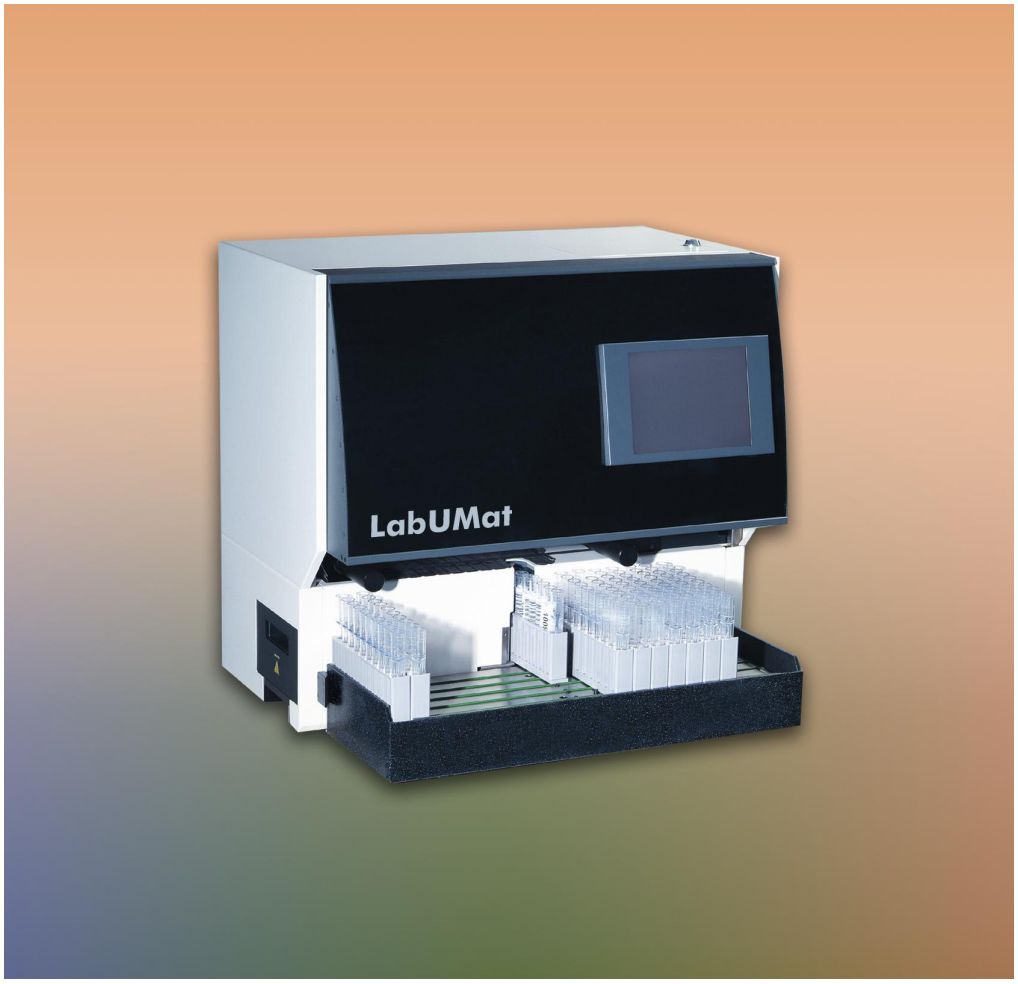
LabUMat

Fully Automated Urine Chemistry Analyzer

User manual



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1. Introduction

Thank you for choosing LabUMat automatic urine analyzer. We hope that you will be satisfied with the services of the equipment.

1.1 General description of LabUMat

LabUMat is designed specifically for professional use in clinical laboratories. It is a fully automated urine analyzer, meeting the usual requirements raised by medical laboratories.

Operation of LabUMat is easy and very efficient. The operator inserts a vial of LabStrip U11 Plus strips into the strip holder tray and puts the racks with test-tubes containing urine samples on the rack mover unit. All the rest is done by the instrument. Strips travel on the conveyor belts driven by the cylinders. After dipping and evaluation they are thrown away into the waste bin at the left side of the instrument. Excess urine may drip on the drop collecting tray under the belts.

Racks travel on the rack mover unit, from the right side to the left and each rack is stopped at the gate of the test-tube driving hole. Racks are inserted in the hole and the instrument dips a strip into each test-tube in the rack. After all the test-tubes are sampled from a rack, the rack is removed from the hole and is conveyed to the left. Racks gathering in the left side can be removed from the rack mover unit. Results can be studied on the LCD or on an external monitor.

LabUMat works by reflectance photometer method. Inside the reader the strip is illuminated by white light, and the light reflected from the strip is detected by a colour CCD sensor. Digitalized image is processed by built-in program: it locates the pads, then based on reflected light-wave information, urine component parameter values - as the result of evaluation - are calculated. The results together with the actual date, time and patient ID are stored in the memory of LabUMat, which is large enough to store 10000 records. Stored results can be studied on LCD display, sent to PC or can be printed out by external printer, if one is connected to LabUMat.

1.2 Main parts of LabUMat

External parts:

Service door: Located on the top right of the instrument. It can be opened with the key, which is among the attached accessories.

LCD: The touchscreen on the right side of the instrument for communicating with the operator.

Unused strip bin: Contains unused strips. It can be found on the right side with "**LOAD**" label.

Waste bin: Collects the used strips which fall into the bin on the left side of the equipment.

Switch on button: The red button on the right side of the equipment.

Power connector: Power cord should be connected to the equipment on the left side of the rear panel.

Backboard connectors: Serial, USB and LAN connectors can be found on the right side of the rear panel. Through the two PS2 connectors mouse and keyboard can be connected to LabUMat.

Rack mover unit: The attachable part in the front of the equipment. It conveys the racks.

Inner parts:

Conveyor unit: The triple bands for moving the strips through the whole measuring process.

Feeder unit: The feeder places strips on the conveyor.

Strip holder tray: This tray contains the strips to be measured. It can be found behind the Unused strip bin, it is part of the Feeder unit.

Sorter unit: The strips wait in the sorter unit until the previous strip passes the dipping period.

Robot unit: The Robot dips the strips into the test tubes filled with urine samples.

Measuring head unit: The measuring head measures the colour deviation of the strips.

For more detailed description refer to the service manual.

1.3 Methodology of urine testing

The urine analysis is part of the medical diagnosis methods frequently used by medical doctors in laboratories in order to reveal diseases.

The most cost-effective solution used to screen urine is paper or plastic dipstick. This microchemistry system has been available for many years and allows qualitative and semi-quantitative analysis within about a minute by simple but careful observation. The colour change occurring on each pad of the strip is compared to a colour scale to obtain result. However, the results may be misread or misinterpreted due to individual handling habits of the user or to different light conditions.

IVD

Urine analyzer (urine strip reader) devices are designed specifically to improve accuracy and safety of urine strip evaluation by using light and photometric reader in order to detect the colour changes on test strips. The analyzers also help in test data handling and report generation by offering data storage and automated data processing features in medical laboratories.

LabUMat is a fully automated urine strip reader. This means that the operator simply has to feed the equipment by putting the racks with test-tubes containing urine samples on the rack mover unit. The rest: dipping, placing on conveyor, forwarding, reading, evaluating, and throwing away the strips are done automatically by the equipment.

1.4 Test strips

Good quality, dry reagent urine multi-strips are the basis of urine analysis. These strips have separate pads for each tested parameter. Pads contain certain chemicals, which develop colour changes reacting with each tested parameter according to their concentration in urine.
LabUMat works with LabStrip U11Plus urine multi-strips, which provide accurate results. Tested ingredients are as follows:

Billirubin	Blood
Urobilinogen	pH
Ketones	Nitrite
Ascorbic Acid	Leucocytes
Glucose	Specific Gravity
Protein	

2. Installation

2.1 Packing list

LABUMAT equipment	1 pc
Power cord	1 pc
Serial cable	1 pc
Rack mover unit	1 pc
Cylinder	2 pcs
Rubber belts	6 pcs
Drop collecting tray	1 pc
Touchscreen pen	2 pcs
Touchscreen pen holder	1 pc
Test tubes + cap	100 pcs
Racks	10 pc
Service door key	1 pc
Spacer for rack mover part adjustment	8 pcs
Strip loader tool	1 pc
Grey strip	1 pc
User manual	1 pc
Unpacking instructions	3 pcs

2.2 Packaging

Important!

- **Check the packing list if the shipment is complete and not damaged. If it is complete and undamaged follow the instructions below, otherwise please contact your distributor immediately.**
- **Ship and store the instrument between 0 - 50 °C and between 20 - 80 % humidity.**
- **Do not place the instrument into direct sunlight, because strong light can interfere with its optical sensors.**

LabUMat is shipped in cardboard box. Prior to unpacking, clear the area where the instrument is to be operated: a 80 x 60 cm size table is needed, which is strong enough to support an almost 60 kg equipment. Refer the detailed Packing manual – find attached – on how to pack and unpack the instrument. Please note the shipping marks on the box while handling. Open the box. Cut the tape only, leave the carton material intact. (It is recommended to keep the packaging materials for a while.)

1. After opening the box you will find the accessories on the top. Remove the whole level of packaging material with the accessories and take it apart. Find assembled LabUMat below.

2. Take the box with test-tubes out from the left side of the package.

3. Remove the box from LabUMat by pulling the sides of the box.

4. Take the equipment out and put it to an appropriate place, where mains connector is near.

5. Cut the bands which fasten the rack mover unit and the tube-cap box, and take them off.

⚠ **Note:**

- **If the instrument has to be installed at another location all removable parts have to be removed for transportation (cylinders, conveyor belts, drop collecting tray, rack mover part) and the robot arm has to be fixed with the supplied fixing screw. For transportation a trolley might be necessary as the instrument is quite heavy (about 60 kg).**

2.3 Installation sequence

1. Find 1 screw at the back of the instrument. It is supposed to fix the robot arm of LabUMat during traveling. It has to be removed before switching on the equipment. Unscrew the fixing screw with your hand and remove it from the equipment. It is recommended to keep the fixing screw, as you might need it if you would like to ship LabUMat to another destination.

2. At the bottom of the package find the rack mover unit. Take it out of the box and piece it together with LabUMat. After fitting their edges push the rack mover unit gently until it clicks. Please, note that only the rack mover part supplied by the manufacturer can be used with LabUMat.

⚠ **Important!**

- **It is important to remove the fixing screw from the back of LabUMat before connecting the equipment to the mains. When the power is switched on, the initialisation procedure is performed. This includes the motion checks, which may cause damage if the fixing screw has not been removed.**

- **LabUMat operates with 100 up to 250 VAC mains voltage. In this range the equipment manages voltage levels automatically. Do not use the equipment with other mains voltage.**

- **Do not remove the rear panel of the instrument! Only specially trained service personnel aloud to open the instrument. Always disconnect the instrument from the mains before removing the rear panel.**

3. Connect the power cable first to LabUMat, then to the mains. Because of safety reasons LabUMat can only be connected to connectors which have protective ground.

4. Use supplied serial cable or USB port to connect LabUMat to host PC. On how to send data from LabUMat to host PC refer section "**Data menu**".

5. Switch on the LabUMat and it will start to boot up. Wait until the booting sequence finishes.

6. Place the driven cylinder onto the right shaft and the cylinder without cog-wheel on the left shaft. Don't push the cylinders in yet.

7. Install all three belts onto the cylinders. They should properly fit in their slots on the cylinders.

8. After all the belts are on**,** push the cylinders in together, until the built-in magnet fixes them in the proper position. Check whether the cylinders are turning after placing.

9. Insert the drop collecting tray under the cylinders until it bumps. Take care to have one of the cuts on the tray above the test-tube driving hole of LabUMat.

⚠ **Note:**

- **Registration process should be done before starting to use the equipment. On how registration should be done refer section "Registration".**

- **After installation check whether the equipment operates accurately. There are control solutions available on the market (for example Quantimetrix from Quantimetrix Co.) which can be used for testing.**

2.4 Placing barcodes onto test tubes

Built-in barcode reader of LabUMat can automatically identify urine samples by barcodes affixed onto the side of test tubes. LabUMat is able to identify most types of barcodes, however yet only the following ones were tested on the instrument:

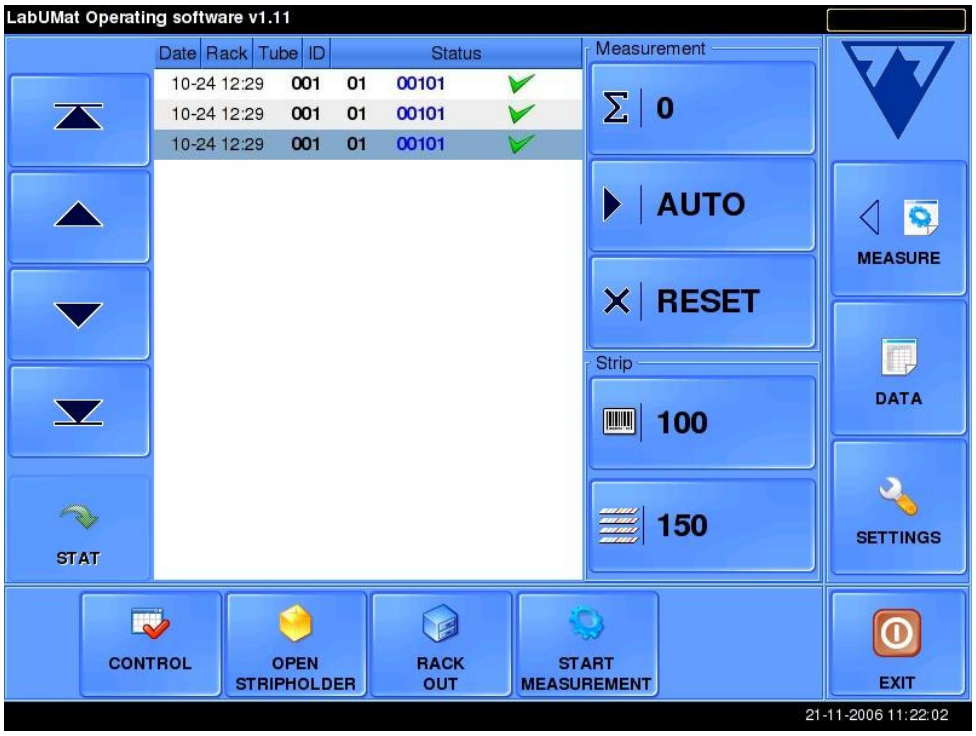
- CODE 39
- CODE 128
- EAN-13
- EAN-8
- INTERLEAVED 2/5

Barcodes should be affixed around the middle of the test tubes, between the levels indicated red in figure on the left. Note that barcodes above or below these levels might not be identified by LabUMat. When placing samples with barcode in the racks, take care to have the barcodes at the open side of the racks, otherwise barcode reader of LabUMat won't be able to read the codes.

There is one tube which has barcode on its side among the supplied test tubes. You might study this tube, to learn the optimal positioning of the barcode. This tube can also be used for initial testing of built-in barcode reader.

3. Menu system

LabUMat has an easy to use, user friendly menu system. The main menu points are in the right side of the screen, and the relating sub-menu points are in the bottom. The menu points can be selected on the LCD touchscreen by a simple touch or with the click of connected mouse or by the arrows of external keyboard also. The characters can be written by a keypad (which appears on the screen) or by external keyboard. Some buttons have more states, therefore these buttons give status information as well. If you press a multi state button, its icon and text changes to mark if the process is in progress or ready.



1. Measuring menu

There are three access levels in LabUMat: the operator, the administrator and the service levels. Some functions are available only in administrator or service levels which are password protected.

3.1 Measure menu

In "**Measure**" main menu a list is displayed in the middle of the screen, containing date, time, rack and tube numbers, sample IDs as well as the status icons of strips in the process of evaluation. There are arrow buttons to reach the first, the previous, the next or the last item in the list. During measurement arrow buttons are disabled and the last item is selected by default.

There are the following action buttons in the **Measure** menu:

STAT: This function should be used if there are some urgent samples, which have to be measured urgently before the scheduled ones. STAT button is disabled if there is no running measurement or control measurement is performed and enabled when normal measurements are running. If STAT button is pressed, the instrument stops only after current sample in rack is measured. Until this has not been realized, "Wait until the current measurement is finished." message is displayed on the screen. Then recent rack is pushed out and the rack mover conveyor moves the following not yet measured racks backwards, in order to make room for the extra rack which contains the urgent samples. The message "Insert the urgent sample(s)." indicates if the instrument is ready to handle the urgent samples, so they can be placed on the rack mover conveyor. Right after pressing the OK button in the message window, LabUMat pulls in the extra rack and measures the samples in it. These measurements will have an extra ID (e.g. ST-01, etc.). However, if there are barcodes on the urgent sample tubes, barcodes will be assigned as IDs. After measuring the extra rack, the interrupted measurements automatically continue.

Open/Close Stripholder: Press this button to open or close the strip holder and wait until the icon and the text on the button change. The button is disabled during measurements, unless the number of strips is fewer than 15 (according to the "**Strip left**" field). To insert new strips, open the **Stripholder** and turn the strip holder tray with 90° until it is perpendicular to the side of the instrument. Take a vial of test strips and pour it in the strip holder tray. It is recommended to pour the whole vial of strips in strip holder tray.
Find the unused strips in the unused strip bin below the strip holder tray after opening the strip holder. Unused strips can be used again if they are not too old. By shaking the unused strip bin collect strips in the front corner and pour them into their vials through the hole on the left side of the bin if you finished working with LabUMat. Try to avoid touching unused strips with your hand! Throw away too old unused strips from the strip holder bin.
If the number of strips drops under 15, the "**Open/Close Stripholder"** button becomes active during measurements as well, so that a new vial of strips can be poured in the strip holder tray without stopping the measurement. In order to do that, just remove the unused strip bin and feed the equipment after opening the strip holder tray with the activated button (the unused strips will not be unloaded in this case). For further details of how to insert test strips into the instrument, please refer chapter 4.4.

Control: measuring accuracy of the instrument can be checked by quality control functions of LabUMat. These functions become available if "**Control"** button is pressed. For detailed description of quality control functions, please refer chapter 5.

Important:

- **One vial contains the maximum amount of strips you may insert at once. Feed only the instrument with a new vial of LabStrip U11 Plus strips if the number of remaining unused strips inside the instrument has dropped under 15 (number of remaining unused strips can be seen in the "Strip left" field).**

- **Don't store strips in strip holder tray! Take out strips from strip holder bin and take them back in their vials, if you stopped working with LabUMat. Strips in the strip holder tray are not properly protected against moisture which may significantly damage strip quality.**

Rack out: Press this button to push out the actual rack from the test-tube driving hole. This button is disabled during measurements.

Start/Stop Measurement: Press this button to Start/Stop the measurement. To study details of the measuring sequence refer to the chapter "**Typical daily routine**".

Exit: Press this button if you finished working with LabUMat. After confirmation, the software of the instrument will stop and LabUMat can be switched off by the red switch button on the side. Exit button is only active if measurement has been stopped previously. Exiting is not possible if measurement is under process.

Auto/Manual: This two state button is to set the measure mode automatic or manual (see chapter "**Measuring modes**"). This button is inactive during the measurement process.

Σ: Shows the number of already measured strips both in Auto and Manual measuring modes. However, in Manual measuring mode the number of planned measurements – as in this mode it can be adjusted with this button – will be displayed as well. In Manual measuring mode this field will display information in the following format: already measured strips/planned number of measurements. Press this button to set the number of measurements that are planned to be done in a sequence with a keypad (has effect only in "**Manual**" mode). For details on how to set the number of desired measurements refer section "**Measuring modes**". This button is inactive during the measurement process.

Reset: Press this button to remove all records of measurements that have been done lately from the list displayed in "**Measure**" menu. Records will not be deleted from the memory, they can be still accessed in "**Data**" menu. This button is inactive during the measurement process.

Registered strips: shows the number of strips that can be used with recent registration. Press this button to enter new registration code. Registration code is affixed to registration card which can be found in the vial of LabStrip U11 Plus strips. Use the card with "LabUMat" caption on it and enter the first 16 digit number from the two numbers that can be seen on code card. After successful registration the number of available strips will increase.

Strip left: Shows how many strips have remained in the strip holder. This number correlates well with the real number of strips in the strip holder tray only, if the whole vial of strips is inserted each time when feeding new strips. However, there is a possibility to adjust the displayed number of strips by pressing this button. The displayed number can be adjusted between 1 and 165.

⚠ **Note:**

LabUMat presumes that each time you feed the instrument the whole vial of strips – 150 pieces - is inserted. If you insert strips unlike the recommended manner, the displayed number of remaining strips will only correlate with the number of strips in the strip holder tray if the displayed number of strips is properly adjusted manually by the operator.

3.2 Data menu

Data managing features are available in the "**Data**" main menu. Data management is accessible during the measurement as well. In "**Data**" main menu two lists are displayed: the left one is a list of records containing the date, time, sample ID and patient name (if the user has defined one), while the list on the right shows the result of the measurement selected from the list on the left side. The full name of the selected patient is always displayed underneath the result table. A new record with measurement result is added to the list only if the measurement has been successfully performed on the sample. Select a record from the left side list by pressing it and the belonging result will be displayed on the right side. Records can be scrolled by pressing the first, previous, next and last item arrows next to the list. No result is displayed if no record is selected.

2. Data menu

Select/Deselect all: Press this button to select or deselect all the records in the list.

Selection of multiple records: It is possible to select more than one record at a time. In order to do that, double click on one of the records that is about to be selected. Colour of the navigation arrows on the left side will change from black to red as an indication of multiple selection mode. As long as the colour of the arrows is red, every record which is selected by the arrows will be added to the group of selected records. To exit from this multiple selection mode, double click on the list of records. The colour of the navigation arrows will change back to black as well.

⚠ **Note:**

Multiple selected records cannot be renamed together. Before renaming, select only one record which ID or name of is about to be changed.

Rename ID: Press this button to give a new ID to the selected record. First select the record that is about to be renamed. Type in the new ID with the appearing keypad and press the green tick to save changes. Press the red x to cancel. Please note, that no characters can not be saved as valid ID.

Patient Name: With the help of this button a patient name can be entered for each selected record. First select the record that is about to be named. Type in the desired name with the appearing keypad and press the green tick to save it. Press the red x to cancel. Please note, that no characters can not be saved as valid name.

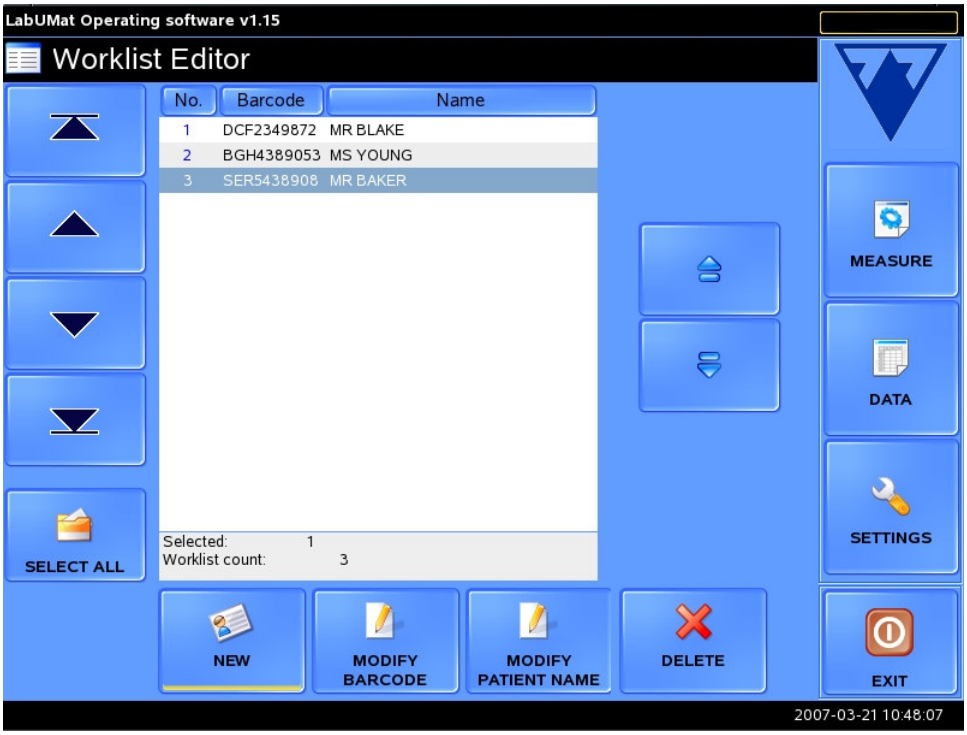
⚠ **Note:**

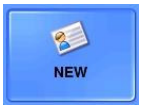
The widths of the columns in the data menu are fix. IDs are displayed in the column on 8 characters and names on 12 characters. However, if one record is selected, near the measurement result the whole name is displayed.

Transfer: Send the results of the selected records to PC by pressing this button. The default way of data transfer is using the RS232 serial port. With this "**Send**" function printing is also possible through the serial port. Parameters of the serial port can be adjusted in the "**Settings menu**".

Delete: Press this button to erase the selected records.

Worklist: Enter worklist editor to assemble a list from patient names, to identify the results of the following measuring sequence. Names from the list will be automatically assigned one by one to the next successfully completed measurements. Worklist is only effective if it has been previously enabled in the settings menu. Worklist can be assembled also on host computer with the help of special software supplied by the manufacturer. Assembled worklist from host computer can be downloaded to LabUMat through attached serial cable (for details please ask your distributor). During worklist downloading and measurements the worklist editor cannot be used.





New: New barcode and patient name can be added to the worklist with this button.

Modify Barcode: Barcode can be modified with this button.

Modify Patient Name: Patient name can be modified with this button.

Delete: Press this button to erase selected elements of the worklist.

Scrolling among the elements can be done exactly the same way as in the data menu. Selection of the elements is also similar.

Use these buttons to change the position of an element in the list. If the up arrow is pressed, the selected item moves towards the beginning of the list, while if the down arrow is pressed the selected item moves in the opposite direction.

Result table:

LabStripU11Plus			+	++	+++	++++		
Bilirubin	Conv.	neg	1	3	6			mg/dl
Bil	SI	neg	17	50	100			umol/l
Urobilinogen	Conv.	norm	2	4	8	12		mg/dl
Ubg	SI	norm	35	70	140	200		umol/l
Ketone	Conv.	neg	15	50	150			mg/dl
Ket	SI	neg	1.5	5	15			mmol/l
Asc. Acid	Conv.	neg	20	40				mg/dl
Asc	SI	neg	0.2	0.4				g/l
Glucose	Conv.	norm	50	150	500	1000		mg/dl
Glu	SI	norm	3	10	30	50		mmol/l
Protein	Conv.	neg	30	100	500			mg/dl
Pro	SI	neg	0.3	1	5			g/l
Blood	Conv.	Neg(ca.5)	10	50	300			Ery/ul
pH	Conv./SI	5	6	7	8	9		
Nitrite	Conv./SI	neg	pos					
Leukocytes	Conv./SI	neg	25	75	500			Leu/ul
Spec. Grav.	Conv./SI	1.000	1.005	1.010	1.015	1.020	1.025	1.030

3.3 Settings menu

To enter the "**Settings"** main menu, press the **Settings** button. This menu is password protected, so access of different users can be easily controlled. The default password is: SETTINGS. After entering this menu the default password can be changed. The **Settings** button is disabled during measurement.

3. General settings menu

Features available in this menu are the followings:

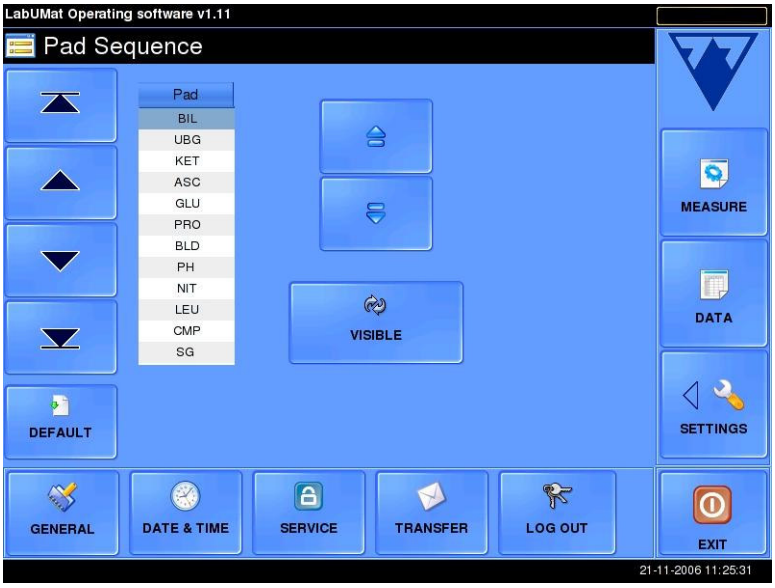
General: Press this button to enter the "**General"** sub-menu. Through this sub-menu the below mentioned functions are accessible:

Parallel measurements: It is possible to make more parallel – redundant - evaluations from each sample. Press this button to enter the number of strips that should be dipped in the same urine sample. Please, note that each strip absorbs some urine from test tube when dipped. Always ensure if there is enough urine in test tubes before starting parallel measurements. Maximum 10 parallel measurements can be set.

Select language: Language of the software can be changed after entering this menu function. Users can choose between the following languages: English, German, French, Spanish, Greek, Turkish, Chinese and Hungarian.

Pad Sequence: The sequence of the measured parameters in the data menu and through the serial transfer too, can be customized by the user. It is also possible to hide the result of some of the pads and not displaying

them among the others. Default settings can be restored by pressing the **Default** button.

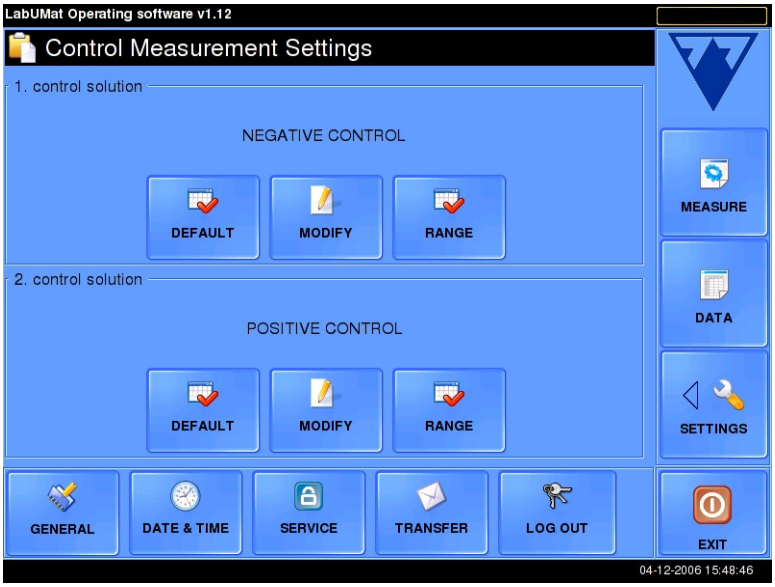


4. Pad sequence adjustment

Use these buttons to change the position of an element in the list. If the up arrow is pressed, the selected item moves towards the beginning of the list, while if the down arrow is pressed the selected item moves in the opposite direction.

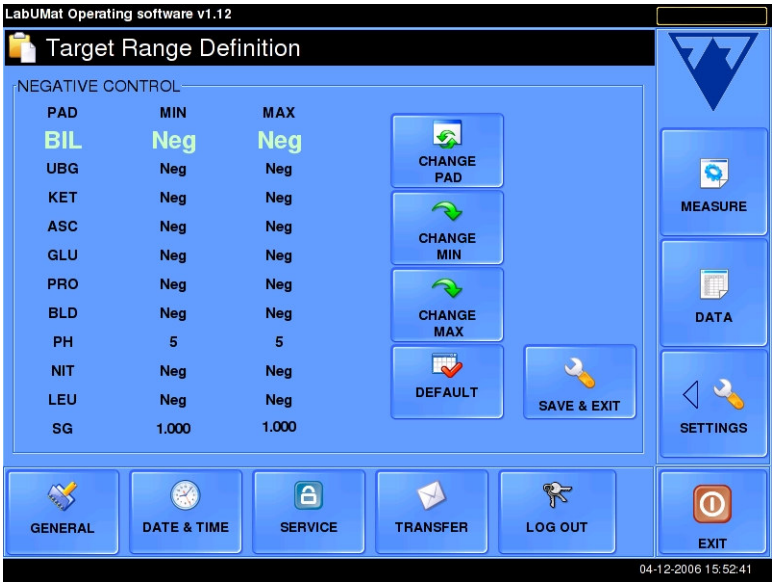
Eliminate the presence of a parameter both in the data menu and in the printout by pressing this button when the certain parameter is selected in the list. Eliminated parameters appear with light grey colour in the list.

Control Measurement: Adequate measurement ability of the instrument can be checked with control solutions. The instrument works properly if the results of the control measurements are within the desired range. This menu feature allows the user to adjust LabUMat for the use of different control solutions.



5. Customizing the attributes of the control solutions

By default the name of control solution 1 is set to Negative control, while the name of control solution 2 is set to Positive control. However, these names can be modified to any other identifier - within a maximum length of 33 characters - by pressing **Modify** button. The set name is displayed as patient name in the Data menu. By the **Default** button the names of control solutions can be set back to the original. Press **Range** button in order to set the normal range for each parameter, where results of control measurements are considered to be satisfactory. When performing control measurements, those results which fall outside the set ranges, will be indicated with red colour in the data menu.



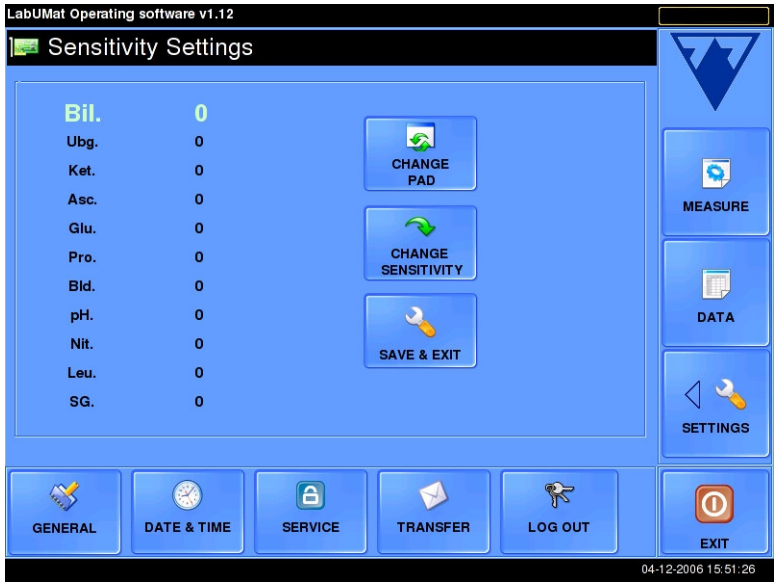
6. Setting the limits of the acceptable range for each parameters

The normal range concerning each pad can be adjusted separately according to arbitrary unit. At one time only one selected pad's limits can be changed with the help of the **Change Min** and **Change Max** buttons. **Change Min** button modifies the lower limit of the range, while **Change Max** button adjusts the higher limit. Higher limit of the range cannot be

set lower than the lower limit. In case of such adjustment, “Attention! Min cannot be higher than Max!” message appears on the screen. Changing between pads is possible by the **Change Pad** button. After the normal range for each pad has been adjusted properly, settings can be stored by pressing **Save & Exit** button. If **Save & Exit** button is pressed, message appears: “Would you save changes?”. Changes are stored only if acknowledged. After modifications the original settings can be restored by pressing the **Default** button.

Worklist settings: if worklist is enabled, the assembled worklist will be assigned to the following measurement results until there is an element in the worklist. If it is consumed, measurement stops and warning appears: “Worklist elements are consumed!” If worklist is disabled, no patient name is assigned automatically to measurement results. Worklist cannot be used during STAT or Control measurements, even it is enabled.

Sensitivity adjustment: Measurement sensitivity in the program can be adjusted in two levels in both directions (-2, -1, 0, +1, +2) for each pad. In figure 7 the display shows the default setting for sensitivity.



7. Sensitivity adjustment

The sensitivity of each pad can be adjusted separately. At one time only one selected pad’s sensitivity can be changed with the help of the **Change Sensitivity** button. Changing between pads is possible by the **Change Pad** button. After the sensitivity of each pad has been adjusted, settings can be stored by pressing the **Set** button.

Result View: under this feature it is possible to select the measurement unit of test results. Results will be displayed according this setting on printed reports and on LCD in Data menu. Possible units appear one by one upon each button press. Settings are stored automatically.

Options are: Conv. Conv.+Arb.
SI SI + Arb.
Arbitrary

Waste Bin: It can be set how often LabUMat should warn you to empty the waste bin: after 150 or 300 strips or after opening the stripholder or after 24 hours or this warning can be switched off.

Stability Alert: It is not recommended to store strips inside the instrument for a long time, because of the risk of possible affection by air humidity. Here can be defined when should LabUMat alert the user to put the strips from the inside container back to their vials, in order to prevent strip quality loss due to air humidity. Available values are: 6h, 12h, 18h, 24h, 2days, 3days, 5days and message can be switched off also. The default setting is 12h.

Sediment Analyser: use this button to achieve that Urised also starts measuring when the measurement was started on LabUMat.

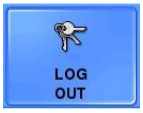
Diagnostics: this button starts an overall checking of the instrument. Diagnostics function is a more complex test of LabUMat as it is checking memory as well. Also there is a possibility of saving the result of diagnostics in a report file that later can be sent to your distributor. To have generated report file, insert a pen-drive in one of the USB ports of the instrument before starting diagnostics. Generated report file will be automatically saved on the inserted pen-drive.

Self Check: Press this button to run the same self-test which runs at each startup. This function checks all independent inner parts and after finishing, it initializes LabUMat. If you experience any problem while using the instrument, it is recommended to run this self check.

Software Upgrade: If software upgrade is available for LabUMat, your distributor sends you the new software version on a pen-drive. To upgrade the software of LabUMat, insert the pen-drive you got from your distributor in one of the USB ports of the instrument and press "**Software Upgrade**". The rest will be done automatically by LabUMat, which may take 16-18 minutes. The upgrade process will not affect your personal settings. When you first switch on your instrument after upgrading, do not press any button until "Successful software upgrade!" is not displayed.

Info: Displays general information about the instrument, such as software and hardware versions.

Change Settings password: With the help of this button the default password of the Settings menu can be changed. For changing the password, the existing one has to be entered first.



Logging out: After once entering, all functions of the General Settings menu are available until this "Log out" button is not pressed or the instrument is not switched off. Press this button to log out from the Settings menu. After logging out, password is required again for entering.

Set date/time: Press this button to set the date and time. Press each time and date parameters one by one to select them and then set them with the +/- key. Press "**Set**" if the settings are ready, and the equipment sets the system date and time.

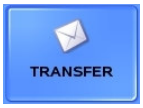
Date format can be adjusted in this sub-menu as well. Two buttons are displayed in the lower part of the display:

- **Short date format**: this is to set the date format which is written in the record of each measurement.
- **Long date format**: this is to set the date format which is displayed in the bottom right corner of the screen.

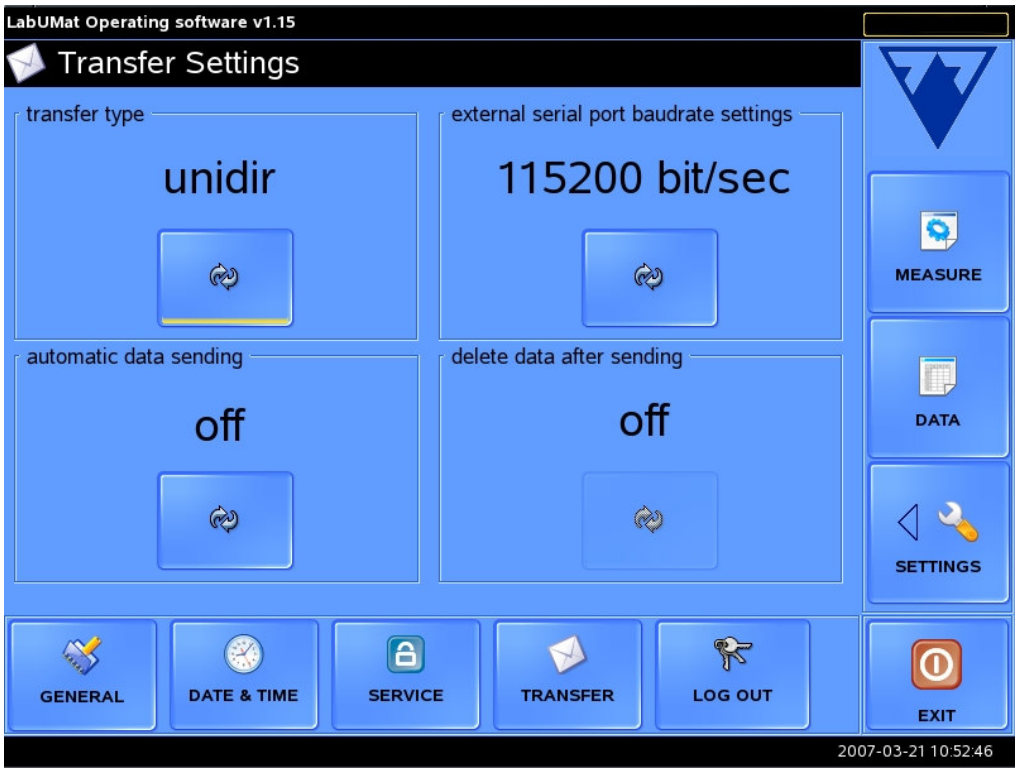
8. Date & Time settings

Both short date and long date format can be adjusted by pushing its button. Possible formats will appear in round cycle. Upon each button press different date and time format will be displayed. LabUMat will automatically set the format which was last selected.

Service: this sub-menu is password protected and is only available for authorized service personnel.



Transfer: in this sub-menu the parameters of the serial communication can be adjusted.



9. Transfer Settings

Transfer type: Options are the following.

- **Unidir:** The traditional text transfer.
- **AUDS:** Connection with our Data Manager software
- **Bidir:** Two-sided communication. In this case there is a feedback about the connection of LabUMat and the receiver system and about data arrival. To use this option, ask your distributor for the protocol. The "Delete data after sending" function can only be used in case of Bidir.
- **Urised:** connection with Urised.
  Connection is managed by Urised. After connection LabUMat adopts the date and time settings of Urised. During measurement, LabUMat sends the results of the measured samples, where they - if satisfy the conditions - will be assembled with the results measured by Urised. If the connection was broken, an error message appears: "Urised communication error!"

Serial interface speed: By pressing this button the speed of the serial interface can be adjusted between 9600 and 115200 Kbit/s. Possible serial interface speeds will appear in round cycle. LabUMat will automatically set the format which was last selected.

Automatic data send: Automatic data sending means that after each measurement the result is sent to the serial port. Therefore, if serial printer is connected to LabUMat than each result will be printed out automatically, if host PC is connected, than the results will be transferred to the PC. With the help of this button automatic data sending can be switched on and off. Small envelop icon in the top right corner indicates if automatic data sending is switched on.

Delete data after sending: This function determines what happens with each data after sending to the serial port. If it is switched on, LabUMat automatically deletes each test result from its memory which has been sent to the serial port. Switching on this function can be advantageous if LabUMat is connected to host PC where the results are stored in a database. However, be aware, that in case of communication problem between LabUMat and host PC data might be lost, as LabUMat is not checking whether data could be transferred successfully. Small red cross in the top right corner indicates if automatic deletion after data sending is switched on.

10. Icons indicating automatic data sending and deletion

4. Operation

4.1 Strip registration

Entering encoded test strip related information allows LabUMat to control the measurement process precisely. This coded information describes the certain strip lot (expiry date, lot number and maximum counts of measurements being allowed with the given registration). Registration code is affixed to registration card which can be found in the vial of LabStrip U11 Plus test strips. Take the code card with "LabUMat" caption on it and press "**Registered strips**" button in **"Measure"** menu.

11. Registered strips button

Type in the first 16 digit number from the two numbers, which can be seen on code card with the help of appearing keypad. After successful registration the number of available strips will increase.

⚠ **Note:**

- **The registration is needed for the proper operation of the reader.**
- **Please note, that a vial of test strips and registration code are co-related.**

4.2 Measuring modes

Measuring mode can be selected in "**Measure**" menu, by pressing the measure mode button which shows the actual state: "**Auto**" or "**Manual**". Automatic mode is selected by default.

In "**Automatic**" mode measurements are performed continuously and LabUMat only stops if there are no more samples on the rack mover unit, if the instrument has run out of strips or if the operator has pressed the "**Stop measurement**" button.

In "**Manual**" mode LabUMat performs exactly as many measurements in a sequence as it was previously set by the operator. The desired number of measurements can be adjusted by using the keypad which appears on the display if "**Σ"** button is pressed after selecting Manual measuring mode. Type in the desired number of measurements with the displayed keypad and set it with the green tick in the bottom line. Press red X to cancel. The instrument stops earlier than the previously set number of measurements are completed only if it runs out of strips or if there are fewer samples on the rack mover unit, than it was previously set, or if the operator has pressed the "**Stop measurement**" button. Always, if new measuring sequence is initiated, number of measurements restarts from zero.

⚠ **Note:**

- **In "Automatic" mode there are always 3 or 4 strips which remain on the conveyor when measurement is stopped either by the user or because there are no more samples on the rack mover unit. These strips are used during the proceeding measuring sequence if it is restarted no later than 8 minutes after its stopping. If more than 8 minutes has elapsed after the last measurement, the 3 or 4 strips which have remained on the conveyor will be directly carried into the waste bin without using them for measurement.**

- **Normally in "Manual" mode no strips remain on the conveyor. However, if the operator presses "Stop measure" earlier, then LabUMat finished measuring the preset number of samples, then exactly the same thing happens with the strips as it is described above.**

4.3 Identification of test results

Test results can be identified either by automatically generated ID numbers or by bar-codes affixed to test-tubes. Both identifications can be changed later by renaming records in "Data" menu. Attributes of the possible identifications are concluded in the followings:
Automatically generated IDs: LabUMat identifies samples by their position. The first three digits of the ID encode the number of the rack, while the second two digits encode the position of the measured sample in the rack. Numbering of the racks starts again from one after each switching off. However, LabUMat assures that the automatically generated IDs are unique during one day time period. This means if the instrument was switched off because of any reason during one day and numbering of the racks started again (from first rack first position), instead of giving an already existing ID, LabUMat extends the numbering with one additional number.
Identification by bar-code: Urine samples can be identified by bar-codes if bar-codes are affixed to test-tubes. On what type of barcodes can be used and on how they should be applied on test tubes, please refer chapter "Placing barcodes on test tubes".

⚠ **Note:**

- **If more than one parallel measurement is set in the Settings menu, IDs are extended with the number of dippings in the samples in both identification cases.**
- **In case of control measurements IDs are always GTEST, CONT1, CONT2 respectively.**

4.4 Inserting test strips

LabUMat is ready to be operated after test strips have been loaded into its dedicated strip holder tray. Test strips can be inserted easily by following the below described steps:

1. Push the "**Open Stripholder**" button. A message will warn you not to open the unused strip bin until the stripholder is not opened. Pull out only the unused strip bin when the warning message disappears and instead **"Now you can open the Unused Strip Bin!"** message is displayed on the screen. This message disappears when you remove the unused strip bin and instead **"No Unused Strip Bin!"** message will be displayed until the bin has not been taken back. If you open the bin earlier than it is indicated, unused new strips that remained in the tray from previous measuring sequences fall outside the strip holder bin.

2. After pulling out the unused strip bin, turn out the strip holder tray a bit from the instrument.

3. There is a special tool provided for LabUMat which facilitates strip insertion in the instrument. Open a new vial of LabStrip U11 Plus test strip and piece together its vial with the strip loader tool as it is shown in figure 9 below. Shake well the vial in order to have all the strips in the strip loader tool.

9. Strip insertion into strip loader tool

10. Loading strips into strip holder tray

4. Take the strip loader tool and interface it with the strip holder tray. Open the cover of the strip holder tool by simply elevating it and pour the strips in the strip holder tray as it is shown in picture 10.

⚠ **Important:**

- **One vial contains the maximum amount of strips you may insert at once. Feed only the instrument with a new vial of LabStrip U11 Plus strips if the number of remaining unused strips inside the instrument has dropped under 15 (number of remaining unused strips can be seen in the "Strip left" field).**

- **If there are too many unused strips inside LabUMat, when removing them some might not fall properly in the unused strip bin and may remain inside. Please in this case remove strips manually.**

- **The code of the new vial should be entered in order to be able to perform measurements with the new strips. On how registration should be done study "Registration" section.**

5. After inserting strips, fold back the strip holding tray until you hear it clicks in its position. Insert the unused strip bin back to its place as well.

The strip holder tray pours the strips to the feeder unit automatically after placing back the strip holder bin. However, stripholder will not close automatically, if less then 5 seconds elapse between opening and closing the strip holder tray. Strip holder tray can also be closed by pressing the "**Close stripholder**" button.

4.5 A typical daily routine

It is very easy to operate LabUMat after it has been set up for normal operation and test strips have been loaded into the instrument. Just follow the instructions listed below to finish your laboratory work without any effort.

⚠ **Important:**

Only specially trained professionals may use the instrument. Always wear rubber gloves or other protecting cloth when operating LabUMat.

1. Remove all racks from the rack mover part and switch on LabUMat. Self-diagnostic procedure is automatically performed and "**Measure"** menu appears on the touchscreen. After switching on, let the instrument to warm-up for 10 minutes before starting measurements.

2. Prepare urine test samples in test-tubes and put the test-tubes in the supplied racks. If your test-tubes are identified by bar-code, take care to have the bar-codes at the open side of the racks, otherwise bar-code reader of LabUMat won't be able to identify test-tubes.

3. Put the racks with test-tubes containing urine samples on the rack mover unit to the right of the little black pins on the right side of test-tube driving hole. Take care to place racks on the rack mover unit by facing their open side to the right. LabUMat automatically ensures correct rack angle right before the rack reaches the test-tube driving hole.

⚠ **Note:**

Fill test tubes with urine to the mark, otherwise strip cannot be fully dipped in sample.

4. Now LabUMat is ready to operate. Select the measurement mode (Automatic or Manual). In „**Manual**" mode, the number of urine samples that you would like to measure in a sequence has to be adjusted. For detailed description of these modes see chapter "**Measuring modes**". After executing the instructions above, you only have to press the "**Start measurement**" button and LabUMat will perform your laboratory work automatically. During measurement, the measuring process is displayed on the screen: the date, time, ID and the status of each strip is continuously displayed. There are useful information displayed in the Strip Info and Sample Info fields as well: number of available strips, number of already performed and - in Manual mode - number of remaining measurements. The results of the measurements can be studied in the Data menu (for details see Data menu chapter).

5. LabUMat stops automatically if it runs out of strips or if there are no more samples to be measured on the rack mover unit. To finish work earlier press "**Stop measurement**" button. LabUMat doesn't stop immediately, only after evaluating the strips that have already been dipped or were about to be dipped into the urine sample when "**Stop measurement**" was pressed.

6. After finishing working with LabUMat open strip holder by pressing "**Open Stripholder**" button. Put the unused strips from the strip holder bin back to their vials through the hole on the left side of the strip holder bin. Try to avoid touching the strips with your hand!

7. If the last rack remains inside the test-tube driving hole after finishing measurements, press "**Rack out**" button to have the rack removed. Afterwards measured samples can be poured out.

8. Open the waste bin on the left side of the equipment and empty it. It is also recommended to wash it out at the end of each day.

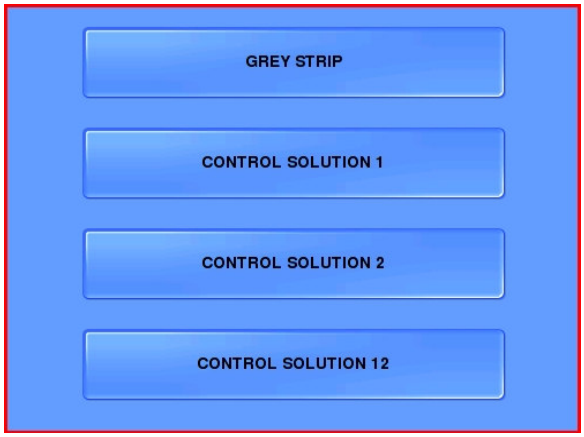
9. Switch off the instrument by pressing "**Exit**" button. Switch off the equipment by the switch on its right side.

⚠ **Important!**

- **Don't store strips in strip holder tray! Take out strips from strip holder bin and take them back in their vials, if you finished working with LabUMat. Strips in the strip holder tray are not properly protected against moisture which may significantly damage strip quality.**
- **LabUMat can be operated only with LabStripU11 Plus strips.**
- **Don't touch the rack mover part during operation when there are racks with test-tubes on it.**
- **If you reuse supplied test tubes, don't forget to wash them thoroughly. Dirty test tubes may frustrate test results. If possible use only single use tubes! Don't reuse single use tubes!**
- **If you use glass test tubes, place only a maximum of 5 racks (50 test tubes) on the rack mover unit at a time. As glass test tubes are heavier, bigger number of them may damage the rubber belts on the rack mover unit.**
- **Measuring process is suspended if any problem arises during operation. In case of failure consult "Error messages and Troubleshooting" chapter for advice.**
- **Never switch off the instrument with the red switch on the side during measuring process. Always exit from its software by pressing "Exit" button before switching off!**
- **Always use the instrument according to the recommended manner! It might be dangerous if protections are avoided.**

5. Quality control

Adequate measuring performance of LabUMat can be controlled through different procedures: either with the use of supplied check strip or by control solutions. Desired control operation can be started from the Measure menu by pressing the Control button.



12. Quality control options

Grey strip function: this procedure checks the optics of the instrument, if it is able to adequately evaluate the colour of the supplied check strip. When selecting this control method “Place the grey strip under the measurement head!” message will ask the operator to place the supplied check strip perpendicularly to the conveyor belt under the measuring head, so that the white light could be seen all the way long on the strip. After placing the strip properly, press the green tick in the message box. LabUMat performs the check measurement and displays "The grey strip test passed!" message if the test was successful and "The grey strip test failed!" message if there has been a problem with the measurement. This type of control measurement has always GTEST ID and its result is never stored in the database.

Control Solution 1 and Control Solution 2 functions: instrument starts a measuring process exactly the same way as if one measurement had been set in Manual mode. The ID of the measurement will be CONT1 if control solution 1 was chosen and CONT2 in case of control solution 2, regardless whether barcodes have been attached to test tubes (these IDs neither can be changed later in the Data menu). As patient name, the set name of the control solution is displayed in the Data menu. Results of these measurements are stored in the database in all cases and they are evaluated according to the normal ranges set for the control solutions in the settings menu (see Control Measurement description in 3.3 chapter for more details). If the result complies with the set normal range "The control solution test passed!" message appears, while "The control solution test failed!" message indicates if the result fell outside the desired range.

Control Solution 12 function: the instrument performs the above described control solution 1 and control solution 2 measurements right after each other, just as if two measurements had been set in Manual mode.

⚠ **Important!**

If the quality test measurement has not been successful, always try to repeat the measurement carefully. If the problem persists, contact with your distributor for help.

6. Maintenance

To keep LabUMat in perfect condition the following maintenance activities are recommended to be done regularly:

- Empty the waste bin and wash it out with water or with alcohol at the end of each day.
- Remove drop collecting tray, conveyor belts and cylinders. Wash them under running water or in alcohol. Clean the shafts also with wet cloth. Always check if the cylinders are turning after replacement.
- Take care that you do not touch the optics. Use only soft cloth and water for cleaning the optics, as other special cleaning solutions might damage its transparency which would result serious loss in the measuring accuracy of LabUMat.
- Remove rack mover unit to clean it easily with water or with alcohol. This part does not contain any electrical parts, so you do not have to worry about getting some water inside. However, immersing the rack mover unit under water is not recommended, as flooding water damages bearings inside.
- Dry removed parts before replacing them.
- If necessary, use a wet cloth for cleaning the surface of the instrument as well.
- Change the strip mover belts in every years.

Warning! Since urine is a fluid of human origin, it may be infective and may bear the possibility of biological risks. Handle used strips and urine contaminants with care!

7. Error messages, troubleshooting

7.1 Warning messages

If a warning message from the following list appears follow the troubleshooting instructions and press "**OK**". Some messages disappear immediately if their reasons are resolved.

Warning messages	Troubleshooting
Messages concerning the normal measurement process	
"Measurement is running!"	This message appears, if exit button is pressed during ongoing measurement process. It warns the operator not to shut down the system while it is performing measurements.
"Wait until the current measurement is finished!" and "Insert the urgent sample(s)"	If STAT button is pressed, the instrument stops only after current sample in rack is measured. Until this has not been realized, "Wait until the current measurement is finished!" message is displayed on the screen. The message "Insert the urgent sample(s)." indicates that the instrument is ready to handle the urgent samples, so they can be placed on the rack mover conveyor. By clicking on the OK button the message disappears and the instrument starts measuring the emergency samples.
"No rack holder!"	Insert the rack holder.
"No rack!"	Place racks on the rack mover unit.
"Rack mover full!"	Remove the already measured racks from the rack mover.
"Waste-bin missing! Please insert it."	Put waste-bin back.
"Attention! Air humidity may damage the test strips in the container. Check test strip performance before doing further measurements."	Test strips have been stored inside the instrument longer than it is set in the "Stability alert" point of the settings menu (12h as default). Take back the strips into their vials, where they are properly protected against moisture.
Messages concerning the Data menu	
"Empty ID is not valid!"	Enter characters before saving new ID or patient name!
"Please select a single item!"	Multiple selected records cannot be saved together. Select only one record to be renamed!
Messages concerning strip loading	
"Stripholder empty!"	Put strips in the equipment (see **3.1 Measure menu**)
"No unused strip bin!"	Put the unused strip bin back.
"Insert unused strip bin to open!"	To open strip holder tray, first insert unused strip bin back.
"15 strips remain from now on, you can load new strips!"	If the number of unused strips drops below 15 – according to the Strip left field – this message draws the attention of the operator that the instrument is running out of strips. When this message is displayed the 'Open Stripholder' button turns active, therefore insertion of test strips becomes available without stopping the measurement process.

"Don't open the Unused Strip Bin until the stripholder is opened!" and „Now you can open the Unused Strip Bin!"	When Open stripholder button is pressed, instrument displays "Don't open the Unused Strip Bin until the stripholder is opened!" message to draw the attention of the operator to wait with the opening of the Unused Strip Bin while unused strips are not removed into it. After unloading unused strips, „Now you can open the Unused Strip Bin!" message tells the user that the bin can be removed.
"No unused strip bin! Please insert it."	This message is displayed, if Unused Strip Bin is removed from the instrument. When inserting the Unused Strip Bin, the stripholder tray is closed automatically and this message disappears as well.
Messages concerning strip registration	
"Registration successful!"	If the operator enters properly the number written on the registration card attached to the vial of LabStrip U11 Plus, the instrument displays this message and increases the number of available measurements.
"Registration code is already in use!"	This message appears if a certain registration code is entered more than once. In this case the number of available measurements doesn't change.
"Invalid registration code!"	If not the proper registration code was entered (because of mistyping or because of using not complying strip type), then the number of available measurements is not increased and this message is displayed.
"Registration code expired!"	If the registration code is entered of an already expired vial of strips, then this message is displayed. In this case the number of available measurements does not change.
Messages concerning control measurements	
"Place the grey strip under the measurement head!"	This message asks the operator to place the supplied check strip perpendicularly to the conveyor belt under the measuring head, so that the white light could be seen all the way long on the strip. By clicking on the green tick the message disappears and the instrument starts to perform the control measurement with the grey strip.
"The grey strip test passed!"	Control measurement with the grey strip was successful, the instrument operates properly.
"The grey strip test failed!" message and Xt error code	Control measurement with the grey strip was not successful. Repeat the measurement and try to place the check strip more carefully, after wiping off the check strip with a soft tissue. If the result is still not satisfactory, please contact your distributor for help.
"Control Solution test passed!"	Control measurement with control solution was successful, the instrument operates properly.
"Attention! Min cannot be higher than Max!"	Higher limit of the range cannot be set lower than the lower limit. In case of such adjustment this message is displayed.

"Control Solution test failed!" and Xt error code.	Control measurement with control solution was not successful, result was out of the set range. • Check whether the proper ranges are set for the control solution in the Settings menu. If not, modify the ranges and repeat the measurement. • Also try to perform the measurement with a new vial of test strips and new vial of control solution. • Check, if you are using the control solution recommended by the manufacturer. If the result is still not satisfactory, please contact your distributor for help.
"Control measurement ID can not be changed!"	It is not possible to rename the IDs of control measurement results like 'CONT1' or 'CONT2'.
Messages concerning password changing	
"Invalid SETTINGS password!"	For entering the Settings menu, password has to be entered. If not the set password is typed in when entering the Settings menu, the instrument displays this message. Try to type in the password more carefully again. Contact your distributor for help, if the password has been forgotten.
"Invalid SERVICE password!"	For entering the Service menu, password has to be entered. If not the set password is typed in when entering the Service menu, the instrument displays this message. Try to type in the password more carefully again. Contact your distributor for help, if the password has been forgotten.
"Password changing successful!"	For changing the password of the Service or the Settings menu, first the old password and then two times the new password have to be entered. This message is displayed if the new password could be set properly.
"Password changing failed!"	This message is displayed, if changing of the Settings menu or the Service menu was not successful. The reason for this is that the new password has not been entered the same way twice. Try to type in the new password more carefully again.
"Invalid password!"	New password can only be set, after successfully entering the old password. This message appears, if the old password was not typed in properly. Try to type in the password more carefully again. Contact your distributor for help, in case of forgetting the password.
Messages concerning service operations	
"First you should stop the QC sequence!"	QC measurement for testing the measuring head can be started from the Service menu. This process has to be stopped before initiating a normal measurement. Should you miss quitting from this QC measurement, the instrument displays this message if normal measurement is started. This message can be eliminated by stopping the QC measuring head test in the service menu.

“No software upgrade found!”	The message is displayed in the following cases: • pendrive was not inserted into the USB slot before starting the upgrade • upgrade file was not copied onto the pendrive or not in the root directory • pendrive is not recognized by the instrument or the upgrade file is damaged Try to perform the upgrade again, by following the steps more carefully. Contact your distributor for help, in case the upgrade process fails again.
“Service door open! Please, close it!”	Instrument displays this message in case of the opening of the service door. After closing the service door, the instrument first performs self-check before returning to normal operation.

7.2 Error messages

During operation a control program checks the operational conditions needed for proper execution of each functions. If checking ends with indication of a problem, an error message will be displayed. If an error message appears, go to "**Settings**" menu and run "**Self check**". In some cases this will automatically solve the problem by initializing LabUMat. If not try also to switch off and on the instrument as hardware reset may help to eliminate the problem as well.
If the problem still persists, attach a pen-drive to the USB port and run "**Diagnostics**". This will run an overall test on the instrument and copies a diagnostic.txt file to the pen drive. This report file contains all important information regarding the status of LabUMat .Contact your distributor and send the diagnostic.txt file to them in order they could help you to solve your problem.
The instrument should be repaired only by specially trained service personnel. However, in case of the below listed minor problems, you might try the followings to overcome the situation:

Experienced problem or error message	**Troubleshooting**
"Start self check due to previous error(s)"	Message appears, if there have been error(s) with some part(s) of the system during boot up process or during diagnostic or self check operations. This message can also be evoked by the opening of the service door. To eliminate the message, press the appearing Reinit button. This will start the System self check process. If error message appears again, please contact your distributor for help.
"Lost strip at robot!"	Check if the robot dropped a strip.
"Old strip!"	The measured strip was old. Check expiry date of the strips.
"Lost strip!"	Check if a strip has been dropped.
There are strips in the feeder, however it does not give out any despite of turning up and down quite noisy.	There might be a false positioning strip in the feeder. Open the service door and carefully try to remove the false positioning strip from the feeder.

⚠ **Important!**
Do not try to repair the equipment without the assistance of a professional.

7.3 Possible measurement errors

While performing measurements, LabUMat displays the status of the strips in the "**Measure**" menu "**Status**" column. If the measurement process of a sample could not be finished adequately, the instrument displays a red X and an error code next to it, in the "**Status**" column. Those measurements which are signed with red X, does not have evaluated result in the "**Data**" menu. These measurements should be repeated in order to obtain proper result.
Meanings of the error codes written next to the red X can be found in the table below.

X_1	Strip appeared earlier under the measuring head than it should have to
X_2	Strip lost, or it was detected later than it should have to
X_3	False positioning of strip under the measuring head
X_4	Dry strip or inadequate colour of strip pads
X_5	White strip or turned strip
X_6	Strips are not synchronized, there might have been some obstruction previously
X_t	Control measurement error (control measurement result is out of the set range)
X	Other undefined error

8. Technical data

methodology	reflectance photometer
Detection	CCD image processing
Max. Throughput	250 samples/hour
Memory	9999 measurements
Display	800 X 600 colour TFT, VGA adapter for external display
Printer	External
Size	600 X 650 X 550 mm
Weight	60 kg
Power	100-250 VAC, 50-60 Hz
Power consumption	At 90V it takes 1A
	At 275V it takes 430mA
Fuse	T 8A L
Interfaces:	Standard 15 pin D-Sub VGA connector for compatible devices *
	PS2 interface for standard PS2 compatible keyboard *
	PS2 interface for standard PS2 compatible mouse *
	LAN connector to connect Ethernet RJ45 compatible devices *
	USB interfaces to connect USB compatible memory drives *
	Serial interface to connect serial printer and host computer *
Patient ID input	Automated barcode label reading from tube
Op temperature	15-30 °C
Op humidity	20-80 %
Storing temperature	0-50 °C
Storing humidity	20-80 %

*: All connected devices should comply with EN 60950 standard and all its extensions relevant to the type of connected device.

9. Symbols

In vitro diagnosticum


Warning


Information inside

Serial number


Manufacturer


Biological risks


Warning! High voltage!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V3.0 2007.05.15.
UAZ-9201-8