Visionix VX120+

User Guide

UM-30201120-ENG VX120+ FEB 2020 rev3.0.1

VISIONIX

The Vision of the Future

Contents

Manufacturer Information:

LUNEAU TECHNOLOGY
OPERATIONS
2 rue Roger Bonnet
27340 Pont de l'Arche
France

1. Introduction

The VX120+ is a multifunctional eye diagnostic device. There are several operation modes combined in a single platform: aberrometer, autorefractometer, keratometer, corneal topographer, tonometer, pachymeter, tear-film analyzer , and retro illumination.

- The wavefront aberrometer uses the Shack-Hartmann principle and is used as an advanced autorefractometer that measures both lower and higher order aberrations of the refraction of the eye. The aberrometer principle can measure the maximum pupil size of the pupil or the default pupil size specified in the settings.
- The corneal topographer uses 24 Placido disks to measure the shape of the anterior surface of the cornea. It shows a detailed description of the shape of the cornea that can be presented as corneal aberrometry. The placido rings also function as a keratometer.
- The Scheimpflug pachymeter analyzes the anterior chamber of the eye (thickness of the cornea, irido corneal angles, anterior chamber analysis and kappa angle) by illuminating it with a slit of light and a camera using the Scheimpflug technique.
- The air-puff non-contact tonometer measures the intraocular pressure.
- The tear-film analysis system provides tools for evaluating dry-eye conditions. Three methods of evaluation are supported: Tear break-up time measurement, tear meniscus measurement, and manual observation and photographing of the eye.
- Retro illumination imaging captures the light reflected from the eye to help identify dark spots on camera. It is designed to take images of eyes with pupils of a diameter of 2-8mm

The device is fully automated and a number of different measurements can be performed by a single command including alignment and focusing.

This guide explains how ophthalmologists, optometrists, and other eye-care professionals can use the VX120+. It includes instructions on how to setup, operate and maintain the unit.

Caution: Federal (U.S.) Law restricts this device to sale by or on the order of a physician.

1. 1 Indications for Use

Indications for Use

The VX120+ is a multi-function diagnostic device combining corneal topographer, retro-illuminator, tonometer and pachymeter, indicated for:

- Measuring the refraction of the eye giving both lower and higher order aberrations
- Measuring the shape of the cornea
- Retro-illumination imaging of the eye
- Measuring the intraocular pressure without contacting the eye for glaucoma evaluation.
- Photographing the eye and taking images of the eye to evaluate the thickness of the cornea.

- Analysis of the tear film and evaluation of tear film non-invasive tear break-up time (NITBUT)
- Meibomian glands imaging
- Evaluation of tear meniscus height

1.2 About this Guide

This guide contains the following chapters:

Chapter	Description
Safety 7	Information about using the VX120+ safely
Equipment and Installation 11	Equipment in the VX120+ package, description of the unit's parts, installing and setting up the unit, turning the unit on and off
Overview of the Software 20	Introduction to the interface screens
Managing Patients 88	Adding patient records to the database; finding, modifying and deleting existing patient records
Performing a Diagnostic 97	Preparing the patient and the unit for an exam procedure; initiating and running the exam; working with the test results
Managing the List of Test Results 136	Opening, exporting, moving, and deleting test results that are stored in the database
Managing the Database 142	Configuring the patient display, exporting and importing the database, deleting patient records
General Actions and Features 148	Additional information about the VX120+ and its features - screen saver, password protection, virtual keyboard, updating the software, and getting assistance
Configuring the Unit 153	Information about configuring the unit's settings
What Should I Do If...? 194	Troubleshooting common problems
Maintenance 196	Routine maintenance procedures
Appendices 206	Technical specifications, conformation with international standards, contact information

1.3 Warning

This document contains confidential information that is the property of Manufacturer Any use, reproduction or divulging of this material, in part or in whole, is strictly forbidden. This document is provided for the exclusive use of Manufacturer employees and other authorized users.

The content of this user guide may be modified without warning. The images are not contractual. Every reasonable effort has been made to ensure that its content is accurate. For

further information please contact a Manufacturer representative.

2. Safety

Manufacturer provides sufficient information to ensure patient safety, avoid system malfunctions, and prevent incorrect readings.

Manufacturer declines all responsibility for injury to patients or damage to equipment due to ignorance of its safety instructions or in the event that they are not followed.

The safety information appears in the form of warnings and alert messages.

Important!

- Never attempt to disassemble or reassemble the equipment. There are no user serviceable parts in the device.
- Do not modify the equipment in any way.
- Repairs and maintenance must be carried out only by qualified service personnel.
- Operators and patients should keep hands and body clear from moving parts on the device.
- This is a Class 1 laser product with an embedded Class 3R laser.

---

2. 1 Electricity

Important!

- To avoid risk of electric shock or bodily injury, do not handle the electrical plugs with wet hands.
- To avoid risk of electric shock or fire, make sure the VX120+'s power cord is not damaged before plugging it into an electrical outlet.
- To avoid risk of electric shock, the power cord should be fully inserted in an outlet equipped with a protective ground connection.
- When connecting external devices such as a screen or printer, ensure that the device conforms to IEC 60950-1 Information Technology Equipment - Safety.

2. 2 Transport, Storage, and Handling

Important!

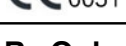
- Transport the VX120+ in its specially designed case.
- Make sure the packing is firm and secure.
- Do not subject the VX120+ to strong vibrations. Shocks or violent movements can cause malfunctions.

2. 3 Precautions During Use

Important!

- Do not place or use the VX120+ in direct sunlight.
- Do not expose the VX120+ to excessive dust or humidity.
- Do not place the VX120+ in a hot air current (e.g. above a heater).
- Do not obstruct the ventilation vents.
- Never place the VX120+ close to the following types of equipment which can perturb the reception of commands from the remote control:
  - Halogen lamp (direct or indirect)
  - Fluocompact lamp
- Keep the screen surface clean. Protect it from dust, fingerprints, and shocks.
- When you switch off the VX120+, wait at least 5 seconds before switching it on again.
- When connecting external devices such as a screen or printer, ensure that the device conforms to IEC 60950-1:2005 Information Technology Equipment - Safety.
- WARNING: Use of this equipment adjacent to or stacked with other equipment should be avoided because it could result in improper operation. If such use is necessary, this equipment and the other equipment should be observed to verify that they are operating normally."
- "WARNING: Use of accessories, transducers and cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and result in improper operation."
- "WARNING: Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the [ME EQUIPMENT or ME SYSTEM], including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result."

2. 4 Symbols

Symbol	Description
	Important: consult the documents supplied with the equipment
	Alternating current
	Type BF
	The equipment must be returned to the manufacturer for scrapping (see Waste Electrical and Electronic Equipment (WEEE) Directive[216])
	Manufacturer
	Year of Manufacturing
	Serial Number
	Compliance with Medical Device Directive 93/42/EC
Rx Only	Caution: Federal (U.S.) Law restricts this device to sale by or on the order of a physician.

2. 5 Network Configurations

The safety of the VX120+ has not been verified when connected to IT-networks including other equipment and may result in previously unidentified risks to patients, operators or third parties. Therefore, we recommend that every user should identify, analyze, evaluate and control these risks. Changes to the IT-Network may introduce additional analysis to confirm the safety of the device, such as changes including, but not limited to:

- Changes to Network Configuration
- Connection of additional items
- Disconnection of items
- Update of equipment
- Upgrade of equipment

3. Equipment and Installation

3. 1 List of Equipment Supplied

The VX120+ package contains the following items:

- VX120+ unit
- Power cord
- Dust cover
- Headrest cover
- Chin-rest paper
- Printer paper roll
- CD and documentation

3. 2 Description of the Device

User Side

No	Description
1	**Optical-measurement head** Contains the hardware used to perform all of the measurements during patient diagnostic exams.
2	**On/Off switch** Shuts down the machine
3 & 6	**Ventilation Slots**
4	**Power-cable connector** Connect the supplied power cable to this connector; plug the other end of the cable into a standard electrical outlet.
5	**Connectors for external devices** See the table below for a list of the available connectors.

No	Description
7	**Base** Contains the unit's computer and other electronics
8	**LCD touch screen**

The following connectors for external devices are available:

Port Type	Uses
USB (4 ports)	• Connect an external hard drive or flash drive to export data from the unit's database and/or to import data to the unit. • Connect a keyboard to use instead of or along with the virtual keyboard[149]. • Connect a mouse to use instead of or along with the touch screen. • Connect a printer to print on standard printer paper.
Network (2 ports)	Connect a network cable to connect the unit to a LAN. You will then be able to export and import data to and from computers on the LAN.
Serial port (RS-232)	Connect a compatible optometric device, such as a phoroptor, to the unit
VGA port	Connect an external monitor to the unit

Patient Side

No	Description
1	**Headrest** The patient should lean their forehead on the headrest during all diagnostic procedures.
2	**Chin rest** The patient should lean their chin on the chin rest during all diagnostic procedures.

Side

VX120+ unit, printer side

No	Description
1	**Ventilation slot**
2	**Printer LED** Printer status indicator: • **LED off:** Printer is turned off. • **LED on (not flashing):** Printer is turned on and ready to print. • **LED flashing:** Printer is on, but either there is no paper or there is a malfunction
3	**Printer paper-feed button** Press to feed a small amount of paper through the paper slot (#5).
4	**Paper slot** Paper is fed through this slot when it is loaded.
5	**Paper-roll compartment** For paper-loading instructions, see Loading Paper into the Printer 17.

3. 3 Installation Procedures

Site Requirements

The VX120+ unit should be placed on a clear table or desktop close to a power outlet. The unit should not exposed to direct light on the patient side. Better results will be obtained if the unit is located in a room with limited illumination.

Unpacking the Unit

To unpack the unit:

- Remove the straps around the box.
- Open the carton with care.
- Lift the protective top cover to uncover the accessories listed in the packing list.
- Remove the accessories to uncover the VX120+ unit, which is packed in a protective plastic bag.
- **Important!**
  Do not grab or hold the screen when extracting the device from the box. Do not lift the device by the head (#1 in Description of the Device 12) as this may damage the motors.
- Take the VX120+ out of the box and put it on the table.
- Lift the protective plastic bag to uncover the device.

Electrical Connection

To connect the unit to an electric outlet:

- Check that the power supply voltage corresponds to that required by the equipment (see the identification label on the back of the unit).
- Insert the power connector of the power cord into the power-cable connector on the unit (#4 in the illustration of the user side12).
- Connect the power plug to a wall outlet.

Loading Paper into the Printer

If the paper roll is used up, the printer LED indicator blinks.

To insert a paper roll into the printer:

- Lift the handle in the middle of the paper compartment and pull the cover down.
- If an empty paper roll is in the printer, remove it.
- Insert the new roll with the end of the paper on the top of the roll.
- Feed the paper into the slot at the top of the compartment.
- Push the paper-compartment door closed.

3. 4 Turning the Unit On and Off

To turn the unit on:

- Press the On/Off switch (#2 in the illustration).

To turn the unit off:

- From the software, in the Home Screen20, select the **Turn Off** button.

  -OR-
- From the software, in the Configuration screen153, select the **Turn Off** button.

  -OR-
- On the unit, press the **On/Off** switch.

  Regardless of which of these methods you use to turn off the unit, it shuts down. If you turn the unit off using the software, the head moves back to its default position. It is important to ensure that the head is in its default position before moving the unit.

Note:

- If you intend to pack and/or move the device, you must turn it off using the software.

3. 5 Setting up the Username and Password

The first time you turn on the device, you will get a request to set your username and password in order to keep your device secure from unauthorized persons. Subsequently, the device will require the username and password each time you turn on the unit.

1. Select the user Diagnostic.

2. Enter this default password:

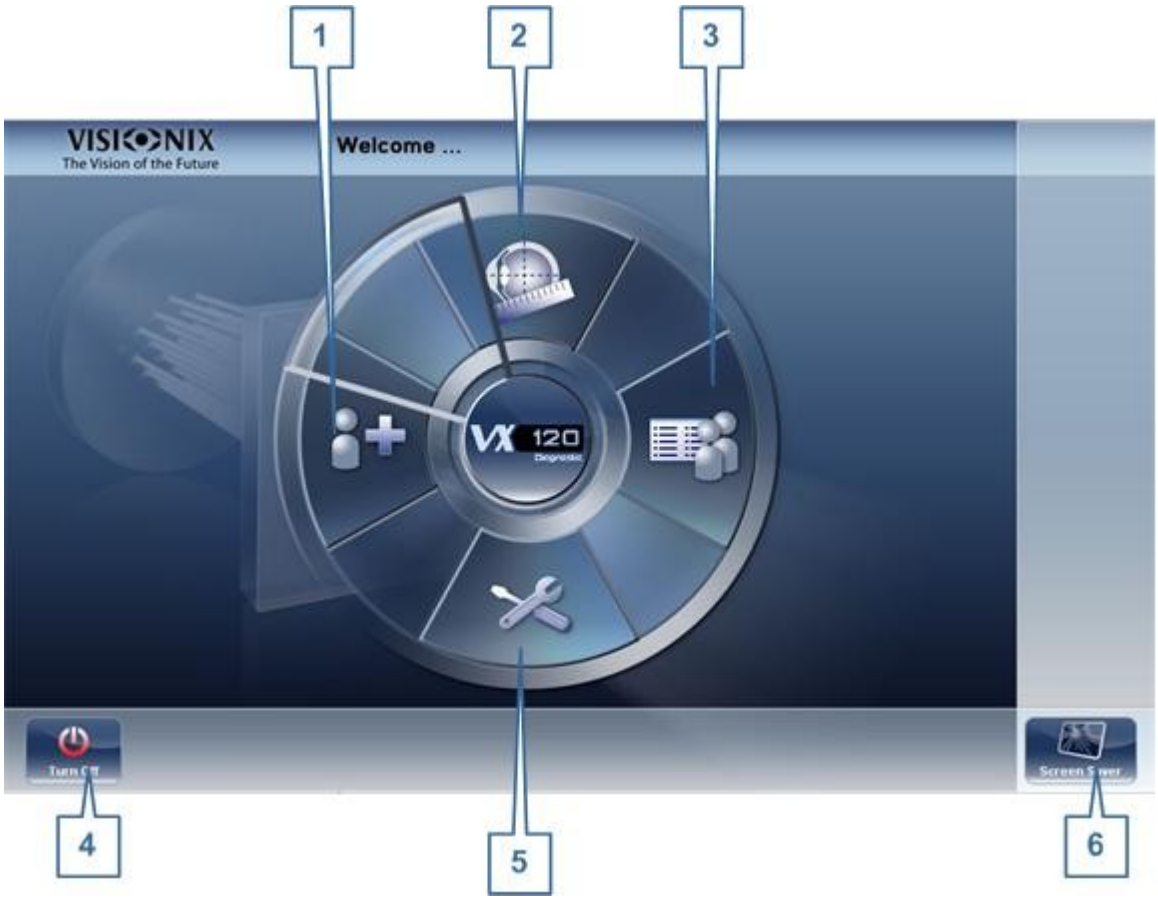
user

The device will not be accessible if the username and password have not been supplied, or if they have been supplied uncorrectly. If you do not remember your username and password correctly, contact an authorized technician for assistance.

4. Overview of the Software

4. 1 Home Screen

The **Home** screen is the main menu of the VX120+. It gives you access to all of the functional screens of the interface.

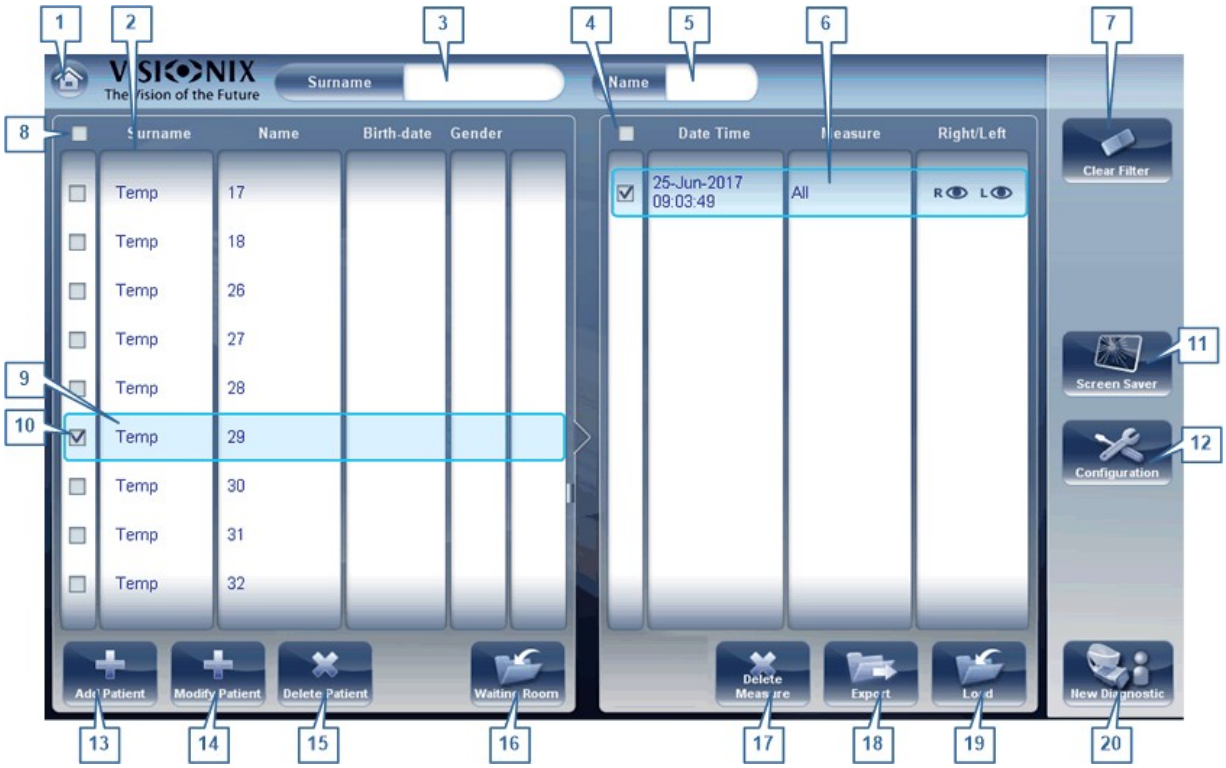


Home screen

No	Description
1	**Add Patient button** Opens the Patient screen 21 with the Patient Information 88 dialog box open so that you can begin entering patient information immediately.
2	**Measurement screen button** Opens the Measurement screen 24 without a patient selected. The results will be saved temporarily with an automatically generated ID number.
3	**Open Patient screen button** Opens the Patient screen 21 and displays the list of patients
4	**Turn Off button** Shuts the unit down. See Turning the Unit On and Off 17 .
5	**Configuration Screen button** Opens the Configuration screen 153
6	**Screen Saver button** Turns on the screen saver.

4. 2 Patient Screen

The **Patient** screen gives you access to the patient database. You can create new patient records, modify existing patient information, view stored test results, and initiate a new diagnostic procedure for a selected patient from this screen.



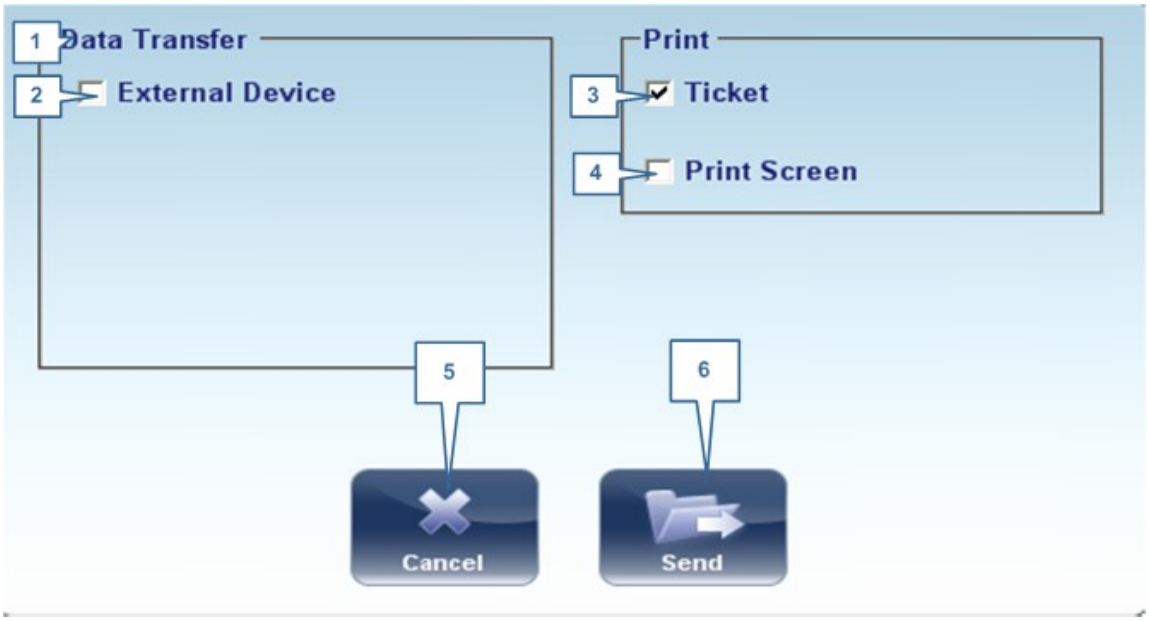
Patient screen

No	Description
1	**Home button** Opens the Home screen[20].
2	**Patient list** List of patients in the database; drag your finger (or mouse) over the entries to scroll up or down.
3	**Surname filter** Enter one or more letters. The list of patients is filtered and only displays patients whose last names begin with the specified sequence of letters.
4	**Mark all measures** Mark the check boxes of all the displayed measures. **Delete Measure** (#17[21]) are applied to all measures whose check boxes are marked.
5	**Name filter** Enter one or more letters. The list of patients is filtered and only displays patients whose first names begin with the specified sequence of letters.
6	**Measure list** List of test results for the selected patient; drag your finger (or mouse) over the items to scroll up or down.
7	**Clear Filter button** Clear all patient filters and display all the patient records in the database.
8	**Mark all patients** Mark the check boxes of all the displayed patient records. **Delete Patient** (#15[21]) is applied to all patients whose check boxes are marked.
9	**Selected patient record** Blue border indicates a patient record is selected. The measures in the Measure list belong to the selected patient. In addition, **Modify Patient** (#14[21]) opens the patient data for the selected patient.
10	**Marked check box** Example of a marked check box
11	**Screen Saver button** Turns on the screen saver.
12	**Configuration button** Opens the Configuration screen[153].
13	**Add Patient button** Opens the Patient Information[88] dialog box.
14	**Modify Patient button** Opens the patient data of the selected patient (#9[21]) **Note:** This button is only available when a patient is selected in the list.
15	**Delete Patient button** Deletes all the patient records whose check boxes are marked (#10[21]) **Note:** This button is only available when the check boxes of one or more patients are selected in the list.

No	Description
16	**Waiting Room** This button displays all of the patients imported via XML For more information, go to the Waiting Room.[91]
17	**Delete Measure button** Deletes all the measures whose check boxes are marked **Note:** This button is only available when the check boxes of one or more measures are selected.
18	**Export button** Exports the selected measures to an external file and/or prints the measurement results or screenshot **Note:** This button is only available when a measure is selected.
19	**Load button** Opens the selected measure in the Results screen[36]. **Note:** This button is only available when a measure is selected.
20	**New Diagnostic** button Initiates a new diagnostic procedure for the selected patient. The results of the diagnostic are automatically stored in the patient's record.

When exporting (clicking on the no. 18 Export button) from the patient screen

the following pop-up will appear:



No	Description
1	**Data Transfer** Options for transferring data from the device to other devices

No	Description
2	**External Device** Exporting data from the VX120+ to another device
3	**Ticket** Allows printing the data on a ticket in the device's internal printer
4	**Print Screen** Select to print a screenshot of the summary screen, this requires a connection to an external printer.
5	**Cancel** Cancels your selection.
6	**Send** Confirms the selection and performs the transfer

The export popup from the patient screen enables you to export data via an **external device**. Select the checkbox next to **external device**, and then press **SEND**. To print a screencapture of the screen you are viewing, select **Print Screen**.

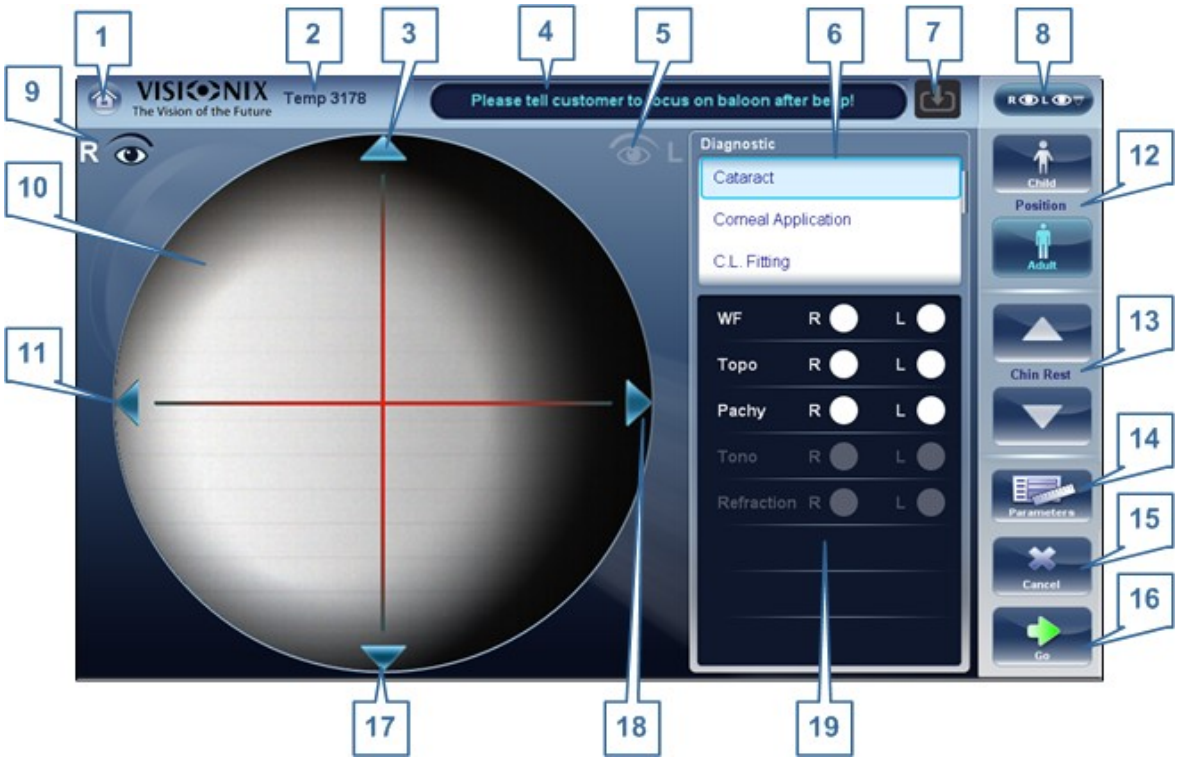
4. 3 Measure Screen

The **Measure** screen is used to select, initiate, and follow the progress of diagnostic tests.

- Before a Measurement 25
- During a Measurement 29

Before a Measurement

When you first open the **Measure** screen, before you start running the diagnostic, the screen looks like this:



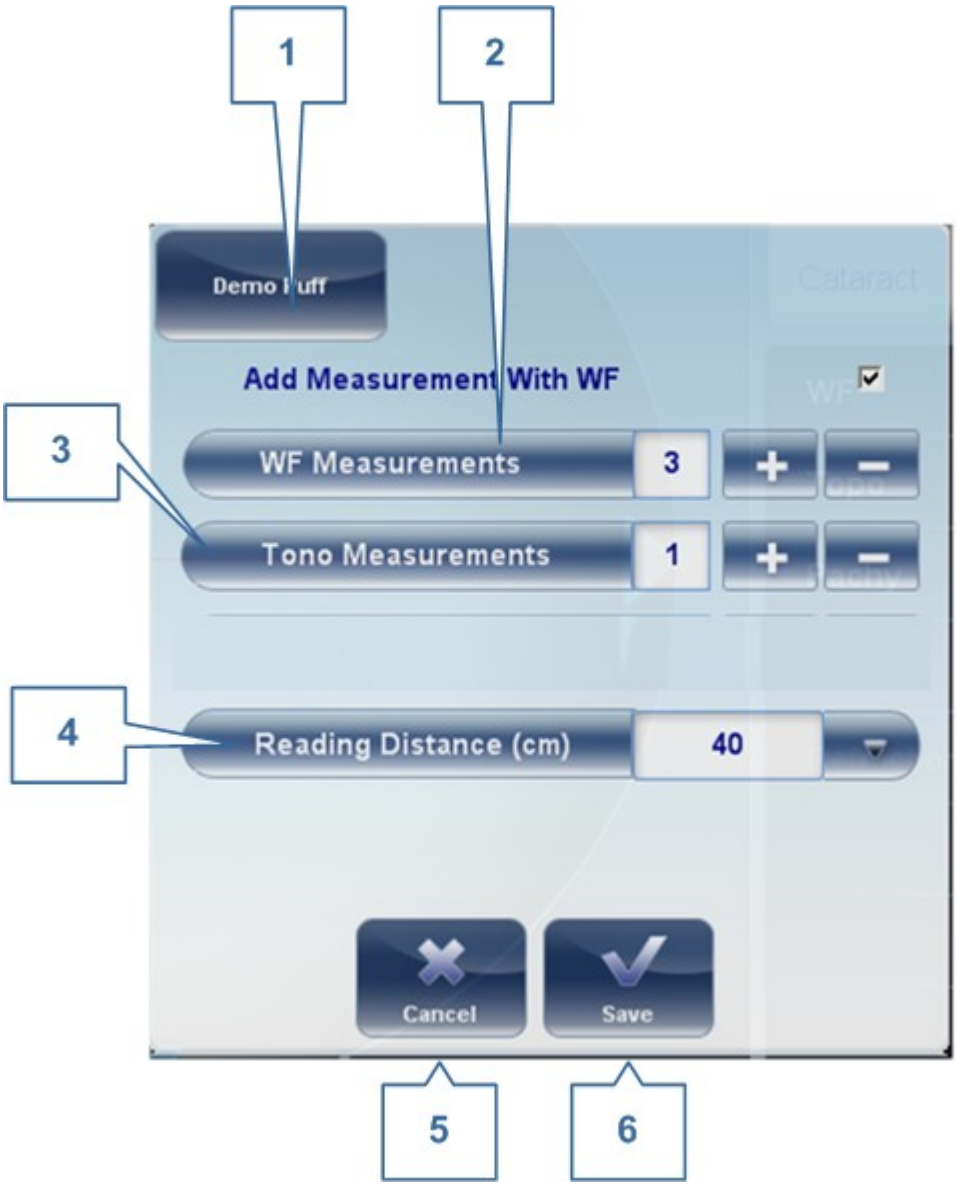
Measure screen before measurement begins

No	Description
1	**Home button** Opens the Home screen 20.
2	**Patient** Name (or ID) of current patient. **Note:** If no patient was selected before the **Measure** screen was opened, a temporary name is generated by the system by combining "Temp" with a number (e.g., "Temp 1184").
3	**Up arrow** Raise the unit's head so that it aligns better with the patient's eyes.
4	**Message field** A text field in which the system displays messages to you, such as instructions for you to give to the patient or information about the testing process.

No	Description
5	**Left-eye indicator** When active, indicates that the head is aligned with the patient's left eye **Note:** In the illustration above, the right-eye indicator is active (see #8 25 below) and the left one is not active.
6	**Diagnostics available** List of available diagnostic tests. Drag up and down on the list to scroll it, if necessary, and select the type of test you want to perform. Go to Diagnostics 157 for a complete list of available options.
7	**Input arrow** Using this Input arrow is a quick way to change a "Temp patient" into a patient that already exists in your XML database. Simply click the blue arrow  to load patient details from your database. If the arrow is greyed out,  , it means that the input folder is empty, and there is no information available for loading. For more information, go to Importing XML data. 90
8	**Eye selector** Select the eye or eyes to be tested.
9	**Right-eye indicator** When active, indicates that the head is aligned with the patient's right eye **Note:** In the illustration above, the right-eye indicator is active, and the left one is not (see #5 25, above)
10	**Camera view** Shows the image that is visible through the camera Select any spot in the image to move the unit's head to align that spot with the cross hairs in the center of the image.
11	**Left arrow** Move the unit's head to the left so that it aligns better with the patient's eyes.
12	**Position** Select **Adult** to move the head and chin rest into the default positions for adults, or select **Child** to move them into the default positions for children. Once you have done this, you can fine-tune the head and chin-rest positions using the the chin-rest controls (#12 25), the arrows (#3 25, #10 25, #16 25, and #17 25).
13	**Chin Rest** Raise or lower the chin rest.

No	Description
14	**Parameters** Open a dialog box in which you can change the number of times WF and Tono teststest will be performed during this diagnostic. **Note:** If the WF and Tono tests are not included in this diagnostic, changing the values in the dialog box will have no effect.
15	**Cancel** Cancel the measurement procedure and return to the previous screen.
16	**Go** Begin the diagnostic test.
17	**Down arrow** Lower the unit's head so that it aligns better with the patient's eyes.
18	**Right arrow** Move the unit's head to the right so that it aligns better with the patient's eyes.
19	**Measures to be performed** Indicates which measurement procedures will be performed for the diagnostic selected in the Diagnostics list (#6 25).

When clicking on Parameters (no. 14 above), the following dialog box is displayed:

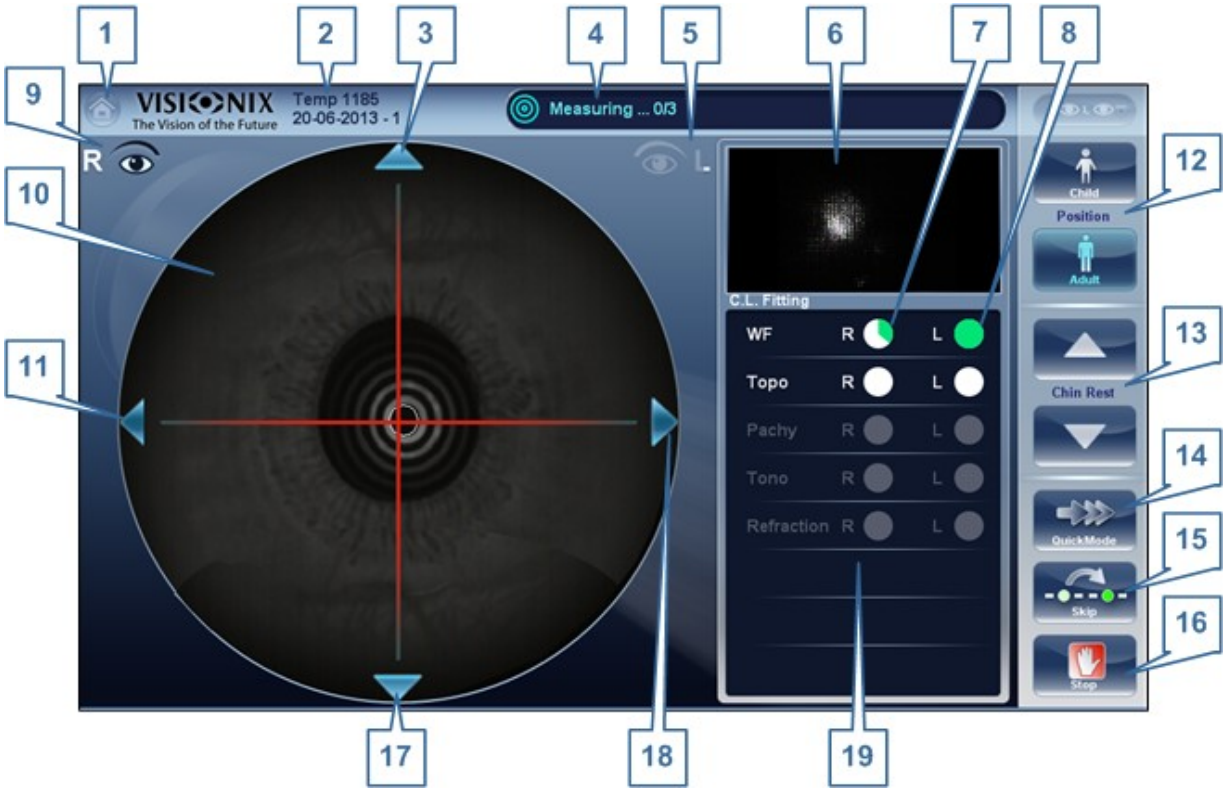


No	Description
1	**Demo Puff** Select to demonstrate tono air puff
2	**WF Measurements** The number of Wavefront measurements to perform
3	**Tono Measurements** Select to modify number of tono measurements to perform

No	Description
4	**Reading Distance** The distance to perform the near vision test, from 30-60cm
5	**Cancel** Closes the dialogue box without saving
6	**Save** Saves the user's preferences

During a Measurement

After you select **Go** to begin the selected measurement procedure, the **Measure** screen shows information about the measurement process. During the measurement process, you can adjust the unit's head and chin rest as you would before the process began. You can also speed the measurement process up, skip parts of the test, or stop the test.



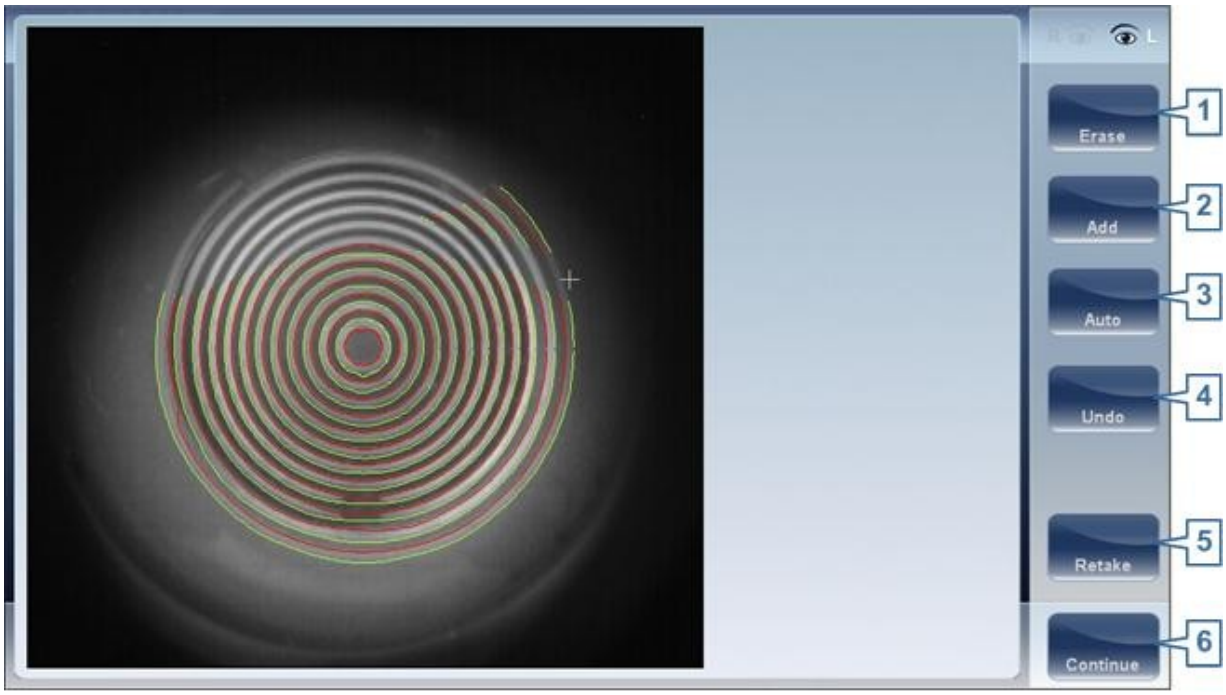
Measure screen during measurement process

No	Description
1	**Home button** [Button not available when a diagnostic is in progress]

No	Description
2	**Patient** Name (or ID) of current patient. **Note:** If no patient was selected before the **Measure** screen was opened, a temporary name is generated by the system by combining "Temp" with a number (e.g., "Temp 1184").
3	**Up arrow** Raise the unit's head so that it aligns better with the patient's eyes.
4	**Message field** A text field in which the system displays messages to you, such as instructions for you to give to the patient or information about the measurement process.
5	**Left-eye indicator** When active, indicates that the measurement is currently being performed on the patient's left eye. **Note:** In the illustration above, the right-eye indicator is active (see #9 25 below) and the left one is not active.
6	**Sensor view** During WF measurement, the Shack-Hartmann image is displayed in this area.
7	**Measure in progress** Indicates that this measure is currently being performed.
8	**Completed test** Indicates that the measure was already performed.
9	**Right-eye indicator** When active, indicates that the measure is currently being performed on the patient's right eye. **Note:** In the illustration above, the right-eye indicator is active, and the left one is not (see #5 25, above).
10	**Camera view** Shows the image that is visible through the camera. **Note:** To manually center the image, select the spot that should be in the center of the image. The unit's head moves so that that spot is aligned with the cross hairs in the center of the image.
11	**Left arrow** Move the unit's head to the left so that it aligns better with the patient's eyes.
12	**Position** Select **Adult** to move the head and chin rest into the default positions for adults, or select **Child** to move them into the default positions for children. The default PD is also set appropriately for adults or children when you select one of these options. Once you have done this, you can fine-tune the head and chin-rest positions using the the chin-rest controls (#13 25) and the arrows (#3 25, #11 25, #17 25, and #18 25).

No	Description
3	**Chin rest** Select the arrows to raise or lower the chin rest.
14	**Quick mode** Speed the measurement process up. This option is only available during WF measurements. It is useful if the patient has trouble sitting still for a long period of time. The results of the measurement may be slightly less accurate than they would be in standard mode.
15	**Skip** Cancel the current stage of the measurement procedure and proceed to the next stage. For example, if a measurement is being performed on the patient's left eye, selecting this button would discontinue the measurement on that eye, and begin measuring the other eye.
16	**Stop** Stop the entire measurement process. When this button is selected, the measurement procedure is aborted, and the pre-test Measure screen 25 is displayed.
17	**Down arrow** Lower the unit's head so that it aligns better with the patient's eyes.
18	**Right arrow** Move the unit's head to the right so that it aligns better with the patient's eyes.
19	**Measurement status** Indicates which measures are included in the current measurement procedure, and shows the status of those measures that have already been completed.

Immediately after the measurement, the Ringer edit screen will be displayed (only if a topography measurement has been made). In this screen, the user can edit the rings detected by the device and those rings that were wrongfully detected.

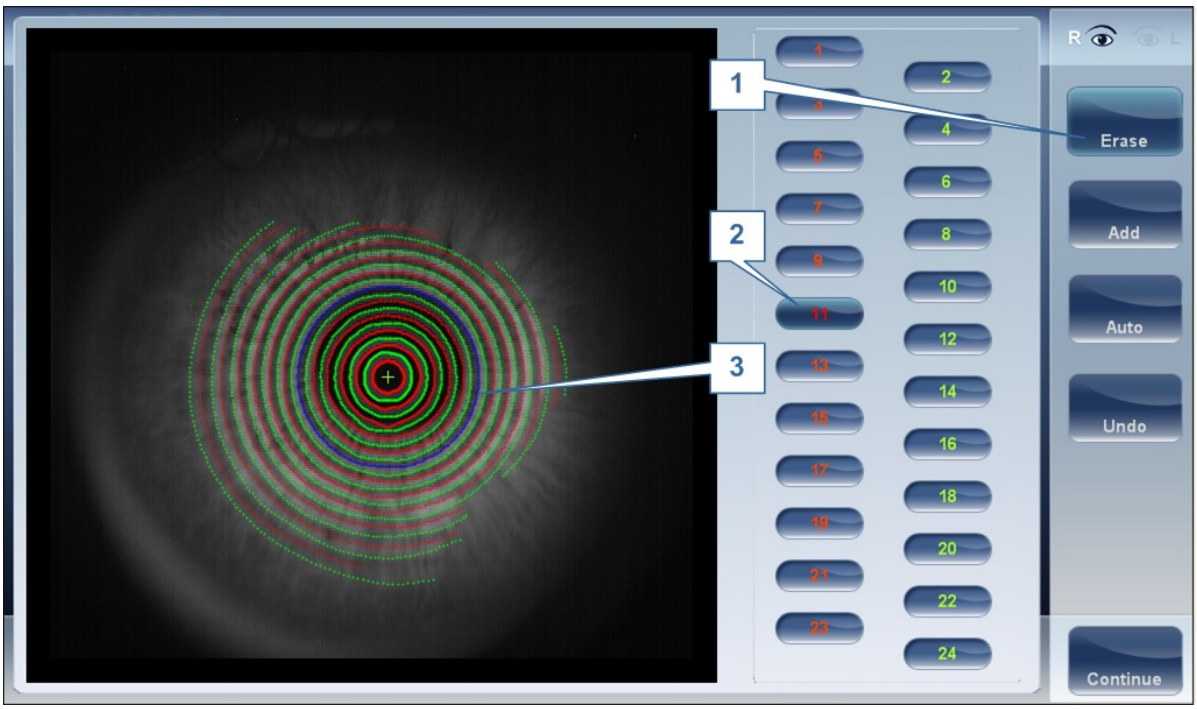


Ringer Screen

No	Description
1	**Erase** To erase individual rings in the topo map image select "Erase". A list of ring positions opens. Select the position of the ring you would like to erase, and then move the cursor over it, and only ring in the selected position will be erased. Note, the outer rings are in higher positions, from position 24 and downwards, while the inner ring is position 1. **Note: If you erase more than 10% of the topography rings, you may reduce the accuracy of the results.**
2	**Add** Select the position number of the ring (shown in blue), then trace the ring in that position, the device "draws" a new ring. Note, rings can only be drawn if the topo image is relatively clear.
3	**Auto** Allows deleting rings by touching the screen. This is the default mode.
4	**Undo** Undo the modifications
5	**Retake** Retakes the measurement
6	**Continue** Validates the modifications that were done and computes the topography map

Editing the Ringer

If you select **ADD** or **ERASE** from the menu above, the following screen appears:



No	Description
1	**Operation buttons** Select these buttons to add, erase, undo, or continue.
2	**Ring Positions** Select the position of the ring that you would like to modify. Once selected the ring will appear blue.
3	**Selected Ring** Once you have selected a Ring in #2, it will appear **blue** and it can be erased/ added to. To erase the ring, move the cursor over the areas that you would like to be erased. To add to the ring, move the cursor over the area you would like to draw. In the image above, the ringer selected is in position number 11.

To erase rings at will, select **AUTO** and then slowly move the cursor over the rings you want erased. This action can erase several rings at a time. After modifying the the Rings, select Continue, and the changes will be saved.

Note: only changes done immediately after the examination will be saved.

Repeating a measurement

After the results screen is displayed, it is possible to repeat the measurement by clicking the "Measure" button (See: Results Screen). After clicking the Measure button, the following dialogue box is opened:

No	Description
1	**Select all** Selects all measurements for both eyes
2	**Right** Measurements for the right eye
3	**Left** Measurements for the left eye
4	**Both** Measurements for both eyes
5	**List of measurements** The list of measurements that were performed previously and that can be repeated
6	**OK** Validates the selection and performs the new measurement according to the selection

Select the measurements that you want repeated, and continue with the measurement as normal.

4. 4 Results

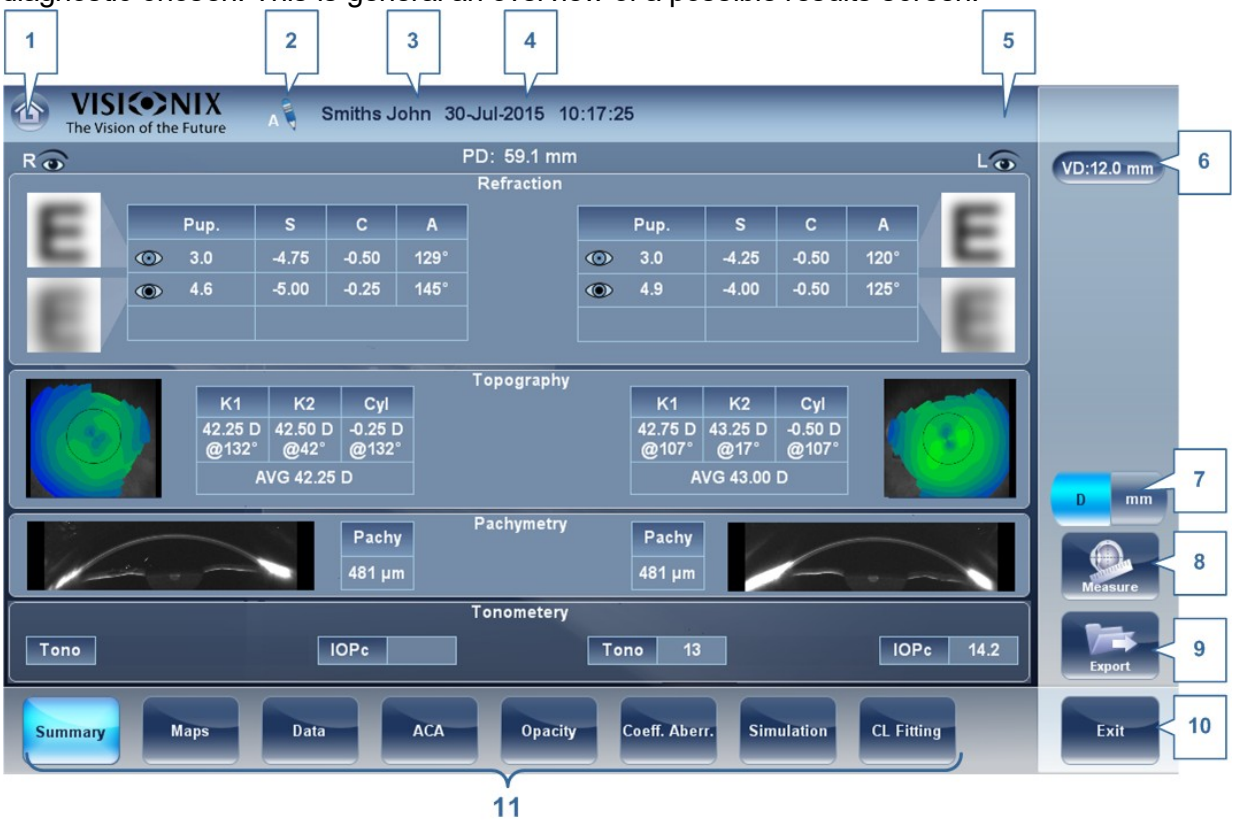
The **Results** screen displays the results of diagnostic measurements. It opens when a diagnostic test is completed or when stored test results are loaded from the Patient screen[21].

The **Results** screen initially displays the Summary tab[38], which gives a condensed view of the results. The other tabs of the **Results** screen show certain aspects of the results in greater detail, and are listed below

---

Overview of the Summary Screen

The **Results** screen is dynamic, and may have a different layout and data according to the diagnostic chosen. This is general an overview of a possible results screen:



No	Description
1	**Home button** Opens the Home screen 20.
2	**Note** This note may contain comments, additional information about the patient, or measurement. Click on the note to open it.
3	**Patient name** The surname and first name of the patient.
4	**Date and Time** The date and time of the measurement
5	**Left eye Indicator** Results displayed on this side of the screen are those of the left eye
6	**VD** Vertex distance, this button displays the distance of the refraction measurement, it allows you to toggle between the default and zero.
7	**D/mm button** This button allows you toggle between displaying the results in millimeters and diopters.

No	Description
8	**Measure button** Opens the Measure screen[25], with the patient's name selected, so that you can perform additional tests that were not included in the current diagnostic.
9	**Export button** Exports the test results to a file on an external device and/or prints the test results. To view more export options, go to Exporting from the Results Screen[139].
10	**Exit button** Closes the Results screen, and displays the default screen (which is selected in the configuration settings[170]).
11	**Tabs** This section may have fewer tabs, depending on the diagnostic chosen. Select a tab to display the topic in greater detail.

Dynamic Summary Tabs

The **Dynamic Summary** tab is displayed by a default opening of the **Result** screen. It gives a condensed view of the results.

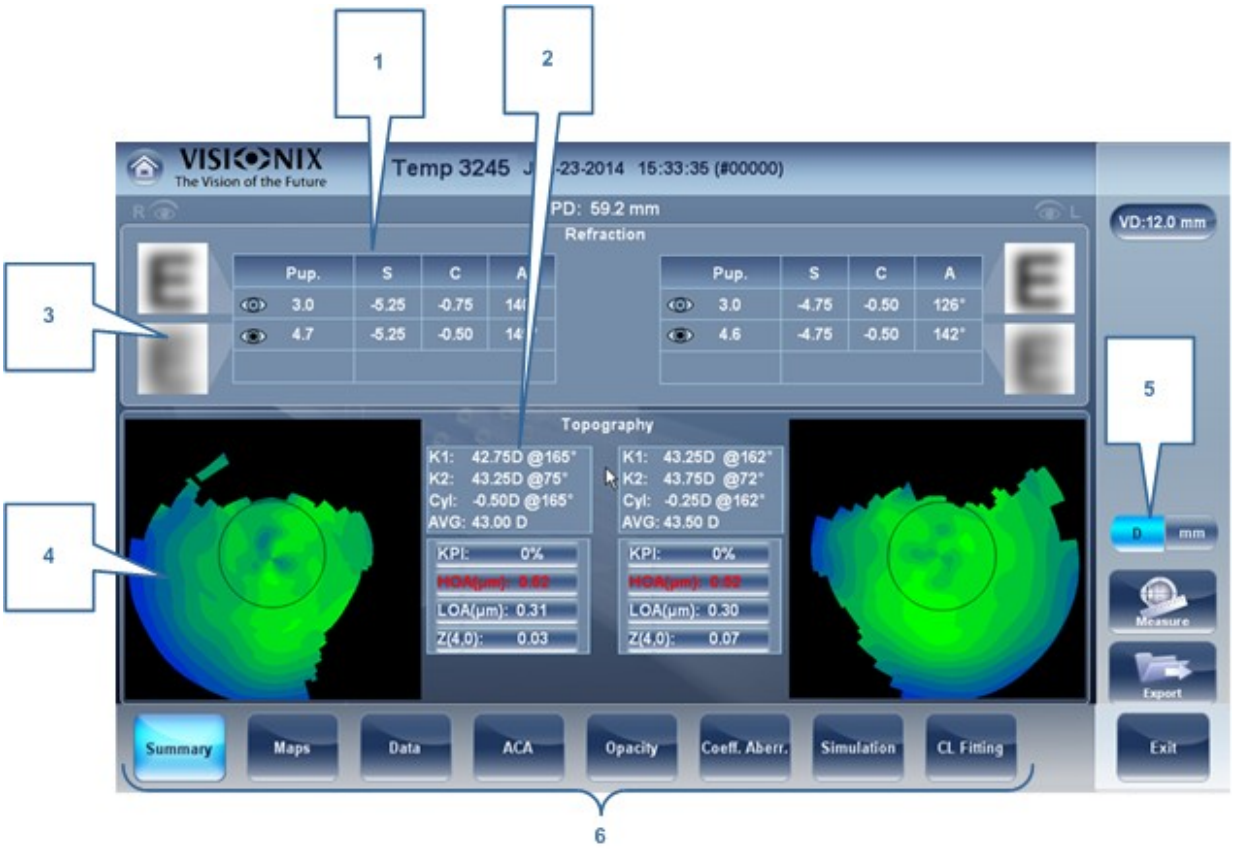
Note: If results for a particular type of test are not available, the result fields are left blank. This chapter will show some of the various summary tabs and their descriptions.

Summary tab for All diagnostic:

Summary Tab, ALL diagnostic

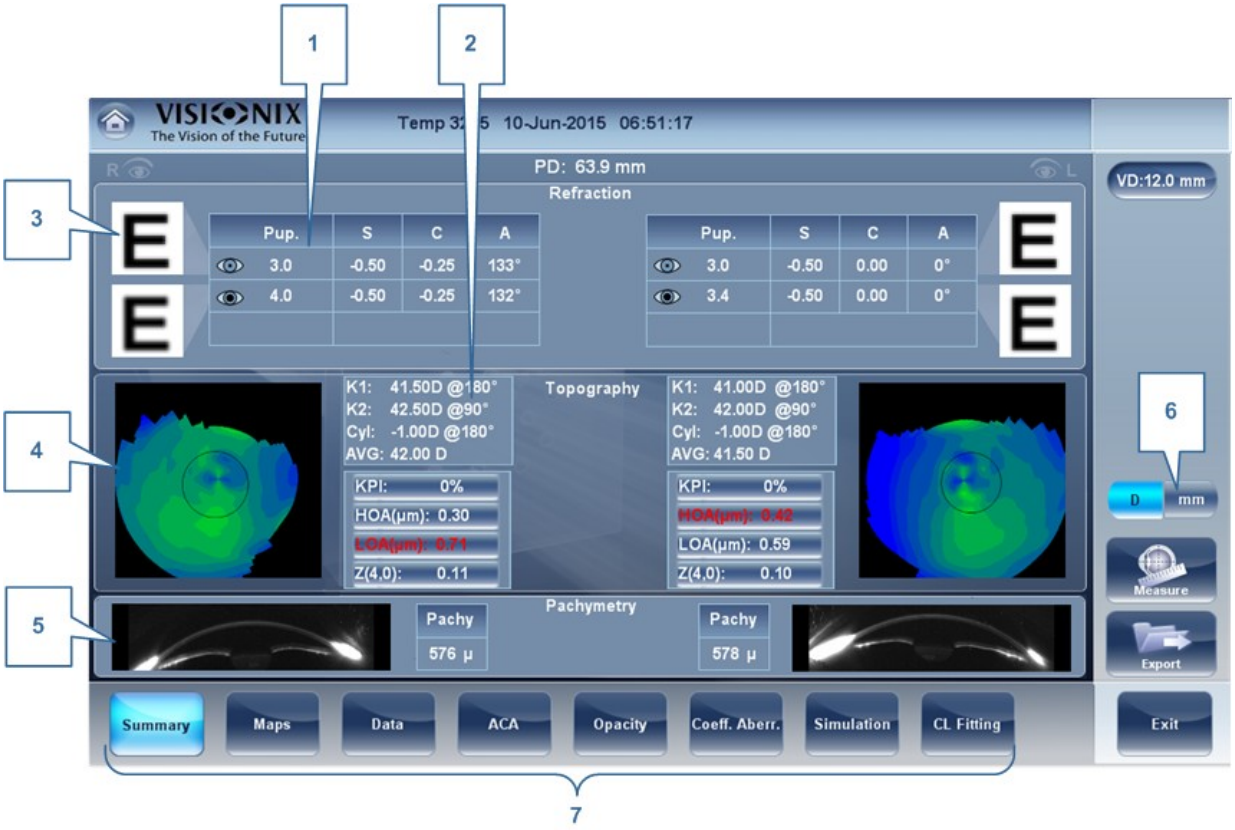
No	Description
1	**PD** Patient's pupillary distance (if available).
2	**Refraction** Displays the photopic and mesopic refractions, with the pupil sizes. The image shows the **Photopic (above) and Mesopic (below) simulation of vision.** The clarity of the **E** indicates how well the patient sees from the eye under photopic or mesopic conditions. Double-tap (or double-click) the **E** to open a visual acuity simulation for daytime / nighttime vision.
3	**Add** Add displays the near vision addition and distance (in cm) it was measured at.
4	**Topography** Displays the topographic map of the eye as well as the keratometry values. Double-tap (or double-click) to open the topography map sub-tab for the eye.
5	**Pachymetry** Displays a Scheimpflug image (if Multi Slit pachy taken) of the cornea as well as the thickness of the cornea at its center. Double-tap (or double-click) on image to open the ACA sub-tab for the eye.
6	**Tonometry** Displays the Glaucoma evaluation results which include: the tonometry test results in PO mm/Hg,the average of the tonometry test results, and the irideo angles and the anterior chamber depth results. In addition it displays the adjusted tonometry results which is based on formulas selected in the settings menu. Double-tap (or double-click) to open the Tonometry Tab 65 sub-tab.
7	**Right-eye indicator** Indicates that the test results on this side of the screen are for the right eye.

Summary Tab for C.L. Fitting:



No	Description
1	**Refraction** Displays the photopic and mesopic refractions, with the pupil sizes.
2	**Keratometry** Displays the keratometry readings, KPI values (Keratconus Index), and High Order and Low Order aberrations
3	**E Simulation** The clarity of the **E** indicates how well the patient sees from the eye under photopic or mesopic conditions. Double-tap (or double-click) the **E** to open a visual acuity simulation for daytime / nighttime vision.
4	**Topography** Displays the topographic map of the eye Double-tap (or double-click) to open the topography map sub-tab for the eye.
5	**D/mm** Select button to toggle between Dioptres and mm
6	**Subtabs** Select subtabs to view subject in greater detail

Summary Tab for Cataract/Corneal App Diagnostics:



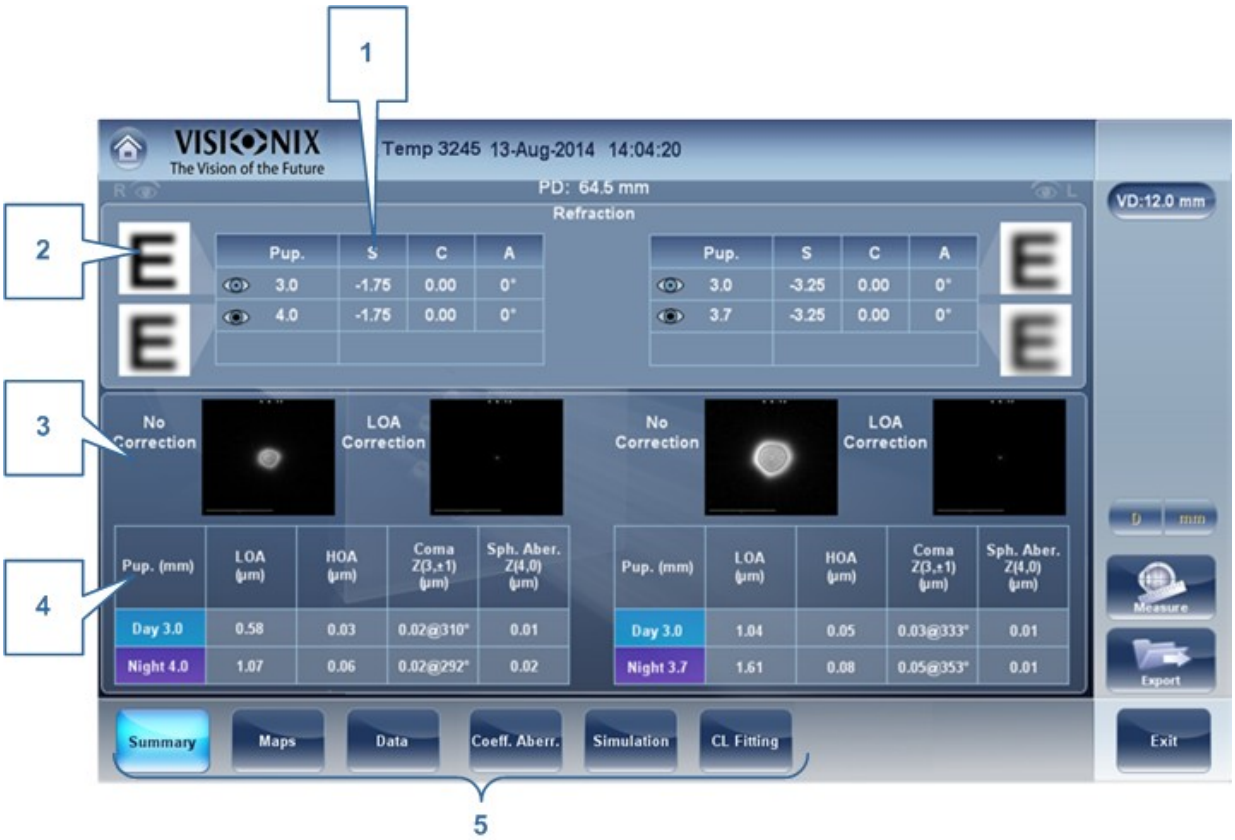
No	Description
1	**Refraction** Displays the photopic and mesopic refractions, with the pupil sizes.
2	**Keratometry** Displays the keratometry readings, KPI values (Keratconus Index), and High Order and Low Order aberrations
3	**E Simulation** The clarity of the **E** indicates how well the patient sees from the eye under photopic or mesopic conditions. Double-tap (or double-click) the **E** to open a visual acuity simulation for daytime / nighttime vision.
4	**Topography** Displays the topographic map of the eye Double-tap (or double-click) to open the topography map sub-tab for the eye.
5	**Pachymetry** Displays a cross sectional view of the anterior chamber, as well as pachymetery for the cornea
6	**D/mm** Select button to toggle between Dioptres and mm

No	Description
7	**Subtabs** Select to see tab subject in greater detail

Summary tab for Glaucoma Evaluation diagnostic:

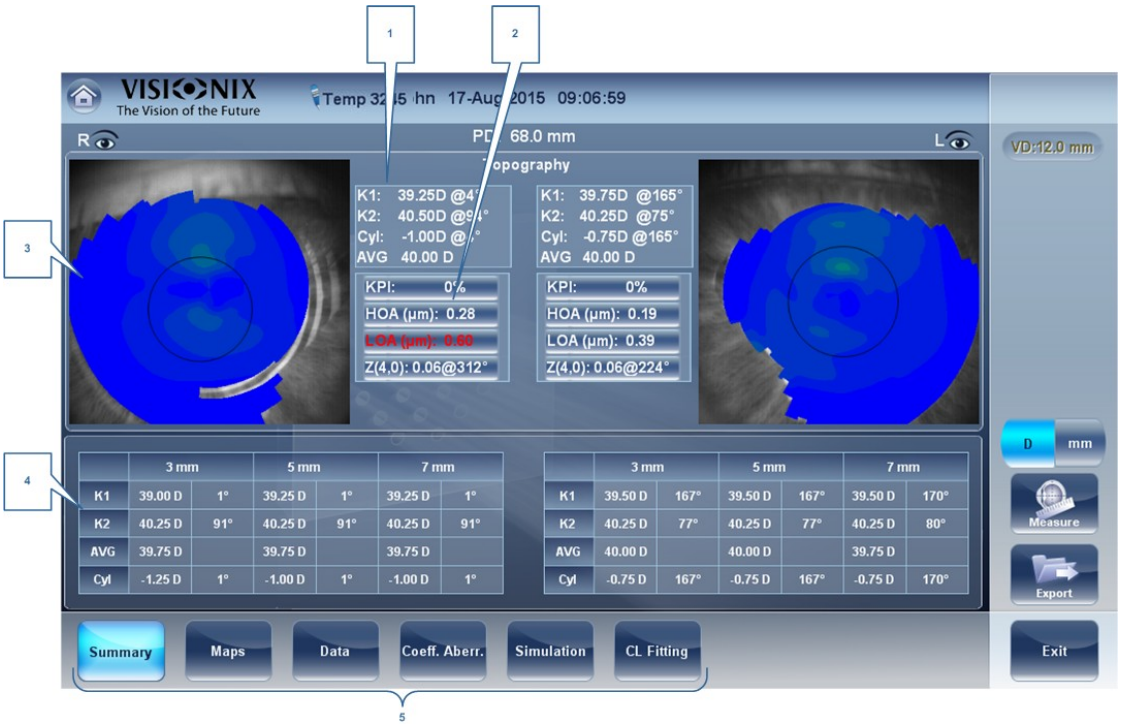
No	Description
1	**Tonometry** Displays the IOP reading, average IOP, and corrected IOP (according to formula chosen in settings)
2	**Pachymetry** Displays the cross-sectional view of the corneal and pachymetery values
3	**Subtabs** Select to view subject in greater detail.

Summary Screen for WF



No	Description
1	**Refraction** Displays the photopic and mesopic refractions, with the pupil sizes.
2	**E Simulation** The clarity of the **E** indicates how well the patient sees from the eye under photopic or mesopic conditions. Double-tap (or double-click) the **E** to open a visual acuity simulation for daytime / nighttime vision.
3	**PSF** Displays the PSF, with no correction, and with LOA correction
4	**Aberrations** Displays values for LOA and HOA under photopic and mesopic conditions
5	**Subtabs** Select to view subject in greater detail

Summary Screen for Topo



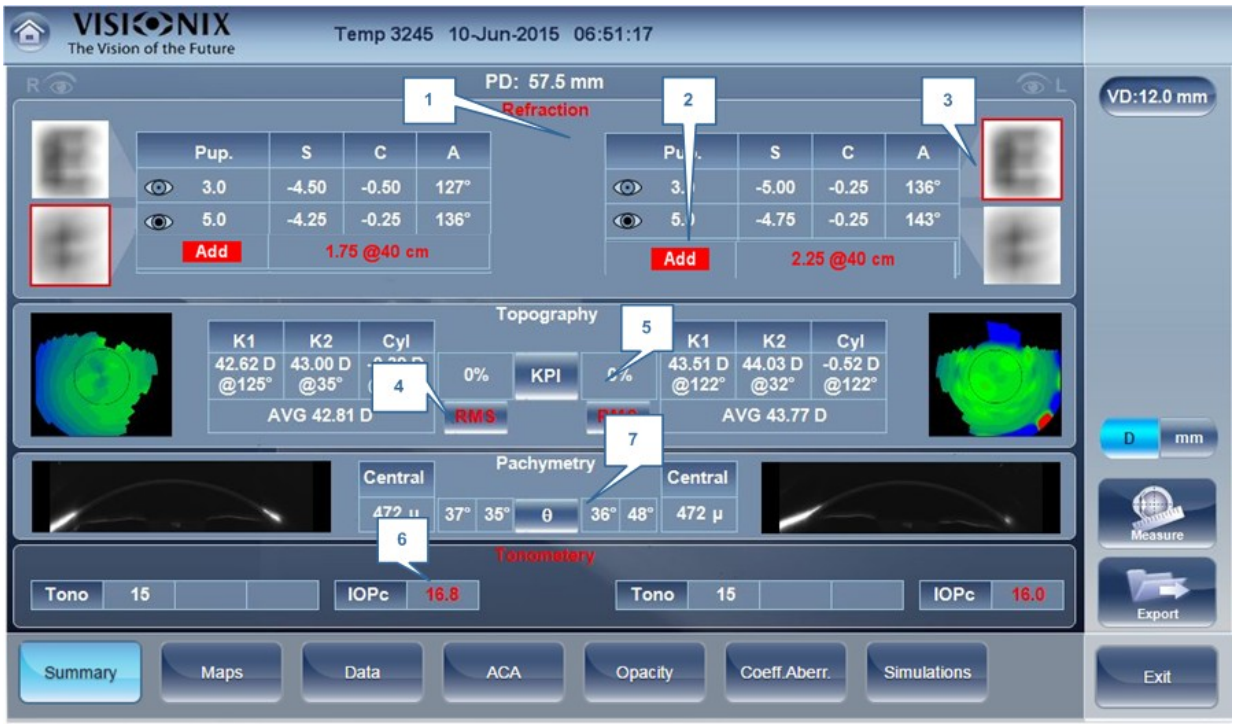
No	Description
1	**Keratometry** Displays the K1 and K2 values
2	**Aberrations Chart** Displays the LOA and HOA as well as KPI (kerataconus index) values
3	**Topo** Displays the corneal topography map
4	**K Readings** Displays the keratometry values according to different pupil diameters (3,5,7mm)
5	**Subtabs** Select to view subject in greater detail

Summary Screen for Pachymetry Diagnostic

No	Description
1	**Pachy Image** Image of corneal anterior chamber with pachymetery results
2	**Negative Pachy Image** A negative of the image of corneal anterior chamber with pachymetery results
3	**Subtabs** Select to view subject in greater detail

Special Alerts

The summary tab will display alerts when results fall outside the expected range:



No	Description
1	**Refraction** Refraction is displayed in red: • When there is a difference of more than 2D in the refraction between the eyes, or the cylinder difference between the eyes is more than 2D. • If the difference in refraction of the same eye in mesopic and photopic light is a different of 1D sphere and 0.75D cylinder, the caution is also displayed. • When Sphere is above ± 20D or Cylinder is more than ± 8D. • When pupil diameter is less than 2.5mm in at least one eye. • When Pupil size difference between OD and OS is greater than 1mm. • When cylinder is greater than 4D in either eye.
2	**Add** Add is displayed in red when the difference between the expected addition for age and measured addition is great than 1D.
3	**E Simulation** E simulation is outlined in red when: • The delta between the night and day sphere is >1D and/or cylinder is greater than >0.75D • The Ocular HOA RMS equivalent sphere is larger than 0.5D in the right or left eye.

No	Description
4	**RMS** RMS is displayed in red when corneal or RMS equivalent sphere is greater than >4D **KPI** or when corneal HOA RMS equivalent sphere is greater than 0.5D in either eye.
5	**KPI** KPI result is displayed in red when its value is higher than the normal population
6	**IOPc** The IOPc value is displayed in red when the inter-ocular pressure is above 20mHg, irideo angles are displayed.
7	**Pachymetry** Pachymetry is displayed in red and irideo anges are displayed when the central corneal thickness is below 400µm or higher than the 700µm.

4. 5 Maps Tab

The Maps tab displays wavefront maps of aberrations and topographic maps of the cornea.

Ocular

The **WF** sub-tab displays wavefront maps of the measured ocular aberrations of one or both eyes.
Display options allow you to view results for photopic and mesopic conditions, to view maps of both eyes at once or of each eye individually, to isolate lower- and higher-order aberrations, to change the step and central value of a map, and to superimpose guidelines of various types onto the maps.

Aberrations values and maps can be shown in OPD (optical Path Difference) mode or in WFE (WaveFront Error) mode, as defined in the settings screen (See the General 163 subtab under the results tab of the settings screen)

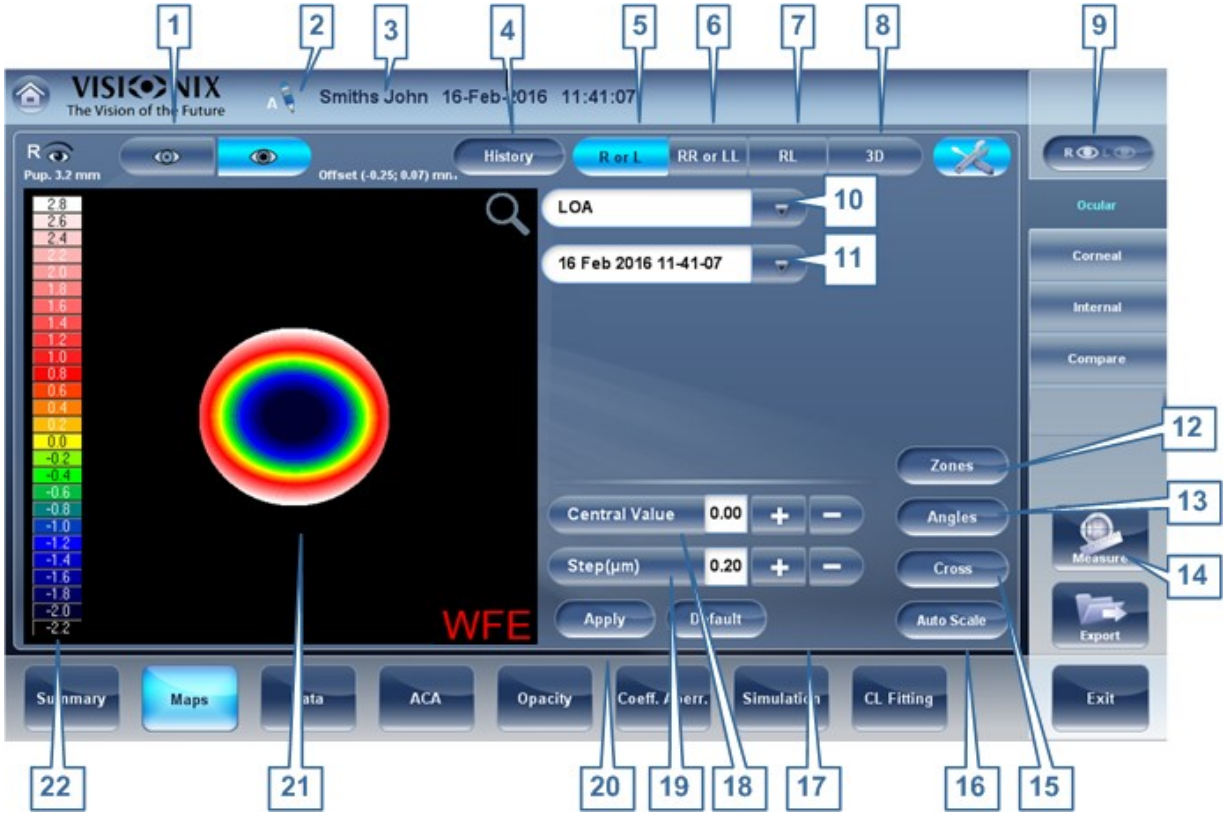
The **Optical Path Difference** (OPD) is defined as the difference between the aberrated and the ideal unaberrated wavefronts. The OPD is positive if the aberrated wavefront leads the ideal

unaberrated wavefront.
Also, if the aberrated wavefront curves in more than the unaberrated wavefront, the OPD is positive. Therefore, a negative focal shift will introduce a positive aberration.

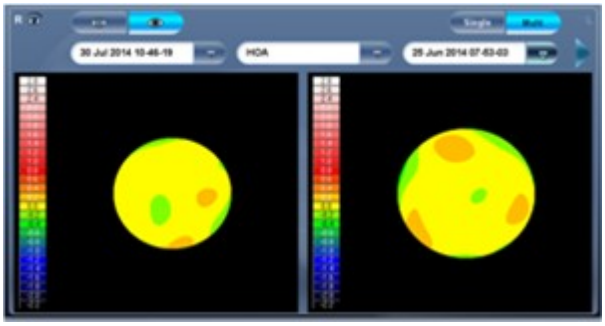
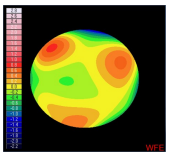
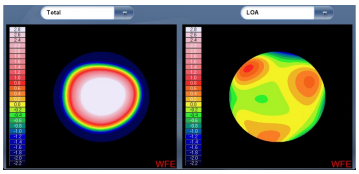
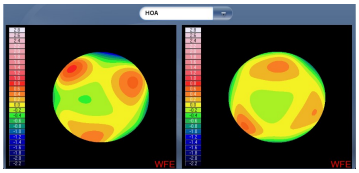
The **WaveFront Error** (WFE) is defined as the difference between the ideal unaberrated wavefronts and the aberrated wavefronts. Essentially, WFE represents the required correction for achieving unaberrated vision.

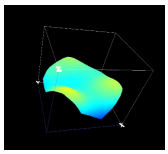
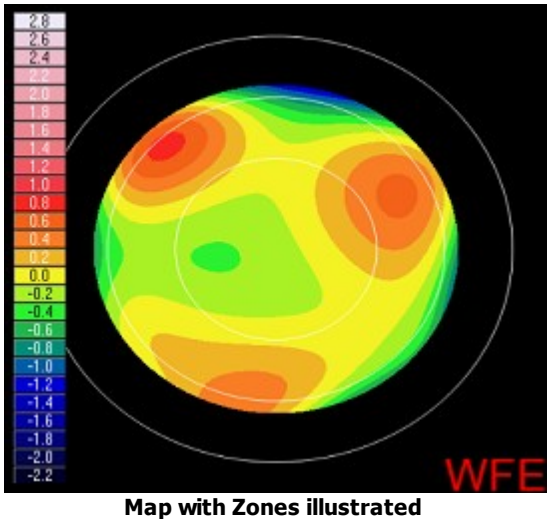
OPD and WFE modes relate in the following way:
OPD(x,y)= -WFE(x,y)

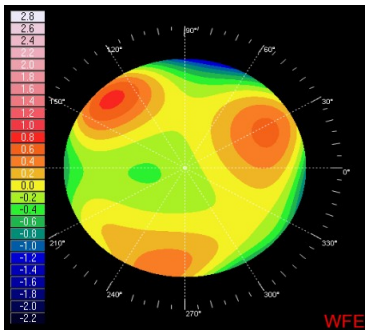
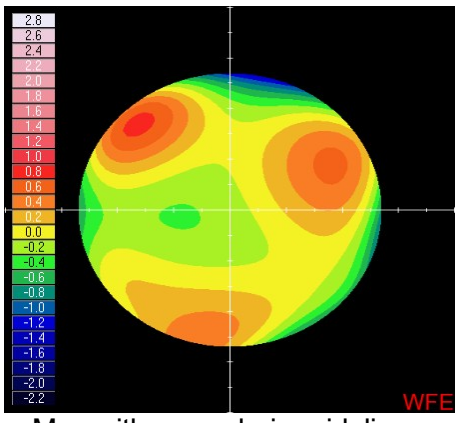
The chosen mode will be marked on each map in the lower right corner of the map.



No	Description
1	**Photopic /Mesopic selector** Select Day to display maps for daytime light conditions or Night to display maps for nighttime light conditions.
2	**Note** Select this to view an existing note, or add a note in the patient file. For more information go to Adding a Patient 88.
3	**Name and date** Patient's name and date and time of the measurement

4	**History** Displays map results from previous and current topographic maps according to selected date. 
5	**R or L mode** Displays single map, for the eye selected in the eye selector.  R or L mode
6	**RR or LL mode** Display two maps, both for the same eye - namely, the eye selected in the eye selector; displaying two maps of the same eye allows you to compare two types of aberrations. For example, you could display HOA data in one of the maps, and LOA data in the other.  RR or LL mode
7	**RL mode** Displays two maps, one for each eye. Both maps are displayed with the same display options.  RL mode

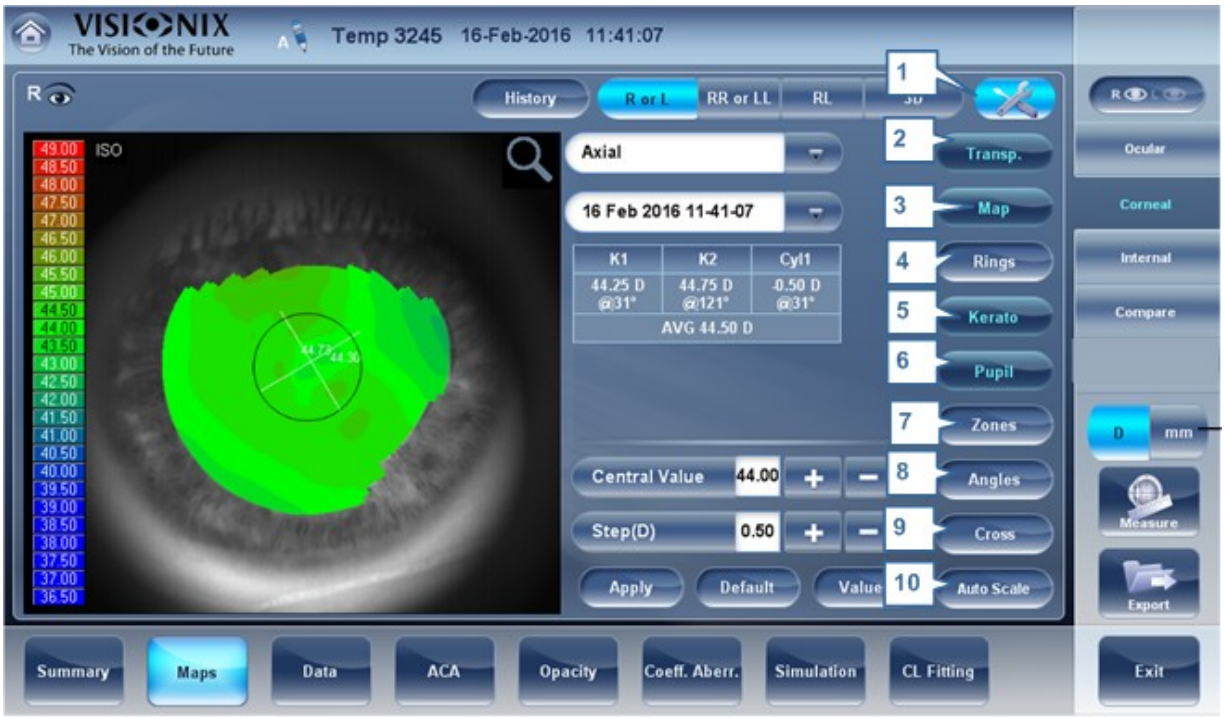
8	**3D:** Displays one map, for the eye selected in the eye selector, in 3D mode.  3D mode Note: In 3D mode, you can change the orientation by dragging your finger (or the cursor, if a mouse is connected to the unit) on the image.
9	**Eye Indicator** Indicates and toggles between Left and Right eyes
10	**Map-type selector** Select one of the following map types: • Total: Display composite of all aberrations • HOA: Display only high-level aberrations • LOA: Display only low-level aberrations • Sphere: Display only the sphere aberrations • Cylinder: Display only the cylinder aberrations
11	**Date Tab** Opens a map from previous examinations. This is only available if the patient has previous examinations saved in the database.
12	**Zones**: Select this button to superimpose zone guidelines (3, 5, and 7mm) on the map display, or to remove them when they are displayed.  **Map with Zones illustrated**

13	**Angles**: Superimpose angle guidelines on the map display, or to remove them when they are displayed.  Map with angle guidelines .
14	**Measure** Select to retake measurement. **Warning, if selected prior to exiting and saving measurement first time, your previous results will be erased.**
15	**Cross**: Superimpose cross-hair guidelines on the map display, or to remove them when they are displayed.  Map with cross-hair guidelines
16	**Auto-scale**: Activate or deactivate auto-scaling. When auto-scaling is activated, the step and central value of the map are set automatically, and the **Step** and **Central Value** selectors are disabled. When it is deactivated, the Step and Central Value selectors are enabled.
17	**Default button** Resets the **Step** and **Central Value** according to what is defined as default in the Settings menu.
18	**Central Value selector** Select the middle value for the color scale. Select + to increase the value, or − to decrease it. Changes you make to the **Central Value** are implemented when you select **Apply**.
19	**Step selector** Select the rate of change for the color scale: the range of values represented by each distinct color. Select + to increase the step, or − to decrease it. Changes you make to the **Step value** are implemented when you select **Apply**.

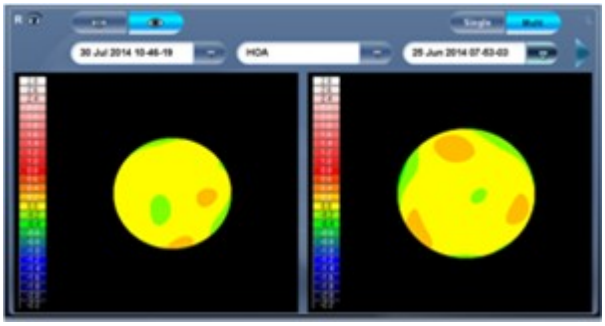
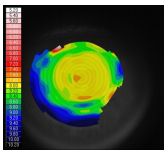
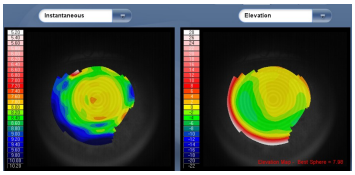
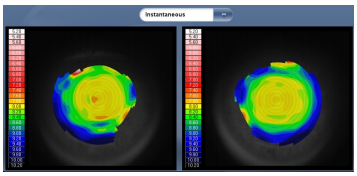
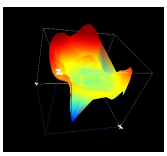
20	**Apply button** Implements changes you make to the **Step** and **Central Values**.
21	**Map** Map of the aberrations.
22	**Scale** Shows the color-coding scale used in the map.

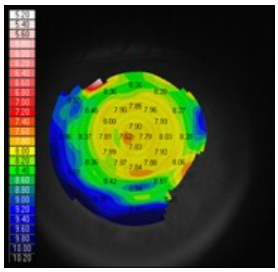
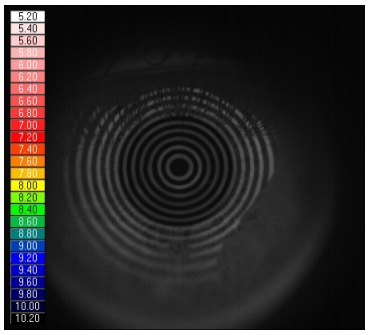
Corneal

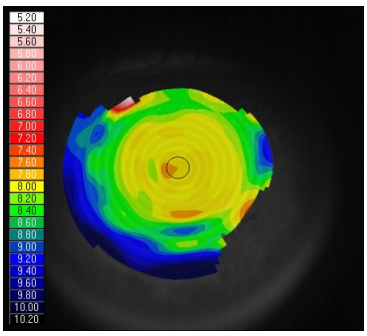
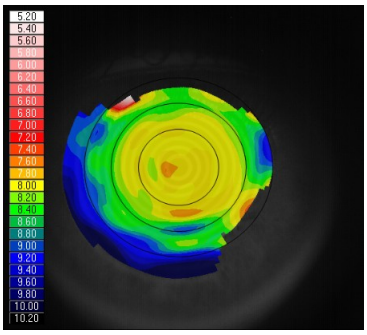
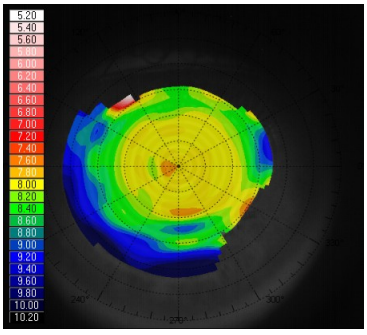
The **Topo** sub-tab displays topographic maps of the corneas of one or both eyes. Display options allow you to view maps of both eyes at once or of each eye individually, to view four different types of topographic maps, to change the step and central value of a map, and to superimpose data and guidelines of various types onto the maps.

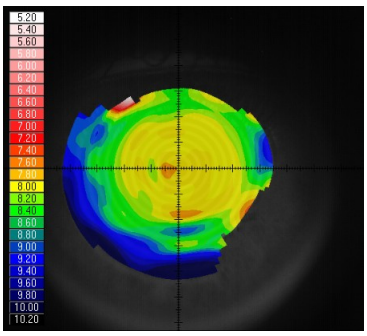


No	Description
1	**Note** Click to view an existing note, or add a note in the patient file. For more information go to Adding a Patient 88 .
2	**Name and date** Patient's name and date and time of the measurement

3	**History** Displays map results from previous and current topographic maps according to selected dates. 
4	**R or L: Displays one map, for the eye selected in the eye selector.**  R or L mode
5	**RR or LL:** Displays two maps, both for the same eye - namely, the eye selected in the eye selector; displaying two maps of the same eye allows you to view the same data in different ways. For example, you could display HOA data in one of the maps, and LOA data in the other.  RR or LL mode
6	**RL**: Display two maps, one for each eye. Both maps are displayed with the same display options.  RL mode
7	**3D:** Display one map, for the eye selected in the eye selector, in 3D mode.  3D mode Note: In 3D mode, you can change the orientation by dragging your finger (or the cursor, if a mouse is connected to the unit) on the image.

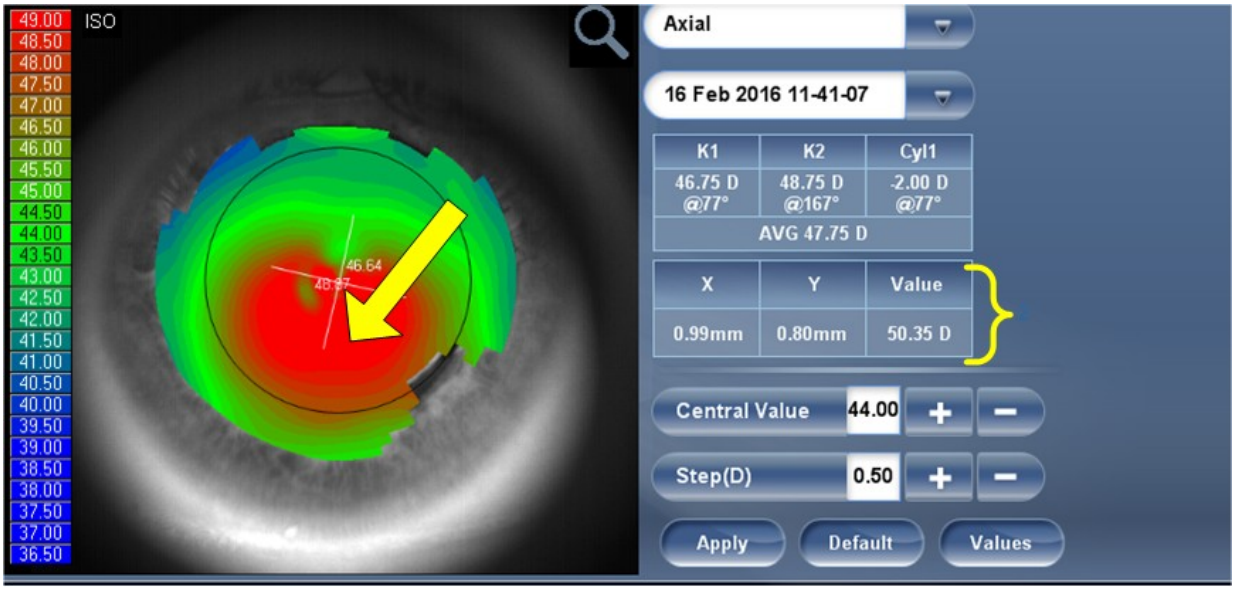
8	**Values button** Shows or hides values on the maps  Values displayed on map
9	**Diopter/mm button** Toggles the display of values between diopters and millimeters.
10	**Transparent** Displays the photo of the eye in the background with the projection of the Placido rings
11	**Map** Displays the topographic map of the cornea according to the map selected from the drop down menu (in #5).
12	**Rings** Displays the image of the Placido rings that were projected onto the cornea. Select Rings to view ringer and make modifications.  Concentric rings
13	**Kerato** Displays/hides the central keratometry values.

14	**Pupil** Superpose a circular guideline on the map indicating where the pupil is or remove it when it is displayed. 
15	**Zones** Superpose zone guidelines (3, 5, and 7mm) on the map display, or to remove them when they are displayed.  Map with zone guidelines
16	**Angles** Superimpose angle guidelines on the map display, or to remove them when they are displayed.  Map with angle guidelines

17	**Cross** Superpose cross-hair guidelines on the map display, or remove them when they are displayed. Each gap is of 1mm in size.  Map with cross-hair guidelines
18	**Auto-scale** Activate or deactivate auto-scaling. When auto-scaling is activated, the step and central value of the map are set automatically, and the Step and Central Value selectors are disabled. When it is deactivated, the Step and Central Value selectors are enabled.
19	**Map-type selector** Select one of the following map types: • Axial: Display an axial topographic map • Instantaneous: Display a tangential topographic map • Elevation: Display an elevation topographic map • Refraction: Display a refractive topographic map
20	**Date Tab** If more than one measurement was performed for the current patient, this tab opens a drop-down menu with the dates of other measurements selected. To view a map of a different date, select it from this menu.
21	**Central Value selector** Select the middle value for the color scale. Select + to increase the value, or − to decrease it. Changes you make to the Step value are implemented when you select Apply.
22	**Step selector** Select the rate of change for the color scale: the range of values represented by each distinct color. Select + to increase the step, or − to decrease it. Changes you make to the Step value are implemented when you select Apply.
23	**Apply button** Apply changes you make to the Step and Central Value values.
24	**Default button** Reset the Step and Central Value to their default values 168.

25	**Scale** Indicates the color-coding scale used in the map.
26	**Map** Details of the chosen map (topographic, aberrometry or refraction)

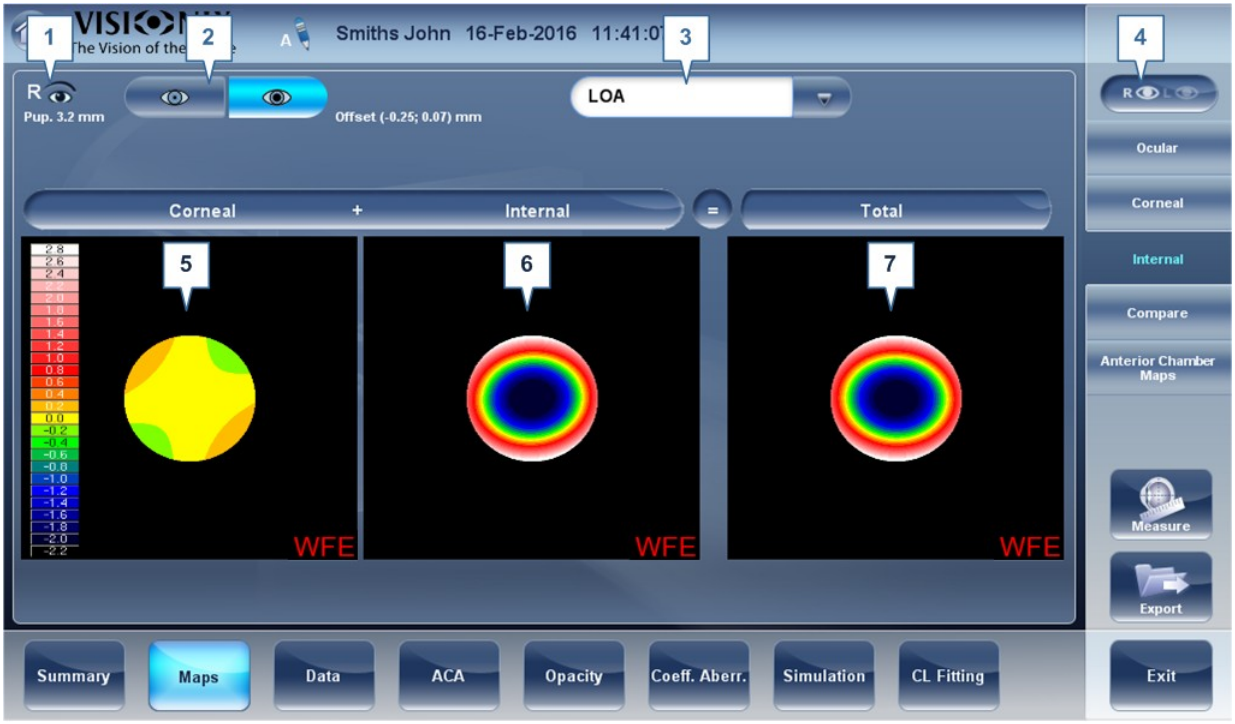
To display the values at a particular location of the map, click on a point in the map, and a table with the value and location appears, as seen below.



Internal

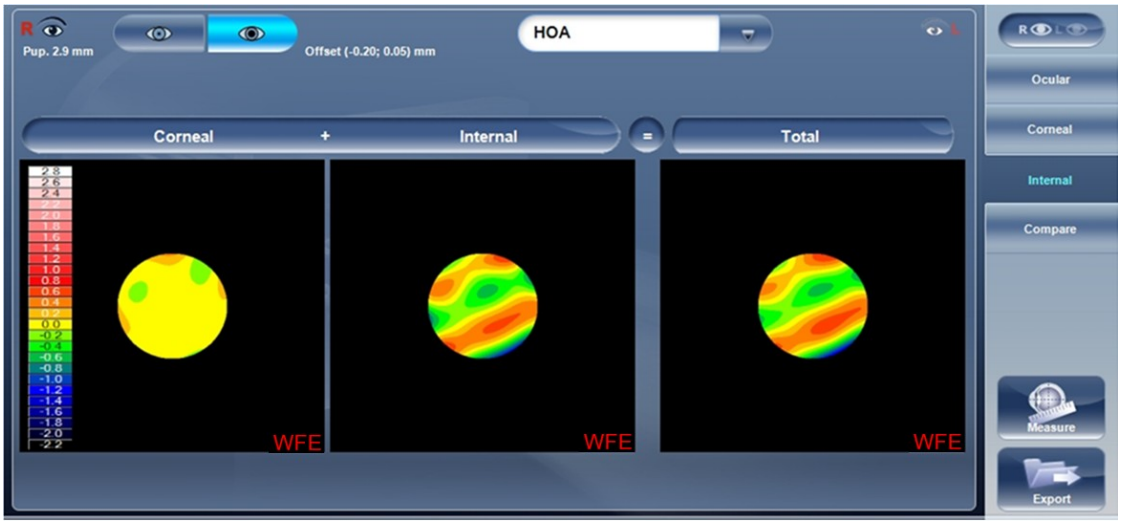
The **Internal** aberrations map represents the calculated differences between the corneal aberrations, and the ocular aberrations for each eye.
These aberrations can stem from anywhere along the optical system from posterior cornea to retina; most commonly from the crystalline lens.

The maps can be displayed both in photopic and mesopic conditions.



No	Description
1	**Left eye Indicator** Results displayed on this side of the screen are those of the left eye
2	**Photopic /Mesopic selector** Select **Day** to display maps for daytime light conditions or **Night** to display maps for nighttime light conditions.
3	**Map Selection** Select a map from this menu to be displayed. The maps available for selection are: Total, LOA, HOA, Cylinder, and Coma maps.
4	**Eye selector** Select the eye you wish to be displayed.
5	**Corneal map** This displays the corneal map that contains the corneal aberrations.
6	**Internal map** This displays the internal map that contains the internal aberrations.
7	**Total map** This displays the map that contains the total aberrations for the eye selected.

The Internal Maps are useful for indicating the location of the aberrations, for example in the map below:

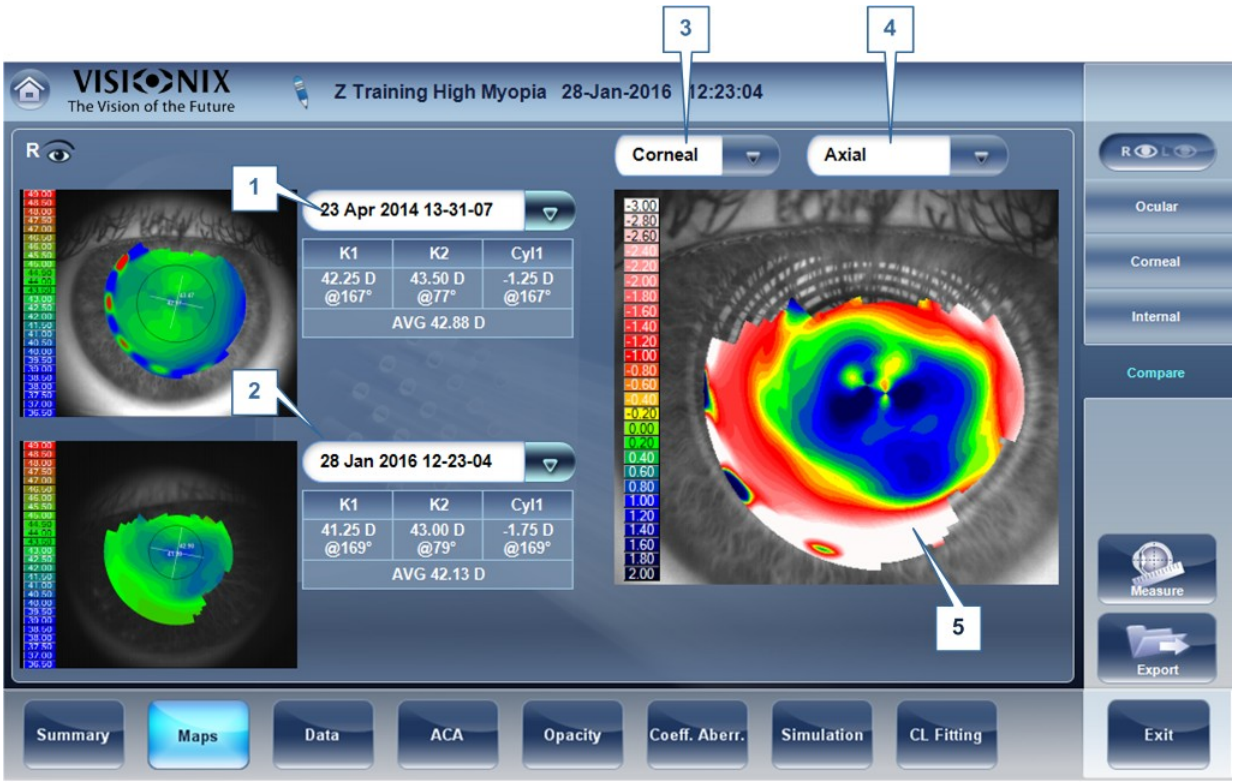


The Internal map here, illustrates how most of the total aberrations are due to Internal aberrations. This could be an indication of Cataract, or an internal eye issue.

Compare

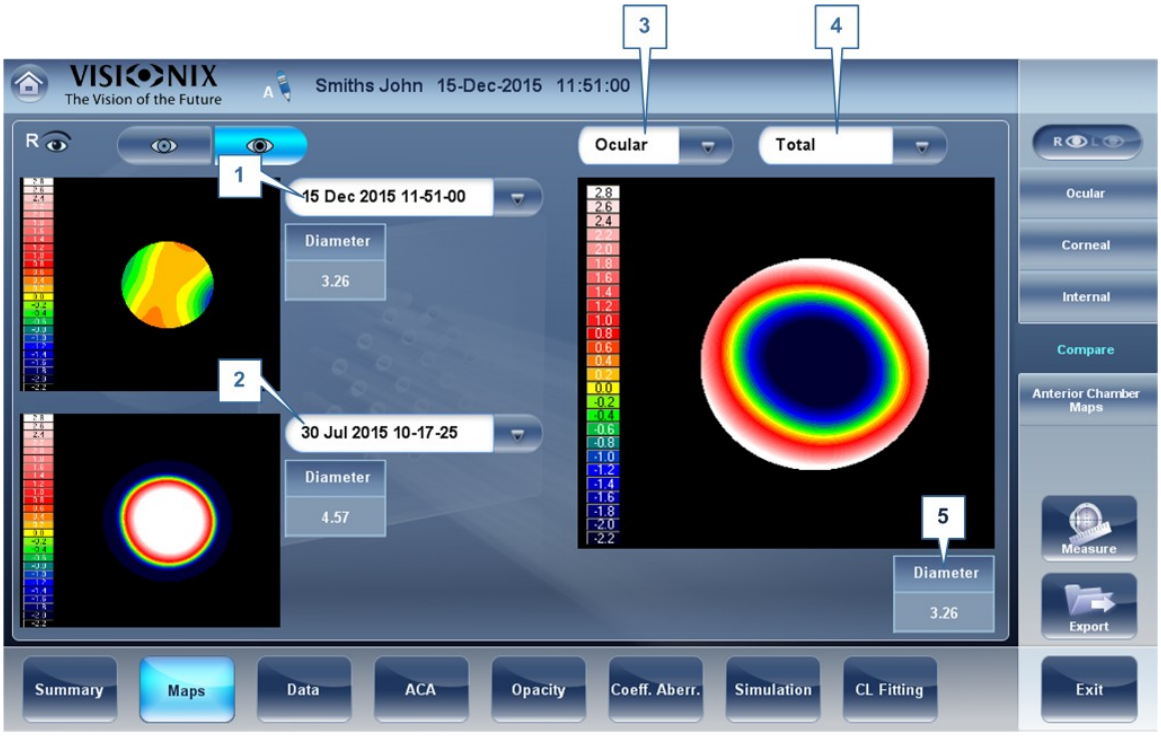
The **Compare** map feature compares two maps for the same patient and generates a delta map to illustrate changes over time. This map is available after retreiving a patient's measurement when the patient has more than one measurement in their file. Both corneal maps and ocular maps are available for comparing.

Compare Corneal Maps



No	Description
1	**Previous Date Tab** Select the date of the map that you would like to have the current map compared to.
2	**Current Date tab** By default, the date selected here will be for the current measurement. To select a different date, click on the arrow, and a list of previous measurements will become available for selection.
3	**Map Selection** Select a map type from this menu to be displayed.
4	**Map Selection** Select a map from this menu to be displayed. The maps available for selection for Corneal maps are: Axial, Tangential, Total, LOA, and HOA maps.
5	**Delta** To display data changes at any point on the map, click any location on the map and the data will be displayed here.

Compare Ocular Maps



No	Description
1	**Current Date tab** By default, the date selected here will be for the current measurement. To select a different date, click on the arrow, and a list of previous measurements will become available for selection.

No	Description
2	**Previous Date Tab** Select the date of the map that you would like to have the current map compared to.
3	**Map Selection** Select a map type from this menu to be displayed, either Ocular or Corneal maps are available for selection.
4	**Map Selection** Select a map from this menu to be displayed. The maps available for selection for Ocular maps are: Total, LOA, and HOA maps. Corneal maps available for selection are: Axial, tangential, total, HOA, and LOA maps,
5	**Pupil Diameter** This is the maximum people diameter based on the pupil of the smaller map.

4. 6 Data Tab

The **Data** tab displays topographic information of the cornea.

Topo Data

The **Topo Data** sub-tab of the **Data** tab displays information about the shape of the cornea. The sub-tab displays the results of the Topo test in three tables: **Eccentricity, Sagittal, and Meridians**.

No	Description
1	**Keratoconus Probability Index** Keratoconus probability results. See Keratoconus Table[63].
2	**Sim_K** • **K1 & K2:** Two orthogonal radii values where K1 is the flattest meridian and K2 is the steepest meridian • **AVG:** Average of K1 and K2 - the mean curvature value between K1 and K2 • **CYL:** Corneal toricity - the difference in diopters between curvatures of the principal meridians (K1 and K2) and axis of the negative cylind
3	**Geometry table** Geometry of the cornea (P=1-e2) and (Q= P-1): • P: Is a factor indicating how similar the shape of the cornea is to a perfect sphere, in the case of a perfect sphere, P=1 • e: This is a factor describing the eccentricity of the cornea,for a perfect sphere, e=0. • Q: Is a factor indicating the asphericity of the cornea, for a sphere, Q=0 Note: An example of average corneal values: P=0.8, Q=-0.2, and e=0.45. These are not the values of a perfect sphere as average corneas are aspheric.
4	**Menu** Select the geometrical data to be displayed: Eccentricity[63], Sagittal Radius[64] and Meridians.
5	**Eccentricity Table** Displays the local eccentricity values according by location on the cornea.

Keratoconus Table

The **Keratoconus** table displays the following data:

- **KPI:** Index of the probability of keratoconus

  CAUTION: Keratoconus indices are designed to be an adjunct to a clinical examination, and should never be used as a sole assessment tool in the diagnosis of Keratoconus.

  Results of a clinical trial of the Keratoconus Prediction Index (KPI) are described in reference 1 and more details of the mathematics are given in reference 2.

  Reference 1. Calossi A. Le altimetrie corneali con sistemi a disco di Placido. In: Mularoni A, Tassinari G, eds. La Topografia Altitudinale. Canelli, Italy: Fabiano Editore; 2005:136-139.

  Reference 2. Maeda N, Klyce SD, Smolek MK, Thompson HW. Automated keratoconus

- **SI:** Symmetry index - the difference between the mean power of two circular zones centered in the vertical axis
- **AGC:** Apical Gradient of Curvature - the mean variation per unit of length of the corneal power between the corneal apex and the periphery of the keratoconus
- **AK:** Apical Keratometry - the curvature of the corneal apex

Note: Values that are associated with a high probability of keratoconus are marked with an asterisk, like the SI and AGC values in this example:

Keratoconus	
KPI	37%
SI	*1.70
AGC	*1.68
AK	7.06

Eccentricity Table

The **Eccentricity** table shows the eccentricity of the cornea (P) at various predefined positions. The positions are defined by the meridian and by the angle from the keratometric measurement axis. R0 is the apical position (corneal apex) and the angles are 10º, 15º, 20º, 25 º, and 30º. The meridians used are the nasal, temporal, inferior, and superior semi-meridians and the horizontal and vertical meridians. The mean is the average of the horizontal and vertical meridians.

Eccentricity-P

	Mer.	R0	10°	15°	20°	25°	30°
Nasal	354°	43.75 D	0.91	0.84	0.77	0.57	0.46
Temporal	174°	44.06 D	1.28	0.91	0.81	0.69	0.62
Inferior	264°	43.84 D	2.03	0.80	0.76	0.78	0.88
Superior	84°	45.92 D	0.56	0.43	0.41	-0.11	-0.11
Horizontal	174°	43.90 D	1.10	0.88	0.79	0.63	0.54
Vertical	84°	44.86 D	1.29	0.62	0.59	0.34	0.88
Medium	0°	44.38 D	1.20	0.75	0.69	0.49	0.67

Sagittal Radius Table

The **Sagittal Radius** table shows the radius of the curvature of the cornea at various predefined positions. The positions are defined by the meridian and by the angle from the keratometric measurement axis. R0 is the apical position (corneal apex) and the angles are 10º, 15º, 20º, 25 º, and 30º. The meridians used are the nasal, temporal, inferior, and superior semi-meridians and the horizontal and vertical meridians. The mean is the average of the horizontal and vertical meridians.

Sagittal Radius

	Mer.	R0	10°	15°	20°	25°	30°
Nasal	273°	7.79	7.89	7.90	8.07	8.28	8.52
Temporal	93°	7.88	7.90	7.97	8.06		
Inferior	183°	7.80	7.86	7.90	8.04	8.22	8.34
Superior	3°	7.77	7.86	7.90	8.05	8.13	
Horizontal	93°	7.84	7.90	7.94	8.07	8.28	8.52
Vertical	3°	7.79	7.86	7.90	8.05	8.18	8.34
Medium	0°	7.81	7.88	7.92	8.06	8.22	8.43

Sagittal Radius table

Tonometry Tab

The **Tono** tab displays the results of tonometry measures, and the results of pachymetry measures. For each eye, the results of the measures are displayed individually, and their average is also displayed, in the following columns:

No	Column
1	**Measurement** Notation of measurement number and average
2	**IPO mm/Hg** Displays the actual intraocular pressure that was measured.
3	**Pachy** Displays the thickness of the cornea at its center, in microns.
4	**IPOc mm/Hg** Displays corrected values for the intraocular pressure, taking the pachymeter readings into account.
5	**ACD** Displays the anterior chamber depth
6	**ACV** Displays the anterior chamber volume.
7	**Angle Kappa** Displays the angle kappa.
8	**Decentration** Displays the decentration between the pupil apex and the visual point on the cornea.

No	Column
9	**IC Angles** Displays the interior chamber angles for each eye.

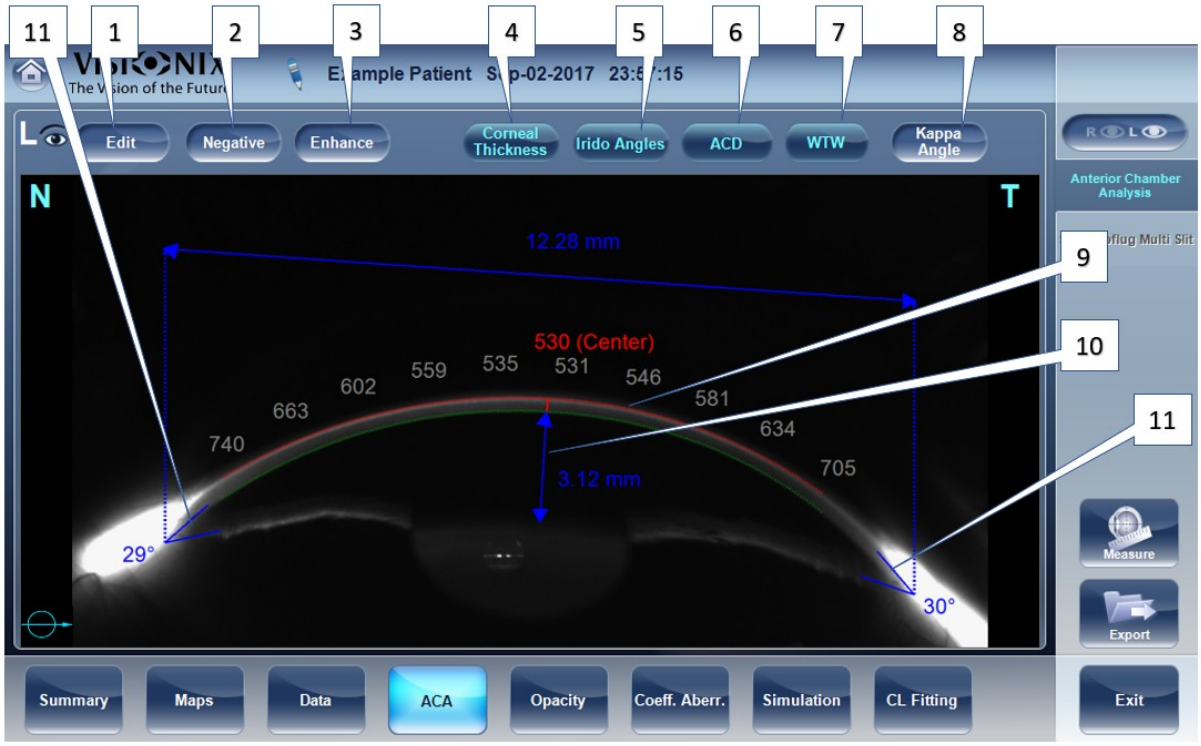
Warning: The safety and efficacy of the VX120+ in measuring intraocular pressures in patients with greater than 3 diopters of corneal astigmatism or greater than 33mmHg of intraocular pressure has not been evaluated."

4. 7 ACA

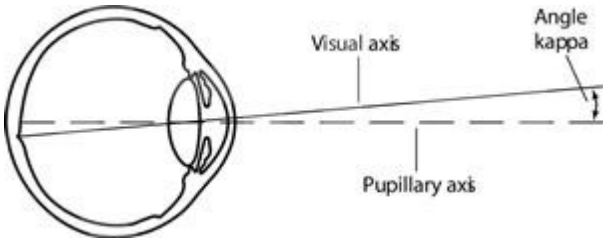
This tab includes data on the Anterior Chamber of the Cornea

Anterior Chamber Analysis

The **Anterior Chamber Analyses** sub-tab of the **Cornea** tab displays diagram and graph for the anterior chamber analysis (pachymetry, irido corneal angle, corneal thickness). The user can edit this diagram by re-positioning the measured points. **Note:** it is only possible to save the reposition of the points immediately after the measurements. When retrieving results, points that are repositioned will not be saved.



No	Description

1	**Edit** Displays the **Edit** screen. In this screen, the measured points can be repositioned by the user. For more information, see Edit 67.
2	**Negative** Displays a negative of the image of the cornea.
3	**Enhance** Enhances the outlines of the image.
4	**Corneal Thickness** Displays values of the corneal thickness in a few areas on the cornea image.
5	**Irido Angles** Displays the Irido Angles values and positions on the image (11)
6	**ACD** Displays the Anterior Chamber Depth in millimeters (10)
7	**WTW** Displays the White to White (in relation to the cornea) distance.
8	**Angle Kappa** Displays the angle between the visual axis and the pupillary axis 
9	**Cornea** Scheimpflug image of the cornea. **T** Indicates that this is the temporal side of the eye. **N** Indicates that this is the nasal side of the eye. The **Orientation** Indicates the orientation of the pachymetry (in the example, a horizontal cut). The **Anterior Face of the Cornea** is marked in red while the **Posterior Face of the Cornea** is marked in green. The **Central Corneal Thickness (CCT)**, in microns is displayed in red.

Edit

The **Edit** screen allows the user to relocate the measured points on the image in order to obtain better values. Clicking on one of the three sections of the image will display a zoom-in of that image. It is then possible to drag each point to a new location.

Please note: if the measured results are not within the following bounds, the **Edit** screen will be automatically displayed when entering the **Anterior Chamber Analysis** results for that eye

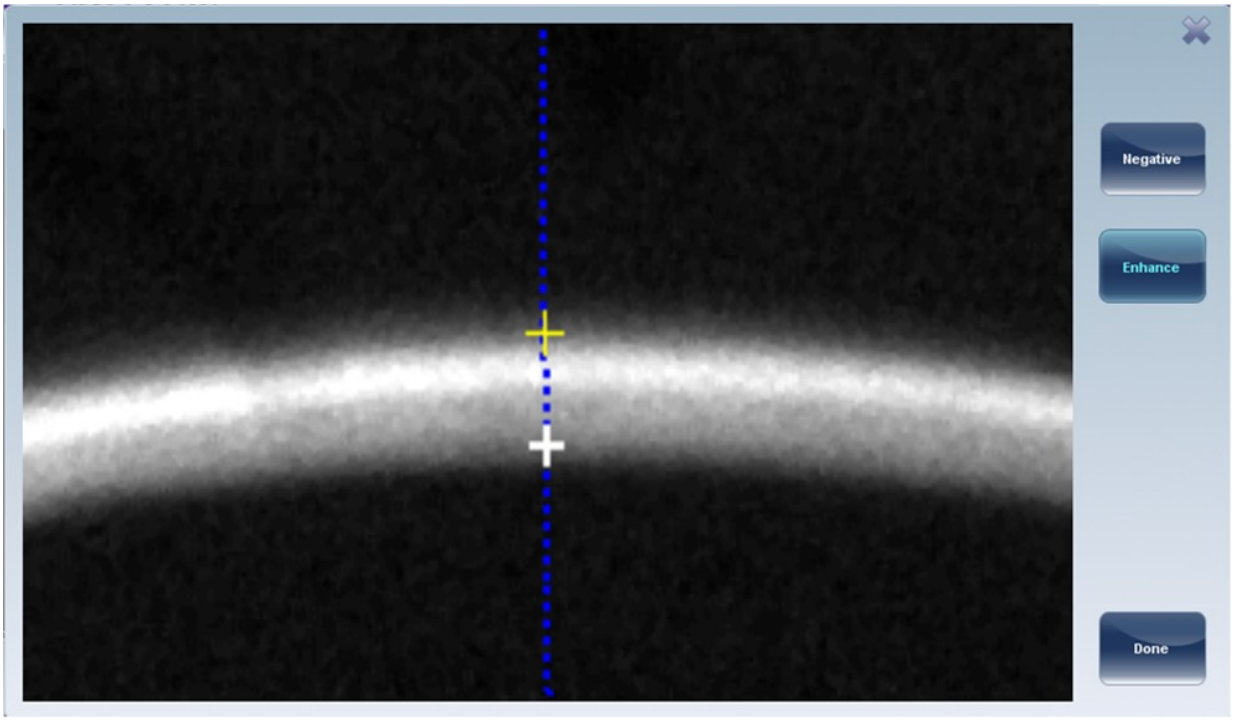
- 5° < Irido Angle < 60°
- 1.5mm < ACD < 4.5mm
- 8mm < WTW
- Irido points should be within their respective EDIT window
- -30° < Pupil Angle < +30°
- 200µ < Corneal Thickness < 800µ
- Corneal thickness values should be symmetrical respective to center

Edit Central Corneal Thickness

To edit central corneal thickness:

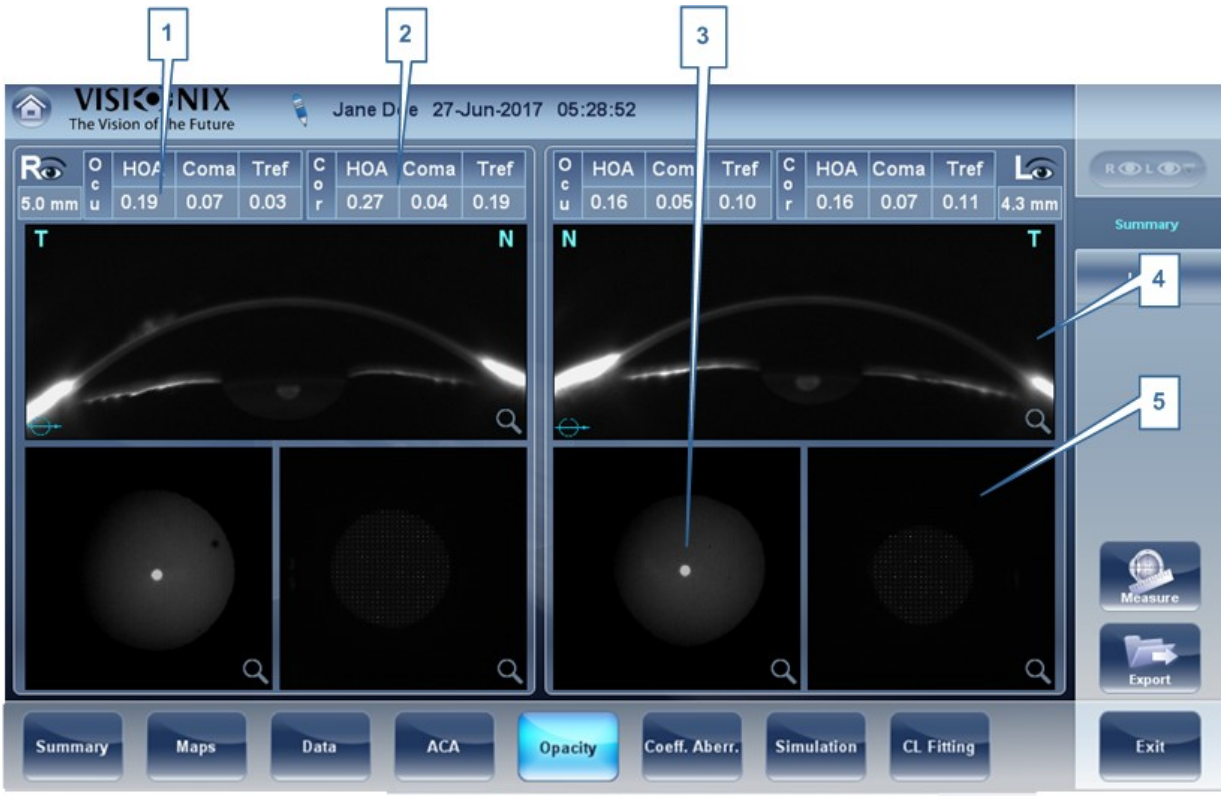
Select the yellow cross and drag it to the outer border of the cornea.

Please note: This is only recommended if dissatisfied with the automatic corneal thickness recognition. This will change the values for central corneal thickness and display only the CCT, the other values along the periphery of the cornea will be erased.


Negative
Enhance
Done

4. 8 Opacity Tab

The **Opacity** tab graphically displays the results of several measures - ocular aberrations, corneal aberrations, retro-illumination, and pachymetry and Shack-Hartmann - to give a general overview of the anterior chamber.



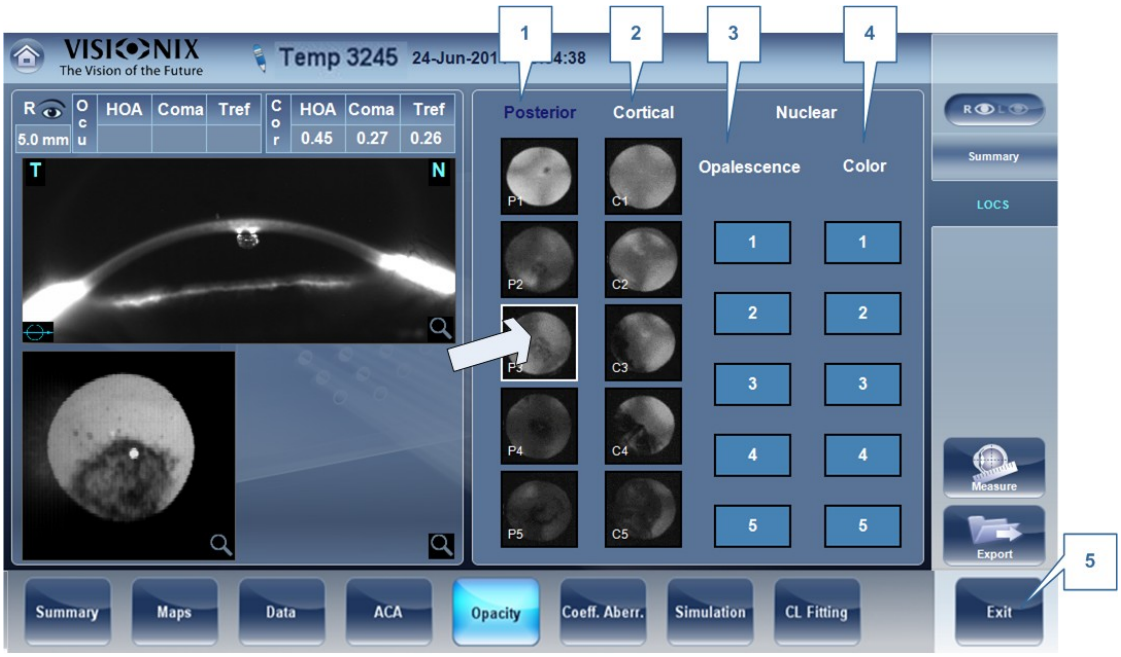
No	Description
1	**Ocular aberrations** Displays values for ocular high order aberrations
2	**Corneal aberrations** Displays values for corneal high order aberrations
3	**Lens** Displays the retro illumination image of the lens and opacities
4	**LOCS** This subtab contains a menu of retro illumination images. After entering this subtab, select the image that most clearly resembles your patient's retro image . More details listed below.

No	Description
5	**Cross Section** Cross sectional image of the cornea and interior chamber
6	**Shack-Hartmann** Shack-Hartmann image.

Note: To view a larger version of an image, double-click it.

LOCS Screen

Once this subtab is selected, the following screen appears:



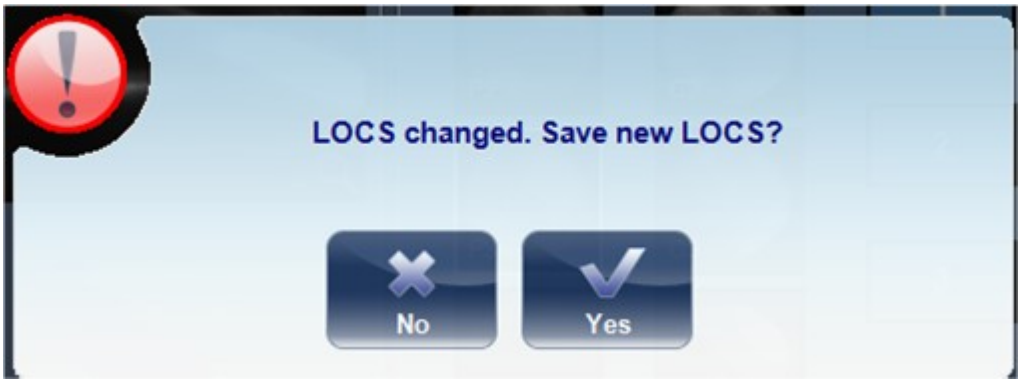
No	Description
1	**Posterior** Select the image that most clearly resembles the patient's retroillumination image.The image on top represents the mildest posterior opacity, while the image on bottom represents the most severe posterior opacity.
2	**Cortical** Select the image that most clearly resembles the patient's retroillumination image. The image on top represents the mildest cortical opacity, while the image on bottom represents the most severe cortical opacity.
3	**Opalescence** Select the image that most clearly resembles the patient's retroillumination image. #1 represents the least opacity, #5 represents the most opacity.

No	Description
4	**Color** Select the image that most clearly resembles the patient's retroillumination image. #1 represents the lightest color, #5 represents the darkest color.

Select the image that best matches the cornea of the patient. There are 4 categories to choose from: Posterior, Cortical, Opalescence, and Color.

Please note: Several options can be selected at once in the LOCS menu.

After exiting the results screen, you will see the message:



Click **Yes** to save or **No** to discard changes.

4. 9 Coeff. Aberr.

The **Aberration Coefficients** tab shows the values of the Zernike coefficients in units of mm for:

Ocular 74
Corneal 75
Internal 76

There are three options for the aberration coefficients to be displayed:

Main Values: Shows a selection of the most common aberrations; defocus, astigmatism, total lower order (LOA), total higher order (HOA), coma, spherical aberration, fourth order astigmatism, trefoil and tetrafoil. Aberrations are shown in value and axis form.

LOA: Shows the values of the lower order aberrations, total LOA, tilt, defocus and astigmatism.

HOA: Shows the values of the common higher order aberrations, total HOA, trefoil, coma, tetrafoil, fourth order astigmatism, spherical aberration, pentafoil, fifth order trefoil and fifth order coma.

Aberrations values and maps can be shown in **OPD** (optical Path Difference) mode or in **WFE** (WaveFront Error) mode, as defined in the settings screen (See the General subtab under the results tab of the settings screen)

The **Optical Path Difference** (OPD) is defined as the difference between the aberrated and the ideal unaberrated wavefronts. The OPD is positive if the aberrated wavefront leads the ideal unaberrated wavefront.
Also, if the aberrated wavefront curves in more than the unaberrated wavefront, the OPD is positive. Therefore, a negative focal shift will introduce a positive aberration.

The **WaveFront Error** (WFE) is defined as the difference between the ideal unaberrated wavefronts and the aberrated wavefronts. Essentially, WFE represents the required correction for achieving unaberrated vision.

OPD and WFE modes relate in the following way:
OPD(x,y)= -WFE(x,y)

The chosen mode is marked on the left side of the coefficient chart above the table.

Ocular

The **Ocular** sub tab shows the value of the Zernike coefficients of the entire eye from the wavefront measurement. It is possible to display either day / night data or right / left data.

No	Description
1	**Aberration coefficients** Choose aberration coefficients to be displayed
2	**Left / Right display** Choose right / left display
3	**Photopic / Mesopic display** Choose day / night display
4	**Graphical representation** Each of the bars represents either Night/Day aberrations, or Right/Left aberrations, depending on what is selected in 2 & 3.
5	**Numerical representation** These are the values for the coefficient of aberrations, they are listed by type and according to either Night/Day or R/L eyes.
6	**Scale** Changes scale of graphical representation

Corneal

The **Corneal** sub-tab shows the values of the Zernike coefficients from the front corneal surface from the corneal topography measurement. It is possible to display either day / night data or right / left data.

No	Description
1	**Aberration coefficients** Choose aberration coefficients to be displayed
2	**Left / Right display** Choose right / left display
3	**Photopic / Mesopic display** Choose day / night display
4	**Graphical representation** Each of the bars represents either Night/Day aberrations, or Right/Left aberrations, depending on what is selected in 2 & 3.
5	**Numerical representation** These are the values for the coefficient of aberrations, they are listed by type and according to either Night/Day or R/L eyes.
6	**Scale** Changes scale of graphical representation

Internal

The **Internal** Coefficient of Aberrations tab represents the differences between the corneal aberrations, and the ocular aberrations for each eye. Zerniki coefficients are displayed for Corneal, Internal and total aberrations. For example, the graph below illustrates that most of the HOA, Defocus, and RMS are due to Internal eye aberrations.

No	Description
1	**Photopic / Mesopic display** Choose day / night display
2	**Aberration coefficients** Choose aberration coefficients to be displayed
3	**Left / Right display** Choose right / left display
4	**Graphical representation** Each of the bars represents aberrations from three parts of the cornea: Corneal, Internal, and Total aberrations.
5	**Numerical representation** This table shows the coefficient aberration values for each section of the cornea listed here, the Corneal, Internal, and Total aberrations.
6	**Scale** Changes scale of graphical representation

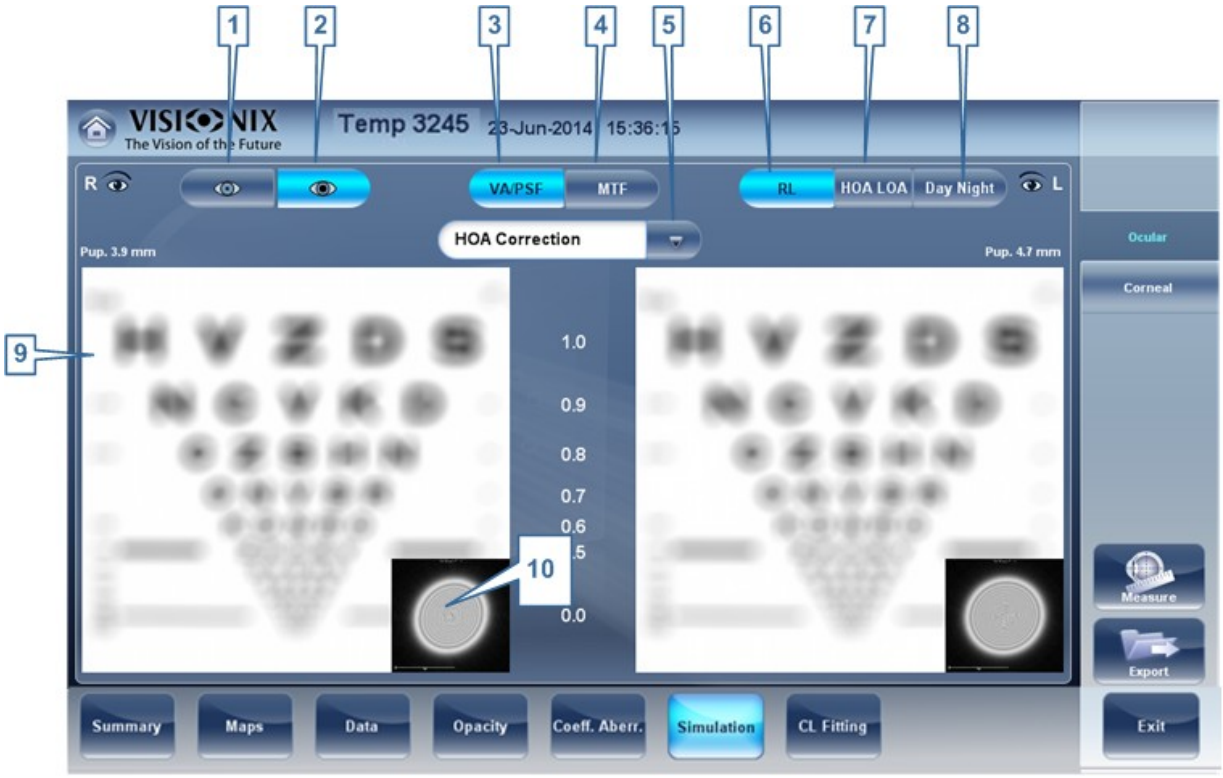
4. 10 Simulation

Visual acuity measures the eye's ability to distinguish object details and shape using HOA (High Order Aberrations) and LOA (Low Order Aberrations).

Visual Acuity measurement is applicable to **Topography** (corneal) and to **Wave Front** (ocular). Results for both options are interpreted in the same manner.

The following simulations are available:

Ocular

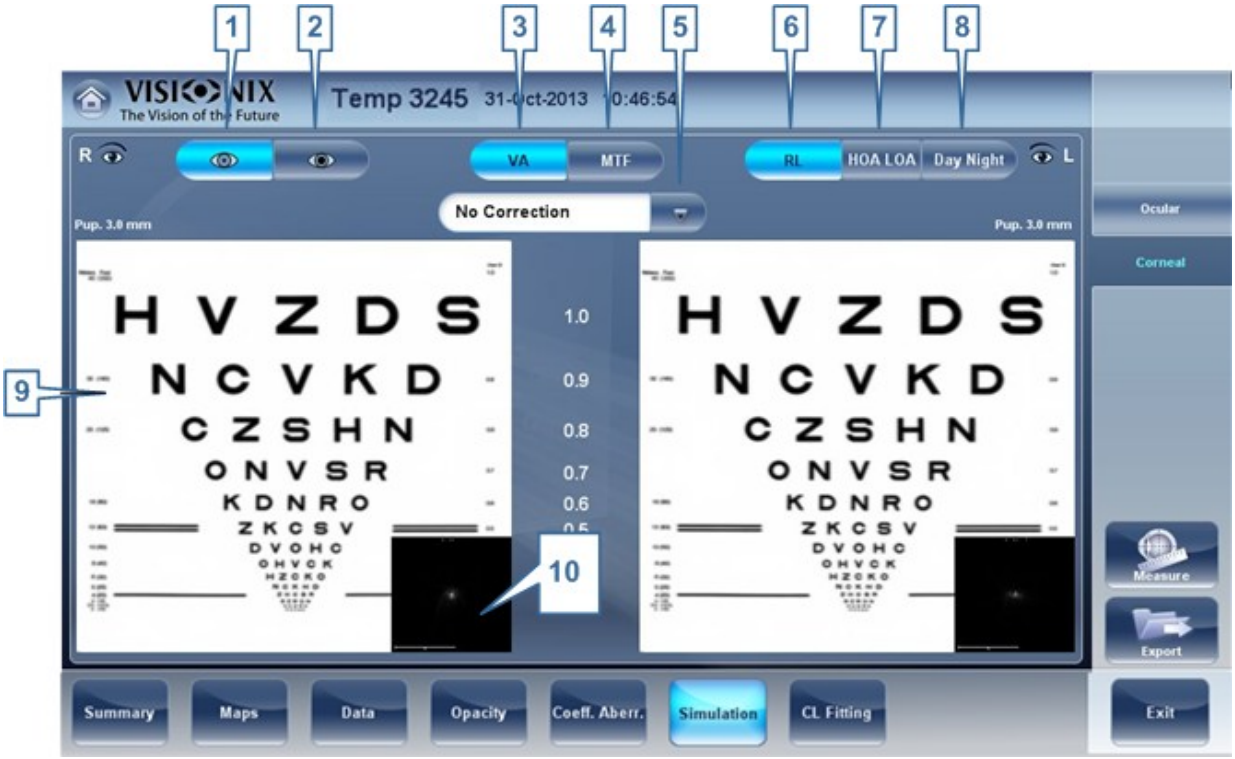


No	Description
1	**Photopic selector** Choose day display

No	Description
2	**Mesopic** Choose night display
3	**VA selector/PSF** Allows you to toggle between the Visual acuity card display and the PSF (Point Spread Function) Display
4	**MTF selector** Displays the MTF graph.
5	**Correction selector** Select HOA to access the same image with an HOA correction. Select LOA to access the same image with a LOA correction. It is possible to select no correction at all, or Full correction.
6	**R/L** Display two cards, one for each eye. Both cards are displayed with the same display options
7	**HOA/LOA** Displays two cards for each eye, one with HOA and one with LOA corrections.
8	**Day Night** Display correction for day or night conditions for one eye.
9	**Visual Acquity image** Reflects the actual quality of patient eyesight.
10	**PSF** Image of the corneal PSF (Point Spread Function).

Corneal

The Corneal sub-tab is identical to the Ocular one, since the **Visual Acuity** measurement is applicable to **Topography** and to **Wave Front**. Results for both options are interpreted in the same manner.

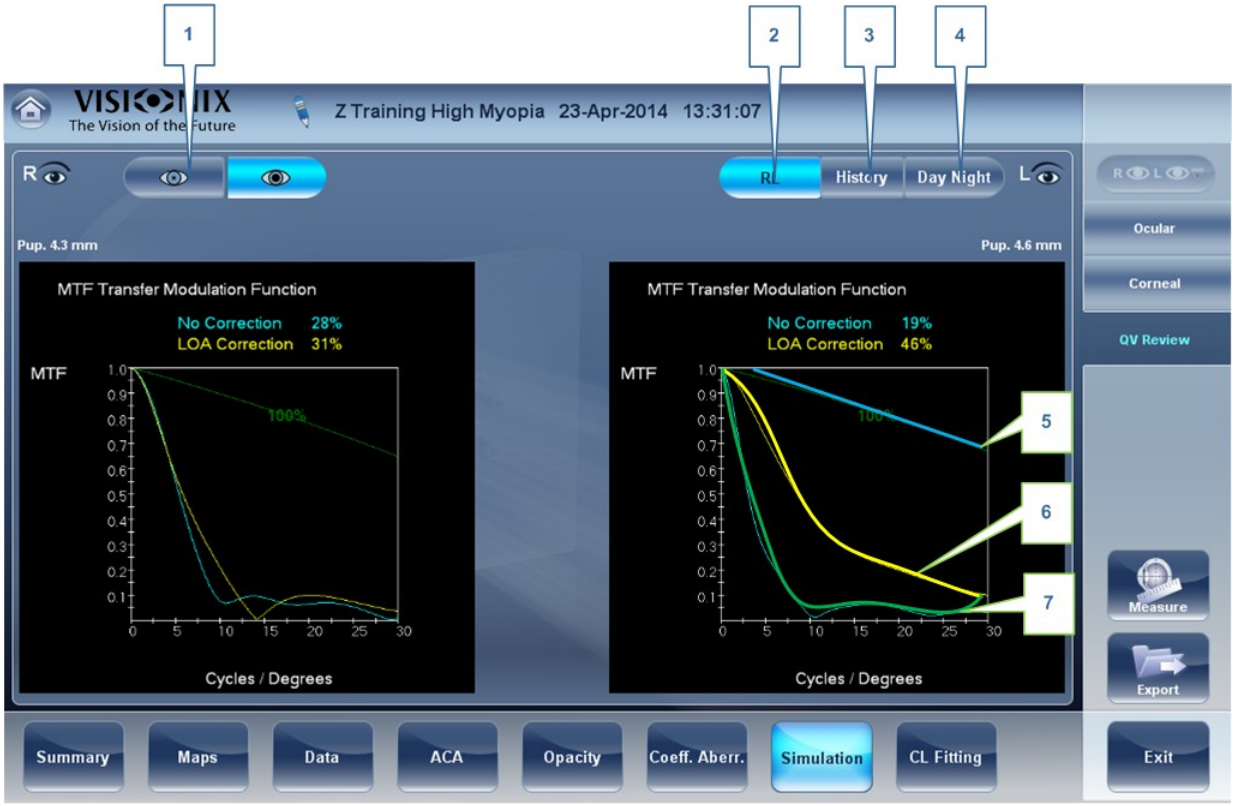


No	Description
1	**Photopic selector** Choose day display
2	**Mesopic** Choose night display
3	**VA selector/PSF** Allows you to toggle between the Visual acuity card display and the PSF Display
4	**MTF selector** Displays the MTF graph.
5	**Correction selector** Select HOA to access the same image with an HOA correction. Select LOA to access the same image with a LOA correction. It is possible to select no correction at all, or Full correction.
6	**RL** Display two cards, one for each eye. Both cards are displayed with the same display options
7	**HOA LOA** Displays two cards for each eye, one with HOA and one with LOA corrections.

No	Description
8	**Day Night** Display correction for day or night conditions for one eye.
9	**Visual Acuity image** Reflects the actual quality of patient's eyesight.
10	**PSF** Image of the corneal PSF (Point Spread Function)

QV

The QV (Quality of Vision) tab opens MTF (Modulation Transfer Function), displaying the LOA correction, displaying without any corrections, and displaying the 100% corrections function.



No	Description
1	**Pupil Selector** Select to display data for either mesopic or photopic pupils.
2	**RL** Display two cards, one for each eye. Both cards are displayed with the same display options

No	Description
3	**History** Displays map results from previous and current topographic maps according to selected date
4	**Photopic /Mesopic selector** Select **Day** to display maps for daytime light conditions or **Night** to display maps for nighttime light conditions.
5	**100%** This line displays the MTF function with no aberrations present.
6	**LOA corrections** The yellow line displays the MTF with all the LOA aberrations corrected, only HOA aberrations are present.
7	**No Correction** This displays the MTF with no corrections, both HOA and LOA aberrations are present.

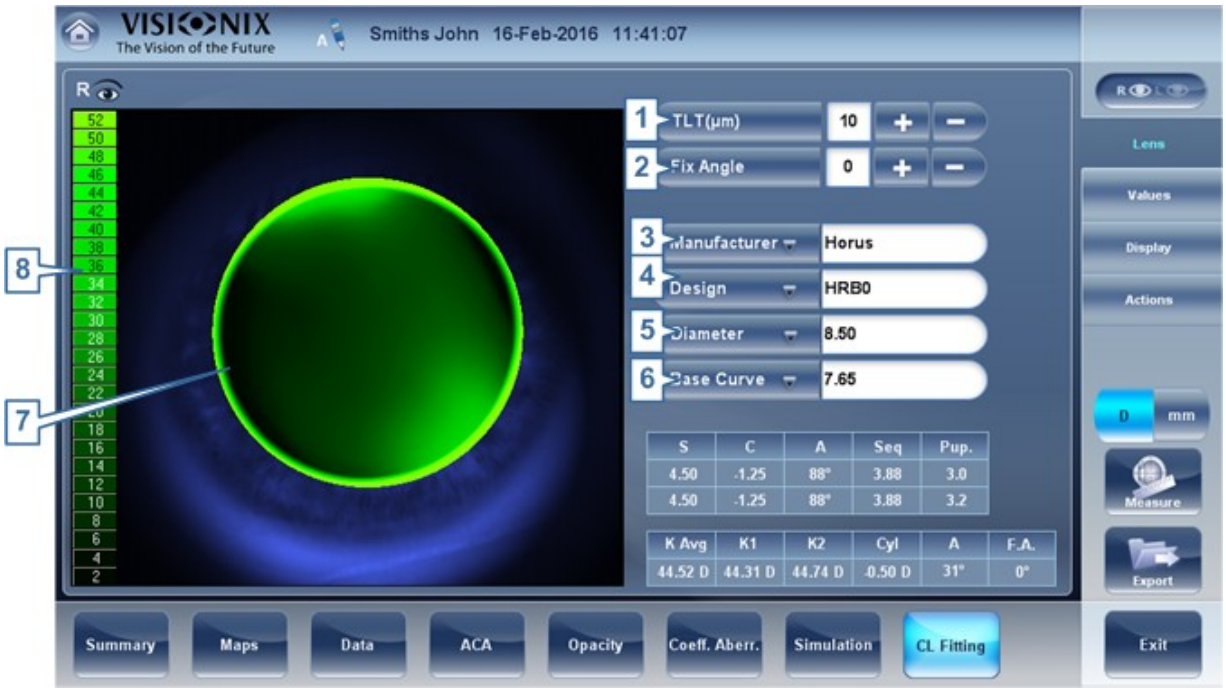
4. 11 CL Fitting

In this tab you can fit contact lens to a patient according to the test results.There are several contact lens types listed according to their manufacturer as well as their dimensions in the dropdown menu of the CL Fitting tab. Choose a specific lens type and the software calculates the approximate fitting for you.

Note: It is possible that the contact lens dimensions listed in the software have changed since this version was updated. To avoid miscalculations, we recommend checking all the dimensions directly from contact lens manufacturer before prescribing contact lenses.

Lens

Choose a lens manufacturer and then select the most suitable lens from the given selection.

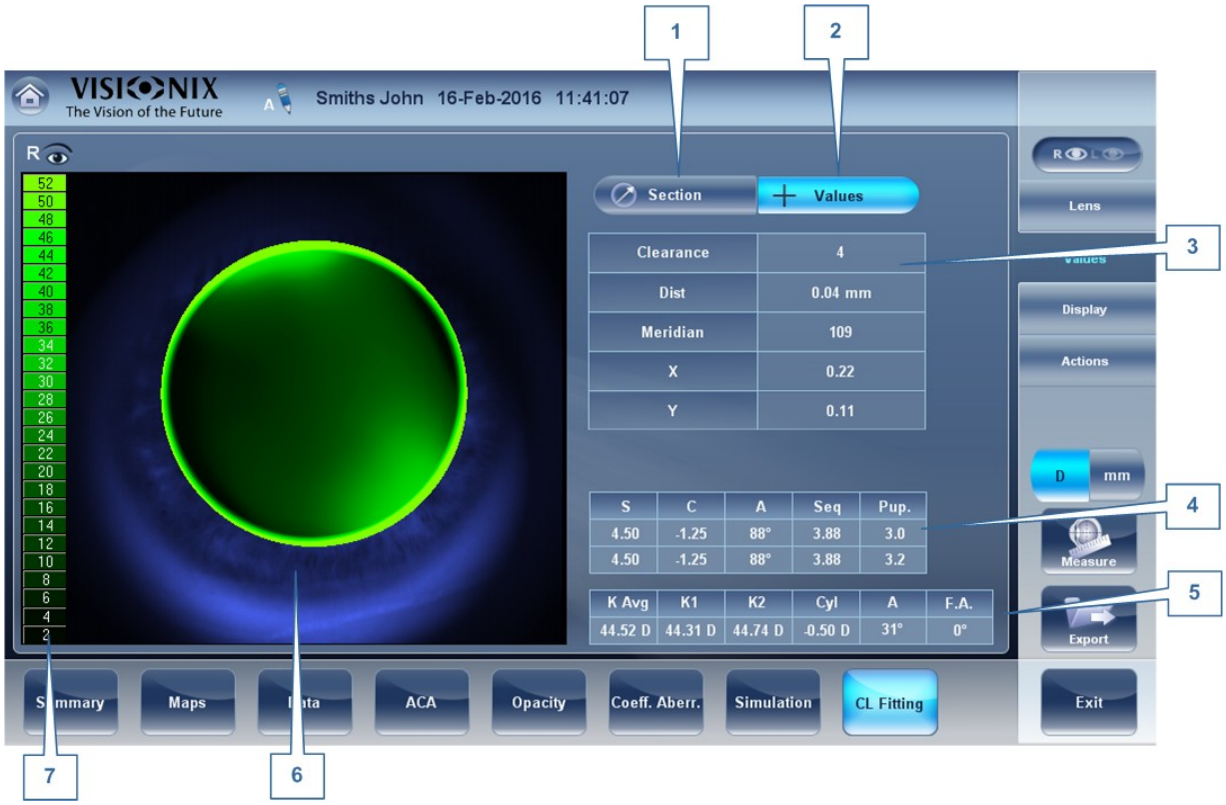


x

No	Description
1	**TLT** (Tear Layer Thickness) Permits setting the value by which the lens is lifted at its center with respect to the cornea. When the TLT is modified, a new model lens or a new manufacturer must be selected; the lenses that meet the new application criteria are displayed. The program “remembers” the variation in TLT setting and uses this criterion the next time the Contact Lenses environment is accessed.
2	**Fix Angle** The orientation of K1, allows selecting the direction of the flattest meridian of a toric lens. The default value is the direction of the flattest meridian of Sim K. You can modify this parameter to simulate a lens rotation. This parameter need to be set before you choose the manufacturer.
3	**Manufacturer** Select a contact lens manufacturer
4	**Design** Select the most suitable lens from the given selection.
5	**Diameter** Choose the diameter of the lens
6	**Base Curve** Choose the base curve of the lens

No	Description
7	**Display** Displays the contact lens image superimposed on the image of the eye
8	**Scale** The scale used for the image in the display

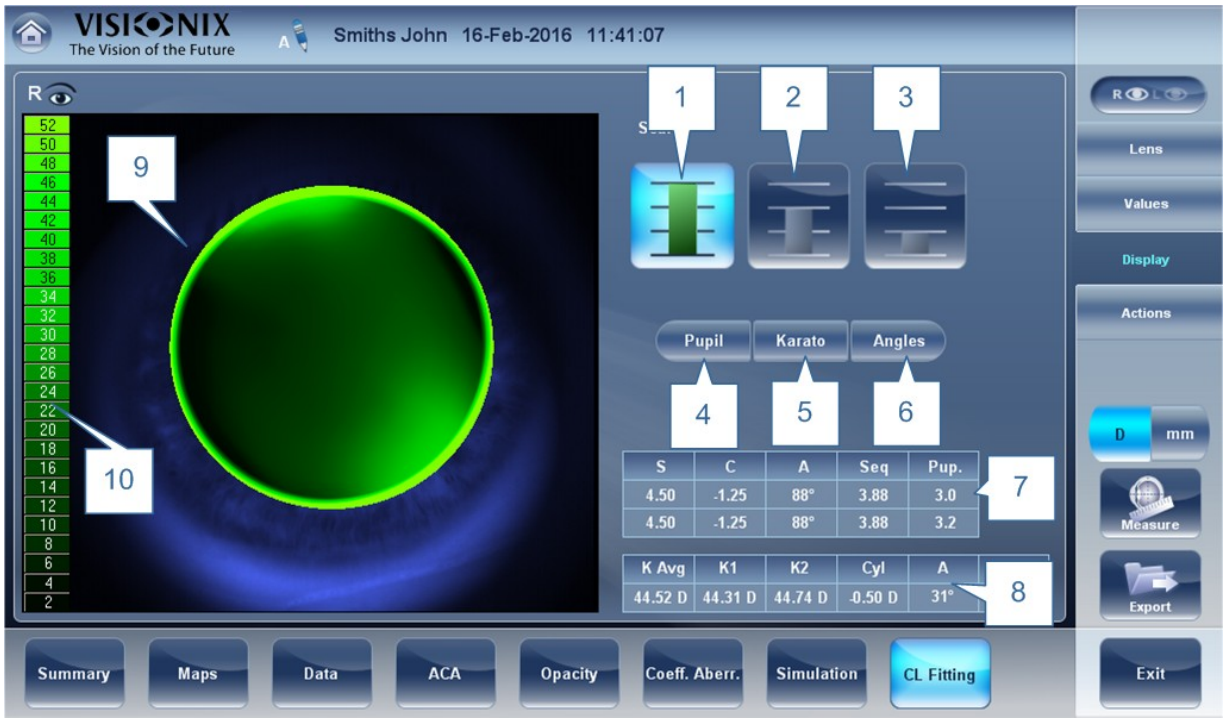
Values



No	Description
1	**Section Display** Displays a cross-section of the lens
2	**Values Display** Select the display of the values on the contact lens map
3	**Values Table** Displays the values of the point where the user clicks on the image
4	**Refraction values** Displays the refraction values for the patient

No	Description
5	**Keratometry values** Displays the keratometry values of the patient
6	**Display** Displays the contact lens image superimposed on the image of the eye
7	**Scale** The scale used for the image in the display

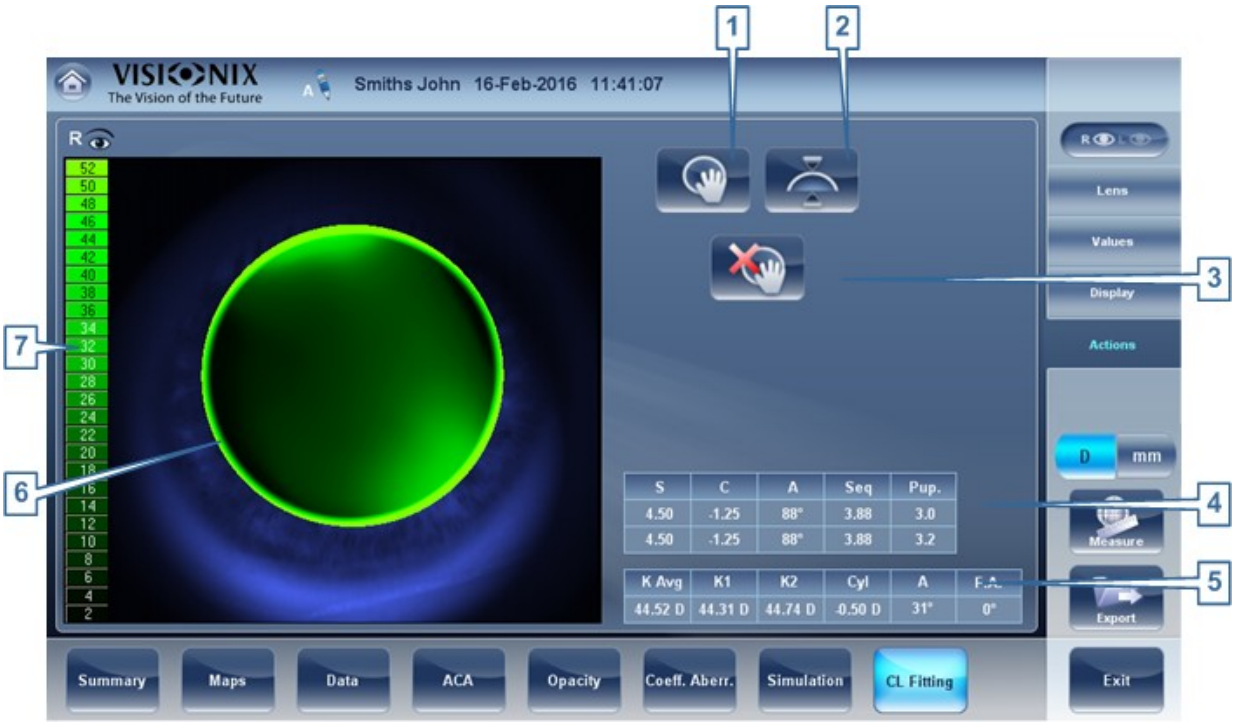
Display



No	Description
1	**1st Scale selection**
2	**2nd Scale selection**
3	**3rd Scale selection**
4	**Pupil** Displays the pupil on the map
5	**Kerato** Displays kerato values and cross on the map

6	**Angles** Displays angles on the map
7	**Refraction values** Displays the refraction values for the patient
8	**Keratometry values** Displays the keratometry values of the patient
9	**Display** Displays the contact lens image superimposed on the image of the eye
10	**Scale** The scale used for the image in the display

Actions



No	Description
1	**Move lens** Moves the lens on the image of the eye
2	**Tilt lens** Tilts the lens
3	**Reset move lens** Undos all changes

No	Description
4	**Refraction values** Displays the refraction values for the patient
5	**Keratometry values** Displays the keratometry values of the patient
6	**Display** Displays the contact lens image superimposed on the image of the eye
7	**Scale** The scale used for the image in the display

5. Managing Patients

You can manage the patient database - add patients, modify patient information, search for patients, and delete patient records - in the Patient screen[21].

---

5. 1 Adding New Patients

You can add a new patient to the database either before or after you perform exams on them. You can also add a number of related patients to the database quickly by duplicating the current patient record and modifying those parts that are different.

Adding a Patient Before Performing an Exam

To add a new patient before performing an exam:

- In the Home screen[20], select the **Add Patient** option

  - OR -

  In the Patient screen[21], select the **Add Patient** button.

  The **Patient Information** dialog box is displayed on top of the Patient screen[21].

Add Patient dialog box on top of the Patient screen

- Fill in the fields.
- Select one of the following:

No	Description
1	**Note** Select to add a Note in the patient file. This note can be accessed by clicking on  symbol in the results screen, in the measurement screen, or in the patient screen. Once information has been added, the note will appear like this  .
2	**Cancel** Cancels saving new patient.
3	**Save** Save the new patient in the database, close the dialog box, and display the patient screen.
4	**Save & New** Save the new patient in the database and leave the dialog box open. You can add an additional patient by modifying the fields as necessary and saving the additional patient's information. **Note:** This is convenient if you want to create a number of new patient records at one time. For example, you could use this option to create new patient records for all of the members of a family.

No	Description
5	**Save and Diag** Save the new patient in the database, close the Patient screen[21], and open the Measure screen[24]. This enables you to go directly from adding a new patient in the database to performing measurements on them.

Adding Related Patients

To add patients from the same family to the database:

- In the Patient Information[88] dialog box, fill in the fields for the first member of the family.
- Select **Save & New**. The patient is saved in the database, but their information is still displayed in the dialog box.
- Modify the information in the dialog box. Select **Save & New** if you want to add additional family members to the database, or either **Save** or **Save and Diag** if there are no additional family members to add. For additional information about these options, see Adding a Patient Before Performing an Exam[88].

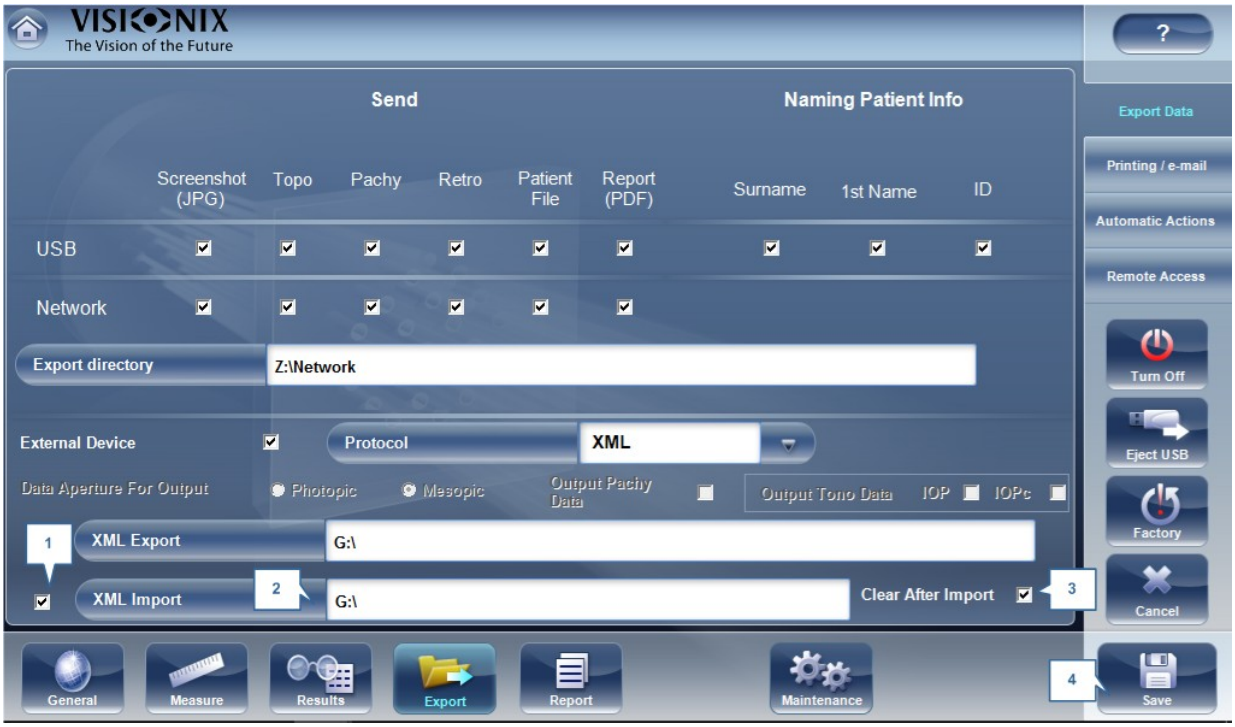
Adding a Patient from an XML database

The VX120+ is XML enabled, allowing data import from compatible XML databases. To import the data to the device, click on the  icon located at the top left of the Measurement screen. Once you have imported the data, continue with the measurement. The measurement will be saved with the name and details from the database.

If the icon is grayed out  it means that there is no data available for importing. Before beginning to import data, please make sure that your settings are configured properly in the Export Data Configuration[171].

Adding a Patient from the Waiting Room

The **Waiting Room** feature allows you to import patients from an external XML database. First you must make sure to have the following configurations in the Settings menu:



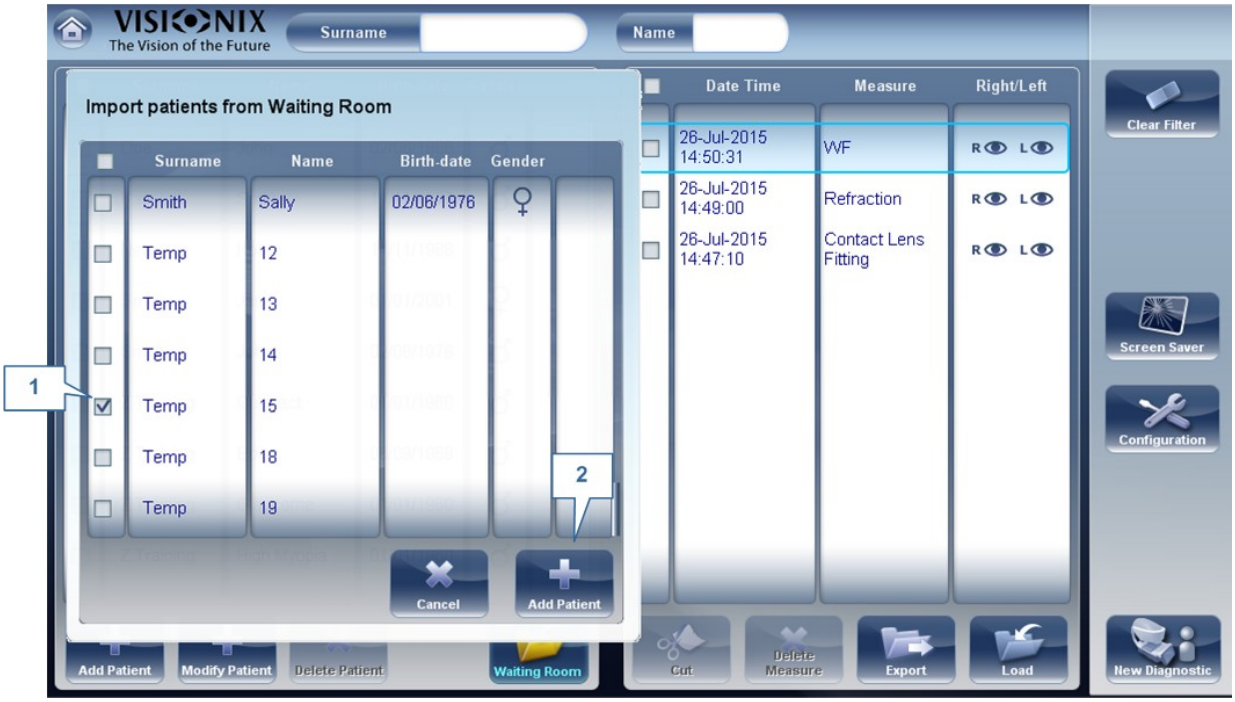
No	Description
1	**XML Import** Make sure that this checkbox is selected.
2	**Path** Click on this field to open a browser and select the path to import the XML data .
3	**Clear After Import** Select this option to erase all of the data in the Waiting Room pop-up once it has been imported. **This erases the data found on the path the user selects. Once it is erased, it cannot be reaccessed.**
4	**Save** Click **Save** to implement these changes.

Note: Only Patients' names and birth dates are imported from the XML database. Existing data will not be modified once the settings menu is defined, provided that there is data in the external XML database,

the 

button becomes selectable. Click on the 

button and the following pop-up appears:



No	Description
1	**Patient Checkboxes** Select the checkboxes of the Patient/s you wish to import.
2	**Add Patient** Click on the **Add Patient** button to import the patient/s. The patients are added to the database, and appear along with the rest of the patients in the Patients screen.

5. 2 Modifying a Patient's Information

To correct typos in the patient's name:

- In the Patient screen 21, in the patient list, select the patient.
- Below the patient list, select **Modify Patient**. The **Patient Information** dialog box opens.
- Modify the spelling errors.
- Select **Save**. The changes are saved, and the dialog box closes.

5. 3 Selecting Patients

There are two ways patients can be selected: individually, or as part of a group. Patients must be selected individually in order to see or modify their personal information and to view and manage their test results. Patients can be selected as a group in order to delete their records from the database.

To select a single patient in order to see the patient's information and test results:

- In the Patient screen 21, in the patient list, select the patient. The patient's entry in the list is highlighted with a blue border.

To select one or more patients in order to delete them:

- In the Patient screen 21, in the patient list, select the check box beside each patient you want to delete.

Patients selected individually and as a group

No	Description
1	Check box selected (to select patients as a group)
2	Patient selected (as an individual)

Please note, only patients with their checkboxes selected will be deleted.

5. 4 Searching for a Patient

You can search for a patient by filtering the display so that it only shows patients whose first and/or last names begin with a specified sequence of letters.

To filter the patient list:

- In the Patient screen 21, at the top of the screen, in the **Surname** field, enter one or more letters from the beginning of the surname you want to see. Only those entries whose surnames begin with the sequence of characters you entered are displayed in the list.
- In the **Name** field, enter one or more letters from the beginning of the given name you want to see. Only those entries whose given names begin with the sequence of characters you entered are displayed in the list.

Filtered patient list

No	Description
1	Filtered list
2	Surname filter
3	Name filter

5. 5 Deleting Patients

To delete patients from the patient list:

- In the Patient screen[21], select the check box beside each patient record you want to delete.
- At the bottom of the screen, select **Delete Patient**. You are prompted to confirm that you want to delete the selected patients.
- Select **Yes**. The patient records are deleted from the list.

6. Performing a Diagnostic

You can initiate a new diagnostic procedure by opening the Measure screen[24]. The **Measure** screen can be opened from any of the following screens:

- Home screen[20]
- Patient screen[21]
- Results screen[36]

Once the **Measure** screen is opened, you can prepare the patient and select the test options, as explained under Preparing to Run a Diagnostic[98], and then select **Go** to begin running the diagnostic tests.

Initiating a Diagnostic from the Home Screen

To initiate a new diagnostic procedure from the **Home** screen, you need only select the **Measure screen** option (#2 in the diagram above[20]).

Note that if you open the **Measure** screen directly from the **Home** screen, no patient is selected. The system automatically generates a patient name for the results, with "Temp" as the surname and a number as the first name (e.g., "Temp 1184"). Temporary records remain in the database until you delete them manually or they are deleted by the system during routine maintenance.

Initiating a Diagnostic from the Patient Screen

In the **Patient** screen, you can initiate a new diagnostic procedure in a number of ways:

- Select **New Diagnostic** with no patient record selected. The **Measure** screen opens with a temporary patient name ("Temp" + a number; see above).
- Select a patient record and then select **New Diagnostic**. The **Measure** screen opens for the selected patient. After you run the diagnostic procedure, the results are automatically saved in the selected patient's record.
- For a new patient, in the **Add Patient** dialog box, fill in the the patient's information, and then select **Save and Diag**. The patient record is added to the database, and the **Measure** screen opens for the new patient. After you run the diagnostic procedure, the results are automatically saved in the new patient's record.

Initiating a Diagnostic from the Results Screen

When the Results screen[36] is open, either immediately after a diagnostic procedure was completed, or when the results were loaded from the patient's record (see Loading Test Results)[137], select **Measure** to open the **Measure** screen for the patient. You can then run some or all of the tests over again or run additional tests.

6. 1 Preparing to Run a Diagnostic

After you open the Measure screen 24, there are a number of things you should do before you start running the diagnostics:

- Clean the headrest.
- Place a new sheet of protective paper over the chin rest, or clean the chin rest.
- In the **Measure** screen, in the list of available measures (#6 in the diagram above 25), select the diagnostic you want to perform. The tests needed to perform the selected diagnostic are highlighted in the list of tests (#18 in the diagram above 25).
- In the upper-right corner (#7 in the diagram above 25), select whether you want to perform the diagnostics on the right eye, the left eye, or both.
- Under **Position**, select **Adult** if the patient is an adult, or **Child** if the patient is a child. The unit's head and chin rest move to the default positions for the selected type of patient.
- If you are performing the WF test and/orthe Tonometer test, and you want to modify the parameters of these tests (the number of measures to take), in the **Measure** screen, select **Parameters**. In the dialog box that opens, modify the parameters as required, and then select **OK** to save the changes.
- Instruct the patient to sit down, place their chin on the chin rest, and lean their forehead on the headrest.
- If you need to fine-tune the position of the chin rest, select the **Chin Rest** up and down arrows (#12 in the diagram above 25) as necessary to move the chin rest up or down.
- If you need to adjust the position of the unit's head, select the up, down, right, and left arrows on the edge of the lens view (#3, #16, #17, and #10 in the diagram above 25) as necessary to move the head up, down, right, or left.
- Instruct the patient to look at the target (balloon). You should see their eye in the image of the lens view in the **Measure** screen.
- Align the patient's pupil with the center of the target (see Centering the Patient's Eye) 99.

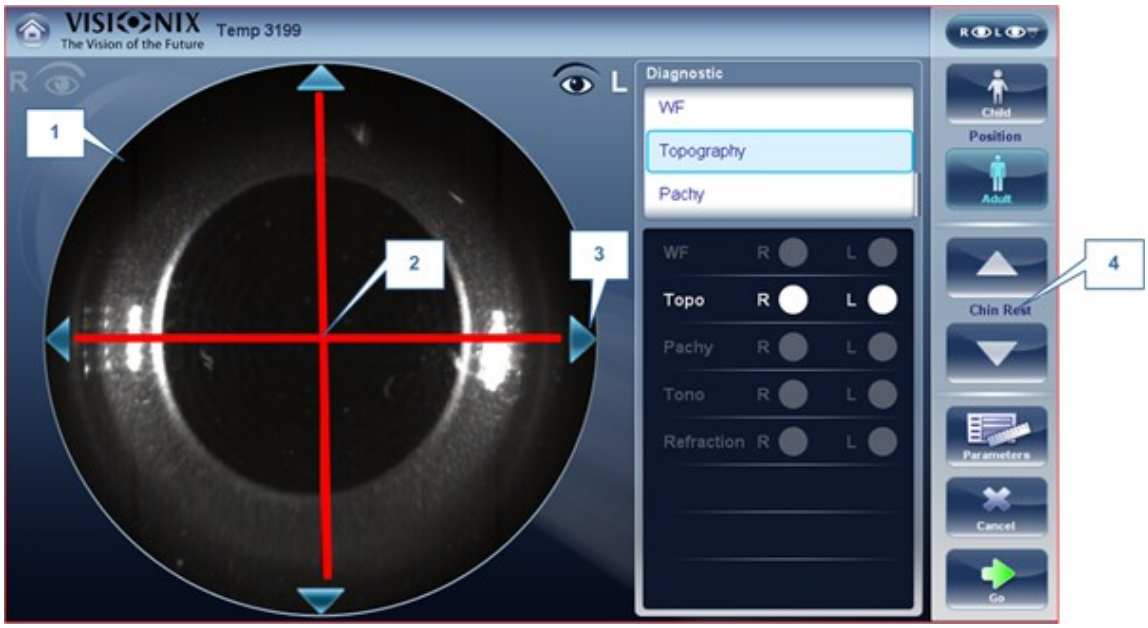
Once you have done all of these things, select **Go** to begin the diagnostic.

6. 2 Managing the Diagnostic Procedure

The diagnostic procedure is managed in the Measure screen 24. In this screen, you can select the diagnostic you want to perform, position the unit head and chin rest so that the patient's eye is centered in the camera view, modify default test settings, start the diagnostic procedure, and monitor its progress.

Centering the Patient's Eye

Before beginning a measurement, make sure that the patient's eye is centered in front of the Camera View:

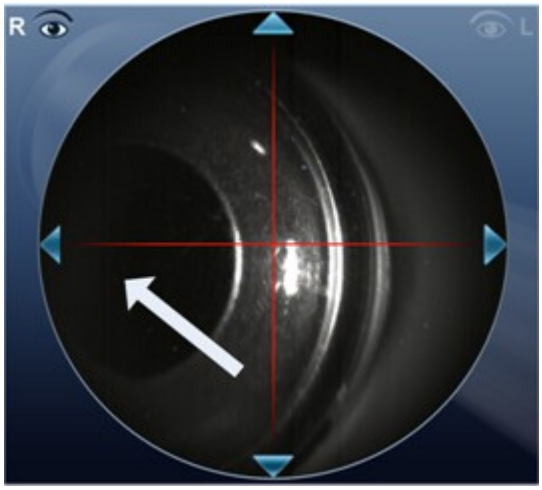


No	Description
1	**Camera View** Shows image of patient's eye as it appears in front of the camera.
2	**Direction arrows** Press on arrows to center patient's eye in the camera view
3	**Camera Cross** The patient's eye should be in the center of the camera cross

No	Description
4	**Chinrest Arrows** Use the arrows to raise or lower the chinrest

In the Measure screen[24], you can see the camera view (#1), make sure that the patient's eye is in the center of the cross (#2). To center the eye use the arrows located on the sides of the camera view (#3) to move up,down, left or right. If you don't see the patient's eye in the camera view, you may also need to raise or lower the chin rest by pressing the arrows located on the right side of the measurement screen (#4).

If the eye is visible in the camera view, but not quite centered:



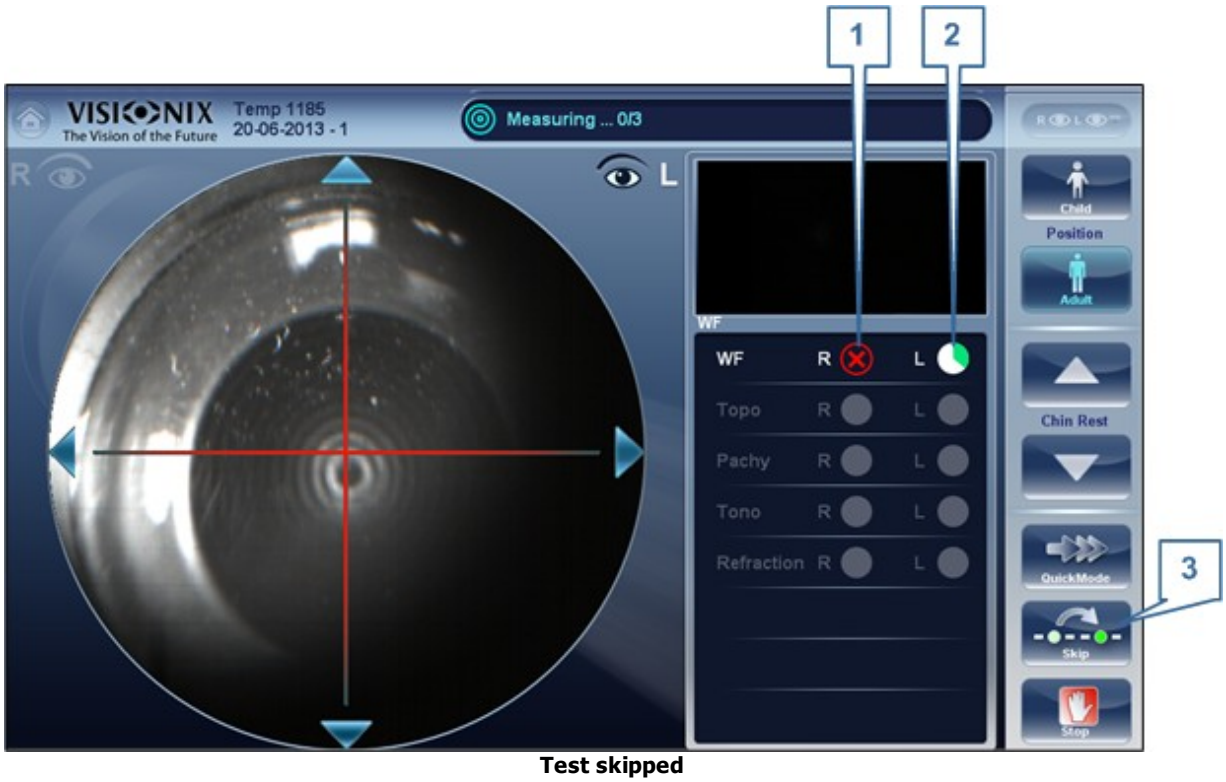
Tap on the center of pupil (from camera view- white arrow) , the device will automatically recenter itself at the pupil.

Note: To ensure maximum accuracy, if the examiner accidentally moves the head of the VX120+ so that the patient's eye is not centered in front of the camera view, the device will reposition itself so that it is re-centered in front of the eye.

Skipping a Measure during a Diagnostic

During a diagnostic, a **Skip** button is located at the lower-right side of the screen (#15 in the overview of the Measure screen[29] above). Select the button to skip the current test and begin the next test, if any more tests remain, or end the diagnostic and display the results in the Results screen[36].

If a test is skipped during a diagnostic procedure, the circle representing it is marked with a red X ( ).



Test skipped

No	Description
1	Test skipped
2	Next test underway
3	Skip button

Speeding the Measurement Process Up

Once you have started running a diagnostic, you can choose to make the measurement process faster if necessary.

To speed the Wave Front measurement process up:

- In the Measure screen 29, select **Quick Mode**. Note: this only works for the wave front measurement.

Stopping a Diagnostic Before It Is Finished

When a diagnostic is running, you can choose to stop it at any point.

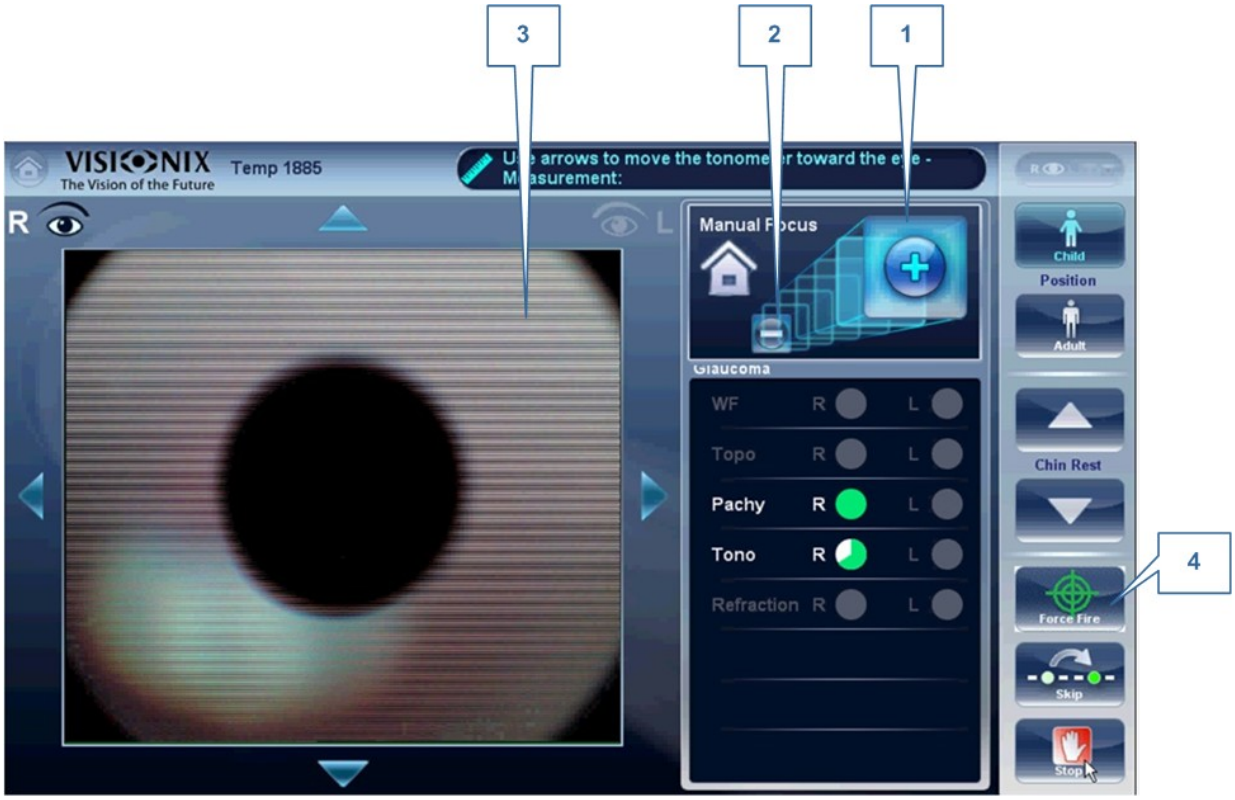
To stop the diagnostic before it is completed:

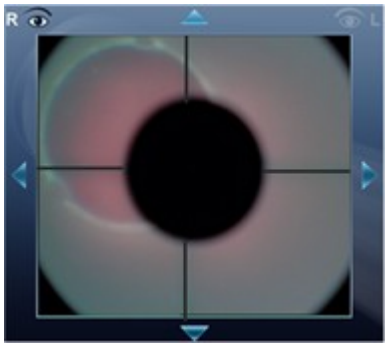
- In the Measurement screen 29, select **Stop**.

Glaucoma Evaluation

The VX120+ provides **Glaucoma** evaluation by measuring both intraocular pressure (IOP) via air-puff tonometry, as well as pachymeter measurement to evaluate anterior chamber depth and irideo angles. You can run the **Glaucoma** evaluation as a stand alone measurement, or select the **ALL** measurement, where it is automatically included.

After the unit completes the pachy measurement, it descends to the tonometer mode. It uses the centering and focusing acquired from the pachy measurement to center and focus the tonometer measurement.The following screen will appear.



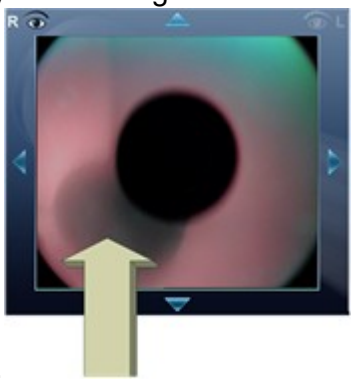
1	**Plus** Select the + button to move the focus closer to the eye
2	**Minus** Select the − button to move the focus further from the eye
3	**Focus of Corneal Cross**  Once focused, the cross appears like this.

1	**Plus** Select the + button to move the focus closer to the eye
4	**Force Fire** When you are satisfied with the focus, you can select **Force Fire** to take a measurement, or wait for the device to take a measurement.

Ask the patient to focus on the black dot. To automatically get the measurement the VX120+ needs to be centered and focused. The cross should be focused and clear behind the black large dot. By default, the tonometer will usually do the measurement automatically, but if it fails to autofocus after several tries, it allows you to make changes with the manual focus buttons.

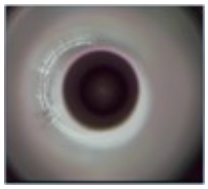
How to help the tonometer focus

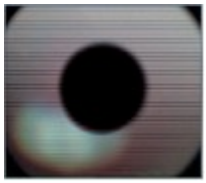
1. If one circle is around the other, click on the grey circle to align both circles. Once centered, the tono will fire the puff automatically.



2. If the grey circle is blurry. Press on the + button continuously until satisfied with the focus, and then the tono will fire the puff automatically.

Troubleshooting

If your Camera View looks like this	What to do
	The cross is not focused, the cross is not visible, only one white circle is visible. Press on the + continuously until the cross becomes focused. If the cross becomes blurry again, you passed the focus, press on the − button until it becomes clear again. When if focus, the tono will fire the puff automatically.

If your Camera View looks like this	What to do
	The circle is centered, the patient moved. Push the the house icon  to get back to your initial point and then continue to focus and center the cross and circle.
	The cross is not focused, press the  continuously until the cross becomes better focused. If the cross becomes blurry again, you passed the focus, press the  button until satisfied with the focus. The tono will fire automatically at the correct focus.

Focused and centered but no measurement taken?

If the circles and cross are focused and clear, but the device has not taken a measurement, you can force the device to take a measurement by pressing Force Fire 

.

If the device remains in one location, and does not seem to be autofocusing, check Tono Automation 160 to see if the device is set to **Semi** mode.

Semi Mode

By default, the device has an Auto focus which is fast and accurate. However, another focusing mode available is Semi Mode. In this mode, the tonometer will remain at the focal point found by the pachymeter, and correction of the focus must be done by the examiner. To adjust the focus, follow the steps listed above. To select the tonometer modes, go to Tono Automation 160. **Please note, in this mode, the device will remain at a set focus point, and all the focusing will be done by the examiner, no tono measurements will be taken if the device is not in focus**.

Demo Puff/Modify number of measurements

If you would like to demonstrate the tono puff for your patient, select the Parameters button and then press "Demo Puff". This popup menu also allows you to modify the number of times each eye is measured by the tonometer.

Manual Focus

Manual Focus will automatically be activated if the device is unable to get a good focus, enabling the examiner to correct the focus manually using the + and − buttons. It may be activated in the following modes:

- **Topo Measurement**
- **Pachy**
- **Tono**

How do you know if you are in Manual Focus?

There is an indicator when the device was is not able to autofocus. The **Topo** measurement and the **Pachy** and **Tono** measurements have an indicator:

Pachy Manual Focus Indicator :

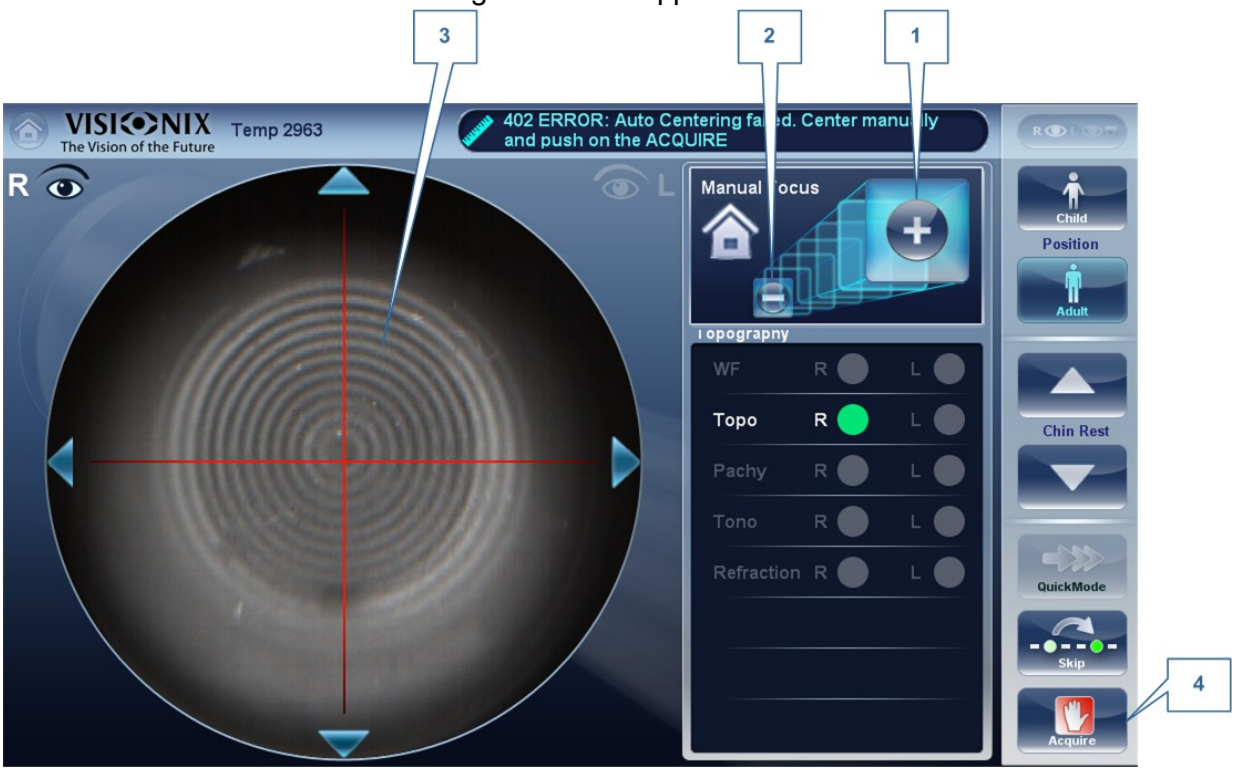
During the pachy manual focus, you will see two indicators, the image above (with the house icon), as well as the warning message, "Step 1: Center and Focus the rings and Select Acquire".

Tono Manual Focus

For instructions on improving the tono focus, go to Glaucoma Evaluation 102.

Topo Manual Focus

During the **Topo** measurement, if device is unable to focus automatically, it will switch to **Manual Focus**.The following screen will appear:



1	**Minus** Select the button to move the focus further from the eye.
2	**Plus** Select the button to move the focus closer to eye.
3	**Corneal rings** These rings should be as sharp and as dark as possible.
4	**Acquire** Press this button once you are satisfied with the focus of the corneal rings.

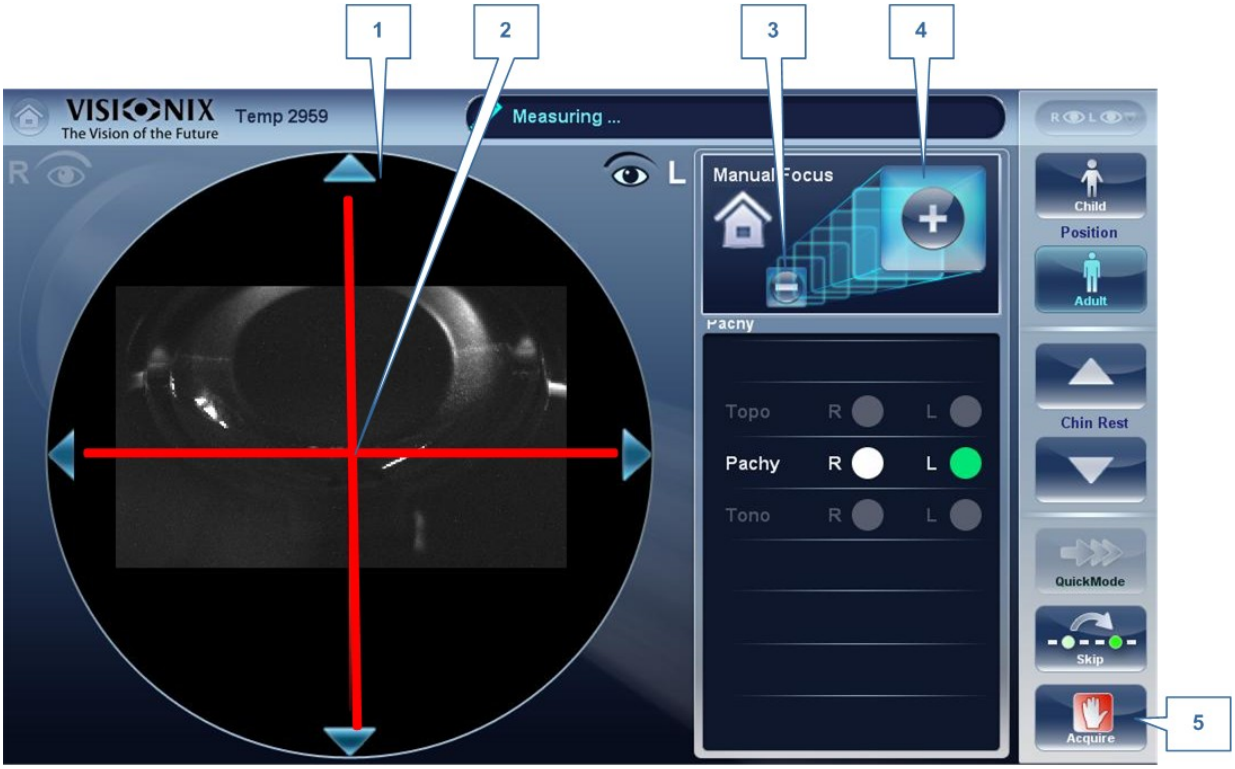
Note: this is also the first step to Pachy Manual Focus

Pachy Manual Focus

Immediately before the device switches to Pachy Manual Focus, a message appears, "Step 1: Center and Focus the rings and select ACQUIRE". Select "OK", and complete the steps listed in Topo Manual Focus 106 106.

Once that step is completed, you will see a message, "Step 2: Use the focus buttons to align the cornea Apex and then select Acquire." After selecting, "OK", you will see the following screen:

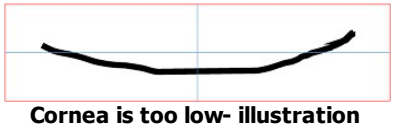
e.



Pachy Manual Mode (Step 2)

1	**Corneal Apex** The corneal apex should be aligned in the center of the cross horizontally, vertically it should be slightly above the red cross (as seen in the image above).
2	**Cross** The Cross is used to center the corneal apex vertically and horizontally.
3	**Minus Button** Select the − button to lower the corneal apex
4	**Plus Button** Select the + button to move the raise the corneal apex
5	**Acquire** Completes Measurement

Sometimes, the cornea is not centered above the cross (#2 above) accurately, and may appear below it or above it. For example, if it appears like this :

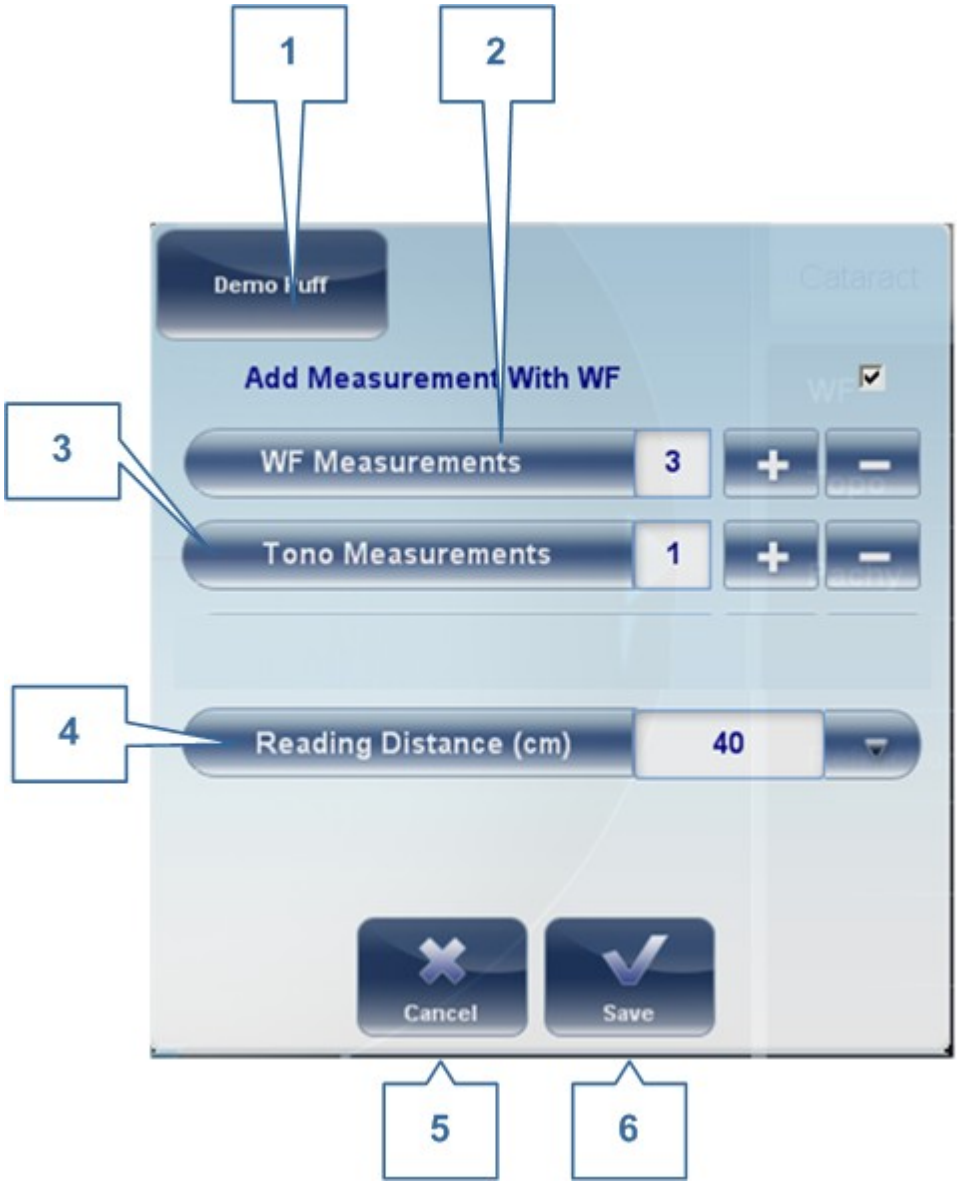
Image of the Camera View	How to Fix it
 **Cornea is too low- illustration**	Use the + and − buttons to lower or raise it until it is centered.
 **Cornea is centered- illustration**	Cornea is centered properly, you can continue with measurement, press **Acquire**.
 **Centered Corneal Image**	This is a properly centered corneal image.

After completing this step, select, **Acquire.**

Near Vision Testing

To add Near Vision Testing to the Wavefront Diagnostic:

In the Measurement screen, select the Parameters button:



1	**Demo Puff** Select to demonstrate
2	**Wave Front** The number of Wave front measurements to be selected.
3	**Tono Measurements** The number of tono measurements to be measured
4	**Reading Distance** Changes distance of Near Vision testing, can be adjusted from 30-60cm

5	**Cancel** Cancels the near vision test
6	**Save** Saves your preferences

Tear Film Analysis

The VX120+ provides three tools for the evaluation of dry-eye symptoms:

- **Non-invasive tear break-up time (NITBUT) measurement:** This procedure records and maps the tear break-up process from the time the patient blinks until either the tear-film has completely broken up or the patient has blinked again. The module uses Placido rings to track the tear-break-up process by identifying when the reflections of the projected rings on the cornea break as a result of changes in the tear layer.

  The results are presented for each eye in a breakage map that shows the times at which tear break-up occurred on each ring; a graph that shows the times, stages, and average breakage time; and a recorded video of the eye during the process, which the practitioner can play back after the procedure, either at its original speed or frame-by-frame.

- **Observation and photographing of the eye:** This procedure has two parts. The first part takes place during the final stage of the NITBUT measurement, when the practitioner has the opportunity to view the patient's eyes through the camera lens and take up to six pictures of each of their eyes for further analysis. The second part takes place after the NITBUT measurement is completed; it is performed manually by the practitioner, who examines the pictures of the patient's eyes in order to judge the extent to which each eye displays indications of certain types of pathologies that are associated with dry-eye symptoms. During this process, the practitioner also has the opportunity to use a built-in measuring tool to measure any elements of the images whose sizes may be significant.
- **Tear meniscus measurement:** This procedure also has two parts. The first part takes place at the end of the NITBUT measurement, when a white LED light is directed towards each eye, causing a reflection on the tear meniscus. Three photographs of each eye, showing the reflections on the meniscus, are taken at this time. The second part takes place after the NITBUT measurement is completed, and is performed manually by the practitioner, who views the pictures of the tear meniscus and uses the built-in measuring tool to measure the size of the reflection.

- Running a Tear Film Analysis 111
- NITBUT Tab 115
- Eye Observation Tab 116
- Tear Meniscus Tab 118
- Detail Windows 120

Running a Tear Film Analysis

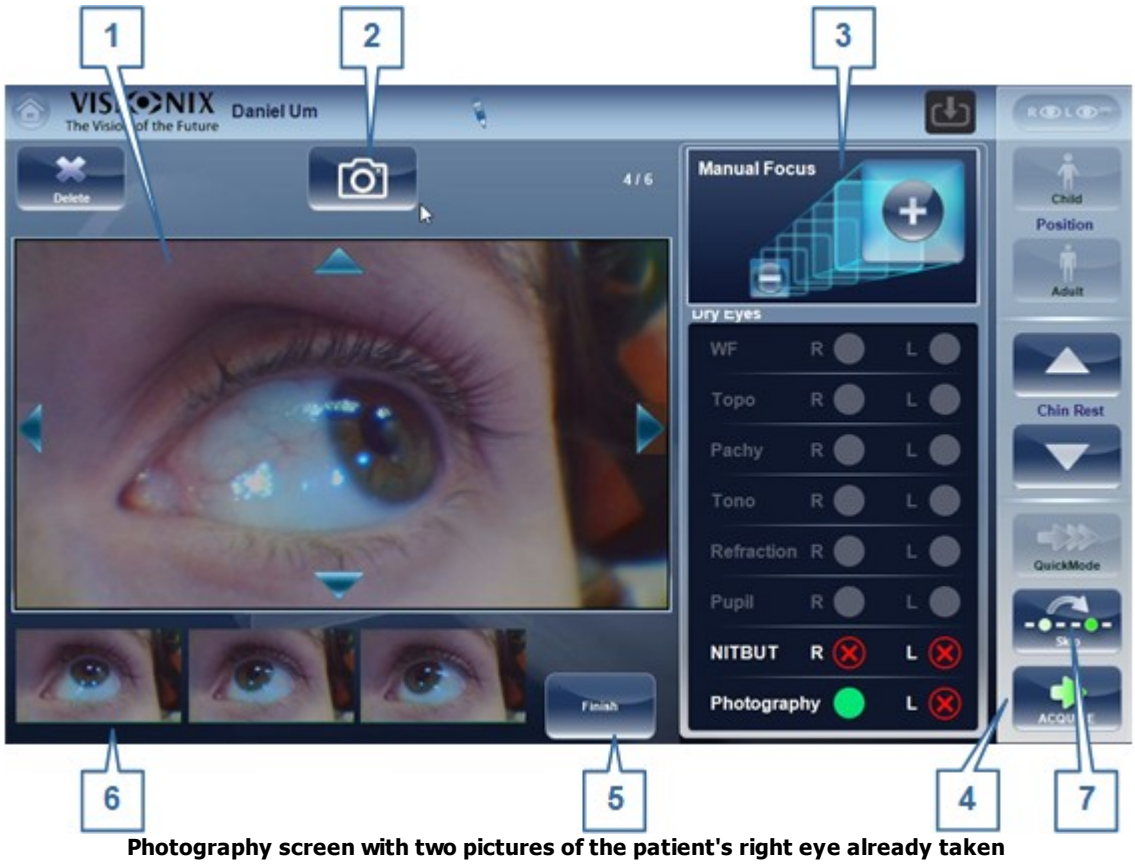
The tear-film analysis is run from the Measure screen[24]. It must be run as a stand alone measurement.

To run a tear-film analysis:

1. In the Measure screen[24], under **Diagnostic**, select **Dry Eyes**.
2. Select **Go**.
3. Instruct the patient to blink twice and then to try not to blink for as long as possible. The system automatically initiates the diagnostic when it detects the patient's blink.

   Note: If it does not detect a blink after 20 seconds, the system initiates the diagnostic in any case.

   At the end of the NITBUT testing, the **Photography** screen opens and shows the current camera view (#1 in the illustration below).



Photography screen with two pictures of the patient's right eye already taken

4. You can take up to six pictures of each eye from this screen. (If you take more than six, only the last six are saved.)

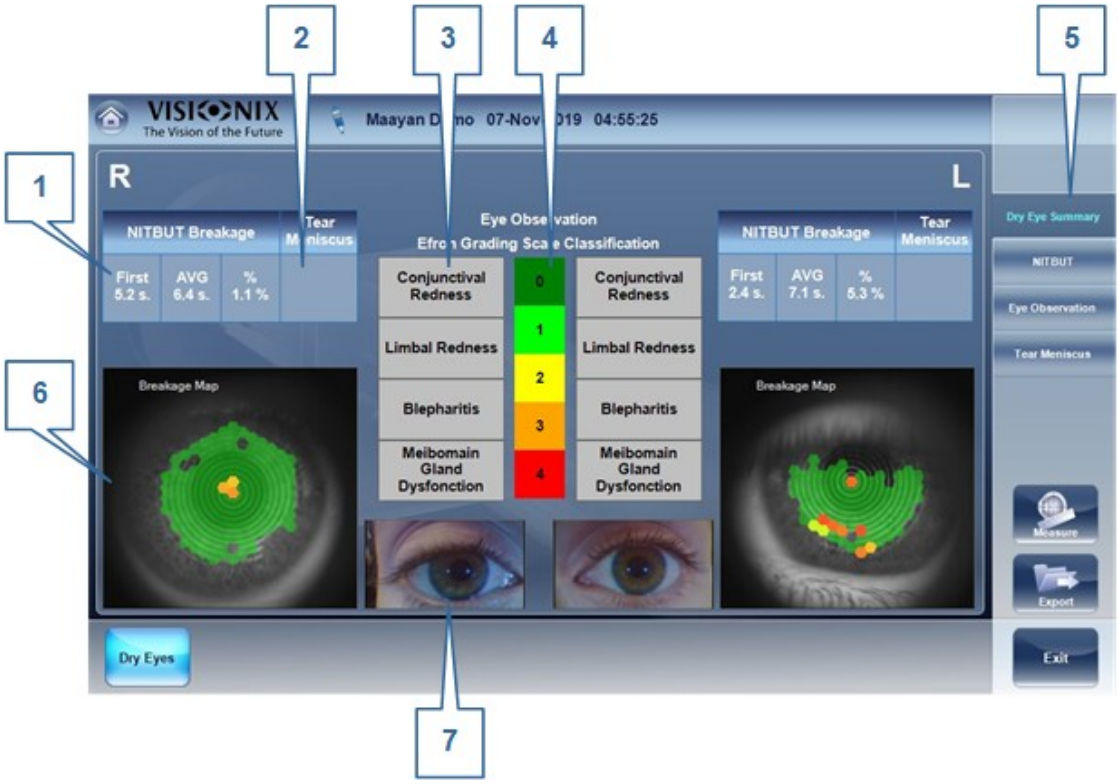
   To capture the image that currently appears in the camera view, tap the  button (#2 in the illustration above) or the **Acquire** button (#4). The pictures you take are shown below the camera view (#6).

   Note: Use the arrows that appear at the edges of the camera view, and the **-** and **+** buttons in the Manual Focus area (#3), to adjust the image before you capture it. You can, of course, also ask the patient to look in a particular direction, or close their eyes, as necessary. For additional information about this screen, see Taking Pictures of the

Patient's Eyes[123].

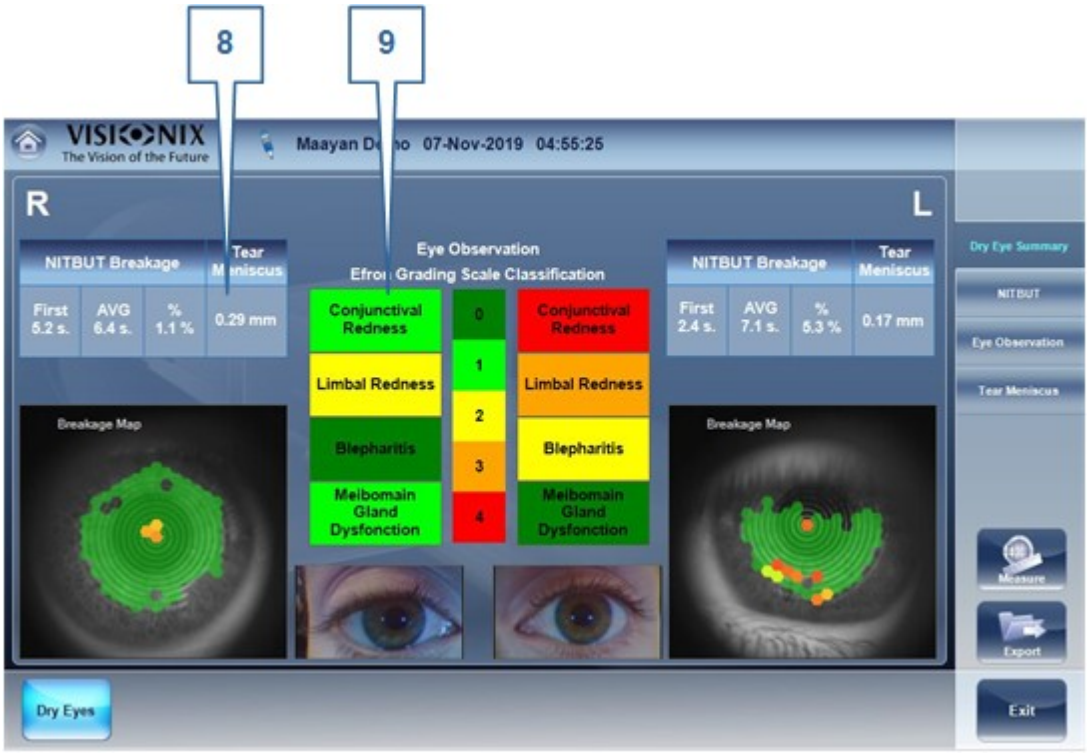
5. When you have finished taking pictures of the left eye, select **Finish** (#5). The head of the machine moves to the right eye.
6. Take up to six pictures of the right eye. The pictures you take are shown below the camera view.
7. When you have finished taking pictures of the right eye, select **Finish**. The **Dry Eye Summary** screen opens and displays the results of the NITBUT diagnostic. If you took pictures of the patient's eyes, one of each also appear in the screen (#7 in the illustration below).

Note: If the NITBUT fails, an **Incomplete Measurement** pop-up window is displayed. You have two options: Either click **Measure** to retry or **Skip** (#7) above.



Dry Eye Summary screen showing results of NITBUT test and pictures of each eye

8. Open the Eye Observation Tab[116] and enter evaluations of the severity of dry-eye symptoms in each eye. The evaluations you enter are added to the **Dry Eye Summary** screen (#9 below).
9. Open the Tear Meniscus Tab[118] and measure the tear meniscuses of each eye. The measurements you make are added to the **Dry Eye Summary** screen (#8).



Dry Eye Summary screen with data from the Eye Observation evaluation and Tear Meniscus measurements included

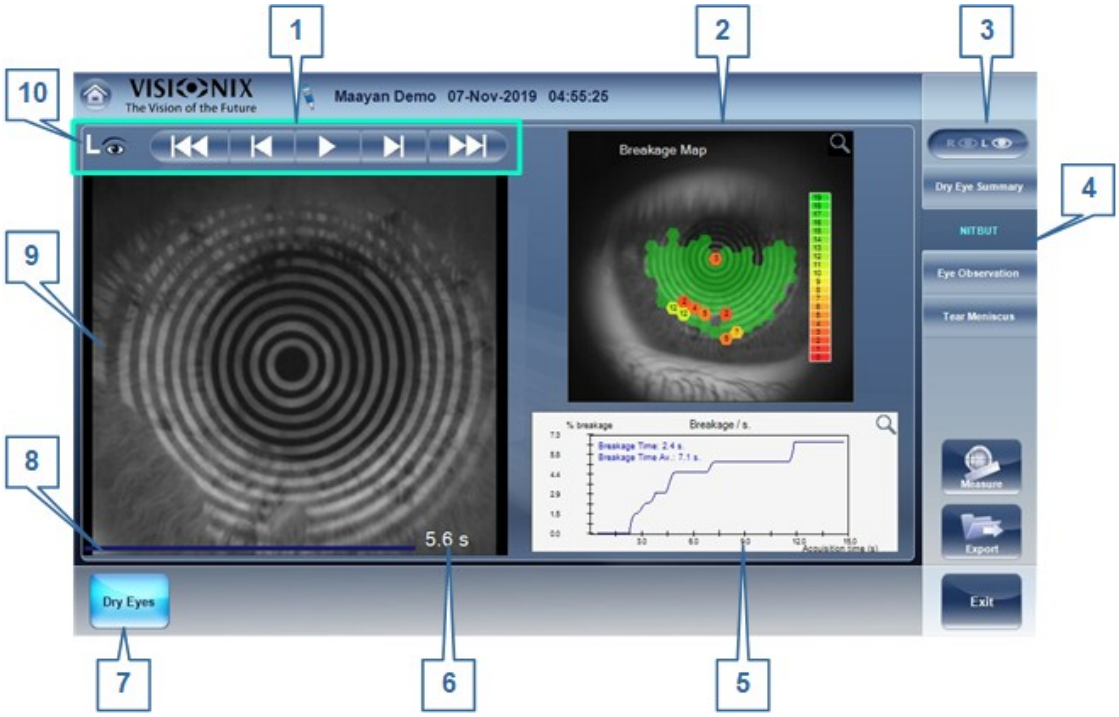
The **Dry Eye Summary** screen contains the following elements (numbers refer to the two illustrations above):

No	Description
1	**NITBUT results** **First:** The time after the patient's blink at which tear break-up began **AVG**: The middle between first break and end of measurement **%:** The percentage of the tear film that broke up at the **AVG** time. For example: For a 10 second measurement, if the **First** break-up was at 3 seconds, then **AVG** is (3 + 10)/2 = 6.5 seconds and **%** is the percentage of break-up at **AVG** time (6.5 seconds).
2	**Tear Meniscus height** Location in which the tear-meniscus height will be shown once it is measured (see #8 below)
3	**Degree of pathology** Location in which the practitioner's evaluations of the levels of pathology in four areas will be shown once the practitioner selects them (see #9 below). When they are selected, each area will be color-coded to indicate the degree of pathology (see #4 below). Since they have not yet been selected, all four areas are shown with gray backgrounds.

No	Description
4	**Efron Scale** Key showing the degree of pathology represented by each color and number, with green (0) representing no pathology, and red (4) representing severe pathology (see #3 above)
5	**Tab selector** Tap a tab to open it.
6	**Breakage Map** Map showing the pattern of tear beak-up over time in the eye. The green background is the detected area. Tap the map to open the NITBUT tab[115] to see more detailed test results.
7	**Photo of patient's eye** The favorite of the pictures taken by the practitioner during the test Tap the picture to open the Eye Observation tab[116], in which you can see all of the pictures, select a different favorite, and grade the degree of pathology.
8	**Tear Meniscus height** Tear-meniscus height as it was measured by the practitioner (in the Tear Meniscus tab)[118]
9	**Degree of pathology** Practitioner's evaluations of the levels of pathology in four areas; each area is color-coded to indicate the degree of pathology (see #4 above).

NITBUT Tab

The NITBUT tab gives you access to all of the results of the NITBUT test, including the videos of the eyes during the test. The tab presents data for one eye at a time.



NITBUT tab

No	Description
1	**Video playback controls** See Video Playback Controls[116] .
2	**Breakage Map** Map showing the pattern of tear beak-up over time in the eye
3	**Eye selector** Indicates which eye is currently displayed Tap to switch eyes.
4	**NITBUT tab selected** The currently selected tab of the Tear Film Analysis feature
5	**Breakage Graph** Graph showing the pattern of tear beak-up over time in the eye, as well as the time at which breakup began and the median time of the breakup process (halfway between the beginning of the breakup and the end)
6	**Playback position** Shows the time from the beginning of the video to the current video frame (7.6 seconds in the illustration above)
7	**Dry Eyes button** Tap to return to the Dry Eye Summary screen[112] .

No	Description
8	**Video progress bar** Bar indicating the current position of playback of the video, out of the total length of the video
9	**Video of the NITBUT process** Playback window for video of the NITBUT process
10	**Eye indicator** Indicates which eye is currently displayed

Video Playback Controls

The following video playback controls are available in the NITBUT tab[115]:

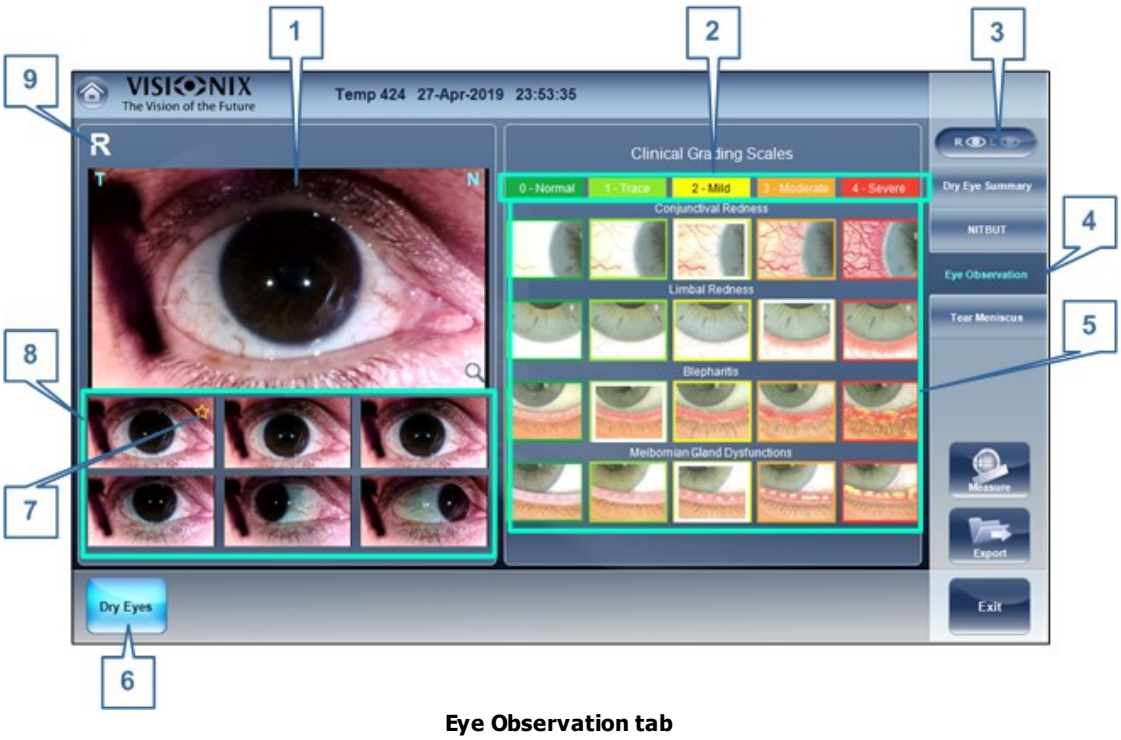
Control	Action during playback	Action when playback is not in progress
	Play in reverse from the current position, and stop at the beginning of the video. **Note:** Additional taps pause and resume playback in reverse.	Resume playback from the current position, at normal speed, in reverse.
	Pause playback and go back one frame.	Go back one frame from the current position.
	Pause playback.	Play the video from the beginning continuously. (When playback reaches the end of the video, it starts over again from the beginning.)
	Pause playback and go forward one frame.	Go forward one frame from the current position.
	Play from the current position, and stop at the end of the video. **Note:** Additional taps pause and resume playback.	Resume playback from the current position, at normal speed.

Eye Observation Tab

The Eye Observation tab enables you to study the pictures you took during the last stage of the NITBUT measurement (see Running a Tear Film Analysis[111]), and judge the extent to which the patient's eyes display signs of dry-eye problems in the conjunctiva, corneal limbus, eyelid, and Meibomian gland. For each of these areas, you can grade the degree of pathology, from normal to severe. Your gradings are attached to the NITBUT results, saved with them in the database, and displayed in the Dry Eye Summary screen[112].

Note:

Your gradings are only saved with the NITBUT results if they are selected before you have exited from the results the first time. If you open the results from the database, you can still open the Eye Observation tab and select gradings, and they are displayed in the Dry Eye Summary screen[112] while it is open, but they are not saved in the database when you exit.



Eye Observation tab

No	Description
1	**Currently selected photo of patient's eye** The picture that is currently selected (from the pictures displayed in #8 below it) Tap the picture to open it in a Detail window[120], in which you can zoom in and measure elements of the image, and select it as the favorite.
2	**Grading key** Key to the grading scale: the levels' numbers, names, and color-codings
3	**Eye selector** Indicates which eye is currently displayed Tap to switch eyes.
4	**Eye Observation tab selected** The currently selected tab of the Tear Film Analysis feature
5	**Clinical-grading pane** For each of the four areas of the eye, compare the area in the patient's eye with the illustration, and select the illustration that most closely resembles that area in the patient's eye.
6	**Dry Eyes button** Tap to return to the Dry Eye Summary screen[112].

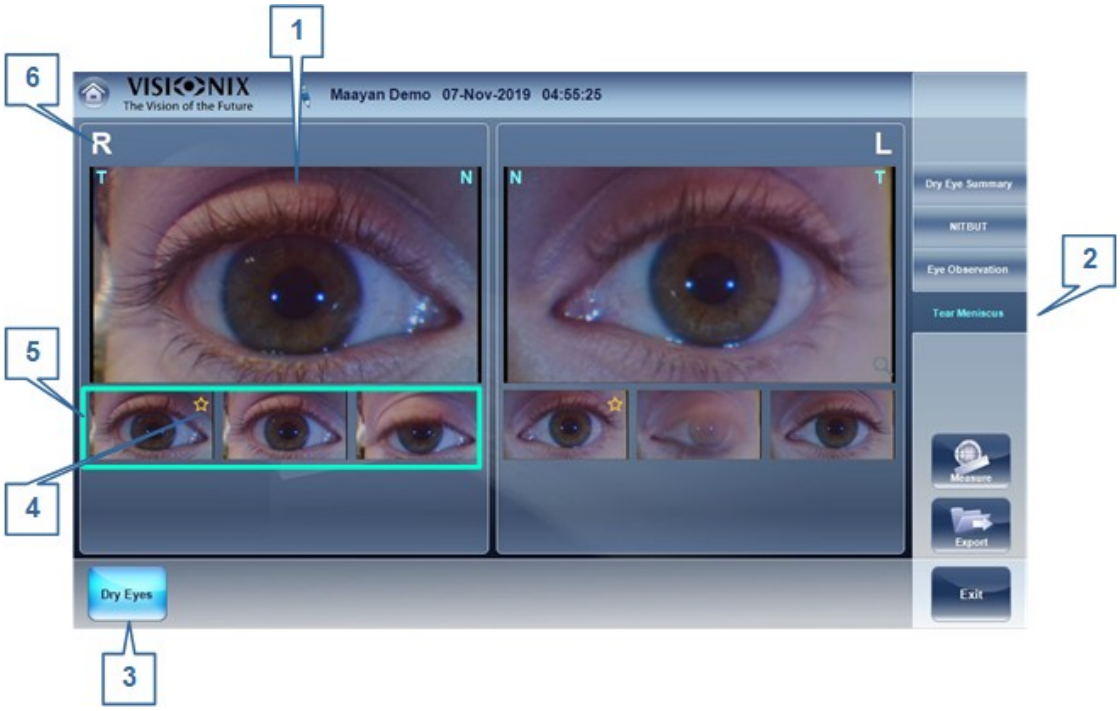
No	Description
7	**Favorite** Star identifying the favorite of the pictures of each eye; this picture appears in the Dry Eye Summary screen[112], below the gradings of the eye (see Running a Tear Film Analysis[111], #7) To select a different picture as the favorite for the eye: • Tap it to select it. It appears as the currently selected picture (#1). • Tap the larger image (#1). A Detail window[120] opens. • Select the **Favorite** button. • Select **Close**. The window closes, and the picture you selected becomes the favorite.
8	**All pictures** Displays all of the pictures of the eye that were saved during the NITBUT measurement The currently selected picture also appears enlarged above the pictures (#1). To select a different picture, tap it.
9	**Eye indicator** Indicates which eye is currently displayed

Tear Meniscus Tab

The Tear Meniscus tab enables you to study the pictures you took during the last stage of the NITBUT measurement (see Running a Tear Film Analysis[111]), and measure the height of the tear meniscus that appears as a white reflection on the lower lid of the eye. Your measurements are attached to the NITBUT results, saved with them in the database, and displayed in the Dry Eye Summary screen[112].

Note:

Your measurement results are only saved with the NITBUT results if they are performed before you have exited from the results the first time. If you open the results from the database, you can still open the Tear Meniscus tab and measure the tear meniscuses, and the measurements are displayed in the Dry Eye Summary screen[112] while it is open, but they are not saved in the database when you exit.



Tear Meniscus tab

No	Description
1	**Currently selected photo of patient's eye** The picture that is currently selected (from the pictures displayed in #5 below it) Tap the picture to open it in a Detail window[120], in which you can zoom in, measure the tear meniscus in the image, and select the image as the favorite.
2	**Tear Meniscus tab selected** The currently selected tab of the Tear Film Analysis feature
3	**Dry Eyes button** Tap to return to the Dry Eye Summary screen[112].
4	**Favorite** Star identifying the favorite of the pictures of each eye; this picture appears in the **Dry Eye Summary** screen, below the gradings of the eye (see Running a Tear Film Analysis[111], #7) To select a different picture as the favorite for the eye: • Tap it to select it. It appears as the currently selected picture (#1). • Tap the larger image (#1). A Detail window[120] opens. • Select the **Favorite** button. • Select **Close**. The window closes, and the picture you selected becomes the favorite.
5	**All pictures** Displays all of the pictures of the eye that were saved during the NITBUT measurement The currently selected picture also appears enlarged above the pictures (#1). To select a different picture, tap it.

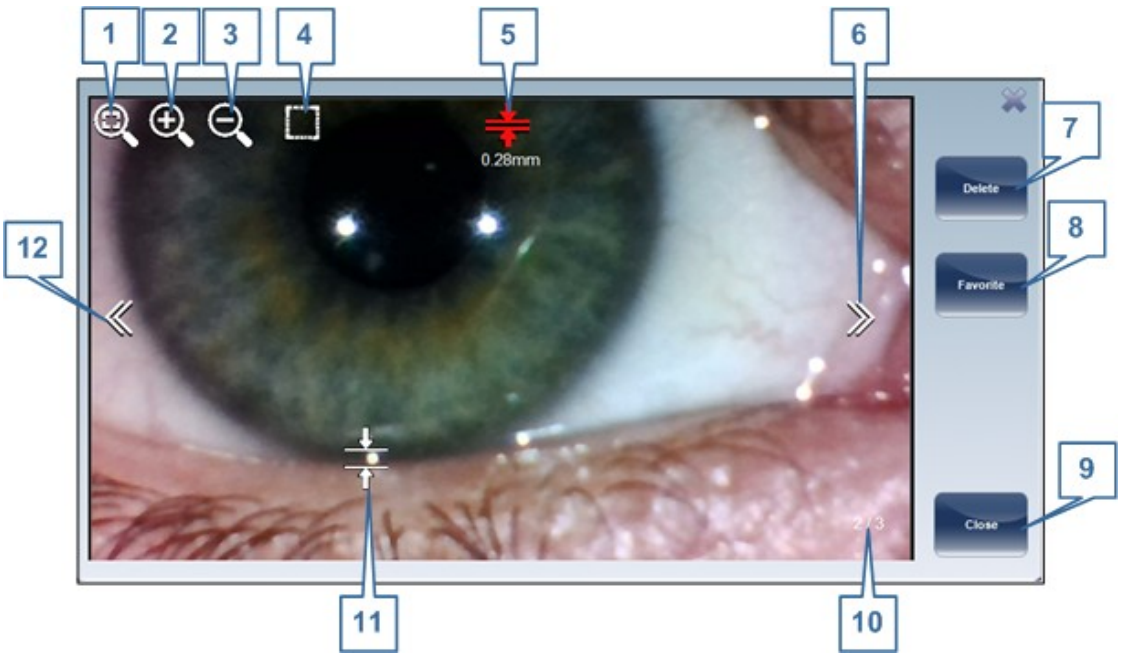
No	Description
6	**Eye indicator** Indicates which eye is displayed on this side of the screen

Detail Windows

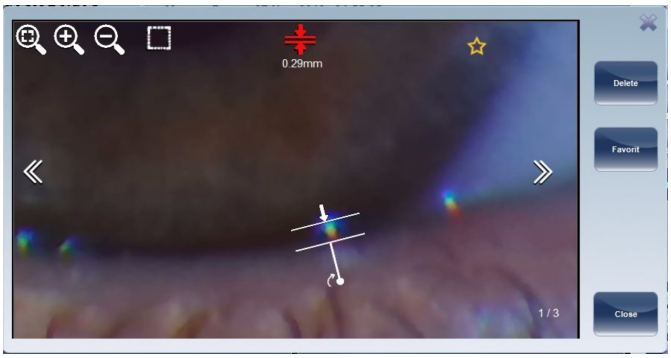
From both the Eye Observation tab[116] and the Tear Meniscus tab[118] you can open a picture in a Detail window. In this window, you can zoom in on pictures you took during the last stage of the NITBUT measurement (see Running a Tear Film Analysis[111]), measure elements that appear in the images, and select a favorite picture from the available pictures. If you are measuring the tear meniscus, your measurements are attached to the NITBUT results, saved with them in the database, and displayed in the **Dry Eye Summary** screen. Other measurements you make are not saved in the database.

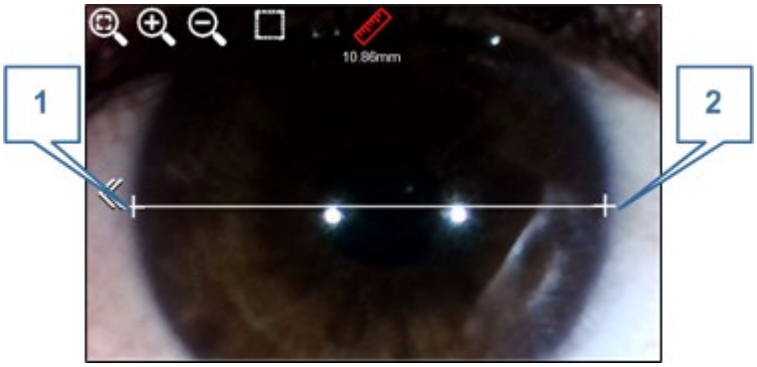
Notes:

- The External Imaging ACA[124] tab opens the same kind of Detail window as the Eye Observation tab[116].
- Your measurements of the tear meniscuses are only saved with the NITBUT results if the measurements are performed before you have exited from the results the first time. If you open the results from the database, you can still open the **Tear Meniscus** tab and measure the tear meniscuses, and the measurements are displayed in the Dry Eye Summary screen[112] while it is open, but they are not saved in the database when you exit.



Detail window of the Tear Meniscus tab

No	Description
1	**Fit picture in window** If you have zoomed in on the picture, tap this option to return the image to its original display size (i.e., to fit in the picture pane).
2	**Zoom in** Tap to zoom in on the picture.
3	**Zoom out** Tap to zoom out of the picture (if it is currently zoomed in).
4	**Switch dragging mode** Dragging-mode selector: tap  to switch from *panning* mode to *selecting* mode or  to switch from *selecting* mode to *panning* mode. By default, *panning* mode is active (and  appears in the Detail window). In this state, if the picture is zoomed, dragging across it pans the image, so that hidden parts of the image can be seen. If the image is not zoomed, dragging across it has no effect. When *selecting* mode is active, dragging across the image selects a rectangular region and zooms in on it (and  appears in the Detail window).
5	**Activate measuring** Tap to open a measuring tool (#11) that you can use to measure elements of the picture. When the measuring tool is open, this button appears in red. **Note:** In the Detail window of the Tear Meniscus tab[118], this button appears as shown in the illustration above (). This measuring tool can only be used to measure a vertical distance, because it is meant to be used to measure the height of a tear meniscus. In the Detail window of the Eye Observation[116] and the External Imaging[124] tabs, this button appears like this:  . When it is selected, a multi-directional measuring tool opens. The tool can also be rotated by dragging the rotation handle  as shown: 
6	**Next picture** Tap to display the next picture.

No	Description
7	**Delete button** Tap to delete the current picture.
8	**Favorite button** Tap to select the current picture as the favorite of this group.
9	**Close button** Tap to close the Detail window. Changes you have made to the favorite selection are implemented, and measurements of the tear meniscus are saved.
10	**Picture count** Shows the number of the current picture and the total number of pictures in this category.
11	**Measuring tool** Use this measuring tool to measure elements of the picture, as follows: • Tear Meniscus tab[118]: Drag the upper arrow to the top of the tear meniscus, and the lower arrow to the bottom of the tear meniscus. The height of the meniscus appears below the Activate Measuring button (#5; 0.28 in the illustration above). • Eye Observation[116] and External Imaging[124] tabs: Drag one end of the measuring line (#1 below) to one end of the element you want to measure, and the other end of the measuring line (#2 below) to the other end of the element.  **Manually measuring an element of an image in the Eye Observation or External Imaging Detail window** **Note:** These measuring tools are only available when they are opened by tapping the or buttons (#5), in which case these buttons appear in red.
12	**Previous picture** Tap to display the previous picture.

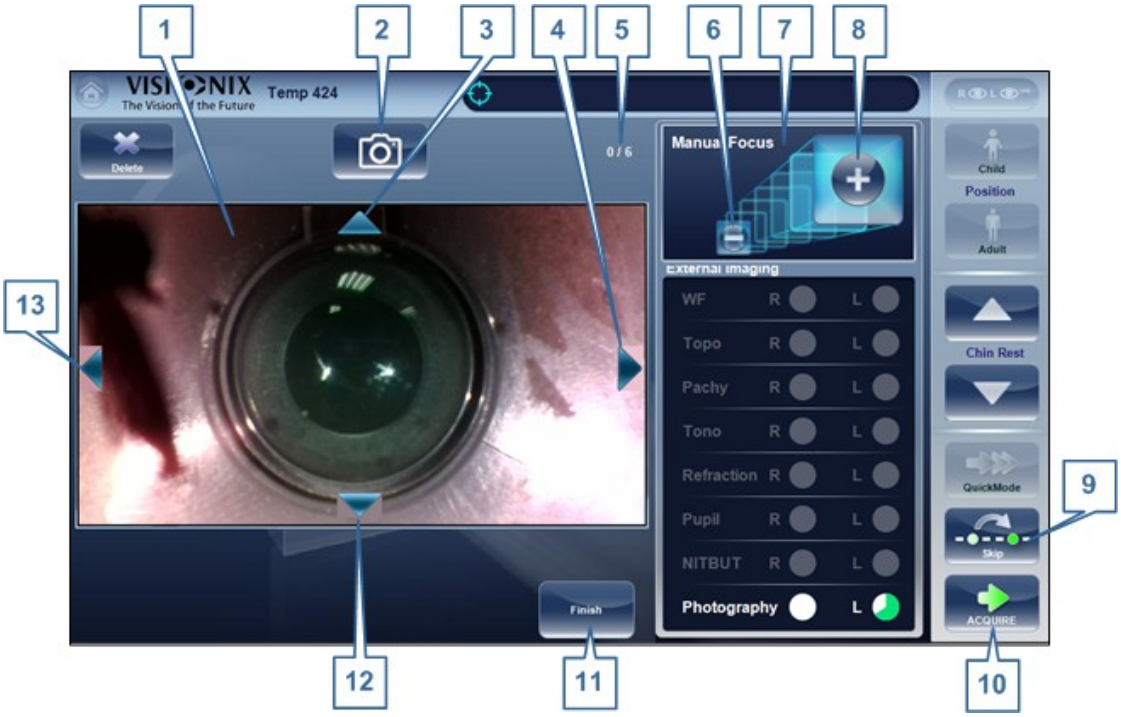
External Imaging

The hardware used by the Tear Film Analysis[110] system can also be used simply to take pictures of patients' eyes, for any reason. The pictures are stored in the patient's database record, and can be exported to other media as required.

Taking Pictures of the Patient's Eyes

To take pictures of a patient's eyes:

1. In the Measure screen 24, under **Diagnostic**, select **Photography**.
2. Select **Go**. The camera focuses on the patient's left eye, and a window showing the camera view (#1 in the illustration below) opens.



External Imaging screen with camera-view window

3. Use the arrows (#3, #4, #12, and #13) to adjust the camera's aim.

   Note: If necessary, you can focus manually in the **Manual Focus** area (#7) by tapping the **-** and **+** buttons (#6 and #8).

4. Tap  (#2) or **Acquire** (#10) to capture the current image. The image appears below the camera-view window.
5. Repeat the previous 2 steps until you have taken up to six pictures of the eye. The counter (#5) shows you how many pictures you have already captured of the eye.

   Note: You can take more than six pictures, but only the last six are retained.

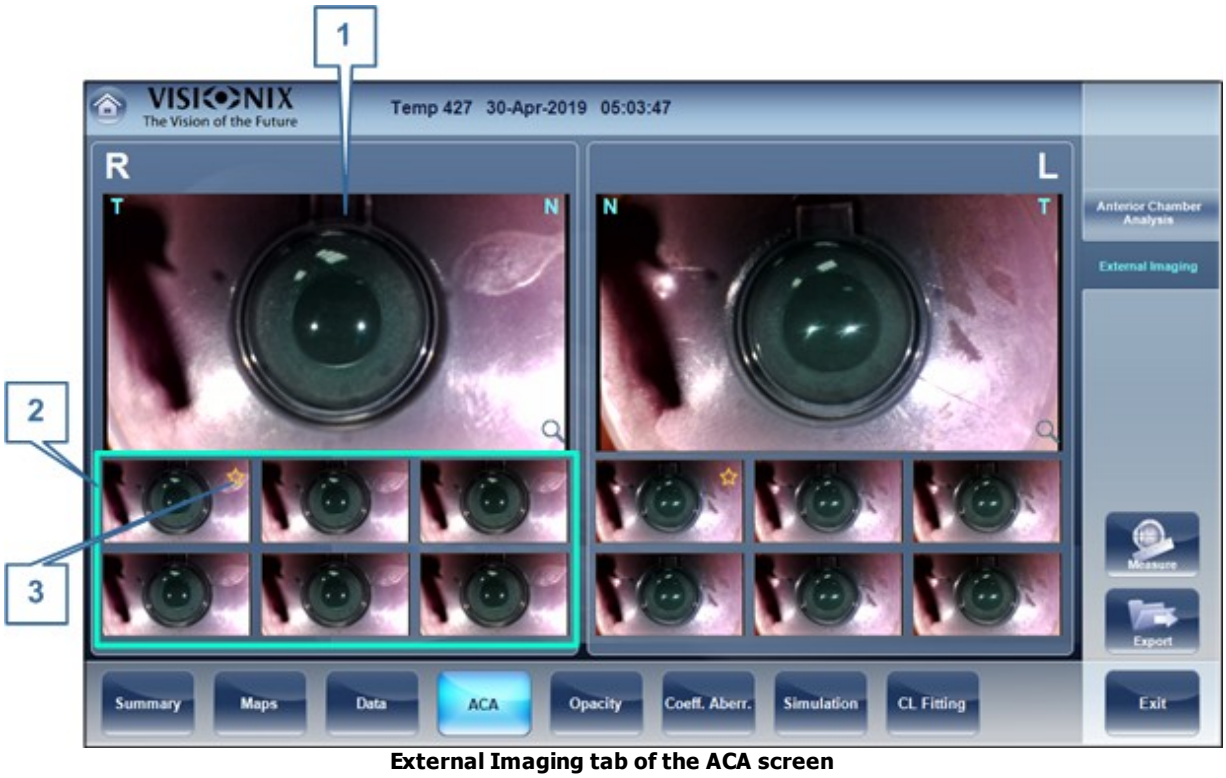
   Note: Select Skip 100 (#9) to skip the current eye. Any pictures you have already taken

of that eye are discarded.

6. Select **Finish** (#11). The camera moves to the patient's right eye and focuses on it; it appears in the camera-view window.
7. Repeat the previous four steps for the right eye.
8. When you are done taking pictures of the right eye, tap **Finish** (#11). The pictures are saved, and the **External Imaging** tab of the **ACA** screen opens and displays them.

Viewing the Pictures

You can view pictures of patients' eyes that were captured during the External Imaging process in the **External Imaging** tab of the ACA screen. This tab opens automatically when you select **Finish** in the External Imaging[123] screen. You can also open it at any time from the patient database by selecting a **Photography** measure.



External Imaging tab of the ACA screen

No	Description
1	**Currently selected photo of patient's eye** The picture that is currently selected (from the pictures displayed in #2 below it) Tap the picture to open it in a Detail window[120], in which you can zoom in and measure elements of the image, and select it as the favorite.
2	**All pictures** Displays all of the pictures of the eye that were saved during the External Imaging process The currently selected picture also appears enlarged above the pictures (#1). To select a different picture, tap it.

No	Description
3	**Favorite** Star identifying the favorite of the pictures of each eye To select a different picture as the favorite for the eye: • Tap it to select it. It appears as the currently selected picture (#1). • Tap the larger image (#1). A Detail window[120] opens. • Select the **Favorite** button. • Select **Close**. The window closes, and the picture you selected becomes the favorite.

6. 3 Working with the Test Results

The test results are displayed automatically in the Results screen[36] as soon as the diagnostic procedures are finished. You can choose from a variety of ways to display the results in the **Results** screen. In addition, you can print the results, export them to a file on an external device, or initiate additional diagnostics from within the **Results** screen. The test results are also automatically saved in the patient database, so you can see them again at any time.

Please note, if automatic export is selected, the exports will be performed after exiting the results.

- Retaking/ Adding a Measurement[126]
- Exporting the Results to a Phoropter[127]
- Exporting the Results to a Network or USB[127]
- Exporting the Results to an External Device[129]
- Export the Results to an Email[130]
- Exporting the Results to Remote Access[132]
- Printing the Test Results[132]
- Generating a Report[133]
- Saving the Test Results[134]

Retaking/Adding a Measurement

Retaking a measurement

If for some reason, you are dissatisfied with the results of your examination, there is an option of retaking the measurement before exiting the results menu. Immediately after completing the measurement, select the **Measure button** 

.

After selecting the diagnostic you wish to perform, the following screen opens:

If the new diagnostic selected contains measurements that were already performed, the device will ask you if you wish to repeat them. Select the measurements you wish to repeat, and then select **OK**. Continue with the measurement process as usual.

Adding measurements

To add measurements to your results screen, select the **Measure** button immediately after completing the measurement. If no measurements are to be repeated, this popup menu will not open. Select a diagnostic and continue with the examination. The additional measurements will appear in your results screen along with your previous measurements.

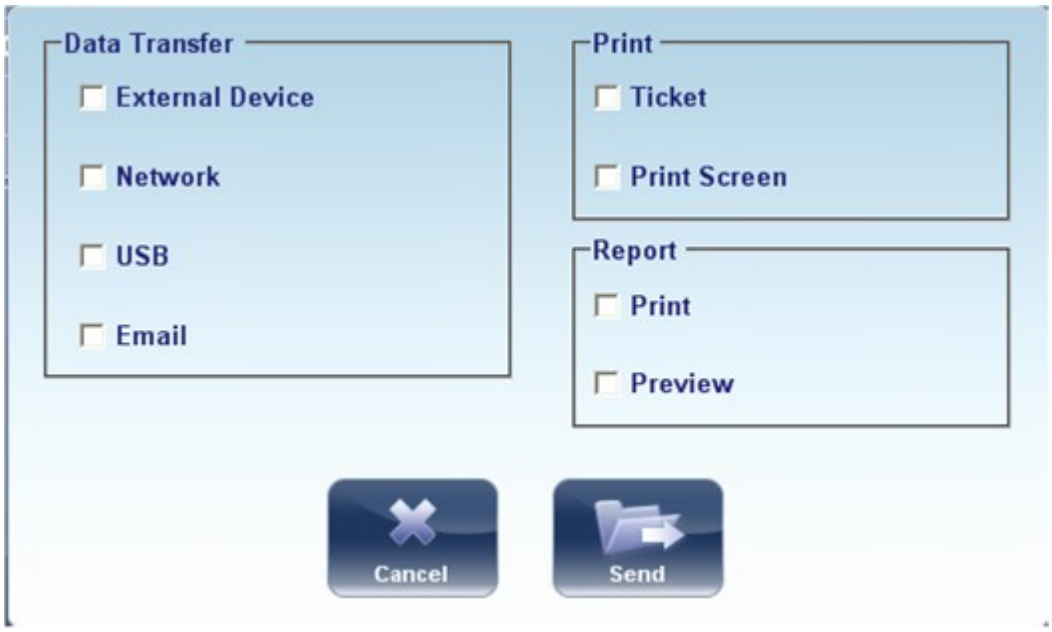
Note: When you repeat a measurement via the Measure button, the previous results are erased. Retaking a measurement is only possible before exiting the results. Once you exit the results, they are saved and cannot changed.

Exporting the Results to a Phoropter

From the Results screen[36], you can export test results to a phoropter that is either connected directly to the unit through its serial port or its USB port, or can be accessed over the network to which the unit is connected.

To export test results to phoropter:

- In the **Results** screen, select the **Export** button.
- Under **Data Transfer**, select the **External Device**.
- Select **Send**. The test results are sent to the phoropter.



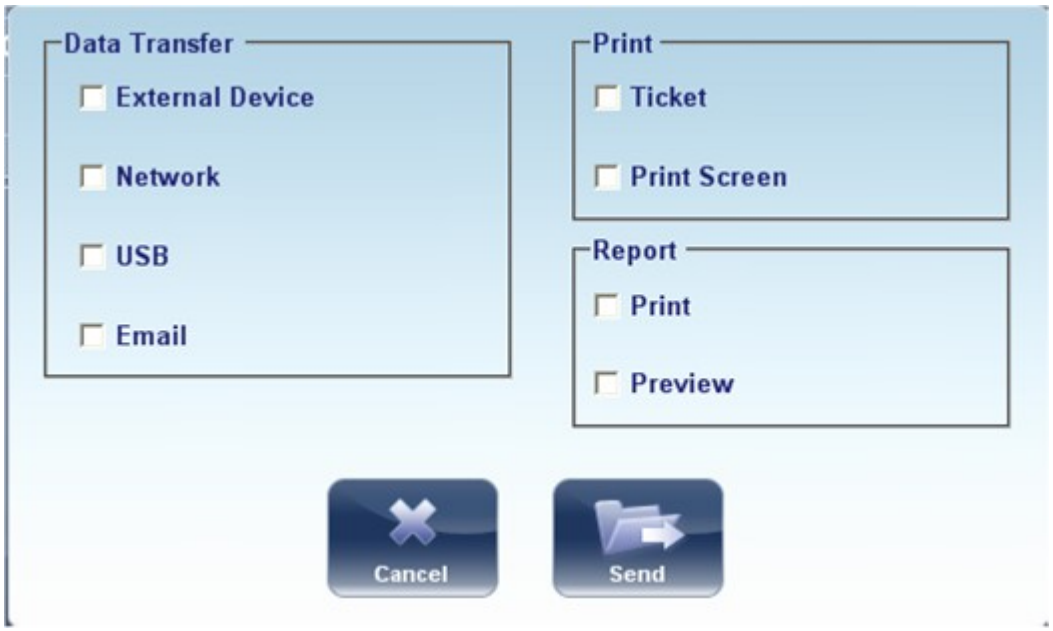
Note: Make sure that the phoropter is selected in the Export Settings menu[171] and that it is properly connected to the VX120+.

Exporting the Results to a Computer or USB Storage Medium

From the Results screen[36], you can export test results to a computer that can be accessed by the VX120+ via the local network, or to a USB storage medium (such as an external hard disk, a flash drive, or a memory card in a card reader connected to the unit's USB port) connected to the unit, from the **Export** dialog box.

To export test results to a Network or USB:

- In the **Results** screen, select the **Export** button. An Export dialog box opens.



Export dialog box

- Under **Data Transfer**, you may select your preference, **Network, or USB.**
- Select **Send** and this browser opens**:**

- Browse for your preferred location and Select **OK**.

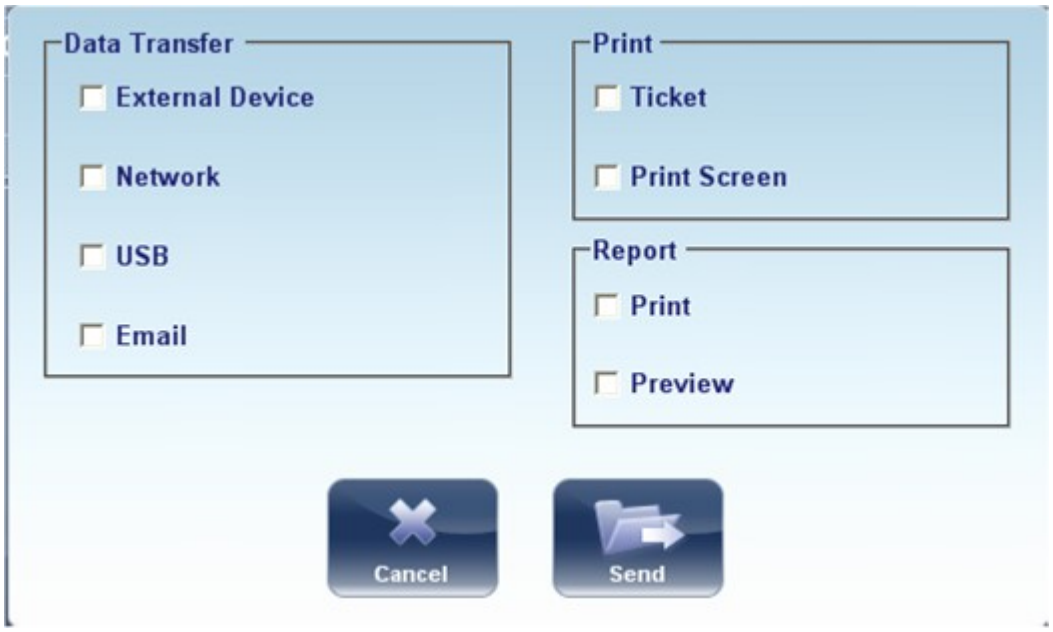
Note: Make sure that the devices are connected to the VX120+.

Note: Before connect a USB memory stick, please check that them to ensure it is virus free.

Exporting the Results to an External Device

To export test results to an External Device:

- In the **Results** screen, select the **Export** button. An Export dialog box opens.



Export dialog box

- Under **Data Transfer**, select **External Device.**
- Select **Send.**

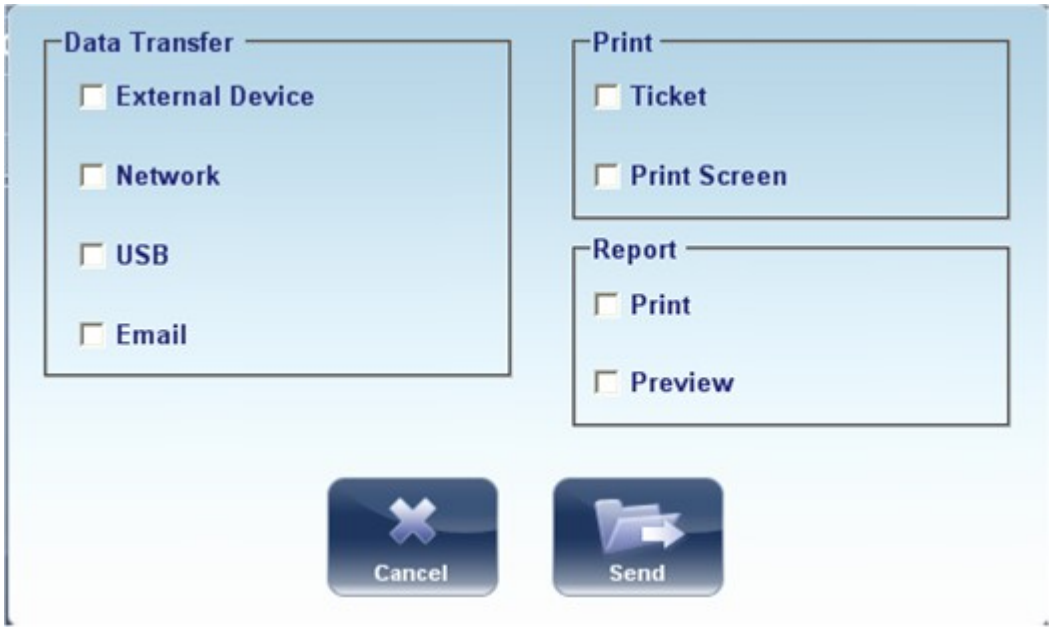
Note: Make sure that the devices are connected to the VX120+ and that External Device is configured properly in the Export Settings 171**.**

Exporting the Results to an Email

From the Results screen[36], you can export test results to an email message to a default recipient, or to a new recipient.

To export test results in an Email message:

- In the **Results** screen, select the **Export** button. An Export dialog box opens.



Export dialog box

Select **Email**, and **SEND**, and the following screen appears:

The following screen will appear:

No	Description
1	**From** This displays by default the name of the sender from the settings menu.
2	**To** Type the email address you want the information sent to in this field or go to #3 to select the default recipient.
3	**Default Recipients** The default recipients are displayed here. To send an email, select the checkboxes next to the names you want the email sent to. Both Colleagues and Laboratories are available for selection. To configure default recipients, go to Printing/Email 173.
4	**Subject** This can be free text or a default subject. To select the current subject as default, click on #9, "Set as Default" button.
5	**Summary** Select to add summary screen to the message.
6	**Topo Pack** Includes the Elevation maps.
7	**Patient File** This is the patients data in a zip file.
8	**Report** This is the pdf file of the patient's report
9	**Set as Default** Sets the subject as a default subject
10	**Message Box** Add your message here.
11	**Import Note** Includes the note from the patient file in the body of the message.
12	**Set as Default** Sets the message as default message.
13	**Cancel** Cancels the message.
14	**Send** Click to send the message.

Note: To send an email, the Email settings must first be configured in the Printing/Email

[173] **settings menu.**

Exporting to Remote Access

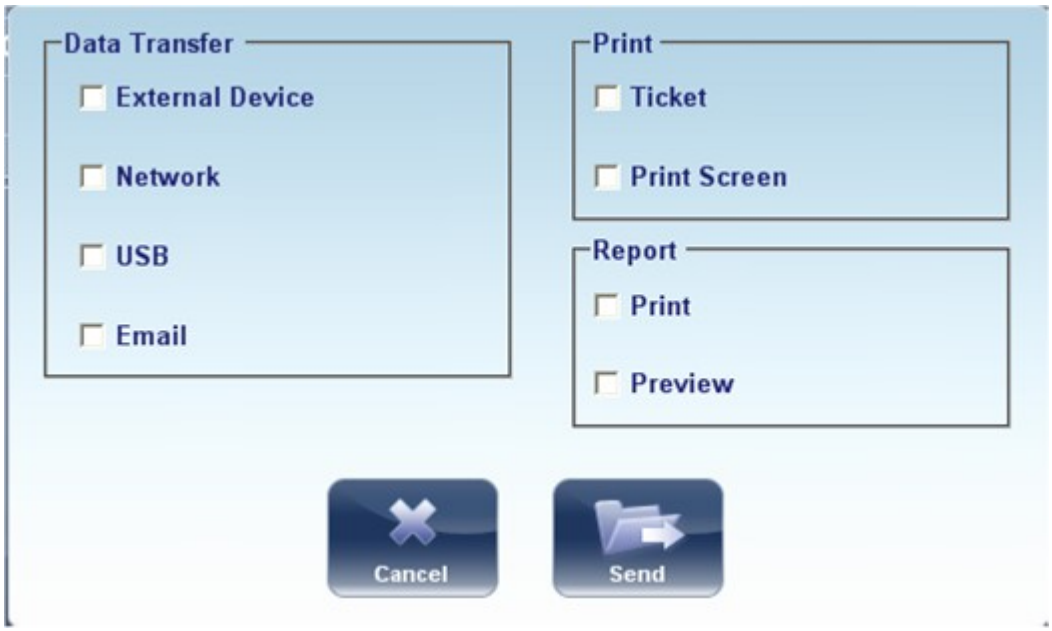
Data is automatically exported to Remote Access immediately after taking a measurement (by default). However, if for some reason, you wish to retroactively export the data, it is possible to do so, via the Rebuild Remote Access[176] button in the Settings menu.

Printing the Test Results

In the Results screen[36], you can print the test results by exporting them to the built-in printer.

To print the test results on the built-in printer:

- In the **Results** screen, select the **Export** button.
- Under **Print**, select **Ticket**.
- Select **Send**.



Export dialog box

To print a screencapture of your results:

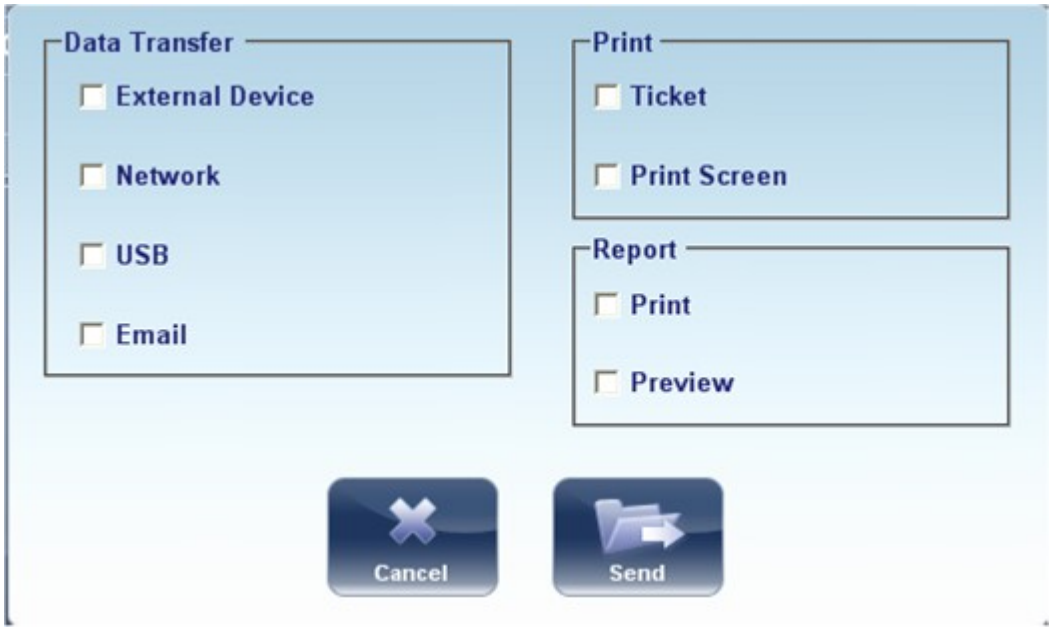
- Under print select **Print Screen**
- Select Send

Note: to print to an external printer, you must have it selected in the Export Print Settings[173] menu.

Generating a Report

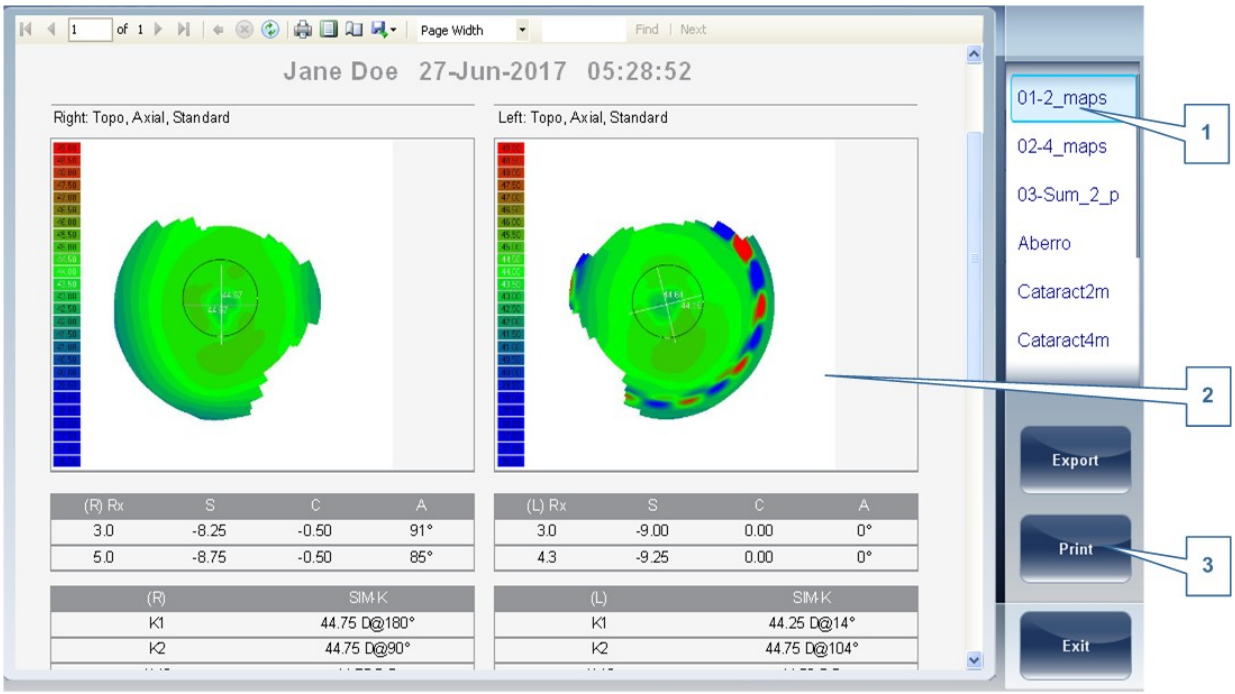
To generate a report:

- In the **Results** screen, select the **Export** button.
- The following dialog box opens:



- Under **Print**, select **Report**.
- Select **Send**.

The Report viewer window opens:



No	Description
1	**Template Menu** Select the report template according to your preferences
2	This shows a preview of the maps and data available in the report
3	Select **Print** to print the report, or **Export** to send it to another device.

For more information on possible **Report** configurations, go to Configuring a Report 184

Saving the Test Results

The test results are automatically saved in the database. If a patient was selected before the diagnostic was initiated, the test results are saved under the patient's name. If no patient was selected when the diagnostic was initiated, the system generates a temporary name, with surname "Temp," and a number for the first name (e.g., "Temp 1185").

Temporary test results are automatically deleted from the system at given intervals (once a day, week, or month, depending on the configuration settings; see Clearing History 145).

7. Managing the List of Test Results

Stored test results are managed in the Patient screen[21]. The results are stored under the patient's name.

To see the list of test results for a patient:

- In the Patient screen[21], on the left side of the screen, select the patient's entry. The patient's entry is highlighted with a blue border, and their test results are listed on the right side of the screen.

---

7. 1 Selecting Test Results

There are two ways test results that are stored in the database can be selected: individually, or as part of a group. To select them individually, select the result you wish to modify, and then you can view, print, or export it. The results can be selected as a group, in order to move them from one patient record to another, or to delete them from the database.

To select a single test result:

- In the Patient screen[21], in the result list, select the result. The result is highlighted with a blue border.

To select one or more test results in order to delete them:

- In the Patient screen[21], in the result list, select the check box beside each result you want to delete.

Test results selected individually and as a group

No	Description
1	Selected patient
2	Check box selected (to select results as a group)
3	Result selected (as an individual)

7. 2 Loading Test Results

To load test results:

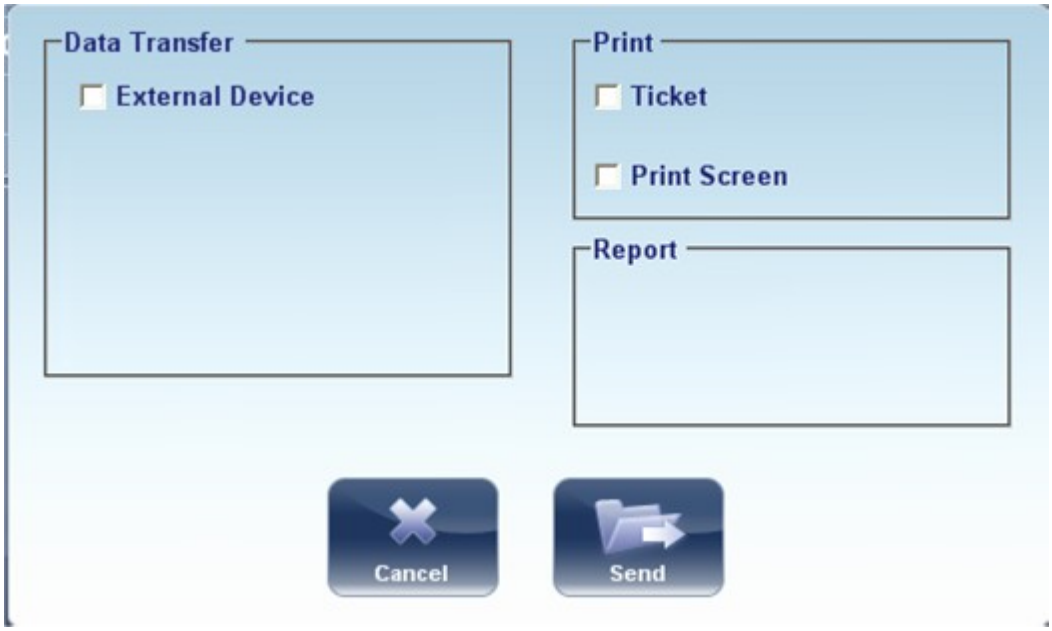
- In the Patient screen[21], in the result list, select the result. The result is highlighted with a blue border.
- At the bottom of the list, select **Load**. The selected test result is opened in the Results screen[36].

7. 3 Exporting Test Results from the Patient Screen

Test results can be exported from the Patient screen to the built-in printer for printing as a ticket or to a file on an external device connected to the unit.

To export test results from the Patient screen:

- In the Measures list (#6 in the Patient Screen above 21), select the measure you want to export. The measure is highlighted with a blue border.
- At the bottom of the list, select **Export**. The **Export** dialog box opens.



Export dialog box

- To print the test results on the built-in printer, under **Print**, select **Ticket**, and then select **Send**. The ticket is printed.

  - OR -

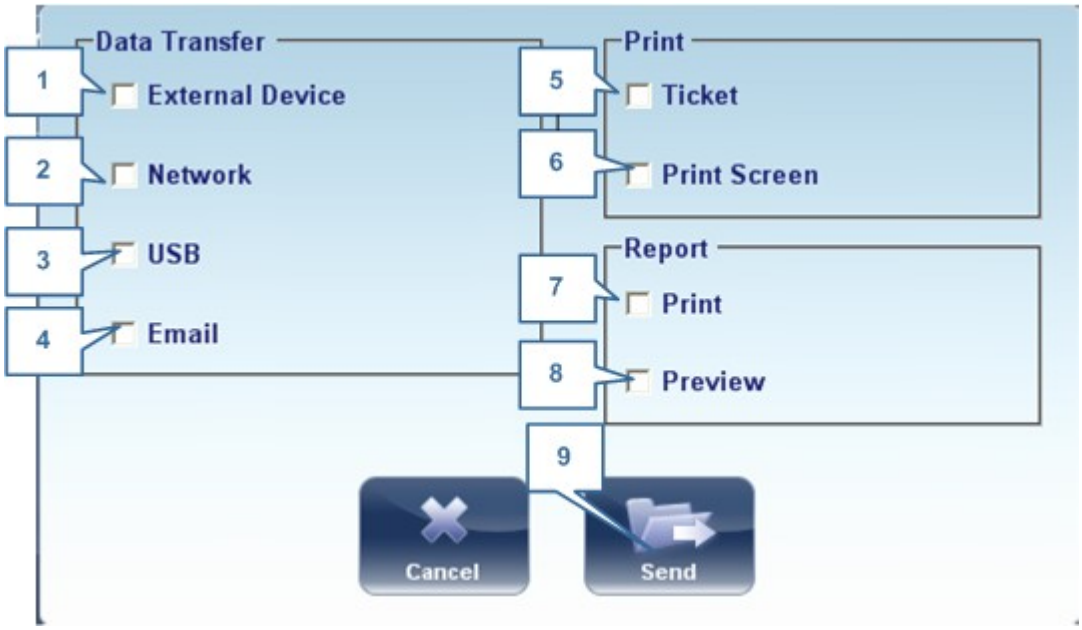
- To export the test results to an external file, under **Transfer**, select the external device, and then select **Send**. A file saver dialog box opens. Navigate to the folder in which you want to save the file, enter a name for the file, and select **Save**.

7. 4 Exporting Test Results from the Results Screen

Test results can be exported from the Results screen to the built-in printer for printing as a ticket or to a file on an external device connected to the unit.

To export test results from the Results screen:

- Select the **Export** button. The **Export** dialog box opens.



Export dialog box

No	Description
1	**External Device** Select to transfer data from the device to an external device; for example, XML data (and XML databases), or data to a phoropter head. To view external device options, go to the Export Settings[171] configuration menu.
2	**Network** Select to transfer data from the device to the network. To view data options and configure an export path, go to the Export Settings[171] configuration menu.
3	**USB** Select to transfer data from the device to a USB. To view data export options go to the Export Settings[171] configuration menu. **Warning-before connecting a USB to the device, please make sure that it has been first screened for viruses.**

No	Description
4	**Email** Select to transfer data to email to recipients. Go to Email settings[173], to configure host and recipient options.
5	**Ticket** Allows printing the data on a ticket in the device's internal printer
6	**Print Screen** Select to print a screenshot of the summary screen, this requires a connection to an external printer.
7	**Print** Prints the report selected as default in the Printing menu[173], this requires a connection to an external printer.
8	**Preview** Opens a report preview of the measurement results.
9	**Send** Confirms the selection and performs the transfer

- To print the test results on the built-in printer, under **Print**, select **Ticket**, and then select **Send**. The ticket is printed.

  - OR -

  To export the test results to an external file, under **Transfer**, select the external device, and then select **Send**. A file saver dialog box opens. Navigate to the folder in which you want to save the file, enter a name for the file, and select **Save**.

  If Automatic Export[176] is selected, the results will be exported to the location specified in the settings menu after clicking **Exit**.

7. 5 Deleting Test Results

To delete test results from a patient record:

- In the Patient screen[21], select the check box beside each test result you want to delete.
- At the bottom of the screen, select **Delete Measure**. You are prompted to confirm that you want to delete the selected measures.
- Select **Yes**. The test results are deleted from the patient record.

8. Managing the Database

The patient database contains all the patient information stored by the system. All test results are associated with specific patient records; even if you preformed diagnostic tests without inputting any patient information, the results are stored in the patient database under automatically generated temporary patient records. You can also export the entire contents of the database to an external file as a backup; import patient records that were previously exported; and delete all of the patient records, or all of the temporary patient records, from the VX120+ database.

For general information about working with patient records, see Patient Screen 21.

---

8. 1 Exporting and Importing the Database

You can export the entire database to a folder that is stored on an external device, such as a USB hard drive or flash drive, or a PC that is on the same LAN as the VX120+. You can also import the data from any the Manufacturer database. Either an entire database or just the data for a single patient can be imported.

To export your database to an external device:

- Selecting the **Maintenance** tab opens the following screen:

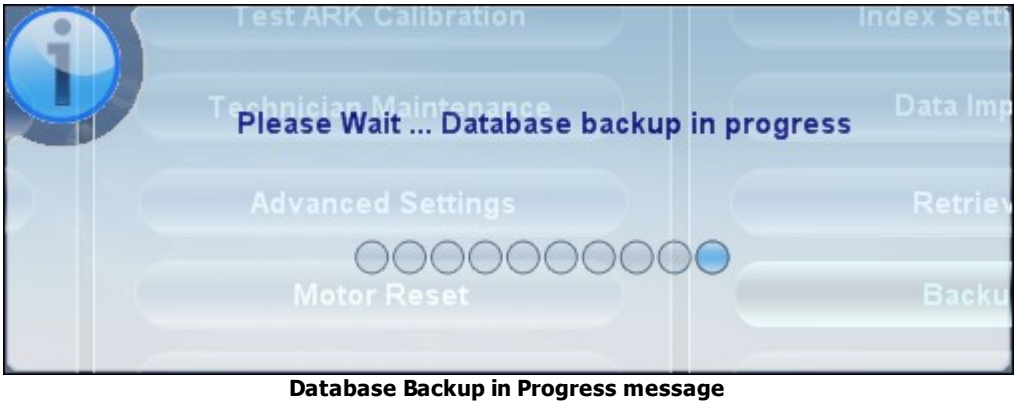
in the **Database** section on the right, select the **Backup** button 

. A **Browse for Folder** dialog box opens.

- Navigate to the device on which you want to save the exported database data, and select (or create and select) the folder in which you want to save the data.
- Select **OK**. The backup begins. A folder called *ClientDB* is created in the folder you selected, and the data from the database is saved in it. A **Copying** dialog box opens and shows the progress of the backup, and a **Database Backup in Progress** message is displayed.

  When the backup is completed, a new message appears asking if you want to clean the

data from the VX120+ database.



Database Backup in Progress message

Clean Database message

- If you want to delete all of the data from the database on the VX120+ unit, select **Yes**. Otherwise, select **No**.

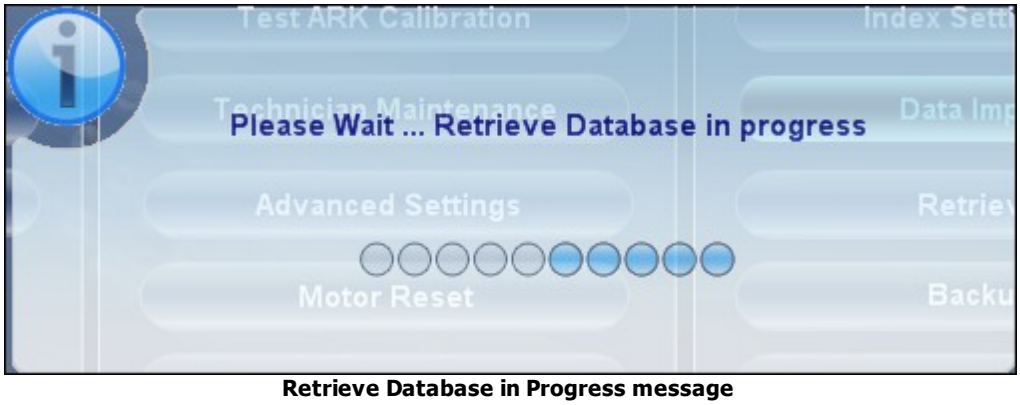
  Note: For additional information about deleting all of the data from the database, see Deleting All Patient Records 146.

To import data from an exported database:

- In the Configuration screen 153, in the **Maintenance** tab, in the **Database** section on the right, select **Data Import**. A **Browse for Folder** dialog box opens.
- Navigate to the device on which the database data is located, and select the *ClientDB* folder in which it is stored.

  Note: If you wish, you can import the data for a single patient rather than all the data in the database. To do so, in the *ClientDB* folder, select the patient's folder. (The name of the folder contains the patient's full name, birth date, and gender. For example, the folder called *Melodie#Emma#12-03-65#f* contains the data for Emma Melodie, whose birthday is 12.3.65 and whose gender is female.)

- Select **OK**. The data import process begins. A **Copying** dialog box opens and shows the progress of the import, and a **Retrieve Database in Progress** message is displayed. When the import process is completed, the dialog box and the message disappear.



Retrieve Database in Progress message

Note: During the import process, you may be prompted to confirm that you want to overwrite an existing folder with an imported one if they both have the same name. Data for new patients will be added to the existing database, and will not be overwritten in your database. Select **Yes** to overwrite the existing data.

8. 2 Deleting All Temporary Patient Records

Temporary patient data is automatically deleted from the database either every day, week, or month, or never depending on the configuration settings (see Device Parameters)153. In addition, you can manually delete all temporary data at any time.

To delete all temporary patient records from the database:

- In the Patient screen21, in the **Surname** filter, type *Temp*. Only patient records whose surname field begins with *Temp* are displayed. This includes all of the temporary patient records in the database.
- In the title bar of the Patient list, select the check box (#8 in the diagram of the Patient screen21).
- Ensure that there are no patient records displayed that are not temporary records (that is, records of patients whose surnames begin with "Temp"). If there are any, clear the check boxes beside their names.
- Below the Patient list, select **Delete Patient**. You are prompted to confirm that you want to delete the selected patient records.
- Select **Yes**. The selected patient records are deleted.

8. 3 Deleting All Patient Records

If necessary, you can delete the entire Patient database.

To delete the entire Patient database:

- In the Configuration screen[153], in the **Maintenance** tab, in the **Database** section on the right, select **Data Deletion**. A appears asking if you want to clean the data from the VX120+ database.

Clean Database message

- Select **Yes**. You are prompted to confirm that you want to delete all of the records in the database.
- A **Deleting** dialog box opens, and shows the progress of the deletion process. When the process is completed, the dialog disappears.

Warning: Deleting the database will not erase the webservice data. To erase the database along with webservice data, erase the data via the Patient Screen[95].

9. General Actions and Features

This chapter provides additional information about the VX120+ and how to work with it: using the screensaver and securing the screen with a password, entering text into text fields, connecting a keyboard and mouse to the unit, updating the software, and getting assistance.

9. 1 Launching the Screen Saver

You can launch the screen saver from either the Home screen 20 or the Patient screen 21 .

To launch the screen saver:

- Select the **Screen Saver** button.

The unit can also be configured to launch the screen saver automatically after a specified number of minutes have passed without any user actions (see Screen Saver) 155 .

Note: We recommend activating and modifying the default password to the screensaver to prevent access by unauthorized people. To learn more about activating the password, go to, Securing the Screen . 148

9. 2 Securing the Screen

You can secure the system by requiring a password to deactivate the screen saver. Ideally, you should also configure the screen saver to start automatically after a few minutes with no user activity. For additional information, see Screen Saver 155.

Please note: The default screensaver password is: **frame**

We recommend changing the screensaver password upon installation. If you are having trouble changing the screensaver, or do not remember it, please contact our technical support team.

9. 3 Entering Text

Whenever you select a text field, such as the field in which you enter a patient's name (see Adding New Patients 88), a virtual keyboard opens on the screen to enable you to enter characters. In addition, if you wish, you can connect a mouse and/or a keyboard to the unit's USB ports. If you connect a keyboard, you can enter characters into text fields with either the virtual keyboard or the physical keyboard. Similarly, if you connect a mouse, you can select characters in the virtual keyboard either by tapping them on the touch screen or by clicking them with the mouse.

Virtual Keyboard open in Patient screen

To close the virtual keyboard:

- Select the button.

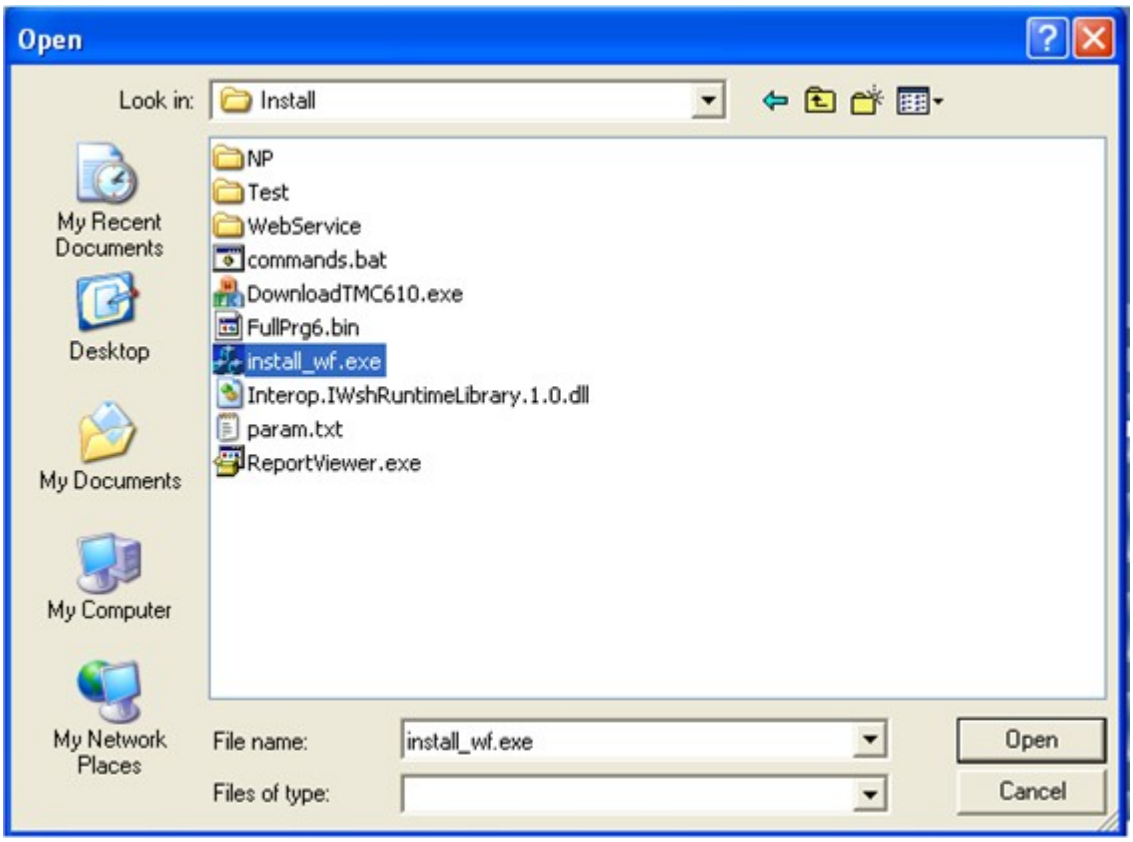
9. 4 Updating the Software

When the Manufacturer releases a software update, you can use it to update the software on the VX120+ unit.

To update the software:

- After receiving the update file from the Manufacturer and save it either on the VX120+ itself or on a device to which it can connect. (For example, download the update file to a USB flash drive and then plug the flash drive into the unit's USB port.)
- From either the Home screen[20] or the Patient screen[21], open the **Configuration** screen.
- Select the **Maintenance** button. The **Maintenance** tab opens.
- On the left side of the screen, under **Software Maintenance**, select **Software Upgrade**

A file selector dialog box opens



- Navigate to the update file.
- Select **OK**.

9. 5 Integrated Help

The VX120+'s help manual can be accessed directly from the software. To access the Help files, click on the  icon. To close the Help files, click on the "X" located at the top left of the screen.

9. 6 Getting Assistance

If your VX120+ is connected to the internet, technical-support staff can connect to the unit on-line if necessary to give guidance and troubleshoot problems. This feature makes use of Teamviewer, a software package that enables remote control and Desktop sharing of PCs. You can activate Teamviewer in the Configuration screen 153, in the **Maintenance** tab. For additional information about this option, please contact your technical support team.

10. Configuring the Unit

10. 1 Accessing the Configuration Settings

To open the Configuration screen from the Home screen:

- Select the **Configuration Screen** button (#5 in the diagram above 20).

To open the Configuration screen from the Patient screen:

- Select the **Configuration** button (#12 in the diagram above 21).

10. 2 Overview of the Configuration Screen

The **Configuration** screen gives you access to the VX120+'s settings and system maintenance functions.

Configuration screen

No	Description
1	**Tab buttons** Select a button to display the tab containing the configuration settings for the category, or select the **Maintenance**[191] tab to access system maintenance functions, such as upgrading the software and calibrating the hardware.
2	**Sub-tab buttons** Some of the tabs are divided into sub-tabs. Select a button to display the sub-tab.
3	**Functional buttons** Standard buttons that are available in all the **Configuration** screen tabs: • **Turn Off:** Turn off the machine (see Turning the Unit On and Off)[17] • **Eject USB:** Safely eject hardware device connected to the unit's USB port. • **Factory:** Restore the factory settings. (Note: This does not delete any data.) • **Cancel:** Cancel all changes that were made to the configuration settings. • **Save:** Save all changes that were made to the configuration settings, close the **Configuration** screen, and display the Home screen[20].

10. 3 Modifying Configuration Settings

You can modify any of the configuration settings that appear in the various tabs of the **Configuration** screen.

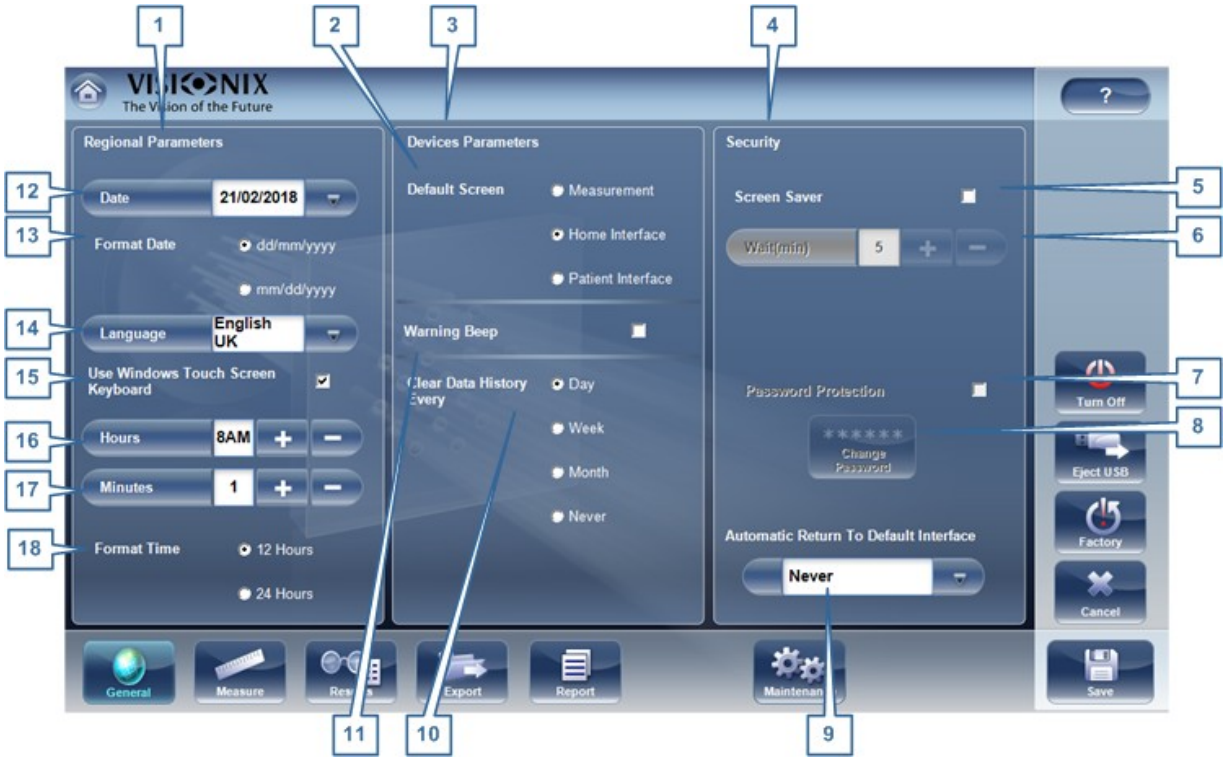
To modify configuration settings:

- Modify the settings you want to change. You can modify settings in more than one tab without saving the changes, as long as you do not close the **Configuration** screen before you save them.
- When you have changed everything you wanted to change, select **Save**. The changes are implemented, and the previous screen is displayed.

10. 4 General Settings

The **General** tab of the **Configuration** screen is divided into three sections:

- Regional Parameters: Date, time, and language settings
- Device Parameters: Selecting the default screen, and scheduling how often temporary data is cleared from the database
- Security: Screen-saver settings



Configuration screen, General tab

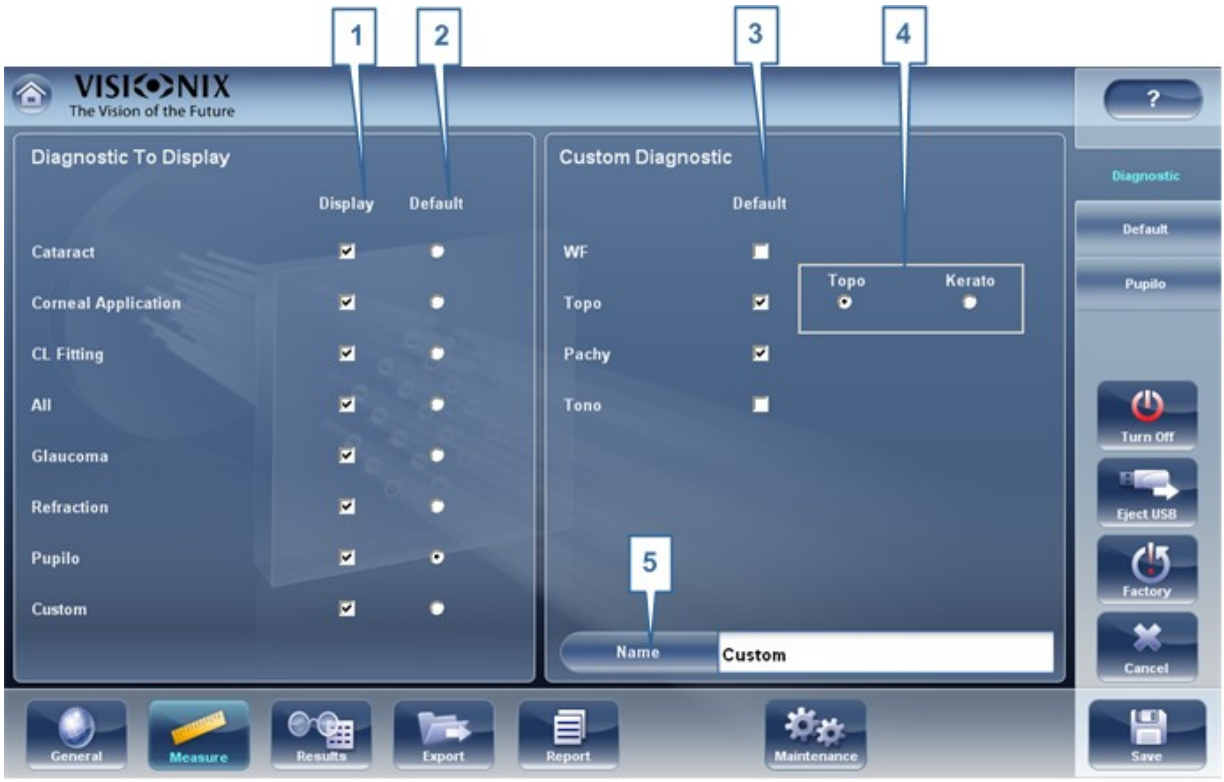
No	Description
1	**Regional Parameters**
2	**Default Screen** Select the screen you want to use as the default screen - the screen that is displayed when you first turn on the VX120+, and when you select **Exit** to close the Results screen[36]. The default screen can be the Home screen[20], the Patient screen[21], or the Measure screen[24].
3	**Device Parameters**
4	**Security**
5	**Screen Saver** Select the check box to configure the screen saver to be activated automatically when there has been no user activity for the number of minutes selected under **Wait** (below).
6	**Wait (min)** Displays the number of minutes of inactivity that will cause the screen saver to be activated. Select the + and − buttons to modify the number.
7	**Password Protection** Select the check box to require a password to deactivate the screen saver.
8	**Change Password** Select this button to change the password. In the dialog box that opens, under **Old Password**, enter the current password (By default, there is no password.) Under **New Password**, and under **Confirm Password**, enter the new password. Select **OK** to close the dialog box. **Please note: the default password of the software is *frame* . Please make sure to change this password upon installation.**
9	**Automatic Return to Default Interface** Allows the user to quit the **Results** screen and return to the default screen automatically after the selected amount of time. Select this button to modify the time, according to your preference (for example 2 min, 3 min, Never).
10	**Clear Data History Every** Select how often you want the system to delete temporary patient records from the database. **Note:** Temporary patient records are the results of measurements that were performed without being associated with a patient record. They have the surname "Temp" and a number for the first name.
11	**Warning Beep** Select whether or not you would like a beep to sound when a warning message is displayed.

No	Description
12	**Format Time** Select the type of hour display to use in the rest of the interface: • **12 Hours:** The 12-hour clock, with AM and PM to indicate which half of the day is intended • **24 Hours:** The 24-hour clock
13	**Minutes** Displays the current minutes past the hour. Select the + and − buttons to reset the current minute.
14	**Hours** Displays the current hour. Select the + and − buttons to reset the current hour.
15	**Language** Select the interface language
16	**Format Date** Select the format for displaying the date in the interface: • **dd/mm/yyyy:** European standard, e.g., June 26, 2013 would be displayed as 26/06/2013 • **mm/dd/yyyy:** American standard, e.g., June 26, 2013 would be displayed as 06/26/2013
17	**Date** Select the current date.

10. 5 Measurement Settings

Diagnostic

The **Diagnostic** sub-tab of the **Measure** tab allows you to choose which diagnostics will be available in the list of diagnostics in the Measure screen 25. You can also select which of the diagnostics will be the default test - the diagnostic that will be selected when you first open the **Measure** screen.



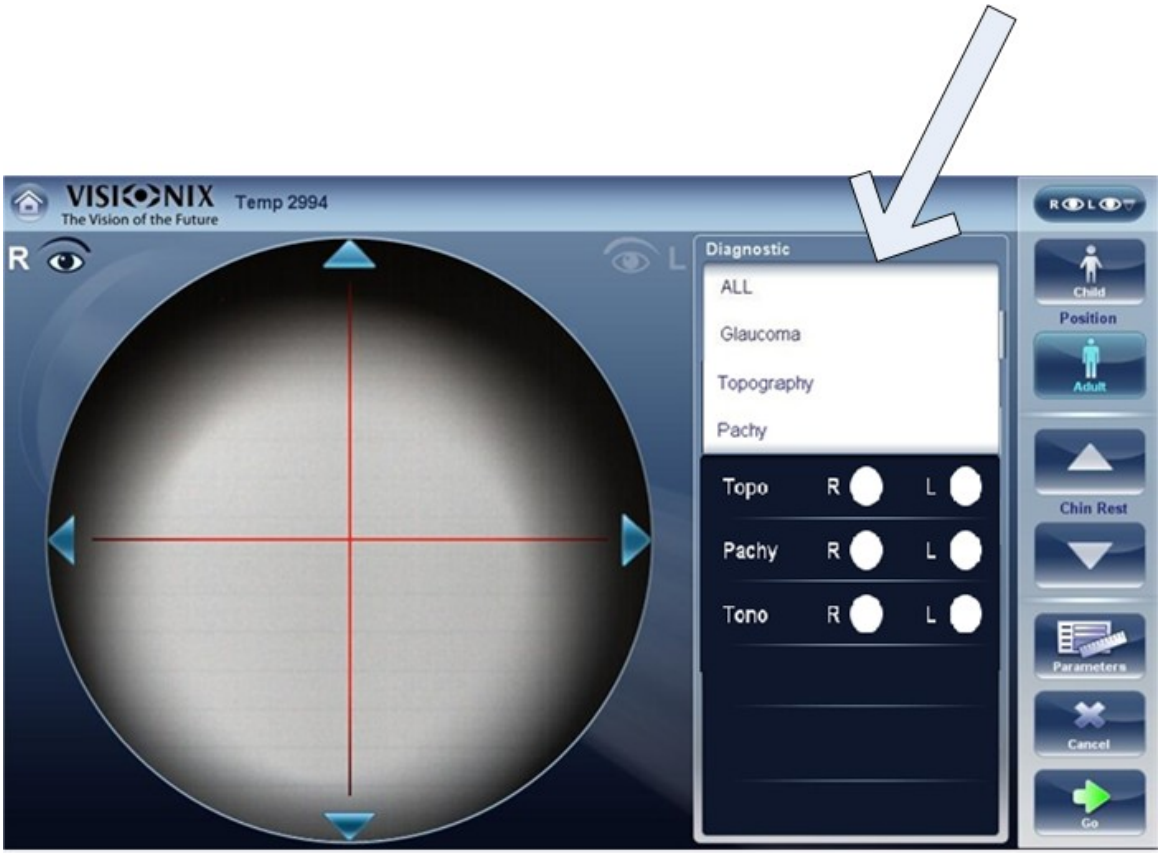
Diagnostic sub-tab

No	Description
1	**Display** Select the diagnostic you wish to display in the menu from the measurement screen.
2	**Default** Select the default measurement, only one measurement may be selected.
3	**Custom Diagnostic** Select the measurements to be included in the Custom diagnostic
4	**Topo** Select either Topo, or Kerato measurement. Both measurements give K readings, but only the Topo generates topography maps.
5	**Name** In this field you can customize the name of the custom measurement.

To configure the list of diagnostics:

- In the **Display** (no. 1) column, select the check box of every diagnostic test you want to have available in the Measure screen[25].
- In the **Default** (no. 2) column, select the default diagnostic - the diagnostic that will be selected when you open the Measure screen[25] .

Scroll down to view additional diagnostics



Diagnostic	Description
All	Includes WF, Topo, Tono, Keratometry, Pachy and Refraction
Glaucoma	Includes Pachy and Tono measurements
Refraction	Includes Refraction measurements
Wavefront	Includes Wavefront, aberrations, and Refraction measurements
Topography	Includes Topography measurements
Pachy	Includes Pachy measurements
Cataract	Includes Wavefront, Topography and Pachy measurements
Corneal App.	Includes Wavefront, Topography and Pachy measurements
C.L. Fitting	Includes Wavefront and Topo measurements

Diagnostic	Description
Pupillo	This measurement displays pupil size and reaction time according to different light conditions.
Custom	This measurement can be tailored according to your preferences and may include all of the measurements in the device except for pupillo. Please note: Kerato is not available with Multi pachy.

To choose a measurement, select it from the list above. Only measurements selected in the Default menu 160 will appear in the measurement menu.

Default

The Default sub-tab of the Measure tab has two sections. In the first section, **Default Device Settings**, you can set default sound and luminosity settings, and choose whether the default head-rest and chin-rest positions will be for adults or children. In the second section, **Measurement Default Settings**, you can select the default number of times the Wave FrontandTonometry tests should be performed and whether to include near vision in your wavefront measurements. You can change the position setting and the number of times the tests should be performed on the fly in the Measure screen 25 before you start a measurement.

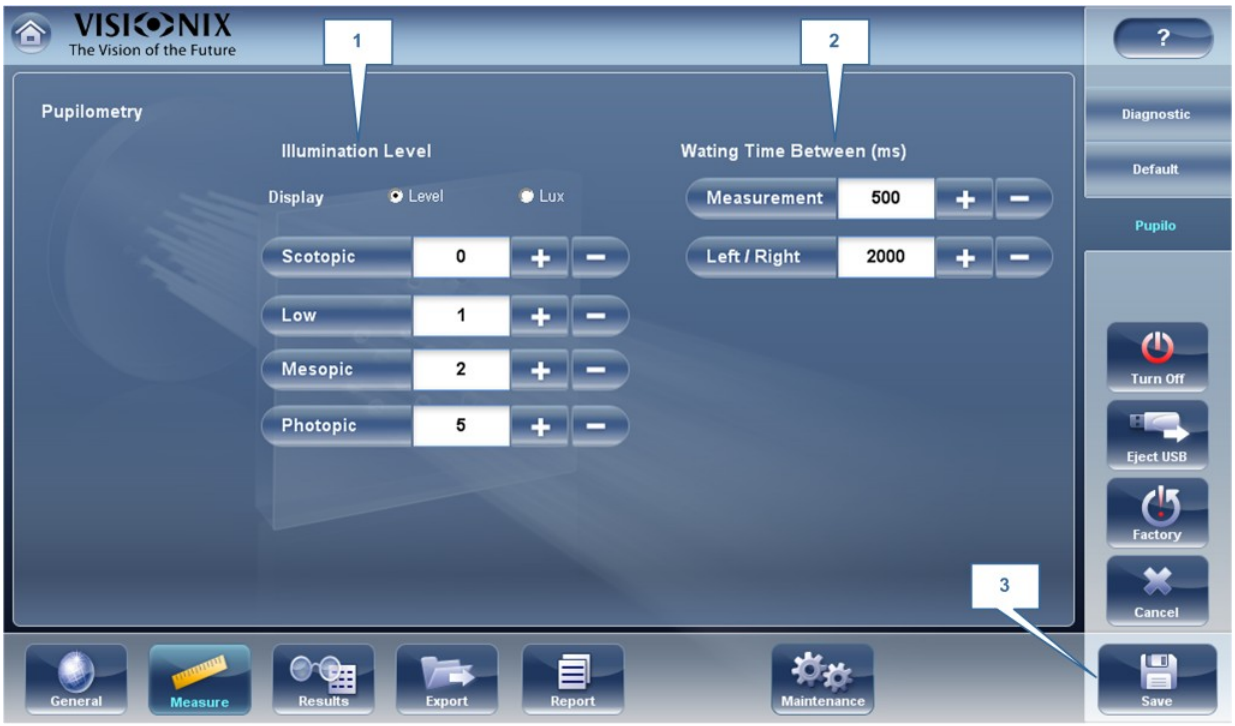
Default sub-tab

No	Description
1	**Beep** Select the volume of the beep sounds that the unit emits during the measurements.**Measurement Default Settings** • WF Measurements: Displays the default number of times the Wave Front test should be repeated. Select the + and − buttons to change this value. • Tono Measurements: Displays the default number of times the Tonometry test should be repeated. Select the + and − buttons to change this value.
2	**Target Luminosity** Select the luminosity level of the fixation target.Topo with Ringer Display the topography results with the Ringer option after the measurment is done and before the results are displayed.
3	**Position** Select whether the default position of the head rest and chin rest should be appropriate for adults or for children.
4	**Reading Distance** Set the reading distance for the near measurement, from 30-70cm.
5	**Add Measurement with WF** Select to add Near Vision in the Wave Front test. Select the + and − to change the default distance for near vision testing. Note: this will add Near Vision testing to every wavefront test.**Tono Measurements** Allows you to modify the number of Tono measurements.
6	**WF Measurements** Select the number of wavefront measurements for each wavefront exam. Only measurements that include wavefront will be effected.
7	**Tono Measurements** Tono Measurements: Displays the default number of times the Tonometry test should be repeated. Select the + and − buttons to change this value. Only examinations that include tono will be effected.
8	**Tono Automation** Two types of focusing are available for the tonometer, **Auto** and **Semi**. By default, the tono measurement is in **Auto** focusing mode, where the device can take a measurement with little intervention by the examiner. In **Semi** mode, the tonometer remains at the centering point found in the pachymeter measurement and all of the focusing is done by the examiner.
9	**Topo with Ringer** By default the ringer is available for editing. To remove the ringer display shown immediately after topo measurements, unselect this checkbox.

.

Pupillo

We recommend using default pupillo illumination settings, although they can be modified in this screen:



No	Description
1	**Illumination Level** Use the + and − to adjust the illumination levels.
2	**Waiting Time** Use the + and − to adjust the waiting time between illumination levels.
3	**Save** Select to save your changes.

10. 6 Results Settings

Refraction Aberrations 163

WF 47

Topography 168

General Settings

The **General** sub-tab of the **Results** tab contains the default display settings for refraction and aberration data of the Results Screen 36 .

Refraction and Aberration sub-tab

No	Description
1	**Terminology** It is possible to set the terminology for the map and scale to Tangential or Instantenous (for the map) and to Standard or Absolute, Auto or Normalized (for the scale)
2	**Refraction** Default settings for Refraction and Ocular Wavefront
3	**Step** Select the measurement display increments.
4	**Cylinder** Select negative or positive cylinder convention, or select Auto to set the sign of the cylinder to match the sign of the sphere equivalent.
5	**Vertex Distance** Select the default vertex distance. (You can change this value on the fly in the Results screen 36.)

No	Description
6	**Aberrations** Default settings for the corneal and ocular aberrometry. **WF convention** selects how to present abberations. Choose between **OPD** (Optical Path Difference) and **WFE** (WaveFront Correction) modes. The **Optical Path Difference** (OPD) is defined as the difference between the aberrated and the ideal unaberrated wavefronts. The OPD is positive if the aberrated wavefront leads the ideal unaberrated wavefront. Also, if the aberrated wavefront curves in more than the unaberrated wavefront, the OPD is positive. Therefore, a negative focal shift will introduce a positive aberration. The **WaveFront Error** (WFE) is defined as the difference between the ideal unaberrated wavefronts and the aberrated wavefronts. Essentially, WFE represents the required correction for achieving unaberrated vision. OPD and WFE modes relate in the following way: *OPD(x,y)= -WFE(x,y)*
7	**Zernike Unit** Select the units (microns or diopters) for displayed measurements.
8	**Tono Formula** Select the formula to use for the corneal thickness Tonometry calculation. Correction formulas are given below.
9	**WF Presentation** Select Day/Night to present the refractometry measurements as photopic and mesopic values, or 3/5 to present the refractometry measurements as values for 3 mm and 5 mm pupil apertures.
10	**Aberrations Aperture** If you selected Day/Night for WF Presentation (above), choose Day to present measurements by default in terms of the photopic pupil aperture, or Night to present them in terms of the mesopic pupil aperture. If you selected 3/5 for WF Presentation (above), choose whether measurements should be presented by default in terms of a 3mm pupil aperture or a 5mm pupil aperture.

Tonometer corrections formulas:

Ehlers 1

Formula:

Corrected IOP = Measured IOP – (CCT-520) × 5/70

CCT is the central corneal thickness in mm

Reference:

Ehlers N, Bramsen T, Sperling S. Applanation tonometry and central corneal thickness. Acta Ophthalmol (Copenh) 1975; 53: 34–43

Whitacre

Formula:

Corrected IOP = Measured IOP – (CCT-560) × 2/100

Reference:

Whitacre MM, Stein RA, Hassanein K. The effect of corneal thickness on applanation tonometry. Am J Ophthalmol 1993; 115: 592 – 596

Doughty 1 (for normal eyes)

Formula:

Corrected IOP = Measured IOP – (CCT-535) × 1.1/50

Reference:

Doughty MJ, Zaman ML. Human corneal thickness and its impact on intraocular pressure measures: a review and meta-analysis approach. Surv Ophthalmol 2000; 44: 367–408

Doughty 2 (for glaucomatous eyes)

Formula:

Corrected IOP = Measured IOP – (CCT-535) × 2.5/50

Reference:

Doughty MJ, Zaman ML. Human corneal thickness and its impact on intraocular pressure measures: a review and meta-analysis approach. Surv Ophthalmol 2000; 44: 367–408

Ehlers 2

Formula:

IOP correction = -0.0706 × CCT + 38.504

Reference:

Ashish A Patwardhan, Mohammad Khan, Susan P Mollan, Paul Haigh The importance of central corneal thickness measurements and decision making in general ophthalmology clinics: a masked observational study BMC Ophthalmology 2008, 8:1

Dresdner

Formula:

IOP correction = -0.0423 × CCT + 23.28

Reference:

Markus Kohlhaas, Andreas G. Boehm, Eberhard Spoerl, Antje Pursten, Hans J. Grein, Lutz E. Pillunat Effect of central corneal thickness, corneal curvature, and axial length on applanation tonometry Arch Ophthalmol. 2006; 124:471-476

Herndon

Formula:

IOP correction = -0.05 × CCT + 27.25

Reference:

Leon Herndon, Review of Ophthalmology, July 2002 88-90

WF

No	Description
1	**Default Map** Select which maps to display in the Results screen[36] as default

No	Description
2	**Color Palette** The colors for max and min curvature are always the same in the color palette. The size of the interval defines the remaining colors. • ANSI has 21 to 25 steps from red to blue. Specifically for ANSI Z80.23 red, orange, and yellow show the steeper areas of the cornea. Green is an "intermediate" color. Light and dark blue show the flattest areas. • ISO has 26 steps from red to blue • Custom palette has 26 steps from white to blue. The central value is yellow. In the settings you can choose this color palette and apply green as the central value. Note: *In case some value is greater than the highest interval or smaller than the lowest interval, those areas will be as the color assigned to highest interval or the lowest interval respectively.*
3	**Step** Select the default rate of change for the color scale: the range of values represented by each distinct color. Select + to increase the step, or − to decrease it. **Note:** You can manually change the step in the Results screen 36 as necessary. This setting only defines the initial setting. **Note:** When **ANSI** is selected under **Map**, the **Step** is automatically set to *1.0*, and the selection cannot be changed.
4	**Central Value** Select the default middle value for the color scale. Select + to increase the value, or − to decrease it. **Note:** You can manually change the central value in the Results screen 36 as necessary. This setting only defines the initial value. **Note:** When either **ANSI** or **ISO** are selected under **Map**, the **Central Value** is automatically set to *44.00*, and the selection cannot be changed.
5	**Green in the middle** Select this option to orient the palette so that the central value is displayed in green rather than the default yellow. **Note:** When either **ANSI** or **ISO** are selected under **Map**, this option cannot be selected.

No	Description
6	**Display by Default** Selection of the parameters to display in the Results screen 36

Topography

The **Topography** sub-tab of the **Results** tab has two sections. The upper section contains general settings. The **Palette Topography** section contains settings that define how the color-coding of topographic maps will be implemented.

The color palette on the left side of the screen changes dynamically as you change the settings in the Palette Topography section. In addition, when certain settings are selected, other settings in this section are automatically set, and their fields become unavailable. For example, if, under **Map**, you select ANSI, all of the other settings in the section are set automatically and cannot be changed.

Topography sub-tab

No	Description
1	**Default Map** Select which maps to display in the Results screen 36 as default.
2	**Unit** Select the default display units - **mm** or **Diopter** units. **Note:** You can change the units in the Results screen 36 as necessary. This setting only defines the initial units used. **Note:** When **ANSI** is selected under **Map**, **Diopter** is automatically selected in this field, and the selection cannot be changed.

No	Description
3	**Eccentricity** Select the shape format you wish to display: *Eccentricity, P,* or *Q*.
4	**Standard Scale** In this scale, colors correspond to values to ensure uniformity when comparing between maps. There are a few possible standard scales: ANSI, ISO, Klyce/ Wilson and Custom.It is possible to set a custom standard scale by setting the central value and the step. The maximum and minimum values are then automatically determined. Select the default color-coding convention: • **ANSI:** Use the ANSI color-coding convention. All of the other settings in the **Palette Topography** section are set automatically as required by this convention and cannot be changed. The middle value will be set to 44D and step to 1D. • **ISO**: Use the ISO color-coding convention. The scale, central value, and color of the central value, are set automatically as required by this convention and cannot be changed. The middle value is set to 44D and the step can be modifiyed 0.5, 1.0 or 1.5D. • **Klyce**: Use the Klyce Wilson color-coding convention. The middle value is 44.5D and the step is set at 1.5D and cannot be changed in the settings menu. • **Custom:** Allows you to set up the palette as you wish; all of the other settings are available. **Note:** These settings define the *default* settings that are used in topographic maps in the Results Screen[36]. You can always change the units, step, and central value in the Maps Tab[47].
5	**Step** Select the default rate of change for the color scale: the range of values represented by each distinct color. Select + to increase the step, or − to decrease it. **Note:** You can manually change the step in the Results screen[36] as necessary. This setting only defines the initial setting. **Note:** When **ANSI** is selected under **Map**, the **Step** is automatically set to *1.0*, and the selection cannot be changed.
6	**Central Value** Select the default middle value for the color scale. Select + to increase the value, or − to decrease it. **Note:** You can manually change the central value in the Results screen[36] as necessary. This setting only defines the initial value. **Note:** When either **ANSI** or **ISO** are selected under **Map**, the **Central Value** is automatically set to *44.00*, and the selection cannot be changed.

No	Description
7	**Color Palette** The colors for max and min curvature are always the same in the color palette. The size of the interval defines the remaining colors. • ANSI has 21 to 25 steps from red to blue. Specifically for ANSI Z80.23 red, orange, and yellow show the steeper areas of the cornea. Green is an "intermediate" color. Light and dark blue show the flattest areas. • ISO has 26 steps from red to blue • Custom palette has 26 steps from white to blue. The central value is yellow. In the settings you can choose this color palette and apply green as the central value. Note: *In case some value is greater than the highest interval or smaller than the lowest interval, those areas will be as the color assigned to highest interval or the lowest interval respectively.*
8	**Green in the Middle** Select this option to orient the palette so that the central value is displayed in green rather than the default yellow. **Note:** When either **ANSI** or **ISO** are selected under **Map**, this option cannot be selected.
9	**Display by Default** Selection of the parameters to display in the Results screen 36
10	**Help** Click on the help button to open the help manual.

Note: To ensure maximum accuracy, if the examiner accidentally moves the head of the VX120+ so that the patient's eye is not centered in front of the camera view, the device will reposition itself so that it is re-centered in front of the eye. If a maximum decenter tolerance is not met the device will not take a measurement.

10. 7 Export Settings

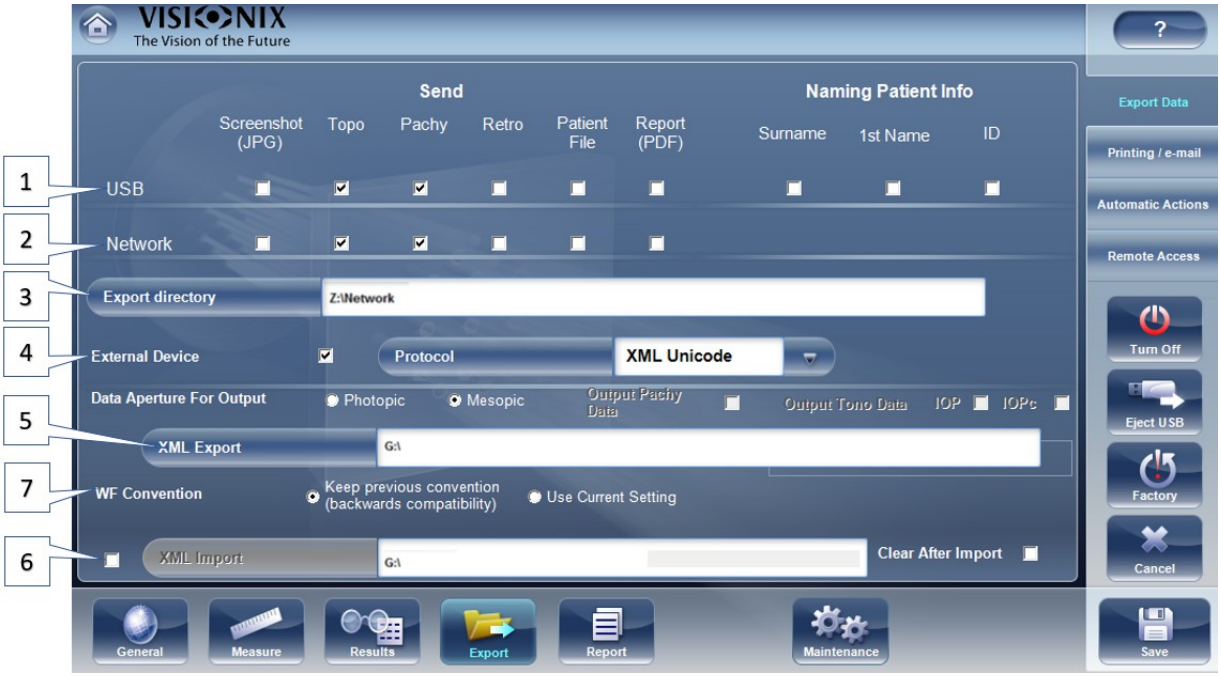
The export settings define the settings that control how the results of the selected (or current) diagnostic can be exported to other devices or printed.

Note: These settings relate to the handling of individual test results. For information about

exporting the entire Patient database, see Exporting and Importing the Database 142.

Export Data

The **Export Data** sub-tab of the **Export** tab contains settings that control what happens when you export the current test results to an external storage device or optometric instrument.



Configuration screen: Export tab, Export-Informatics sub-tab

No	Description
1	**USB** Several file options are available for exporting via USB according to your preferences, fill in the checkboxes of the data you want exported.

No	Description
2	**Network** Several file options are available for exporting via Network according to your preferences, fill in the checkboxes of the data you want exported.
3	**Export Directory** Choose the path to the directory you wish to export to
4	**External Device** Check this box if you would like to export to an external device. External devices are connected with RS232 VXBOX and XML protocols to create XML files sent via the network. This allows file transfer to EMR and other equipment such as VX55, a **phoropter,** and Remote Access. The test results will be transmitted to the device in the selected format. Remote Access may be accessed via the URL path specified in the XML data per patient. Once configured, any computer on the Intranet may view the patient file remotely. Choose the protocol according to the external device - for help please contact a support representative.
5/7	**XML Export (No 5)** After checking **External Device**, select this field to specify the data path to export XML. **WF Convention** (**No 7**) You can select if the export of WF values will be performed in the previous versions' conventions (to keep backwards compatibility with external devices that were already mapped) or in the same **OPD/WFE** convention as the information displayed on screen, as set in the General 163 subtab under the results tab of the settings screen. For more information on OPD/WFE, see Ocular Maps 47
6	**XML Import** Select to Import XML data (patient name and information) from your specified data path. Double click on the box to choose the location of the data to be imported, the press **SAVE**. After configuring the XML import, data will become available for import in the Measurement Screen. For more information, go to Adding a Patient via XML 90.

Settings for Export to a File

The settings in the first section define the destination of exported files, their format, and the patient information they should contain.

The first row defines the settings for exports to devices connected to the VX120+'s USB port. (When you export a file to a USB device, a Windows **Save as** dialog box opens, allowing you to navigate to a folder and specify a file name for the file.)

The second row defines the settings for exporting to devices to which the VX120+ connects via the local network. You can specify the path of the device and the folder on the device in which the files should be saved.

To configure the file-export options:

- To enable exporting to the device connected to the USB port, select the first check box in the **USB** row (i.e., the check box immediately to the right **USB**).
- To enable exporting to a device that can be accessed through the local network, select the first check box in the **Network** row.
- For each option you selected (**USB** and/or **Network**), select the options as follows:

Option	Description
Screenshot (JPG)	Select this option to export the data as a JPG image file.
Patient file	Select this option to export the data as a VX120+ patient file. This creates an XPS file containing the test results and the patient's information (as specified under **Naming Patient Info**) in the format used by the VX120+ database. The test results and patient information can be imported from this file to another database.
Surname	Select this option to include the patient's surname in the exported data.
1st Name	Select this option to include the patient's first name in the exported data.
ID	Select this option to include the patient's ID number in the exported data.

- If you select more than one option, all of the options you select are activated. For example, if you select both Screenshot and Patient file, both a JPG image of the result's Summary tab 38 and a Patient file will be exported.
- If you activated the **Network** option, under **Export directory**, enter the path of the folder in which you want to save exported data. To expedite exporting to a network, we recommend mapping the network drive, for more information go to How to Map a Network Drive.

Printing/Email

The **Printing** sub-tab of the **Export** tab contains settings that control what happens when you choose to export test results to a printer for printing. The left section of the screen configures the printing of *tickets* - printouts from the VX120+'s built-in printer. The right section configures printing that is performed by an external printer connected to the unit's RS-232 serial port or to one of its USB ports.

Note: in order to set an external printer please call technical support or your agent.

Configuration screen: Export tab, Printing sub-tab

No	Description
1	**Ticket** Check this box if you would like to print a ticket with the device's printer
2	**Ticket Header** If you want to include a standard text at the top of each ticket, select the Ticket Header check box, and then enter the text in the lines below it. For example, you could enter your name and address in the lines.
3	**Header Text** Enter the text of the header here
4	**Format** Select the type of printout you want
5	**Character Size** Select either Large print or Small print
6	**Print** Check this box to print using an external printer. You can select to print a Screenshot (of the Summary tab)38and/or Report.
7	**Printer** Select a default printer (only if you are connected to an external printer)

No	Description
8	**Email** Select checkbox to add email options
9	**Test Email** Select this button to send a test email. A confirmation message will appear.
10	**From** Type your email address in this field
11	**Host** Include the host name here, for samples of host names and configurations, go to #16, SMTP.
12	**Password** Type your email password in this field.
13	**Port** This is a field which is sometimes required according to your server configurations.
14	**Colleagues** Type the colleague's name and email address here. Up to 3 colleagues can be included as the default recipient. To add additional colleagues, click buttons 2 & 3.
15	**Laboratory** Type the laboratory's name and email address here. Up to 3 laboratories can be included as the default recipient. To add additional laboratories, click buttons 2 & 3.
16	**Host Configurations** This popup shows possible host configurations, such as SMTP configurations, Port settings.

Email

To configure the Email feature, type in your email address (#8), password (#12), and host (#11) and port (13) specifications listed above. These specifications are liable to vary depending on your particular email service. T

Configuring the Email for Outlook:

Some common email specifications are list here (#16), but may differ than listed here. We recommend using the Test Email button to confirm your email is configured properly. In addition, please make sure that your device is connected to the internet.

Note: Emails cannot be sent automatically to ensure patient privacy. All emails can only be sent via the Export popup from the patient results.

Automatic Actions

The **Automatic Actions** sub-tab of the **Export** tab specifies which export options will be performed automatically when a measure is completed, and which options will appear in the **Export** dialog box.

Configuration screen: Export tab, Automatic Actions sub-tab

To configure the automatic-actions settings:

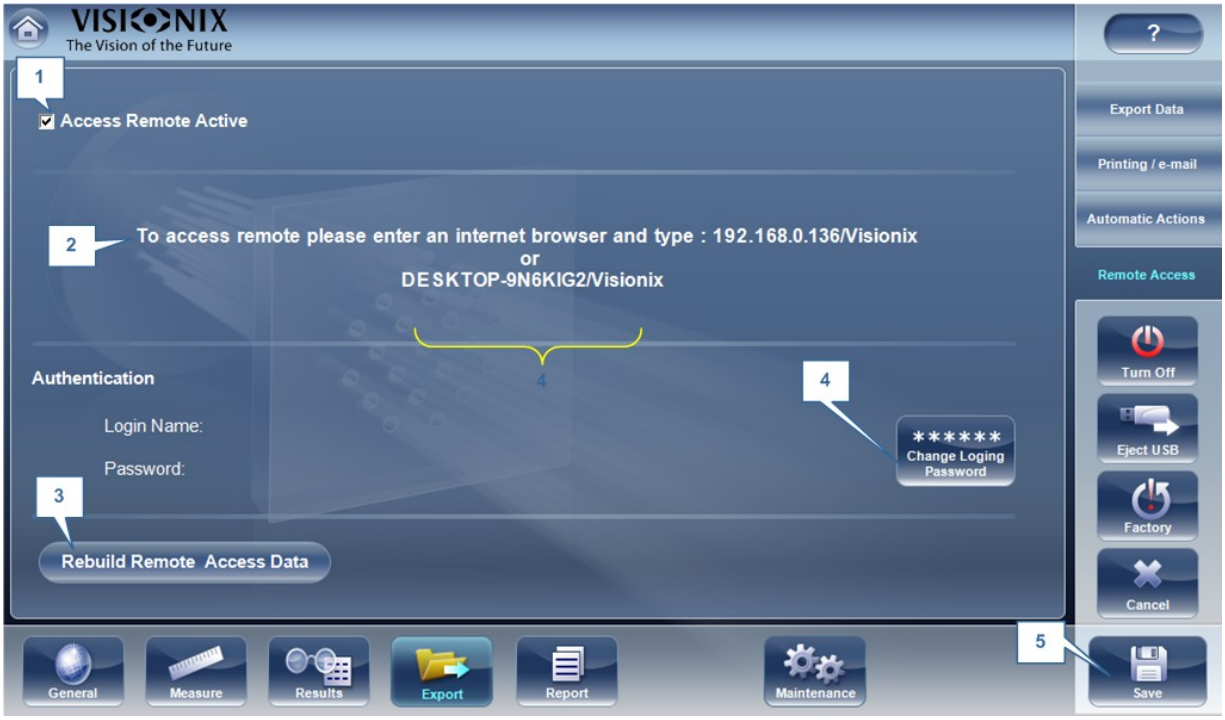
- In the **Automatic Actions** (no. 1) section, select the options that should be performed automatically after a measure is finished (Exporting data (no.2) or Printing (no. 3).
- In the **Selected Items for Export Popup** (no. 4), section, select the options that should appear in the **Export** dialog box (the options available are either for Exporting data (no. 5) or for Printing (no. 6).
- Select **Popup Always Open** (7) to always open the **Export** dialog box when **Export** is selected. Clear this option to automatically perform the actions selected in the **Selected Items for Export Popup** section when **Export** is selected.

Remote Access

Remote Access allows users on the same network to see the results remotely by using the device's IP in the browser. In the browser, you can see the patients list in chronological order, and for each patient, their tests results. All security standards in your intranet may be applied to the VX120+.

You must first define a Login Name and Password before opening the Remote Access, and enter them into the site, otherwise it will not load the data.

To select the data for viewing in the Remote Access site:



No	Description
1	**Access Remote Active** When checkbox is selected, remote access data will be created automatically, after every measurement. To remove this option, unselect checkbox.
2	**IP Address** Displays IP address of Remote Access data site.For example, for the address listed above, you would type in your browser: http://192.168.0.194/visionix/index.html
3	**Rebuild Remote Access Data** Click this button to add Previously taken measurements to the remote access site.
4	**Change Login and Password** To view Remote Access data in your browser, click on this button to save your login and password. You will be required to enter this information when viewing the webservice data.
5	**Save** Allows the user to save the selected preferences

If the Access Remote Active checkbox is selected, data will be automatically exported after every measurement. It may take a few moments for the measurement to appear in the remote access site. If you have data in the VX120+ that is not already in the remote access site, either imported data, or old data that was not exported after the measurement, you have the option of exporting it retroactively.

There are two methods of exporting data retroactively:

1. Exporting just the missing measurements
2. Exporting the entire database.

Please note, option #2 will take a while and may slow down the device. Therefore, we recommend these steps are done while the device is idle.

To export data retroactively, click on the **Rebuild Remote Access Data** button and the following screen appears:

No	Description
1	**Cancel** Cancels selection
2	**No** Once selected, only missing data will be added to the remote access site. Any data already saved in the Remote Access site, will remain.
3	**Yes** This option will save the entire database in the Remote Access site, new data and as well as previously existing data.

Note: Remote access (from intranet) allows viewing images only; data modification, such as replacing data, deleting data, and making other changes are not possible via remote access.

Viewing in Your Browser

Once you have completed the configuration, you can see the maps and data in the browser or your PC, MAC, or tablet with any OS.

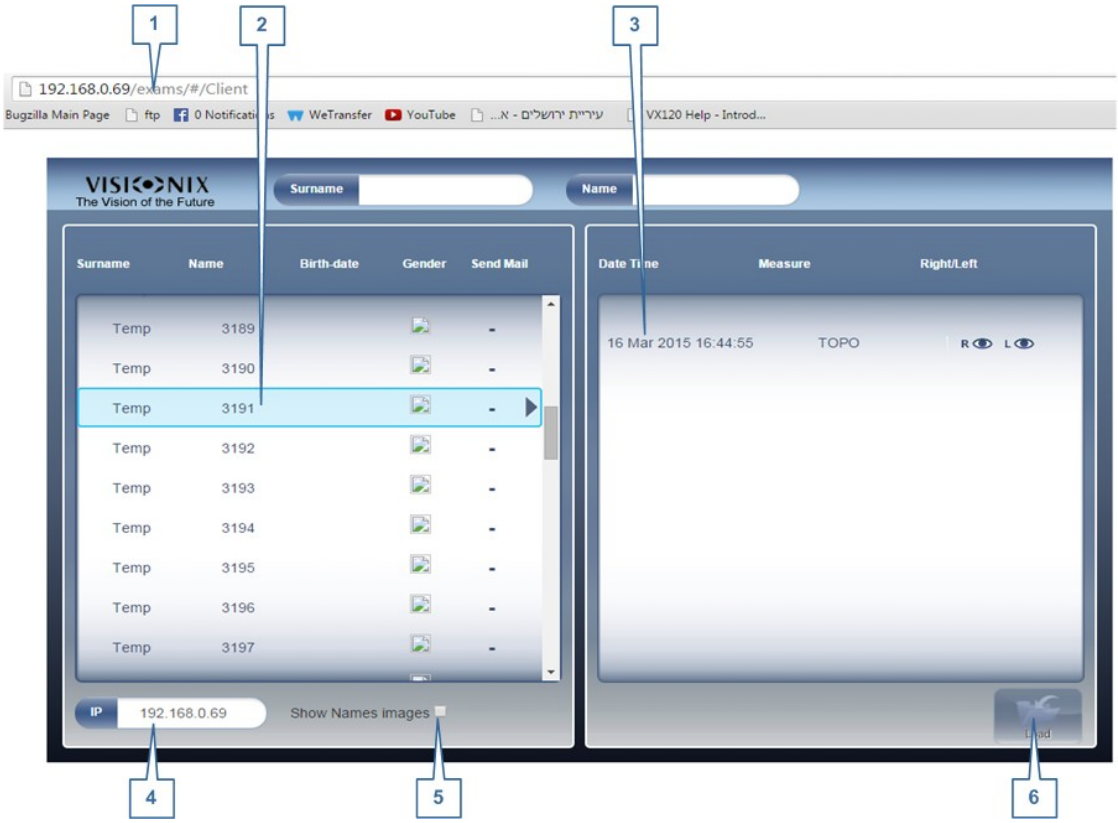
To view Remote Access in your browser:

- Open your browser and enter the IP address listed in the Remote Access[176] menu.
- Enter the username and password configured in the Remote Access settings menu[176].

No	Description
1	**User Name** Enter the user name selected in the settings menu here
2	**Password** Enter the password selected in the settings menu here
3	**Login** Click here to enter the webservice

Note: You need to enter the user name and password to view the webservice. Without entering these fields, it will not be possible to view.

- The following screen opens up:



No	Description
1	**IP address** Type in the IP address listed in the Remote Access menu, may vary from time to time
2	**Patient** Name of patients, including birthday, gender, and email preference
3	**Diagnostic** List of diagnostics and dates measurements were taken
4	**IP address** Identical address as listed in browser, is indication you are connected to site properly
5	**Show Names Images** Select checkbox to view the names of the image files listed in the results
6	**Load** Select to load patient's data

Please note: the first time it may take longer to load the database.

If your Login and password are incorrect, the remote access screen will not load.

- If you choose the option “show name images”, you will see in red on each map and data the original file.
- Select the patient name, select the measurement you want to load and press LOAD

In cases where images are not selected in the settings, they will not appear in the browser. It may take a few minutes before the images appear in the browser. If they do not appear, and they are selected in the settings menu, wait a few minutes and refresh the browser.

- Click EXIT to go back to the database.

Reports

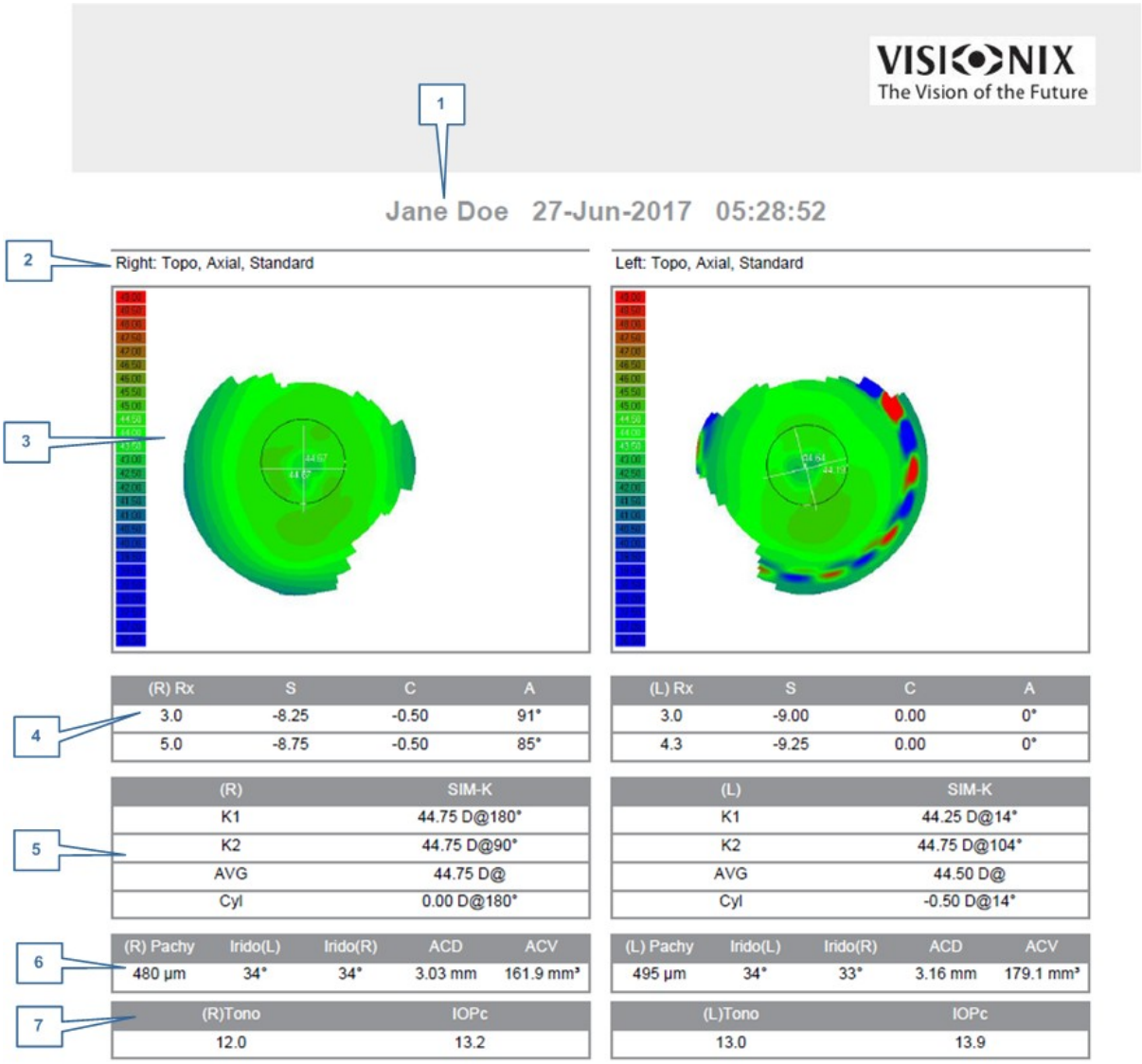
The VX120+ comes with a Report feature, which enables you to view your patient's test results in a clear, concise manner. You can choose the layout and data to be included in a report from over 6 predefined templates, or define your own, custom template.

The report templates included in the VX120+ cover topics:

- Cataract
- Aberrations
- Topography
- Glaucoma
- Mixed/All Diagnostics

For more information about creating a report go to Generating a Report 133

Here is one example of a default report template:



No	Description
1	**Patient Info** Includes patient's name or ID, date, and time of examination
2	**Name of map** Name of map displayed
3	**Map** Displays a map of the selected preference/default setting
4	**Refraction** Displays the refraction data table
5	**Sim K** Displays Sim K data table

No	Description
6	**Pachy** Displays pachy data table: pachy thickness, irideo angle values, and anterior chamber depth
7	**Tono** Displays the tono data table along with IOPc correction

Note: In order for a report to be available in the Export popup from the Results screen, it needs to be selected in Settings>Export>Print: Report

For learning about how to define a Custom report, go to Configuring a Report 184

Configuring a Report

The VX120+ comes with an option to define a custom report . There are 3 screens that you will need to configure in order to complete the report configuration: The title & logo configuration , the maps configuration, and the data table configuration.

Report Menu:

- In the **Settings** menu, select **Report**:

No	Description
1	**Report Templates** Here are several report templates that can be selected. Select the checkbox next to the template you wish to save as default and click **Save**.
2	**Update** This options allows you to edit an existing template. Click on the checkbox next to the template and then select the **Update** button.
3	**New** Click on this button to create a New template for reports.

No	Description
4	**Personalize** This button allows you to change the general layout of all of the report templates including the: Logo, Report Title, Paper Size, and Font Size
5	**Delete** Select the checkbox of the template you wish to erase and click **Delete**.

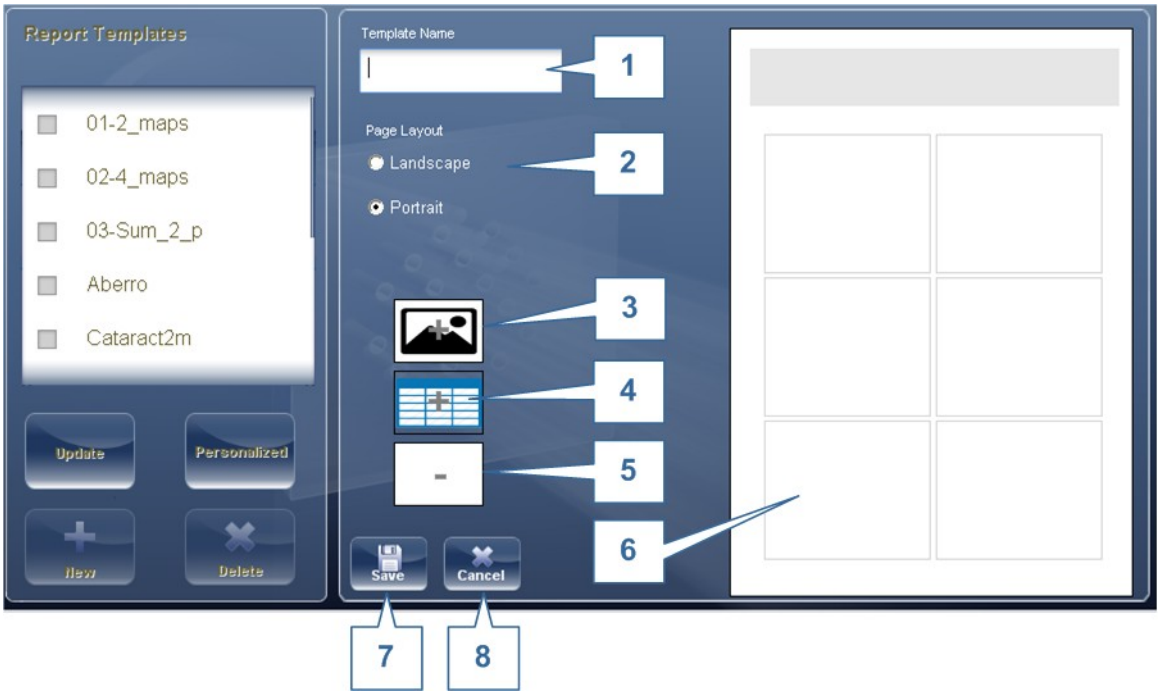
To Edit an Existing Report

No	Description
1	**Name** Select the checkbox next to the report you wish to edit
2	**Update** Click on the Update button
3	**Template Name** Displays the name of the template
4	**Add Map** Click on this image to add a map to the template. Next, click on any available space on the page (#9) to save the map there.
5	**Add Table** Click on this image to add a table to the template. Next, click on any available space on the page (#9) to save the table there.

No	Description
6	**Erase** Select a map or table and then click on this button to erase them.
7	**Map** This is how maps are displayed in the template. To view the map's type, click on it.
8	**Tables** This is how tables are displayed in the template. To view the table's type, click on it.
9	**Available Space** Click on the available space to add a map or a table. Once the space is filled up, it will appear as #7 and #8.
10	**Save** Click on the Save button to save your changes and return to the Report menu.
11	**Cancel** Click on cancel to cancel any changes you made and to return back to Report the menu.

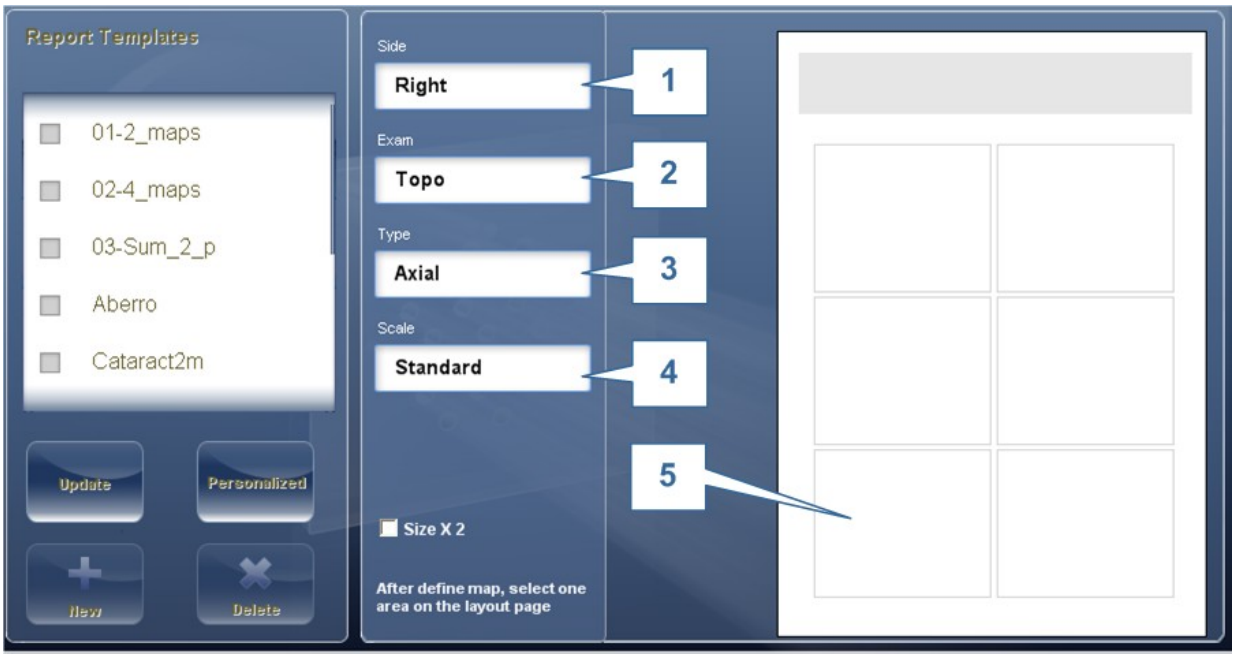
Click on the Update button and select the maps or tables you wish to update. You may add, or erase the maps and tables. To erase first click on the object and then click the **Erase** button. To add a map or table, click on the **Add** button and then click on the Available Space (#9). Once you are finished, click **Save**.

To Create a New Template:

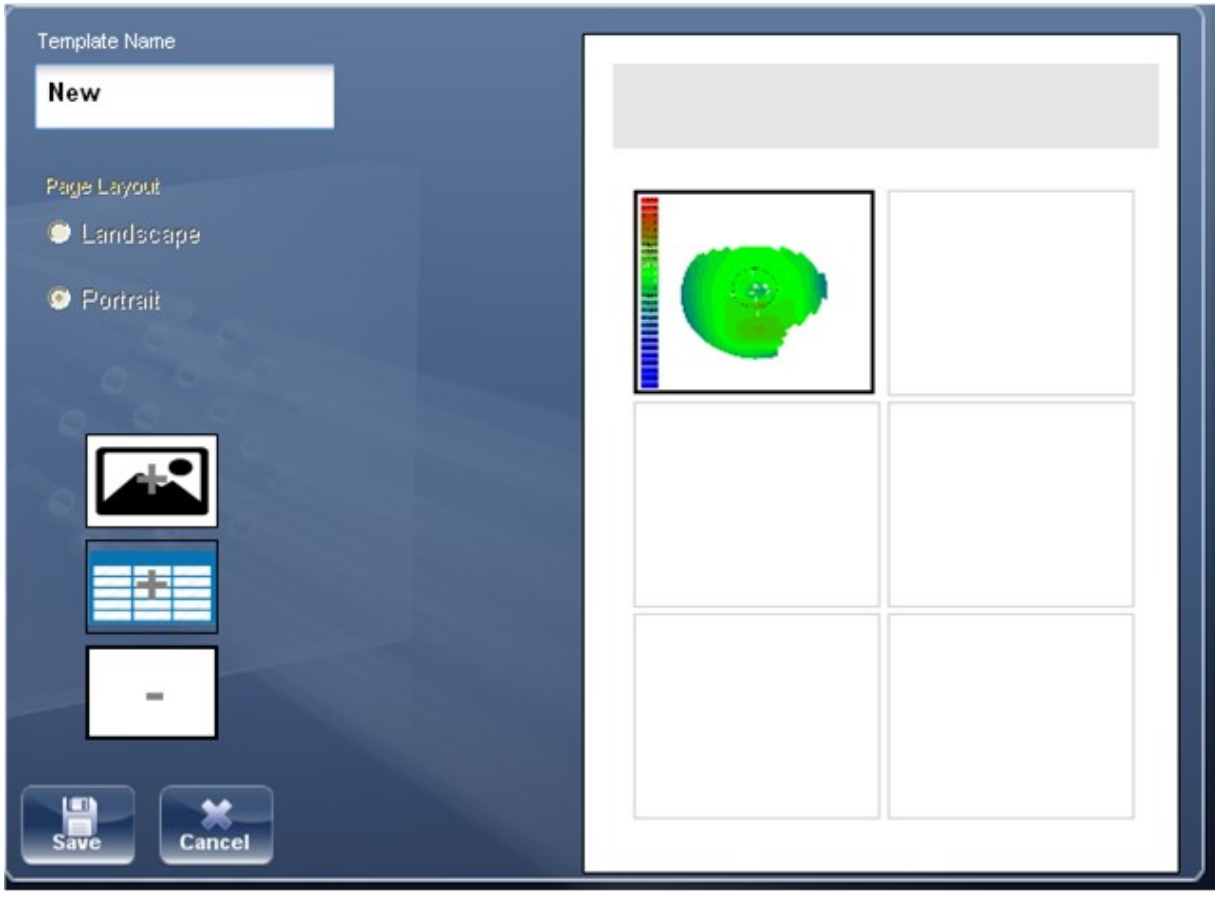


No	Description
1	**Name** Type the name of your new template here.
2	**Page Layout** Select your preferred page layout, Landscape or Portrait
3	**Add Map** Click on this image to add a map to the template. Next, click on any available space on the page (#9) to save the map there.
4	**Add Table** Click on this image to add a table to the template. Next, click on any available space on the page (#9) to save the table there.
5	**Erase** Select a map or table and then click on this button to erase them.
6	**Available Space** Click on the available space to add a map or a table. Once the space is filled up, it will appear as below
7	**Save** Click on the Save button to save your changes and return to the Report menu.
8	**Cancel** Click on cancel to cancel any changes you made and to return back to Report the menu.

After making your selections of template name, page layout, click on button #3 to add a map:



No	Description
1	**Side** Select the eye for the map to be displayed
2	**Exam** Select the exam for the map: Topo, WF, Internal, Pachy, Multi Slits, Retro, or Pupillo
3	**Type** Select the map type you wish to display
4	**Scale** This scale is either Auto or Standard
5	**Available Space** Click on the available space to add a map or a table. Once the space is filled up, it will appear as below

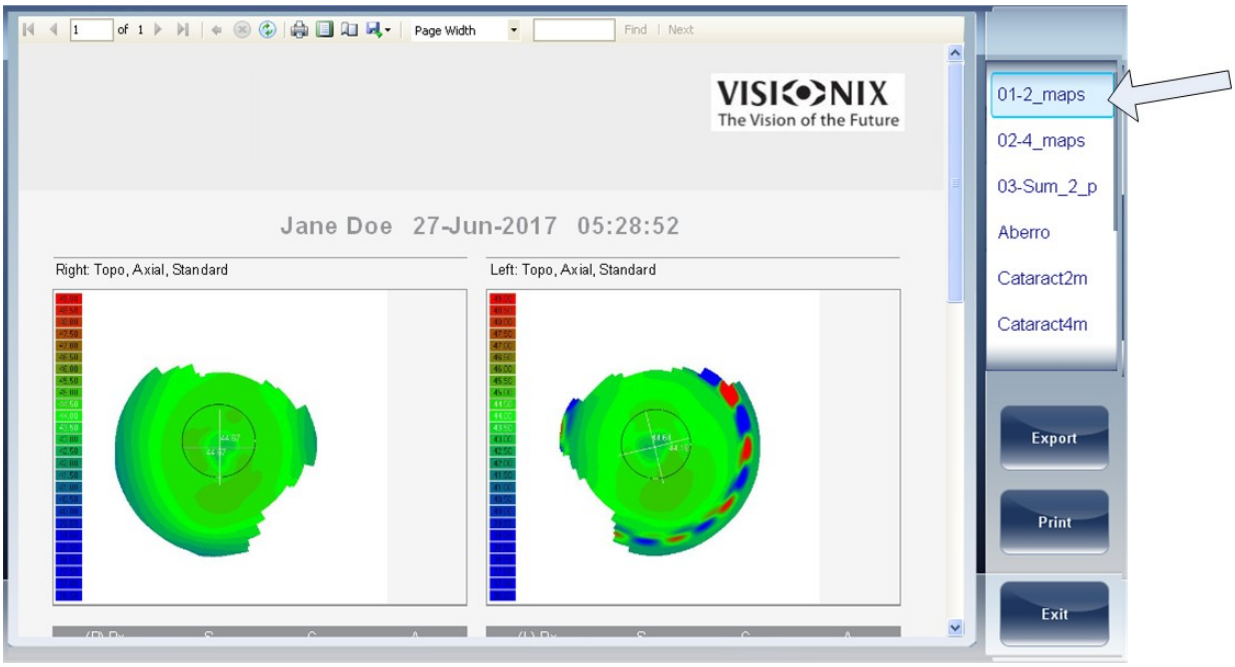


To add tables to the report, click on the table button and follow the same method used for adding maps. At

Note: Before generating a report please confirm it is selected in the Settings menu.

Once you have defined your custom template according to your preferences, it will automatically appear in the **Report Viewer** menu shown here on the right of the dialog box

below:



- Select the template of your choice from the menu, a preview of the report will appear in window.
- Select **Export** to export to external source or **Print** according to your preference
- For more information on creating a report, go to Generating a Report 133

10. 8 Restoring the Factory Settings

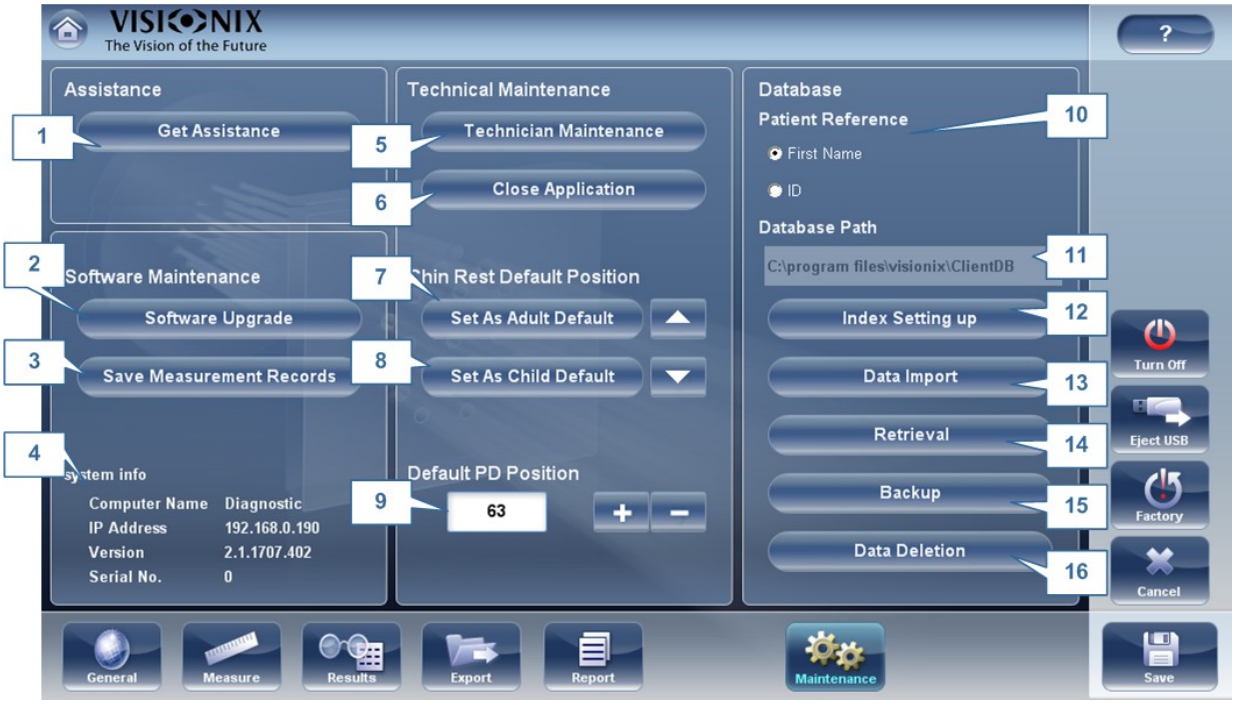
You can return all the configuration settings to their factory-default values.

To restore the factory settings:

- In the **Configuration** screen, select **Factory**. You are prompted to confirm that you want to restore all the factory settings.
- Select **Yes**. The factory settings are restored for all of the configuration settings.

10. 9 Maintenance Screen

The maintenance screen has many tabs that you can access in order to change settings in the overall maintenance of the device:



No	Description
1	**Assistance** Select to open Teamviewer and get assistance[151]
2	**Version** Selecting this button displays the software version number
3	**Software Upgrade** Selecting this option allows you to upgrade software, for more information go to Updating the Software[150]
4	**System Information** Displayed here is the Computer name, IP address, Version, and Serial Number of the unit.
5	**Technical Maintence** This is the technical menu and is password protected to ensure that only an authorized technician has access.
6	**Close Application** Select this button to close the application without restarting the device.
7	**Child Chin Rest Default Position** Select the Child button and use the arrows to adjust the height. This will set the default position for patients under age 14.

No	Description
8	**Adult Chin Rest Default Position** Select the Adult button and use the arrows to adjust the height. This will set the default position for patients over age 14.
9	**Default PD** Use the arrows to adjust the default PD for patients.
10	**Patient Reference** This allows you to display patients by Surname or ID number in the database.
11	**Database path** This displays the path that the database is located.
12	**Index Setting up** This button updates the index of the patient screen. This is recommended after deleting/importing patient records
13	**Data Import** Select this button toimport data 142 from USB or Network
14	**Retrieval** Select to retrieve data 142 from a USB or Network
15	**Backup** Select this button to backup 142 your database, settings menu, or FTP files.
16	**Data Deletion** Select to delete 146 your database.

11. What Should I Do If...?

You may encounter some of the following common problems while working with the VX120+. If you do, try following the suggested solutions listed below. If the problem persists and the suggested solution does not remedy it, contact a qualified service representative or your local distributor.

Problem	Possible Causes	Suggested Solutions
Images are not properly centered	• External lights or windows near the unit • Large patches of light near the unit	• Ensure that there no bright lights or windows near the unit or the patient. • Ensure that there are no large irregular patches of light on the patient or on the unit.
Measured pupil size is different from the expected or actual pupil size	• External lights or windows near the unit • Large patches of light near the unit	• Ensure that there no bright lights or windows near the unit or the patient. • Ensure that there are no large irregular patches of light on the patient or on the unit.
High-order aberrations that differ from what is expected	• Direct light falling on the unit or on the patient.	• Ensure that there no bright lights or windows near the unit or the patient. • Ensure that there are no large irregular patches of light on the patient or on the unit.
Tickets do not print	• Paper jam • Out of paper	• Open the print paper door and release the paper. • Replace the paper roll.

12. Maintenance

This chapter explains how to clean the VX120+ unit and how to perform routine maintenance tasks.

12. 1 Cleaning the Unit

Important!

Before cleaning the unit, turn it off and unplug it from the electric outlet.

To clean the plastic surface of the VX120+, dampen a cloth with a commercial, non-abrasive cleaner and gently wipe the top, bottom, and front surfaces.

CAUTION: Do not spray or pour any liquid directly on the device.

CAUTION: Do not use caustic or abrasive cleaners.

Chin Rest

Regular cleaning of the chin rest with a soft cloth and alcohol is strongly recommended. Chin rest paper coverings are supplied with the device. Use the paper to cover the chin rest after each patient use.

Headrest

Regular cleaning of the forehead rest with a soft cloth and alcohol is strongly recommended. The forehead rest is the only part of the machine that comes into contact with the patient.

12. 2 Replacing the Printer Paper

The printer is mounted on the right side of the VX120+ unit. If the paper roll is used up, the **Printer** LED indicator blinks.

To insert a paper roll into the printer:

- Lift the handle in the middle of the paper compartment and pull the cover down.
- If an empty paper roll is in the printer, remove it.
- Insert the new roll with the end of the paper at the top of the roll.
- Feed the paper into the slot at the top of the compartment.
- Push the paper-compartment door closed.

12. 3 Packing the System

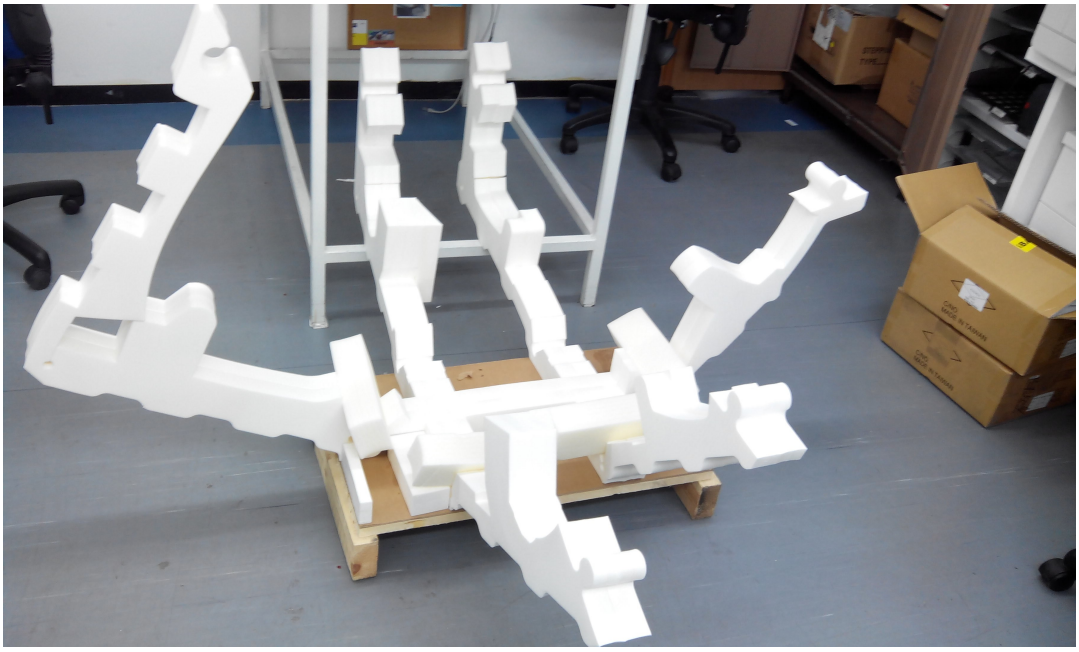
Packaging

Before packaging, shut down the device by clicking the "Turn off" button (from the Home screen, for example). Make sure that the device's head is lowered to its parking position.

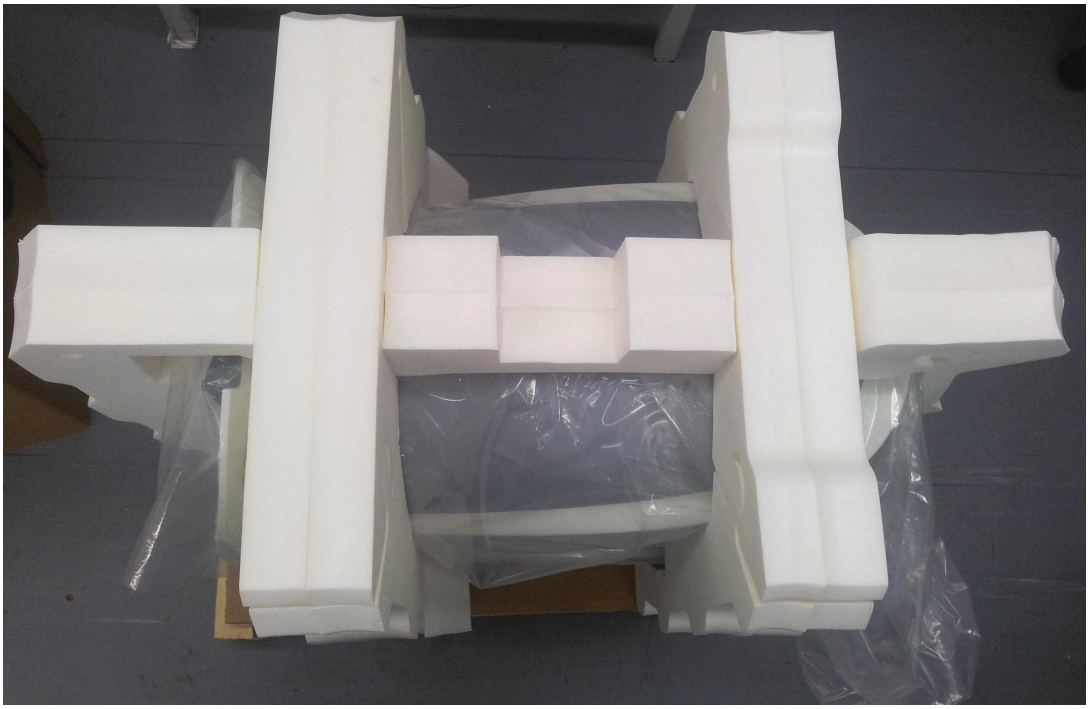
Put the device in the plastic bag:

Open the foam protectors and place the device inside.

Note which side goes to the headrest and which side goes to the screen respective to the foam protector.



Close the foam protector as shown (two steps):



Place the additional foam protector at the center:

Accessories box:

Accessories box location:

Place the cardboard box on top of the device and apply tape to close the box.


VX120

Close the box using the two black bands. Make sure to tighten the bands.

13. Appendices

13. 1 Technical Specifications

Device Specifications

Power supply	100-240 V AC, 50/60 Hz, 300 W
Type of protection against electric shocks	Class 1
Degree of protection against electric shocks	Type BF
IP classification	IPXo
Size (W×L×H)	312mm × 530mm × 570mm
Weight	25 kg

Operating Conditions

Temperature	+10ºC to +35ºC
Hygrometry	30% to 90%
Air Pressure	800 hPA - 1060 hPA

Storage Conditions

Temperature	-10ºC to + 55ºC
Hygrometry	10% to 95%
Air Pressure	700 hPA - 1060 hPA

Transport Conditions

Temperature	-40ºC to 70ºC
Hygrometry	10% to 95%
Air Pressure	500 hPA - 1060 hPA

AR and Power Mapping Specifications

Spherical Power Range	-20D to +20D for vertex distance 12mm
Cylinder Power Range	0D to 8D
Axis	0 - 180°
Measuring Area	2.0 mm - 7.0 mm pupil (3 zones)
Number of Measuring Points	1400 points for 7mm pupil
Working Distance	94mm
Method	Shack-Hartmann

Corneal Topography Specifications

Number of Rings	24
Number of Measuring Points	6144
Number of Analyzed Points	> 100,000
Diameter of Covered Corneal Area at 43D	From 0.75 mm to > 10 mm
Diopters	37.5D to 56D
Repeatability	0.03 mm
Method	Placido Disk

Pachymeter Specifications

Measurement Wavelength	455nm no UV
Measurement Range	150µm - 1300µm
Accuracy	< 5µm
Method	Static Schiempflug / Scan Scheimflug

Tonometer Specifications

Calibrated Range	7mmHg – 44mmHg
Accuracy	+/-2 mmHg
Method	Non-contact air puff applanation tonometry

Retroillumination Specifications

Measurement wavelength	850nm
Method	Retro led

LCD Screen Specifications

Screen type	TFT LCD
Touchscreen type	Capacitance type
Size	10” WSVGA resolution (1024 × 600 pixels)
Contrast ratio	500
Typical luminosity	250 Cd/m2

In a clinical comparison with a Goldmann tonometer on 231 eyes covering the range 7 – 33 mmHg, 95% of measurements with the VX120+ tonometer were within ±5mmHg of the Goldmann tonometer measurements.

13. 2 Clinical Studies

Pachymeter Study:

A clinical study was performed including 68 normal eyes that compared the VX120+ pachymeter function with the Pentacam rotating Scheimpflug camera. Measurements of central corneal thickness (CCT) were recorded. The mean CCT on the VX120+ was 541.74 ±39.76µm (std dev) and on the Pentacam was 535.72 ± 37.93µm. The VX120+ measures 6.02µm thicker than the Pentacam. A Bland Altmann graph showing the average and standard deviations of the measurement differences as well as the 95% confidence levels (std dev × 1.96) and the 99% confidence levels (std dev × 2.58) is shown in Figure A1. The 95% confidence levels for the measurement were from 24.54µm to -16.80µm and 99% confidence levels for the measurement were from 31.08µm to -23.34µm.

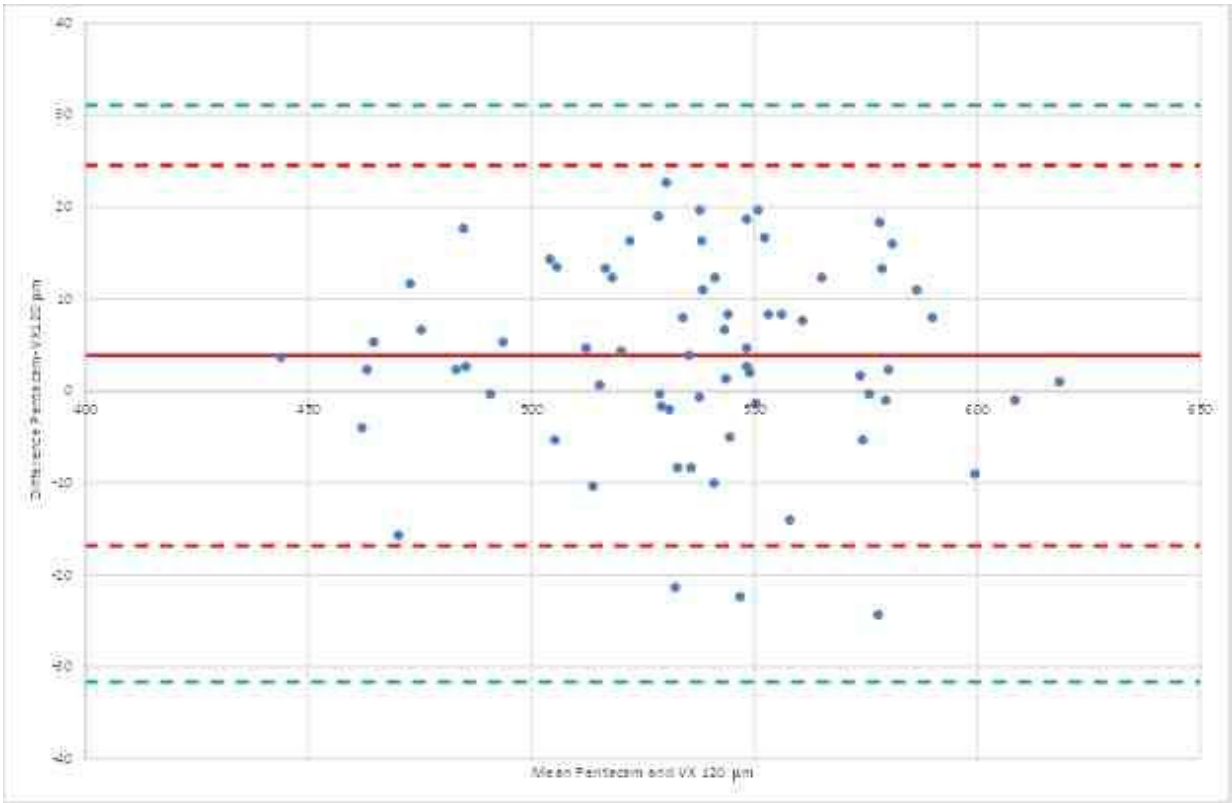


Figure A1: Bland Altmann graph for the pachymeter comparison showing the difference between the reference and test pachymeters, the average difference and 95% (red) and 99% (green) confidence levels.

Tonometry Study:

In a clinical comparison with a Goldmann tonometer on 231 eyes covering the range 7 – 33 mmHg, 96% of measurements with the VX120+ tonometer were within ±5mmHg of the Goldmann tonometer measurements.

13. 3 Conformity to International Standards

The VX120+ conforms to the international standards described below.

- Directives and Standards[211]
- Electromagnetic Emissions[211]
- Electromagnetic Immunity[211]
- Manufacturer
- Waste Electrical and Electronic Equipment (WEEE) Directive[216]

Directives and Standards

The VX120+ complies with the Medical Device Directive 93/42/EC and is in Class IIa (rule 10).

CE 0051

Laser Class: Class 1 Product

- IEC60601-ed.3.1: Medical electrical equipment - Part 1: General requirements for basic safety and essential electrical safety performance.
- IEC60601-1-2 ed.4.: Medical electrical equipment - Part 1-2: General requirements for safety - Collateral standard: Electromagnetic compatibility – Requirements and tests.

Lifetime of the product: 7 years
1rst CE marking : 2013-12

Electromagnetic Emissions

The VX120+ is intended for use in the electromagnetic environment specified below. The customer or the user of the VX120+ should assure that it is used in such an environment.

Emission test	Compliance	Electromagnetic environment – guidance
RF emissions CISPR 11	Group1 Class B	The VX120+ uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
Harmonic emissions IEC 61000-3-2	Class B	The VX120+ is suitable for use in all establishments, including domestic establishments and those directly connected to the public low voltage power supply network that supplies buildings used for domestic purposes.
Voltage Fluctuations And Flicker IEC 61000-3-3:2013	Complies	

Electromagnetic Immunity

The VX120+ is intended for use in the electromagnetic environment specified below. The customer or the user of the VX120+ should assure that it is used in such an environment.

IMMUNITY test	IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
Electrostatic discharge (ESD) IEC 61000-4-2	8 kV contact 2, 4, 8, 15kV air	8 kV contact 2, 4, 8, 15kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.

IMMUNITY test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment – guidance**
Electrical fast transient/burst IEC 61000-4-4	2 kV for power supply lines 1 kV for input/ output lines	2 kV for power supply lines 2 kV for power supply lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	1 kV line(s) to line(s) 2 kV line(s) to earth 2 kV Signal input/ output) to earth	1 kV line(s) to line(s) 2 kV for power supply lines 2 kV for power supply lines	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	0% UT; 0.5cycle at 0°, 45°, 90°, 135° ,180°, 225°, 270° and 315° 0% UT; 1cycle and 70% UT; 25/30 cycles Single phase at 0° 0% UT; 250/300 cycle	0% UT; 0.5cycle at 0°, 45°, 90°, 135°,180°, 225°, 270° and 315° 0% UT; 1cycle and 70% UT; 25/30 cycles Single phase at 0° 0% UT; 250/300 cycle	Mains power quality should be that of a typical commercial or hospital environment. If the user of the VX120+ requires continued operation during power mains interruptions, it is recommended that the VX120+ be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	30 (A/m)	30 (A/m)	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE UT is the a.c. mains voltage prior to application of the test level.			

IMMUNITY test	IEC 60601 TEST LEVEL	Compliance level	Electromagnetic environment – guidance

Conducted RF IEC 61000-4-6	3V, 6V	3V, 6V	Portable and mobile RF communications equipment should be used no closer to any part of the [ME EQUIPMENT or ME SYSTEM], including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance $d = [\frac{3,5}{V_1}]\sqrt{P}$ $d = [\frac{12}{V_2}]\sqrt{P}$
Radiated RF IEC 61000-4-3	10V/m	10V/m	$d = [\frac{12}{E_1}]\sqrt{P}$ 80 MHz to 800 MHz $d = [\frac{23}{E_1}]\sqrt{P}$ 800 MHz to 2,5 GHz where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than the compliance level in each frequency range. D Interference may occur in the vicinity of equipment marked with the following symbol: 
	10V/m from 0.15 to 80MHz; 10V/m from 0.15 to 80MHz and 80% AM at 1kHz	10V/m from 0.15 to 80MHz; 10V/m from 0.15 to 80MHz and 80% AM at 1kHz	
	10V/m from 80MHz to 2.7GHz	10V/m from 80MHz to 2.7GHz	

Recommended separation distances between portable and mobile RF communications equipment and the VX120+				
Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m			
	150 kHz to 80 MHz outside ISM bands $d = [\frac{3,5}{V_1}]\sqrt{P}$	150 kHz to 80 MHz in ISM bands $d = [\frac{12}{V_2}]\sqrt{P}$	80 MHz to 800 MHz $d = [\frac{12}{E_1}]\sqrt{P}$	800 MHz to 2,5 GHz $d = [\frac{23}{E_1}]\sqrt{P}$
0.01	0.12	0.2	0.4	1
0.1	0.37	0.64	1.3	2.6
1	1.17	2	4	8
10	3.7	6.4	13	26
100	11.7	20	40	80

Test specifications for ENCLOSURE PORT IMMUNITY to RF wireless communications equipment							
Test frequency (MHz)	Band a) (MHz)	Service a)	Modulationb)	Maximum power (W)	Distance (m)	IMMUNITY TEST LEVEL (V/m)	Compliance level (V/m)
385	380 – 390	TETRA 400	Pulse modulationb) 18 Hz	1.8	0.3	27	27
450	430 – 470	GMRS 460, FRS 460	FM c) ± 5 kHz deviation 1 kHz sine	2	0.3	28	28

Test specifications for ENCLOSURE PORT IMMUNITY to RF wireless communications equipment							
710 745 780	704 – 787	LTE Band 13, 17	Pulse modulationb) 217 Hz	0.2	0.3	9	9
810 870 930	800 – 960	GSM 800/900, TETRA 800, iDEN 820, CDMA 850, LTE Band 5	Pulse modulationb) 18 Hz	2	0.3	28	28
1720 1845 1970	1 700 – 1 990	GSM 1800; CDMA 1900; GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS	Pulse modulationb) 217 Hz	2	0.3	28	28
2450	2 400 – 2 570	Bluetooth, WLAN, 802.11 b/g/n, RFID 2450, LTE Band 7	Pulse modulationb) 217 Hz	2	0.3	28	28
5240 5500 5785	5 100 – 5 800	WLAN 802.11 a/n	Pulse modulationb) 217 Hz	0.2	0.3	9	9
NOTE: If necessary to achieve the IMMUNITY TEST LEVEL, the distance between the transmitting antenna and the ME EQUIPMENT or ME SYSTEM may be reduced to 1 m. The 1 m test distance is permitted by IEC 61000-4-3.							

Test specifications for ENCLOSURE PORT IMMUNITY to RF wireless communications equipment
a) For some services, only the uplink frequencies are included. b) The carrier shall be modulated using a 50 % duty cycle square wave signal. c) As an alternative to FM modulation, 50 % pulse modulation at 18 Hz may be used because while it does not represent actual modulation, it would be worst case.

Manufacturer

Luneau Technology Operations

2 rue Roger Bonnet

27340 Pont de l'Arche France

Waste Electrical and Electronic Equipment (WEEE) Directive

This symbol indicates that the equipment incorporates electronic assemblies and other components that are subject to the Waste Electrical and Electronic Equipment Directive which advise that such electronic and electrical devices should not be scrapped as ordinary domestic waste.
To avoid environmental risks or other dangers caused by irresponsible scrapping, this product and all its accessories must be disposed of separately in accordance with the practices indicated in the WEEE Directive for EU member countries and in local regulations for other countries. For further information on disposal of this product, please contact your local dealer or the manufacturer.

13. 4 Contact Information

Germany

Luneau Technology Deustchland GmbH

Hammer Dorfstr 35

4021 DUSSELDORF

Tél.: (+49)2131 / 752350

Fax: (+49)2131 / 7523 704

Email : info@weco.instruments.com

Spain

Luneau Technology España S.A.

Calle Corominas 7, Planta 4

08902 HOSPITALET DE LLOBREGAT

Contacto comercial: (+34) 93 298 07 37

S.A.T: (+34) 90 210 40 92

France

LUNEAU LTO

2 rue Roger Bonnet 27340 Pont de l'Arche

Service commercial : 02 32 98 91 32

Service après vente : 09 69 39 50 05

Italy

Luneau Technology Italia Srl

Via Zante 14 20138 MILANO

Ufficio Commerciale : 02 55413251/271

Servizio Assistenza Tecnica : 02 55413253/258

Portugal

Luneau Technology Portugal, Unipessoal LDA

Av. Eng. Duarte Pacheco Emp. das Amoreiras. Torre II.13÷A. 1099-042 LISBOA

Tél.: (+35)1 214 170 225

Linha Verde: 800 205 142

USA

Luneau Technology USA Inc.
224 W James St
Bensenville, IL 60106

Tel : +1 800 729 1959

Export Technical Support

Tél.: (+33) 977556335

techsupport@luneautech.com

Index

- A -

- B -

- C -

- D -

- E -

- F -

- G -

- H -

- I -

- K -

- L -

- M -

- O -

- P -

- Q -

- R -

- S -

- T -

- U -

- V -

- W -

- Z -