

**WOODLEY**  
EQUIPMENT COMPANY LTD.

# *InSight*<sup>®</sup> V-EL

## Veterinary Electrolyte Analyser Operator's Manual



## **Statement**

Thank you for purchasing the InSight V-EL Veterinary Electrolyte Analyser manufactured by Woodley Equipment Company Ltd. (hereinafter referred to as Woodley Equipment). The InSight V-EL Veterinary Electrolyte Analyser is a portable in vitro diagnostic device that produces reliable, accurate results. Do not perform any repairs or modifications without authorisation from Woodley Equipment or the warranty may be affected.

The operator's manual is a reference for the operation, maintenance and repair of the analyser. It describes the characteristics and related information of the analyser in detail. Please read the operator's manual carefully to ensure the correct use of the product. After reading, retain the operator's manual for future reference whenever necessary. The analyser must be operated in strict accordance with the operator's manual. Woodley Equipment does not assume any legal responsibility for faults or accidents incurred as a result of failure to operate the product according to the operator's manual.

The intellectual property rights of the operator's manual and the corresponding analyser belong to Woodley Equipment. This operator's manual must not be photographed, copied, duplicated, modified or translated by any organisation or individual, without the written consent of Woodley Equipment.

The operator's manual contains proprietary information protected by copyright law, including but not limited to, technical secrets, patent information and other trade secrets. The user has the obligation to keep this information confidential and must not disclose any content in the operator's manual to any irrelevant third parties.

The possession of the operator's manual by the user does not mean that Woodley Equipment has authorised the intellectual property right contained in the product. Woodley Equipment has the right to modify and update the operator's manual.

## **Production Information**

Product Name: InSight V-EL Veterinary Electrolyte Analyser

Date of Manufacture: See the label of the Electrolyte Analyser for details

## **Responsibility of the Manufacturer**

Woodley Equipment is responsible for the safety, reliability and performance of the analyser only if installation, improvement and maintenance are all operated by Woodley Equipment authorised personnel.

Please follow the operator's manual to use the analyser.



# Contents

<b>Chapter 1 Security Guide</b> .....	<b>1</b>
1.1 Safety Operation Guide .....	1
1.2 Safety Instructions for Use .....	1
1.3 Electromagnetic Compatibility .....	4
<b>Chapter 2 Product Overview</b> .....	<b>5</b>
2.1 Intended Use .....	5
2.2 Introduction.....	5
2.3 Appearance.....	6
2.4 Composition .....	6
2.4.1 Display .....	7
2.4.2 Thermal Printer .....	7
2.4.3 Power Port.....	7
2.4.4 Network Port .....	7
2.4.5 USB Port.....	7
2.4.6 Scanner Module .....	7
2.4.7 ON/OFF Button.....	8
2.4.8 Test Cartridge Slot .....	8
2.4.9 Speaker .....	8
2.4.10 Battery .....	8
2.5 Configuration.....	9
2.5.1 Product Kit .....	9
2.5.2 Accompanying Products .....	9
<b>Chapter 3 Installation</b> .....	<b>10</b>
3.1 Open Package Inspection .....	10
3.2 Installation Requirements .....	10
3.2.1 Environmental Requirements .....	10
3.2.2 Power Requirements.....	11
3.3 Installation Procedure .....	11
3.3.1 Connecting to AC Power.....	11
3.3.2 Loading/Replacing Printer Paper.....	11
<b>Chapter 4 Sample Collection</b> .....	<b>13</b>
4.1 Blood Collection Device and Sample Size.....	13

4.2	Key Points of Operation .....	13
<b>Chapter 5</b>	<b>Operating Procedure .....</b>	<b>15</b>
5.1	Turning the Analyser On/Off .....	15
5.2	Login .....	15
5.3	User Administration .....	17
5.4	Settings .....	18
5.4.1	Enter the Settings Interface .....	19
5.4.2	Print .....	19
5.4.3	Date and Time .....	20
5.4.4	Language.....	21
5.4.5	Sound.....	22
5.4.6	About.....	23
5.4.7	Restore Default Settings.....	24
5.4.8	Network.....	25
5.5	Sample Testing .....	26
5.5.1	Entering the Testing Interface.....	27
5.5.2	Scanning/Entering Patient Information .....	27
5.5.3	Scanning the Test Cartridge .....	28
5.5.4	Inserting the Test Cartridge.....	30
5.5.5	Test Results.....	31
5.6	Quality Control .....	32
5.6.1	Quality Control Test Using Control Solution .....	34
5.6.2	Quality Control Test Using Electrical Control Cartridge .....	37
5.7	Data Management.....	38
5.7.1	Sample Results.....	39
5.7.2	QC Information.....	41
5.7.3	Operation Logs .....	43
<b>Chapter 6</b>	<b>Cleaning, Maintenance and Disposal.....</b>	<b>45</b>
6.1	Cleaning and Disinfection.....	45
6.2	Care and Maintenance .....	45
6.2.1	Battery Capacity, Charging and Replacement.....	45
6.2.2	Printer and Printing Paper.....	46
6.2.3	Maintenance.....	47
6.2.4	Quality Control .....	47

6.3 Disposal .....	47
<b>Chapter 7 Repair and After-Sales Service .....</b>	<b>48</b>
7.1 Repair.....	48
7.2 After-Sales Service .....	48
<b>Appendix 1 Specifications.....</b>	<b>50</b>
A1.1 Environmental Specifications.....	50
A1.2 Mechanics .....	50
A1.3 Performance.....	50
A1.4 Printer.....	50
A1.5 Battery.....	51
A1.6 Safety certification .....	51
<b>Appendix 2 Troubleshooting Guide.....</b>	<b>52</b>
<b>Appendix 3 Principle .....</b>	<b>54</b>
A3.1 Test Principle .....	54
A3.2 Determination of Test Results .....	54
A3.3 Parameters .....	54
A3.4 Testing Method .....	54
<b>Appendix 4 Symbols .....</b>	<b>56</b>

# Chapter 1 Security Guide

Thank you for choosing the InSight V-EL Veterinary Electrolyte Analyser manufactured by Woodley Equipment. In order to ensure the safe and effective use of the analyser and avoid possible injury, please carefully read the operator's manual, familiarise yourself with the performance of the analyser and fully understand the correct operation method and precautions before use. Please store the operator's manual for future use.

Please carefully read the following guide to safe operation and instructions for safe use to ensure the proper use of the analyser. Woodley Equipment does not assume any responsibility for issues arising from violation of the precautions in the operator's manual.

## **CAUTION:**

- In order to ensure normal operation of the Electrolyte Analyser and user safety, please read this chapter prior to use and proceed with installation and connection by the manufacturer's installation engineer as required.

## **1.1 Safety Operation Guide**

- The analyser should be operated within the ambient temperature range of 10°C-30°C. Ambient temperature beyond this range may affect the accuracy of the analyser and cause damage to its components and circuits. There must be a clearance of at least 5cm around the analyser to ensure that the power cord and network cable connector are not twisted or trapped.
- The analyser must be repaired by Woodley Equipment authorised personnel only. Woodley Equipment will not take responsibility for the function, safety, reliability and performance of the analyser if it has been modified or repaired by personnel not authorised by Woodley Equipment. Please contact Woodley Equipment or your local distributor if replacement parts are needed.

## **1.2 Safety Instructions for Use**

Be sure to follow the operator's manual for safe use during operation of the analyser to avoid possible injury.

### **Safety Instructions:**

- The InSight V-EL Veterinary Electrolyte Analyser is used with the InSight V-EL Veterinary Electrolyte Test Cartridges for the quantitative measurement of electrolyte content in whole blood.
- The analysis result of the analyser is for reference only and should not be used as the sole basis for diagnosis.
- The analyser is intended for veterinary use only.
- The user must operate the analyser in strict accordance with the methods provided in the operator's manual, otherwise the warranty of the analyser may be affected.
- The analyser must only be used for the purposes described in the operator's manual.

- The analyser is intended for use by veterinary professionals only.
- The user must collect and prepare samples in strict accordance with the methods provided in the operator's manual.
- Make sure the analyser is operated under the conditions specified in the operator's manual. Otherwise, the analyser may not work as intended and the measurement results may be unreliable, which may damage the analyser components and cause personal injury.
- Do not position the analyser in a place where it is difficult to disconnect the power cord.
- Never use the analyser in the presence of flammable gases (such as anaesthetic gas and hydrogen).
- The analyser is not equipped with any waterproof device and hence should never be used in a place where water may get inside the analyser.
- Take care not to splash any fluid on the analyser or allow it to get inside the analyser, otherwise there is a risk of electric shock.
- Do not allow any debris to fall or enter into the ports of the analyser.
- The user must check the analyser and power cord for damage before use. It is recommended to inspect the analyser once a week or less. Do not use the analyser if it is malfunctioning or damaged.
- The analyser should be kept dry and avoid being moved quickly from low-temperature areas to high-temperature areas, otherwise condensation or water droplets may occur, causing a short circuit.
- Do not place containers with liquid on the top of the analyser.
- The electrolyte analyser is a precision instrument and the following issues must be noted in use:

**Transport and Storage Conditions:**

- Ambient Temperature: 10°C-40°C
- Relative Humidity: 10%-93% (no condensation)
- Atmospheric Pressure: 86 kPa-106.6 kPa
- Avoid strong sunlight exposure

**Operating Conditions:**

- Temperature: 10°C-30°C
  - Relative Humidity: 10%-85% (no condensation)
  - Atmospheric Pressure: 86 kPa-106.6 kPa
  - Stay away from strong electromagnetic fields
- 
- Risk of electric shock - Make sure that all power sockets are well grounded, sockets without protective grounding should not be used. Make sure the ground wire is connected. Do not connect the triaxial cable of the analyser to a two-hole socket.
  - Risk of electric shock - Never plug or unplug the power cord with wet hands. Make sure that your hands are clean and dry before touching the power cord.
  - Turn off and unplug the analyser before cleaning to avoid possible electric shock hazards.
  - Do not remove the analyser enclosure while it is in operation to avoid possible



electric shock hazards. Do not remove the enclosure without authorisation while it is not in operation to avoid possible electric shock hazards.

- Electromagnetic interference - Make sure that the analyser is not used in close proximity to sources of strong electromagnetic radiation such as a large-scale CT, nuclear magnetic resonance equipment and wireless transmitters.
- Electromagnetic interference - Do not use electromagnetic equipment such as mobile phones near the analyser, as this may cause interference.
- The operator should abide by safety operation instructions and take safety protection measures (such as wearing protective clothing and gloves etc.) when using the analyser for blood sample testing and quality control testing.
- Do not use accessories that are not provided or authorised by Woodley Equipment. Otherwise, the analyser may be damaged, affecting its performance and safety.
- Do not switch the power source of the analyser in the middle of a test, that is, do not insert or unplug the power adapter midway if the analyser is equipped with a battery.
- Battery use - Improper operation may cause the battery to generate heat, ignite, explode, rupture or decrease battery capacity. Please read the operator's manual and the precautions for use carefully prior to the use of a rechargeable lithium ion battery (hereinafter referred to as 'battery').
- The rated power of the analyser is 90W.
- Batteries beyond their expiration date must be disposed of as special waste and discarded in accordance with local regulations.
- Batteries should be charged, used and stored in a place away from static electricity.
- The analyser should not be used for purposes other than measuring the levels of electrolytes in the patient's body. The test sample is potentially infectious, so please take precautions when using the analyser. The used test cartridge should be disposed of as medical waste or in accordance with local regulations as the test sample is retained within the test cartridge.
- The test cartridge is intended for single-use only and should not be reused.
- The test cartridge must be used within the validity period specified by the manufacturer, and stored and operated as required by the manufacturer.
- The used test cartridges and expired control solutions should be disposed of in accordance with local regulations on medical waste.
- Avoid rough handling during use, such as inserting and removing the test cartridge by force, to avoid inaccurate results.
- Do not use the test cartridge if it is bent, twisted or deformed.
- The analyser should be cleaned with clean water or 75% medical alcohol instead of other cleaning agents.
- Residual chemical reagents must be removed after the analyser is disinfected.
- Never sterilise the analyser and its accessories in an autoclave or with gas.
- Improper maintenance may damage the analyser. The user must maintain the analyser following the methods provided in the operator's manual.
- Regular quality control tests must be carried out to ensure the analyser operates normally.
- Make sure that the system date and time are consistent with the current date and time when using the analyser, to avoid misdiagnosis.
- The analyser must not be used beyond its service life to avoid inaccurate

measurement. The analyser and its reusable parts that have reached their expiration dates should be returned to the manufacturer for recycling or disposed of in accordance with local regulations.

- The analyser, test cartridges and control solutions must be transported, stored and used in strict accordance with the methods provided in the operator's manual.
- USB devices must be scanned for viruses before use to make sure that it is virus-free.
- You must ensure the security of data copied to the USB device.
- A wired network must be available at the place where the analyser is used so that immediate communication can be achieved whenever necessary.
- Security authentication is required for network equipment used by the analyser.

### **1.3 Electromagnetic Compatibility**

#### **WARNING:**

- Do not use the analyser near strong radiation sources (such as unshielded radio-frequency sources) as they may interfere with the normal operation of the analyser.

#### **CAUTION:**

- The analyser meets the requirements for emission and immunity specified in the electromagnetic compatibility part of *EN 61326-2-6-2013 Electrical equipment for measurement, control and laboratory use-EMC requirements. Part 2-6: Particular requirements - In vitro diagnostic (IVD) medical equipment*.
- If used in a home environment, this device may cause radio interference, so protective measures need to be taken.
- It is recommended to assess the electromagnetic environment before using the analyser. Use of the analyser adjacent to or stacked with other equipment should be avoided. If such use is unavoidable, it is necessary to monitor and verify that it can operate well under the configuration for its use.

#### **NOTE:**

The manufacturer is responsible for providing electromagnetic compatibility information of the device to the customer or user.

#### **NOTE:**

The user is responsible for ensuring electromagnetic compatibility, so the analyser works properly.

# Chapter 2 Product Overview

## 2.1 Intended Use

The InSight V-EL Veterinary Electrolyte Analyser is used with the InSight V-EL Veterinary Electrolyte Test Cartridges for the quantitative measurement of electrolyte content in whole blood.

The InSight V-EL Veterinary Electrolyte Analyser is used for measuring the levels of  $K^+$  (potassium ion concentration),  $Na^+$  (sodium ion concentration),  $Cl^-$  (chloride ion concentration),  $iCa^{2+}$  (calcium ion concentration) and  $iMg^{2+}$  (magnesium ion concentration).

## 2.2 Introduction

The InSight V-EL Veterinary Electrolyte Analyser is a device designed for veterinary personnel to quickly analyse the electrolytes in venous whole blood samples. The  $K^+$ ,  $Na^+$ ,  $Cl^-$ ,  $iCa^{2+}$  and  $iMg^{2+}$  in blood can be measured using the disposable test cartridges, which will help medical personnel quickly and accurately develop the patient's treatment regimen. The analyser can be operated by trained laboratory scientists, veterinarians and veterinary nurses to analyse blood samples.

### **CAUTION:**

- The analyser must be used by trained and qualified veterinary personnel.
- The analyser is a clinical examination instrument used for screening only. Both clinical examination results and other test results should be taken into account when making clinical judgments based on the analysis results.

## 2.3 Appearance

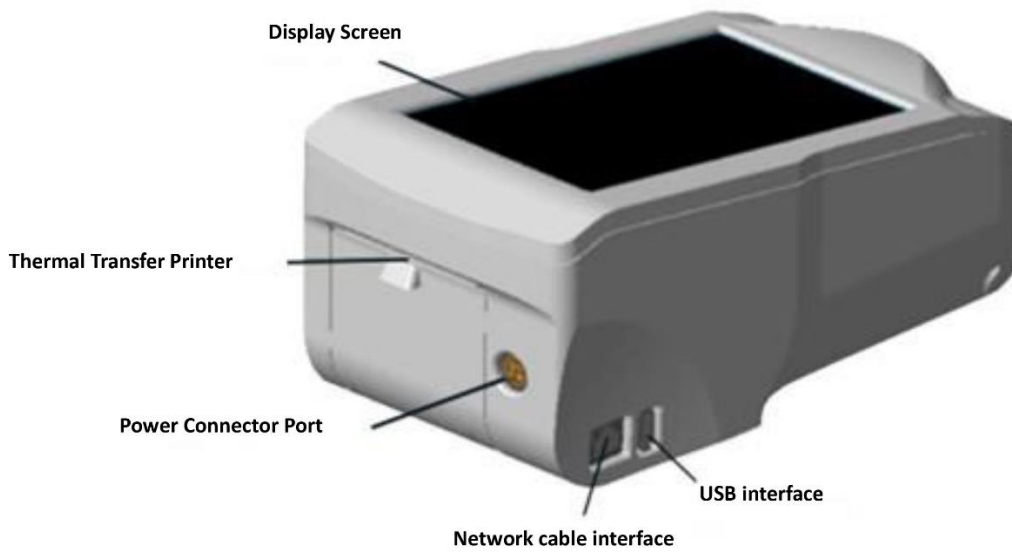


Figure 2.1 Appearance of Electrolyte Analyser

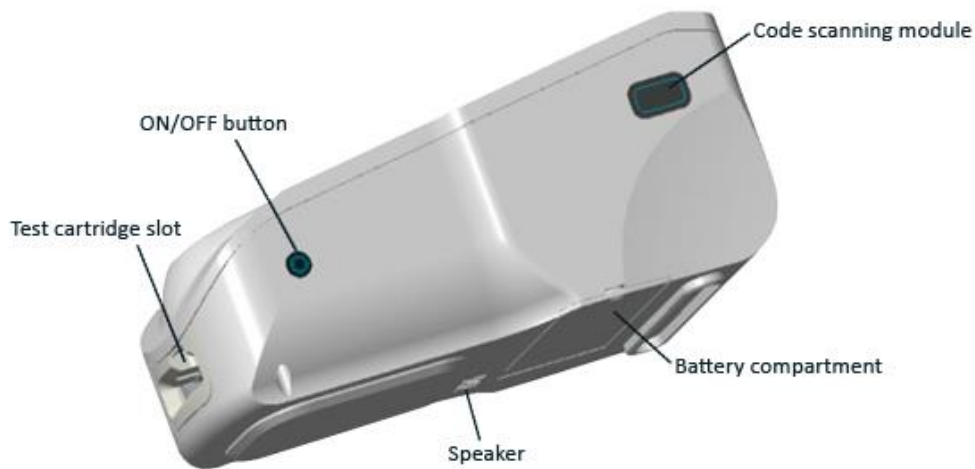


Figure 2.2 Appearance of Electrolyte Analyser

## 2.4 Composition

The analyser consists of a data output module, a result printing module, a signal acquisition module, a test cartridge slot module and a circuit control module. Altogether, these modules provide full functionality of the analyser.

To facilitate correct understanding and use of the analyser by the user, the following components are described, including the display screen, thermal printer, power cord socket, network cable interface, USB port, code scanning module, ON/OFF button, test cartridge slot, speaker and battery compartment.

### **2.4.1 Display**

The analyser conveys information to the operator through the LCD display screen, which can display the analyser's operation interface, test results, database information and system information, as well as prompts users during the test to help users complete the test procedures correctly.

The display screen is a capacitive touch panel, through which the user operates the analyser, such as performing tests, inputting information and viewing results.

### **2.4.2 Thermal Printer**

The thermal printer is located behind the analyser and uses thermal paper to print out sample analysis results, quality control analysis results and patient information.

### **2.4.3 Power Connector Port**

The power connector port is located at the back of the analyser and can only be connected to the power adapter provided by Woodley Equipment. The user must connect to the appropriate power supply as per the information on the label of the power adapter.

### **2.4.4 Network Port**

Wired network interface is used to connect the analyser to the PMS.

### **2.4.5 USB Port**

The analyser can export data to the USB device.

#### **CAUTION:**

- The USB port does not support the user to import data from the USB device to the analyser.

### **2.4.6 Scanner Module**

The code scanning module is built into the analyser and is used to scan and obtain information from the barcode or QR code, including operator ID, patient ID and test cartridge information.

Follow the steps below to scan the barcode/QR code:

1. Press the code scanning icon as prompted on the display interface to start the code scanning module and the code scanning module will light up.
2. Aim the scanning spot at the barcode of operator ID or patient ID and the QR code on the test cartridge. The barcode or the QR code should be 5-15cm away from the code scanner.
3. The analyser will automatically close the code scanning module after successful code scanning. If the information scanned into the analyser meets system requirements, the system will go to the next interface. If the information scanned into the analyser does not meet system requirements, a prompt dialog box will pop up.

**CAUTION:**

- Do not look directly at the light beam emitted by the code scanning module, to avoid eye damage.
- Do not scratch the cover glass of the code scanning module with hard objects, as scratches will affect scanning.
- Do not hit the cover glass of the code scanning module forcefully, as this may smash it, causing personal injury.
- When the cover glass of the code scanning module is dirty, wipe it with a non-woven cloth to avoid affecting the scan.

**2.4.7 ON/OFF Button**

The ON/OFF button is located on the right side of the analyser and is used to turn the analyser on/off.

**2.4.8 Test Cartridge Slot**

The test cartridge slot is located on the front of the analyser that is closest to the user and is used to insert the test cartridge for corresponding testing or quality control operations.

**CAUTION:**

- The test cartridge must be properly inserted into the slot.
- Do not insert other foreign objects into the test cartridge slot, as this may damage the analyser and make it unusable.
- Please remove the test cartridge immediately after the test is complete. Do not leave the used cartridge in the slot.

**2.4.9 Speaker**

The speaker is located at the bottom of the analyser and is used to send out voice prompts.

**2.4.10 Battery**

The analyser is designed with a built-in rechargeable battery. The battery compartment is located at the bottom of the analyser and covered by the battery cover.

## **2.5 Configuration**

### **2.5.1 Product Kit**

- InSight V-EL Veterinary Electrolyte Analyser
- InSight V-EL Electrical Control Cartridge
- Power Cord
- Power Adapter
- Rechargeable Lithium Battery
- Thermal Printing Paper
- Operator's Manual

### **2.5.2 Accompanying Products**

- Test Cartridges – Please use the InSight V-EL Veterinary Electrolyte Test Cartridges
- Quality Control – Please use the InSight V-EL Veterinary Electrolyte Quality Control

# Chapter 3 Installation

## 3.1 Open Package Inspection

Before unpacking, check the outer packaging for abnormality or damage. If there is any, please contact Woodley Equipment. After unpacking the analyser, you should carefully inspect the contents of the package against the packing list. Then, install the analyser as required after confirming that there has been no damage during transportation. In the event of missing products, wrong products or damaged parts, please contact Woodley Equipment or your local distributor as soon as possible.

### WARNING:

- Do not use the products if they appear damaged after unpacking.
- Avoid collisions and falls.

### CAUTION:

- Keep the packaging materials for future transportation or storage.

## 3.2 Installation Requirements

### 3.2.1 Environmental Requirements

The operating environment of the analyser is critical to its performance. The analyser must be used in a place meeting the following environmental conditions:

- If AC power is used, it should be used in a place where it is easy to connect the power cord of the analyser to a power socket that is grounded.
- Avoid direct sunlight.
- Ambient Temperature: 10°C-30°C.
- Relative Humidity: 10%-85% (no condensation).
- Atmospheric Pressure: 86 kPa-106.6 kPa.
- The place where the analyser is located is flat and spacious and the workbench should be able to withstand a weight of more than 2kg.
- Keep the analyser away from strong electromagnetic radiation.
- Avoid locations where dust and volatile gas accumulate.
- Keep the analyser away from explosive gases or steam, and corrosive materials.

### CAUTION:

- The above requirements also apply to analysers powered by a battery.
- If the room temperature is beyond the operating temperature range of the analyser, the analysis results obtained will be unreliable.



### 3.2.2 Power Requirements

The power source connected to the analyser must meet the requirements in the table below:

Voltage	Tolerance	Frequency
100V-240V	±10%	50Hz /60Hz

**WARNING:**

- The analyser must be used under a good grounding condition.
- Make sure that the input voltage meets the requirements of the analyser.

### 3.3 Installation Procedure

**WARNING:**

- The analyser must be installed by Woodley Equipment authorised personnel.

Set up the analyser in an environment that meets the installation requirements described in **3.2.1 Installation Requirements**, then proceed to the next step.

#### 3.3.1 Connecting to AC Power

Insert one end of the power adapter into the power input terminal of the analyser and connect the other end to the power cord. Finally, plug the power cord into a grounded socket.

**CAUTION:**

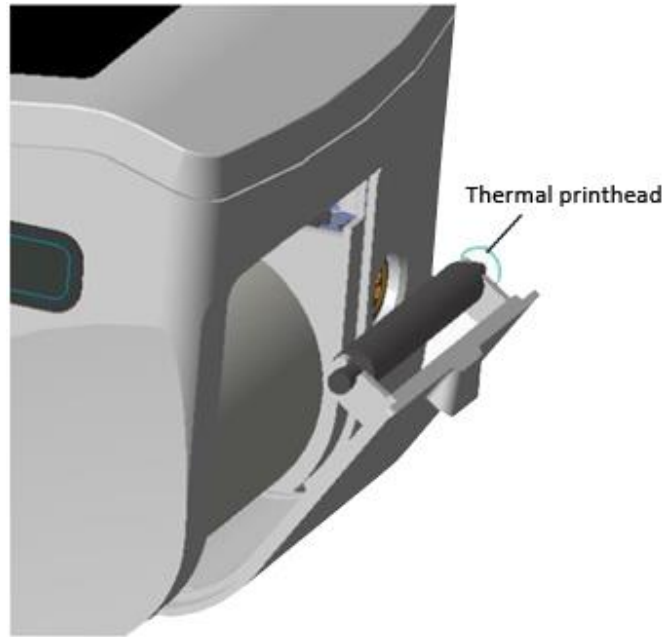
- Use power cords and sockets that contain a protective earthing conductor.
- Do not unplug or plug the power adapter during a test.

#### 3.3.2 Loading/Replacing Printer Paper

The analyser uses thermal-sensitive printer paper with a width of 57mm. If there is no printer paper in the analyser, a pop up box displaying 'Out of Paper' will appear on the screen, prompting the user to load or replace the printer paper.

**Loading Printer Paper:**

1. Open the paper cover of the printer.
2. Insert the printer paper into the paper feed deck, with the outer surface of the printer paper facing upward toward the thermal printhead, as shown in Figure 3.1.



**Figure 3.1 Loading of Printer Paper**

3. Pull about 20mm of the printer paper out, pay attention to avoid moving the printer paper when pulling out.
4. Close the paper cover of the printer.

**Replacing Printer Paper:**

The steps to replace the printer paper are roughly the same as those of loading the printing paper. The user only needs to complete another step after step 1, namely taking out the old printing paper from the paper cover.

**CAUTION:**

- The paper cover of the printer must always be closed unless you are replacing the printer paper or troubleshooting.
- Be sure to use the printer paper provided by Woodley Equipment or your local distributor, otherwise the built-in thermal printer may be damaged. Such damage is not covered by the warranty.
- Do not directly touch the thermal printhead and paper detector with bare hands to avoid damage caused by static electricity.

# Chapter 4 Sample Collection

## CAUTION:

- Please read the recommendations and rules for blood sample collection in this chapter carefully to avoid inaccurate or incorrect test results.
- Venous whole blood samples that are fresh, sealed and anti-coagulated with lithium heparin are recommended.
- Avoid direct contact with the sampling device, which has potential biological hazards, as it may be contaminated with blood samples.
- Users should abide by local guidelines on safe operation and wear personal protective equipment (such as protective clothing and gloves) at the time of testing samples.

## 4.1 Blood Collection Device and Sample Size

### Preparations for Blood Sampling:

- Syringe
- Alcohol swab (pad)
- Cotton swabs

The InSight V-EL Veterinary Electrolyte Analyser is intended to measure electrolytes in venous whole blood, which is drawn after removing the syringe needle. After removing bubbles at the front end of the syringe, insert the syringe into the injection port of the test cartridges for sample injection. A syringe with a capacity greater than 150µl is recommended. The blood collection device must use lithium heparin as the anticoagulant. Be sure to remove air from the syringe during blood sampling.

## 4.2 Key Points of Operation

- 1) In order to prevent blood from being contaminated by indoor air, the needle must be shielded immediately after sample collection.
- 2) To ensure adequate mixing, gently invert the syringe several times immediately after blood samples are drawn, otherwise blood clots may form.
- 3) The test should be performed immediately after sample collection. If the test cannot be performed within 1 hour after blood collection, store the sample at 2°C-8°C for no longer than 10 hours.
- 4) Used blood collection devices should be disposed of as medical waste or in accordance with local regulations.

### 4.3 Blood Collection

It is recommended to test samples **immediately after drawing a sample** to obtain results that represent the Patient's status with the greatest accuracy.

<b>Sample Type</b>	Fresh whole blood from arterial, venous or capillary sources
<b>Sample Volume</b>	100µl
<b>Sample Collection</b>	23 gauge or larger needle
<b>Anticoagulant</b>	Use balanced lithium heparin. Cat blood should be drawn into anticoagulant to prevent clotting.
<b>IV or indwelling line</b>	Avoid using line if possible. If using, draw and discard 3-6 times to volume of the line to avoid contamination of sample.

# Chapter 5 Operating Procedure

## 5.1 Turning the Analyser On/Off

### CAUTION:

- Before turning the analyser on, make sure that the power is connected.

### Turning the Analyser On:

Press the power button on the right side of the analyser to turn it on.



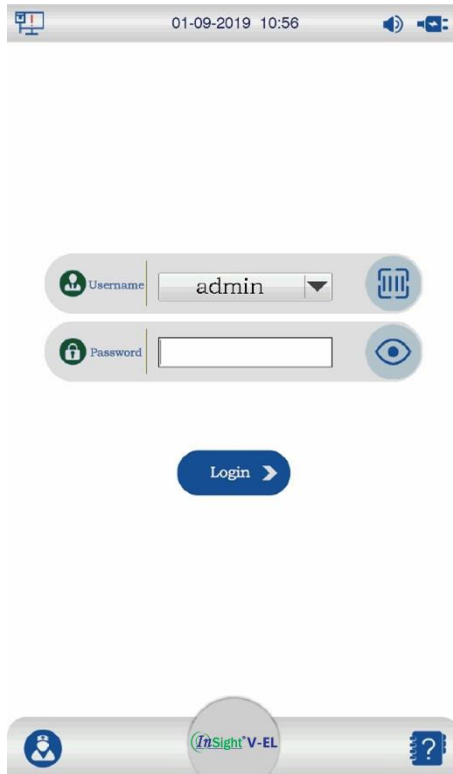
Figure 5.1 Turning the Analyser On

### Turning the Analyser Off:

Press and hold the power button on the right side of the analyser for 5 seconds to turn it off.



## 5.2 Login


Press the power button, the system will automatically be initialised and perform a self-check. It will enter the login interface after a successful startup, as shown in Figure 5.2.



**Figure 5.2 Login**

The analyser is pre-set with an administrator account and an operator account before delivery. The administrator account cannot be deleted but the operator account can be deleted according to the needs of the user.

Press  next to the username on the login interface and all registered usernames will be displayed. Select the login username you want to use, enter the password and press  to log into the system. If you forget your password, you need to contact the administrator and log in as an administrator to view the password on the user management interface.


After viewing the password, press  in the lower left corner to logout and return to the login interface.


You can also press the code scanning button  and log into your account by scanning the code with the scanner (if set up in settings).

**CAUTION:**

- The interfaces that are accessible after login vary with different types of accounts. You may perform sample testing, quality control, setting and data management when you login as an operator and you may perform user management and network setting by logging in as an administrator.

The network (wired network) connection status, volume icon and power supply mode (battery or power adapter; there will be a battery indicator when powered by a battery) are displayed at the top of the login interface.

The current date and time are displayed at the top of the login interface. If the date or time is not correct, you can press **Setting** or  successively for modification after login.

You may choose to logout of the current account or shut down the analyser by pressing the  button on the lower left corner of the login interface.



### 5.3 User Administration

Only administrators can enter the user management interface.

The user management interface displays all user data (username, password) by default. A maximum of 10 users (including the admin) can be registered. You can add or delete users, and change the password on the user management interface. The user management interface is shown in Figure 5.3.

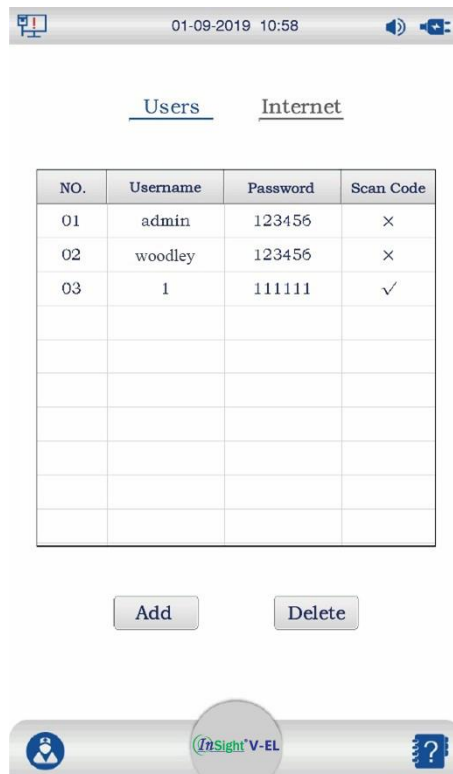

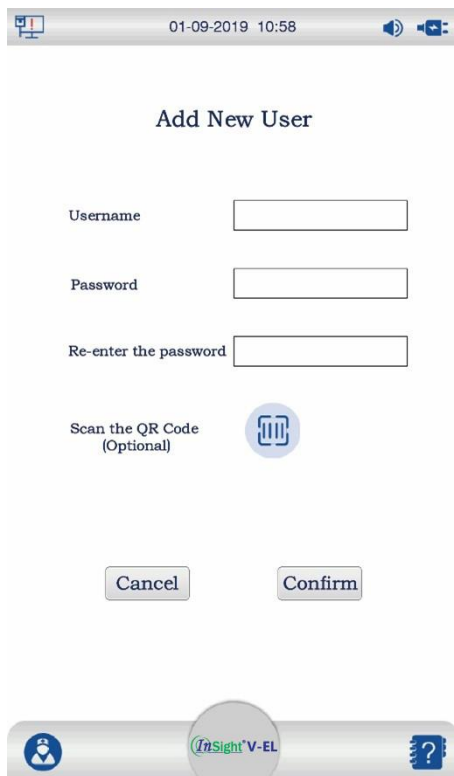


Figure 5.3 Main Interface of User Management

Select the row of the user account you wish to delete and press **Delete** .

Press **Add** to enter the user adding interface, as shown in Figure 5.4. Enter the username and password as required and verify the password. Press 'OK' to successfully add a user. You can also press  to scan the associated QR code.



**Figure 5.4 Adding a New User**

**NOTE:**

- The password must include at least 6 characters.

Double pressing the row of a user will take you to the interface where you can change the password.

## 5.4 Settings

The analyser supports various settings to meet different clinical needs. You may view/set the following items through the setting menu.

**Operator Account:**

- Print Settings
- Date and Time
- Language
- Voice Prompt
- About Information

**Administrator Account:**

- Network Settings
- User Administration (see **Section 5.3** for details)

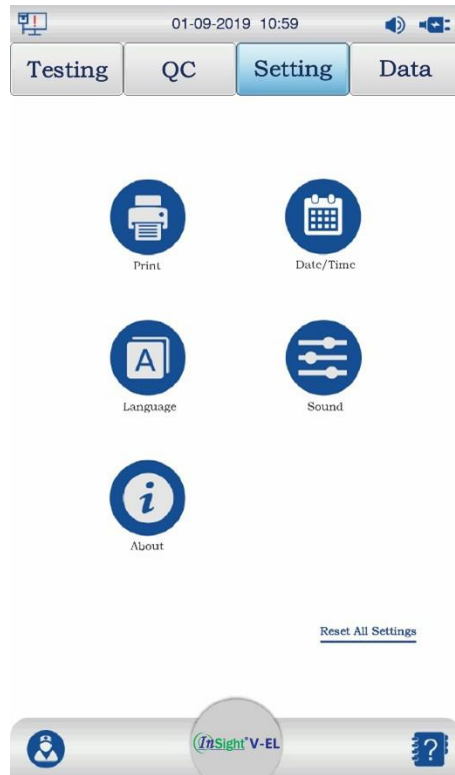
**CAUTION:**

- The system will remember and save modified settings even if it is shut down later on.



### 5.4.1 Enter the Settings Interface

Login as an operator and press **Setting** to enter the settings interface on the main menu interface, as shown in Figure 5.5.



**Figure 5.5 Main Settings Interface**

Through settings, you can perform the following operations:

### 5.4.2 Print

Print settings are used to set whether to automatically print the test results (or quality control results) and the number of printing copies after the test.

Print settings can be changed using the following steps:

1. Press  to enter the Print settings interface, as shown in Figure 5.6.




**Figure 5.6 Print Settings**

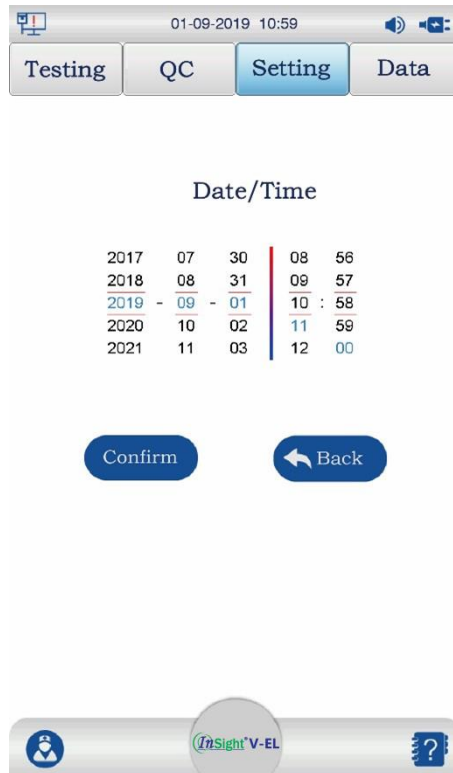
2. On the Print settings interface, you may select automatic printing and modify the number of automatic printing copies. Press 'Confirm' to save any changes. There will be a 'Setup completed' prompt once complete.
3. Press the 'Back' button to return to the settings interface.

### 5.4.3 Date and Time

Date and time settings are used to set the system date and time.

Date and time settings can be changed using the following steps:

1. Press  to enter the Date and Time settings interface, as shown in Figure 5.7.



**Figure 5.7 Date/Time Settings**

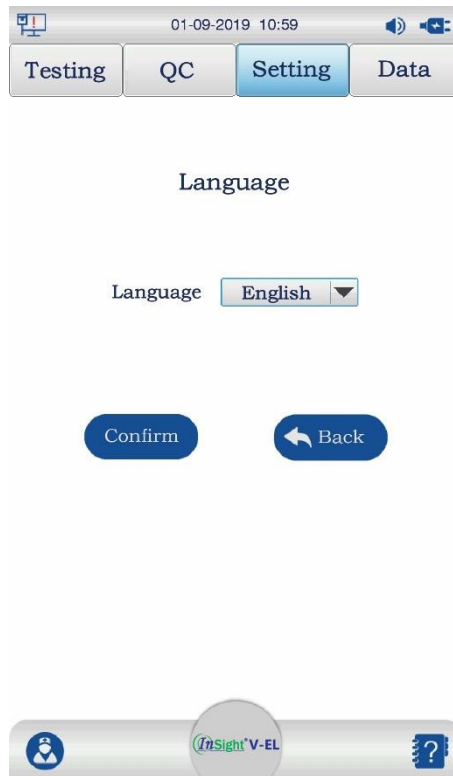
2. You can scroll up or down to set the date/time and press 'Confirm' to save any changes. There will be a 'Setting is successful' prompt once complete.
3. Press the 'Back' button to return to the settings interface.
4. You can change the format of D/M/Y

#### 5.4.4 Language

Language settings are used to change the language used by the system.

Language settings can be changed using the following steps:

1. Press  to enter the Language settings interface, as shown in Figure 5.8.



**Figure 5.8 Language Settings**

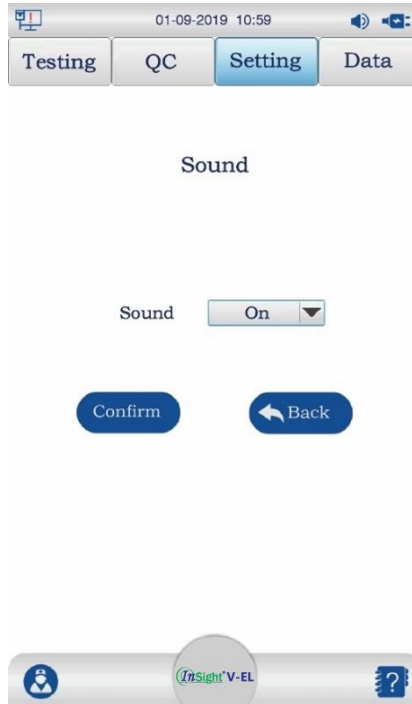
2. The device currently supports Chinese and English.
3. Press the 'Back' button to return to the settings interface.

#### **5.4.5 Sound**

Sound settings are used to turn the sound on or off.

Sound settings can be changed using the following steps:

1. Press  to enter the Sound settings interface, as shown in Figure 5.9.



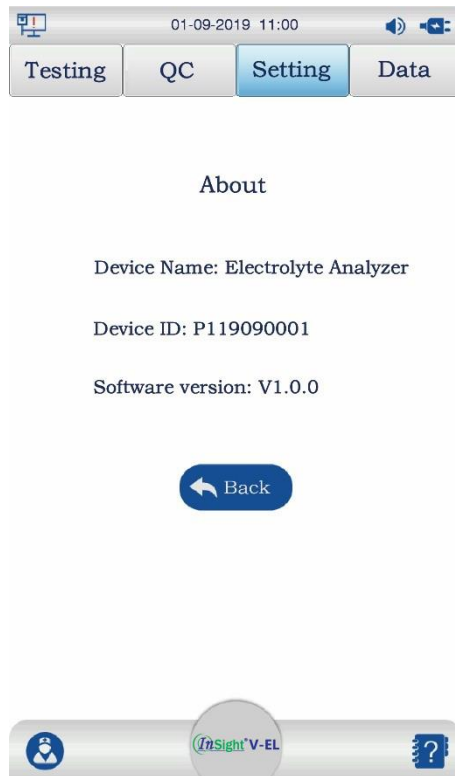
**Figure 5.9 Sound Settings**

2. On the Sound settings interface, you can press the dropdown arrow to turn the sound on/off. Press 'Confirm' to save any changes. There will be a 'Setup completed' prompt once complete.
3. Press the 'Back' button to return to the settings interface.

#### **5.4.6 About**

About settings contains information about the device name, device ID and software version of the analyser.

1. Press  to enter the About settings interface, as shown in Figure 5.10.



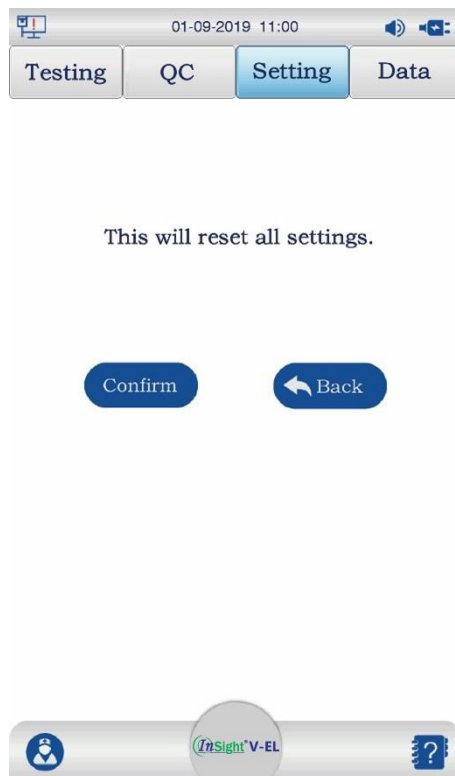
**Figure 5.10 About**

2. On the About settings interface, you can view the device name, device ID and software version of the analyser.
3. Press the 'Back' button to return to the settings interface

#### **5.4.7 Restore Default Settings**

Restore Default Settings is used to restore the parameters to default values:

1. Press 'Restore Default Settings' to display the interface as shown in Figure 5.11.



**Figure 5.11 Restore Default Settings**

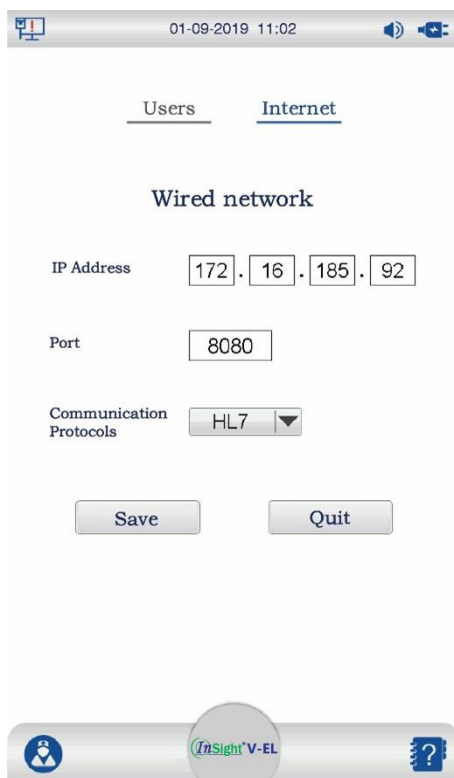
2. Press 'Confirm' to save any changed. There will be a 'Setup completed' and the default settings will be restored.
3. Press the 'Back' button to return to the settings interface.

#### **5.4.8 Network**

Currently, only wired networks are supported. Only administrators can enter the Network Settings interface.

Network settings can be changed using the following steps:

1. Press 'Internet' to enter the Network settings interface, as shown in Figure 5.12.



**Figure 5.12 Network Settings**

2. Change the Network settings according to user requirements.
3. Press 'Save' and the settings will take effect after the device has been restarted. Press 'Quit' and the settings will not be saved; the network information that was originally set will still be used.

## 5.5 Sample Testing

The concentration of  $K^+$ ,  $Na^+$ ,  $Cl^-$ ,  $iCa^{2+}$  and  $iMg^{2+}$  in venous whole blood samples can be analysed by the InSight V-EL Veterinary Electrolyte Analyser quickly and easily. The analyser should be placed on a surface free from vibration during testing and enough space should be left for operation. Before testing, please collect patient samples as described in **Chapter 4 Sample Collection**.

- Gently invert the syringe several times to thoroughly mix the sample.
- Place the test cartridge horizontally on the table, insert the syringe into the sample entry port of the test cartridge and push the syringe to inject the blood sample to just past where the arrow points on the test cartridge.

### CAUTION:

- Prior to analysis, samples should be well mixed to avoid inaccurate test results.
- Ensure that samples are free from bubbles and clots. If clots are observed in the sample, a new sample should be collected for testing.
- When a syringe is filled, the first 2 drops of blood should be discarded. Then, the syringe needle should be removed before inserting the syringe into the sample entry port for sample addition (recommended sample size is 110 $\mu$ l). Slide the sample cover



on the test cartridge to the right to seal it.

- Users should abide by the safety operation instructions and wear personal protective equipment (such as protective clothing and gloves) if they are exposed to samples with potential biological hazards.
- Please perform the test immediately after the sample has been collected.

### 5.5.1 Entering the Testing Interface

Login using the operator account, the Testing interface should automatically display. If another interface is displayed, you can enter the testing interface by pressing 'Testing' on the Main Menu interface, as shown in Figure 5.13.

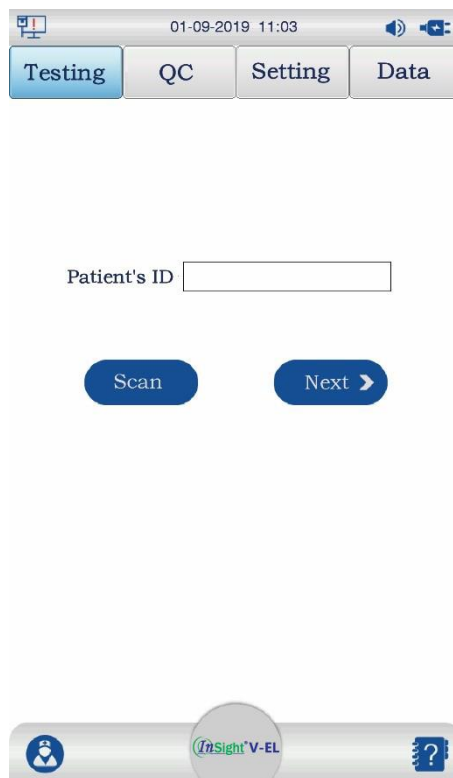
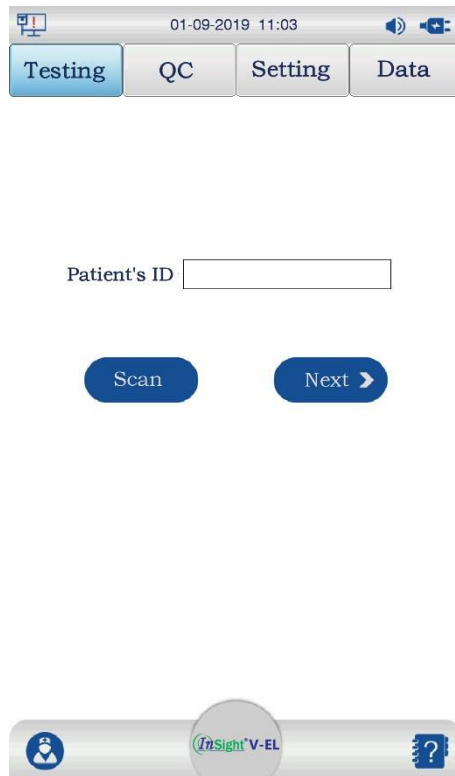


Figure 5.13 Testing Interface

### 5.5.2 Scanning/Entering Patient Information

After entering the Testing interface, the code scanning/entering patient information page is displayed by default. This is where the patient's ID can be entered or the code information of the patient can be read, as shown Figure 5.14.



**Figure 5.14 Scanning/Entering Patient Information**

There are two ways to enter patient information.

1. Manually enter the patient ID in the input box. After entering (or not entering), press 'Next' to display the test cartridge scanning interface.

**OR**

2. Scan the patient's QR code or barcode about 5cm away from the code scanning window on the right of the analyser. If the scanning is successful, the test cartridge scanning interface is immediately displayed.

**CAUTION:**

- If there is a test cartridge in the test cartridge slot, the system will display an error prompt 'The cartridge slot is occupied, please remove the cartridge'.
- If no scanning is ongoing, the scanner will be turned off by the system after a period of time. If you want to start the scanner, press the 'Scan' button.
- During scanning, you can slowly adjust the barcode or QR code to the left/right or far/near for easy scanning and recognition.
- If there is something wrong with the scanned barcode or QR code, the system will prompt 'Invalid code'.
- If you don't want to proceed with the testing and would like to perform other operations, press the relevant button on the interface.

### **5.5.3 Scanning the Test Cartridge**

After entering the test cartridge scanning interface, please confirm whether the patient information is correct. If there are any errors, you can manually modify it. After confirming

the patient information is correct, scan the QR code on the pouch of the new test cartridge with the scanner on the right of the analyser.



**Figure 5.15 Scanning the Test Cartridge**

If the QR code scanning is successful, the test cartridge interface will display.

**CAUTION:**

- If no scanning is ongoing, the scanner will be turned off by the system after a period of time. If you want to start the scanner, press the 'Scan' button.
- During scanning, you can slowly adjust the QR code to the left/right or far/near for easy scanning and recognition.
- If there is something wrong with the scanned QR code, the system will prompt 'Invalid QR code'.
- If the scanned test cartridge has expired, the system will prompt 'Expired test cartridge'.  
**NOTE:** The QR code of the batch is provided on the pouch of the test cartridge, which contains the expiry date of the test cartridge and the calibration parameter information of the batch. The analyser must read this information in advance before each test to ensure the test cartridge used is within the expiry date and to ensure the accuracy of the test.
- If you don't want to proceed with the testing and would like to perform other operations, press the relevant button on the interface.

### 5.5.4 Inserting the Test Cartridge

After entering the test cartridge insertion interface, please confirm whether the batch number of the test cartridge is correct.

- If the batch number of the test cartridge is incorrect, press 'Back' to scan the correct QR code of the test cartridge.
- After confirming the batch number is correct, open the pouch and remove the test cartridge. Place the test cartridge horizontally on the table, add the sample and slide the sample cover on the test cartridge to the right to seal it. When the test cartridge is ready, insert it into the test cartridge slot of the analyser and gently push the test cartridge in until you obtain obvious touch feedback. The system will prompt that the testing has started.



Figure 5.16 Inserting the Test Cartridge

If the cartridge has been inserted correctly, it will display that the system is 'Testing'. When the system is 'Testing', no other operation can be performed.



**Figure 5.17 Testing**

**CAUTION:**

- If you don't want to proceed with the testing and would like to perform other operations before inserting the test cartridge, press the relevant button on the interface.
- Before inserting the test cartridge, please confirm that the test cartridge to be inserted is the scanned cartridge.
- Once the system reports an error, the test cartridge will be invalid.
- Avoid tearing the QR code on the aluminium pouch.

**5.5.5 Test Results**

After entering the test results interface, you can view information about the test results of the patient sample. If the test results are abnormal, results will be flagged with an up or down arrow, as shown in Figure 5.18.

01-09-2019 11:03

Testing QC Setting Data

Patient's ID: q00156

Name: Poppy Gender: Female Age: 2

Card Type: V-EL Card Lot No.: EL210101

Sample Type: Venous Blood

Parameter	Result	Unit	Range	Reference
K <sup>+</sup>	-----	mmol/L	3.80-5.80	-
Na <sup>+</sup>	-----	mmol/L	138.0-156.0	-
Cl <sup>-</sup>	-----	mmol/L	100.0-115.0	-
iCa <sup>2+</sup>	-----	mmol/L	1.10-1.40	-
iMg <sup>2+</sup>	-----	mmol/L	0.80-1.20	-

Upload Export Print

i7Sight V-EL

**Figure 5.18 Sample Test Results**

- After the patient sample testing is complete, the results will be uploaded automatically if the analyser is connected to the network. The test results can also be manually uploaded by pressing 'Upload'.
- Press 'Export' to export the test results to a USB device.
- Press 'Print' to print the test results on the built-in thermal printer.
- Sample test results are automatically saved to the analyser and can be viewed in the 'Sample Results' interface under 'Data Management'.

**CAUTION:**

- Press the relevant button on the interface to proceed.
- After testing, please remove the test cartridge from the analyser immediately.

**5.6 Quality Control**

The reliability and accuracy of the analyser are ensured through two ways: built-in self-check and quality control.

- Self-check is used to confirm that the electrolyte analyser is working to specification. Self-check is performed every time the analyser starts up.
- Quality control (QC) is performed to ensure that the analyser and the test cartridge are working to specification, and reliable test results can be obtained.

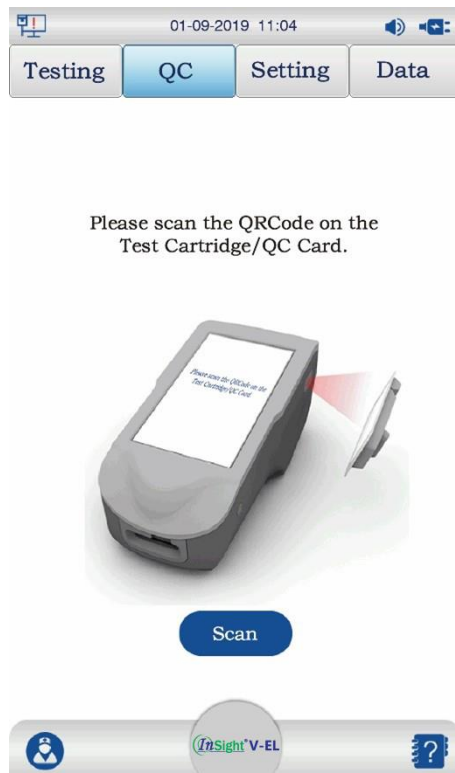
Quality Control can be carried out using the electrical control cartridge and electrolyte control solution. The electrical control cartridge is mainly used to check whether the analyser can properly acquire the signals to be detected from the test cartridge. Control

solutions, like sample testing, are performed with the test cartridges. The only difference is that sample testing uses blood samples, while QC uses control solutions or the electrical control cartridge.

This section mainly describes quality control (QC). The policy on the implementation of QC testing is determined at each laboratory's discretion. QC analysis is recommended in the following conditions:

- Using the analyser for the first time.
- Validating the storage condition of the test cartridge.
- Querying the test results.
- Validating the performance of analyser and the test cartridge.
- QC prompt (at least once every month or every 500 tests, whichever is earlier).

The Quality Control interface is shown in Figure 5.19.



**Figure 5.19 Scan the Test Cartridge or Electrical Control Cartridge**

**CAUTION:**

- If there is a test cartridge in the cartridge slot, the system will display an error prompt 'The cartridge slot is occupied, please remove the cartridge'.
- If no scanning is ongoing, the scanner will be turned off by the system after a period of time. If you want to start the scanner, press the 'Scan' button.
- If the QR code of the test cartridge is scanned, the interface of QC by control solutions will be entered. If the QR code of the electrical control cartridge is scanned, the interface of QC by electrical control cartridge will be entered.
- If you would like to perform other operations before inserting the test cartridge, press the relevant button on the interface. The scanner will be turned off automatically.

### 5.6.1 Quality Control Test Using Control Solution

Quality control is performed to test whether the electrolyte analyser is working to specification and whether the expected performance can be achieved.

#### CAUTION:

- Users must store and use control solutions in strict accordance with the operator's manual. Only InSight V-EL Veterinary Electrolyte Control Solution, provided by Woodley Equipment or your local distributor, should be used.

#### Performing a Quality Control Test:

1. Check the packaging of the control solution and confirm that the control solution is within the expiry date.
2. Remove the control solution from the packaging box and allow it to attain room temperature before use.
3. Scan the QR code of the test cartridge with the scanner on the right of the analyser. Enter the control solution scanning interface, as shown in Figure 5.20.

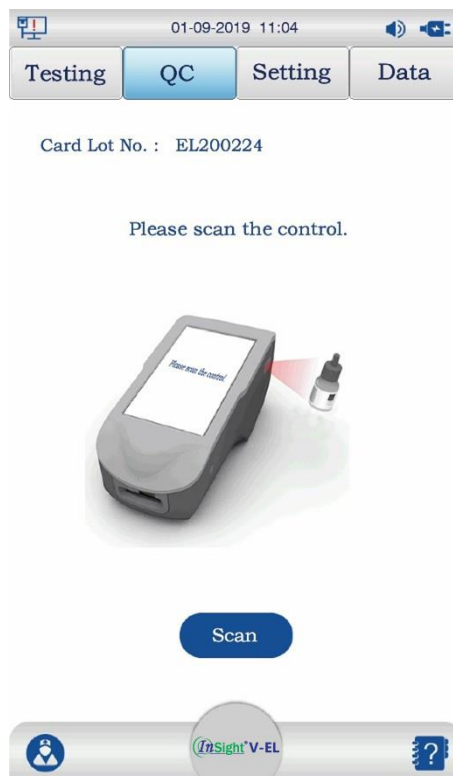
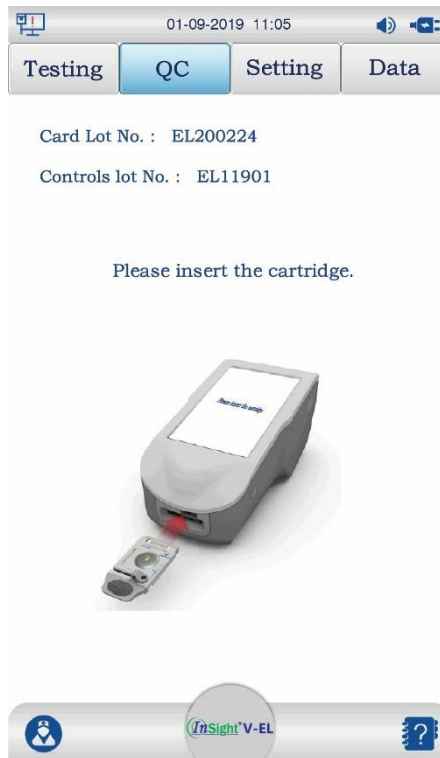


Figure 5.20 Scan the Control Solution

4. If the QR code of the control solution is scanned successfully, the test cartridge insertion interface will display, as shown in Figure 5.21.





**Figure 5.21 Insert the Test Cartridge**

5. Open the pouch and remove the test cartridge.

**CAUTION:**

- Avoid tearing the QR code on the pouch.

6. Open the bottle of control solution and use a plain syringe with the needle removed to collect the control solution. After removing bubbles at the front end of the syringe, insert the syringe into the sample port on the test cartridge and add 110µl of control solution. Slide the sample cover on the test cartridge to the right to seal it. It is recommended to complete the QC test immediately after the control solution is opened.

**CAUTION:**

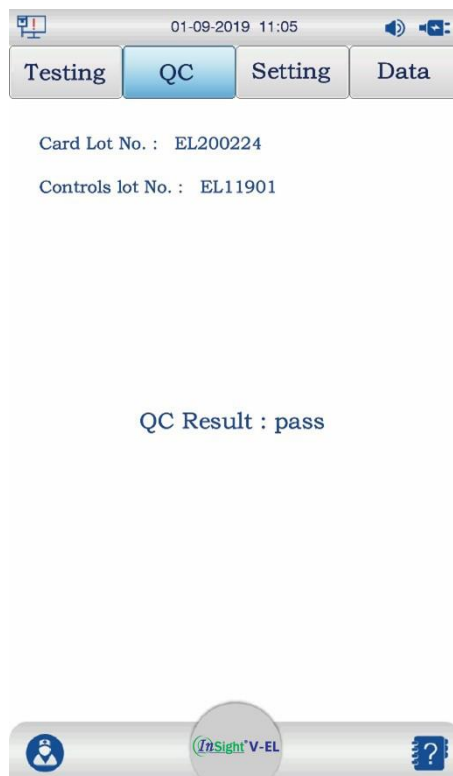
- When opening the control solution bottle, take safety measures to protect your fingers, such as gloves and gauze.

7. Insert the test cartridge into the cartridge slot and gently push the test cartridge inward to ensure that it is inserted correctly. If the cartridge has been prepared and inserted correctly, the interface will show the current test progress. When the system is 'In QC', no other operation can be performed.

**CAUTION:**

- If you don't want to proceed with the QC test and would like to perform other operations before inserting the test cartridge, press the relevant button on the interface.
- Before inserting the test cartridge, please confirm that the test cartridge to be inserted

- is the scanned cartridge.
- Once the system reports an error, the test cartridge will be invalid.
8. After the QC test is complete, the system will automatically display the QC result, as shown in Figure 5.22.



**Figure 5.22 QC Result**

The QC result is automatically saved to the analyser and can be viewed in the 'QC Information' interface under 'Data'.

**CAUTION:**

- The control solution has an expiry date. Be sure to check the expiry date before using.
- If the QC result is abnormal, please read the operator's manual to confirm that the instructions are strictly followed and perform a new test.
- The test cartridge and the control solution should be stored properly and used within their expiry date.

If the above conditions are followed and the test results are still abnormal, please stop using the analyser and contact Woodley Equipment or your local distributor for help.

9. Please remove the test cartridge from the analyser immediately.

## 5.6.2 Quality Control Test Using Electrical Control Cartridge

The electrical control cartridge is used to check whether the electrolyte analyser can properly acquire the signals from the test cartridge.

### CAUTION:

- Quality control testing using an electrical control cartridge can be carried out at any time.

### Performing an Electrical Quality Control Test:

1. Scan the QR code of the electrical control cartridge with the scanner on the right of the analyser. Enter the electrical control cartridge insertion interface, as shown in Figure 5.23.



**Figure 5.23 Insert the Electrical Control Cartridge**

2. After inserting the electrical control cartridge, the system will perform a QC test using the electrical control cartridge.
3. After the testing is complete, the system automatically displays the QC results from the electrical control cartridge, as shown in Figure 5.24.



Card Lot No. : EC19101

QC Result : pass



**Figure 5.24 QC Results Using Electrical Control Cartridge**

**CAUTION:**

- If the QC result is abnormal, please read the operator’s manual to confirm that the instructions are strictly followed and perform a new test.

If the above conditions are followed and the test results are still abnormal, please stop using the analyser and contact Woodley Equipment or your local distributor for help.

## 5.7 Data Management

Sample results, QC results and operation logs are stored in the analyser, and the acquired data can be uploaded to the LIS/HIS system.

**Data Transmission Modes Supported by the Analyser:**

- Export data through a USB device
- Transmit data to the LIS/HIS via the network

The Data Management interface is shown in Figure 5.25.



Figure 5.25 Main Interface of Data Management

Use ◀ and ▶ to turn pages.

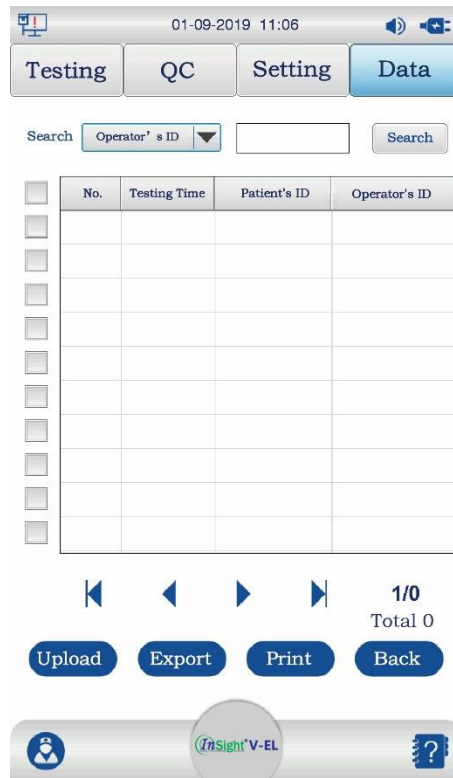
5.7.1 Sample Results

Press 'Result' to enter the sample results interface, as shown in Figure 5.26.



Figure 5.26 Sample Test Results Database

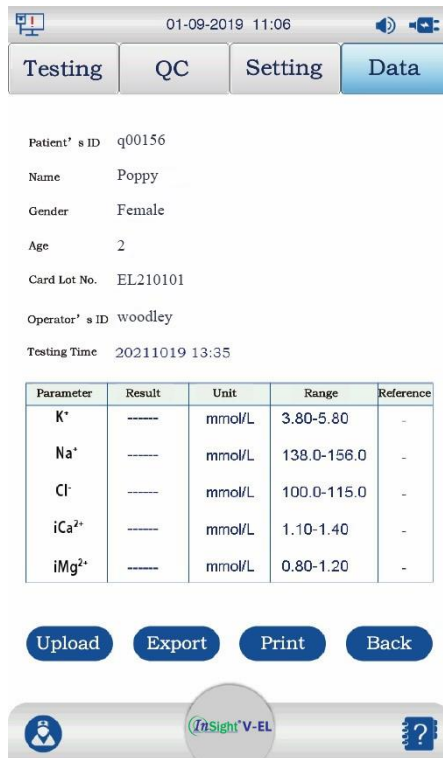
- On the sample results interface, check the selection box next to a record or several records to select them.
- Press 'Upload' to manually upload the selected test results to the LIS/HIS.
- Press 'Export' to export the selected test results to a USB device.
- Press 'Print' to print the sample results of the selected patient(s). Press 'Search' to enter the search interface, as shown in Figure 5.27.



**Figure 5.27 Enter the Search Interface**

Select the search condition (users can search by Test Time, Patient ID and Operator ID), enter the Patient Data to search for and press 'Search'. The search results will be listed.

On the sample results interface, double press the patient sample result you wish to view. The patient sample result will be displayed, as shown in Figure 5.28.



**Figure 5.28 Search Results**

- Press 'Upload' or 'Export' to transfer the patient sample results
- Press 'Print' to print the patient sample results.
- Press 'Back' to return to the sample results interface.

### 5.7.2 QC Information

Press 'QC information' to enter the QC information interface, as shown in Figure 5.29.



Figure 5.29 QC Information Database

On the QC information interface, check the selection box next to a record or several records to select them. Press 'Upload' to manually upload the selected records. Press 'Export' to export the selected test results to a USB device. Press 'Print' to print the results of the selected QC(s). Press 'Search' to enter the search interface, as shown in Figure 5.30.

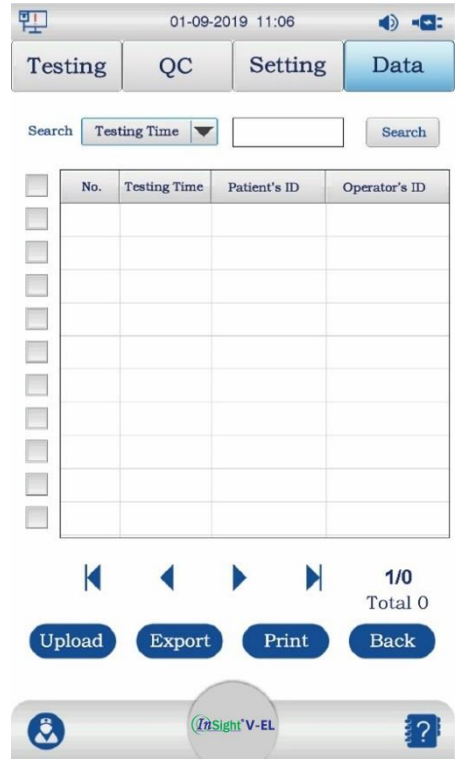
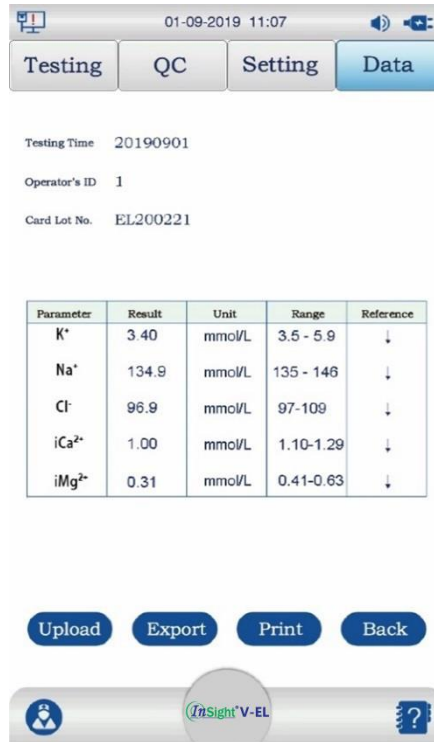


Figure 5.30 Enter the Search Condition



Select the search icon, enter the search criteria and press 'Search'. The search results will be listed.

On the QC information interface, double press the QC data to be viewed and the QC details will be displayed, as shown in Figure 5.31.



**Figure 5.31 QC Search Results**

- Press 'Print' to print the QC information results.
- Press 'Back' to return to the QC information interface.

### 5.7.3 Operation Logs

Press 'Activity' to enter the operation logs interface, as shown in Figure 5.32.



**Figure 5.32 Operation Logs Database**

Press 'Search' to enter the search interface (search by Date or Operator's ID).

# Chapter 6 Cleaning, Maintenance and Disposal

Routine cleaning and maintenance are required to ensure that the analyser remains in optimum working condition.

## 6.1 Cleaning and Disinfection

Cleaning and disinfection are required for the analyser system to remove dust and stains from the surface of the analyser. You can determine the cycle of cleaning and disinfection according to the needs of your laboratory. Be careful when cleaning and disinfecting the analyser.

The user should abide by the safety operation instructions and take safety protection measures (such as wearing protective clothing and gloves) when cleaning and disinfecting the analyser.

### CAUTION:

- Users must carry out cleaning and disinfection in strict accordance with the operator's manual.

Clean and disinfect the outer surface of the analyser using the following steps:

1. Turn off the analyser using the steps described in **Section 5.1**.
2. Unplug the power cord and power adapter of the analyser.
3. If the analyser is connected to other devices, unplug the connection.
4. Use a damp cloth to wipe the outer surface of the analyser.
5. Once the surface of the analyser dries completely, use a non-woven cloth dipped in the disinfecting agent to gently wipe it.
6. Put the non-woven cloth into a biohazard-proof disposal bag.
7. After the outer surface of the analyser dries completely, plug in the connecting cables, power adapter and power cord.

### CAUTION:

- The outer surface should be completely dry before disinfection.
- The non-woven cloth should be moist but not dripping.

Cleaning Agent: Water or 75% medical alcohol

## 6.2 Care and Maintenance

### 6.2.1 Battery Capacity, Charging and Replacement

#### WARNING:

- Improper operation may cause the battery to generate heat, ignite, explode, rupture or decrease battery capacity. Please read the operator's manual and the precautions for use carefully prior to the use of the battery.

**CAUTION:**

- An adapter icon is displayed in the status bar at the top of the screen when only the adapter is used for power supply.
- A battery icon showing the actual battery level is displayed in the status bar at the top of the screen when only the battery is used for power supply.
- Only a battery icon (which dynamically changes) is displayed in the status bar at the top of the screen when both the adapter and the battery are used for power supply, and the battery is being charged.
- The corresponding icon is displayed in the status bar at the top of the screen when both the adapter and the battery are used for power supply, and the battery is not being charged.

**Battery Charging:**

The analyser is equipped with a rechargeable lithium battery. The battery level is generally not sufficient during the first use of the battery, due to the loss of battery level in storage and transportation. Charging the battery in advance is recommended before using it.

Users only need to connect the power supply unit supplied with the analyser to charge the rechargeable lithium battery.

**CAUTION:**

- If the battery is not used for a long time (more than two months), users should charge the battery before using it again.

**Battery Replacement:**

When the rechargeable lithium battery no longer holds charge or the battery has a leakage, please replace the battery by contacting Woodley Equipment or your local distributor.

**WARNING:**

- Make sure you use the same model of rechargeable lithium battery provided by Woodley Equipment or your local distributor.
- Never reverse the positive and negative terminals, or it may cause an explosion.
- If the battery is not used for a long time, charge the battery at least every six months to prevent the battery from being unable to be used due to over discharge.
- Waste batteries should be handled and disposed of in accordance with local regulations.

**6.2.2 Printer and Printing Paper****CAUTION:**

- Make sure you use the printer paper provided by Woodley Equipment, otherwise the built-in thermal printer may be damaged. Such damage is not covered by the warranty.

Please adhere to the requirements below to preserve the printer paper:

- Printer paper should be kept in a dry and cool place, away from high temperature, humidity and exposure to sunlight.
- Avoid exposure to the fluorescent lamp for long periods of time.
- Printer paper should be stored in an environment without polyvinyl chloride plastics, otherwise it will lead to discoloration of the printer paper.

### **6.2.3 Maintenance**

#### **CAUTION:**

- The analyser should be periodically tested for safety (once every 6 months).

#### **Main Items to be Tested:**

1. Check whether there are mechanical and functional damages to the host machine and accessories.
2. Check whether the safety sign is intact.
3. Validate the functions of the analyser by testing samples/QC material according to the operator's manual.

Tests should be carried out by trained and qualified personnel, and test results should be recorded. If the analyser has any problems during the above testing, it must be repaired.

#### **Analyser:**

1. Avoid high temperature, exposure to sunlight, moisture, dust or impact, and avoid violent vibration when moving.
2. Prevent liquid from spilling into the analyser as it may affect its performance and safety.
3. The performance of the analyser should be tested regularly.

Replace the accessories based on actual needs. If an accessory is found to be damaged, please contact Woodley Equipment or your local distributor to order a new accessory and replace the damaged accessory directly.

### **6.2.4 Quality Control**

The analyser should be periodically checked for accuracy (at least every month or every 500 tests, whichever is earlier). Please refer to **Section 5.6 Quality Control** for methods. Without quality control, the accuracy of the analyser cannot be guaranteed.

## **6.3 Disposal**

Used test cartridges are a potential biohazard and should be disposed of as medical waste or in accordance with local regulations.

# Chapter 7 Repair and After-Sales Service

## 7.1 Repair

The warranty of the analyser covers all equipment failures caused by the failure of materials, components and the production process. During the 12 month warranty period all faulty accessories can be repaired and replaced free of charge.

### Manufacturing Process and Raw Materials

Woodley Equipment guarantees that the analyser is manufactured with materials and by processes that meet requirements. Under normal use and maintenance, and within the warranty period from the date of shipment, Woodley Equipment will repair or replace the hardware products if a fault occurs.

### Software

The software installed in Woodley Equipment hardware products will be repaired or updated by Woodley Equipment if a fault occurs, within the warranty period from the date of shipment.

### NOTE:

Woodley Equipment's obligations under this warranty do not include freight and other costs.

There are no accessories that can be repaired by the user in the machine and all repairs should be performed by Woodley Equipment authorised personnel.

Woodley Equipment is not liable for direct, indirect or ultimate damage or delay caused by:

- Artificial damage.
- Natural disasters.
- Accessories removed, stretched and readjusted.
- Replacement or usage of accessories not approved by Woodley Equipment, or repair or modification by non-Woodley Equipment authorised personnel.
- Damage caused by abnormal use beyond the specified service conditions.
- The original serial number label or manufacturing mark is replaced or removed.
- Other failures not arising from the product itself.

## 7.2 After-Sales Service

In case of failure of the analyser, please try the corresponding solutions mentioned in the troubleshooting guide in **Appendix 2**. If the analyser still doesn't function correctly, please turn off the power supply, stop using the analyser, store it properly and contact Woodley Equipment.

The analyser is a high-precision analytical instrument and cannot be disassembled without authorisation. Instrument maintenance, software upgrades and optimisation must be carried out by Woodley Equipment or authorised personnel.

After the warranty expires, Woodley Equipment or your Distributor can continue to provide maintenance services.

# Appendix 1 Specifications

## A1.1 Environmental Specifications

Analyser	Usage	Temperature	10°C-30°C
		Relative Humidity	10%-85% (without condensation)
		Atmosphere Pressure	86 kPa-106.6 kPa
	Transport and Storage	Temperature	10°C-40°C
		Relative Humidity	10%-93% (without condensation)
		Atmosphere Pressure	86 kPa-106.6 kPa

## A1.2 Mechanics

Dimensions	240 mm x 120 mm x 110 mm
Weight	1.5±0.2 kg (including battery)
Display Screen	7-inch colour touch screen
Power Switch	Press once to power on, press and hold to power off
Power Supply	Lithium battery (16.8 V) or 19 VDC (alternating current input: about 100 V ± 10 V - 240 V ± 24 V, 50/60 Hz ± 1 Hz, input power: 90 VA)
Data Interface	USB interface
Network	Ethernet
Code Scanner	Built-in
Printer	Built-in

## A1.3 Performance

Time Required	The time from test cartridge insertion to the output of results is 5 ± 0.5 min
Data Storage	99,999 pieces of data (including test and QC results); the earliest records will be overwritten if exceeding the limit

Parameter	Accuracy (Deviation ≤)	Precision	Linearity			Stability
			Range (mmol/L)	Deviation	Correlation Coefficient r	
K <sup>+</sup>	±3.0%	≤1.5%	1.0-15.0	≤3.0%	≥0.995	≤2.0%
Na <sup>+</sup>	±3.0%	≤1.5%	100-200	≤3.0%		≤2.0%
Cl <sup>-</sup>	±3.0%	≤1.5%	65-160	≤3.0%		≤2.0%
iCa <sup>2+</sup>	±5.0% or ±0.05 mmol/L	≤1.5%	0.25-4	≤ 5.0% or ± 0.05 mmol/L		≤3.0%
iMg <sup>2+</sup>	±5.0% or ±0.05 mmol/L	≤3%	0.2-1.5	≤ 5.0% or ± 0.05 mmol/L		≤3.0%

## A1.4 Printer

Printer	Built-in thermal printer, using thermal printer paper
Print Width	57mm



## A1.5 Battery

Type	Rechargeable lithium battery
Working	Continuous standby for 24h and continuous testing for ≥50 times
Charging Time	No more than 8h
Limiting Voltage for Charging	16.8V
Charge Mode	Constant current/voltage
Charging Current (Standard)	1A
Maximum Continuous Discharge Current	1000mAh
Cycle Life	≥300 times

## A1.6 Electrical Safety

Applicable Standards	EN 61010-2-081-2015 EN 61010-1:2010 EN 61010-2-101-2017
Safe Temperature	The analyser cannot be operated in an environment higher than 30°C.
Safe Humidity Range	Maximum relative humidity of 85% at the temperature of up to 30°C; relative humidity reduced to 60% at the temperature increased to 40°C
Contamination Level	2
Liquid proofing	Common equipment, without the ability to prevent liquid from entering
Degree of Safety in the Presence of Combustible Gases	Not suitable for use in an environment with combustible gases
EMC	Category A, Group 1
Shock-proof Type	Class I device
Work Mode	Continuous service

## Appendix 2 Troubleshooting Guide

This chapter describes the solutions to some common problems. Users can refer to the provided solutions when the following problems occur.

### Error Codes

Error Code	Problem	Solutions
E01	Abnormal ambient temperature	<ul style="list-style-type: none"> <li>● Confirm that the ambient air temperature is within 10°C-30°C, and that the air inlet and outlet of the analyser are not blocked by foreign objects.</li> <li>● Power off the device for 3 min and then restart.</li> <li>● Use the power adapter for power supply.</li> <li>● If the problem persists, contact Woodley Equipment or your local Distributor.</li> </ul>
E02	No liquid detected	<ul style="list-style-type: none"> <li>● Repeat the test with a new test cartridge.</li> <li>● If the problem persists, contact Woodley Equipment or your local Distributor.</li> </ul>
E03	Bubbles present, please retest	<ul style="list-style-type: none"> <li>● Repeat the test with a new test cartridge.</li> <li>● If the problem persists, contact Woodley Equipment or your local Distributor.</li> </ul>
E04	Data storage failure	<ul style="list-style-type: none"> <li>● Please contact Woodley Equipment or your local Distributor .</li> </ul>
E05	Expired test cartridge	<ul style="list-style-type: none"> <li>● Use a test cartridge within the expiry date.</li> <li>● If the problem persists, contact Woodley Equipment or your local Distributor.</li> </ul>
E06	Invalid QR code	<ul style="list-style-type: none"> <li>● Replace with a valid QR code.</li> <li>● If the problem persists, contact Woodley Equipment or your local Distributor.</li> </ul>
E07	Data export failure	<ul style="list-style-type: none"> <li>● Check whether the USB device is damaged.</li> <li>● Export again.</li> <li>● If the problem persists, contact Woodley Equipment or your local Distributor .</li> </ul>
E08	Data upload failure	<ul style="list-style-type: none"> <li>● Check whether the network is connected. After confirming that the network is connected, manually press 'Upload' to try again.</li> <li>● If the problem persists, contact Woodley Equipment or your local Distributor.</li> </ul>
E09	The cartridge slot is occupied. Please remove the test cartridge	<ul style="list-style-type: none"> <li>● Remove the test cartridge from the cartridge slot.</li> <li>● If the problem persists, contact Woodley Equipment or your local Distributor .</li> </ul>
E10	Please load printer paper	<ul style="list-style-type: none"> <li>● Load the printer with printer paper.</li> <li>● If the problem persists, contact Woodley Equipment or your local Distributor.</li> </ul>
E11	Low battery level, please charge the battery	<ul style="list-style-type: none"> <li>● Use the power adapter for power supply.</li> </ul>
E12	The battery has depleted and the analyser will shut down	<ul style="list-style-type: none"> <li>● Use the power adapter for power supply.</li> </ul>

## No Error Code

Problem	Solutions
The analyser cannot be started.	<ul style="list-style-type: none"> <li>● Check power supply.</li> <li>● Power on again.</li> <li>● If the problem persists, contact Woodley Equipment or your local Distributor.</li> </ul>
Touch screen failure	<ul style="list-style-type: none"> <li>● Power on again.</li> <li>● If the problem persists, contact Woodley Equipment or your local Distributor.</li> </ul>
The test procedure is not entered after the insertion of the test cartridge	<ul style="list-style-type: none"> <li>● Reinsert the test cartridge.</li> <li>● Replace with a new test cartridge.</li> <li>● If the problem persists, contact Woodley Equipment or your local Distributor.</li> </ul>
The scanner cannot read the code	<ul style="list-style-type: none"> <li>● Rescan the code.</li> <li>● If the problem persists, contact Woodley Equipment or your local Distributor.</li> </ul>
Test cartridge removal failure	<ul style="list-style-type: none"> <li>● Take out the cartridge after powering on again and the system initialisation is complete.</li> <li>● If the problem persists, contact Woodley Equipment or your local Distributor.</li> </ul>
Automatic paper dispensing failure in the thermal printer	<ul style="list-style-type: none"> <li>● Open the printer cover and check whether there is paper available. If there is no paper, please change the paper roll.</li> <li>● Straighten the printer paper, close the printer cover and press 'Print' again.</li> <li>● If the problem persists, contact Woodley Equipment or your local Distributor.</li> </ul>
Paper jam in the thermal printer	<ul style="list-style-type: none"> <li>● If this is the first time it happens, it's probably because the paper is not in the right place. Open the printer cover, take out the paper, tear off the crumpled part, put the paper back, carefully adjust the paper position and close the printer cover.</li> <li>● If the problem persists, contact Woodley Equipment or your local Distributor.</li> </ul>
After pressing the touch screen, no voice prompt.	<ul style="list-style-type: none"> <li>● Enter the voice prompt settings interface and check the volume settings.</li> <li>● If the problem persists, contact Woodley Equipment or your local Distributor.</li> </ul>
Internet connection failure through a wired network	<ul style="list-style-type: none"> <li>● Log in with the administrator account and enter the network settings interface. Check the wired network settings.</li> <li>● If the problem persists, contact Woodley Equipment or your local Distributor.</li> </ul>
Abnormal charging of the internal battery	<ul style="list-style-type: none"> <li>● Please contact Woodley Equipment or your local Distributor.</li> </ul>
Settings failure	<ul style="list-style-type: none"> <li>● Reset.</li> <li>● Restart the analyser.</li> <li>● Please contact Woodley Equipment or your local Distributor.</li> </ul>
Abnormal sound emitted inside the analyser during normal use	<ul style="list-style-type: none"> <li>● Stop using the analyser and contact Woodley Equipment or your local Distributor.</li> </ul>
Unqualified QC	<ul style="list-style-type: none"> <li>● If the problem persists, contact Woodley Equipment or your local Distributor.</li> </ul>

# Appendix 3 Principle

## A3.1 Test Principle

The InSight V-EL is a Veterinary Electrolyte Analyser used for measuring the contents of K<sup>+</sup> (potassium ion concentration), Na<sup>+</sup> (sodium ion concentration), Cl<sup>-</sup> (chlorine ion concentration), iCa<sup>2+</sup> (calcium ion concentration) and iMg<sup>2+</sup> (magnesium ion concentration) in whole blood samples based on the electrochemical potential difference sensor.

The potential difference sensor is a membrane electrode on the chip, which is the core of the testing technique. The electrochemically induced membrane covering the electrodes makes each electrode inductive and ultimately indicates the potential difference between the working electrode and the reference electrode. Wherein the reference electrode maintains a constant potential throughout the test. The working electrode is an ion selective electrode. Each kind of ion selective electrode is particularly sensitive to a certain ion in the solution and undergoes ion exchange reaction with the ion in the solution, which changes the membrane potential of the electrode through chemical reaction. When the concentration of the measured ion in the solution changes, the membrane potential changes accordingly.

## A3.2 Determination of Test Results

The concentration of an analyte can be calculated by the voltage values of the calibrant and the sample to be tested with the Nernst equation. The formula is as follows:

$$E_{\text{sample}} - E_{\text{calibrant}} = S \cdot \log (\alpha_{\text{sample}} / \alpha_{\text{calibrant}}) \quad (1)$$

### In Formula (1):

- E<sub>sample</sub> denotes the electric potential of the sample.
- E<sub>calibrant</sub> denotes the electric potential of the calibrant.
- α<sub>sample</sub> denotes ion activity to be tested in the sample.
- α<sub>calibrant</sub> denotes ion activity to be tested in the calibrant.

## A3.3 Parameters

The test parameters measured by the InSight V-EL are K<sup>+</sup>, Na<sup>+</sup>, Cl<sup>-</sup>, iCa<sup>2+</sup> and iMg<sup>2+</sup>.

## A3.4 Testing Method

The analyser uses a special calibrant for one point calibration. The solution in the liquid package is the calibrant, which provides background calibration for the dry and wet process of the test cartridge. Finally, the results are calculated by the potential signal difference between the sample and the calibrant.

### Calibration Principle

The standard curves of the performance indexes of electrolytes show a linear relationship.















The voltage signal is obtained by testing the sample of known concentration, so as to establish the linear equation of concentration and signal. The coefficient of linear equation is obtained by the least square method. Finally, the concentration of the sample to be tested can be obtained through the equation coefficient and the voltage signal of the sample to be tested.

### **Calibration Process**

After the test cartridge is inserted, the motor inside the analyser moves. The buffer solution inside the liquid packaging flows to the sensor surface through the liquid channel. The analyser detects the electrode, indicating through the signal change and collects signals to complete the one-point calibration.

## Appendix 4 Symbols

The following graphics, symbols and abbreviations may appear on the outer packaging, labels, display screen and operator's manual of the product. See the following table for specific meanings:

	Biological hazard
	Consult instructions for use
	CE Mark
	UKCA Mark
	Lot number
	Caution
	Serial number
	Manufacturer
	Date of manufacture
	Expiry date
	Fragile, handle with care
	This way up
	Keep dry
	Authorised representative in the European Community/European Union





Woodley Equipment Company Ltd.  
Old Station Park Buildings,  
St. John Street, Horwich,  
Bolton, BL6 7NY, UK

**Tel:** +44 (0) 1204 669033

**Email:** [sales@woodleyequipment.com](mailto:sales@woodleyequipment.com)

**Web:** [www.woodleyequipment.com](http://www.woodleyequipment.com)

Version: 1