



BLUE POINT OF QUALITY



USER MANUAL

SW v. 1.5

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Contents



Contents	2
1. Introduction	3
1.1 Intended use	3
1.2 Measurement principle	3
1.3 Buttons and interfaces	4
1.3.1 Overview of the instrument	4
1.3.2 Overview of the keypad	5
1.3.3 Overview of connection the instrument	6
1.4 Icons and abbreviations	7
2. Installation	8
2.1 Unpacking	8
2.2 Set up the instrument	9
3. Routine operation overview	11
3.1 Standby	11
3.2 Measurement	11
3.3 Sample identification	13
3.4 Cleaning	14
4. Menu structure	15
4.1 Menu overview	15
4.2 Main menu	16
4.2.1 Worklist submenu	16
4.2.2 Memory	17
4.2.3 Control measurement	19
4.2.4 Cleaning	20
4.3 Settings	21
4.3.1 Strip Settings	21
4.3.1.1 Parameter settings	21
4.3.1.1.1 Unit settings	22
4.3.1.1.2 Parameters table	23
4.3.1.1.3 Sediment settings	24
4.3.1.1.4 Sensitivity	24
4.3.1.2 Printing order	25
4.3.2 Printer Setting	25
4.3.3 Language Setting	26
4.3.4 Date / Time setting	26
4.3.5 Interface setting	27
4.3.6 Customisation menu	27
5. Service information	28
5.1 Troubleshooting	28
5.2 Service information	29
5.2.1 Safety information	29
5.2.2 Guarantee conditions	29
5.2.3 Ordering information	29
5.2.4 Producer	29
5.2.5 Technical parameters	30
6. Serial interface protocol	31
7. Short instructions	32
8. Index	33

1. Introduction

This manual contains the operation and maintenance instructions for the LAURA photometer.

1.1 Intended use

The reader LAURA is a reflection photometer for semiquantitative urinalysis using test strips DekaPHAN® LAURA and HeptaPHAN® LAURA.

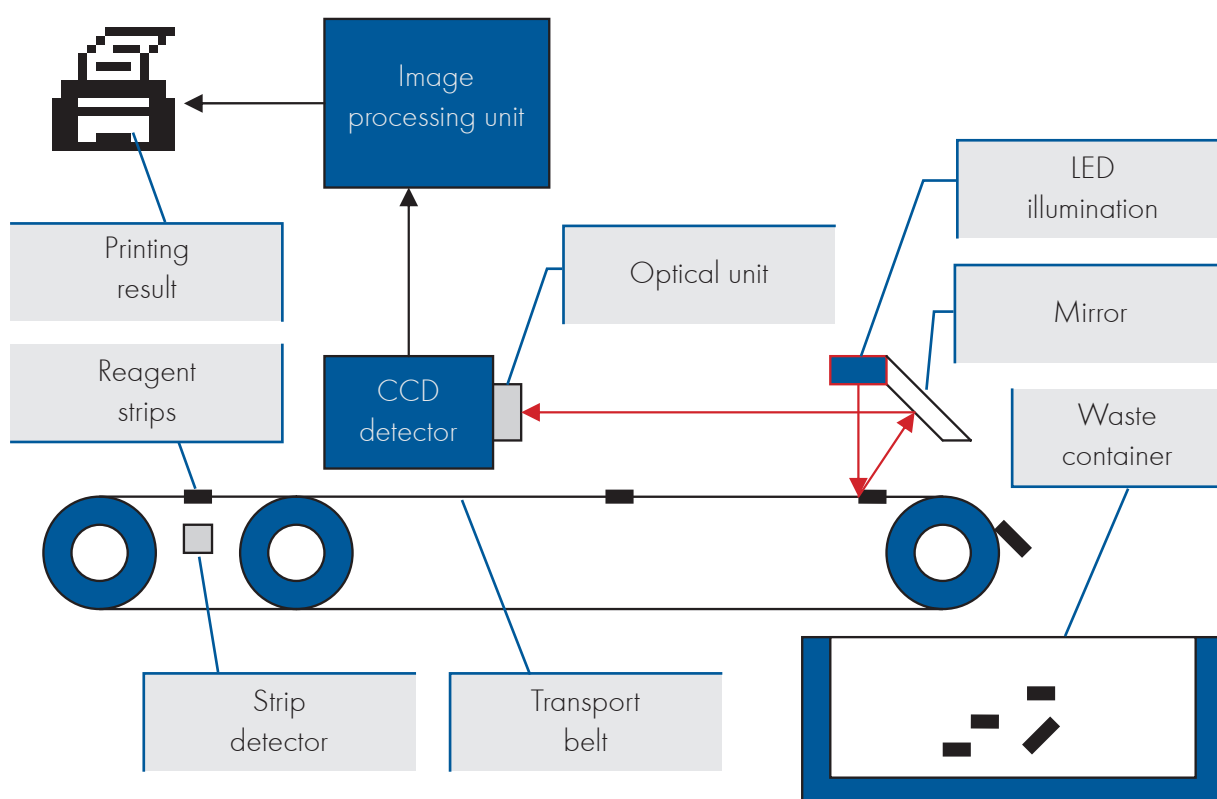
It is designed for use in medical laboratories.

The reader LAURA is a high throughput semi-automatic instrument. The user has to dip the strip into the urine sample, and places it into the reader slot, the rest of the measurement: timing, measurement and displacement of the strip is done by the reader.

1.2 Measurement principle

The following drawing shows the theoretical working function of the reader LAURA. The strip is placed onto the transport belt section 1. The detector recognizes the strip and turns the movement on. The strip reaches the measuring position at about 55 seconds after being placed onto the belt. The measurement area is illuminated by LEDs. The reflected light is directed into the CCD unit with help of a mirror and an optical unit.

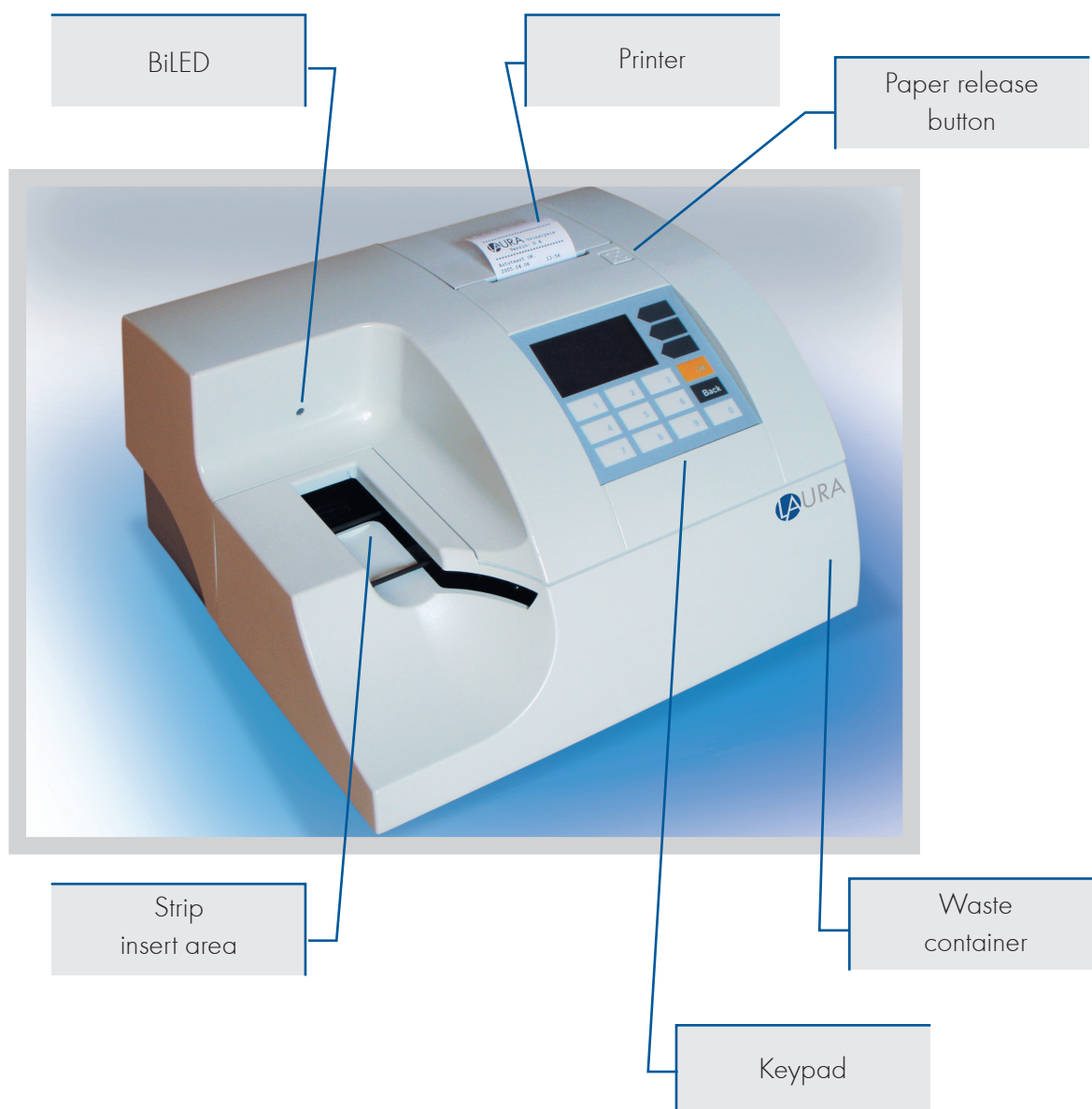
The CCD converts the light into a digital value. This value is transmitted to the computing unit (microprocessor), which calculates the result and sends it to the built-in printer.



1.3 Buttons and interfaces

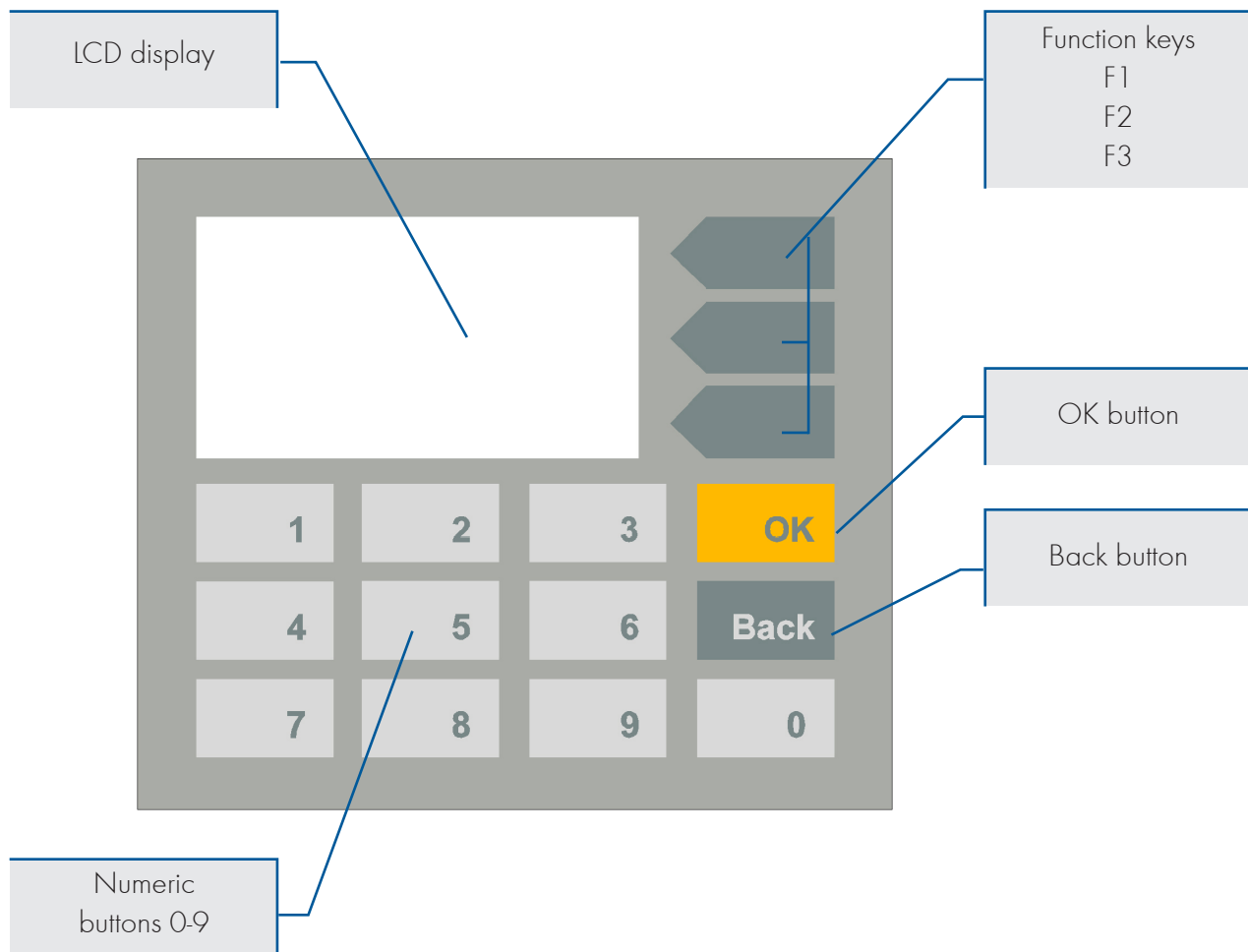
1. Introduction

1.3.1 Overview of the instrument



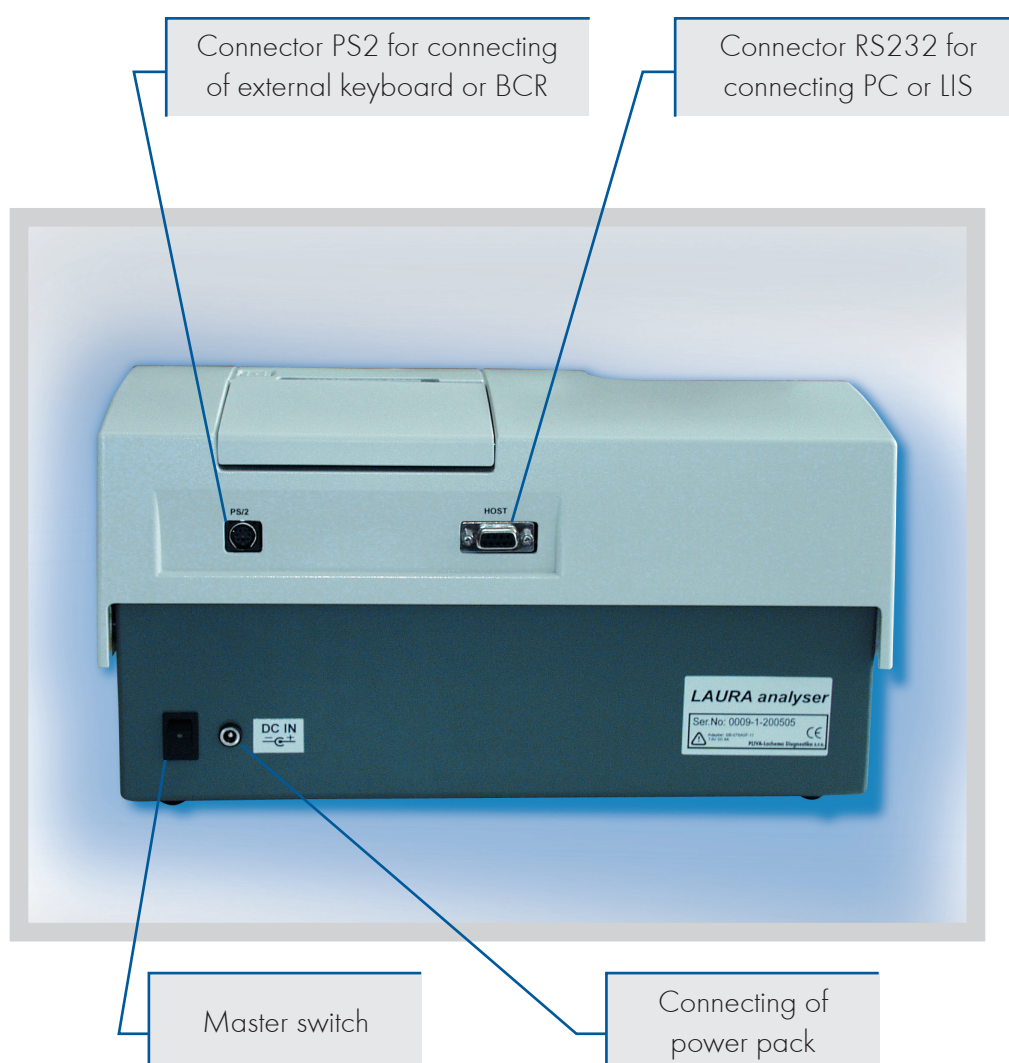
1. Introduction

1.3.2 Overview of the keypad



1.3.3 Overview of connection the instrument

1. Introduction





1. Introduction

1.4 Icons and abbreviations



- Select among options



- Jump to the next item



- MENU icon



- Printing



- Skip actual item



- Stop actual process

ID

- Patient identification code
(a figure or a text, max. 13 chars)

Seq. No

- Sequence number of the measurement

Sample

- Urine specimen to be measured

REM

- Remission value

BCR

- Barcode reader

Host

- Computer (Laboratory Information System)

BiLED

- Bicolor (red/green) LED over the strip insert area

2.1 Unpacking

After unpacking the instrument, please check carefully that the package contains all the parts listed below, and all of them are in a good condition.

2. Installation



Figure 1

- Reader LAURA
- Adapter with 230 V cable
- 2 sets of rubber belts
- Serial interface cable
- 2 rolls of thermal printer paper
- A tube with control grey strips
- User manual

2. Installation

2.2 Set up the instrument

Please follow the steps below:

- **Select the working place**
Choose a place for the reader, which is flat and clear.
Do not place the device close to a window, centrifuge or heating surface. Protect it from direct sunlight, vibration and extreme temperature.

- **Assemble the reader LAURA**
 - Placing rubber belts

Refer to the picture:

Pull the bottom plastic part to the front and open the upper part by lifting.

Insert 1 set of rubber belts to the axes in the following order: 1 long, 2 short, 1 long.

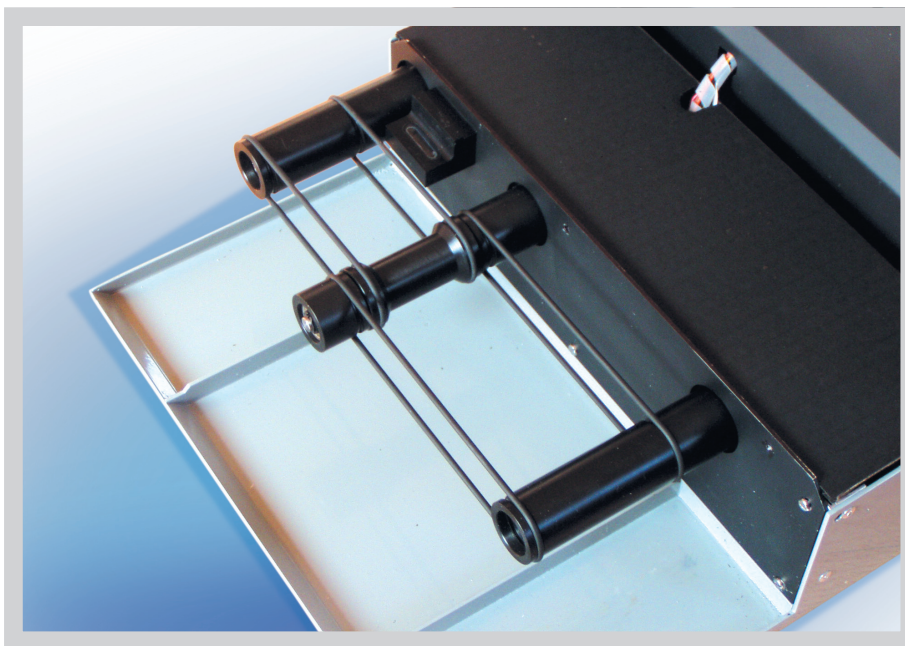


Figure 2

(The other set of rubber belts is for spare.)

Check if the belts are placed in correctly.

Close the instrument by turning the upper part down and pushing the bottom part back to its place.

- **Connect to the power supply and interfaces**



Check if the main switch on the rear side is turned off!

- Insert the serial cable and the keyboard or BCR to the reader. Use the PS2 input for BCR.
- Insert the adapter output plug into the reader LAURA!
- Insert the adapter main cable into the net.

2. Installation

- Inserting the printer paper

- Open the printer cover by pressing the release button!
- Place the paper roll to its holder and pull out approx. 10 cm of the paper to the front. Bend it onto the LCD part. Check if the paper lies between the 2 metal ears of the printer.
- Close the cover while holding the paper tight with one hand. (Figure 3)
- Push the cover to the middle of both sides until it clicks into its place.



Never push the cover asymmetrically!



Figure 3

Now the reader LAURA is ready to turn on, switch on the main switch!

After power on the LCD lights up and the reader carries out a Self-Test. During this test the optical unit and the built-in calibration strip is tested.

After having completed the test successfully, the reader prints out the „OK“ message and goes into the Standby mode.

The reader LAURA is now ready for measurement.

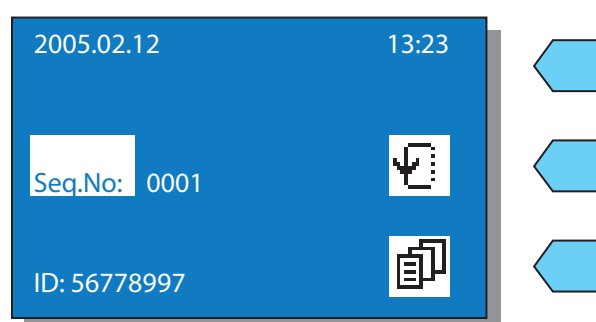
3. Routine operation overview

3.1 Standby

This is the status where the instrument arrives after having completed the Self-Test and waits for user action. The user can either:

- Start a new measurement process, by placing a strip on the belts, or
- Enter the menu by pressing the MENU icon.

In Standby mode the reader LAURA is ready to measure, the bicolor LED lights green over the strip insertion area and shows that the reader can accept the next strip. The SeqNo and the ID of the next strip is displayed on the LCD.



3.2 Measurement

The reader LAURA enters the measurement status automatically when a strip is placed in.

To carry out a measurement perform the following steps:

- Change the SeqNo or ID if necessary
- Dip the strip into the urine sample
- Remove excess urine from the strip
(Press the edge of the strip to an absorbent paper, refer to the user manual of the strip.)
- Insert the strip into the instrument. Place it on the rubber belts, and push it as far as to the bumper. (Figure 4).

The reader LAURA has a built-in strip detector at the end of the insert area, under the belts. If the strip is placed correctly, this detector will recognize it and the bicolour LED will flash on green.

- After a couple seconds (2-7) the bicolour LED turns red and the reader shifts the strip away.



Do not touch the strip when the red LED is on!

The strip will reach the measurement position after 55 seconds. The reader measures the strip and prints out the result.

- The reader LAURA increments the SeqNo automatically and displays it. The bicolour LED turns back green and the reader can accept another strip. The minimum time between placing two strips on the belt is 9 seconds.
- After the strip was measured, it falls into the waste container.

When all placed strips have been measured, the instrument stops the transport belts and turns back into Standby. The type of the strip (DekaPHAN® LAURA or HeptaPHAN® LAURA) will be recognised automatically.

3. Routine operation overview

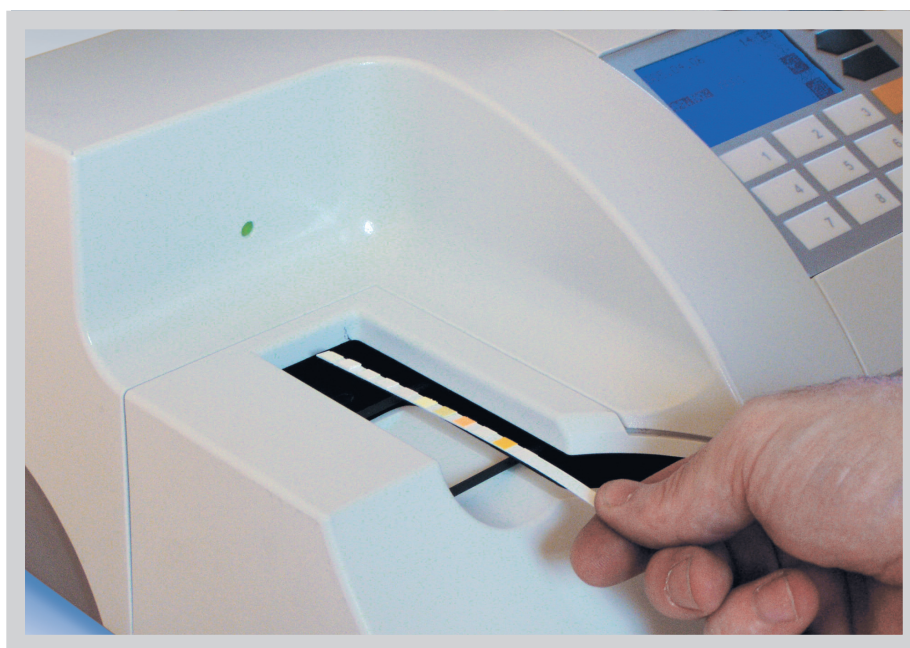


Figure 4

The instrument counts the amount of placed strips and gives a warning message when it reaches 100 pcs:

Waste container full!

In such a case the reader doesn't accept more strips. Don't touch the icon STOP. Wait until the already placed strips will be processed and the measurement stops automatically. Then make the container empty, and continue the measurement.

3. Routine operation overview

3.3 Sample identification

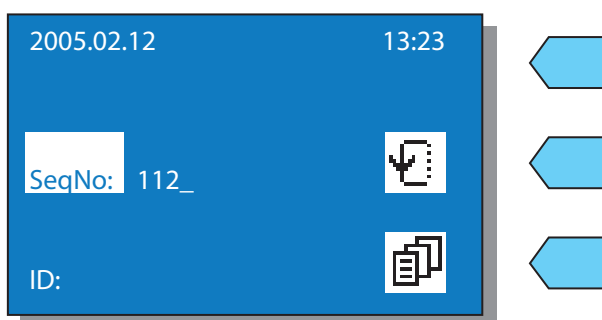
The reader LAURA supports 3 different sample identification modes:

- SeqNo mode – working with Sequence Number
- Single ID mode – enter ID for each strip before inserting it
- Worklist mode – enter IDs in batch before starting the measurement

1. SeqNo mode

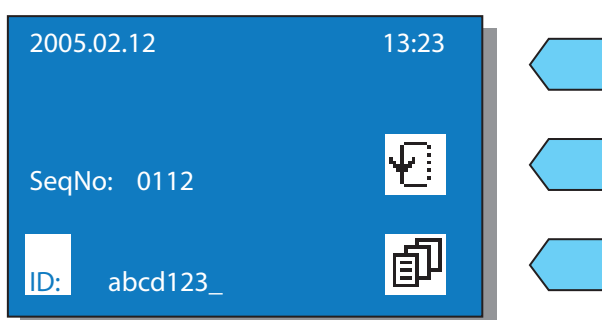
In Seq No mode the user can assign an individual SeqNo to every sample, before the strip is inserted into the reader. This SeqNo will be increased automatically by the instrument. The SeqNo mode is selected if the SeqNo is highlighted on the display.

The SeqNo is a figure between 1-9999.



2. Single ID mode

This mode is selected if the ID is highlighted. Press the F2 function key to change the selection. In this case the user must enter an ID before the reader accepts the strip. The bicolour LED is off until an ID is entered. The user can enter an ID by using the numeric buttons or an external keyboard or BCR. The ID is an alphanumeric text, max. 13 chars long. After the ID is set, the bicolour LED lights green and the strip could be placed.



3. Worklist mode

In this mode, more sample IDs could be entered before the measurement is started. The reader LAURA can accept 100 sample IDs and store them in memory. After all the IDs are stored, the measurement can be started. The reader displays the ID of that strip which is to be placed next. This mode can be reached under the MENU/WORKLIST (see bellow).



Take care that the strips should be placed in the same order as the IDs were entered. Else the IDs and the samples will mix!

If a strip in the list should not be measured, press the skip button to skip its ID. For detailed description of this working mode please refer to: 4.2.1 Worklist - submenu

3. Routine operation overview

3.4 Cleaning

At the end of the working day the reader is to be cleaned.

- We recommend using the one-off waste container for collecting of measured strips, which cumulating in the waste container. Put the one-off waste container to the waste container before measurement.
- Remove the waste container, located at the right side of the bottom part
- In the case, that you don't use the one-off waste container, then
- Empty the container and clean it with usual disinfectant.
- For cleaning the belts select the MENU/CLEANING function. The belts start to move and the reader can be opened.
- Clean the belts and axes using a wet cloth, moistured with a common disinfectant.
- Pay attention that the belts remain in their track. If it is necessary, the belt could be removed and washed separately. For replacing the belts refer to „Installation“ chapter.
- Close the reader, push the bottom part back, replace the container
- Stop the belt movement by pressing the STOP icon

For disinfection, use an alcohol disinfectant (max 85 %) such as ethanol, isopropanol, if necessary!

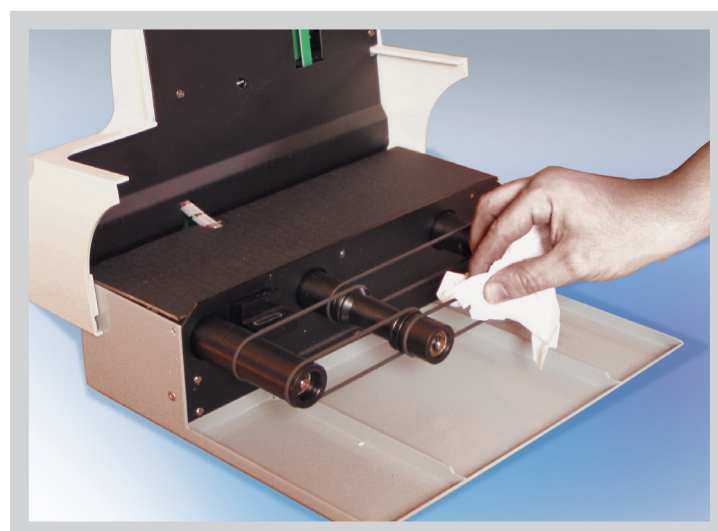
Do not touch the mirror or the internal REF strip!



WASTE DISPOSAL:

Used strip should be treated as potentially infectious and should be disposed in accordance with local and national regulations relating to safe handling of such materials. Waste is to be recycled or to be put to municipal waste.

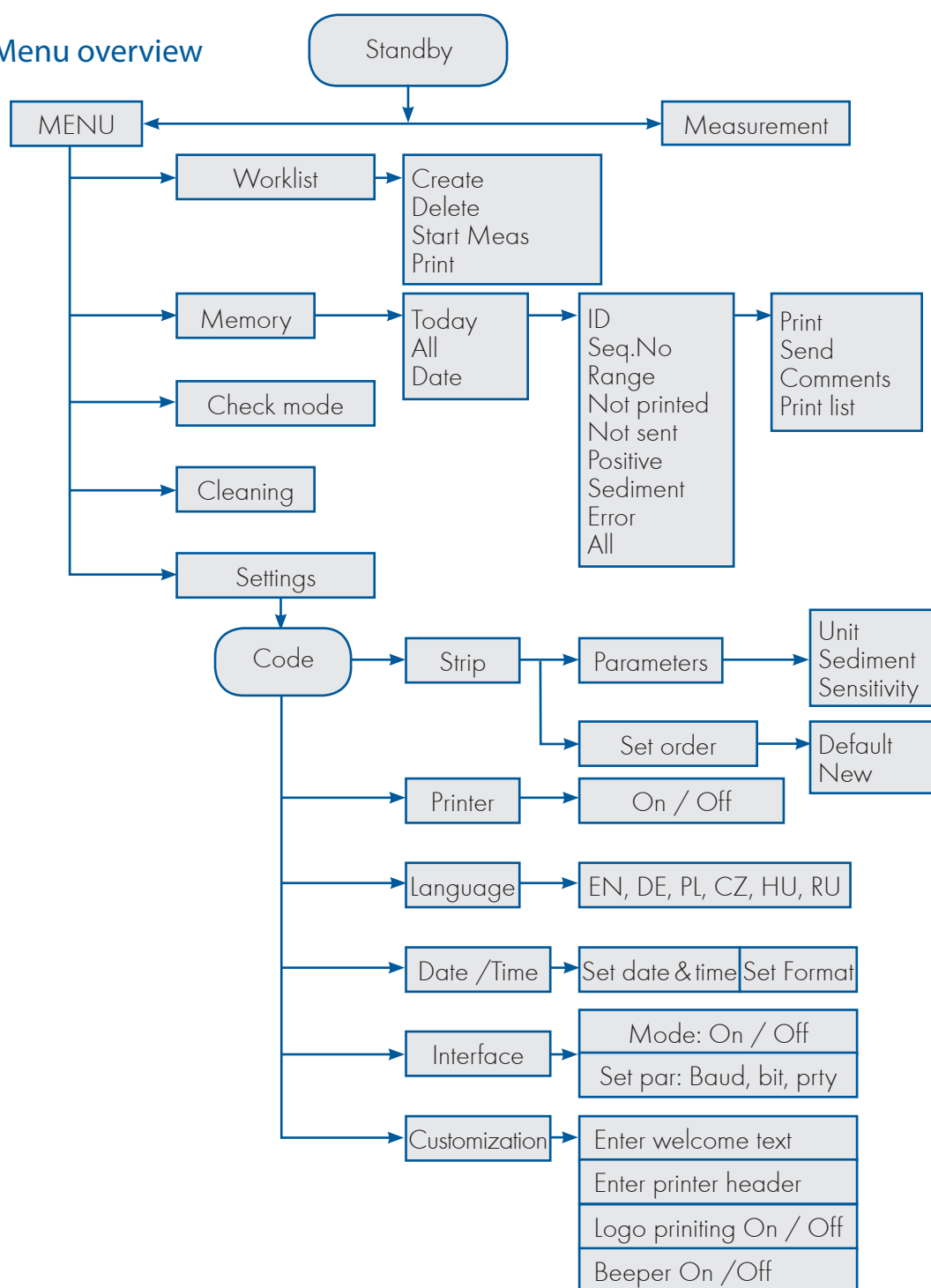
Never use acetone, petrol or other aggressive solvents for the cleaning!



4. Menu structure

The reader LAURA has a clear, well organized menu structure. The user is guided through the menu by the LCD. The menu functions are represented either by an icon for F1-3 buttons or by a numbered list. The desired function can be activated by pressing the function key next to the icon, or by pressing the related numeric button. Pressing the BACK button, the program jumps back to the previous menu level. If no button is pressed for 3 minutes, the program jumps back to Standby.

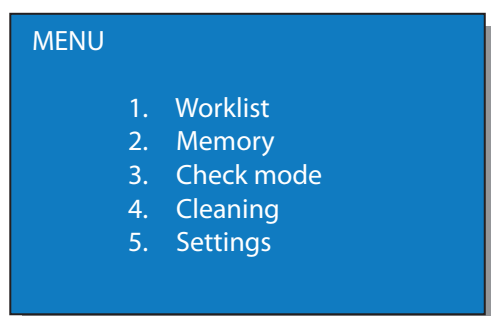
4.1 Menu overview



4.2 Main menu

4. Menu structure

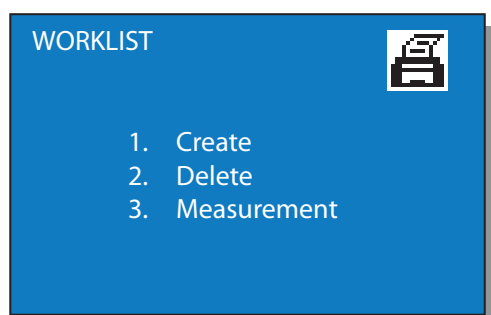
After entering the MENU  in Standby mode the following main functions are available:



The individual menu functions could be activated by pressing the corresponding number on the numeric pad.


4.2.1 Worklist submenu

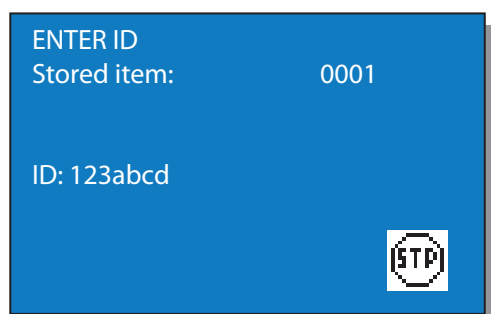
This menu serves to create a list of sample IDs and to start the measurement in Worklist mode. The following functions are available:



The actual Worklist could be printed by pressing , (F1 button).

To enter new ID, select 1:

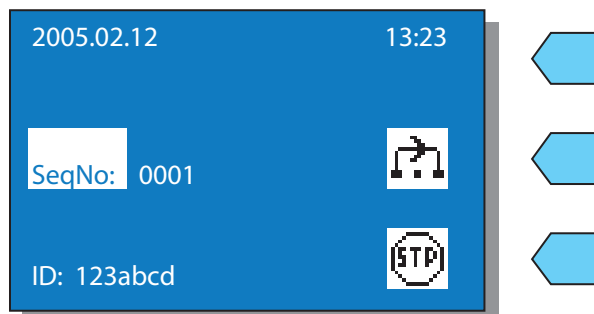
ID can be entered either by using the numeric buttons or from an external keyboard (numbers and characters) or BCR. The amount of stored IDs is displayed. Maximum 100 IDs could be preset in this way. If the Worklist was not empty when entering the Create mode, the stored items figure displays the total number of stored IDs. When the  icon (F3 button) is pressed, the process is finished and the reader jumps back to the Worklist menu.




By selecting Delete (numeric button 2), the whole work list could be deleted. The reader asks for confirmation before deletion.

4. Menu structure

The Worklist mode measurement can be started with the numeric button 3. The display shows the following information:



The ID field displays the 1st item of the worklist and the reader accepts the first strip. The reader moves the strip, the instrument asks for the next strip and displays the next stored ID. The ID of the measured samples will be removed from the worklist. The ID given by the instrument cannot be changed, only skipped by pressing the  icon. The reader jumps to the next ID and the skipped ID remains in the list for further measurement.

The sequence number of the samples can be set freely.

4.2.2 Memory

The reader has a non-volatile memory, which automatically stores the last 500 measurements. The oldest result will be overwritten by a new measurement without any warning.

When the actual measurement is finished, the reader stores the result along with the following parameters:

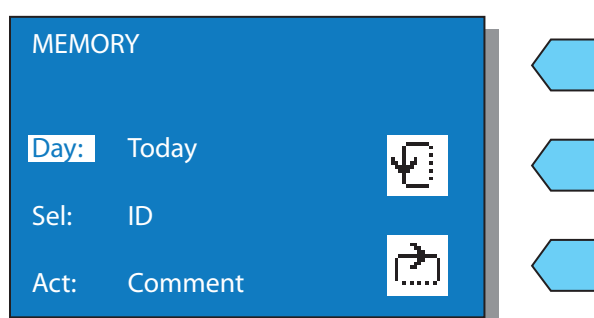
- Results for 10 or 7 parameters, in accordance with the strip PHAN® used.
- Seq.No
- ID
- Date and time

It is possible to add comments to the measurement via external keyboard (see bellow). This comment will be attached to the selected measurement and also kept in the Memory.

The user can reach the memory from the main Menu by selecting the numeric button 2.

For administration of the Memory the following display appears:

F2 and F3 buttons serve to set the selection parameters, pressing the OK button activates the selected action.



4. Menu structure

The desired measurement can be selected as follows:

- Select **Day** of the measurement:
 - Today - searching only among the today measured result
 - Specific date - specify the desired day
 - All - regardless of date
- Set the **Sel** criteria:
 - SeqNo - enter the desired SeqNo
 - ID - enter the desired ID
 - SeqNo range - enter a range of SeqNo (from - to)
 - Not printed - results that where not printed yet
 - Not sent - results that where not sent yet
 - Positive - where at least 1 value was positive
 - Sediment - if at least 1 value is higher then the sediment limit, defined under Par settings
 - Error - when the measurement failed
 - All - all stored result
- Choose an **Action**, what should happen with the selected results:
 - Print - the selected measurements will be printed
 - Send - results will be sent to HOST via RS 232 line
 - Print List - a list of SeqNo and ID of the selected measurements will be printed.
 - Comment - comment will be attached to the selected measurements


After all of the three above mentioned parameters (Day, Sel, Act) have been defined, the process can be activated by pressing the OK button.


The reader will search the Memory with the defined criteria through and print or send the results, which meet the selection.

In case that Comment is selected, the following display appears:

A comment can only be attached by using external keyboard. The typed letters appear on the LCD. At the end of the lines, the new line will be set automatically. Do not press ENTER for a new line! By pressing ENTER the comment is attached to the stored result, and the program jumps to the next measurement.



If the user does not want to add a comment to the actually displayed result, it is possible to skip it by using the  (F2) button.

When the  (F3) button is pressed, the reader closes the comment-entering mode and jumps back to the Memory menu.

4. Menu structure

4.2.3 Control measurement

The purpose of the control measurement is to verify that the optical measuring capability of the instrument is OK. Perform this test once a week, or if you receive suspicious result in normal use.

For testing the instrument grey strip pairs are provided in the reader LAURA package. The strips are labelled 1 and 2.

Perform the test as follows:

- Empty the waste container and clean it carefully!



The strip falls into the container and could be contaminated!

- Press the numeric button 3 from the main menu
- Take out one pair (1 and 2) of grey strips from the tube
- Place the grey strip 1 onto the belts
- The reader starts the measurement then expects the grey strip 2
- Place the grey strip 2 onto the belts
- Wait for the measurement is complete.

After measurement, the reader compares the obtained remission values to the predefined ranges, stored in the LAURA device, in all of the grey pads and for both wavelengths, and prints out the result in the following format:

```

LAURA TEST MEASUREMENT
2005.04.01      11:39
*****
PAD:      %Rg   %Ro

      1      696   671
      2      361   347
      3      141   132

TEST: OK
-----
  
```

Keep the printout for QC reference.

If the test fails, „Test Error“ will be printed.

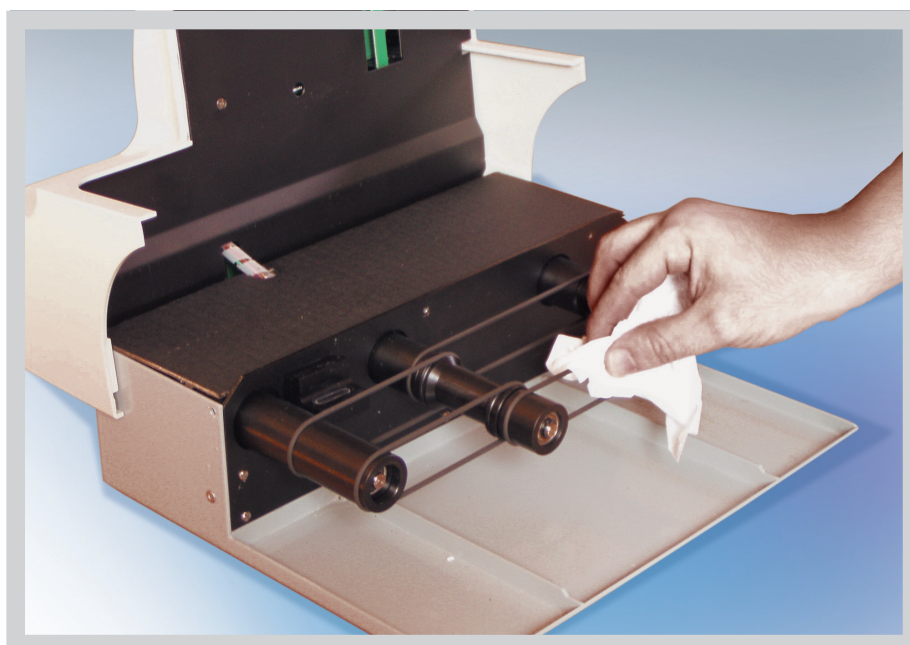
In such a case, repeat the test with another check strip pair. If it reports error again, call the service.

Keep the grey strips always in their tube, do not touch the surfaces by hand, and handle them with care. Refer to the label on the grey strip tube!

4.2.4 Cleaning

This mode assists by cleaning the transport belts. When this function is selected, the reader switches on the transport belts without starting a measurement.

The reader LAURA can be opened and the belts could be accessed and wiped off easily. To quit this mode the STOP icon is to be pressed.



Do not touch the mirror or the internal REF strip!

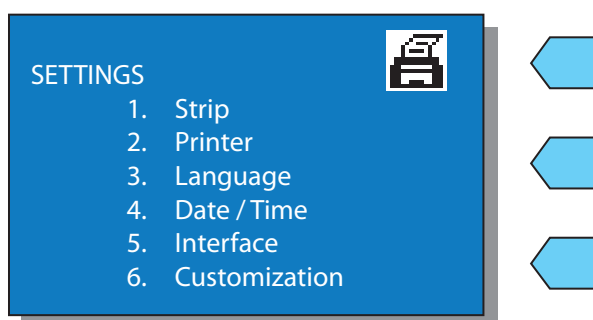
For more information, please refer to section 3.4.

4. Menu structure

4.3 Settings


In this menu point the instrument working parameters can be set. In order to avoid an accidental change of these parameters, the Settings menu is code protected. The code is **2134**. Enter this code then press OK to enter the menu.

The available settings are displayed in the following format:



The working parameters are organized in the following way:

- Strip - strip related settings
- Printer - turning the printer ON/OFF
- Language - selecting the language
- Date / Time - set the date and time and the date format
- Interface - set up the RS 232 interface parameters
- Customisation - for entering header text and logo

The actual settings can be printed and sent to Host by pressing the  icon (F1 button). The format of the sent data corresponds to the printout. ASCII text is sent with the parameters defined in the Interface submenu.

4.3.1 Strip Settings

This menu point is divided into two submenus:

- Parameter settings
- Printing order

4.3.1.1 Parameter settings

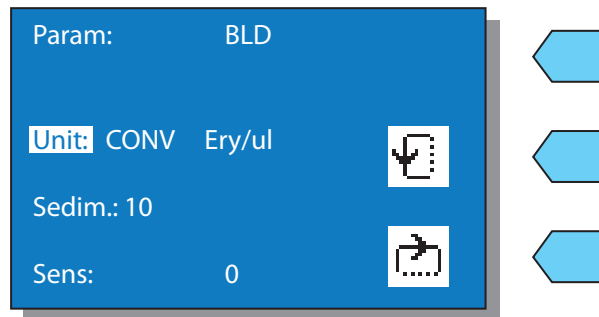
The reader LAURA allows setting the following strip parameters individually:

- Unit
- Sediment criteria
- Sensitivity

In order to set this setting, choose the parameter first.

Press the  icon until the desired parameter name is displayed on the LCD, and then press OK.

The following display will appear:





The screenshot shows a blue menu box with the following text and icons:

- Param: BLD
- Unit: CONV Ery/ul (with a unit selection icon)
- Sedim.: 10 (with a selection icon)
- Sens: 0 (with a selection icon)

Three blue arrow icons point to the right from the menu box.

4. Menu structure

The name of the parameter is displayed on the top. (e.g.: BLD for Blood). Each setting, which will follow, refers to the selected parameter. The settings could be changed with help of  and  icons. The actual setting can be stored by pressing the OK button. When the Back button is pressed, the program jumps back to the parameter selection level, none of the possible will be stored.

4.3.1.1.1 Unit settings

Unit can be selected from 3 predefined possibilities:

CONV, SI, and ARB

LAURA will print the result according the selected unit.

The unit selection has influence on serial interface protocol as well. (Please refer to chapter: Serial interface protocol).

The following table summarizes the possible reported values.

4. Menu structure

4.3.1.1.2 Parameters table

Parameter	CONV		SI		ARB
	value	unit	value	unit	value
BLD	NEG	Ery/ μ l	NEG	Ery/ μ l	NEG
	10		10		1+
	50		50		2+
	250		250		3+
LEU	NEG	Leu/ μ l	NEG	Leu/ μ l	NEG
	25		25		1+
	75		75		2+
	500		500		3+
BIL	NEG	mg/dl	NEG	μ mol/l	NEG
	1		17		1+
	3		51		2+
	6		103		3+
UBG	NORM	mg/dl	NORM	μ mol/l	NORM
	1		17		1+
	3		51		2+
	6		102		3+
	12		203		4+
KET	NEG	mg/dl	NEG	mmol/l	NEG
	5.2		0.5		\pm
	16		1.5		1+
	52		5		2+
	156		15		3+
GLU	NORM	mg/dl	NORM	mmol/l	NORM
	50		2.8		1+
	100		5.5		2+
	300		17		3+
	1000		55		4+
PRO	NEG	mg/dl	NEG	g/l	NEG
	30		0.3		1+
	100		1		2+
	500		5		3+
pH	5				
	6				
	6.5				
	7				
	8				
	9				
NIT	NEG				
	POS				
SG	1.000				
	1.005				
	1.010				
	1.015				
	1.020				
	1.025				
	1.030				

4. Menu structure

4.3.1.1.3 Sediment settings

The reader LAURA can filter the measurements in order to find out which samples should be investigated for sediment analysis. For this purpose sediment limit could be defined for each parameter. If the measured result is higher than this limit, then the measurement is marked as relevant for the sediment. After the chemical measurement is over, the instrument can print a list with the SeqNo and ID of those measurements where at least one parameter was higher than the defined sediment limit.

To do so, follow these steps:

- Select Menu
- Select Memory
- Set Day: Today
- Set Sel: Sediment
- Set Act: Print List
- Press OK

The reader LAURA will print a list of samples that should be further processed.

4.3.1.1.4 Sensitivity

The reader LAURA allows the user to slightly change the instrument sensitivity, for each parameter individually. The sensitivity can be set in ± 5 points, where:

0 :	no change,
-1 .. -5:	less sensitive,
+1..+5:	more sensitive

The sensitivity value changes the measured remission value before it is compared to the predefined remission borders. The change is valid proportionally for the whole measuring range, from NEG to the highest POS value.



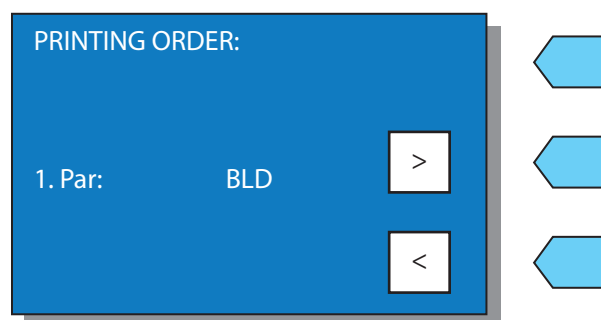
! Notice that the sensitivity has an influence on the instrument performance!

4. Menu structure

4.3.1.2 Printing order

The reader LAURA offers you the possibility to define the parameters printing order corresponding to your laboratory practice. Select the Setting / Strip / Order of Par. menu point: The DEFAULT setting means: same order as it is given on the test strip.

After selecting the New option, the following display appears:



- With help of F2 and F3 select the desired parameter, then press OK.
- The position „2. Par“ will appear.
- Repeat these steps until all the 10 parameters are set.

After that, the reader stores the new setting and this order will be used for the further result printings. This setting has only effect on the printing; the sending is always in the default order.

4.3.2 Printer Setting

In this menu point the built-in printer could be switched ON or OFF.

The factory configuration of the reader LAURA is „ON“, which means that the results will be printed immediately after measurement.

It is possible to switch this feature off, in such a case the instrument measures the strip and stores the results in the memory without printing them.

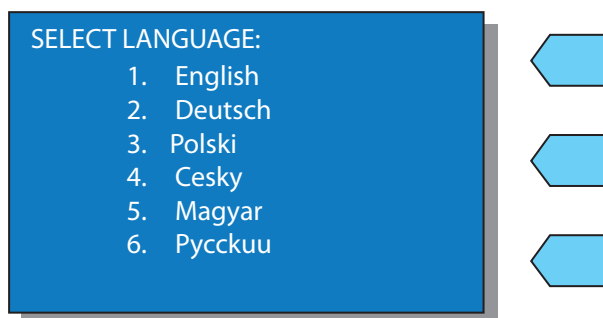
The result can be printed at any time from the memory.

Sending to Host and printing of a result are independent.

4.3.3 Language Setting

Here the user can select the language used on the LCD. The selection can be performed by pressing the corresponding numeric button; the Display and the printing are modified then.

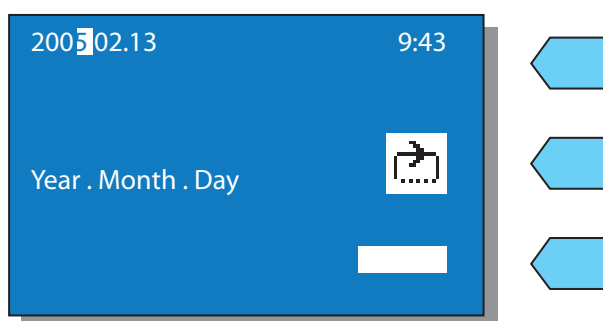
The following languages are available:



4.3.4 Date / Time setting

The reader LAURA has a built-in real time clock; the time and the Date format can be set in this menu point.

Select number 4 in settings menu; the following display will appear:



Type in the correct date and time using the numeric buttons, the highlight jumps to the next number automatically.

When the date and time is correct, select the desired format by pressing the F3 function key.

The following formats could be used:

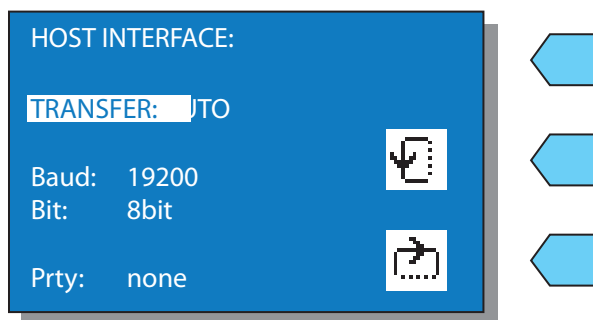
YYYY.MM.DD
DD.MM.YYYY
MM.DD.YYYY

Pressing the OK button will set the clock; if the Back button is used, the reader will jump back without storing the changes.

4. Menu structure

4.3.5 Interface setting

The reader LAURA has an RS 232 serial interface to HOST connection. This interface can be configured according to the HOST computer. The format of the data, sent through the serial line, is described bellow. In this menu point the parameters of the RS 232 interface could be adjusted as follows:



Mode: AUTO or MEMORY

If the mode „AUTO“ is on, the results will be sent to HOST immediately after the measurement; if the mode „MEMORY“ is on, the results will only be sent from the memory.

Baud: Baud rate could be selected in the range 2 400 – 19 200 Bd

Bit: bit length of 7 or 8 bits

Prty: parity none, even, or odd

Press OK to make the selection valid; press Back to jump back without saving the changes.

4.3.6 Customisation menu

The customisation menu serves to enter user-defined texts into the reader.

There are 2x2 lines, which could be set up in this way, with help of a connected keyboard:

- 2 greeting lines appear after switching the power on
- 2 lines in the measurement header, which will always be printed along with the result.

Beyond these, there are 2 additional options, which could be chosen in this menu:

- Logo ON or OFF

In case of logo ON, the  logo will be printed with every result.

- Beep On or OFF

Turns ON or OFF the beep sound at measurement when the reader moves the strip away and the next one is accepted.

5. Service information

The reader LAURA is a high sensitive and accurate optical measuring instrument.
All optical components, such as the mirror, objective, REF field are adjusted with special tools during manufacturing.
Do not remove the cover plates, and never touch the mirror and the REF field when the instrument is open for cleaning.

5.1 Troubleshooting

In case of malfunction, please refer to the following table. It helps to identify the possible cause of the malfunction and provides instruction how to solve it.

Error description	Possible cause	Corrective action
The reader cannot be switched on. The LCD remains dark.	Power supply is not connected, or wrong type.	Check the power supply and the connections.
Self-test failed.	The instrument is not closed.	Close the upper part. Insert the bottom plastic part and waste container.
The reader doesn't print, or the printing is not visible.	Paper cover is not closed. Wrong paper is in (not thermal paper). Paper is inserted with wrong side up.	Check the printer visually, for any damage or jam. Insert the right type of paper correctly. Close the printer cover.
The reader does not recognize the inserted strip. BiLED doesn't flash.	Reader is in ID mode, and no ID was given. Strip is placed extremely to side. Strip detector is dirty or damaged. Plexi cover is not in the right position.	Enter an ID. Move the strip to the middle of the insert area. Remove the plexi cover and test the detector. Check the detector for damage or extreme dirt. Push back the plexi to its position.
The reader recognises the placed strip, BiLED flashes on green, but the strip is not transported inside.	The transport mechanism is damaged. Rubber belts are missing.	Flip up the reader. Check the transport belts.
Host communication failed.	Serial cable is not attached or wrong. Interface mode is turned OFF, or parameter doesn't match with HOST settings.	Check the cable! Check that interface mode is ON and parameters are correct.
Reader displays Measurement Error.	Strip is placed wrong. Wrong strip is used. Dry or not fully moistured strip is used.	Repeat the measurement with correct strip.

Number of error codes	Code	Description
1	ERR_EE	EEprom fails HW error
2	ERR_RTC	RTC ack fails HW error
3	ERR_COMM	Communication error
4	ERR_EXTLIGHT	Extern light too high
5	ERR_WRONGSTRIP	Wrong strip
6	ERR_STRIPWIDTH	Strip too wide
7	ERR_SRSTRIP	Strip angle too high
8	ERR_DRYSTRIP	Strip not inserted fully in sample
9	ERR_PAPER	Printer out of paper
10	ERR_LOGIN	Login failed not implemented
11	ERR_OPEN	Upper part open
12	POP_EMPTY	Memory empty
13	POP_EMPTYWL	Worklist empty
14	POP_NEWVAL	Setting stored

5. Service information

5.2 Service information

In case of malfunction, try to solve the problem according to the troubleshooting guide first. If the problem persists, please contact your distributor for service.



! Never open the cover plates of the reader.

5.2.1 Safety information

The reader LAURA complies with the EMC directive 89/336/EEC and low voltage directive 73/23/EEC.

The reader LAURA in combination with test strips Dekaphan® LAURA and Heptaphan® LAURA complies with the requirements of the IVD directive 98/79/EC.

5.2.2 Guarantee conditions

The guarantee conditions are included in the sales agreement.

5.2.3 Ordering information

	Cat. No.:
LAURA reader	- 50001727
Dekaphan® LAURA	- 10008297
Heptaphan® LAURA	- 10008298
LAURA one-off waist container	- 50003091
Control strips LAURA	- 50003491

5.2.4 Producer

Producer of the system LAURA and diagnostic strips PHAN®:

PLIVA-Lachema Diagnostika s.r.o.
Karásek 1, 621 33 Brno
Czech Republic

5.2.5 Technical parameters

5. Service information

General	Dimensions	430×290×170 mm
	Weight	7 kg
	Power source	External adapter 7,5 V DC / 6 A, 90–230 V/ 50–60 Hz
	Power consumption max / standby	45 W / 6 W
Measurement	Method	Reflection photometry
	Throughput	max. 400 Strips/hour
	Wavelength	535, 610 nm
	Optic viewing area	100 mm
	Pixel resolution	640 pixels / 100 mm
	AD resolution	12bit
User Interface	Printer	58 mm graphical thermal printer, 24 chars/line
	LCD	128×64 pixel graphical blue backlight, 8×21 char
Memory	Capacity	500 measurement results with date, ID, and comments
	RTC	Lithium battery for keeping real time clock on
Interfaces	Host interface	RS 232 Serial interface, 2400–19200 Bd
	BCR	Wedge type BCR with standard PS2 interface, max. range 13 chars
	PC AT / keyboard	Wedge type BCR with standard PS2 interface
Recommended operating environment	Temperature	15–35 °C Optimal range 20–25 °C
	Humidity	20–80 %
	Place	Horizontal surface No shock or vibration
Storing / transport	Temperature	-20 – +60 °C
	Humidity	20–90 %

6. Serial interface protocol

The LAURA has an RS 232 interface to HOST computer. If the communication is enabled (TRANSFER: AUTO) the reader sends out the result immediately after measurement. Stored measurements can also be sent at any time.

The parameters of the port can be set in the SETTING/INTERFACE menu within the following ranges:

Baud rate: 2 400, 4 800, 9 600, 19 200 Bd

Bit length: 7, 8

Parity: No, Even, Odd

The interface has a DB9 mother type connector with the following PIN connection:

PIN number	Connected
2	TxD
3	RxD
5	GND
1, 4, 6, 7, 8, 9	- not connected

The communication is unidirectional LAURA → HOST, in ASCII text form.

The reader sends 1 result in 1 package. Every package has the same format, which is:

Name of field	Characters sent out										# of bytes	
Frame start	STX										CR, LF	3
Strip name line	10 char long name of strip				14×SP				CR, LF	26		
SeqNo line	“Seq.No:” 7 char		SP	4 char long Seq number, right justified, filled with 0					CR, LF	26		
ID line	“Pat.ID:” 7char		SP	14 char long ID				2×SP	CR, LF	26		
Date line	YYYY.MM.DD				6×SP		HH:MM		3×SP	CR, LF	26	
1 st . result line	‘*’ or SP	SP	3char par. name	SP	5char result	SP	6char unit	SP	5char ARB result	CR, LF	26	
10 th . result line	‘*’ or SP	SP	3char par. name	SP	5char result	SP	6char unit	SP	5char ARB result	CR, LF	26	
Comment line	{	80 char long comment or space								}	82	
Frame end	ETX										1	

Where:

- STX = 0×02, ETX= 0×03, CR=0×0d, LF=0×0a, SP=0×20
- Each information is arranged in lines 24 char + CR, LF
- The parameter order is the default one regardless of printing order.
- In case of Hepta-PHAN, only 7-parameter-line is sent
- The result and the unit depends on the selected unit (SETTINGS/STRIP/PARAMETER)

7. Short instructions

1. Check carefully if the instrument is complete and all parts are placed in correctly (waste container, transport belts etc.)
2. Connect the instrument to the plug with the relevant cable, check if there is a connection between the instrument and external plug.
3. Switch on the instrument with the main switch.
4. Wait till the instrument performs the self-test.
5. Set the mode of the results (direct printing after analysis, printing after measurement of all samples, sending to the external net etc.).
6. Now you can start with measurement in the mode SeqNo or you can start with creating of the worklist in MENU/Worklist.
7. Complete the measurements of urine samples; follow all recommendations during the operation, which are included in the instruction of the diagnostic strips.
8. Perform the everyday cleaning after having finished your daily measurements.
9. Now you can leave the instrument switched on in Standby mode or you can switch it off using the main switch.

8. Index

Adapter	8, 9, 30
Beep	27
Belts	3, 9, 11, 14, 19, 20, 27, 32
Control measurement	19
Cleaning	14, 15, 20, 32
Customization	21, 27
Date	15, 17, 21, 26
ID	7, 11, 13, 14, 15, 16, 17, 18, 24
Installation	8, 9,
Interface	8, 21, 27, 30
Introduction	3, 4, 5, 6, 7
Language	15, 21, 26
LCD	5, 10, 11, 15, 18, 21, 26, 30
LED	3, 4, 7, 11, 13
Logo	21, 27
Memory	15, 17, 24, 27
Paper	4, 8, 10, 28
Parameter	17, 21, 22, 23, 24, 25, 27, 30
Power	6, 27, 28, 30
Printer	4, 10, 21, 25, 28, 30
Rubber belts	8, 9, 28
Sample	3, 7, 11, 13, 17, 24, 32
Sediment	18, 21, 24
Sensitivity	21, 24
SeqNo	7, 11, 13, 15, 17, 18
Set up	9, 21, 27
Settings	21, 22, 24, 25, 26, 27
Standby	10, 11, 12, 15, 16
Technical parameters	30
Time	17, 21, 26
Unit	15, 21, 22, 23
Unpacking	8
Worklist	13, 14, 15, 16, 17, 32