AURA®

BLUE POINT OF QUALITY

USER MANUAL

Last revised: 02-2011

Contents

1. Introduction

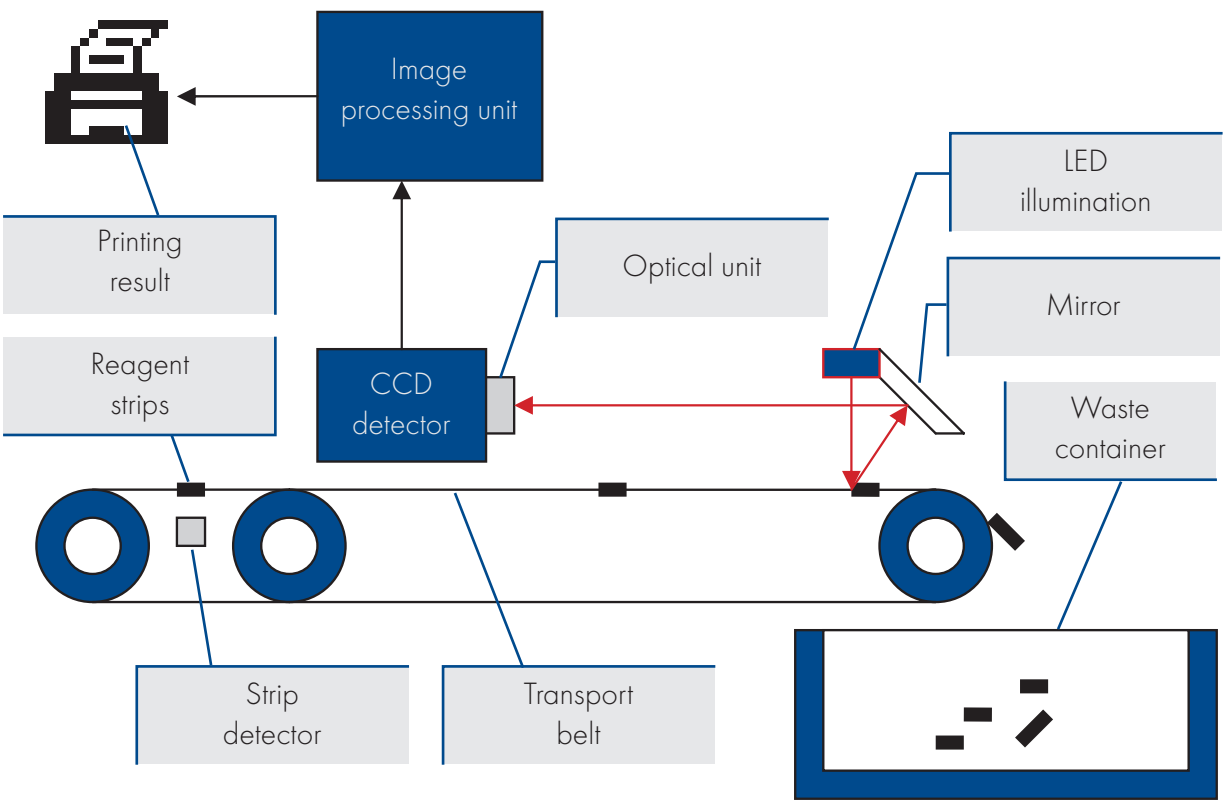
This manual contains operation and maintenance instructions for the LAURA photometer.

1.1 Intended use

The reader LAURA is a reflectance photometer for semi quantitative urine analysis using test strips PHAN® LAURA.
The reader LAURA 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.

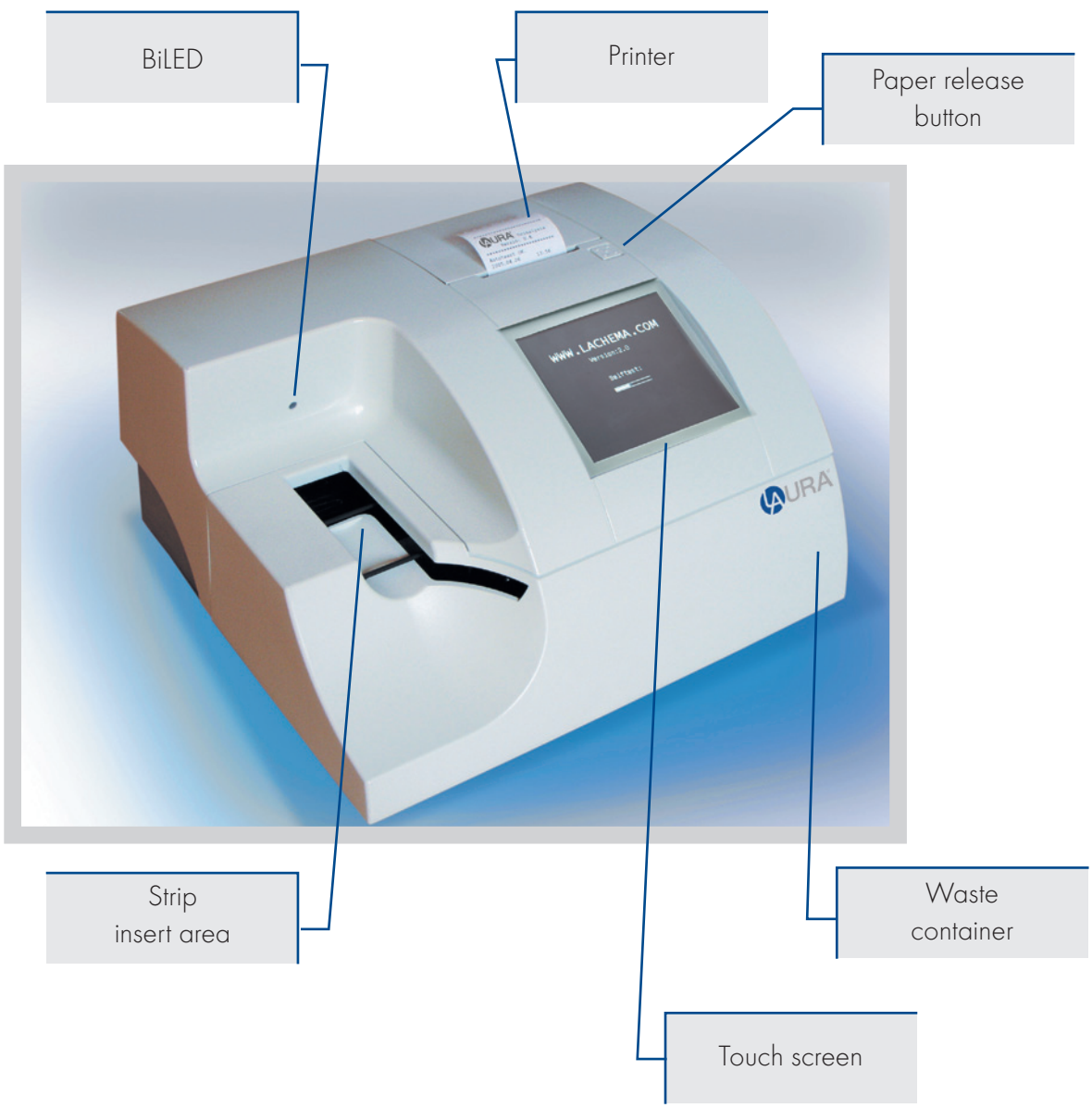
1.2 Measurement principle

The following drawing shows the theoretical working function of the reader LAURA.
The strip is inserted onto the transport belt section. The built-in strip detector recognizes the strip and starts to movement on. The strip reaches the measuring position after approx. 55 sec. after placing on transport belts. The measurement area is illuminated by LEDs. The reflectance light goes directly into CCD unit with help of mirror and an optical unit.
The CCD unit converts the reflectance light to the digital value and this value is transmitted to the microprocessor, which calculates the concentrating results and printed them by the built-in thermo printer.

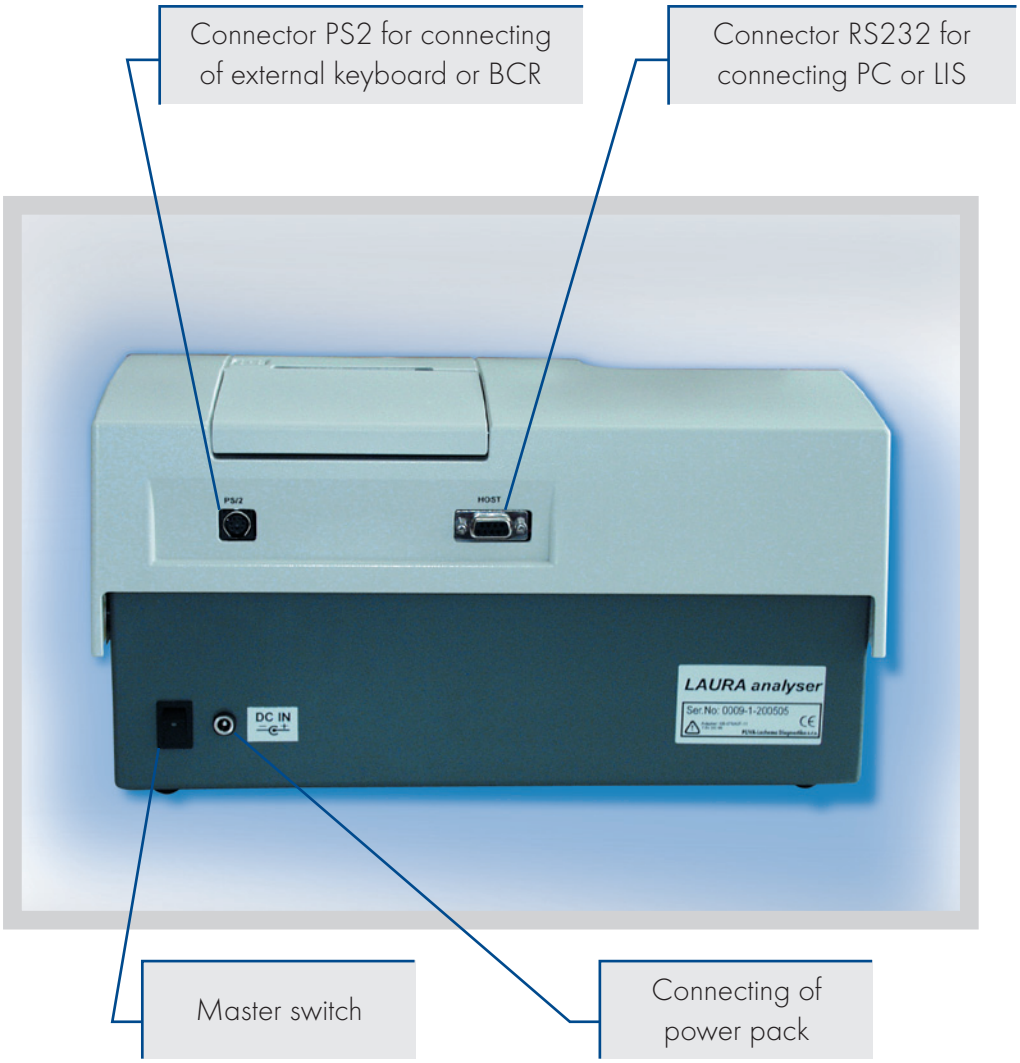


1.3 Buttons and interfaces

1.3.1 Overview of the instrument



1.3.2 Overview of connection of the instrument



1.4 Icons and abbreviations

ID	-	Patient identification code (a figure or a text, max. 15 characters)
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	-	Bicolour (red/green) LED over the strip insert area

2. Installation

2.1 Unpacking

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

Figure 1

- LAURA reader
- DC Adapter with 230 V (AC) cable
- Serial interface cable
- 2 sets of transport belts
- 2 rolls of thermo printer paper
- Tube with control grey strips
- User manual

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 the window, centrifuge or heating surface. Protect it from the direct sun light, the intensive artificial light, vibrations and extreme temperature.

- Assemble the reader LAURA
  - o Placing transport belts

Refer to Fig 2.
Pull the bottom plastic part to the front and open the upper part by lifting.
Insert 1 set of transport belts to the axes in the following order: 1 long, 2 short, 1 long.

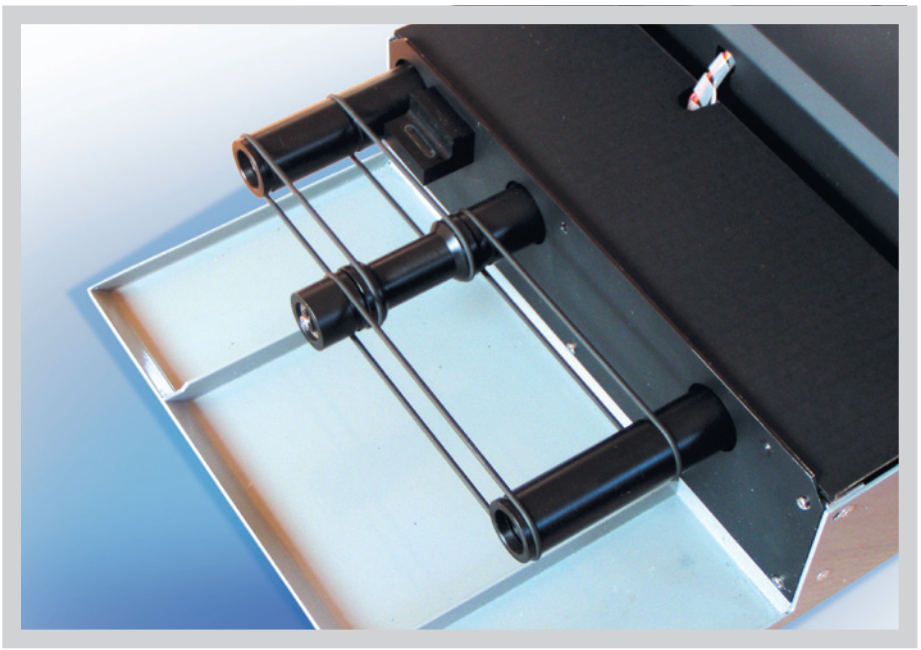


Figure 2

Save the next set of transport belts as spare part.
Check if the belts are placed correctly.
Close the instrument by turning the upper part down and pushing the bottom part back to its place.

- Connect the power and interfaces

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

- o Insert the serial cable and the keyboard or BCR to the reader; use the PS2 input for the keyboard/BCR.
- o Insert the adapter output plug into reader.
- o Insert the adapter main cable into the net.

2. Installation

- Inserting of the printer paper

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

Never push the cover asymmetrically!

Figure 3

The reader LAURA is now ready to be turned on; switch on the master switch!

After power-on the display lights up and the reader carries out a self test.
During this test the optic and the built in calibration PAD is tested.
After having completed the test successful, the reader prints out the "OK" message and goes into the Standby mode.

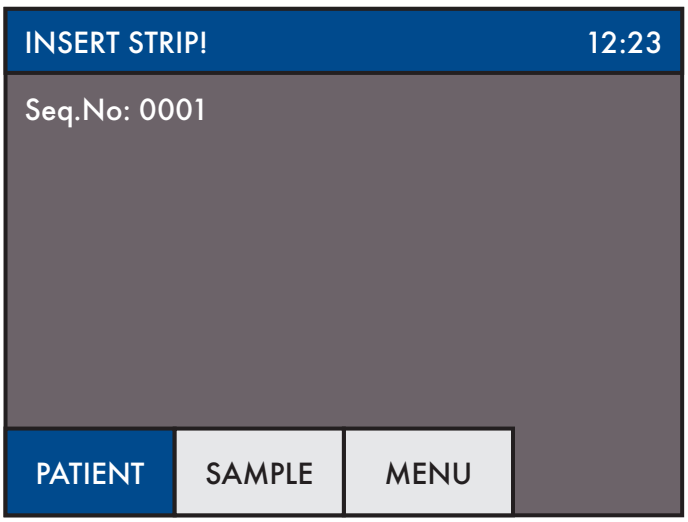
The reader is now ready for measurement.

3. Routine operation overview

3.1 Ready to measure status

This is the status where the instrument after performing the self test waits for user command. The instrument has a touch-sensitive display. The user can control the instrument by pressing the displayed buttons.

In the *Ready to Measure* status the following possibilities are available for the user:



Start a new measurement process by placing a strip on the transport belts in the insert strip area. In ready to measure mode the reader LAURA is ready to measure, the bicolour 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 touch screen.

- Enter patient information:
  - Seq.No
  - ID

- Enter sample information:
  - Select a sample colour from the predefined list
  - Select a sample clarity from the predefined list
  - Insert comment

- Enter the menu by pressing the MENU icon.

3. Routine operation overview

3.2 Measurement

The instrument LAURA begins the measurement automatically when a strip is placed on the strip area on the transport belts.

To carry out a measurement do the following steps:

- Enter a new Seq.No. or ID if necessary
- If you want to define appearance of the sample, select a colour or clarity from the offer
- Dip the reagent strip into the urine sample
- Remove excess urine from the strip (Push the edge of the strip to an absorbent paper, follow instruction for the strips PHAN® LAURA)
- Insert the strip into the insert strip area on the transport belts

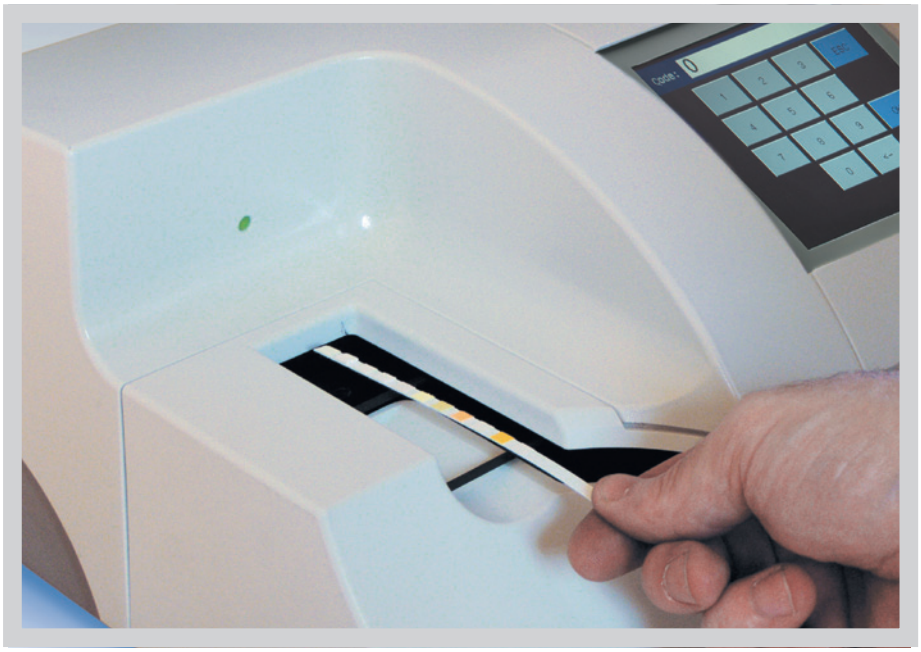


Figure 4

LAURA has a build-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 green.
After a few seconds (2-7 seconds) the bicolour LED change the colour to the red and reader LAURA shift the strip into reader.

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 the result.

- The reader LAURA increments the Seq.No. 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.

The other result parts are stored in the memory.

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.

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

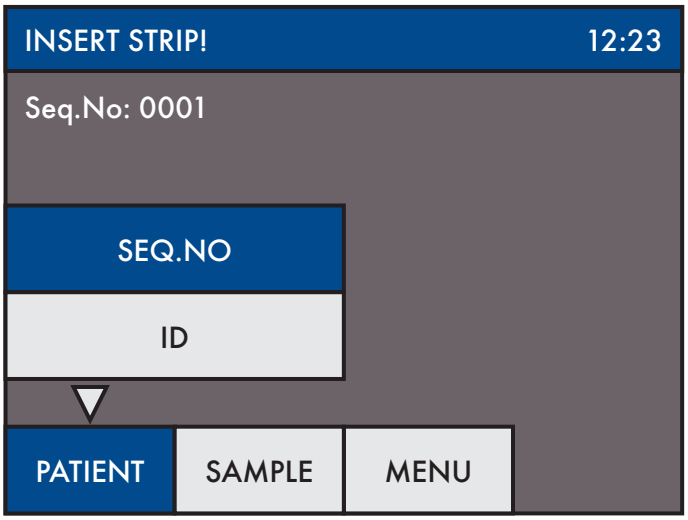
Waste container full!

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.

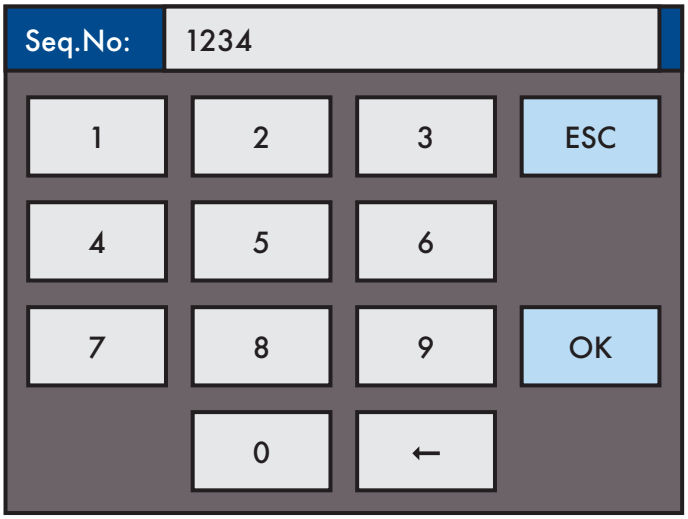
3.3 Patient identification

LAURA reader supports 3 different sample (patient) identifications:

- Seq.No – working with Sequence Number
- Patient ID – working with Identification number
- Work list – create the list of patients' ID before measurement



Seq.No.
In order to enter a new Seq No the user has to touch the *PATIENT* button and then select the *SEQ.NO* button.

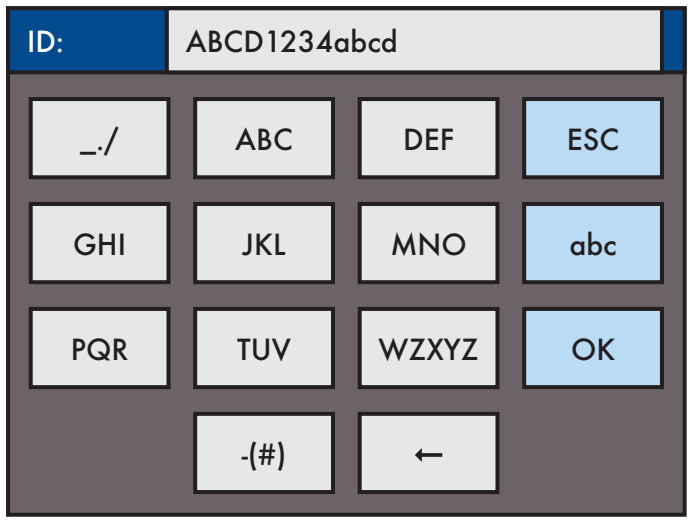


The following numeric PAD will appear and the user can type a number between 1-9999.

3. Routine operation overview

Patient ID

After selecting the ID button a similar edit field appears, where the user can enter a max 15 characters long ID string. This ID could also be entered with help of an external keyboard or a barcode reader in the *Ready to Measure* status.



Work list

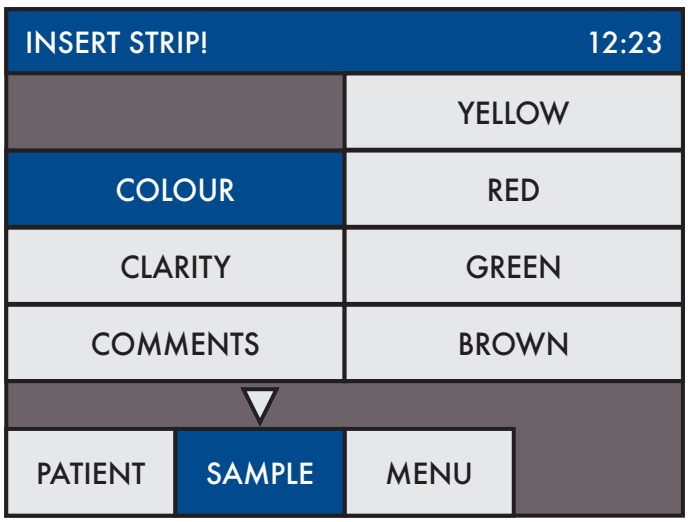
In this mode, more sample IDs could be entered before the measurement is started. The reader LAURA can accept 100 sample IDs and store them in memory. After all the IDs are stored, the measurement can start. The reader displays the ID of that strip which is to be placed next. This mode can be reached 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 Work list – submenu

3.4 Colour and clarity

Before placing the strip to the transport belts, the user can set the colour and clarity information of the sample.



Colours and clarities are predefined and can be modified by the user in the customisation menu (see 4.6). There are four different colours and four different clarities available.

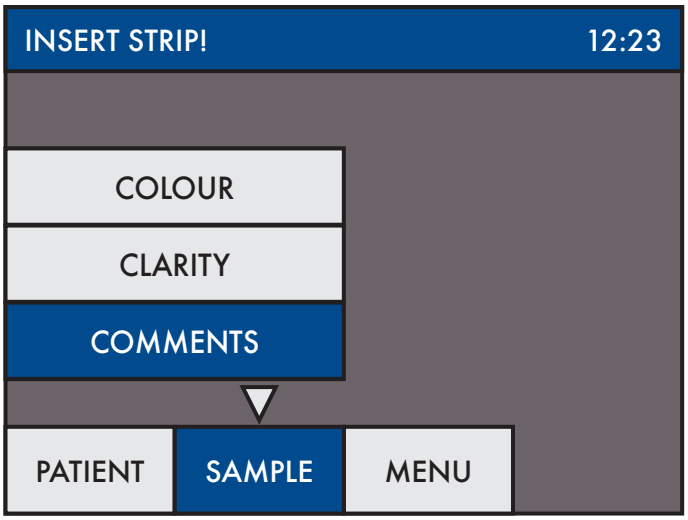
The colour and clarity information will be listed after pressing the following buttons:
***SAMPLE* and *COLOUR* or *CLARITY*:**

Pressing the desired button will select the corresponding information. It will appear on the display and will be added to the next measured sample.
For deleting the previously selected information, the user can go into the selection menu again but instead of selecting a value from the list the COLOUR or CLARITY button has to be pressed again. In this case the program clears the previously set value.

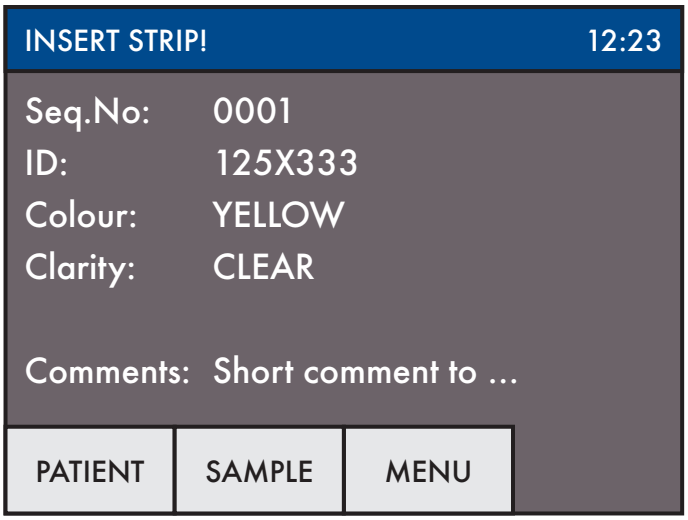
3.5 Comments

It is possible to add comments (39 characters long) to the measurements at two different points:

- Before the measurement
- When the result is selected from the memory



To add a comment before a measurement starts use the following buttons:



This picture shows an example screen when all measurement related parameters are set:

Possibility to add the comments after measurement is in menu MEMORY, please refer chapter 4.2.2

Remember that if you add any comments before measurement and would like to add next comments after measurement to the same sample, you have to overwrite the previous text, in other case will be the previous text deleted.

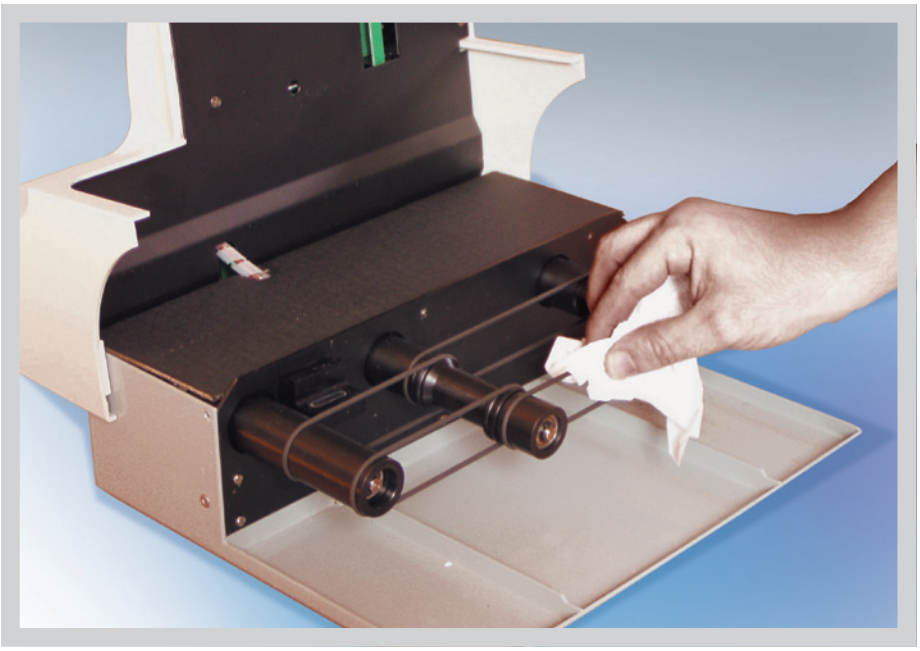
3. Routine operation overview

3.6 Cleaning

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

- We recommend using the one-off waist container for collecting of measured strips, which cumulating in the waist container. Put the one-off waist container to the waist 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 waist 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, moistures 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, and 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:

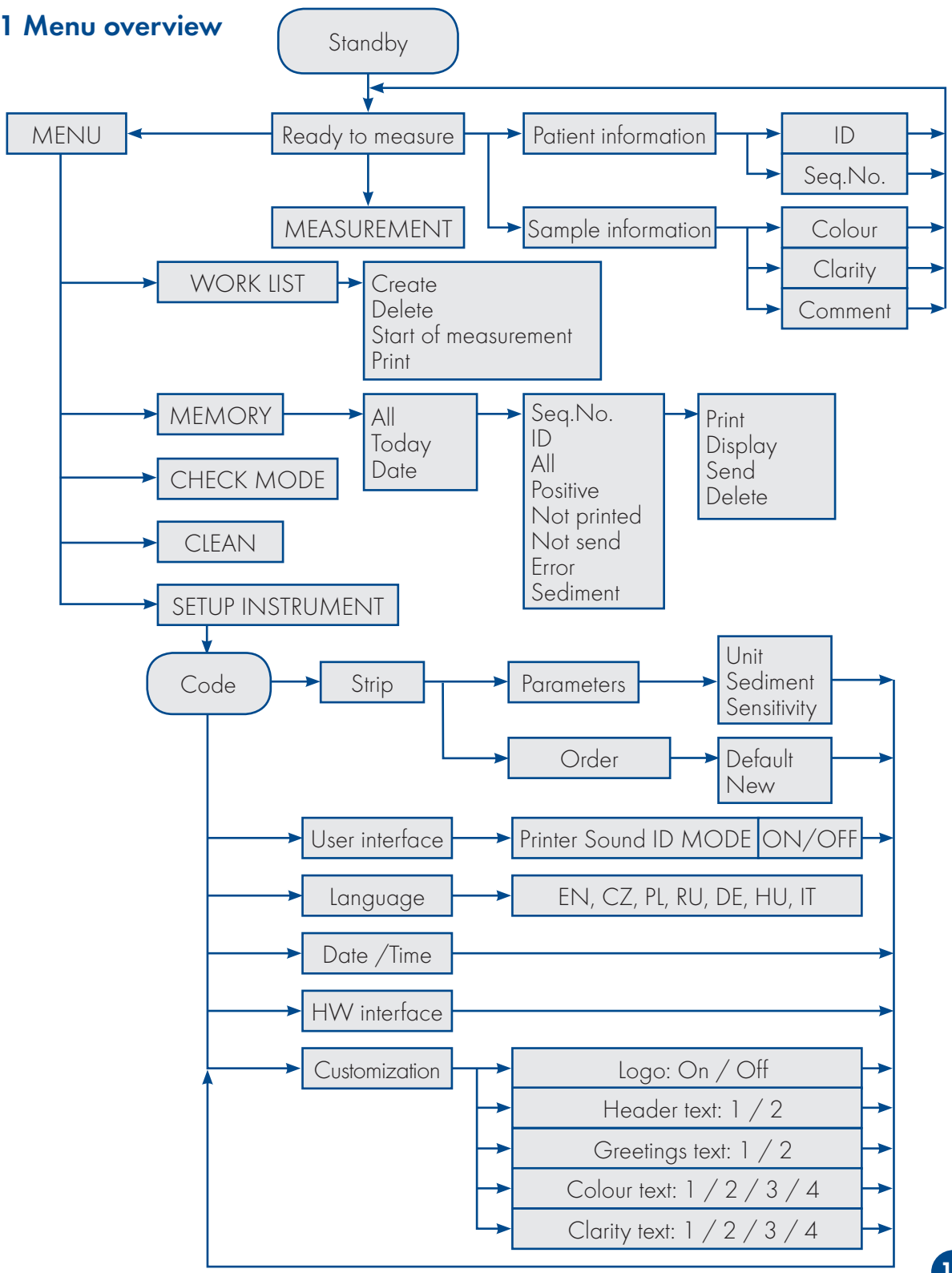
Used strip should be treated as potentially infectious and should be disposed in accordance with local and national regulations relating to safe handling of such materials. Waste is to be recycled or to be put to municipal waste.

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

4. Menu structure

LAURA reader has a clear, well organized menu structure. The user is guided trough the menu by the touch screen. The menu functions are represented by buttons or list controls.
Pressing the touch screen can activate the desired function.
The pressed buttons are highlighted with blue colour.
Pressing the button ESC, the program jumps back to the previous menu level. The program jumps back to Standby, if any button isn't pressed for 3 minutes.

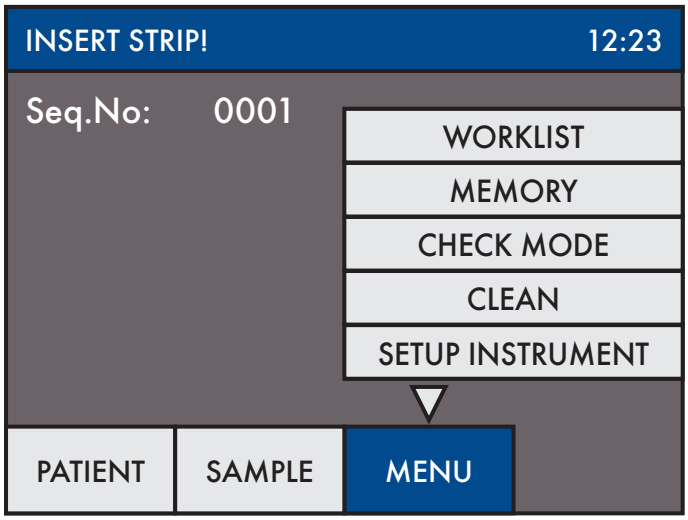
4.1 Menu overview



4. Menu structure

4.2 Main menu

After pressing the MENU in *Ready to measure* status the following main functions are available:



- WORKLIST
  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 start. The reader displays the ID of that strip which is to be placed next.

- MEMORY
  LAURA reader has a memory for the last 1 000 measurements.
  The stored measurement results with all of their related information (date, time, comment, colour...), can be selected from the memory, displayed, printed or sent to the computer anytime.

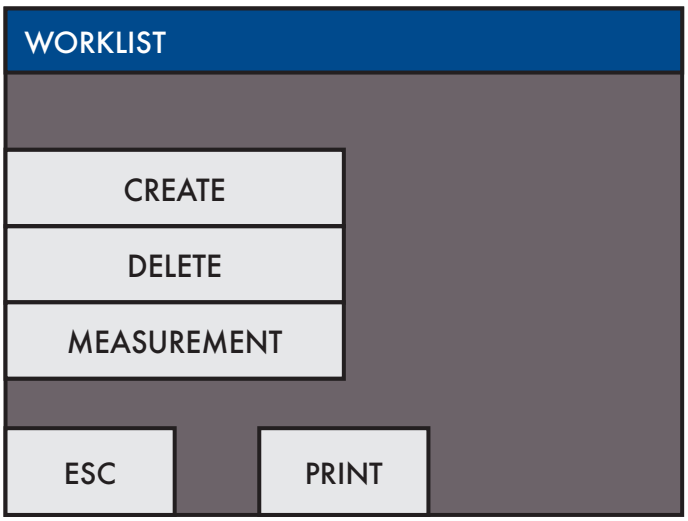
- CHECK MODE
  With this function the instrument measuring capability could be tested, by using the grey control strips. The instrument measures the grey control strips and compares the result to the predefined values. The test result is displayed and also printed for QC purposes.

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

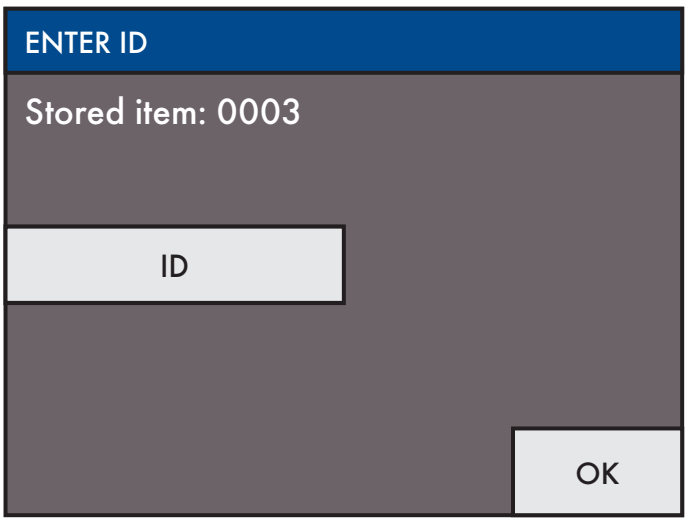
- SET UP INSTRUMENT
  In this menu point the working parameters of the reader could be set.

4.2.1 Work list

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

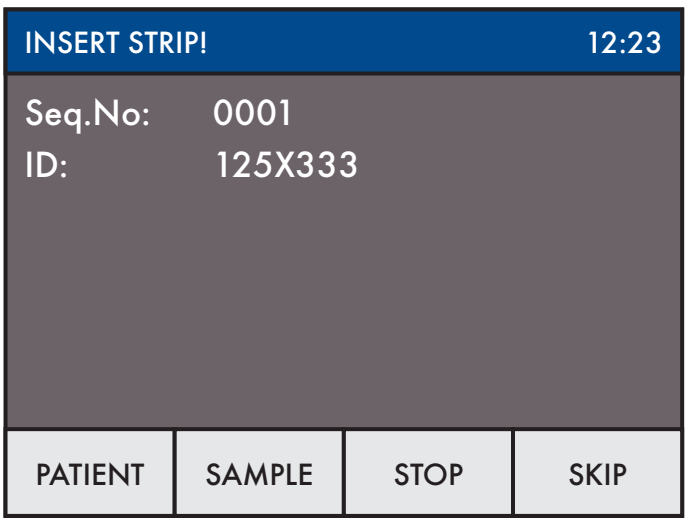


The individual menu functions could be activated by pressing the corresponding button.



To enter new ID, select button CREATE:
ID can be entered either by using the numeric or letter buttons or from an external keyboard or BCR. The amount of stored IDs is displayed. Maximum 100 IDs could be preset in this way. If the Work list was not empty when entering the Create mode, the stored items figure displays the total number of stored IDs. When the button OK is pressed, the process is finished and the reader jumps back to the Work list menu.

By selecting button DELETE, the whole work list could be deleted. The reader asks for confirmation before deletion.



The Work list mode measurement can be started with the button MEASUREMENT. The display shows the following information:

4. Menu structure

The ID field displays the 1st item of the work list and the reader accepts the first strip. The reader moves the strip into reader and the instrument asks for the next strip and displays the next stored ID. The ID of the measured samples will be removed from the work list. The ID stored in the instrument cannot be changed, only skipped by pressing the button SKIP. 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.

Take care that the strip should be placed in the same order as the IDs were entered to the worklist and the reader shows it on the display. Else the IDs and the samples will mix!

4.2.2 Memory

The reader has a non-volatile memory, which automatically stores the last 1 000 measurements.

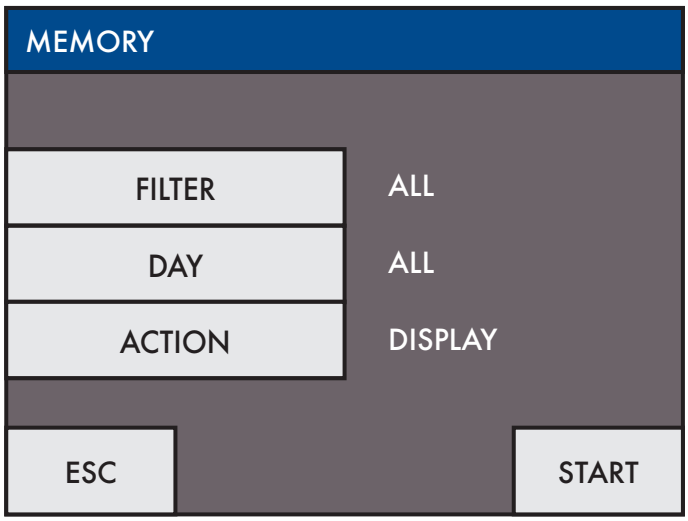
The oldest result will be overwritten by the new measurement without any warning.

When the current measurement is ready the reader stores the result along with the following parameters:

- Test result
- Type of the strip
- Seq.No
- ID
- Date and time
- Colour
- Clarity
- Comment

The user can reach the memory from the Menu by selecting the Memory button.

For administration of the memory the following display appears:



FILTER and *DAY* buttons serve to set the selection parameters, after that the *START* button activates the selected action.

4. Menu structure

The desired measurement can be selected in the following way:

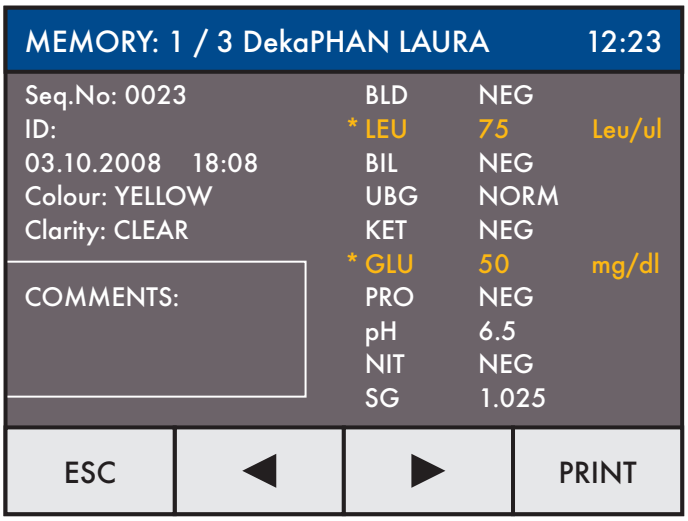
- Select the FILTER criterion:
  - All - all stored result
  - ID - enter the desired ID
  - Seq.No - enter the desired SeqNo
  - Not printed - results that where not printed yet
  - Not sent - results that where not sent yet
  - Positive - where at least 1 value was positive
  - Sediment - if at least 1 value is higher then the sediment limit, defined under Parameter settings
  - Error - when the measurement failed

- Select the DAY of the measurement:
  - All - regardless of the date
  - Today - searching only among the today measured results
  - Specific date - select the desired day
    (The program offers only those days for which there are results in the memory.)

- Choose an ACTION (what should happen with the selected results):
  - Display - the selected measurements will be displayed
  - Print - the selected measurements will be printed
  - Send - results will be sent to HOST, RS232
  - Delete - measurements corresponding to the selection criterion will be deleted

After all of the three above mentioned parameters (*Filter, Day and Action*) have been defined, the process can be activated by pressing the *START* button.

In case that *DISPLAY* was selected the appropriate results are displayed as follows:



The last measurement in the list will be displayed as the first one.
With help of the buttons ◀▶ the user can step forward or backward in the list.
The currently displayed result could be printed and a new comment could be attached.
Positive parameters are marked with* and are displayed in yellow colour. The result can be printed any time by pressing the PRINT button.

4. Menu structure

4.2.3 Check mode

The purpose of this test measurement is to verify that the optical measuring capability of the instrument works properly. Perform this test once a week, or if you receive suspicious result in normal use.
For testing the instrument the grey control strips are provided in the LAURA reader package.
The strips are labelled 1 and 2.
Perform the test as follows:

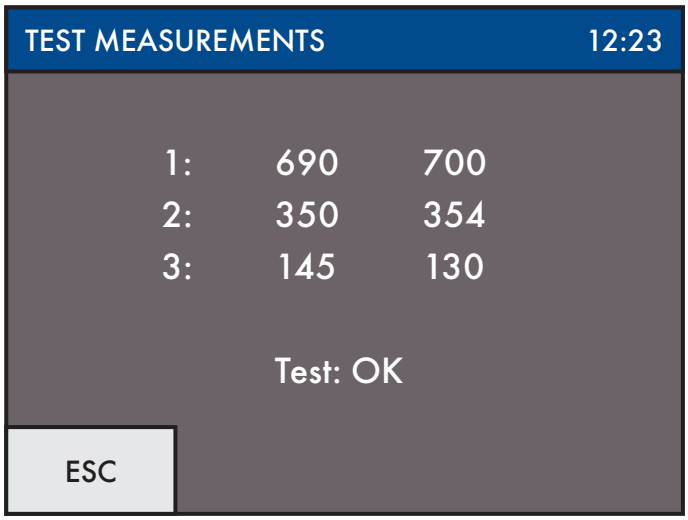
- Empty the waste container and clean it carefully!

The strip falls into the container and could be contaminated!

- Press the button CHECK MODE 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 instrument, in every greyscale and wavelength. After that it displays and prints out the result.
When the measured values are in harmony with the predefined values the result of the QC *Test is OK*.

The display after QC Test is follows:



Print out the result of the measurement:

```
LAURA TEST MEASUREMENT
2009.10.01        11:39
************************
PAD:        %Rg   %Ro

  1         696   671
  2         361   347
  3         141   132

TEST: OK
------------------------
```

Keep the print out for QC reference.
If the test fails, Test Error will be reported and the wrong result is displayed in red. In this case repeat the test with another check strip. If it reports an error again call the service.

Keep the grey strips always in the tube, do not touch the surfaces by hand, and handle them with care. The strips are reusable. Refer to the label of the grey strips tube!

4.2.4 Clean

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 (Fig. 5). To quit this mode the STOP button is to be pressed.

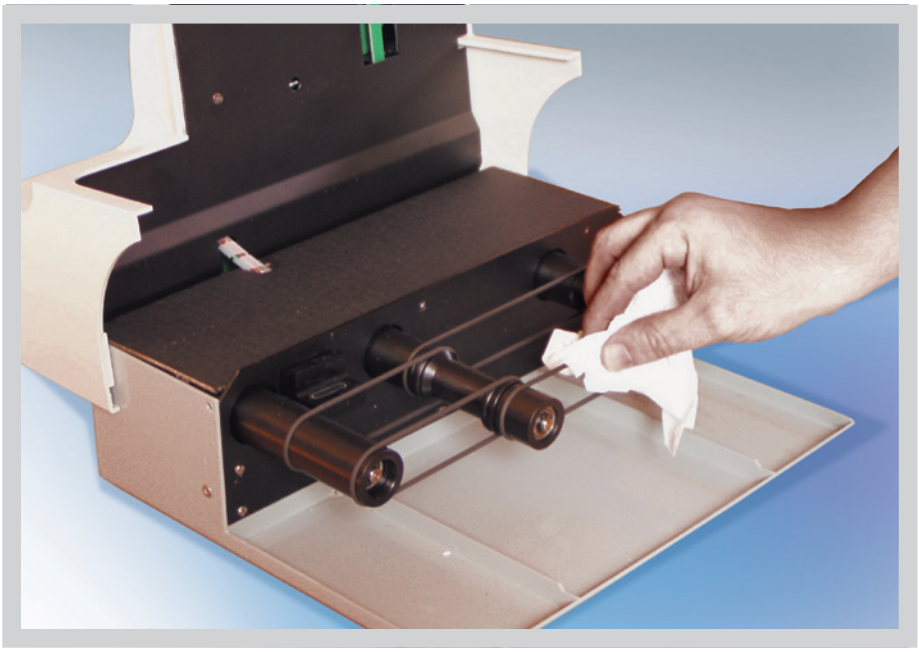


Figure 5

Do not touch the mirror or the internal REF strip!

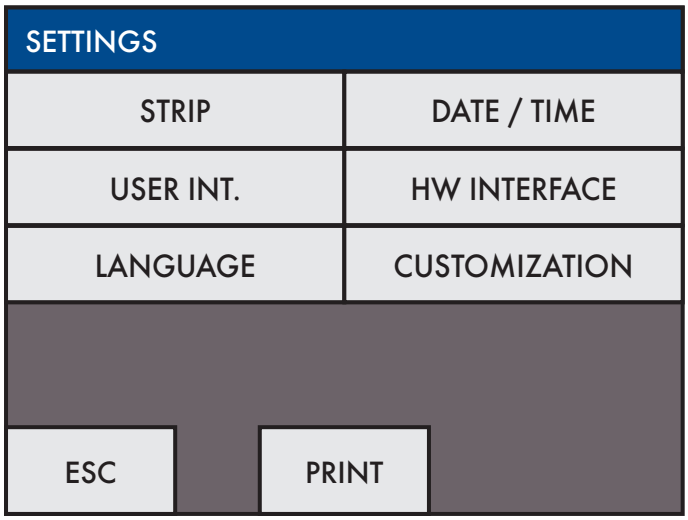
For more information, please refer to section 3.6.

4. Menu structure

4.2.5 Set up of instrument

This menu point of the instrument is usable for setting of working parameters. To avoid an accidental change of these setting parameters, is the Settings menu 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 as follows:

- Parameter – strip and measurement related parameters could be set here, as:
  - ORDER of parameter at printing
  - UNIT of parameters

- User interface – turning ON/OFF the following user interfaces:
  - PRINTER
  - SOUND
  - ID MODE

- Language – selecting the language from the 7 defined languages:
  - EN – English
  - DE – German
  - IT – Italian
  - CZ – Czech
  - PL – Polish
  - HU – Hungarian
  - RU – Russian

- Date / Time – set the date and time and the date format

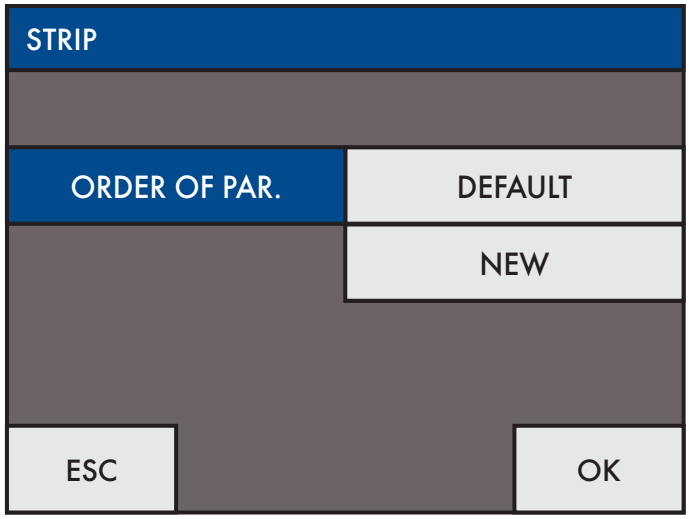
- HW Interface – serial communication parameter settings

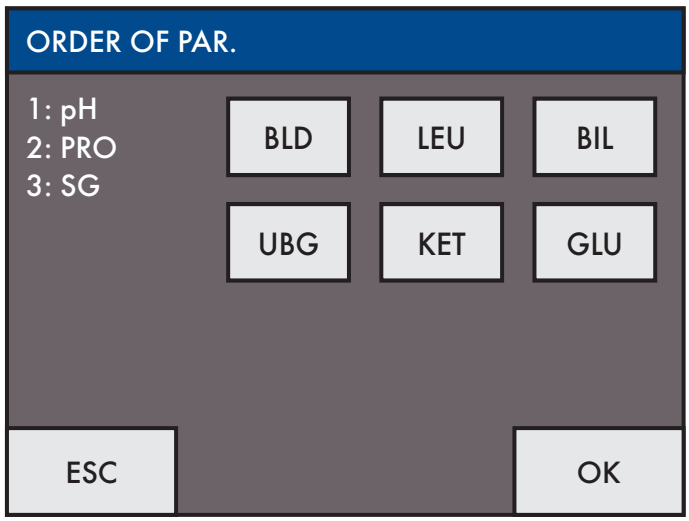
- Customisation – customizing the header text and logo, defining colour and clarity texts

4.3 Strip menu -parameter settings

This menu point is divided into two submenus:

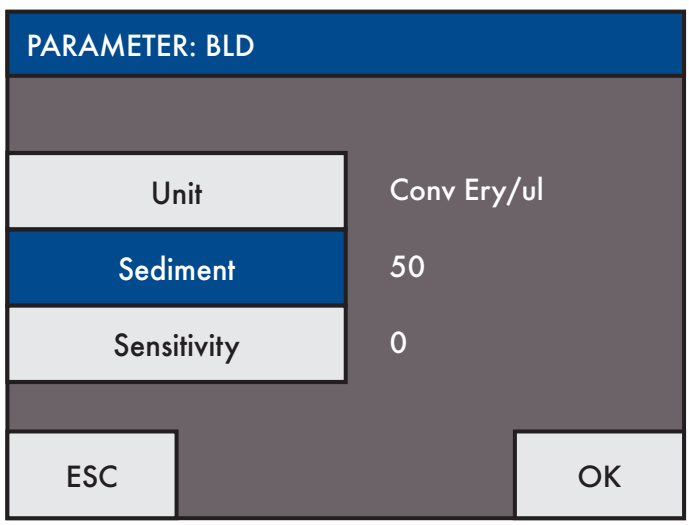
- Printing order
- Unit settings





4.3.1 Printing order

The parameter printing order can be set in the following menu point:
After pressing the *DEFAULT* button the printing order will correspond to the Parameter order of the strip DekaPHAN® LAURA.
The instrument enables to change this order according to the user's wish. In this case the *NEW* menu point should be used. The program offers all the parameters and they should be touched one after each other in the desired order.



4.3.2 Unit settings

The user set the unit individually for each parameter. The parameter is displayed in the header of the LCD and the desired unit can be set individually.
The following table lists the possibly reported values for all of the three types of units:

Possibilities for settings of units are CONV, SI and ARB or their combination.

The following table summarizes the possible reported values.

4. Menu structure

4.3.3 Parameter table

Parameter	CONV		SI		ARB
	value	unit	value	unit	value
BLD	NEG	Ery/µl	NEG	Ery/µl	NEG
	10		10		1+
	50		50		2+
	250		250		3+
LEU	NEG	Leu/µl	NEG	Leu/µl	NEG
	25		25		1+
	75		75		2+
	500		500		3+
BIL	NEG	mg/dl	NEG	µmol/l	NEG
	1		17		1+
	3		51		2+
	6		103		3+
UBG	NORM	mg/dl	NORM	µmol/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		±
	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				

4.3.4 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 (see 4.3.2. unit settings). If the measured result is higher than this set 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 Seq.No and ID of those measurements where at least one parameter was higher then the defined sediment limit.

To do it, 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.

4.3.5 Sensitivity settings

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 is	no change,
-1 to -5 is	less sensitive,
+1 to +5 is	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!

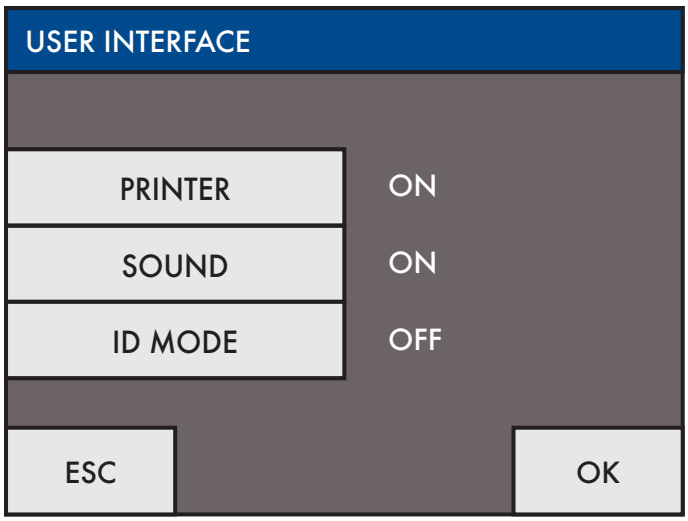
4. Menu structure

4.4 User Interface

In this menu point the built in interfaces could be switched ON or OFF. These interfaces are:

- Printer
- Sound
- ID Mode

The factory setting for all this interfaces for LAURA® is the next:



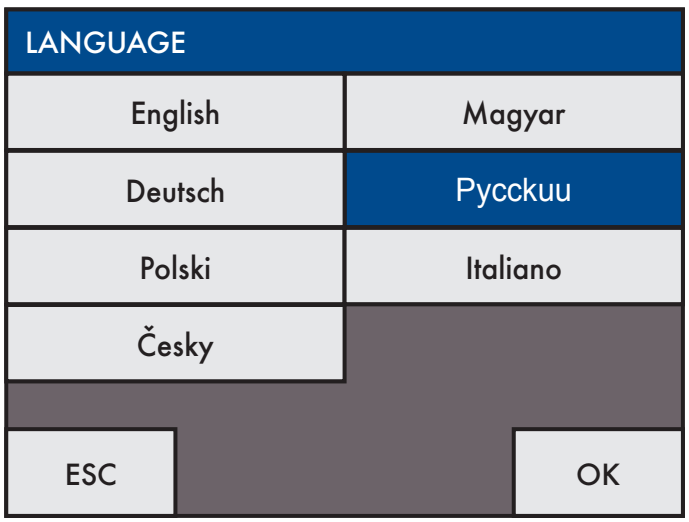
Printer ON /OFF indicates whether the results will be printed automatically after measurement, or not.
It is possible to switch off this feature; in this case the instrument will measure the strip and store the results in the memory, but it won't be printed.
The result can be printed at any time from the memory or when the result is displayed.

Sound ON/OFF turns the button feedback beep on or off.
Warning beeps are always ON, this setting has no influence on them.

ID MODE In this case the equipment doesn't start the measure without ID, so the user need to type in the ID of the sample.

4.5 Language Setting

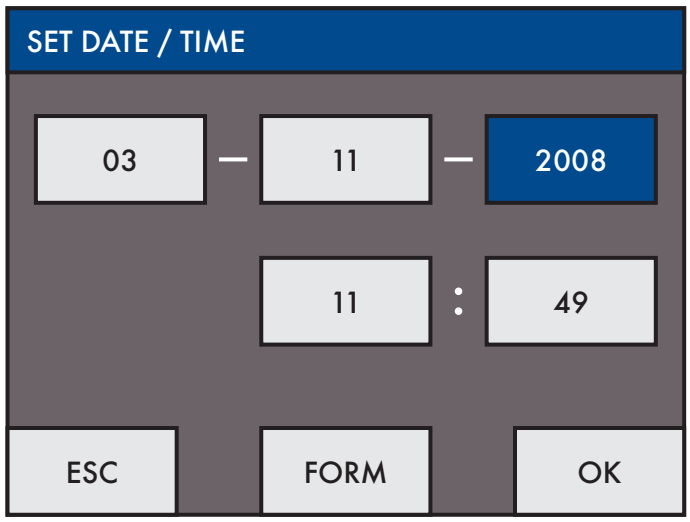
The user can select in this menu the language, which want to communicate with the instrument.
The selection can be performed using the corresponding button. The button of the currently set language is highlighted. OK button must be pressed to make the selection valid.



The following languages are available:
English
German
Italian
Czech
Polish
Hungarian
Russian

4.6 Date / Time setting

The Time and the Date format can be set in this menu point.
Select the *Date / Time* button in settings menu, the following display will appear:

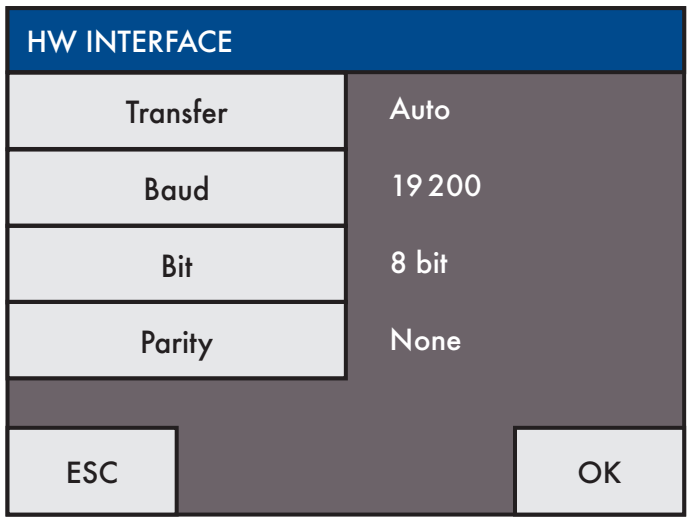


To change the date or time values push the corresponding button!
A numeric PAD will appear and the desired value can be entered.
When date and time are correct the DATE format can be set, by pressing the *FORM* button.

The following formats could be used:
Year – Month – Day (YYYY-MM-DD)
Day – Month – Year (DD-MM-YYYY)
Month – Day – Year (MM-DD-YYYY)

The update settings become valid after pressing the *OK* button.
The real time clock in reader LAURA is running from a built in lithium battery.

4.7 HW Interface



This menu is used for connection of the reader LAURA with laboratory information system (LIS) or directly with PC.
The reader LAURA has an RS 232 serial interface to HW connection. This interface can be configured according to the HW 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 HW 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 ESC to jump back without saving the changes.

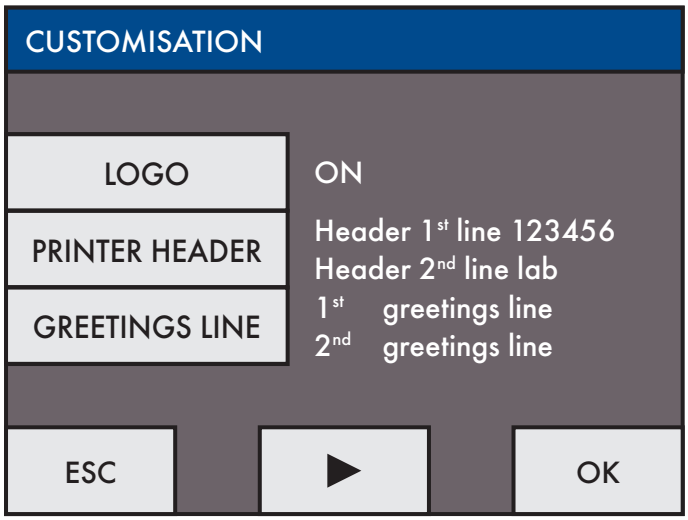
Details for connection are written in serial interface protocol – please refer to chapter 7.

4. Menu structure

4.8 Customization menu

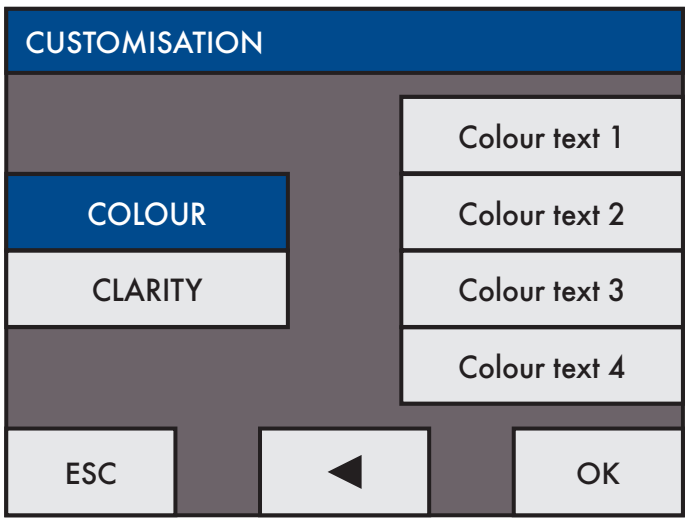
Customization menu serves to enter user defined texts into the reader LAURA.
The text lines could be entered with help of alphanumeric PAD or with a connected external keyboard:

These texts are as follows:



Beyond these, the **Logo** ON/OFF switch could be reached from this menu point. In case logo LAURA ON is set, the logo will be printed with every result.

Printer header - 2 header lines appearing with each result print out, max 24 characters
Greetings line - 2 greeting lines, printed after self test, max 24 characters



Colour - 4 different colour texts, max 10 characters each
Clarity - 4 different clarity texts, max 10 characters each

Paging could be done by pressing the buttons ◀▶

5. Service information

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

5.1 Trouble-shooting

In case of any error, please refer to the following table. It helps to identify the possible cause of the error and gives 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 to 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 an error, try to solve it according to the above trouble-shoot guide first.
If the failure remains, please contact your distributor for service.

Never open the reader's case.

5.3 Safety information

The reader LAURA complies with the EMC directive 89/336/EEC and low voltage directive 73/23/EEC.
LAURA instrument in combination with PHAN® LAURA test strips complies with the requirements of IVD directive 98/79/EC.

5.4 Producer

Producer of the system LAURA and diagnostic strips PHAN® LAURA:

Erba Lachema s.r.o.
Karásek 1d, 621 33 Brno
Czech Republic

5.5 Ordering information

cat. number:		
LAURA reader	-	50001727
DekaPHAN® LAURA	-	10008297
HeptaPHAN® LAURA	-	10008298
LAURA one-off waist container	-	50003091
The Grey control strips for LAURA	-	50003491

5.6 Guarantee conditions

The guarantee conditions are included in the sales agreement.

6. Technical parameters

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
	Coloured tooch screen	5" TFT (320×240 pixels)

Memory	Capacity	1000 measurement results with date, ID, and comments
	RTC	Lithium battery for keeping real time clock on

Interfaces	Host interface	RS 232 Serial interface, 2 400-19 200 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 %

7. Serial interface protocol

The LaUra has an RS232 interface to HOST computer.
If the communication is enabled (Mode: ON) 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			Strip name			9 space			CR, LF	26
Seq.No 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
COLOR	„COLOR:"		3×SP	Color text 10 char						CR.LF	21
CLARITY	„CLARITY:"		SP	Clarity text 10 char						CR LF	21
Date line	YYYY.MM.DD			6×SP		HH:MM			3×SP	CR, LF	26
1st. result line	'*' or SP	SP	3char par. name	SP	5char result Conv or SI	SP	6char unit	SP	5char ARB result	CR, LF	26
10th. result line	'*' or SP	SP	3char par. name	SP	5char result Conv or SI	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 = 0x02, ETX= 0x03, CR=0x0d, LF=0x0a, SP=0x20
- The parameter order is the default regardless of printing order.
- In case of Hepta-PHAN only 7 parameter line is sent
- The result and the unit is depending on the selected unit (*SETTINGS/STRIP/PARAMETER*)

8. 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 work list in MENU/Work list.

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.

9. Index