DIAReader

User Manual

Conformity

The product complies with the general safety and performance requirements of the following regulation: EU Regulation 2017/746 on in vitro diagnostic medical devices (IVDR)

It also complies with the European standard:

EN 61010-1:2010;

EN 61010-2-101:2017;

EN 62304:2016,

EN 62366-1:2021,

EN 13612:2002,

EN 61326-1:2013 and

EN 61326-2-6:2013.

Conformity is confirmed provided the equipment is installed and used in accordance with the requirements described in the manual.

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CE

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Symbols used

Symbols in the manual

NOTE!
Notes contain additional information or tips on using the appliance.

CAUTION!
Precautions are marked with CAUTION and should be followed carefully to ensure that your device operates correctly and to prevent unnecessary injury.

Symbols on the appliance

This symbol indicates that the marked part becomes hot during operation of the device. Do not touch the marked part, as you may burn yourself.
The symbol is located on the lamp holder of the optical system.

Warning! This indicates that the marked area may cause injury and/or damage to the photometer.

This symbol indicates the product's serial number, enabling a specific product to be identified.

This symbol identifies the product as an in vitro diagnostic.

This symbol indicates the manufacturer of the product. The manufacturer's name and address are provided.

This symbol indicates the date on which the product was manufactured.

CE marking in accordance with Regulation (EU) 2017/746 (IVDR).

Biological risks
Indicates that the product is associated with potential biological risks.

This symbol indicates the temperature range to which the product can be safely exposed.

Safety precautions and potential hazards

General

Before you begin installing and working with the DIAReader, you should read the safety precautions and regulations listed in this chapter.

Report serious incidents or potential serious incidents relating to the DIAReader to the manufacturer and your competent authority in accordance with the requirements.

Operator qualifications

Please note that the DIAReader must only be operated by a qualified laboratory technician.

Qualification of the service technician

The installation, maintenance and repair of the device must only be carried out by service technicians who have been trained by the manufacturer or its authorised representatives. It is assumed that the service technician is familiar with the operation as described in the manual.

Electrical

To ensure safe operation of the device, please observe the following points:
To avoid the risk of electric shock and damage to the device, the operator must not open the device cover. Opening the housing for maintenance or repair purposes is reserved exclusively for authorised specialist personnel.
Touching the main circuit board whilst the device is switched on can result in serious injury. In the event of technical problems, contact your supplier immediately.

Mechanics

When the device is closed, the mechanical components pose no danger. However, if the device covers are removed, there is a risk of injury and damage to the device if the following safety instructions are not observed:

DO NOT wear loose clothing or jewellery that could become caught in the mechanical components.

DO NOT reach into the operating range of moving parts or other components whilst the device is in operation.

DO NOT carry out any mechanical repairs unless the device has been taken out of service or switched off.

Lamp

The lamp reaches extremely high temperatures during operation. Never touch the lamp whilst it is switched on! Always switch off the device before replacing the lamp. Wait until the lamp has cooled down completely before replacing it.

Chemicals

The operator is responsible for taking all necessary precautions against hazards associated with the use of clinical laboratory chemicals. Specific recommendations for each reagent used with the DIAReader can usually be found in the manufacturer's package inserts or in the product information sheets for each chemical. Wipe up any spilled reagents from the device immediately.

Biologically hazardous materials

As with all in vitro diagnostic systems, patient samples analysed using this device, as well as all residues from the waste container, must be treated as potentially infectious (biological hazard). All materials and mechanical components that come into contact with the sampling and waste system must be handled in accordance with your institution's applicable biosafety guidelines. Use the prescribed personal protective equipment (PPE) when working on these components.

- **Samples**

Treat all samples as potentially biohazardous and infectious. If a sample drips onto the device, use the appropriate personal protective equipment (PPE – gloves, lab coat, etc.), wipe it up immediately and clean the contaminated area with a disinfectant.

- **Reagents**

Avoid direct skin contact with reagents. Direct contact may cause skin irritation or damage. Specific instructions can be found in the reagent packaging or in the manufacturer's instructions for use.

Additional precautions

- Flammable substances

Avoid using hazardous flammable materials near the device.

- Accuracy/precision of measurement results

To ensure the device is used correctly, you should perform checks and monitor the device during operation.

An incorrect measurement result may lead to a misdiagnosis and thus pose a risk to the patient.

Use the tests in accordance with the manufacturer's recommendations. Specific instructions can be found in the reagent packaging or in the accompanying instructions for use.

Ensure that the sample/reagent mixture does not contain blood clots, dust or other insoluble contaminants. If the sample contains insoluble contaminants, inaccurate or incorrect readings may be obtained.

- Operation and maintenance

Follow the instructions when operating and maintaining the instrument and do not touch any parts of the instrument other than those specified.

Ensure that the front covers are closed whilst the device is in operation.

Avoid touching mechanisms such as the suction mechanism inside the device whilst it is in operation. This may cause the device to stop working or result in damage to the device.

WASTE DISPOSAL

- To protect the environment and public health, it is recommended that consumables, wear parts, liquid waste and end-of-life equipment are not disposed of in the environment.
- Ensure that the disposal of liquid waste, consumables, wear parts and end-of-life equipment is carried out in accordance with applicable laws and regulations.

Using the Manual

This manual contains information on system installation, operating procedures, system parameter settings, maintenance, etc. We recommend that the user reads the manual carefully before operating this device.

If you have any questions, please contact your local dealer.

Note: Contains useful tips on using your device. These are printed in italics.

Precautions:

The precautions must be followed carefully to ensure that your device operates correctly and is not damaged. Precautions are printed in bold as shown here.

Intended use

The DIAReader is an IVD device for the qualitative or quantitative analysis of human samples in combination with ELISA kits. The semi-automated device measures absorbance to detect the presence or concentration of antibodies or antigens to aid in the diagnosis of infectious diseases, autoimmune disorders, thyroid, steroid, fertility and tumour markers. The specific diagnostic range and sample type are determined by the ELISA kit. For professional laboratory use only.

1. INSTALLATION

1.1 Unpacking

Carefully unpack the device and check it for any damage caused during transport.
Check the components:

- Device
- Instructions for use
- Packing list
- Accessories: Mouse, stylus, power cable, RS-232 serial cable, lamp, fuses, thermal printer.

Note!

Keep the original packaging in case of future transport.

Report any damage or missing accessories to your local representative.

1.2 Environmental conditions

Position the device so that it is not exposed to excessive dust, vibrations, strong magnetic fields, direct sunlight, draughts, excessive humidity or large temperature fluctuations.
Leave sufficient space (10 cm) on both sides of the device to ensure adequate air circulation.
Refer to the Technical Specifications in Chapter 2.3 for further environmental conditions.

1.3 Power supply

- 110 V to 220 V AC
- 50/60 Hz
- 120 W

Warning!

- **The mains plug must be earthed at the main socket.**
- **The circuit used should be largely free of large voltage spikes.**
- **If you notice smoke or unusual noises, please switch off the device immediately and contact your dealer.**

Connect the supplied mains cable to the designated socket on the rear of the device. Plug the other end of the mains cable into a mains socket.

1.4 Connecting an external printer

With the device and external printer switched off, connect the USB cable to the back of the device. Plug the other end of the USB cable into the printer. Then connect the power cable to the printer. Load printer paper if necessary.

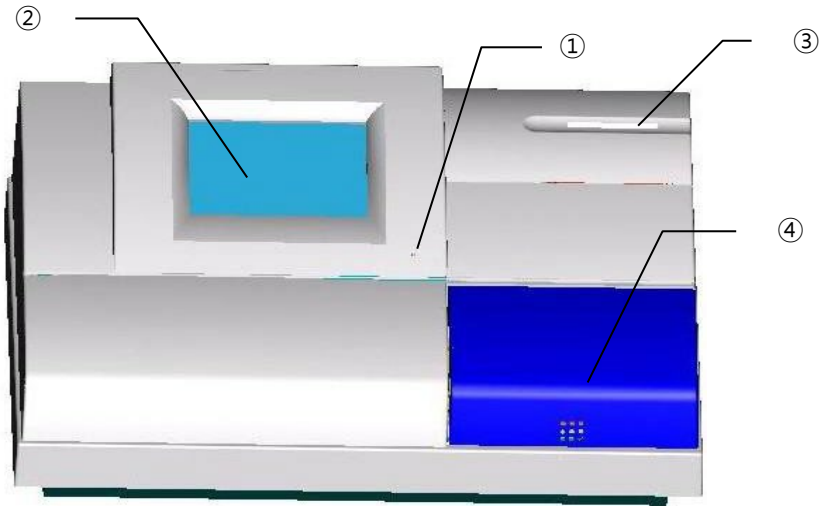
2. FUNCTION DESCRIPTION

2.1 Introduction

1) The DIAReader is an IVD device for analysing human samples in combination with ELISA tests by reading microtitre plates with the following features:
2) The touch panel makes operation easy.
3) 100 programmable tests.
4) Calculation methods:
   - Absorbance mode (ABS)
   - Cut-off mode
   - Single standard mode
   - Curve mode
   - %ABS Multipoint mode
   - Linear regression mode
   - Exponential regression mode
   - Logarithmic regression mode
   - Power regression mode
5) Flexible plate configuration for each run
6) Test duration <5 s/plate; shake the plate before testing
7) Maximum storage capacity of 100 programs, 1,000 patient records and 10,000 sample records.
8) Report printing, support for multiple printer types.
9) Information management function: department database, operator database, system log database.

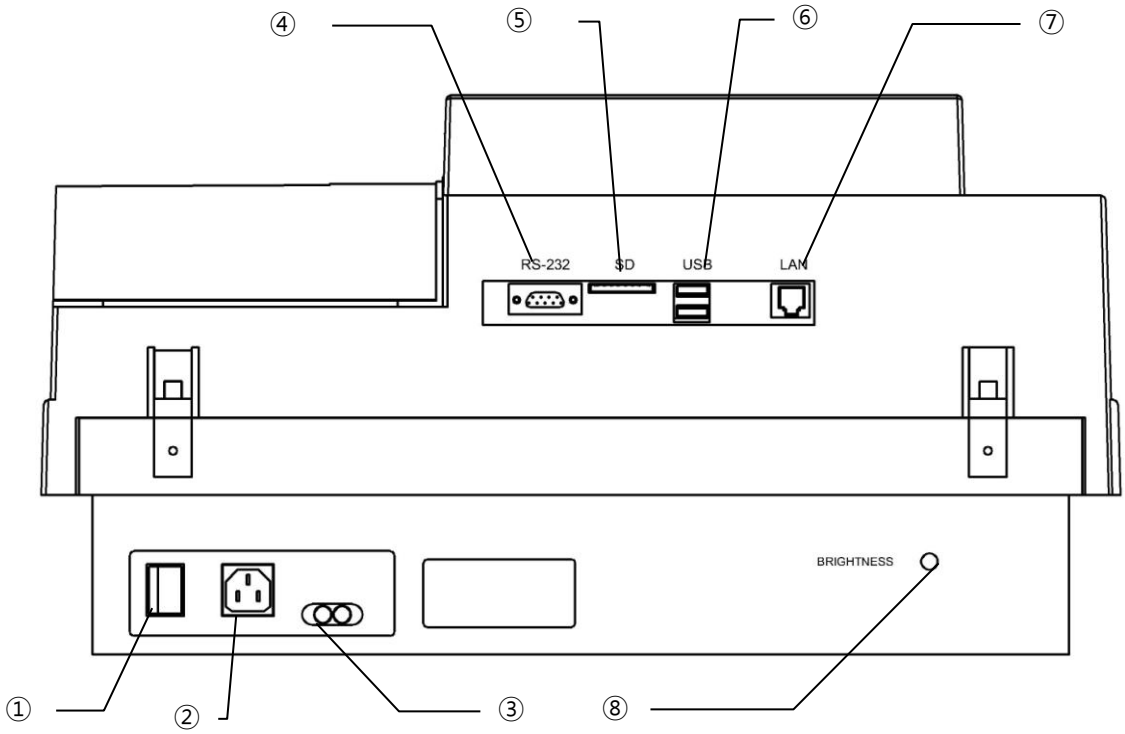
2.2 General description

2.2.1 Front view



① Power indicator: Lights up when the appliance is switched on
② Touchscreen: Displays the program
③ Internal printer
④ Plastic cover

2.2.2 Rear view



① Power switch
② Power connection
③ Fuses
④ RS-232 port
⑤ SD interface
⑥ USB port
⑦ LAN port
⑧ Contrast adjustment button

2.3 Technical specifications

Parameters	Technical specifications
Weight	7.5 kg
Overall dimensions	460 mm (L) × 330 mm (W) × 190 mm (H)
Power	110 V–220 V, 50 Hz/60 Hz
Fuses	T3.15AL 250 V
Operating environment	Temperature 5 ℃ to 40 ℃; humidity ≤ 80 %
Storage environment	Temperature 0 ℃ to 40 ℃; humidity ≤ 85 %
Lamp	OSRAM64255, 6 V/20 VA.
Standard wavelength	405, 450, 492, 630 nm (replacement filters from 400 to 700 nm available to special order)
Abs range	0–3,500 A
Measuring range	0–2,000 A
Accuracy	0–2.0 A: ±1.0% or ±0.007 A
Accuracy	0–2.0 A: ±0.5% or ±0.005 A
Linearity	±2.0% or ±0.007 A
Reading speed	Continuous operation ＜5 s, step operation ＜15 s
Warm-up time	1 minute
CPU	Embedded RISC CPU
Memory capacity	100 programmes, 1,000 patient records, 10,000 test results
Interface	RS-232C serial interface, USB interface, RJ45 interface, SD interface
Display	5.7-inch LCD display (320 × 240 pixels, 256 grey scales)
Input	Touch panel and stylus, external mouse (special order)

3. OPERATING THE TOUCHSCREEN

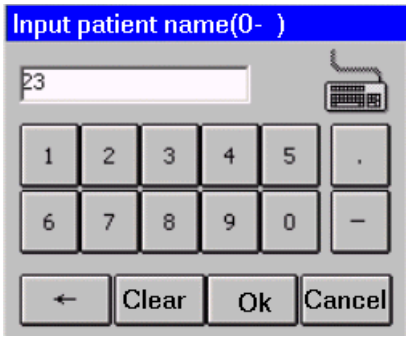
3.1 Touchscreen and stylus

The device has a touch panel; you can operate the device using a stylus.

Warning!
Use the stylus to touch the panel.

Note: You can also operate the device using an RS-232 mouse.

3.2 Digital numeric keypad



Enter a number and press the “OK” button to save the entry, or the “Cancel” button to exit without saving.

Edit: Press the ← button to delete a character before the cursor.

Press the “Delete” button to delete all characters

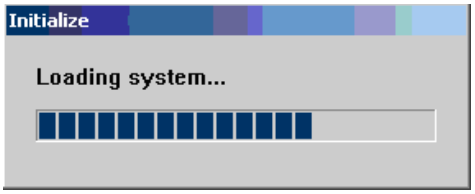
3.3 On-screen keyboard

You can use this keyboard just like a PC keyboard and move windows by dragging them.

4. OPERATION

4.1 Switching on the DIAReader

Switch on the device using the power button and wait a few seconds until the following message appears (System loading…):



During initialisation, the device performs a number of tasks:

1) Loading the system
2) Checking the system
3) Reading user data
4) Initialising the user interface
5) Stabilising the lamp
6) Checking the filters (the filters rotate during the check). The device performs a self-test and the initialisation data is loaded.

If the device fails the self-test, an error message is displayed.

4.2 main menu

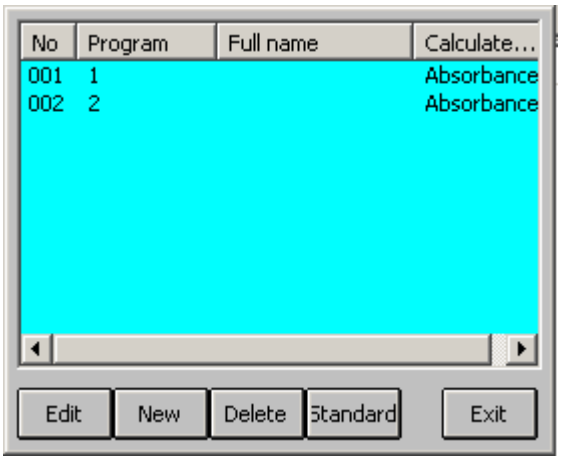
After the self-test, the system displays the main menu:

Test……..Test
Program……Program
QC Manage…..QC
Report……Print
System……..System
Power off…….Switch off

The main menu provides access to all the functions of this device.
When the user clicks on the icon in the window, the corresponding function is executed.

5. Program

Clicking the ‘Program’ icon displays the program list:



You can program 100 tests into the device.

5.1 Setting the calculation mode

The device supports 10 calculation modes. These can be divided into three types.

5.1.1 ABS mode

In this mode, the instrument only displays and prints the absorbance of the samples.

5.1.2 Cut-off mode

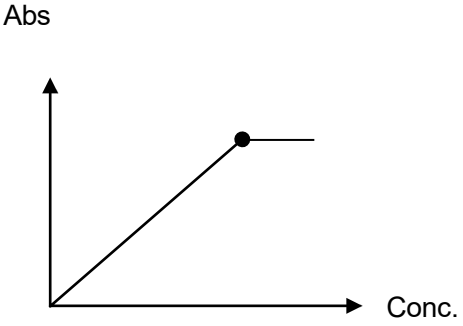
Cut-off formula: $CO = X \times NC + Y \times PC + Fac$

In this cut-off mode, NC is the mean value of the negative controls, PC is the mean value of the positive controls, CO is the cut-off absorbance, X, Y and Fac are coefficients that can take any positive or negative numerical value (including 0 and 1); for example, the sample OD/NC ≥ 2.1 is positive if X = 2.1, Y=0 and Fac=0.

In regular cutoff mode, the device classifies the sample as positive if the sample OD/CO > 1.

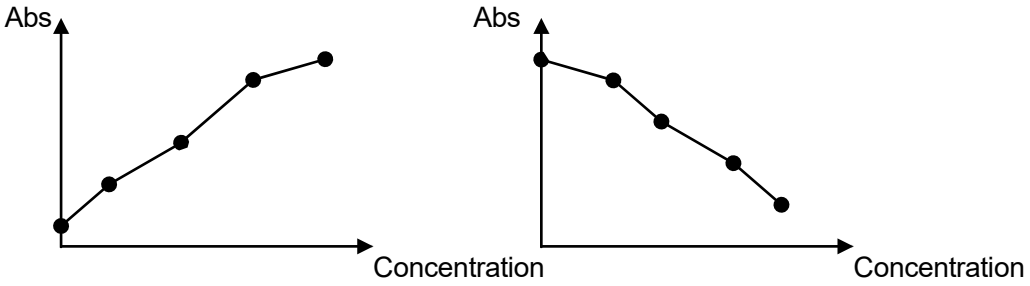
5.1.3 Quantitative calculation with standards

1) Single standard mode: A single standard of known concentration is used, so that the concentrations of unknown samples can be calculated in accordance with Beer’s law.



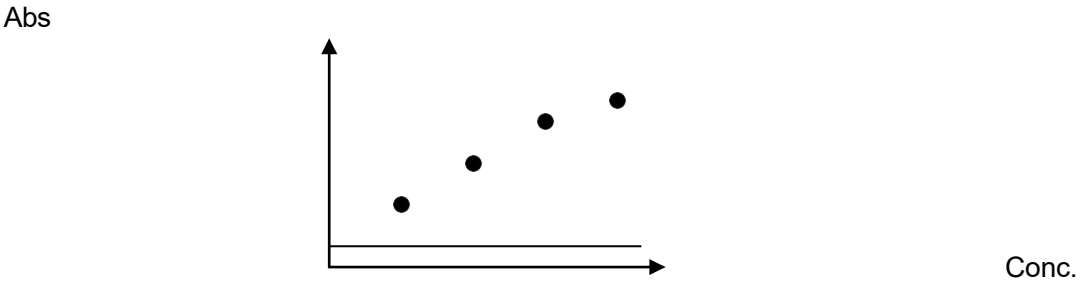
2) Curve mode: You can specify 2 to 8 standards; the resulting calibration curve is a series

of lines connecting the calibration points, which can be entered in ascending or descending order of absorbance.



3) %ABS Multi-point: You can set 2 to 8 standards. The highest absorption standard is assigned a value of 100, and each sample and standard is expressed as a percentage of the absorption of the highest calibrator. The resulting calibration curve connects the individual points, which can be entered in ascending or descending order of absorption.
4) Linear regression mode: You can set 2 to 8 standards. This is a multi-point standard mode that calculates the best possible linear equation based on the standard points.

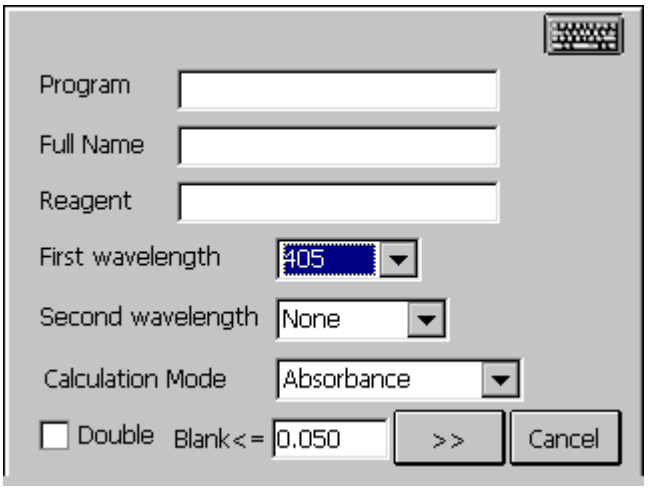
   Equations: linear. $Y = kX + b$. This is used when the absorption and concentration



5) Logarithmic regression mode: You can set 2 to 8 standards. Equation: $Y = ke^{bX}$; This is used when the natural logarithm of the absorbance is plotted against the concentration.
6) Logarithmic regression mode: You can set 2–8 standards. Equation: $Y = kLnX + b$; This is used when the natural logarithm of the concentration is plotted against the absorbance
7) Exponential regression mode: You can set 2–8 standards. Equation: $Y = kX^b$; This is used when the natural logarithm of the absorbance is plotted against the natural logarithm of the concentration.
8) Percentage logarithm mode: You can set 4 to 8 standards. Using these standards, a new curve can be plotted, which you can then treat as a standard curve. The sample concentration is determined by regression.

Edit program

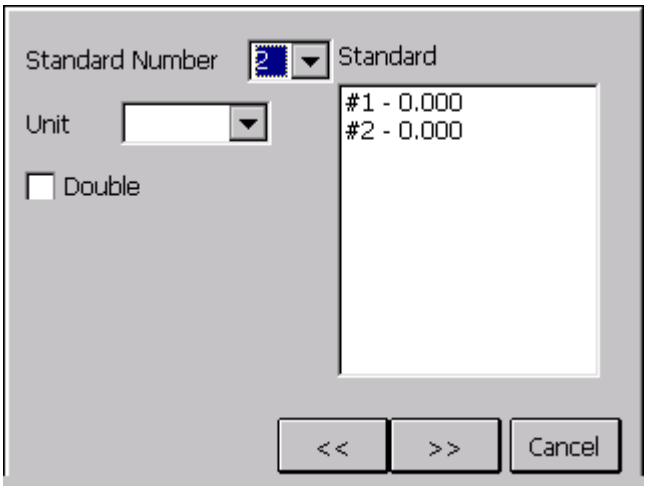
Select an existing program (it will be highlighted), press the ‘Edit’ button and the following window will appear:



- Program (Program): Program or test name; do not enter a name that already exists.
- Reagent: Enter the name of the reagent used; however, this is not strictly necessary.
- Wavelength (First wavelength, second wavelength)
- Calibration or calculation mode
- Double sample: If you select this option, the samples must be pipetted into two consecutive wells. The mean value of the absorbance measurement is used to calculate a single concentration.
- Blank: You can set the range of the blank’s absorbance. If the blank’s absorbance is outside this range, the system displays the following message: ‘Blank absorbance outside range’.

You can press the >> button to move to the next window or the << button to return to this window. You can click the ‘Cancel’ button to exit the program configuration window.

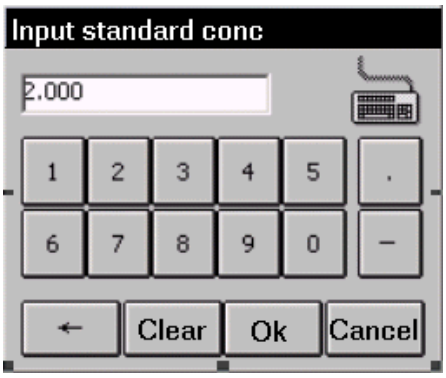
1) Calibration settings window:



- Standard number: You can select up to 8 standards.
- Concentration unit: You can select this from the list.

- Double determination (Double): If you select this option, the standards must be pipetted into two consecutive wells. The mean value of the absorbance measurement is used to calculate a single concentration.

Standard concentration (Standard): Select the standard from the list and enter the concentration (Input Standard con.)

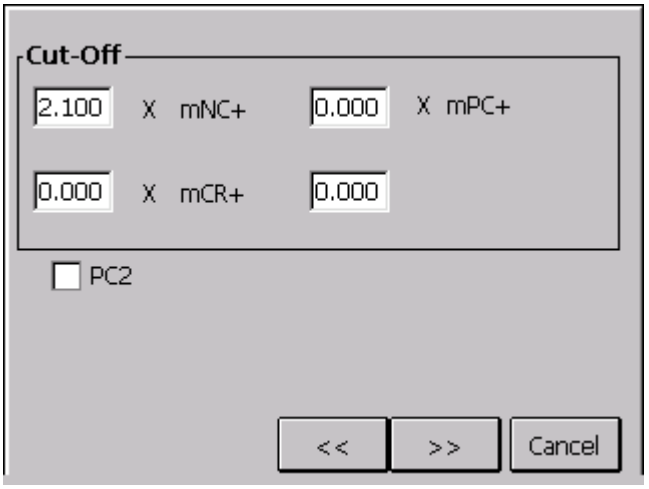


Note!

Standards can be entered in ascending order of absorbance

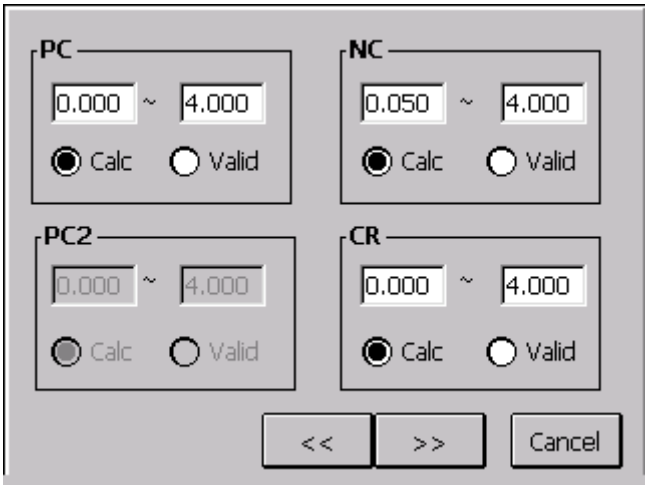
. Standard 1 is the lowest concentration.

2) Settings window for Cut-Off mode:



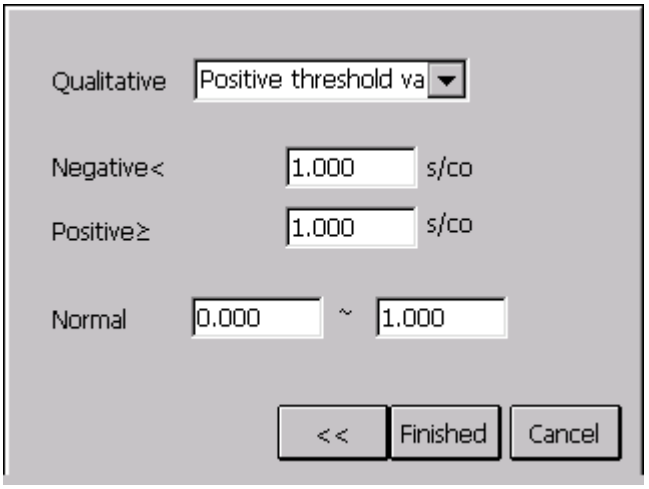
- Cut-off formula parameters: CO=X*N+Y*P+Fac.
  (See Section 5.1.3)

- Range for negative and positive: If the absorbance of the negative control and the positive control lies outside the range, the instrument calculates the minimum or maximum absorbance value.



- Duplicate controls: If this option is selected, the controls must be pipetted into two consecutive wells. The mean of the absorbance measurement is used to calculate a single concentration.

3) Settings window for positive and negative



Qualitative mode: In this option, you can choose between regular CO, reverse CO and no CO.

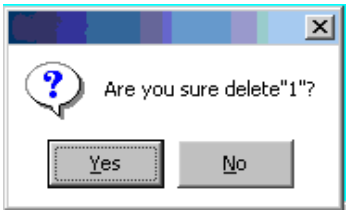
- Regular CO: Samples with values above the positive cutoff are marked as positive. Samples with values below the negative cutoff are marked as negative. All samples with values between the negative cutoff and the positive cutoff are marked as unclear.
- Reverse CO: Samples with values below the positive cutoff value are marked as positive. Samples with values above the negative cutoff value are marked as negative.
- None: You can select ‘None’ if you do not wish to assign either negative or positive values. Normal range: Please enter the values in accordance with the instructions for the reagent. Click the ‘Done’ button to return to the program list window.

5.2 Create program

Click the ‘New’ button to create a new program, then enter the parameters. If the programme name already exists, the system will display the warning ‘Programme exists’.

5.3 Delete program

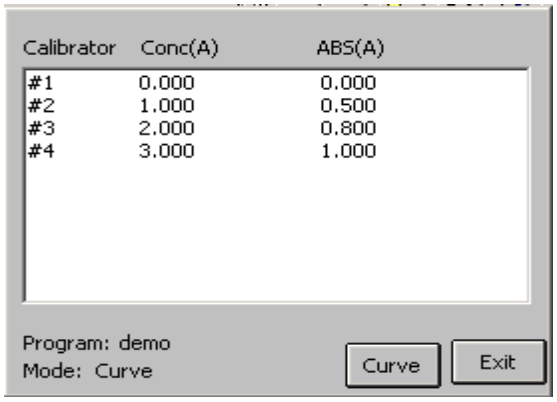
Select a program from the program list and click the ‘Delete’ button. The system displays the following window:



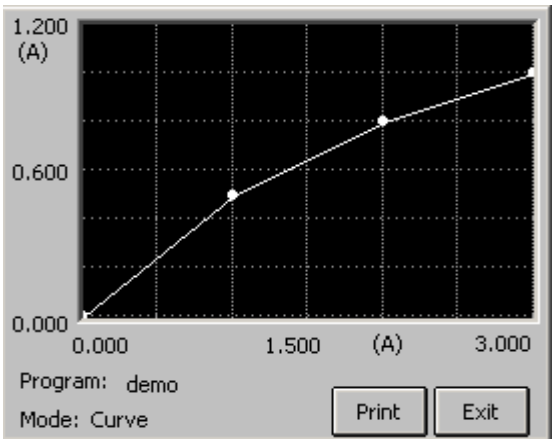
Click “Yes” to delete the program. Click “No” to cancel the operation.

5.4 Standard

The standard test results and the curve are saved. The operator can check and print the results. Select a program from the program list and click the ‘Standard’ button. The system displays the standard concentration and the standard sequence.



Press the “Curve” button; the system displays the standard curve:



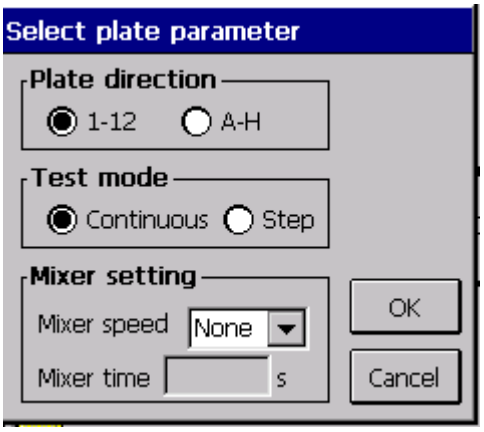
Press the “Print” button; the system will print the standard curve.

Note!
Old standards are deleted when program settings are changed. (Wavelength, calculation mode, standard number, standard concentration, etc.)

6. PERFORMING TESTS

6.1 Setting plate parameters

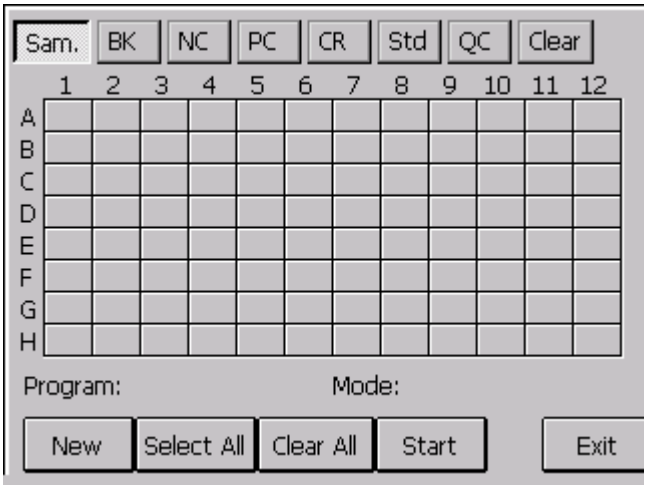
Click on the ‘Test’ icon in the main menu, whereupon the following windows will appear:



- Plate direction: A-H orientation and 1-12 orientation.
- Test mode: You can choose between continuous mode (<5 seconds) and step mode (<15 seconds).
- Mixer setting:

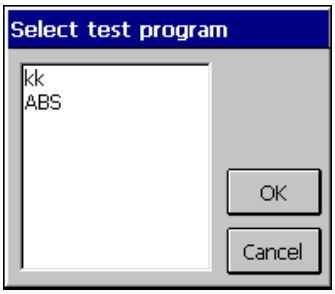
  Mixer speed: You can choose between fast, normal, slow or none. Mixer time: You can choose between 1 and 60 seconds.

  Click the ‘OK’ button to proceed to the next window:



6.3 Test program

The device supports 12 programs on a single plate. First, press the ‘New’ button, whereupon the following window will appear:

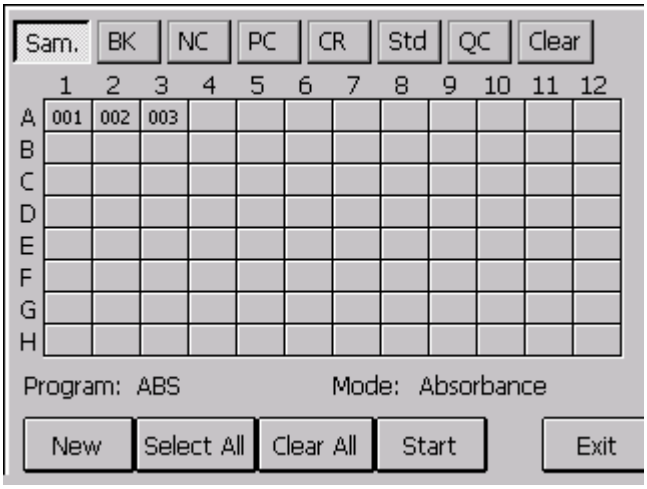


Select the program and press the ‘OK’ button.

Note! If you are testing multiple programs on a single plate, you must set the programs individually. STD: Standard.

6.4 Setting the function of individual wells

You can define the function of each well. First select the function of the well, then click on the well you wish to mark.

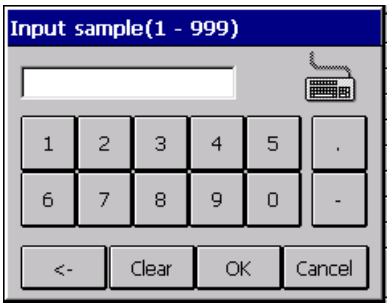


Marking designation:

Sample
(Sam.): 1–999
Blank values:
BK
Negative control: NC
Positive control: PC
Cut-off control: CR
Standard: S1–S8
Quality control: QC

6.4.2 Sample

Click on the well to be tested to select it. If you wish to change the sample number, please click on this well again. A window will appear:



Re-enter the sample number. If you enter an existing number, the system will display the message “Sample number already exists, please re-enter”.

Note!

A patient is identified by a single sample number. Negative controls: NC; Positive controls: PC.

6.4.3 Blank value

In various tests or programs, you can choose between a blank value and ‘No’. In one program, only a blank value is specified. The blank value is automatically saved and used.

6.4.4 Negative controls

If a negative control has been programmed in the test, place it on the plate

6.4.5 Positive controls

If a negative control has been programmed in the test, position it on the plate

6.4.6 Standard

This option is only valid if a test/program requires standards. If this test/program contains old standard values, you can choose whether or not to define standards.

Note!

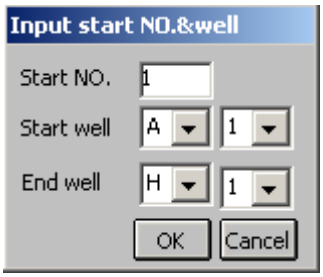
If a test/program defines standards and the measurement of the standards is successful, the new standard values will replace the old values.

6.4.7 Delete

If you wish to delete selected wells, press the ‘Delete’ button and then select the desired wells.

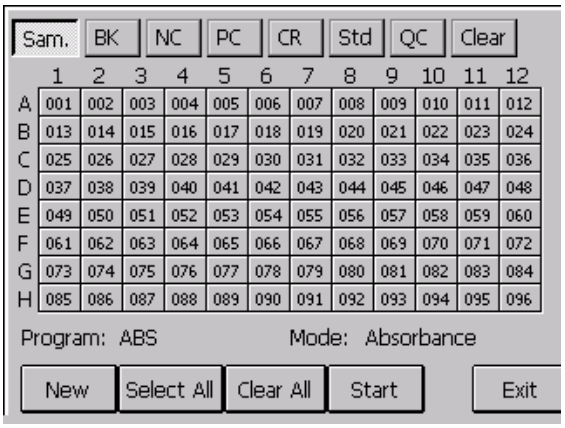
6.5 Select All

This button allows you to select wells quickly. Press the ‘Select All’ button to display the following window:



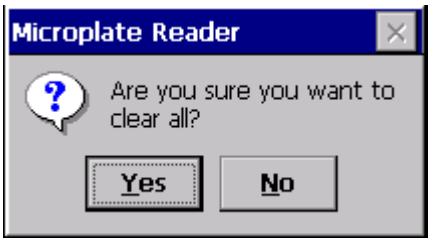
Enter the start number (1–999) and the first and last wells (row number and column number), then press the ‘OK’ button. All wells in this plate will be marked as samples. The start number is the number you have entered.

This option deletes all set programs and wells. You should set standards and controls after selecting “Select All”.



6.6 Delete All

Press the “Delete All” button; the system will display the following:



Press the ‘Yes’ button to delete all well/sample well settings.

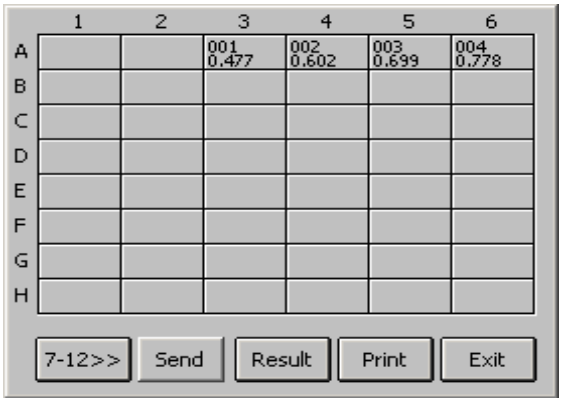
6.7 Test

Press the ‘Start’ button; the system will test the plate:

You can press the ‘Stop’ button to end the test.

6.8 Results

The test results are displayed:

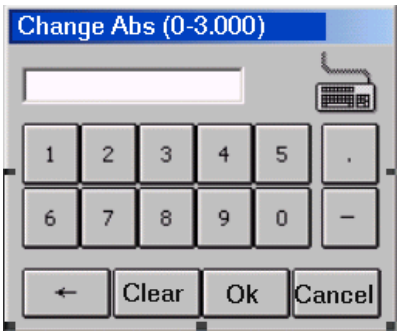


The results for columns 1 to 6 are displayed. Tap on the results in the columns.

Example: 001 is the sample number, 0.040 is the result. 7-12>> key, Windows displays 7-12

Note: If the Abs results are > 3.500 A, 3.500 is displayed and calculated as 3.500. If Abs is < 0.000 A, 0.000* is displayed and calculated as 0.000.*

You can change the result for a position/well by clicking on the position/well:

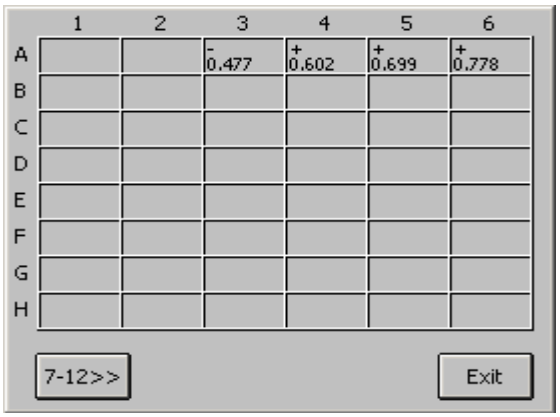


Enter the absorbance value and click ‘OK’.

Note! Changing the standard or control absorbance value affects all results!

6.9 Calculation results

In the window displaying the absorbance values, click the “Result” button to view the calibration results:



You can view the values and the display of the negative/positive marker in each well of the plate. If the values in a well are <0.0, that well is marked with a “*”.

6.10 Print

Note! QTA: quantitative analysis; QLA: qualitative analysis.

Press the ‘Print’ button in the test window to print all test results.

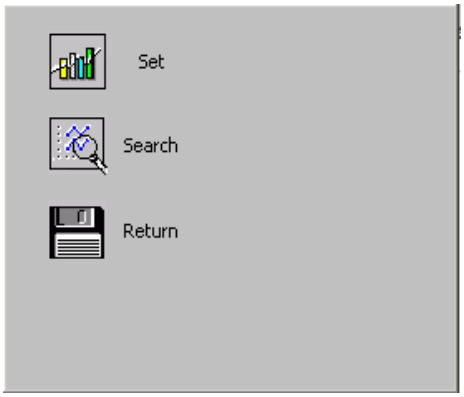
6.11 Saving the test results

Press the ‘Cancel’ button in the Abs window to automatically save the test results to the database.

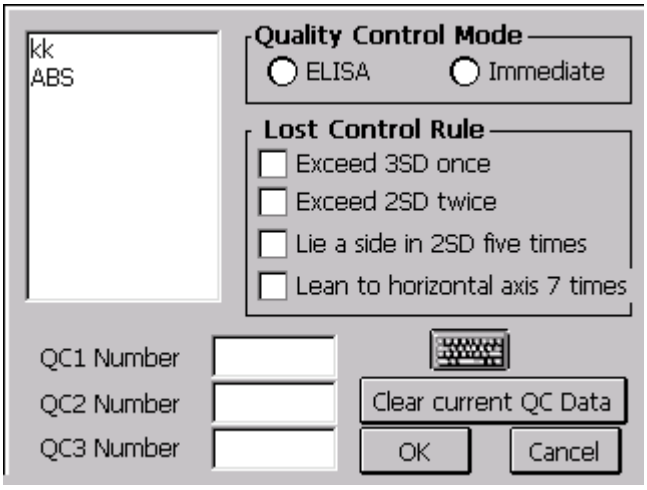
7. QC MANAGEMENT

7.1 Procedure

Press “Manage QC” in the main menu; the system displays the following window:



7.2 Set up QC



First, you can select a program from the program list and then choose a quality control method.

In the next step, enter the number of quality controls and press the “OK” button to save your settings.

7.2.1 ELISA SETTINGS

There are four ways to evaluate or view the results of the QC checks.

7.2.2 SET UP IMMEDIATE QUALITY CONTROL

Select the ‘Immediate’ button to evaluate the QC test data straight away.

Note!

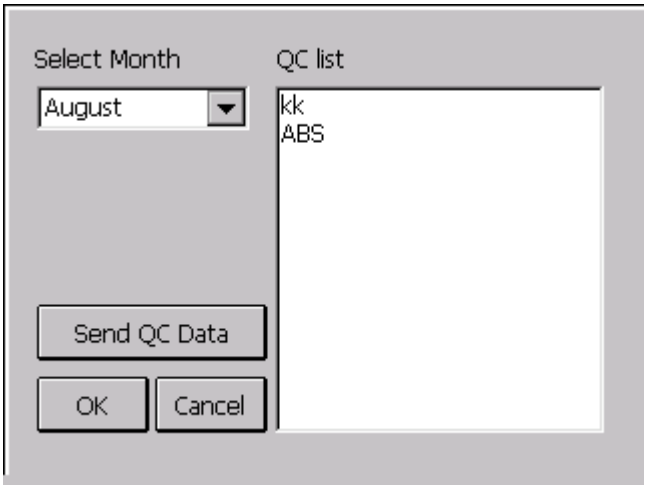
If the type of quality control is changed, you must delete the quality control data. Otherwise, the quality control evaluation will be invalid.

7.2.3 DELETING THE CURRENT MONTH’S QUALITY CONTROL DATA

Press the ‘Delete current QC data’ button to delete all data for the current month.

7.3 Search for quality control

7.3.1 PROCEDURE



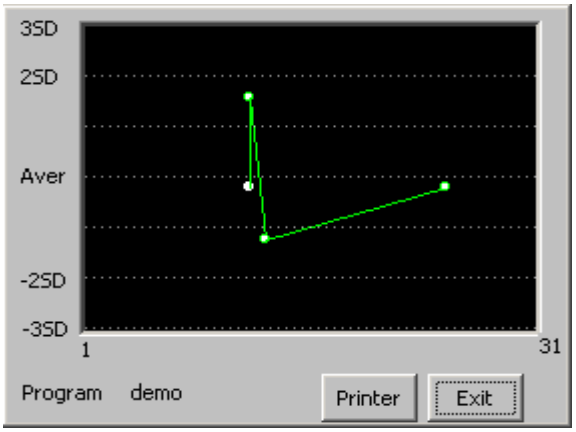
Select the desired month from the month list and select the program. The corresponding number of quality controls will then be displayed in the window.

Select the desired month from the month list and select the program/test. Then click on “Send QC data” to send the QC data for the selected month for the selected program/test to the PC.

Note!

If no QC test was performed for the selected month, the quality control count for that month will remain blank. If you wish to obtain the count, you must specify the type of quality control and ensure that the program number is identical.

7.3.2 QC VALUE



Press the “Printer” button to print the results.

8. REPORT

8.1 Report Form

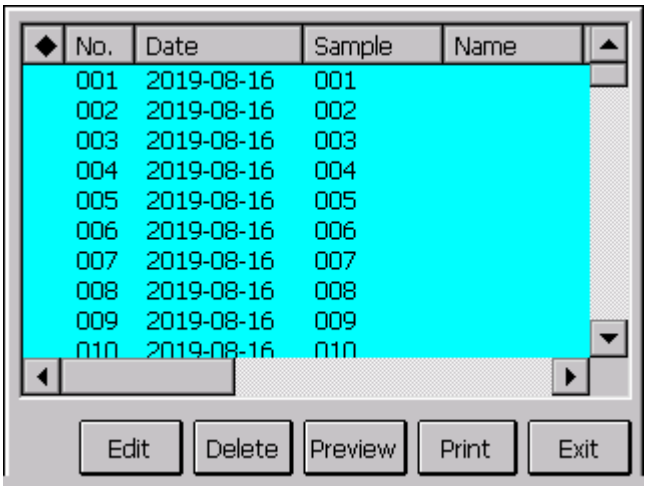
Click on ‘Report’ in the main menu, whereupon the system displays the following window:

Select the Report Form:

- Report form (Report by): Report by patient list (Patient) or program list (Program).
- Date range (Date): today and all days (all).

8.2 Patient Report

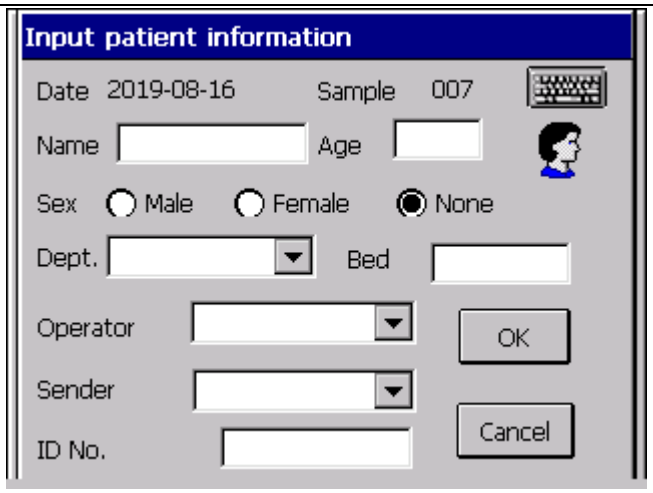
Select “Patient”, press the OK button, and the following windows will appear:



1) Select a patient
2) Select multiple patients: You can select all patients by hovering over the first row in the header bar.

8.2.1 Edit patients

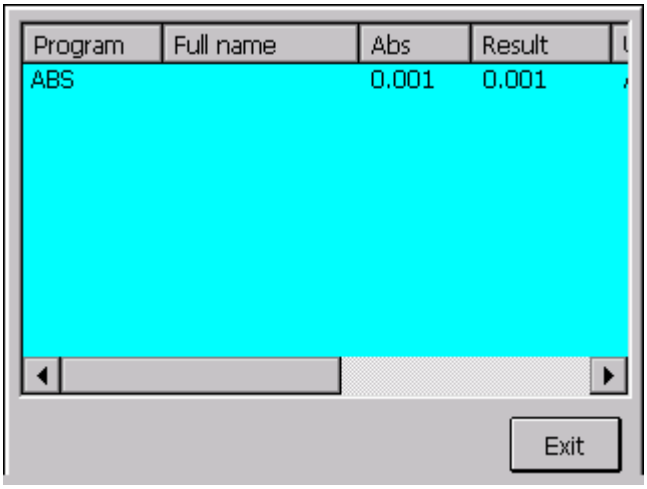
Select a patient, click the ‘Edit’ button and the window containing the patient’s details will appear:



Enter the information. Click ‘OK’ to save the information, or ‘Cancel’ to exit without saving.

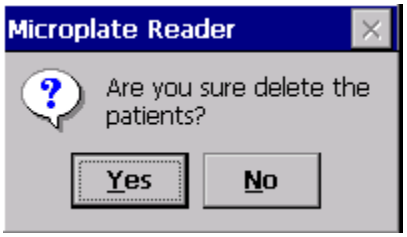
8.2.2 Preview the report

Select a patient and click the ‘Preview’ button to display that patient’s data in a list.



8.2.3 Deleting patient data

Click the ‘Delete’ button, whereupon a window will appear:



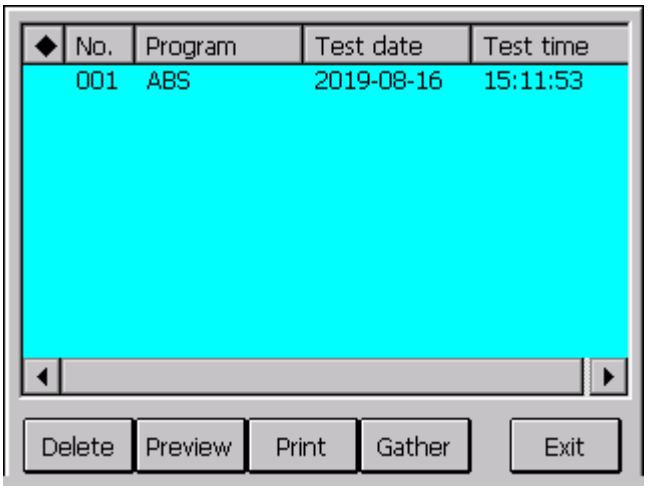
Click “Yes” to delete all selected patient data. Click “No” to exit without saving.

8.2.4 Print report

Click the ‘Print’ button to print all selected patient reports.

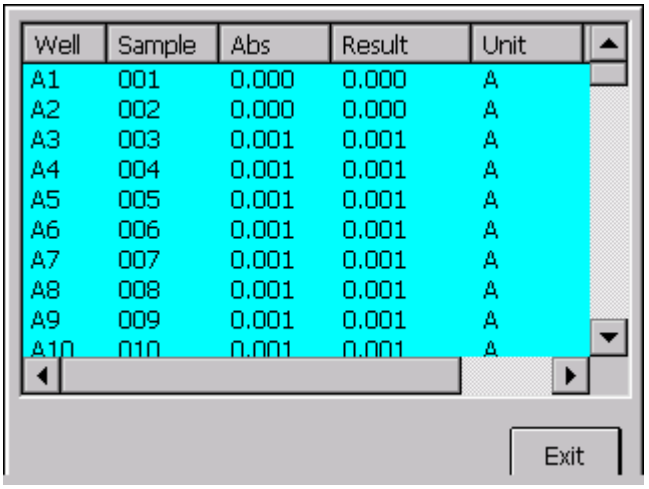
8.3 Printing the program list

Select “Program”, click “OK” and a window will appear showing the program list:



8.3.1 Preview the patient report

Select a program, click the ‘Preview’ button and the preview window will appear:



8.3.2 Deleting a programme

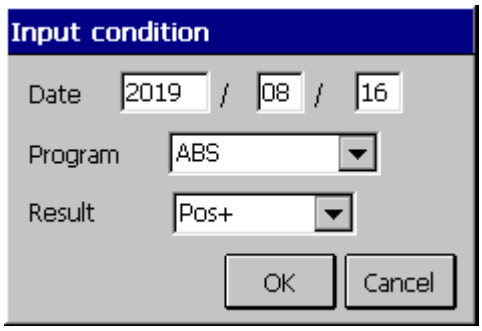
Press the “Delete” button and then “Yes” to delete all selected program and test data.

8.3.3 Print report

Press the ‘Print’ button to print the standard curve and the test data for all selected programs.

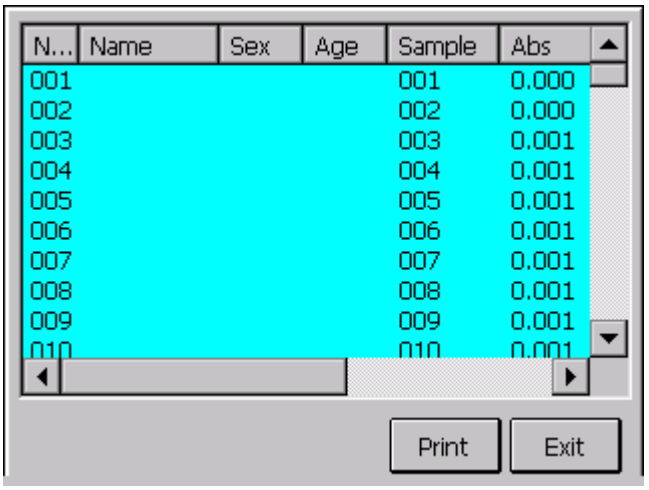
8.3.4 Collect and print report data

The device supports the collection of printouts, allowing you to quickly print all negative or positive patient data for a given day. Press the ‘Collect’ button to proceed to the next



window:

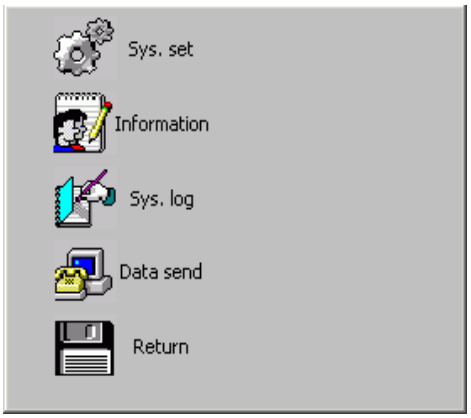
Enter the date, select the program and results from the list, and click “OK”. All matching patients will be displayed in the list window:



Press the ‘Print’ button to print all data.

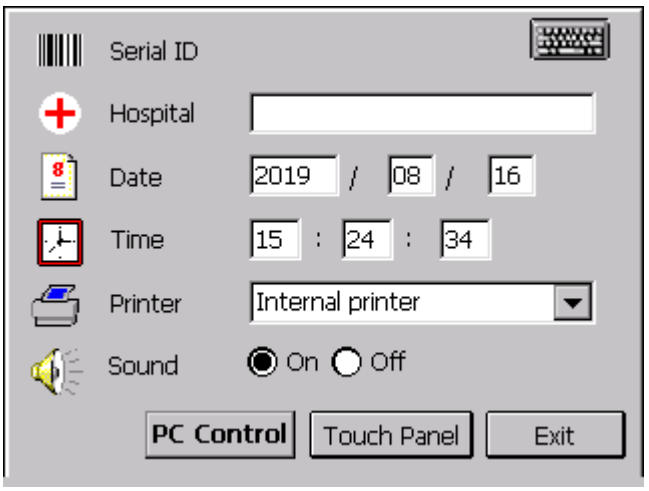
9. MANAGE SYSTEM

Click the ‘System’ icon in the main menu, which will display the following window:



9.1 System settings

Press the ‘Sys. set’ button in the window above, and the following window will appear:



1) Serial number (serial ID)
2) Hospital: Name of the hospital.
3) Date and Time
4) Printer: The device supports the following printers: Internal printer, PCL laser printer (PCL 5E protocol), Epson ME 1+ and HP P1007.

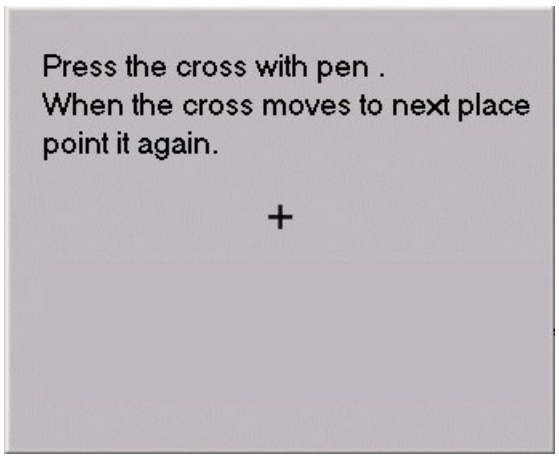
   You can select one of the printers.

Note! The printers may change. Please refer to the printer list in the system settings. If the printer settings are incorrect, printing errors may occur.

5) Contrast setting: Press [+] to increase the contrast and [-] to decrease the contrast. The new setting is saved and applied.

6) Sound: Switch the speaker on or off

Calibrating the touch panel: You can calibrate the touch panel. Press the 'Touch Panel' button to access the calibration window:



Press the center of the cross with the stylus, wait a second, and the cross will automatically move to the next position. You should press the cross again with the stylus. The same process is repeated five times, then the system displays the next window:

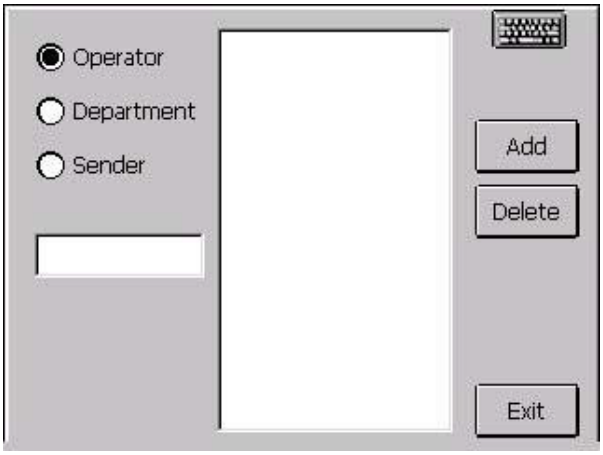
Note!

If the cross does not move after you press it, please try again.

Click anywhere on the panel; the system will save the new setting and return to the system settings window.

9.2 Information

Click the ‘Information’ button in the system window to open the following window:



The device has an operator and a department database. You can add or delete operators/departments in these databases. The device can store 100 records in each of these two databases.

Select an operator or a department. Example: Operator database Add record: Enter the operator’s name in the edit field and click the “Add” button. If this operator’s name already exists, the system displays the following window:

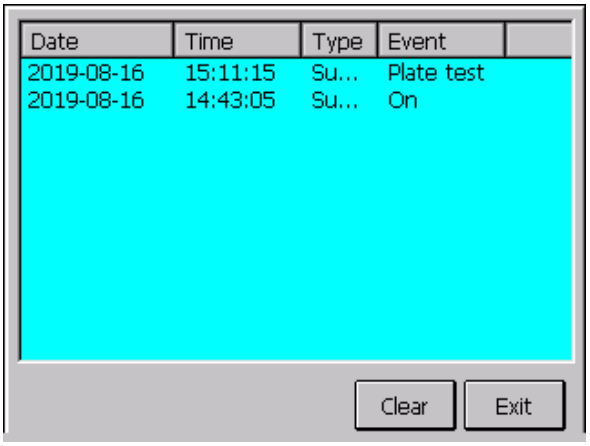
If the database is full, the system displays the message: “The operator database is full.”

7) Delete record: Select an operator from the list and click the ‘Delete’ button:

Click the ‘Yes’ button to delete this record, or the ‘No’ button to cancel the operation.

9.3 System log

Press the ‘Sys. log’ button in the system window to view the history log:



System logs contain the date, time, type and event status. The device can record a maximum of 2500 results. The most recent result is displayed first. You can use the ‘Delete’ button to delete all result records. The ‘Cancel’ button takes you back to the main menu.

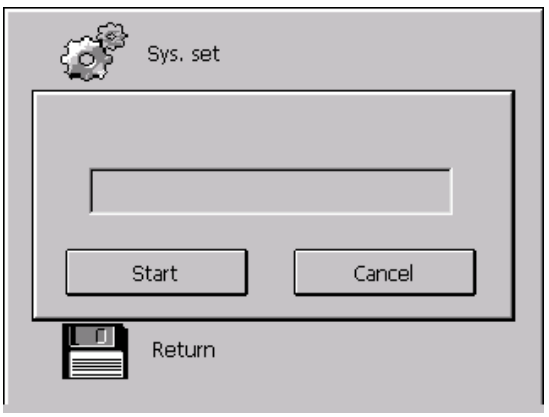
9.4 Communication with the PC

The device can be connected to a PC and send data to the PC. Using the software, you can save patient lists, view graphs, print reports and record QC data.
Further information on the PC software is available from your dealer.

1) Switch off the device and the PC, connect the serial cable to the device and plug the other end into the COM1 port on the PC.

Warning!
Do not switch on either the device or the PC whilst the serial cable is connected to the PC, as this may cause damage to the hardware.

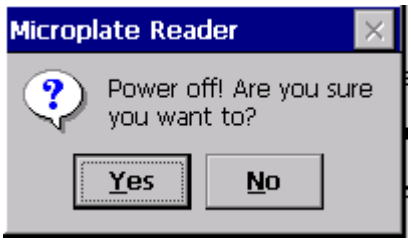
2) Start the PC software, select the “Send Data” menu and receive the data.
3) Press the “Send data” button on the device, proceed to the next window and press the “Start” button to send the data:



4) Once the data transfer is complete, press the “Cancel” button to return to the main menu.

10. SWITCHING OFF THE DEVICE

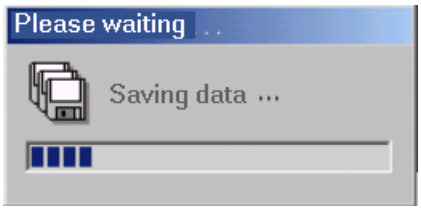
In the main menu, press the “Switch off” button to display the following window:



Press the “Yes” button to switch off the device. Press the “No” button to return to the main menu.

Note! *If you do not switch off the device correctly, the results and parameters being processed at that time will not be saved.*

The system displays the following window:



Warning!

Please leave the power supply switched on when switching off the device. The device may no longer function correctly if the power supply is interrupted.

Once the data has been saved, the following will be displayed in the window:

You can now safely switch off the device.

Note! *Switch off the device for at least 30 seconds and then switch it back on.*

11. EQUIPMENT SERVICE

11.1 Maintenance

The device is designed to be maintenance-free. To ensure optimum, trouble-free performance, the device should be kept dry and operated in an environment without excessive dust.

11.2 Cleaning the device

- Keep the working environment clean.
- Use a slightly damp soft cloth to remove dirt or stains. 70% isopropyl alcohol is recommended for decontamination.
- Use a soft cloth to remove dirt or stains from the LCD screen.

Note! The use of other chemicals or abrasive cleaners is not recommended.

11.3 Replacing device parts

11.3.1 Replacing the fuses in the main switch

1) Disconnect the power cable from the mains before replacing the fuses.
2) Open the fuse box to the left of the power switch, replace the fuse and close the fuse box again. Fuse specification: 250 V/3.15 A.
3) Switch on the appliance.

Note! Use the same fuse when replacing it.

11.3.2 Replacing the lamp “ ”

1) Switch off the device and open the device cover by loosening a screw on the front of the device.
2) Remove the four screws from the cover of the optical assembly. Remove the cover.
3) Lift the lamp by the terminal block. Disconnect the terminal block from the lamp contacts.
4) Reattach the terminal clip to the contacts on the new lamp (OSRAM64607, 6 V/20 W). Insert the new lamp.
5) Close the cover of the optical assembly. Refit the screws.
6) Close the instrument cover. Switch the instrument back on.

11.4 Troubleshooting

Problem	Causes and solutions
The device will not switch on	Check the mains cable Check the fuses Check the mains voltage Switch the device off for 30 seconds and then switch it back on.
The lamp is not lit	Check the lamp voltage The lamp is faulty Replace the lamp
RAM test error	Switch the device off for 30 seconds and then on again. Switch on the device first, then the printer. Cable connection error: Switch off the device, open the device cover and reconnect the cable between the two circuit boards.
Lamp intensity is too high	Filters are installed in the wrong position.
Lamp intensity is too low	The lamp is faulty and needs replacing.
Motor not working	The motor is faulty Open the cover of the appliance and check the motor.
The chopper wheel is running too fast	Fault in the chopper drive motor Open the device cover and check the chopper drive motor.
Filter does not return to the zero position	Fault with the filter wheel. Open the device cover and check the sensor.
Plate does not return to its starting position	The plate may not be positioned correctly.
Plate does not move	Fault in the drive motor; open the cover and check whether the drive motor is working.
Error opening the COM port	Switch off the device. Disconnect the mouse from the device and switch it back on.
The printer is not working	Fault with the printer's power supply. Check the on/off switch on the printer. Check that the printer type is set correctly in the system settings. Switch on the printer first, then the device. Check that the printer cable is properly connected to the device.
The print is incomplete or faint	Clean the print head.
Printing has stopped	See the printer user manual
Other printer errors	See the printer user manual

Note!

For further information on servicing, please contact your dealer.