Lactate Scout 4
Instruction manual
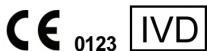
EKF
Diagnostics

Part-No.: 7023-9014-0256

Version 1.1-11/2018

Lactate Scout 4 instruction manual

CE 0123 |IVD|

Contents

Intended use

- The Lactate Scout 4 measuring system is designed to measure lactate concentration in capillary blood in order to assess physical performance and conditioning in the field of sport.

- The Lactate Scout 4 measuring system is not designed for taking quantitative lactate measurements to support clinical diagnoses in medical applications.

- The Lactate Scout 4 measuring system is designed to be used exclusively outside of the body (in vitro diagnostic medical device).

- The Lactate Scout 4 measuring system is designed for self-testing.

- The Lactate Scout 4 measuring device can only be used with Lactate Scout sensors.

- Lactate Scout sensors are designed for single use.

Safety instructions

PLEASE READ THE INSTRUCTION MANUAL BEFORE USE AND KEEP IT IN A SAFE PLACE!

Failure to comply with any text marked as a "**WARNING**" can result in serious damage to health.

Failure to comply with any text marked "**ATTENTION**" can lead to incorrect tests or damage to the device.

Please ensure you observe the separate warning and safety instructions specified on the labels of the batteries and lancets that you are using.

⚠️ **WARNING**

There is a risk of small parts being ingested, such as batteries, sensors, screw caps or drop dispensers on test solution bottles.

The Lactate Scout 4 measuring device and all related accessories must be kept out of the reach of children.

WARNING

The method for obtaining blood samples for lactate tests involves a risk of infection. Sensors, lancets, cellulose cloths and measuring devices contaminated with blood carry a risk of infection.

Safety gloves must be worn when performing tests for third parties.

Please make sure that lancets and sensors are intact and unused before use.

Make sure you dispose of any used sensors, lancets and cellulose cloths safely in the household waste.

Make sure you only use the Lactate Scout 4 measuring system for the purpose specified in the instruction manual.

⚠️ **ATTENTION**

Make sure you only use accessories that have been provided or recommended by the manufacturer.

The measuring device must not be used if it is not functioning correctly or has been damaged.

Your guarantee will be voided and all liability claims will be excluded if the housing of the device is forcefully opened.

Required accessories

To carry out lactate measuring the following accessories are needed:

- Lactate Scout 4 measuring device
- Lactate Scout Sensors
- Sterile lancets
- Cellulose cloths (paper tissues)
- Clean water

Please note that sterile lancets (we recommend safety lancets), cellulose cloth, and water are not included in the scope of delivery and need to be provided separately.

To carry out functionality tests Lactate Scout test solutions are needed additionally, which are available in different concentrations (see section 10).

1.1 Lactate Scout 4 measuring device

Opening (1A) for inserting the sensor

Display (1B) for displaying when the device is ready to take a measurement, blood lactate levels, warning messages, configuration options and status information

Keypad for operating the measuring device

- **Arrow keys (1C)**:
  - for moving between menus, sub-menus and menu items
  - for adjusting values

- **OK button (1D)**:
  - for enabling menus, sub-menus and menu items
  - for confirming choices
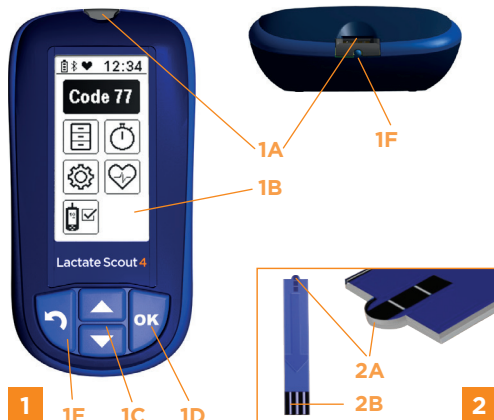 - for activating and deactivating configuration mode

- **Back button (1E)**:
  for undoing the last step/cancelling

- **Temperature sensor (1F)**:
  for reading the ambient temperature

1.2 Lactate Scout sensor

The sensor has an opening for the blood sample **(2A)**. This opening is connected to the measuring chamber. The contacts **(2B)** connect the sensor to the measuring device.

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1.3 Inserting the batteries

The Lactate Scout 4 requires two CR2450 (3V lithium button cell) batteries.

The device is supplied with batteries included. Firstly, remove both of the battery insulating strips **3** .

The measuring device must be turned off to replace the batteries. Gently push the battery cover on the back outwards. Remove the discharged batteries. When inserting the new batteries, ensure that the polarity is correct.

Push the battery cover back in until it completely locks into place **4** .

If the time to replace the batteries exceeds 30 seconds, the date and time setting will be lost and must be re-entered. However, any stored data and settings will be retained.

PLEASE NOTE
Used batteries must not be disposed of with household waste. End users have a statutory obligation to ensure used batteries are returned for recycling. Used batteries can be returned free of charge to retailers or collection points.

1.4 Switching the device on and off

The Lactate Scout 4 has a configuration/display mode and a measuring mode, both of which can be switched on and off independently.

The **configuration and display mode** can be switched on or off by holding down the OK button for two seconds.

The **measuring mode** is switched on or off when the sensor is inserted into the measuring device, even if the measuring device was previously switched off or is in configuration and display mode. Removing the sensor from the device will switch the measuring device off.

The measuring device can be switched off by holding down the OK button for two seconds.

The device will switch itself off if it is not used for two minutes in configuration and display mode or if the device is not used for two minutes while the sensor is inserted in the measuring device.

1.5 Display

An information line will be displayed in both modes at the top of the display when the device is switched on. This line provides information about the battery level, the current time and the active functions of the measuring device **(5A)**.

In configuration and display mode, a symbol line will also be displayed beneath the info line **(5B)**. This line uses corresponding symbols to indicate the configuration and display mode menu/sub-menu that the measuring device is in.

5 | 12:34 **5A** **5B**

If symbols or numbers have a black background, this means they can be selected and confirmed.

If symbols or numbers have a grey background, this means they cannot be selected and confirmed. The associated function needs to be activated in the main menu (Chap. 3).

1.6 Code setting for the sensors

A two-digit code must be entered when setting up the measuring device or when using sensors from a new sensor container; this code is printed on the label of the sensor container.

Firstly, switch the configuration and display mode on. You can do this by holding down the OK button for two seconds **6**. Then press the OK button again. The code setting menu will open. The symbol line will display the "Code" symbol **7**.

Enter the two digits of the code, starting from the left. Enter the digits of the code using the two arrow keys and confirm by pressing the OK button **7** - **9**. You will then hear a signal tone to confirm that the code has been set. The measuring device is now ready to take measurements using sensors with this code **10** - **11**.
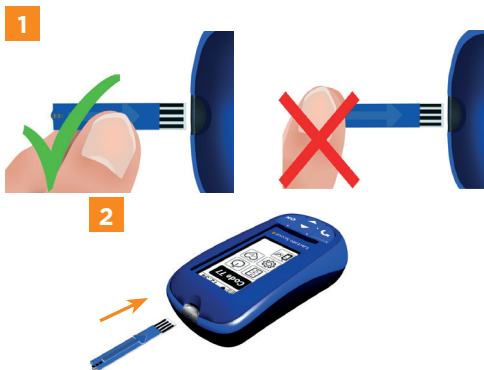
You can now either insert a sensor or switch off the device.

2.1 Preparing for a test

Remove a sensor from the container. Make sure you do not touch the opening for the blood sample `1`. As soon as you have taken it out, insert the sensor into the measuring device opening in the direction of the arrow until you can feel resistance `2`. The contacts must be facing up.

The display will briefly show the code which is currently configured. A blinking drop symbol will then be displayed to indicate that the measuring device is ready to take a measurement. The ambient temperature of the measuring device will be displayed beneath the info line `3`.

⚠️ **ATTENTION**

Before you use a sensor from a new sensor container, you must check that the code on the label is the same as the code currently configured in the device. If the code does not match, then it must be configured again in the device.

⚠️ **ATTENTION**

The sensor and the measuring device must be at the same temperature when performing a test. If you take the sensor container out of the fridge, you must wait for at least 20 minutes until the sensor container has reached the ambient temperature before you open the container. If you take the sensor container out of the freezer, you must wait for at least 2 hours until the sensor container has reached the ambient temperature. Only remove sensors to be used immediately for testing purposes. Reseal the container immediately after removing the sensor. Never leave the container open.

2.2 Blood collection and test

Wash your fingers or earlobes with clean water at the puncture site. You can use the spray bottle supplied with the accessories for this purpose. Dry the puncture site. In order to take a capillary blood sample, puncture the site using a suitable lancet.

Wipe away the first droplet of blood. Apply gentle pressure to the puncture site. The second droplet must be large enough to fill the measurement chamber of the sensor in one go.

⚠️ **WARNING**

Avoid pressing on the puncture site too heavily as sweat and/or tissue fluid can merge with the droplet of blood and falsify the test result.

The droplet of blood must not run. Bring the fingertip with the droplet of blood close to the tip of the sensor that has been inserted in the measuring device. The sensor now draws blood into the measuring chamber **4**.
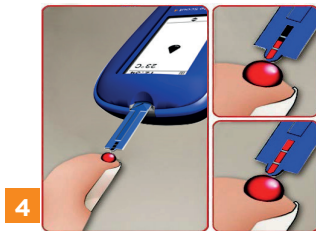
The sensor must draw the blood in one go. The puncture site must therefore be kept steady when taking the sample. Failure to do so results in the risk of insufficient filling of the sensor.

If performing lactate tests on third parties, move the measuring device with its inserted sensor to the droplet of blood on the fingertip or earlobe of the subject. Once the measurement chamber on the sensor tip is completely filled, an acoustic signal will sound and the test will begin. A circular symbol with a progress bar will be displayed **5**. After ten seconds, a second acoustic signal will sound and the test result will be displayed in the measurement unit "mmol/L". The allocated memory space number will be displayed next to the memory symbol. The test result is stored along with the date and time of the test and the memory space number **6**. Information regarding interpretation of the lactate value can be found at:
www.lactatescout.com

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☣ **WARNING**

Lancets and sensors may only be used once.

Used lancets and sensors carry a risk of infection. Ensure any used lancets and sensors are disposed of safely in the domestic waste along with contaminated cellulose/paper wipes.

2.3 Checking the code setting

The code is displayed briefly when you switch measuring mode on **7**. If more than 25 tests are performed with the same code, a reminder to check the code will be displayed for three seconds **8**. Pressing the OK button within three seconds will take you to the code configuration menu.

2.4 Checking the ambient temperature

To ensure that equally reliable test results are achieved under different climatic conditions, the measuring device is equipped with a temperature sensor. The temperature sensor is located underneath the opening for the sensors **9**.
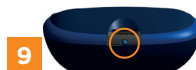
⚠️ **WARNING**

Make sure you do not touch or cover the temperature sensor with your hand. Failure to do so results in the risk that the temperature sensor will read the ambient temperature incorrectly and the measuring device may record incorrect test results.

3 Settings, functions and displays

Settings can be changed in configuration and display mode. In order to go to configuration and display mode, there must not be a sensor inserted in the measuring device. The configuration and display mode can be switched on or off by holding down the OK button for two seconds. An acoustic signal will sound, and the main menu will be displayed along with its symbols. The symbols display the sub-menus **1**:

- Stored test results **(1A)**

- Device settings **(1B)**

- Functionality test **(1C)**

- Sensor code configuration **(1D)**

- Stopwatch function **(1E)**

- Heart rate **(1F)**

Choose a symbol to move to the associated sub-menu.

Briefly press one of the two arrows to select a symbol. The selected symbol is displayed with a black background. Pressing the OK button takes you to the sub-menu. Once you have completed your configuration in the sub-menu and confirmed your selection with the OK button, you will be taken back to the main menu. Pressing the Back button will also take you back to the main menu. The last stage will be cancelled and you will be returned to the previous status.

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3.1 Device settings

If you choose the "Device settings" symbol **1B** in the main menu and confirm your selection by pressing the OK button, you will be taken to the device settings **2**. The following settings are available:

- Date and time settings **(2A)**
- Search for heart rate monitor and connect **(2B)**
- Activating/deactivating the Bluetooth® function **(2C)**
- Volume control for acoustic signals **(2D)**
- Device information **(2E)**

3.1.1 Volume control

If you choose the "Loudspeaker" symbol **2D** in the "Device settings" menu and confirm your selection by pressing the OK button, you will be taken to the volume control settings **3**. The following settings are available:

- mute **(3A)**
- medium volume **(3B)**
- loud **(3C)**

Set the volume using one of the two arrow keys and confirm your selection by pressing the OK button. Once you have confirmed your selection, you will be taken directly back to the "Device settings" menu.

3.1.2 Date and time settings

If you choose the "Date and time settings" symbol in the "Device settings" menu **2A** and confirm your selection by pressing the OK button, you will then have the option to set the year. A calendar will appear in the symbol line **4**. Set the year using one of the two arrow keys and confirm your selection by pressing the OK button. Once you have confirmed your selection, you will then have the option to set the day and month. Two calendar symbols for the day and month will appear in the symbol line **5 - 6**. Set the day and month using one of the two arrow keys and confirm your selection by pressing the OK button. Once you have confirmed your selection, you will then have the option to set the time. A clock will appear in the symbol line. Firstly, choose a time display format. The following settings are available **7**:

- 24-hour clock
- 12-hour clock

Once you have confirmed your selection, you will then have the option to set the time. Set the hours and minutes using one of the two arrow keys **8** and confirm your selection by pressing the OK button. Once you have confirmed your selection, you will be taken back to the "Device settings" menu.

If the date and time are not (re)set when the device is configured or reset, the time will be displayed in the info line with a black background.

2A

12:34

4

12:34

20 **17**

◆ OK

5

12:34

09/**21**

◆ OK

6

12:34

09/**21**

◆ OK

7

12:34

24h

12h

◆ OK

8

12:34

16 : **20**

◆ OK

3.1.3 Activating and deactivating the Bluetooth® function

You need to activate the Bluetooth® wireless technology function if you want to connect the Lactate Scout 4 to a heart rate monitor or if you want to transfer data to a PC, a tablet or a smartphone. When in the "Device settings" menu, select the symbol for activating and deactivating the Bluetooth® function **2C**. Confirm your selection by pressing the OK button. The sub-menu will then open **9**. To activate the Bluetooth® function, use one of the two arrow keys to select the "Activation" symbol (check box with vertical stroke) and confirm your selection by pressing the OK button. The Bluetooth® symbol will now be displayed in the info line. The function requires additional power and should therefore only be activated when it is needed **10**.

To deactivate the Bluetooth® function, use one of the two arrow keys to select the "Deactivation" symbol (check box with circle) and confirm your selection by pressing the OK button.

3.1.4 Connecting to a heart rate monitor

Activate the Bluetooth® wireless technology function. Each heart rate monitor (chest strap, armband, ear clip) must be registered in the measuring device:

You will be taken to the sub-menu if you select the heart symbol **2B** in the "Device settings" menu by using one of the two arrow keys and confirm your selection by pressing the OK button. To search for the heart rate monitor, use the arrow keys to select the "Search" symbol **11** and confirm your selection by pressing the OK button. The measuring device will now search for all Bluetooth® Low Energy (LE) compatible heart rate monitors in the immediate vicinity **12**. If the search is successful, a list of all of the heart rate monitors found will be displayed **13**. Select the heart rate monitor using one of the two arrow keys and confirm your selection by pressing the OK button. The heart rate monitor is now registered in the measuring device. The measuring device is automatically connected to the selected heart rate monitor. The heart symbol which is filled in will appear in the info line **14**. If it is not possible to establish a connection, then the heart symbol will remain empty **15**.

If the measuring device fails to find a heart rate monitor after a period of 10 seconds, an error message will appear **16**.

Each time the Lactate Scout 4 is switched on, the measuring device will attempt to automatically connect to the registered heart rate monitor. A brief acoustic warning will be emitted if the existing connection is temporarily interrupted. The measuring device will then make three further attempts to restore the connection. If the connection fails due to the fact the heart rate monitor is too far away, the measuring device will not attempt to reconnect until the next time that it is activated.

If you want to delete a registered heart rate monitor, simply select the "Heart" symbol again in the "Device settings" menu **2B**. Confirm your selection by pressing the OK button. To delete the heart rate monitor, use one of the two arrow keys to select the "Delete" symbol and confirm your selection by pressing the OK button **17**.

3.1.5 Displaying information about the device

If you choose the "Info" symbol in the "Device settings" menu **2E** by using one of the two arrow keys and confirm your selection by pressing the OK button, you will be shown the following information about the device, firmware and device components. If you use the arrow keys to browse through the pages in this menu item, then the following information will be displayed:

- *Serial number of the measuring device*
- *Firmware version of the measuring device*
- *MAC address of the Bluetooth® LE module*
- *FCC ID and IC of the Bluetooth® LE module*
- *QR link to the Lactate Scout website*
- *Licensing information on the font used*

Once you have pressed the OK button again, you will be taken directly back to the "Device settings" menu.

3.2 Heart rate

If the measuring device is connected to a heart rate monitor, the heart rate monitoring system automatically records the measured rate and saves it at five second intervals together with the date and time. If you select the "Heart" symbol **1F** in the main menu by using one of the two arrow keys and confirm your selection by pressing the OK button, you will then be shown the heart rate in beats per minute (bpm) **18**. The heart rate display will remain active for two minutes before switching to standby mode to save energy **19**.

If you press any button, the heart rate display will be activated for another 10 seconds **20**. If the connection (temporarily) fails, then the heart symbol will remain empty **21**.

Heart rate values can be recorded for a maximum of approximately 30 hours. After this point, the earliest recorded values will be overwritten.

The heart rate will no longer be measured if the measuring device fails to connect to the heart rate monitor after three automated attempts.

If an individual lactate test is performed while the heart rate is being recorded, or a lactate test is performed during a step test, then the heart rate recorded in the minute prior to the lactate test will be stored along with the lactate value.

If the sensor is removed in measurement mode or while the heart rate is being measured, the measuring device will switch to standby mode to save energy.

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Heart rate data can be accessed from the Lactate Scout Assistant software when transferred with lactate values.

3.3 Functionality test

The functionality test is used to check the correct functioning of the Lactate Scout 4 measuring system. If there are any doubts regarding the accuracy of the test result or the correct functioning of the measuring device, you must perform a functionality test. Please use the Lactate Scout test solution for the functionality test. The label on the test solution bottle states the range of the test solution.

The test solution is available in the following concentrations:

8.9 - 1 1.1 mmol/L   (display: 10 mmol/L)

4.5 – 5.6 mmol/L   (display: 5 mmol/L)

1.8 - 2.2 mmol/L   (display: 2 mmol/L)

The test solution can be used for a period of three months after opening for the first time. Once opened, ensure the test solution is stored tightly closed between 15 – 25°C.

⚠ **ATTENTION**

Never bring the opening of the test solution bottle directly into contact with the sensor. Failure to do so will contaminate the contents of the bottle and render it unusable.

Test solution, sensor and measuring device must be at the same temperature when performing the functionality test.

⚠ **WARNING**

Do not swallow the test solution. Avoid contact with mucous membranes.

Risk of small parts being ingested: keep the test solution out of the reach of children.

Select the "Functionality test" 1C sub-menu in configuration and display mode.

Then select the concentration of your test solution 22. The measuring device will then ask you to insert a sensor 23. For testing purposes, the target value will be displayed with the measurement unit (mmol/L) in the symbol line.

The configured code will be displayed briefly after you have inserted the sensor. This code must also match the code printed on the sensor container for the functionality test as well. The measuring device will then ask you to fill the sensor with test solution 24. Open the test solution bottle.

Wipe the opening to make sure it is clean. Press out a droplet onto a clean non-absorbent surface. You can use your thumbnail for this purpose 25.

Discard the first droplet.

Press out another droplet. Then move the measuring device with its inserted sensor to the droplet. Allow the droplet to fill the measurement chamber until the opening for the blood sample is immersed in the droplet. An acoustic signal will sound when this is successfully filled and the test will begin.

You can track the progress of the test on the display **26**. The measured lactate concentration will be displayed immediately afterwards. If the result is within the permissible tolerance range, a tick will be shown in the centre of the display. It also means the measuring device and sensor are functioning properly **27**. If the result is outside of the tolerance range, an error message will be displayed **28** (see chapter 7 on page 39, "Functionality test not successful").

The device will turn off when the sensor is removed.

3.4 Stopwatch

If you choose the "Stopwatch" symbol in the main menu by using one of the two arrow keys and confirm your selection by pressing the OK button **1E**, you will be taken to the stopwatch function **29**. Press the OK button again to start the stopwatch. An acoustic signal will sound after every minute that passes. The stopwatch displays the minutes on the left and the seconds on the right. A quarter of the circle will be filled in after every two-and-a-half minutes **30**. After 10 minutes, the stopwatch function will automatically stop and the measuring device will switch back to the main menu.

If you want to stop the stopwatch during the 10 minute interval, you can do so by briefly pressing the OK button. An acoustic signal will sound several times. You can reset the timer by pressing the OK button again. Pressing the Back button will take you back to the main menu. If you use the stopwatch during a step test to record the time for a step test phase, the measured time is stored together with the next measured lactate value. The measured time can be used to evaluate the step test at a later stage using an app.

The stopwatch function can be used in a similar manner for individual tests.

3.5 Displaying stored values

If you choose the "Memory" symbol in the main menu by using one of the two arrow keys and confirm your selection by pressing the OK button, you will be taken to the stored values. The display will show the most recent lactate value **(31A)** 31. The memory symbol and the memory space number will appear in the symbol line. **(31B)**. The date and time **(31C)** of this measurement will be shown in the bottom section of the display.

If the measurement was taken as part of a step or endurance test and the heart rate was also recorded, where applicable, the display will also show the following additional information 32: heart rate **(32A)**, step test phase **(32B)**, number assigned to the test in that step test phase **(32C)**.

If you want to see all of the test results, you can do so by pressing one of the two arrow keys. You can move through the items quickly by holding an arrow key down.
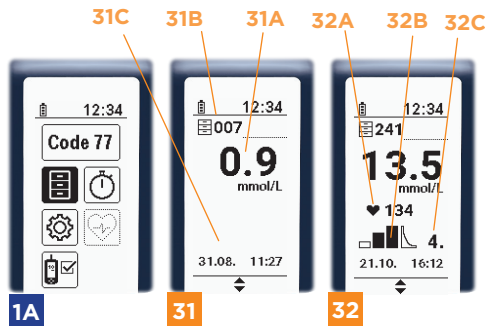
3.6 Battery level indicator

The battery level is monitored by the measuring device. The battery level is shown in the info line. There are three different display options available:

- Batteries are full **(33A)**

- Batteries are partially discharged **(33B)**

- Batteries are almost fully discharged – the Bluetooth® function has been automatically deactivated. The batteries need to be changed **(33C)**

If the batteries are fully discharged, the measuring device will no longer turn on. An error message will be displayed **34**.

12:34 **33A**

12:34 **33B**

33 12:34 **33C**

4 Performing a step test

4.1 Step test mode

In addition to individual tests, the measuring device can also be used to perform step tests. In order to do so, all of the test results recorded during a step test will be stored in memory by the measuring device along with the relevant configured parameters.

The general procedure for test preparation, sampling and measurement is the same as the individual test.

Insert the sensor into the measuring device. You are then in measuring mode. Now use one of the two arrow keys to select the respective step test phase which the subject is in before the measurement. You can choose between the following step test phases:

- pre-load (for resting levels) **1**

- load (for exertion values) **2**

- after-load (for post-exertion values) **3**

The black bar in the step test symbol indicates the respective step test phase.

You can begin with any of the step test phases. However, you cannot change the order of the test step phases. As an example, pre-exertion cannot be selected after the exertion phase.

The number of lactate values taken per step test phase corresponds to the number of measurements in that phase. The test results are counted separately for each step test phase. The number to the right of the step test symbol indicates the number assigned to the measurement/exertion level 4 - 6 .

Lactate levels are measured at each exertion level during the "exertion" step test phase. The most recently selected step test phase will always be used if you insert a new sensor. The number of the next test is also displayed. If you stay in step test mode, you can proceed with this test or switch to later phases by pressing the top arrow key. Alternatively you can exit step test mode.

If you want to exit step test mode, hold down an arrow key when the test result is displayed. The "Exit" symbol for the step test will then appear 7 .

4.2 Heart rate during step tests

If a device is connected to an active heart rate monitor, the heart rate for each exertion level is displayed along with the lactate value **4** - **6**.

The heart rate displayed is the maximum rate detected during the minute leading up to the lactate measurement. For this reason, it is important to measure the lactate level immediately after each exertion level.

4.3 Displaying the post-exertion phase

During the post-exertion phase, the amount of time since the last test in the exertion phase is also displayed by the measuring device in measuring mode **8**.

The time display is updated every 10 seconds. The post-exertion time display is limited to 20 minutes.

5 Data transfer

The Lactate Scout 4 comes with a Bluetooth® LE module which can be used to wirelessly transfer the data stored on the measuring device.

In order to retrieve the transferred data on your PC, you must have the "Lactate Scout Assistant" software installed. This software is available for Windows and Android.

Additional information is available at:

www.lactatescout.com

⚠ **ATTENTION**

The Bluetooth® LE module has a range of approximately 3 m. The recipient device must be within this range to ensure secure data transmission.

6 Storage, cleaning and disposal

The Lactate Scout 4 is an electronic measuring device and must be handled and stored with care.

You must ensure the measuring device is protected against liquids, moisture, prolonged solar radiation and excessive cold or heat (below -20° C and above +50°C).

Heavy mechanical loads, improper handling and contamination may impair the functionality of the device or render it completely inoperable.

Ensure that no liquid or dirt enters the inside of the device through the openings (opening for sensor and battery housing).

Any blood, test solution, dust or other contaminants on the housing must be cleaned using a soft, lint-free cloth or tear-resistant cellulose cloth (e.g. paper towel). To do this, moisten the cloth with a mild cleaning agent. You can use water with a small amount of washing-up liquid, for example. Clean the measuring device before wiping it dry.

☣ **WARNING**

Used measuring devices carry a risk of infection.

Make sure you wear gloves when cleaning/disinfecting a used measuring device.

We recommend using Pursept® A Xpress as a disinfectant. Carefully spray the measuring device with disinfectant. After waiting the specified time for it to take effect, wipe the measuring device with a soft, lint-free cloth or paper towel. Please ensure you read the instructions for the disinfectant.

For disposal of the measuring device, firstly remove the batteries. Because of the risk of infection stated in 'Warnings' above and on page 8 of this manual, the device should not be disposed of as electrical and electronic waste but should be disposed of carefully in household waste.

7 Error messages and warning indicators

Display	Description and potential causes	Solution
	Sensor error Sensor damaged, improperly stored (outside of the container/in an open container, exposed to sunlight), or already used.	Use a new sensor from a correctly stored container.
	Error when filling the sensor Blood droplet too small or has run, contact time of sensor with blood droplet too short, interrupted sample absorption or sensor pressed against skin.	Repeat the test with a new sensor; if the droplet is relatively large, attempt to improve capillary circulation (by gently massaging the puncture site).
	Temperature error The temperature is outside of the operating range.	Ensure that the ambient temperature is within the specified operating range of the measuring device.

Errors/warnings	Description and potential causes	Solution
⚠ 🔋	**Battery error** The batteries are discharged or expired or there is possible corrosion of the battery contacts.	Change the batteries. If the battery contacts are corroded, please contact the Lactate Scout 4 service team.
⚠ < 0.5 mmol/L	**Test result too low** The test result is below the test range of the Lactate Scout 4; Water used for washing may have diluted the droplet at the puncture site.	Repeat the test with a new sensor. Check the code configuration. Follow the instructions for performing the test. Dry your hands well before collecting the blood. Use the test solution to perform a functionality test. Please contact the Lactate Scout 4 service team if there is an error message.
⚠ > 25 mmol/L	**Test result too high** The test result is above the test range of the Lactate Scout 4 Perspiration on the skin containing a significant proportion of lactate may have been included in the blood droplet.	Repeat the test with a new sensor. Check the code configuration. Follow the instructions for performing the test. Carefully wash perspiration away from the intended puncture site and dry your hands well.

Errors/warnings	Description and potential causes	Solution
	Functionality test not successful Test solution has been used more than three months after the bottle was opened or is past its expiry date. Test solutions not stored correctly. Sensors were not stored correctly or have exceeded their expiry date.	Repeat the functionality test with new materials after checking the code. Follow the instructions for performing the functionality test. Make sure that the target concentration you have selected in the menu matches the concentration of the test solution. If the problem persists, please contact the Lactate Scout 4 service team.
	Electronic error inside the device.	Turn the device off and on again. If the problem persists, please contact the Lactate Scout 4 service team.
	Storage error	Please contact the Lactate Scout 4 service team.

Errors/warnings	Description and potential causes	Solution
Code check	**Brief code "reminder"**	Confirm the code if it remains the same. Alternatively enter the code for the new sensor container.
	The "Code" symbol with a sensor container and a question mark behind it is displayed for three seconds when you insert a sensor.	
	You need to confirm or change the code after 25 tests.	
Time display	**Time displayed with black background**	Set the date and time.
	The date and time were not set when the device was configured/reset.	
Device fails to turn on	**Device fails to turn on**	Change the batteries.
	Device fails to turn on, either in configuration and display mode or in standby mode.	If the problem persists, please contact the Lactate Scout 4 service team.
Measurement mode cannot be configured	**No droplet symbol displayed**	Insert sensor with the black contacts facing up until it clearly locks in place (see Item 2.1).
	Device is not switched on as sensor not inserted properly.	

Errors/warnings	Description and potential causes	Solution
No acoustic signal	**No acoustic signal in any mode** Volume was muted in the "Configuration" menu.	Open the "Volume" menu and change the settings.
Device turns itself off	**Device turns itself off** The display shows a bright EKF logo on a black background. This happens automatically after two minutes of inactivity. Ambient temperature is too low or batteries are empty. Display malfunctioning. Defective electronics or mechanical damage.	Restart the measuring device. Make sure that the ambient temperature is within the operating range of the measuring device. Change the batteries. Please contact the Lactate Scout 4 service team.
Defective test results	**Values seem too high/too low** Perspiration, intended puncture site not washed correctly or perspiration occurred due to a delay between washing and collecting the blood. Intended puncture site was still wet after washing.	Repeat the test with a new sensor. Check the code configuration. Precisely follow the instructions for performing the test. Carefully wash perspiration away from the intended puncture site and dry your hands well. Use the test solution to perform a functionality test. Please contact the Lactate Scout 4 service team if there is an error message.

Errors/warnings	Description and potential causes	Solution
Slow update of the screen content	**Slow update of the screen content** The Lactate Scout 4 uses an e-paper display. Please note that it may take some time for the display to update, depending on the ambient temperature. This is normal for e-paper displays.	

8 Technical specifications

Parameter	Specification
Type of device	Lactate Scout 4 - hand-held device for measuring blood lactate
Sample material	Fresh capillary whole blood
Sample volume	0.2 μL
Measuring range	0.5 mmol/L - 25.0 mmol/L
Hematocrit range (Hct)	20 - 70%
Precision	Hct range 35 – 50%: 0.5 – 6.7 mmol/L blood lactate ≤0.2 mmol/L, 6.8 – 25.0 mmol/L blood lactate ≤3 %
	Hct ranges 20 – <35%, >50 – 70%: 0.5 – 7.5 mmol/L blood lactate ≤0.3 mmol/L, 7.6 – 25.0 mmol/L blood lactate ≤4 %
Measuring principle	Enzymatic amperometric determination of lactate using lactate oxidase
Test duration	10 seconds
Measurement temperature range	+10 °C - +45°C
Humidity	10 - 85% relative humidity (max. 2 minutes for sensors)
Storage temperature	-18 °C - +8 °C (sensors in container) and/or -20 °C - +50 °C (device)

Parameter	Specification
Max. elevation for use	up to 4,000 metres
Data storage	500 lactate test values with date, time, heart rate and step test allocations, heart rate memory over 30 hours
Data transfer	via Bluetooth® LE v4.1
Power supply	2 x 3 V CR2450 (3V, lithium batteries, button cell batteries)
Device dimensions	91 mm (L) x 46 mm (W) x 21 mm (H)
Service life	5 years
Weight	60 g (including batteries)
Radio system	Bluetooth®
Band	2.402 to 2.480 GHz
Transmission power	10 mW

SensLab GmbH hereby declares that the Bluetooth® radio system type conforms with Directive 2014/53/EU. The full EU declaration of conformity text can be obtained via the following email address: support@ekf-diagnostic.de

The Bluetooth® brand and logos are registered trade marks of Bluetooth SIG, Inc., any use of these brands by SensLab GmbH shall be under licence. Other brands and trading names are the property of their respective owners.

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9 Symbols

Labels on sensor containers, device labels, in accompanying documentation
and on packaging

Symbol	Meaning
IVD	In vitro diagnostic medical device
$C\,\epsilon_{0123}$	Product meets the requirements of the applicable Directives
▲	Manufacturer
SN	Serial number
⚠	Attention, consult accompanying documentation, observe safety instructions
☣	Biological risks
📖	Follow instructions for use
⊗	Designed to be used once only
⧖	Expiry date YYYY-MM
LOT	Batch no.
⌇	Storage temperature range

Symbol	Meaning
$\overline{\underline{\nabla}}$	Sensor number
☀	Do not expose to direct solar radiation
☂	Protect against liquid
❽	Wireless data transfer with Bluetooth® wireless technology
(((•)))	Device includes RF transmitter
⎓	Direct current
🚮̶	Used batteries must not be disposed of with household waste

10 Consumables and accessories

The following accessories are available at EKF-diagnostic GmbH, at specialist retailers or online at www.ekfdiagnostics.com:

Item	Order No.
BigPack 72+: 3 x 24 Lactate Scout Sensors in sensor containers	7023-3405-0846
BigPack 48+: 2 x 24 Lactate Scout Sensors in sensor containers	7023-3405-0727
BigPack 24+: 24 Lactate Scout Sensors in sensor container	7023-3405-1008
Lactate Scout test solution: Pack of 5 x 2.5 ml bottles with 1.8 - 2.2 mmol/L lactate	7023-6151-0257
Lactate Scout test solution: CombiPack of 2.5 ml bottles (2 x 5 units) with 4.5 - 5.6 mmol/L and 8.9 - 11.1 mmol/L lactate	7023-6131-0235
Lactate Scout test solution: DuoPack of 2.5 ml bottles (2 x 1 units) with 4.5 - 5.6 mmol/L and 8.9 - 11.1 mmol/L lactate	7023-6161-0412
Lactate Scout test solution: Pack of 10 x 2.5 ml bottles with 8.9 - 11.1 mmol/L lactate	7023-6141-0246

Additional product information, literature and references can be found online at www.ekfdiagnostics.com

Item	Order No.
Lactate Scout 4 USB Dongle	7023-7541-0195
PC Pack consists of:	7023-7542-0217
Dongle for PC for data transfer between Lactate Scout 4 and PC via Bluetooth® Low Energy functionality	
USB stick with "Lactate Scout Assistant" software for evaluation of lactate performance diagnostics (Windows 7 – 10)	