following:

- Mild detergent or non-abrasive cleaner
- Alcohol
- Soap and water
- 10% household bleach solution (9 parts tap water to 1 part household bleach)

Avoid using excess fluids that may enter the epoc Reader or epoc Host and possibly come in contact with the electrical components.

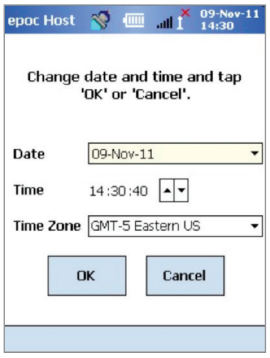
Allow surfaces to dry before turning ON any of the epoc System components.

7.2 Date and Time Settings

1. At the Login screen, scan the administrator barcode (located on the Reader) for both the user ID and password. Alternatively, type administrator in both the user ID and password fields and press **LOGIN**.
2. Press **TOOLS ▶ SET DATE /TIME**. Input correct date, time, and time zone, and press **OK**.
3. Check for correct Date and Time in upper right corner of host screen. It may take up to ~10 seconds to update.

⚠ CAUTION

The date and time displayed become part of the test record.



7.3 Software Update

Software updates allow the Element POC (epoc) to benefit from improvements to the Test Card manufacturing process, as well as any refinements to the internal calibration and/or changes to the host software, species specific reference ranges, *etc*. Biannual software updates are required to run current Test Card lots. Updates can be accomplished by one of three methods:

1. Wirelessly, by downloading the update file to the EDM Lite software and then selecting Perform upgrade in the Host;
2. Via a Micro-SD card; or
3. By Host-to-Host wireless connection.

Heska will provide notification of all required updates, as well as any recommended, optional updates.

7.4 Soft Reset

A soft reset is like rebooting a computer. It is useful if the Host is non-responsive. Procedure takes approximately 1 minute.

Data will not be lost after a soft reset.

- Perform a soft reset by pressing the Host **POWER** button for 5 seconds.

7.5 Hard Reset

Performing a hard reset is also like rebooting a computer. It is useful if the Host is non-responsive and a soft reset proves ineffective. Procedure takes approximately 1 minute.

The data will not be lost after a hard reset, but the date and time may need to be reset.

- Perform a hard reset by simultaneously pressing and holding the "1" and "9" keys, then press **POWER**, then release.

7.6 Charge Reader Battery with AC Adaptor

The Reader contains a lithium ion rechargeable battery. The battery compartment is not accessible to the user.

1. The AC adapter plugs into the power jack located on the backside of the Reader.
2. The AC adaptor recharges the Reader when the Reader is either ON or OFF.

⚠ CAUTION

Exercise caution if using an extension cord or power bar with the Reader AC adaptor. These devices may void the product safety certification if not appropriately certified or approved for medical use.

⚠ CAUTION

The Reader battery must be replaced by authorized Heska service personnel only.

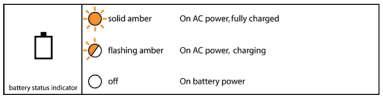
⚠ CAUTION

Use only the AC adapter as specified by the label on the bottom of the Reader.

1. When the Reader is charging, the amber battery status indicator will flash. When charging is complete, this indicator will stay solid amber.
2. When the indicator is off, it indicates that the AC adaptor is not connected and the Reader is operating on battery power.
3. It takes approximately 4 hours to recharge a fully discharged Reader battery.

7.7 Charge Host Battery Using Reader

1. The Host contains a lithium ion rechargeable battery.
2. To recharge the battery, insert the Host cradle blade into the Reader docking pivot. Connect the Reader AC adaptor to the power jack on the backside of the Reader and also into the wall receptacle.
3. Up to 4 hours may be required to fully recharge the battery. The Host can be operated normally while it is being charged on the Reader.
4. The amber charging indicator blinks indicating that the Host battery is charging. The indicator turns solid amber when charging is complete.



7.8 Replace Host Battery

1. Press and release **POWER** to suspend the Host.
2. Use your finger or stylus to slide the battery latch to the right releasing the battery. The battery ejects slightly.
3. Lift the battery from the device.
4. Insert the new battery, bottom first, into the battery compartment in the back of the Host.
5. Press the battery down into the battery compartment until the battery release latch snaps into place.

⚠ CAUTION

Only replace with a battery designated for use.

⚠ CAUTION

Always dispose of batteries in accordance with local regulations. Never place a battery in municipal waste.

Aqueous blood gas, electrolyte, and metabolite control fluids are commercially available for verifying integrity of newly received Test Card lots. Recommended products are described in the table below.

Control fluids do not contain animal serum or serum products, but do contain buffers and preservatives.

QA test feature of the epoc System provides the following characteristics:

- Ranges are increased, so the user can test analyte levels at, or just outside of, the measurement range.
- QA test results are stored separately from blood test results in the epoc data manager.

NOTE: User must be set up to run QA tests (**ADMINISTRATOR ▶ OPTIONS ▶ ADMIN OPTIONS ▶ USERS TAB**).

8.1 QC Fluids Recommended for Verification of epoc Test Cards

Manufacturer	Description	Ref. No.	Usage	Level	Quantity	Volume	Heska CAT No.
Eurotrol Inc., Ede, The Netherlands	Eurotrol GAS-ISE-Metabolite QC	179–1–B913	BGEM	1	10 Ampoules	2.5 ml	CAT 5430–1
Eurotrol Inc., Ede, The Netherlands	Eurotrol GAS-ISE-Metabolite QC	179–1–B913	BGEM	2	10 Ampoules	2.5 ml	CAT 5430–2
Eurotrol Inc., Ede, The Netherlands	Eurotrol GAS-ISE-Metabolite QC	179–1–B913	BGEM	3	10 Ampoules	2.5 ml	CAT 5430–3

⚠ CAUTION

Always follow manufacturer's storage instructions.

⚠ CAUTION

All aqueous control fluids must be run as QA test when using the epoc System.

8.2 QC Fluids with Blood Gases

Quality control fluids contain dissolved gases, so they become very unstable over time after opening the ampoule.

⚠ CAUTION

Always use a fresh ampoule for each Test Card when multiple tests are being run on a single Reader. Multiple Test Cards can be tested using one ampoule only if tested at the same time on multiple Readers.

⚠ CAUTION

Once opened, fluid should be analyzed immediately.

⚠ CAUTION

Never use the last 0.5 mL of control fluid in syringe.

⚠ CAUTION

Gas levels in fluids vary with temperature. Deviation from room temperature affects gas levels in fluid. Always handle fluid carefully to avoid any heating or cooling.

Procedure:

1. If ampoules are taken from a cool storage, equilibrate the ampoule to room temperature 68°–77°F (20–25°C). Equilibration time for blood gas QC fluids is 4 hours minimum.
2. Immediately before use, shake the ampoule vigorously for 5 to 10 seconds to equilibrate liquid and gas phases.
3. Always hold the ampoule at the tip and bottom with your forefinger and thumb to minimize the increase in fluid temperature. If necessary, tap the ampoule tip to return fluid into the bottom section of the ampoule. Protect your fingers with gauze, tissue, or glove, or use an ampoule breaker to snap off the ampoule tip at neck.
4. Immediately transfer fluid from the ampoule into a plain sterile 1 mL or 3 mL syringe with a 16–20 gauge blunt needle. When loading the syringe, slowly draw about 1mL of fluid from the bottom of the ampoule. Never invert the syringe to expel the air trapped between the leading edge of fluid and syringe plunger (this will not affect the solution near the syringe tip).
5. If air bubbles are continually drawn into the syringe, or if a bubble is trapped near the syringe tip, discard the ampoule and the syringe. Begin the process again with a fresh ampoule and syringe.
6. Before injecting fluid in the Test Card, expel 1 or 2 drops from the syringe.
7. Transfer fluid immediately into the Test Card. Remove the blunt needle and apply the syringe luer in the Test Card's sample introduction port as during a normal blood test procedure.

Temperature Correction for Blood Gas QC Fluids:

It is well established that pCO_2 and pO_2 results are inversely affected by temperature. Targets and ranges in Value Assignment Sheets can be adjusted to account for ambient temperature effects using the following table.

Temperature Correction for pCO_2 and pO_2 Targets for Aqueous Control Fluids:

Parameter	Level	59–62.6°F (15–17°C)	64.4–68°F (18–20°C)	69.8–73.4°F (21–23°C)	75.2–78.8°F (24–26°C)	80.6–82.4°F (27–28°C)	84.2–86°F (29–30°C)
pCO_2	~70 mmHg	1.6	0.8	0.0	-0.8	-1.5	-2.0
pO_2	~55 mmHg	4.0	2.0	0.0	-2.0	-3.6	-5.0
pO_2	~95 mmHg	6.9	3.5	0.0	-3.5	-6.3	-8.6
pO_2	~145 mmHg	9.5	4.8	0.0	-4.8	-8.7	-11.9
pCO_2	~9.33 kPa	0.22	0.11	0.00	-0.11	-0.20	-0.27
pO_2	~7.33 kPa	0.53	0.26	0.00	-0.26	-0.48	-0.66
pO_2	~12.66 kPa	0.92	0.46	0.00	-0.46	-0.84	-1.15
pO_2	~19.33 kPa	1.27	0.63	0.00	-0.63	-1.16	-1.59

For example, if ambient temperature in the laboratory is 59°–62.6°F (15–17°C) and pO_2 range is 135 to 155 mmHg, the range can be adjusted by adding 9.5 mmHg to upper and lower limits to obtain the adjusted range: (135+9.5) to (155+9.5) = 144.5 to 164.5 mmHg.

8.3 Value Assignment Data Sheets

The Value Assignment Data Sheets (VAD) contain target values and acceptable ranges for aqueous control and calibration verification fluids specific to the epoc System.

Download the current Value Assignment Data Sheets at http://www.epocal.com or contact Heska's Technical Support Services at 800.464.3752, option 3.

Each value assignment data sheet (VAD) is identified by fluid name, level, lot number and epoc System sensor configuration version. Assure all information is correct when using VAD to determine acceptability of results. The epoc System sensor configuration version is located in the Host Help, About menu.

Ranges displayed represent the maximum deviation expected when fluids and Test Cards are performing properly. If the results are outside the specified ranges, refer to *Section 9: Troubleshooting* of this guide.

⚠ CAUTION

Never use target values or ranges from the package insert included with control fluids.

9.1 Troubleshooting

CAUTION

The epoc System has no user serviceable parts or adjustments. Do not attempt to open the Reader or Host, or tamper with epoc Test Cards.

Selected Host application messages are listed in the table below. To resolve errors encountered while using the Host application, first attempt solutions in the action section in the order recommended. If the problem persists, contact Heska's Technical Support Services at 800.464.3752, option 3.

Error Message	Action
Unable to connect to Reader	1. Verify that the Reader is turned ON; 2. Verify that the Reader is not connected to another Host. If used by another Host, wait until test is complete; 3. Verify that the Reader is within range of the Host, approximately 30 ft (10 meters); 4. Repeat discovery by pressing the Reader Discovery icon at top right of the screen. If the Reader is not discovered, turn the Reader OFF and ON, and then try to connect to the Reader again; 5. If still unable to connect, reset the Host and log into Host application again.
Connection failure: Connection to Reader lost	1. Verify the Reader is always in range, and always turned ON; 2. Reconnect to the Reader: by pressing **RECONNECT** on the Reader screen (when connection is lost) to the right of the Patient ID/lot number entry box, OR by closing the Reader screen using , pressing on the Reader Icon, and selecting [Run blood test] (or [Run QA test]).
Reader failure: General error	1. Remove the Test Card; 2. Close the Reader tab, then turn the Reader OFF and ON again; Reconnect and insert another Test Card to begin a new test.
Unable to read barcode	Remove the Test Card and insert it again with a swift, smooth motion. If unsuccessful after multiple attempts, use another Test Card.
Invalid barcode	1. Remove the Test Card; check that the barcode is not damaged. If the barcode is damaged, use another Test Card; If the barcode appears to be undamaged, insert the Test Card again with a swift, smooth motion. If unsuccessful after multiple attempts, use another Test Card.
Ambient temperature too low to use Reader OR Ambient temperature too high to use Reader	1. Move the Reader to a location where the ambient temperature is within acceptable limits described in this user guide; 2. Allow the Reader enough time to adjust to the new temperature. If the actual ambient temperature is within specified limits, contact Heska's Technical Support Services at 800.464.3752, option 3.
Ambient pressure too low to use Reader OR Ambient pressure too high to use Reader	1. Move the Reader to a location where the atmospheric pressure is within acceptable limits; 2. Allow Reader enough time to adjust to the new environment. If the actual atmospheric pressure is within specified limits, contact Heska's Technical Support Services at 800.464.3752, option 3.
Ambient pressure sensor failed QC	Close the Reader tab, turn the Reader OFF and ON, and then try again.
Failed Reader electronic QC	If a Reader fails electronic QC: 1. Close the Reader screen; 2. Turn the Reader OFF and ON, and then try to connect to the Reader again; 3. If the Reader connects successfully (and therefore, passes the electronic QC) it is acceptable for use.

Error Message	Action
Failed iQC: Calibration fluid not detected Fluidics check Humidity check Early injection Resistance check Sensor check	Remove the old Test Card and insert a new Test Card to begin another test. If this message persists, try using a different Reader if available or contact Heska's Technical Support Services at 800.464.3752, option 3.
Failed iQC: Thermal check	Use a different Reader, if available. If the Reader is well equilibrated within environmental limits, but this message persists on Reader, contact Heska's Technical Support Services at 800.464.3752, option 3.
Failed iQC: Fast sample injection	Remove the Test Card. Insert a new card and repeat the test. Inject the test sample a little slower.
Failed iQC: Insufficient sample detected	Remove the Test Card. Insert a new card and repeat the test. Ensure that the sample is fully injected within 3.4 seconds from the start of sample injection.
Failed iQC: Sample delivery	Remove the Test Card. Insert a new card and repeat test. Ensure a smooth, steady injection. Avoid injecting air into the Test Card.
Fluid detected in Test Card	1. Remove and discard the old Test Card; 2. Insert a new Test Card into Reader.
Out-of-range results on the Test Card for liquid quality control	From the Host, disconnect from the Reader and then reconnect. If the wireless connection is successful and the electronic QC passes, verify the following: 1. Is the control Value Assignment Data Sheet correct? 2. Has the use by date of controls been exceeded? 3. Have the controls been handled correctly? 4. Have Test Cards and controls been stored correctly? Repeat the test. If the repeat results are in range, the cards are acceptable for use. If the results are still out of range despite meeting the above criteria, repeat the test using a new box of control solutions and/or Test Cards.
Failed iQC on result display	Remove the Test Card. Insert a new card and repeat the test. ⓘ Sometimes, Failed iQC is reported next to certain results (sample bubbles, contaminated sensor, *etc.*), whereas other parameters on the same test report OK. The reason for this could be non-conformities in individual sensors of the Test Card. Because each sensor is checked individually after sample injection, the user is still able to see valid test results obtained on remaining good sensors.
cnc on result display	Remove the Test Card. Insert a new card and repeat the test. ⓘ This message means "Could not calculate. Component required for calculation was not available." It should be noted that if the response of a failed sensor is needed to compute the result of a good sensor, the iQC failure may trigger cnc. This would happen even when the user had not selected the sensor which eventually failed the iQC.

10.1 Specifications

Measured Parameters	Measurement Range
Blood Gas Parameters	
pH	6.5–8.0
pCO_2	5–250 mm Hg
TCO_2	5–50 mmol/L
pO_2	5–750 mm Hg
Electrolyte Parameters	
Na^+	85–180 mmol/L
K^+	1.5–12.0 mmol/L
Cl^-	65–140 mmol/L
iCa^{++}	0.25–4.0 mmol/L
Chemistry Parameters	
BUN	3–20.0 mg/dL
Creatinine	0.3–15.0 mg/dL
Glucose	20–700 mg/dL
Lactate	0.30–20.00 mmol/L
Hematocrit (Hct)	10–75% PCV
Calculated Parameters	
$cHCO_3$, BE (ECF), AG, cSO_2, cHgb	
Reference Ranges	
Species	Dog, Cat and Horse
Operating Parameters	
Sample volume	> 92 µL
Analysis time	~ 35 seconds after sample introduction.
Sample throughput	~17/h
Sample Processing	
Sample type	Whole blood from arterial, venous or capillary source should be tested immediately after drawing to obtain most accurate results.
Sample containers	1–3 mL syringe: Li, Na or balanced heparin, or without anticoagulant (test immediately).
Calibration	**Duration**
Test Card	165 seconds

Data Processing (Host)	
Processor	Marvell™ PXA 320 at 806 MHz
Software	Microsoft® Windows Mobile 6.5 Classic
Memory	256 MB RAM; 1 GB Flash
Display	PenTile® 3.5 in color VGA, super bright 650+ NITS
Bluetooth	Class II, v 2.1 EDR, up to 32' range
Wireless LAN	Tri-mode IEEE® 802.11a/b/g, up to 98' range
Electrical	
AC input (Reader)	100–240 Vac, 0.5 amps, 50–60 Hz
Battery (Reader)	Lithium ion rechargeable
Battery (Host)	Lithium ion rechargeable
Environmental	
Operating temperature (Host)	14°F to 122°F (-10°C to 50°C)
Operating temperature (Reader)	59°F to 86°F (15°C to 30°C)
Operating humidity (Host)	Up to 95% relative humidity, non-condensing
Operating humidity (Reader)	Up to 85% relative humidity, non-condensing
Barometric pressure (Reader)	400–825 mmHg (53–110 kPa)
Dimensions	**(L x W x H)**
Host	5.78 in x 3.03 in x 1.06 in
Reader	8.46 in x 3.35 in x 2 in
Weight	
Host	12.5 oz
Reader	< 1.1 lb

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For further assistance, please call Heska's Technical Support Services at 800.464.3752, option 3.

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