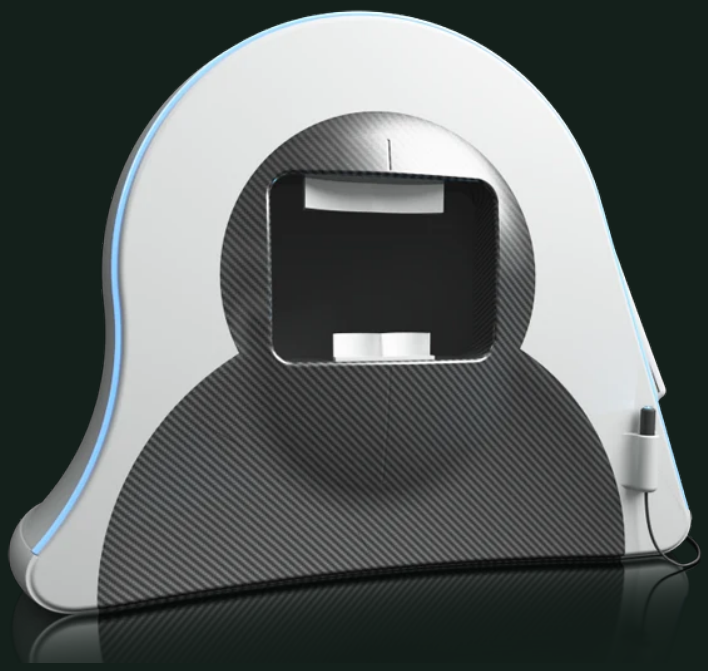
EVOptica

OPHTHALMIC INSTRUMENTS / ENGLISH EDITION

VON

User Manual

TECHNICAL REVIEW EDITION



Full English translation of the supplied manual. Source inconsistencies are identified for technical review. This document is not a released clinical IFU for a new US configuration.

evoptica.com

contact@evoptica.com

About this English edition

This edition translates the supplied original instructions and updates the corporate identity and contact details to EVOptica. It does not change instrument operation, calibration values, treatment parameters or the documented software behavior.

TECHNICAL REVIEW EDITION - NOT A RELEASED CLINICAL IFU

The supplied originals contain unresolved configuration differences, malformed values and, in places, text apparently copied from other instruments. These differences have been identified without guessing a correction. Manufacturer engineering and clinical review is required before releasing instructions for a specific product configuration.

Navigation and original references

Source section numbers below refer to pages in the supplied original. The English layout has its own footer page numbers. The linked section list and PDF bookmarks navigate this edition; original figure, table and contents references retain their source context.

Screenshots and interface labels

Illustrations document the original software interface. Portuguese button labels are retained where needed and paired with English descriptions. This translation does not imply that the underlying software has been localized or that obsolete operating systems and network settings are a new configuration recommendation.

The full configuration and source-review notes appear after the translated instructions. Resolve those notes before releasing this document for a specific instrument configuration.

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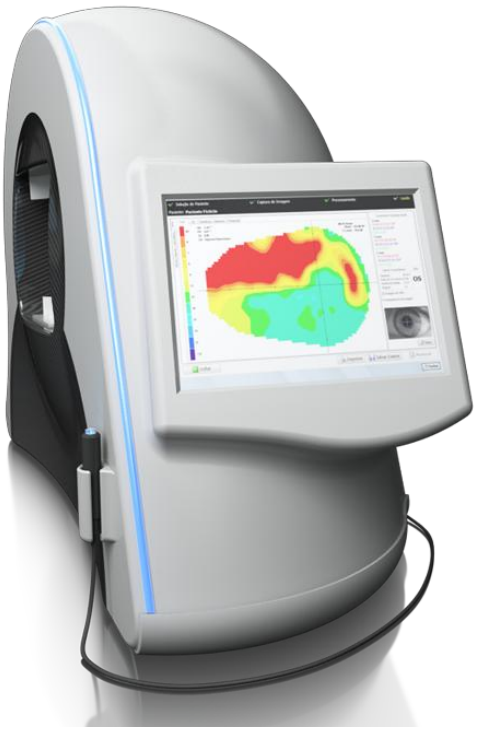
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USER MANUAL

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Original instrument or software illustration. See the English instructions and interface labels in this section.

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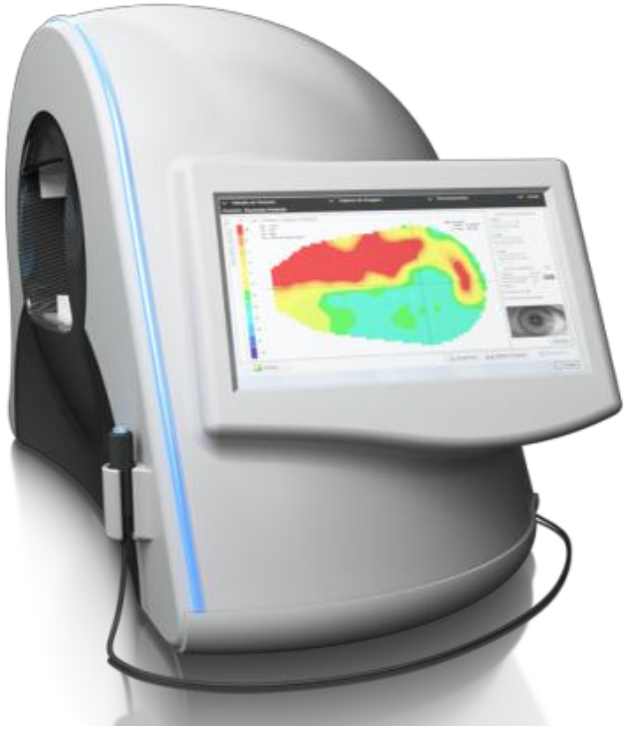
PRODUCT: VON - LED Perimetry System

MODEL: VON 1.0

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Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 3

PARTNERS

EVOptica partners: Our company's success owes much to the support of the organizations, institutions and companies below. We are grateful to them and will continue to count on their support.

SOURCE SECTION 4

CONVENTIONS AND ABBREVIATIONS USED IN THIS MANUAL

ABBREVIATIONS:

USP: University of São Paulo.

UFSCar: Federal University of São Carlos.

IPD: Parqtec Design Institute.

PDF: Adobe Acrobat Reader text format (www.adobe.com).

CCD: Charge Coupling Device, the silicon-sensor technology of the modern CCD cameras used by the VON system.

Note: The optic nerve parameters are all calculated using the metric system, usually mm for linear distances, mm^2 for areas and mm^3 for volumes.

Micrometers: microns or µm.

Millimeters: mm.

Names of buttons and menu items on the software screen are shown between angle brackets (< >).

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1. INTRODUCTION

Congratulations! You have just purchased one of the most advanced visual field analysis systems available. The VON 1.0 Automated Perimeter was developed and manufactured using the most modern technologies available worldwide, following strict quality standards to provide the user with maximum performance, quality and safety. For more information about this and other company products, visit https://evoptica.com.

The VON perimeter was designed, developed and manufactured in Brazil using highly sophisticated techniques. The housing was designed with the same software used by Embraer for aircraft; the optical system used the same software used by Zeiss, along with Windows. Its entire database is based on the Brazilian population.

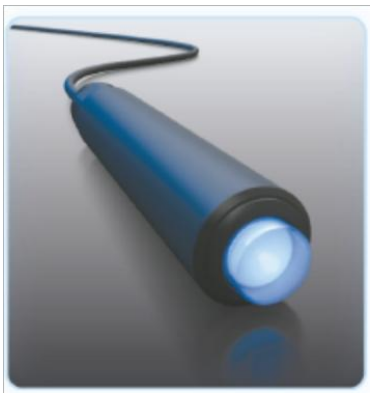
VON software offers numerous features, including major examination strategies compatible with Humphrey, such as full threshold, screening, 2-zone and 3-zone. The island of vision can be displayed in several ways, from grayscale images to three-dimensional maps and color maps. Various print formats are also available, including a dot-matrix printer format compatible with Humphrey reports, and one-click export for email and PDF.

VON has a modern joystick that connects to a USB port. Its illuminated button makes it easier for the patient to see and lets the operator know that the instrument is on and operating. Since it is powered by the USB port itself, it requires no additional wires or computer input ports.

Illustrations - source section 10



Original instrument or software illustration. See the English instructions and interface labels in this section.



SOURCE SECTION 11

1.1. THE FUTURE OF PERIMETRY HAS ARRIVED

VON has a modern, ergonomic design, with a white finish and a carbon-fiber pattern where the patient rests against it. Its paint facilitates cleaning and resists aging. The built-in computer comes with a high-resolution touchscreen monitor for operating the system, viewing exams and accessing the Internet, together with a touch keyboard. A conventional mouse or keyboard is therefore unnecessary if the customer does not wish to use them.

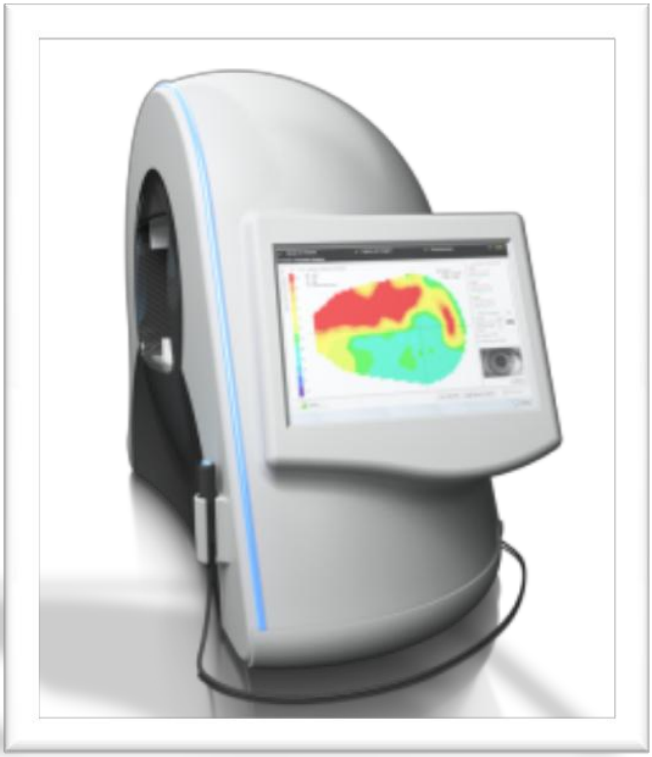
Around the VON housing, a lighting system using super LEDs and optical fiber gently illuminates the surroundings and indicates that the system is operating.

When the exam ends, this light switches off automatically, indicating to the physician and operator (technologist or secretary) that the examination is complete. Since some visual field exams take longer, this completion indicator can be very useful, saving both physician and patient time.

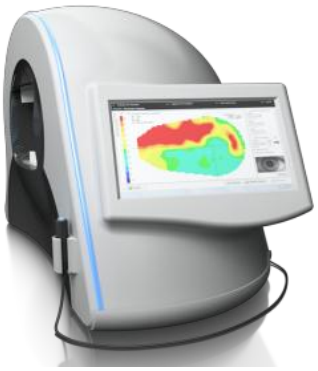
TOUCHSCREEN MONITOR

Every VON includes a powerful Intel-processor computer, genuine Windows 7 operating system, and a motherboard embedded in the housing. The software is factory installed, making the system truly plug-and-play: plug it into the outlet and start using it. The user can add optional accessories of their choice, including an external keyboard, mouse and printer, and use VON's wireless capabilities. The wireless antenna is included. VON permits Internet access, maintenance, upgrades and remote technical assistance by the EVOptica software team.

Illustrations - source section 11



Original instrument or software illustration. See the English instructions and interface labels in this section.



SOURCE SECTION 12

2. MAIN HARDWARE AND SOFTWARE FEATURES

A high point density (more than 200 LEDs) provides precise visual field measurements.

Fixation monitoring (eye tracker) with an infrared camera, live pupil-centroid processing and a graphical indication of fixation over time.

All standard central and peripheral visual field tests and analysis strategies: 2 Zone, 3 Zone, Quantify Defect, Screening, Neurological, Fast Threshold, Fastcan and Binocular.

Customized report printing.

Detailed statistical analysis, result comparisons, retrospective analyses and global indices such as MD, PSD and GHT; statistical indices based on a Brazilian database.

Software controls the entire lighting system, LEDs and examination process, facilitating upgrades.

All hardware is designed and built with PIC microprocessors on a single electronic board, produced in Brazil and easy to access and service.

The entire computer, including the high-resolution color touchscreen monitor and motherboard, is built into the instrument. VON is therefore truly plug-and-play: connect it to an outlet and it is ready for use.

Figure 1 - Specialized technicians.

Highly specialized maintenance technicians and professionals specializing in various fields of knowledge.

Illustrations - source section 12



SOURCE SECTION 13

2.1. PRODUCT

Technical name: Automated Perimeter.

Trade name: Automated LED Perimeter.

Commercial model: VON 1.0.

2.2. BRAND: EVOptica

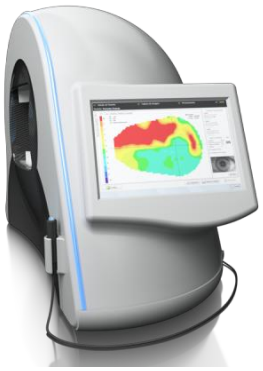
COMPANY CONTACT: EVOptica

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Original instrument manufacturer reference: Brazilian CNPJ 08.109.979/0001-42.

Original instrument technical officer: Engineer Elizeu Benigno Ramos.

Illustrations - source section 13



SOURCE SECTION 14

ATTENTION!

Read all the information in these Instructions for Use carefully before starting to use the equipment.

SOURCE SECTION 15

3. A BRIEF HISTORY OF VON

Von Graefe (right) is credited with introducing perimetry into clinical medicine. In 1855, at age 28, he published a work entitled “Examination of Visual Functions in Amblyopes.” Von Graefe continued ideas first proposed by Helmholtz, who had recommended placing a numbered grid in front of the patient to direct the patient's eye in known directions and maintain attention during fundus examination. Graefe used a slate marked with these grids, creating a tangent screen. He worked at a distance of 18 inches and used a piece of white chalk about 1 cm in diameter as the test object. In addition to chalk, he used various symbols and everyday objects as fixation targets so the patient could recognize visual deficiencies more easily.

His classic articles show that von Graefe was already plotting experimental visual fields of close colleagues and others. He gave examples of scotomas, concentric visual field constriction, blind-spot enlargement and many other visual field problems. Graefe's work is considered fundamental to the later development of visual field measurement equipment in clinical medicine and ophthalmologists' offices.

In recognition of his innovative and fundamental contributions to perimetry, the VON ophthalmic instrument bears its name in memory and honor of the celebrated scientist Von Graefe.

3.1. PRODUCT PRESENTATION

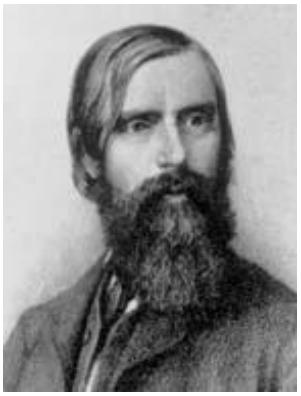
The VON Automated Perimeter was conceived both for ophthalmologists wishing to perform routine examinations and screening and for those wishing to conduct specific, quantitative diagnosis or research on the human visual field. Based on a projection unit and chromatic super LEDs, VON

Figure 2 - Von Graefe.

Figure 3 - VON instrument, front view.

Illustrations - source section 15





SOURCE SECTION 16

serves for both static and kinetic measurements and also offers different contrast patterns, such as Blue-Yellow examination. Its hardware and software features also allow demonstrations, preparation of classes, image export to the Internet or PowerPoint for conference presentations, image processing and other uses.

VON is much more than a console for quantitative visual field measurements. It has a bold, innovative design, compact integrated hardware with a color LCD touchscreen, and software with a database collected from a large sample of the Brazilian population. The original company website reported a UFSCar master's student's work establishing this database. The source describes this as making the system highly reliable for comparisons, since demographic factors are known to influence retinal sensitivity and thus the visual field as a whole to a non-negligible extent. VON hardware and software use Windows 7, allow informative monochrome or color reports, and offer measurement strategies analogous to the Humphrey perimeter's “gold-standard” examinations, among many other options. VON permits functions unavailable on dedicated consoles. The following sections provide the information needed for correct installation and use.

3.2. AN INTRODUCTION TO PERIMETRY

3.2.1. BASIC CONCEPTS

This is a brief introduction to basic perimetry concepts. Campimetry or perimetry is the science of measuring (“-metry”) peripheral (“peri-”) visual sensitivity to measure the visual field (VF). VF may be defined as any part of space visible to the eye at a particular instant. Although the visual field normally combines both eyes' fields, each eye is usually examined separately for diagnosis. Once the VF of each eye is determined, the two may be compared for symmetry or each may be compared with a database of eyes considered to have normal sensitivity.

Figure 4 - Exam screen.

SOURCE SECTION 17

Perimetry has grown considerably in recent years, especially with computers and computer graphics. In 1927, Traquair made an analogy that became a classic in VF [Remo et al., 2001]: the visual field is an “island of vision in an ocean of blindness.” This analogy models the “art” of visual field analysis. Figure 1 [Choplin et al., 1999] shows an example of an island of vision for a patient with a normal VF. With this analogy, perimetry becomes a matter of accurately measuring each patient's VF.

The earliest perimetry methods sought to determine VF limits by moving objects of specified sizes and luminous intensities from invisible to visible regions. Known as kinetic perimetry, this technique is used with tangent screens and the Goldmann perimeter. Changing object intensity and size identifies a contour line of the VF. An area of the VF with lower sensitivity than expected is known as a scotoma. Plotting contour lines on a flat map produces a graph like the lower portion of Figure 2. The upper portion shows a cross-section of the sensitivity profile along a particular meridian.

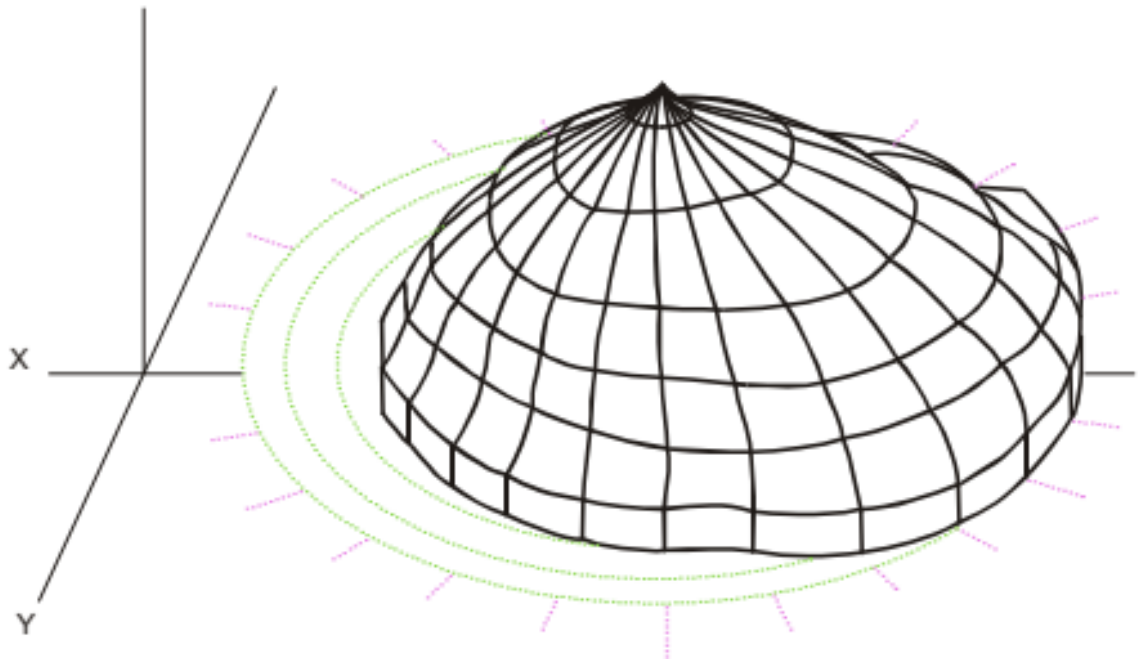
The values obtained are considered “thresholds.” Since the stimuli are at fixed positions, this technique is known as static perimetry.

Performing VF examinations using nonautomated techniques is difficult and complex. To perform perimetry using the Goldmann perimeter in a patient

Figure 5 - “Island of vision in a sea of blindness” [Dias et al., 1992].

Figure 1 - “Island of vision in a sea of blindness” [Dias et al., 1992]. Coordinates x and y indicate retinal position; z indicates sensitivity at that point. Note that peak sensitivity is over the fovea. Z (height).

Illustrations - source section 17



Island of vision in a sea of blindness (source: Dias et al., 1992). X and Y indicate retinal position; Z indicates visual sensitivity. Original vector illustration; source figure numbering is retained in the text.

SOURCE SECTION 18

with glaucoma, for example, kinetic techniques (to determine isopters) and static techniques (to find thresholds in different regions) must be combined. This can take 20-30 minutes per eye. Preparing the instrument and patient, repeating stimuli for enough isopters to draw a map with reasonable resolution, and finally preparing the VF map are all tasks that require attention and considerable time when performed manually. In addition to these inconveniences, subjectivity may influence the final examination result.

Automatic VF measurement systems have been developed over the last 20-25 years, mainly to reduce the importance of subjective factors such as the examiner's previous experience, in-depth knowledge of the examination technique and emotional factors. Procedures previously performed manually can be computer controlled and standardized, minimizing or even eliminating examiner-related subjectivity. The repetitive tasks described above, which require high reproducibility, can be implemented as computer algorithms. Perimetry automation therefore developed with microprocessors and, more recently, extensive use of microcomputers because of their low cost and high performance. Automation enabled the transition from manual examinations (kinetic perimetry) to fully computer-controlled examinations (static threshold perimetry). The latter has proved capable of detecting sensitivity loss, particularly centrally, earlier than older techniques.

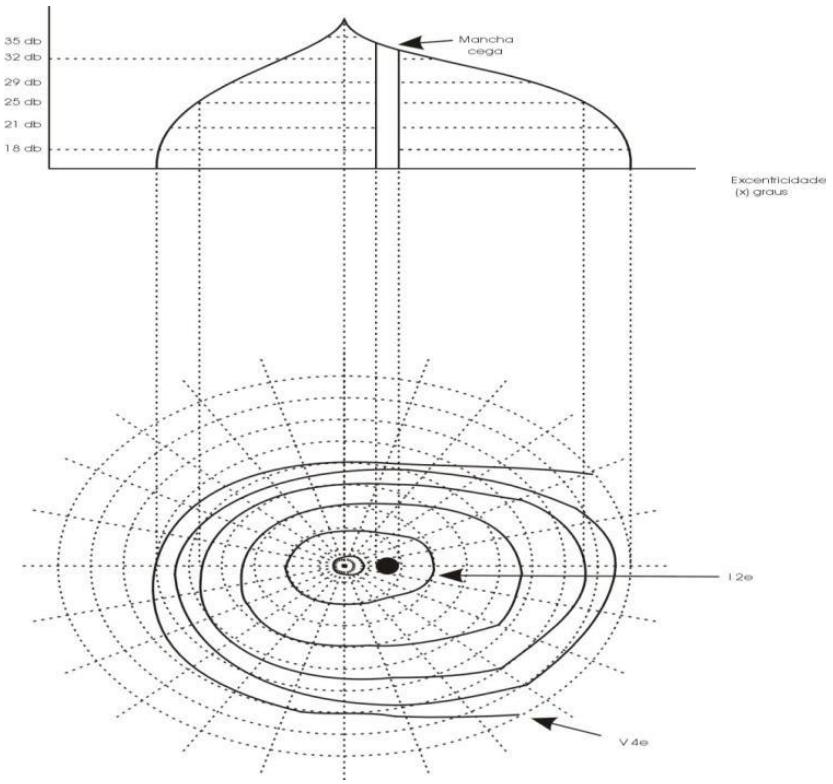
Figure 6 - Contour lines and intensity profiles measured in decibels (dB*).

Figure 2 - Contour lines and intensity profiles measured in decibels (dB*).

At the blind spot there are no cones or rods, because this is where nerve fibers enter to form the optic nerve leading to the brain.

Perimeters normally use the blind spot as a reference when checking patient fixation.

Illustrations - source section 18



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 19

3.2.2. ADVANTAGES OF A BRAZILIAN PERIMETER

Many automated perimeter models have been manufactured and developed by companies and research centers abroad (www.medmont.com and www.humphrey.com) and, in Brazil, www.pclab.com.br, manufactured in Recife, PE. The source identifies a disadvantage of the Brazilian perimeter: examinations are performed on a computer screen rather than a bowl. In theory, a plane would not provide a reliable examination because the visual field should be measured at points equidistant from the retina [Dias et al., 1992]. Actual stimulus intensity is also difficult to calibrate on a computer monitor. Over time, a monitor may lose sharpness and brightness, essential parameters for a quality quantitative examination.

Most imported equipment performs static perimetry, finding sensitivity at multiple VF points, unlike the Brazilian equipment mentioned above. Some models, however, perform automated kinetic perimetry to find VF isopters. They generally use a projection system controlled by small stepper motors and can illuminate any bowl region, unlike systems with fixed light points such as LEDs (Light Emitting Diodes). Although imported equipment has evolved considerably in hardware and software, its algorithms are limited by the demographic information in their databases.

Sensitivity to a stimulus is classified as normal or abnormal by comparison with average data collected from eyes in a given population. This population invariably and inevitably has regional demographic characteristics, such as ethnicity and dietary habits. These matter for VF because they may directly or indirectly affect visual sensitivity.

Any automated perimeter database must contain average sensitivity values at hundreds of points for various ages, from children to older adults, and both sexes. This database is stored on the computer's hard disk and used for every examination. For imported equipment these averages are calculated from

SOURCE SECTION 20

a particular population, generally in the instrument's country or region of development. This warrants concern when, for example, an instrument developed in Germany is used to measure VF in a São Paulo population. Some VF differences, even subtle ones, are to be expected between people of the same age and sex in these populations. This is a principal reason for developing an automated perimeter with algorithms and a database generated exclusively from different segments of Brazil's population. One project objective is to collect data from several Brazilian regions, since demographic diversity is considerable even within Brazil. The instrument will include precision mechanics, accurate moving-stimulus projection systems and light control using precision photometers and microprocessors. Its mechanics, electronics and software will be developed entirely in Brazil through a partnership between Eyetec Equipamentos Oftálmicos, the São Carlos Institute of Physics (IFSC)-USP and the Ophthalmology Department of the São Paulo School of Medicine (EPM)-UNIFESP.

Psychophysical tests are normalized against an age-matched database of normal individuals. This allows discrimination between normal and abnormal findings for the condition concerned. Automated perimetry is no exception. The database must nevertheless be regionalized, because a strategy's sensitivity and specificity vary when the reference population is compared with another population. Classic perimeters such as Humphrey, Octopus and MedMont do not allow local data entry for regional normalization. The only Brazilian perimeter, PCLab, has no database of its own. A national database is therefore needed. In addition to a nationally representative Brazilian database, ideally the instrument would allow still more local data to be included, as is possible in electrophysiology. This would increase the database size and improve its suitability for a particular region.

3.3. PRODUCT DESCRIPTION

SOURCE SECTION 21

The VON Automated Perimeter consists basically of two component categories, broadly divided into hardware and software. The hardware can in turn be divided into two parts:

3.3.1. OPTICAL SECTION

The VON optical head, computer and peripherals.

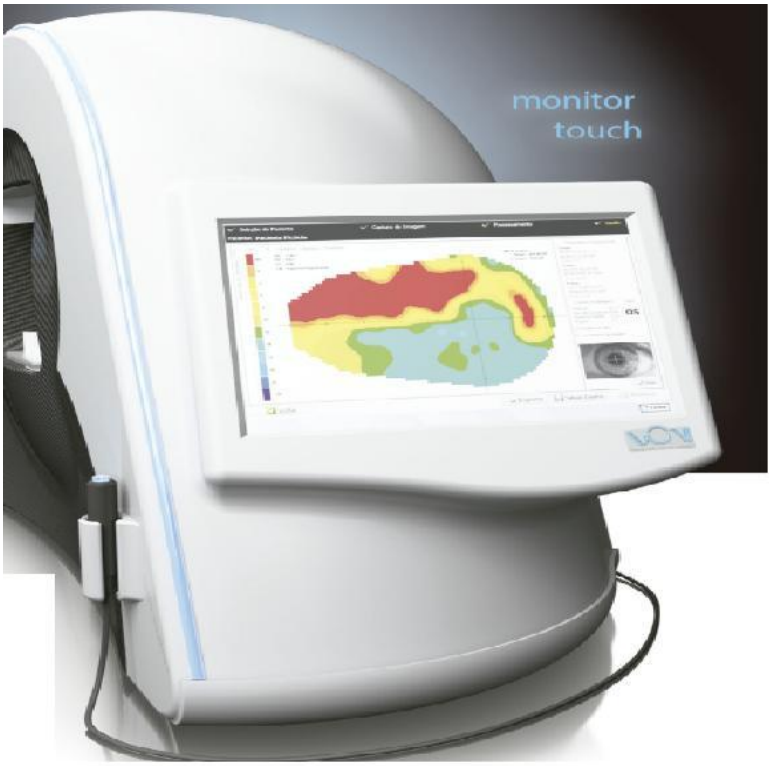
Figure 7 - Photograph of VON perimeter.

Figure 8 - Side with computer.

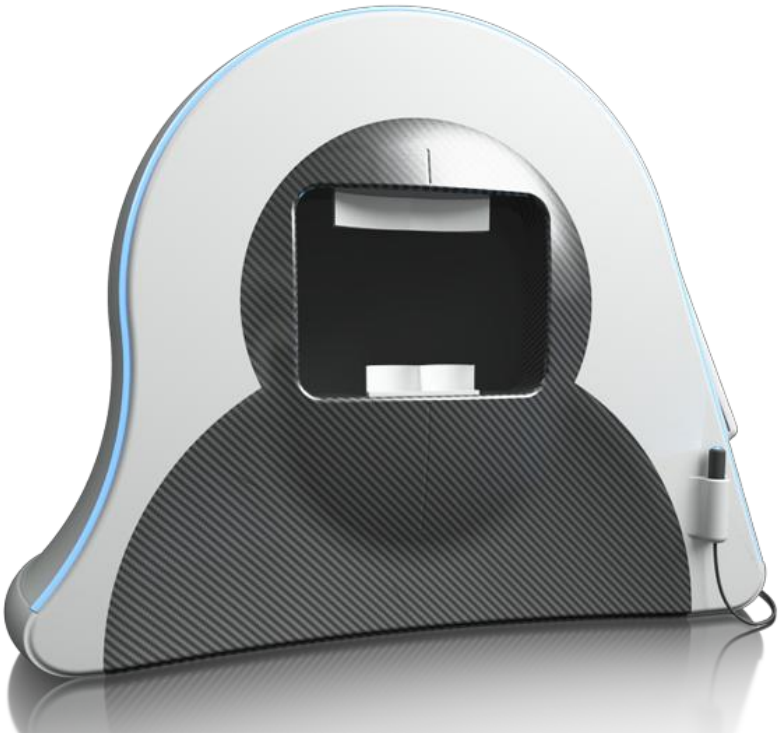
3.3.2. PHYSICAL PRINCIPLE AND TECHNOLOGICAL FUNDAMENTALS APPLIED TO CORRECT PRODUCT OPERATION

VON uses the same principle as the Goldmann perimeter. Every point of its bowl is equidistant from the eye: it is a spherical dome whose center of curvature is the eye being examined. The other eye must be covered with an eye patch (pirate-style). Depending on the chosen examination type and strategy, the VON program will

Illustrations - source section 21



Original instrument or software illustration. See the English instructions and interface labels in this section.



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 22

illuminate the green LEDs at the back of the bowl randomly and at different intensities, so the patient responds to the stimuli using the instrument's joystick (see Figure 5 below).

3.3.3. UNDERSTANDING DIFFERENT TYPES OF PERIMETERS

There are several perimeter models and types on the market. Users need to understand certain concepts to know where the VON Automated Perimeter fits into these categories.

Early perimeter models used only conventional lamps and had no pupil-monitoring system. The projection or stimulus screen was a plane on which lamps lit at different intensities. Seen and unseen points were recorded manually by an operator or physician. This principle remains but has evolved considerably and is now fully automated. Most current perimeters use the Goldmann principle and fall into two categories: projection or LED. This VON version uses LEDs, offering lower cost, greater robustness and less need for servicing. VON also incorporates a touchscreen, powerful Intel computer, Windows operating system, modern design, pupil eye tracking and integrated Wi-Fi.

Another advantage is integration: the bowl and processing unit are fully integrated. The unit is based on an IBM PC-compatible computer running Windows. The VON graphical interface is very easy to use. The final report and software modules are largely automatic and easy to learn. For the most important examination component, the map of patient sensitivities, VON software

Figure 9 - Joystick.

Joystick for patient responses to stimuli. The EVOptica joystick has blue LED illumination for visibility in dark or dim surroundings.

Illustrations - source section 22



SOURCE SECTION 23

allows report printing fully compatible with many other systems, including Humphrey-Zeiss. Report print quality is also much higher than video printers attached to nonmodular systems. These advantages entail greater user responsibility and training. The following sections should therefore serve as a guide with tips to support learning.

3.3.4. PARTS SUPPLIED WITH THE VON AUTOMATED PERIMETER

Bowl, optical head and CPU fully integrated into one unit.

LCD touchscreen monitor (operated by finger touch).

Patient-response joystick system.

Electric height-adjustable table (110/220), optional and purchased separately.

Note 1: No printer is supplied, since the instrument is compatible with any printer with integrated Wi-Fi. The customer may choose one.

Note 2: Every HVON system also includes a USB foot pedal to facilitate retinal photography.

Figure 10 - VON instrument.

Illustrations - source section 23



SOURCE SECTION 24

ACCESSORIES

The components described are supplied with the VON Automated Perimeter and properly accommodated inside the packaging.

OPTIONAL ITEMS

Note: Depending on the configuration chosen at purchase, some previously mentioned accessories may not accompany the product and may be supplied as optional items.

3.4. CONSUMABLES

Not applicable to this product.

3.5. SUPPORTING MATERIALS

Instructions for Use: Quick Guide for Experienced Users and Warranty Certificate.

ATTENTION:

Use of parts, accessories or materials not specified in these Instructions for Use is entirely the owner's responsibility and may compromise the specified warranty period.

3.6. IMAGE PROCESSING

Semiautomatic: The operator clicks predetermined points and the software fills in the remaining points.

SOURCE SECTION 25

3.6.1. ALIGNMENT

Easy, flexible alignment. Alignment is performed entirely by the operator. The chinrest has two types of movement: vertical and horizontal.

Figure 11 - Positioning the patient.

Resistant material that readily adapts to the patient's anatomy.

3.6.2. MONITORING

High-resolution color LCD touchscreen monitor. The user can view the pupil image and examination progress point by point in real time.

3.6.3. SOFTWARE

Very fast and secure. The supplied software is based on Windows 7 and stores thousands of examinations, including images and optic nerve data. Data remain protected and ready for reprinting when needed. Back up all data with one click.

Illustrations - source section 25



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 26

4. STRATEGIES

4.1. AGE NORMAL REFERENCE

Age Normal is the initial distribution for all visual field rings (degrees). Given the patient's age, the initial Z value in dB is calculated from these conditions:

If age <= 45, Z = 24.

If age >= 45 and age <= 65, Z = 21.

If age >= 65, Z = 18.

Once the initial Z value is defined, intensity levels at other points are calculated as follows:

Ring (degree)	Initial brightness (dB)
1°	Z + 3
3°	Z + 3
6°	Z + 3
10°	Z
15°	Z - 3
22°	Z - 6
30°	Z - 9
40°	Z - 12
50°	Z - 15

Table 1 - Age Normal reference.

4.2. 2 ZONE STRATEGY

2 Zone is the fastest available strategy. Before the test starts, initial dB levels are assigned to every point using the Age Normal reference. Each field point is tested only once in the 2

SOURCE SECTION 27

Zone strategy. If the patient responds positively, the point is displayed as “O.” If the patient does not see it, “X” is displayed.

Figure 12 - 2 Zone strategy algorithm.

4.3. 3 ZONE STRATEGY

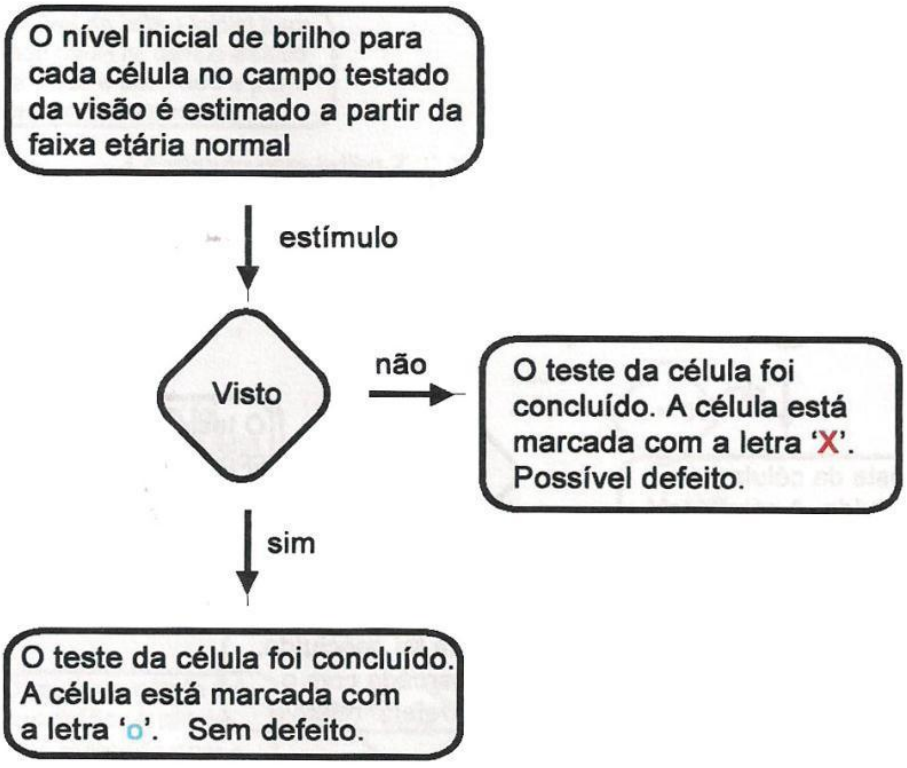
3 Zone is very similar to 2 Zone. Before the test begins, initial dB levels are assigned to all points using the Age Normal reference. Every point is tested as follows: the point is presented at its initial brightness. If the patient responds positively, it is displayed as “O” and testing of that point is complete.

If there is no response, the point is retested at a brightness of 0 dB. If the patient sees this stimulus, it is marked “RD” (relative defect). If it is not seen, “AD” (absolute defect) appears in red.

English labels for the strategy diagram

- Seen? (Visto): yes (sim), no (não).
- Stimulus (estímulo).
- The initial brightness level for each cell in the tested visual field is estimated from the normal age range.
- Cell testing is complete. The cell is marked “O.” No defect.
- Cell testing is complete. The cell is marked “X.” Possible defect.

Illustrations - source section 27



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 28

Figure 13 - 3 Zone strategy algorithm.

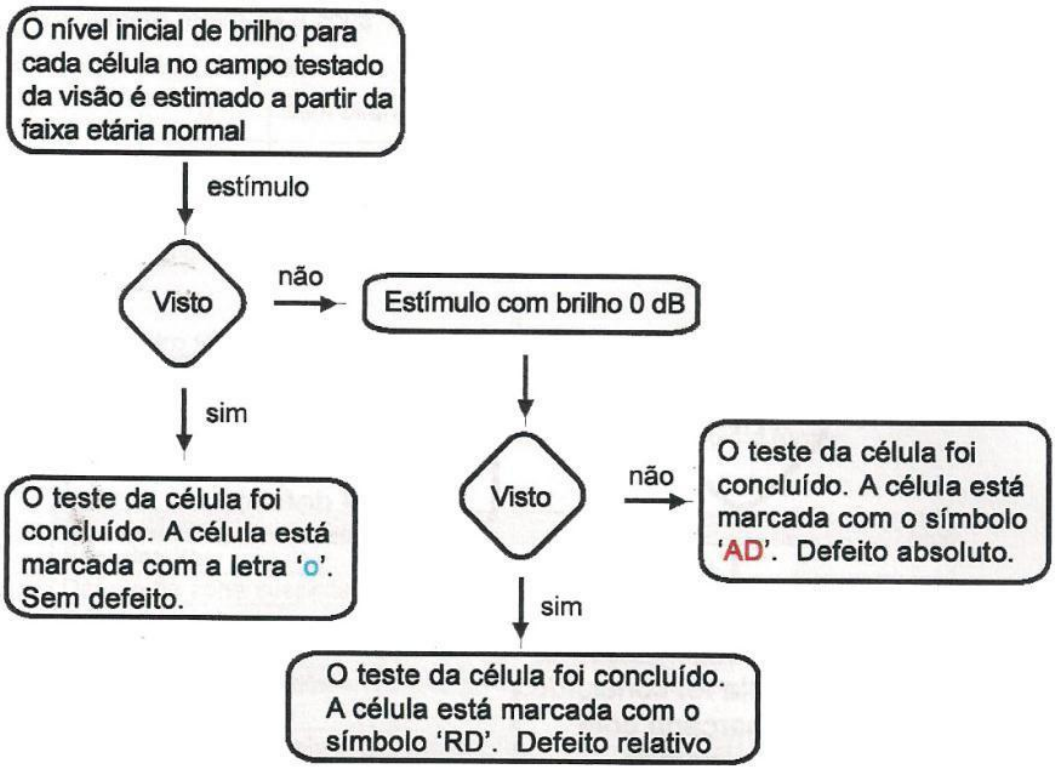
4.4. QUANTIFY DEFECT STRATEGY

Quantified Defect is a simplified version of Screening. Before testing, initial dB levels from the Age Normal reference are assigned to all points, as in 2 Zone and 3 Zone. Each point is tested as follows: it is presented at its initial brightness. If the patient responds positively, it is displayed as “O” and testing of that point is complete. If the initial response is negative, the point is tested repeatedly with brightness decreasing by 6 dB at each interval until a positive response is obtained. If the patient does not see the point, it is marked “X.” If the patient responds positively at brightness level Z, the point is additionally tested at Z + 3 dB. If that response is positive, the result is saved as Z + 3 dB and testing of the point ends. Otherwise, the result is Z dB and testing of that point also ends.

English labels for the strategy diagram

- Seen? (Visto): yes (sim), no (não).
- Stimulus (estímulo).
- The initial brightness level for each cell in the tested visual field is estimated from the normal age range.
- Stimulus with brightness 0 dB.
- Cell testing is complete. The cell is marked “O.” No defect.
- Cell testing is complete. The cell is marked “AD.” Absolute defect.
- Cell testing is complete. The cell is marked “RD.” Relative defect.

Illustrations - source section 28



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 29

Figure 14 - Quantify Defect strategy algorithm.

4.5. SCREENING STRATEGY

Screening is a standard perimetry strategy. First, the four yellow points must be tested to determine initial levels for all field points. All four calibration points are calibrated using Screening. They are initially presented at intensities from the Age Normal reference. Once calibration is complete, the point with the lowest brightness (highest sensitivity) is used to calculate initial dB levels for comparison of field points. If the calibration point

English labels for the strategy diagram

- Seen? (Visto): yes (sim), no (não).
- Stimulus (estímulo).
- The initial brightness level for each cell in the tested visual field is estimated from the normal age range.
- Stimulus with brightness Z.
- Stimulus with brightness Z = Z - 6.
- Z = 0?
- Stimulus with brightness Z + 3.
- Cell testing is complete. The cell is marked “O.” No defect.
- Cell testing is complete. The cell is marked “X.” High probability of a local defect.
- Cell testing is complete. The cell is marked with the value “Z” in white.
- Cell testing is complete. The cell is marked with the value “Z+3” in white.

Illustrations - source section 29



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 30

with maximum brightness N dB is identified, the other points' intensity levels are calculated as follows:

Ring (degree)	Initial brightness (dB)
1°	N
3°	N
6°	N
10°	N
15°	N - 3
22°	N - 6
30°	N - 9
40°	N - 12
50°	N - 15

Table 2 - Screening strategy.

Any calibration point with a dB value below the maximum is retested, starting at the initial level assigned according to the table above.

The second stage presents points at appropriate intensities calculated from the calibration level. If a point is not seen, intensity is increased by 3 dB and the point is retested. Testing of the point stops when the patient responds positively.

SOURCE SECTION 31

Figure 15 - Screening strategy algorithm.

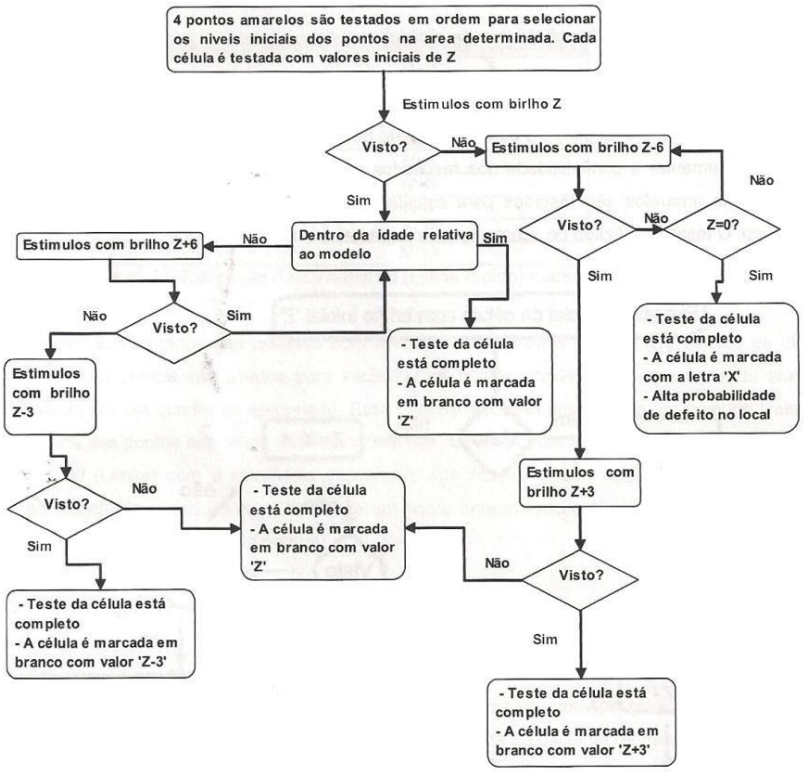
4.6. NEUROLOGICAL STRATEGY

Neurological is based on Screening. Its first stage is identical: four yellow calibration points are tested to calculate initial levels for all field points using the Screening formula. Four randomly chosen points from each quadrant are then selected and tested, from rings located up to 30°. If the points in a given quadrant are not seen, all other points in that quadrant are also considered unseen and are not tested; the entire quadrant is filled with “X.” The remainder of the test follows the procedure described above.

English labels for the strategy diagram

- Four yellow points are tested in sequence to select the initial levels of points in the specified area. Every cell is tested with initial values of Z.
- Stimuli with brightness Z.
- Seen? (Visto?): yes (Sim), no (Não).
- Within the age relative to the model (Dentro da idade relativa ao modelo).
- Stimuli with brightness Z+6.
- Stimuli with brightness Z-6.
- Z = 0?
- Stimuli with brightness Z-3.
- Stimuli with brightness Z+3.
- Cell testing is complete. The cell is marked in white with value “Z-3.”
- Cell testing is complete. The cell is marked in white with value “Z.”
- Cell testing is complete. The cell is marked in white with value “Z+3.”
- Cell testing is complete. The cell is marked “X.” High probability of a local defect.

Illustrations - source section 31



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 32

4.7. FAST THRESHOLD STRATEGY

Fast Threshold provides results very similar to Threshold, while potentially reducing test duration significantly and increasing result reliability. First, four yellow calibration points are tested to calculate initial levels for all field points. Testing follows the rules below.

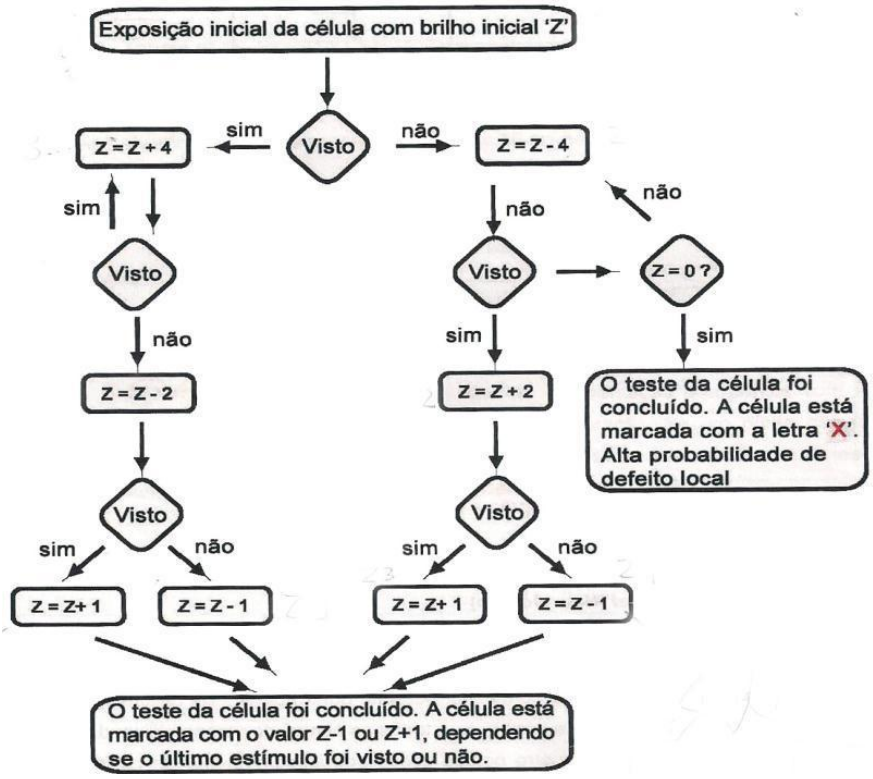
Figure 16 - Fast Threshold strategy algorithm.

A set of points is selected: one point from each ring in every quadrant. They are tested at initial intensities according to the table:

English labels for the strategy diagram

- Initial cell exposure at initial brightness “Z.”
- Seen? (Visto): yes (sim), no (não).
- Z = Z + 4.
- Z = Z - 4.
- Z = 0?
- Z = Z - 2.
- Z = Z + 2.
- Z = Z + 1.
- Z = Z - 1.
- Cell testing is complete. The cell is marked “X.” High probability of a local defect.
- Cell testing is complete. The cell is marked with value Z-1 or Z+1, depending on whether the last stimulus was seen.

Illustrations - source section 32



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 33

Ring (degree)	Initial brightness (dB)
1°	N + 3
3°	N + 3
6°	N + 3
10°	N
15°	N - 3
22°	N - 6
30°	N - 6
40°	N - 9
50°	N - 12

Table 3 - Fast Threshold strategy.

The selected points are tested using Threshold. Their measured dB values initialize nearby points in the part of the ring located in the relevant quadrant. This helps predict a threshold level for 80% of the points not yet tested. Those points are tested using Threshold with Age Normal reference values; testing ends when a point's dB value is at or above the Age Normal value.

4.8. THRESHOLD STRATEGY

Threshold is performed identically to Fast Threshold. The only difference is that Age Normal values are not used as a reference, so the result is the patient's actual retinal sensitivity in dB. Results are highly precise, with sensitivity measured to an accuracy of 1 dB.

4.9. FASTSCAN STRATEGY

SOURCE SECTION 34

Fastcan is performed identically to Screening, except that approximately half of the points in a selected field are tested. This speeds the examination but reduces the spatial resolution of the results.

4.10. BINOCULAR STRATEGY

Binocular tests so-called “binocular single vision.” Both eyes are tested simultaneously. Points are shown at maximum intensity (0 dB). The patient decides whether each point appears single or double. For example, when a single point is seen, the patient presses the response button once; if a double point is presented and is not seen, the patient does not press the button. Points appearing single are indicated by “S,” and double points by “D.” Unseen points are retested and marked “X” if there is again no response.

For Binocular, exposure time = 0.2 s, response time = 1.5 s, waiting time = 0.2 s and fluctuation time = 0.2 s. These times cannot be changed. Fixation monitoring is inactive in the Binocular strategy.

SOURCE SECTION 35

5. STANDARD TESTS

5.1. CENTRAL 22°

Standard central 22° test field. The small number of points shortens test duration regardless of the chosen strategy.

5.2. CENTRAL 30°

Central test field up to 30°. It can be used with Threshold and Fast Threshold because fewer points are tested.

5.3. FULL

The Full test covers 50° of the patient's visual field. Use with 2 Zone, 3 Zone, Quantify Defect or Screening is recommended because of the large number of points and likelihood of a lengthy test.

5.4. GLAUCOMA

The Glaucoma field is a Central 30° field extended nasally to 50°. It can be used to monitor glaucoma regression and is an alternative to Central test fields.

5.5. MACULA

The Macula field covers a small section within 10° of the visual field center. It provides a rapid diagnosis of the patient's macula. Use with Threshold is recommended.

SOURCE SECTION 36

5.6. WIDE

The Wide field is Central 30° extended to 50° in the horizontal plane and is convenient for examining glaucoma regression. For older patients, Wide eliminates the problem of drooping eyelids because it reaches only 30° toward the temples.

5.7. PERIPHERAL

The Peripheral field covers three rings: 30°, 40° and 50°. It is recommended when testing sensitivity in a peripheral part of the patient's retina.

SOURCE SECTION 37

6. FIXATION CONTROL

The VON Automated Perimeter has two fixation-control mechanisms: the Heijl-Krakau method, based on blind-spot position, and eye-position analysis using a video-camera image.

6.1. FIXATION CONTROL WITH THE HEIJL-KRAKAU METHOD

Heijl-Krakau is a classic fixation-control method used in most automated perimeters. It checks blind-spot position by random high-brightness stimulation at eleven points during testing. The blind-spot LEDs lie 11°-19° from the center, between the 0° parallel and the line defining a 15° deviation. This follows eye anatomy and the blind spot's retinal location.

Figure 17 below shows the eleven blind-spot points.

The blind spot is described by these symbols:

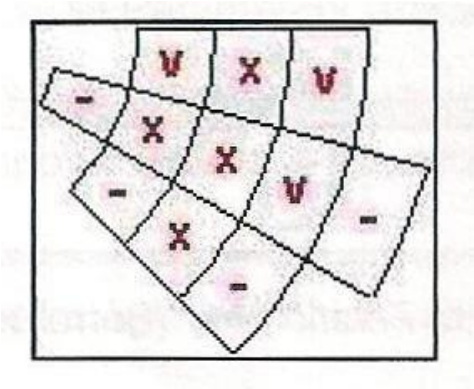
(X) A point not yet tested.

(-) A point with a positive patient response. It is removed from the fixation-control group.

(V) A point with a negative response. It is reused for fixation control.

Figure 17 - Graphical representation of the blind spot.

Illustrations - source section 37



SOURCE SECTION 38

During the first test phase, blind-spot location is checked alternately with the four yellow calibration points. In a calibration-point sensitivity test, testing starts with a complete check of all eleven blind-spot points. The software uses only those of the eleven points not seen during the first verification phase.

Unseen blind-spot points are checked regularly during testing, alternating with stimulus points. Their testing frequency is defined in software settings. The default is 15: on average, the blind spot is tested once every 15 standard measurement cycles.

With correct patient positioning, the blind spot should contain at least five unseen points at its center (diagram A below). Fewer points, or unseen points displaced toward the blind-spot boundaries, indicate incorrect patient positioning.

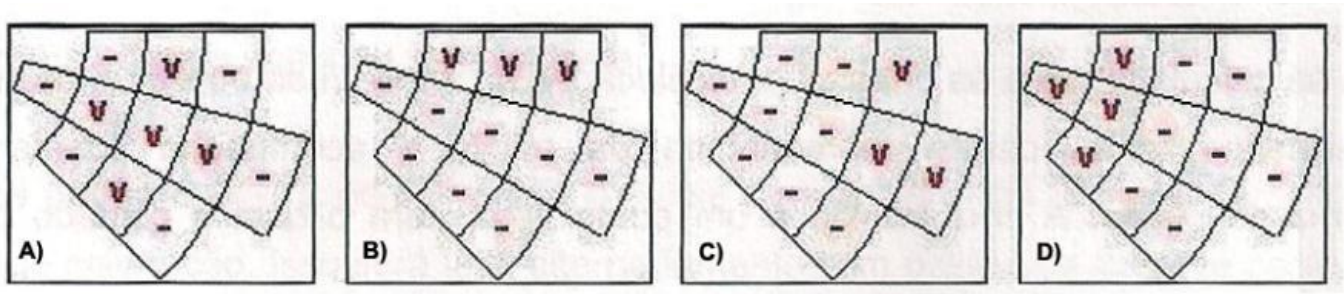
Figure 18 - Examples of blind-spot position.

Diagram B shows the blind-spot field when the patient is too high. Diagrams C and D indicate an extended movement to the left or right. These examples do not invalidate the test results. Highly reliable results are possible even when the blind-spot field indicates one unseen point. Nevertheless, that point must remain unseen throughout the test.

6.2. DIGITAL FIXATION CONTROL

This function analyzes the video-camera image. The pupil is centered in the image and identified using complex software algorithms. Its position is

Illustrations - source section 38



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 39

monitored continuously during testing. When digital fixation is selected, the blind-spot region is not tested. Fixation is checked during every test-point exposure rather than only randomly.

Fixation is calculated between the image's central cross and a point on the patient's pupil image. The point defines the pupil's instantaneous position and continuously follows its movement. The cross is the zero reference from which fixation deviation is counted.

At the bottom of the exam screen, a graph displays instantaneous fixation. Its bars can have three colors:

Black: fixation level cannot be determined, for example because the eye is closed.

Red: fixation loss is excessive.

Green: fixation is within acceptable limits.

Bar height shows the actual fixation level. If the software cannot detect the pupil, for example because the eye is closed, the patient blinks or lighting is incorrect, the instantaneous fixation bar drops to minimum height. The fixation graph is marked by a black line extending from its base to its center.

After every measurement cycle, the instantaneous bar's color and height move along the horizontal fixation graph. Points at which fixation was determined extend from the center upward to the height corresponding to the fixation level.

Digital fixation does not work if the room is insufficiently dark or ambient light is excessive.

SOURCE SECTION 40

7. PARAMETERS AND PRESENTATION OF RESULTS

EXAM PARAMETERS

AGE (IDADE): patient's age.

TYPE (TIPO): test type used during the examination.

STRATEGY (ESTRATÉGIA): chosen strategy defining how points are tested.

EYE (OLHO): examined eye, right or left.

FIXATION (FIXAÇÃO): fixation type used.

WIDE FIXATION (FIXAÇÃO AMPLA): fixation-target type, wide or central.

DATE (DATA): examination date.

TIME (HORÁRIO): examination time.

DURATION (DURAÇÃO): total examination duration.

FALSE POSITIVE (FALSO POSITIVO): informs the user of a patient's response to a stimulus that should not have been seen. The software runs an inactive cycle during the exam, presenting no stimulus, to check for a positive response. Increasing “Fluctuation time” (Tempo de flutuação) during testing is recommended to minimize this error.

FALSE NEGATIVE (FALSO NEGATIVO): occurs when the patient does not respond when a response is expected: the tested point should have been seen. It is tested at points already tested successfully.

FIXATION LOSS (PERDA DE FIXAÇÃO): number of fixation losses based on blind-spot tests, calculated only with Heijl-Krakau fixation control.

STIMULI SEEN (ESTÍMULOS VISTOS): total stimuli seen relative to the total tested.

SOURCE SECTION 41

SLOPE - THEORETICAL SLOPE OF A PATTERN DEVIATION: the expected slope of a Pattern Deviation, expressed in decibels per 10°.

For Screening, Slope is taken as 3.0 dB/10°.

For Threshold and Fast Threshold, it is calculated as follows. The highest-dB point is found in each ring. An average is then calculated for each ring using all points no more than 6 dB below that maximum. Finally, the averages are used to find a virtual line passing as close as possible to them all. Its slope is the theoretical Pattern Deviation slope. The Slope parameter should range from 1.0 to 4.5 dB/10°.

If the calculated value exceeds these limits, the limiting value, 1.0 or 4.5 dB/10°, is used and marked "*."

3° LEVEL (NÍVEL 3°): calculated from tested dB values in the 1° and 3° rings. The highest-dB point is selected as reference. All points differing from it by no more than 6 dB are averaged. This average may be considered a Pattern Deviation sensitivity. If 3° Level cannot be calculated, it is assumed from Age Normal values and marked. For example, if the patient sees no central points, all points used to calculate 3° Level are "X" and 3° Level is displayed as 0 dB*.

ZERO LEVEL (NÍVEL ZERO): the most common dB value in the field.

MEAN (MÉDIA): calculated in dB from every point of the tested field. All unseen points ("X") are assigned a virtual value of -1 dB for averaging.

PATTERN DEFECT (DEFEITO PADRÃO): obtained from an expected Pattern Deviation. Standard deviations are first calculated for values in each ring; these represent local field changes. They are then multiplied by weighting factors. Rings farther from the center have smaller weights, so central local changes affect Pattern Defect more strongly. Pattern Defect is the mean of the standard deviations multiplied by these weights.

SOURCE SECTION 42

Pattern Defect can only have positive values. Additional descriptions depend on its value:

PD range	Description
<0 dB, 3 dB>	PD: N dB
<3 dB, 6 dB>	PD: N dB *
<6 dB, 9 dB>	PD: N dB **
<9 dB, N dB>	PD: N dB ***

Table 4 - Pattern Defect.

A high Pattern Defect indicates more defects and local changes in the visual field. A smooth field without localized defects has a value closer to zero (0). General field depression or elevation does not affect Pattern Defect.

AVERAGE DEFECT (DEFEITO MÉDIO): the average difference between measured values and Age Normal values. Only points considered to come from a Pattern Deviation pattern, the blue points on that map, are used.

Average Defect may be positive or negative. Local changes and defects do not affect it; general field depression or elevation has a strong influence. A depressed field may have a negative value and an elevated field a positive value.

Additional descriptions depend on Average Defect as follows:

AD range (Average Defect)	Description
< -3 dB, 3 dB >	AD: ±N dB
<(-6 dB, -3 dB) (3 dB, 6 dB >	AD: ±N dB *
<(-9 dB, -6 dB) (6 dB, 9 dB >	AD: ±N dB **
(-3N dB, -9 dB) (9 dB, N dB)	AD: ±N dB ***

Table 5 - Average Defect.

SOURCE SECTION 43

GHT - GLAUCOMA HEMIFIELD TEST: compares five zones in the upper half of the field with identical mirrored zones in the lower half. The zones are where glaucoma effects are likely to be observed. They cover the field within 30° of the center. The 1° ring and the five points nearest the blind spot are excluded. The diagram below shows the zones covering the upper field in the right and left eyes.

Figure 19 - GHT glaucoma-region comparison.

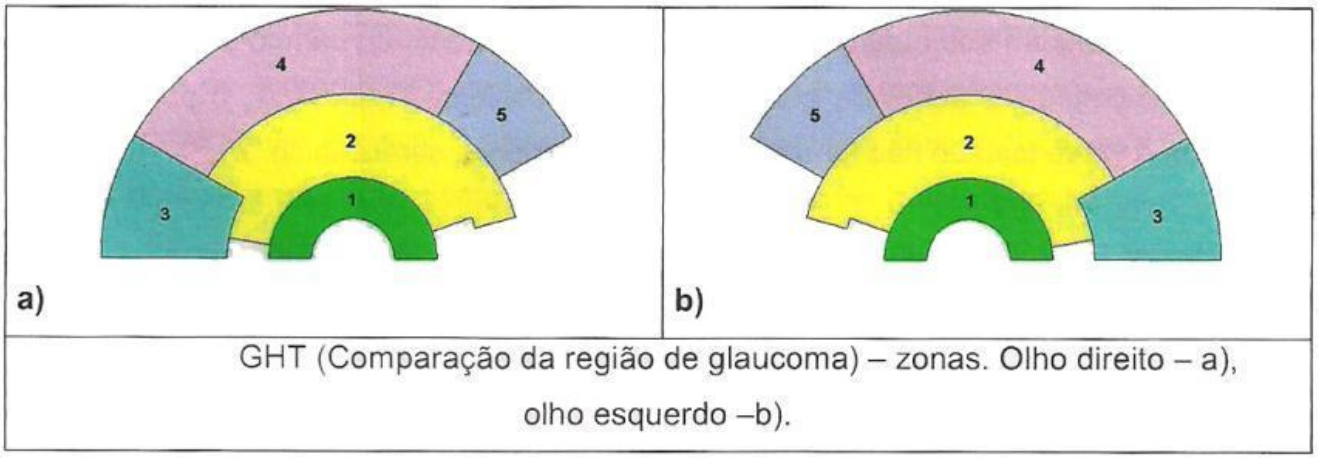
Mean values of mirrored sectors are calculated and compared. GHT has this format:

GHT: +2, -3, 0, +1, -3 SUSPECT ZONE DEFECT

Each value is the dB difference between the means of symmetric zones. The first number refers to zone 1 and the fifth to zone 5. GHT notation is described in the table:

0	No difference
+N	Upper-zone sensitivity is higher by N dB.

Illustrations - source section 43



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 44

GHT notation, continued:

-N	Lower-zone sensitivity is higher by N dB.

Table 6 - Suspect Zone Defect.

If GHT cannot be calculated, it is not displayed.

Additional GHT descriptions are defined as follows:

Description	Classification
No defects	No differences
Suspect zone defect	Difference > 3 dB in one zone
Zone defect	Difference >= 6 dB in one zone, or > 3 dB in two or more zones
Depression in half the field	Difference > 3 dB in three or more zones

Table 7 - Additional GHT descriptions.

SOURCE SECTION 45

8. DECIBEL LEVEL MAP

The decibel level map is a classic presentation of examination results. Every tested field point is represented by its measured value. The map refers to retinal sensitivity: the higher the dB value, the higher the sensitivity. Values may range from 0 to 45 dB. Available graphical formats are:

Numeric; grayscale; color scale; pattern scale; 3D color scale; 3D grayscale.

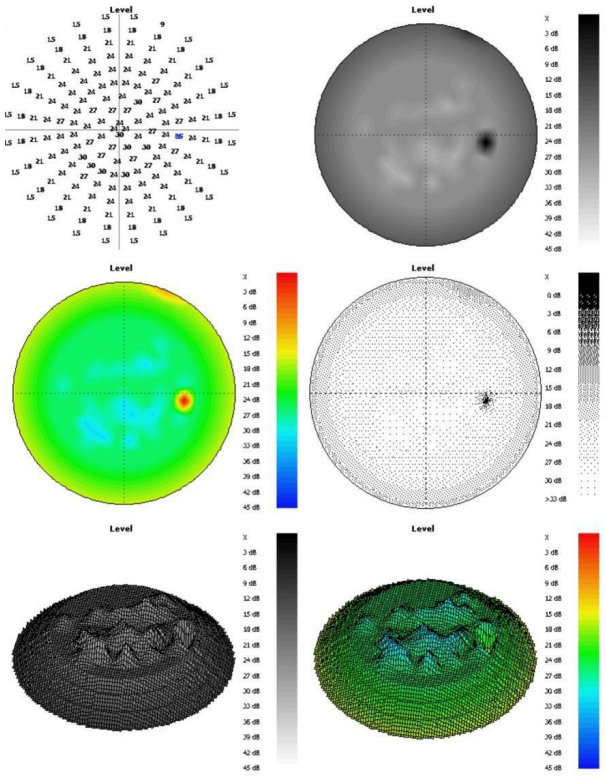
In numeric presentation, all points the patient did not see are marked “X.” “BS” indicates blind-spot location. Values represent retinal sensitivities at the corresponding locations.

SOURCE SECTION 46

Figure 20 - Available decibel-level map formats: numeric, grayscale, color scale, pattern scale, 3D grayscale and 3D color scale.

8.1. HOV MAP - HILL OF VISION - PATTERN DEVIATION

Illustrations - source section 46



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 47

The Pattern Deviation map shows differences between theoretical and calculated Pattern Deviation. The theoretical Pattern Deviation is calculated from two parameters: 3° Level and Slope.

In Screening, Pattern Deviation is considered equal to 3° Level, with Slope = 3 dB. When the theoretical 3° Level = N dB, the Pattern Deviation profile for the rings is:

Ring	Theoretical Pattern Deviation value
1°	N
3°	N
6°	N
10°	N - 3
15°	N - 3
22°	N - 6
30°	N - 9
40°	N - 12
50°	N - 15

Table 8 - Standard Deviation.

For Threshold and Fast Threshold, Pattern Deviation is also considered equal to 3° Level. However, Slope is calculated from the results and may therefore differ for the following rings.

When Slope = Z and 3° Level = N, the theoretical profile is:

Ring	Theoretical Pattern Deviation value
1°	N
3°	N
6°	N
10°	N - Z
15°	N - Z
22°	N - (Z * 2)
30°	N - (Z * 3)

SOURCE SECTION 48

40°	N - (Z * 4)
50°	N - (Z * 5)

40°	N - (Z * 4)

Table 9 - Parameters for Z.

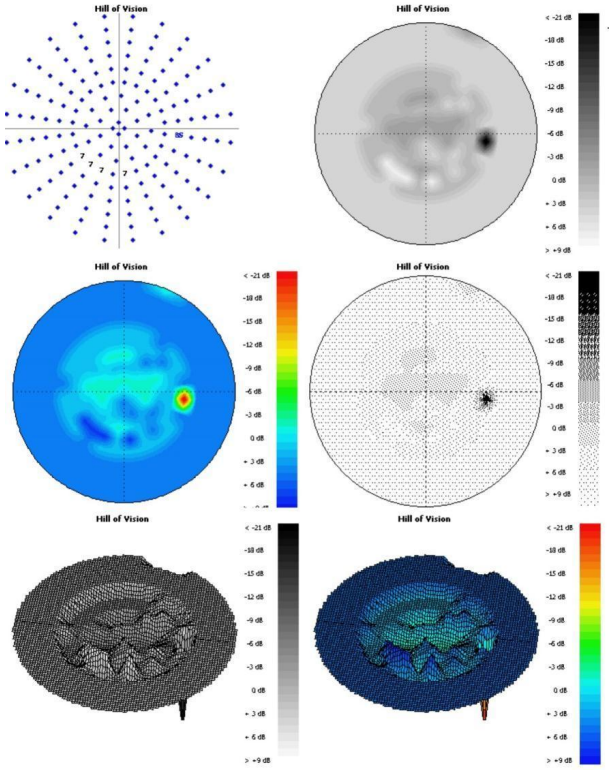
Actual Pattern Deviation values are then subtracted from theoretical values. The result is displayed as a difference map, as illustrated below.

Available formats: numeric; grayscale; color scale; pattern scale; 3D color scale; 3D grayscale.

SOURCE SECTION 49

Figure 21 - Available Pattern Deviation graphical formats: numeric, grayscale, color scale, pattern scale, 3D grayscale and 3D color scale.

Illustrations - source section 49



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 50

8.2. HOV PROBABILITY MAP - HILL OF VISION - PATTERN DEVIATION

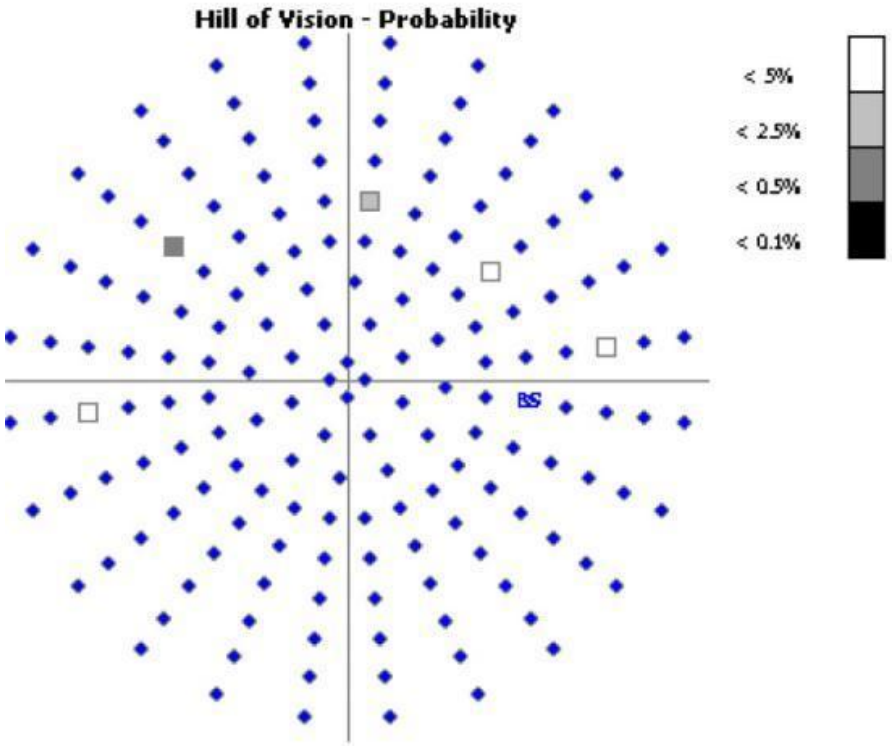
The Pattern Deviation probability map displays a Pattern Deviation defect probability for each individual field point. Probabilities are calculated from differences between theoretical and calculated Pattern Deviation. The lower the probability, the greater the visual field defect.

Figure 22 - Probability map.

Pattern Deviation probability ranges are:

Symbol	Difference between theoretical and calculated Pattern Deviation	Description
Blue dot	<(-6, N)	No defect
White square (unfilled)	<(-9, -6)	Value occurs in less than 5% of the population. Small defect.

Illustrations - source section 50



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 51

Light-gray square	<(-12, -9)	Value occurs in less than 2.5% of the population. Medium defect.
Dark-gray square	<(-15, -12)	Value occurs in less than 0.5% of the population. Deep defect.
Black square	(-N, -15)	Value occurs in less than 0.1% of the population. Very deep defect.

Table 10 - Pattern Deviation probability ranges.

8.3. AGE NORMAL MAP

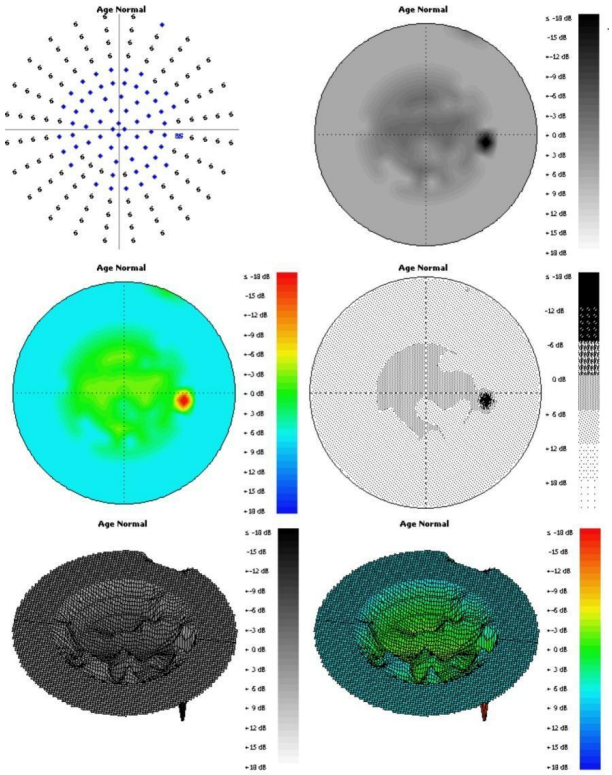
The Age Normal map displays differences between age-normal values and those obtained during the examination. It is thus the difference between theoretical and measured dB-level maps.

Available formats: numeric; grayscale; color scale; pattern scale; 3D color scale; 3D grayscale.

SOURCE SECTION 52

Figure 23 - Available Age Normal graphical map formats: numeric, grayscale, color scale, pattern scale, 3D grayscale and 3D color scale.

Illustrations - source section 52



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 53

8.4. AGE NORMAL PROBABILITY MAP

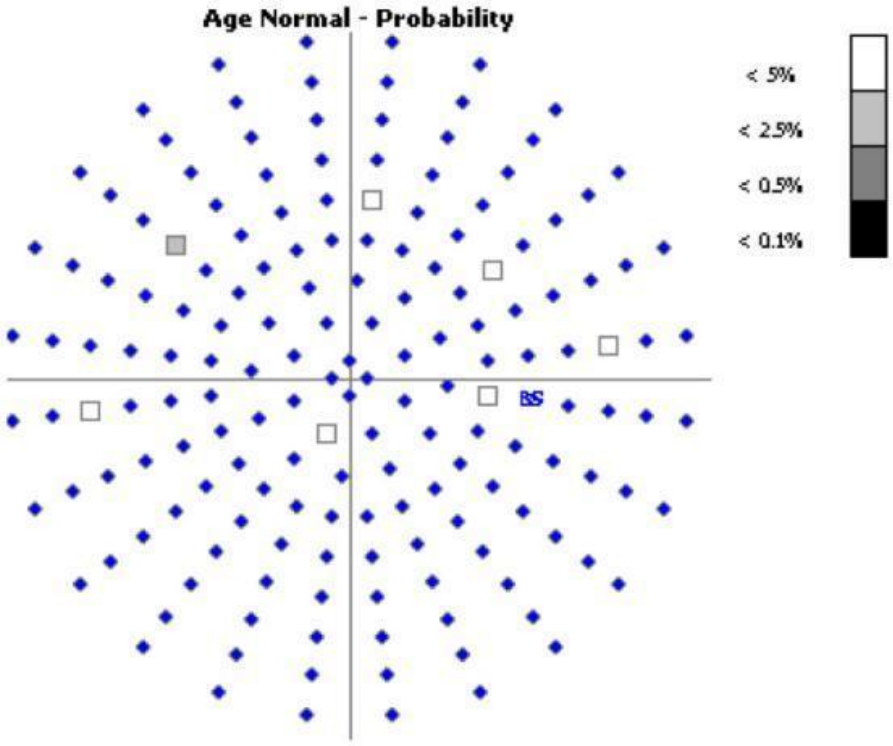
The Age Normal probability map shows a defect probability for each individual field point. Probabilities are calculated from differences between theoretical and calculated Age Normal values. The lower the probability, the greater the visual field defect.

Figure 24 - Probability map.

Age Normal probability ranges are:

Symbol	Difference between theoretical and calculated Pattern Deviation	Description
Blue dot	<(-6, N)	No defect
White square (unfilled)	<(-9, -6)	Value occurs in less than 5% of the population. Small defect.
Light-gray square	<(-12, -9)	Value occurs in less than 2.5% of the population. Medium defect.

Illustrations - source section 53



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 54

Dark-gray square	<(-15, -12)	Value occurs in less than 0.5% of the population. Deep defect.
Black square	(-N, -15)	Value occurs in less than 0.1% of the population. Very deep defect.

Table 11 - Age Normal probability ranges.

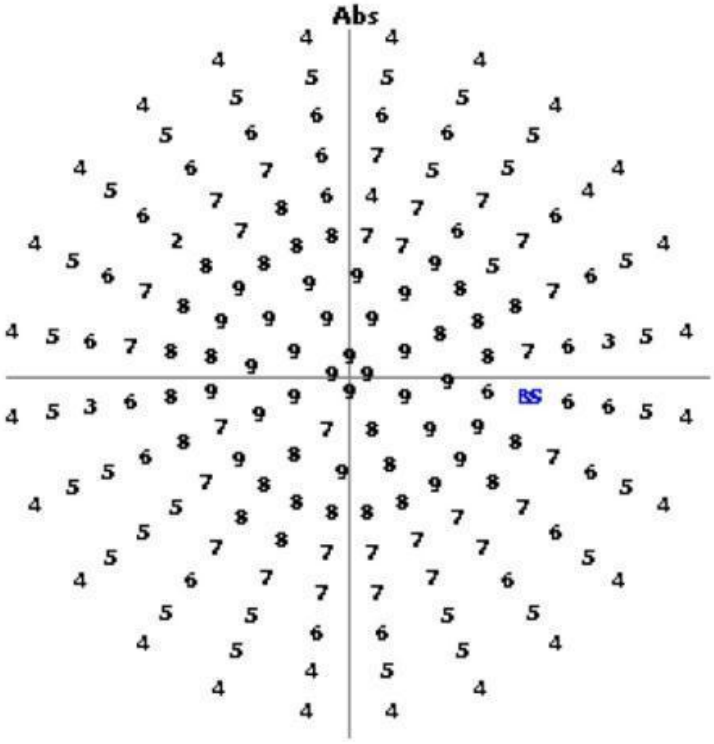
8.5. ABS MAP

The ABS map is obtained by dividing all dB-level map values by 3, reducing the display's dynamic range. Higher values disappear and local changes are emphasized, making the ABS map easy to analyze.

The ABS map is available only in numeric format.

Figure 25 - ABS map.

Illustrations - source section 54



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 55

8.6. NORMALIZED ABS MAP - NORMALIZED

The normalized map is obtained by subtracting Zero Level from all values making up the decibel-level map.

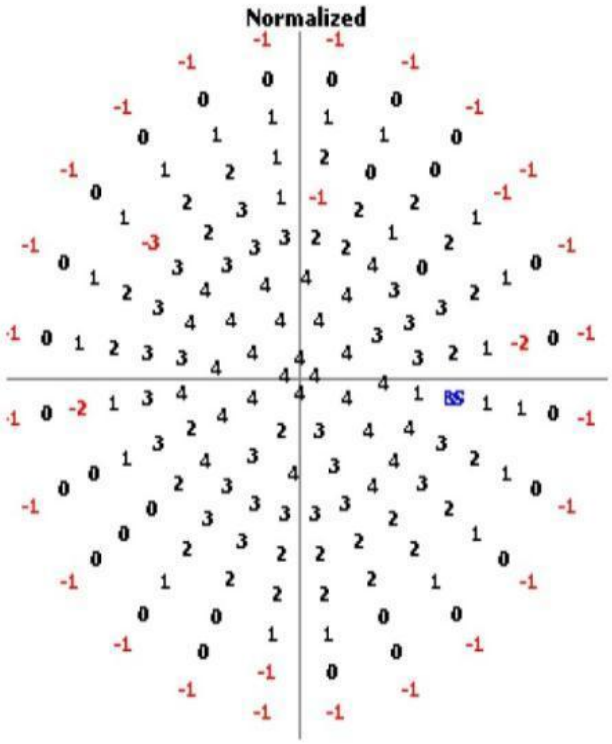
Normalized ABS = ABS - Zero Level

Negative values indicate points with reduced sensitivity and are shown in red. All local changes are thus easier to read.

The normalized ABS map is available only in numeric format.

Figure 26 - Normalized ABS map.

Illustrations - source section 55



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 56

9. DEFECT GRAPH - BEBIE CURVE

The defect graph summarizes defects in an examination result. It is based on Age Normal deviation values. The vertical axis represents Age Normal deviations. Tested points are placed along the horizontal axis in descending order, with high-sensitivity points on the left and low-sensitivity points on the right.

When eye sensitivity decreases, for example with cataract, the defect curve descends. Local visual field changes lower its right side. The deeper the defects, the steeper the curve profile. If local sensitivity is lower than expected, the defect curve is elevated on the left.

Figure 27 - Defect graph.

Illustrations - source section 56



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 57

10. SOFTWARE SCREENS

10.1. STARTUP SCREEN

Log in when starting the software: select the user, enter the password and click Enter (Entrar).

Figure 28 - VON screen.

Illustrations - source section 57



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 58

10.2. STARTUP SCREEN - USER SELECTION

The startup screen displays a list of registered physicians.

Figure 29 - User selection.

Illustrations - source section 58



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 59

10.3. STARTUP SCREEN - PASSWORD ENTRY

Click the password field to type the password. The virtual keyboard opens automatically. This happens for every text field in the software.

Figure 30 - Password entry.

Illustrations - source section 59



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 60

10.4. MAIN MENU

After login, the main menu appears. It offers New Exam (Novo Exame), Review Exam (Rever Exame), Settings (Configurações) and Logout. Logout returns the user to the main login screen.

Figure 31 - Startup menu.

Illustrations - source section 60



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 61

10.5. MAIN MENU - SETTINGS

Settings (Configurações) provides Physician Registration (Cadastro de Médicos), Clinic Registration (Cadastro de Clínicas) and System Settings (Configurações do Sistema).

Figure 32 - Main menu - Settings.

Illustrations - source section 61



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 62

10.6. PHYSICIAN REGISTRATION

The physician-registration screen offers New (Novo), Delete (Excluir), Access Password (Senha de Acesso) modification and Default Clinic (Clínica Padrão) selection. The default clinic always appears in the headers of that physician's reports. If Exclusive Exams (Exames exclusivos) is selected, only that physician can view their examinations.

Figure 33 - Physician registration.

Illustrations - source section 62



Original instrument or software illustration. See the English instructions and interface labels in this section.

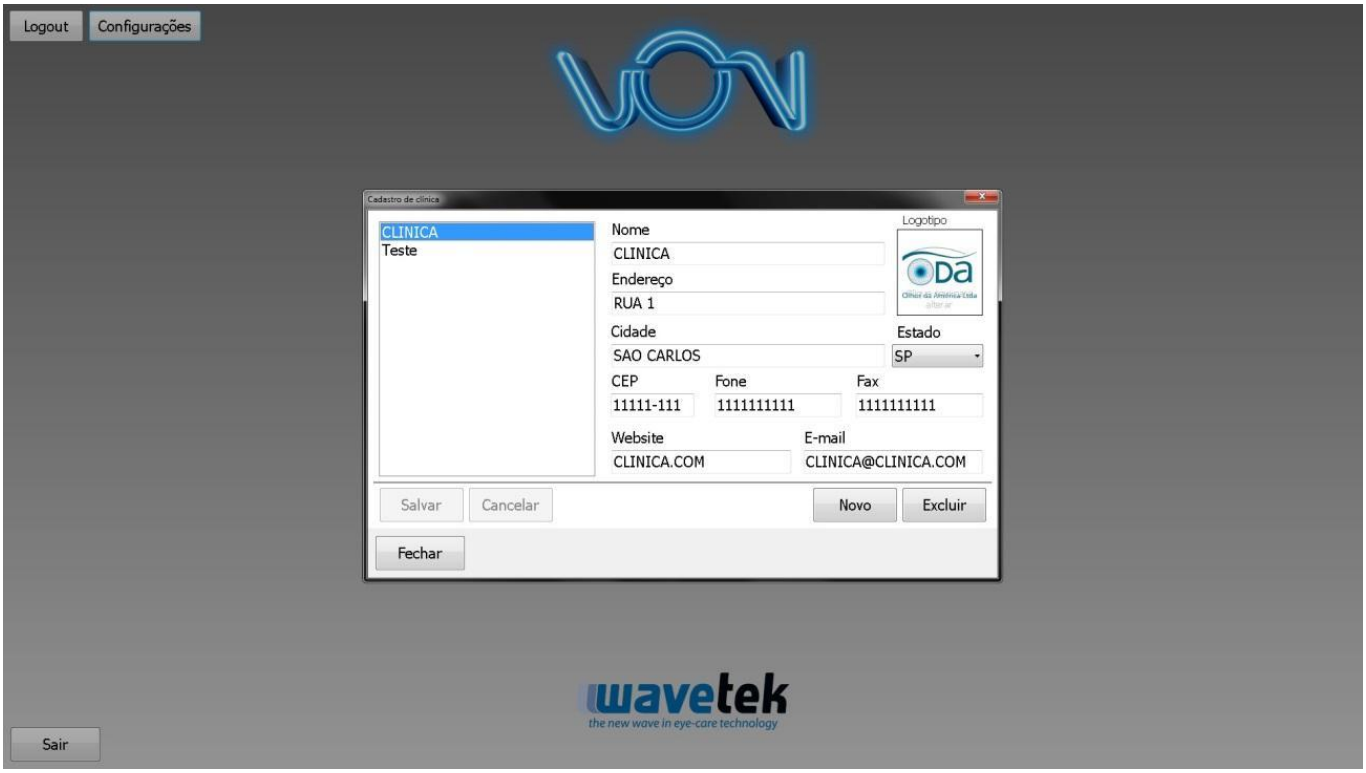
SOURCE SECTION 63

10.7. CLINIC REGISTRATION

Clinic registration offers New (Novo) and Delete (Excluir).

Figure 34 - Clinic registration.

Illustrations - source section 63



Original instrument or software illustration. See the English instructions and interface labels in this section.

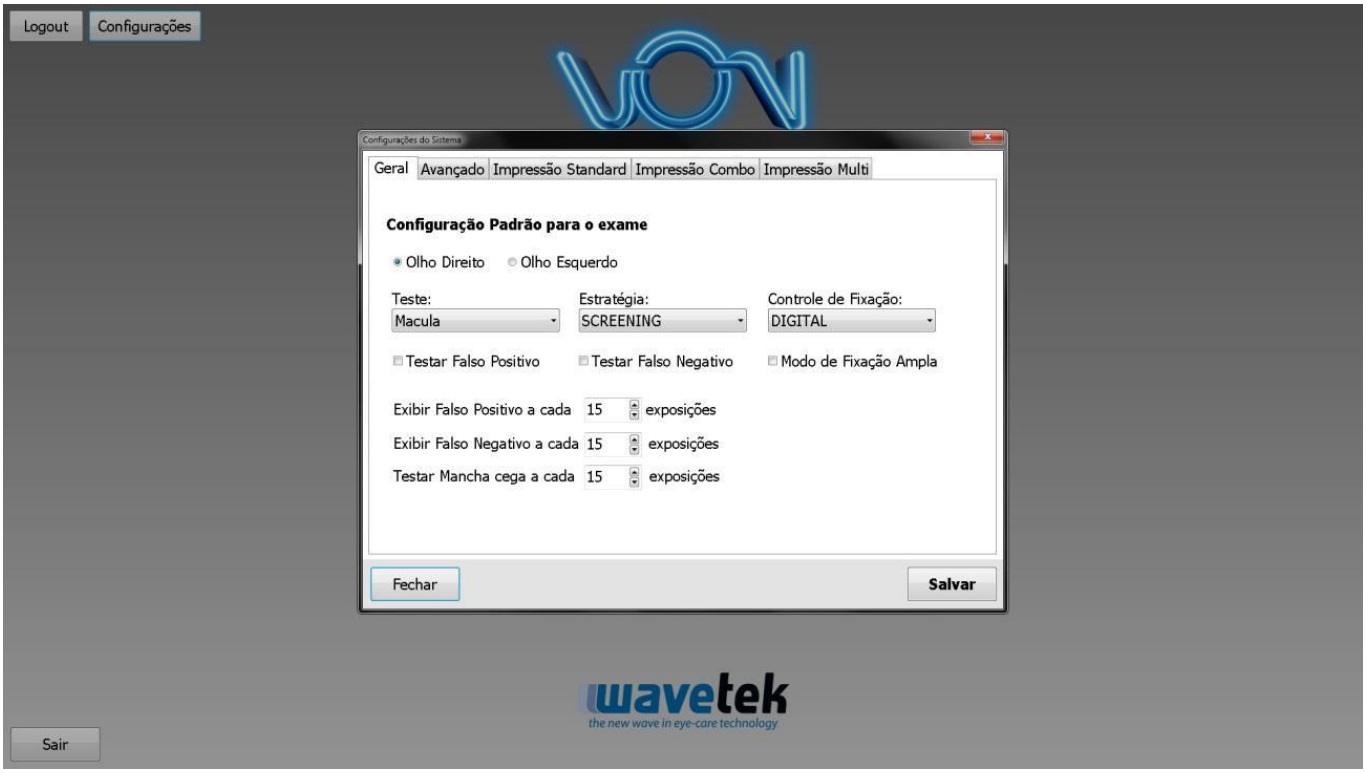
SOURCE SECTION 64

10.8. GENERAL SETTINGS

The general-settings tab defines examination defaults. The parameters set here are used by default for every new examination.

Figure 35 - General settings.

Illustrations - source section 64



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 65

10.9. ADVANCED SETTINGS

Advanced settings allow changes to timing parameters used during the examination. Hardware settings, such as the default camera and lighting, and Backup options are also available.

Figure 36 - Advanced settings.

Illustrations - source section 65



Original instrument or software illustration. See the English instructions and interface labels in this section.

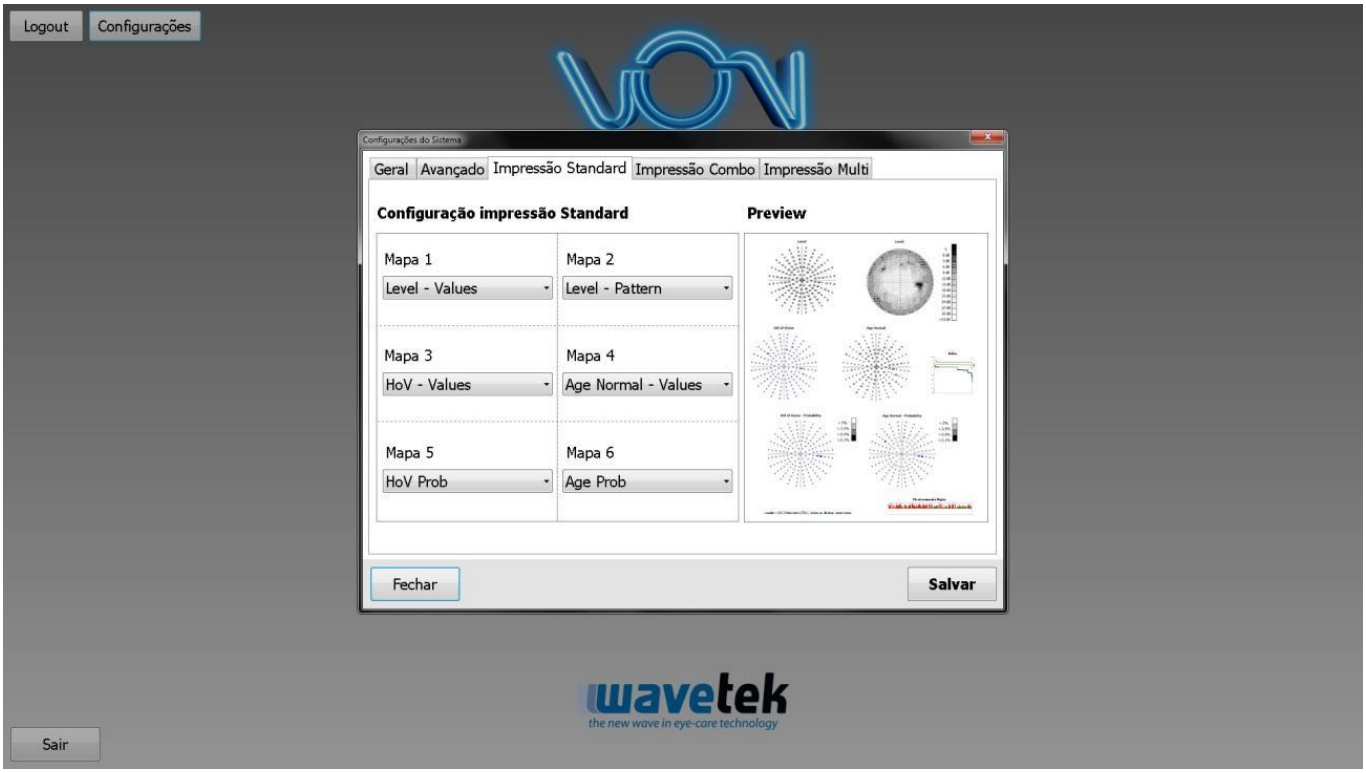
SOURCE SECTION 66

10.10. STANDARD PRINT SETTINGS

This screen defines the defaults for Standard printing. Every time an exam is printed with Standard, these defaults are used as the reference for displaying the report.

Figure 37 - Standard print settings.

Illustrations - source section 66



Original instrument or software illustration. See the English instructions and interface labels in this section.

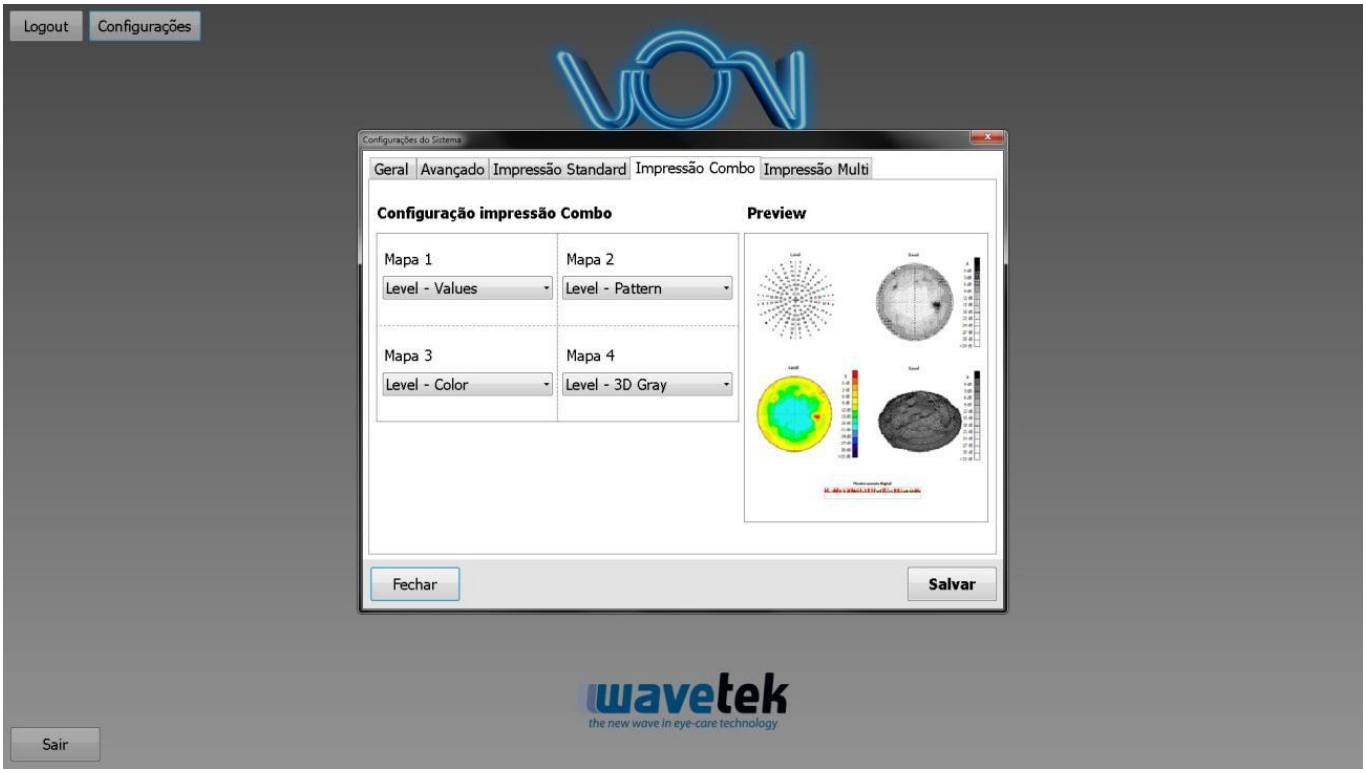
SOURCE SECTION 67

10.11. COMBO PRINT SETTINGS

This screen defines the defaults for Combo printing. Every time an exam is printed with Combo, these defaults are used as the reference for displaying the report.

Figure 38 - Combo print settings.

Illustrations - source section 67



Original instrument or software illustration. See the English instructions and interface labels in this section.

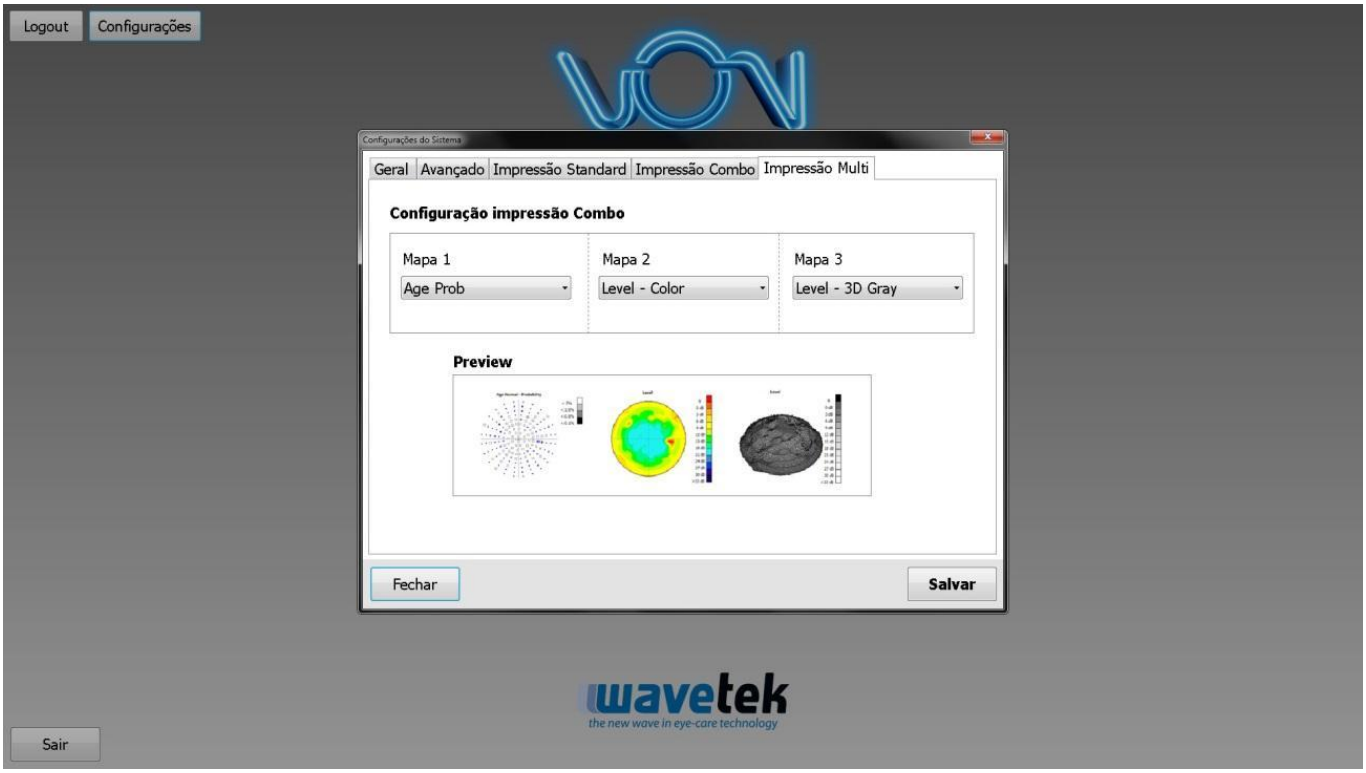
SOURCE SECTION 68

10.12. MULTI PRINT SETTINGS

This screen defines the defaults for multi-map printing. Every time an exam is printed with Multi Maps (Multi mapas), these defaults are used as the reference for displaying the report.

Figure 39 - Multi print settings.

Illustrations - source section 68



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 69

10.13. PATIENT SELECTION

To select a patient, enter the code in its field, or enter a first or last name. A results list appears. To proceed, click the desired patient in the list and then Next (Avançar).

Figure 40 - Patient selection.

Illustrations - source section 69



Original instrument or software illustration. See the English instructions and interface labels in this section.

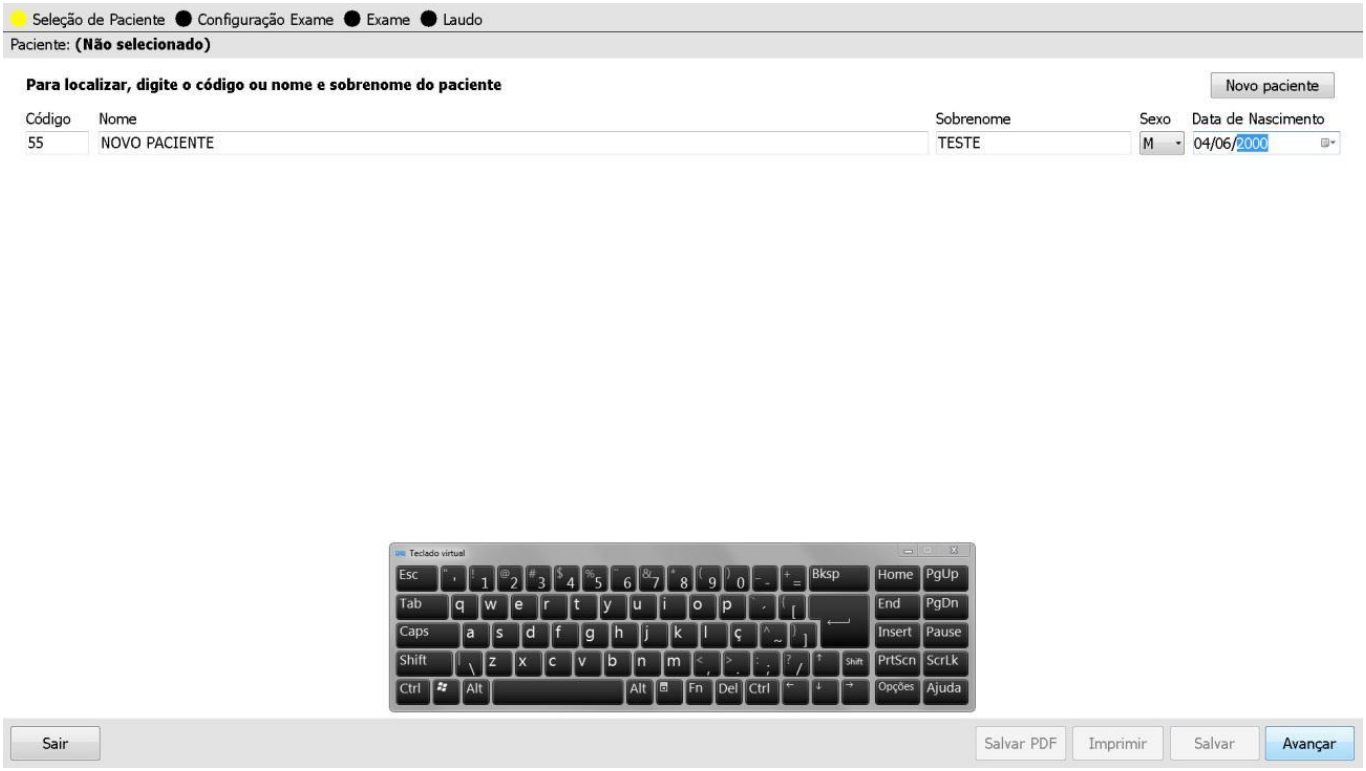
SOURCE SECTION 70

10.14. ADDING A PATIENT

If the patient is not registered, click New Patient (Novo paciente) and complete the fields. Once all fields are correctly completed, click Next (Avançar); the patient is added automatically.

Figure 41 - Adding a patient.

Illustrations - source section 70



Original instrument or software illustration. See the English instructions and interface labels in this section.

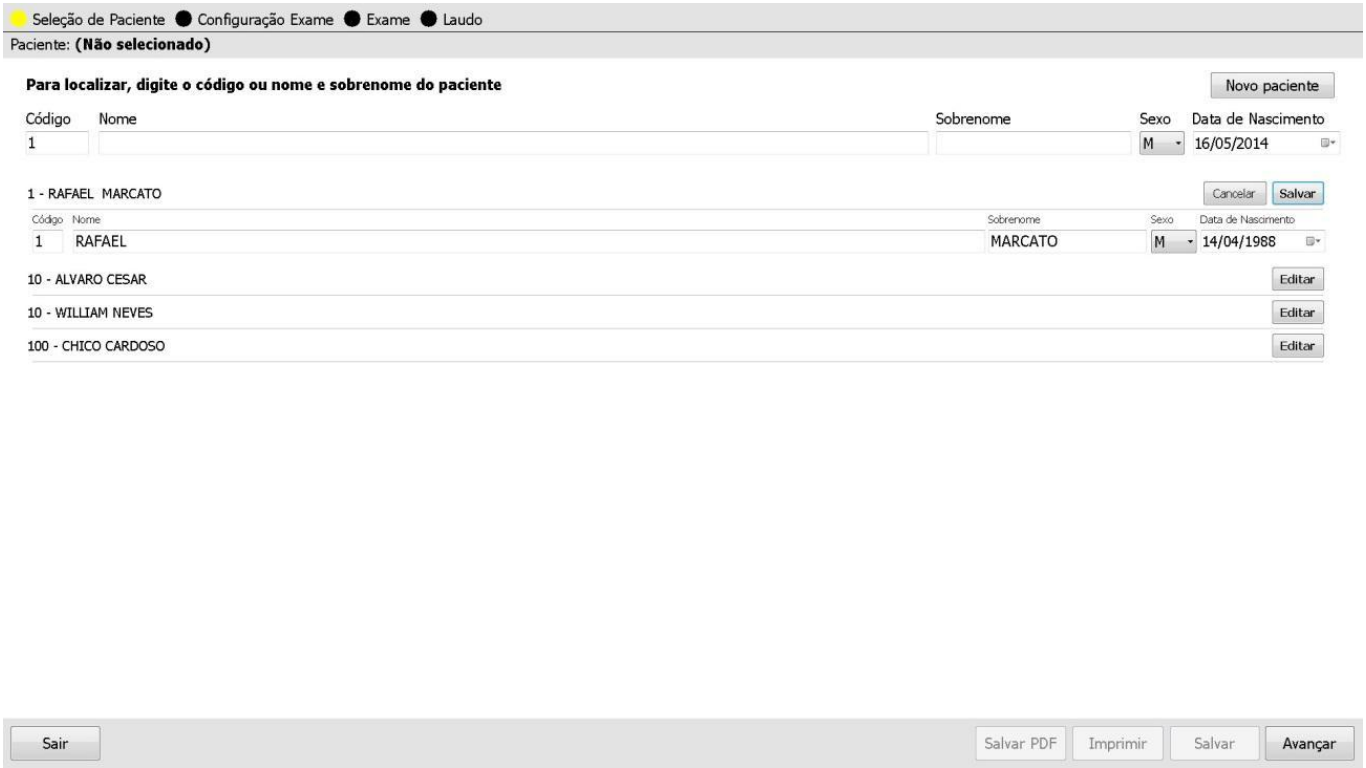
SOURCE SECTION 71

10.15. EDITING A PATIENT RECORD

Search for the patient and click Edit (Editar) in the results list. The patient's data appear. After making changes, click Save (Salvar) or Cancel (Cancelar).

Figure 42 - Editing a patient record.

Illustrations - source section 71



Original instrument or software illustration. See the English instructions and interface labels in this section.

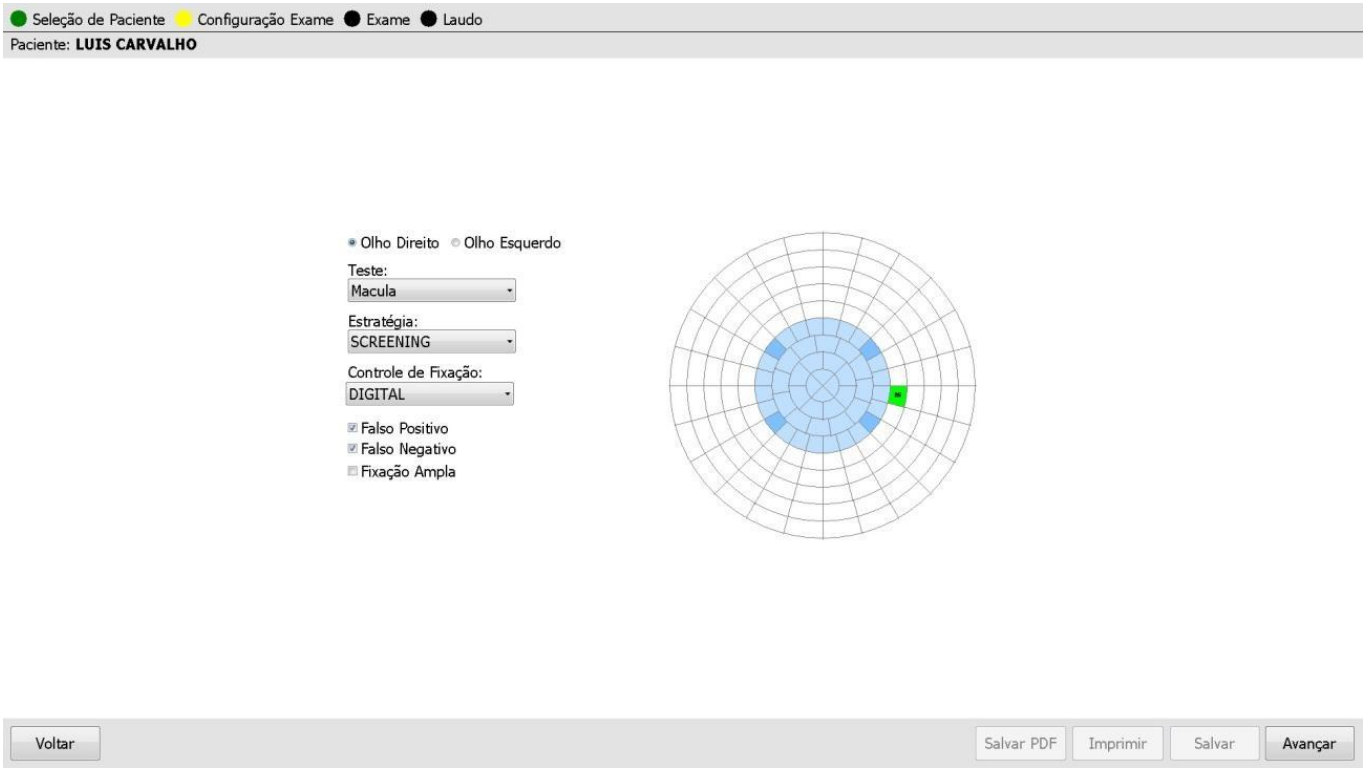
SOURCE SECTION 72

11. EXAM SETUP

To simplify exam setup, parameters are populated using the defaults selected in settings. All fields may be changed as needed.

Figure 43 - Exam setup.

Illustrations - source section 72



Original instrument or software illustration. See the English instructions and interface labels in this section.

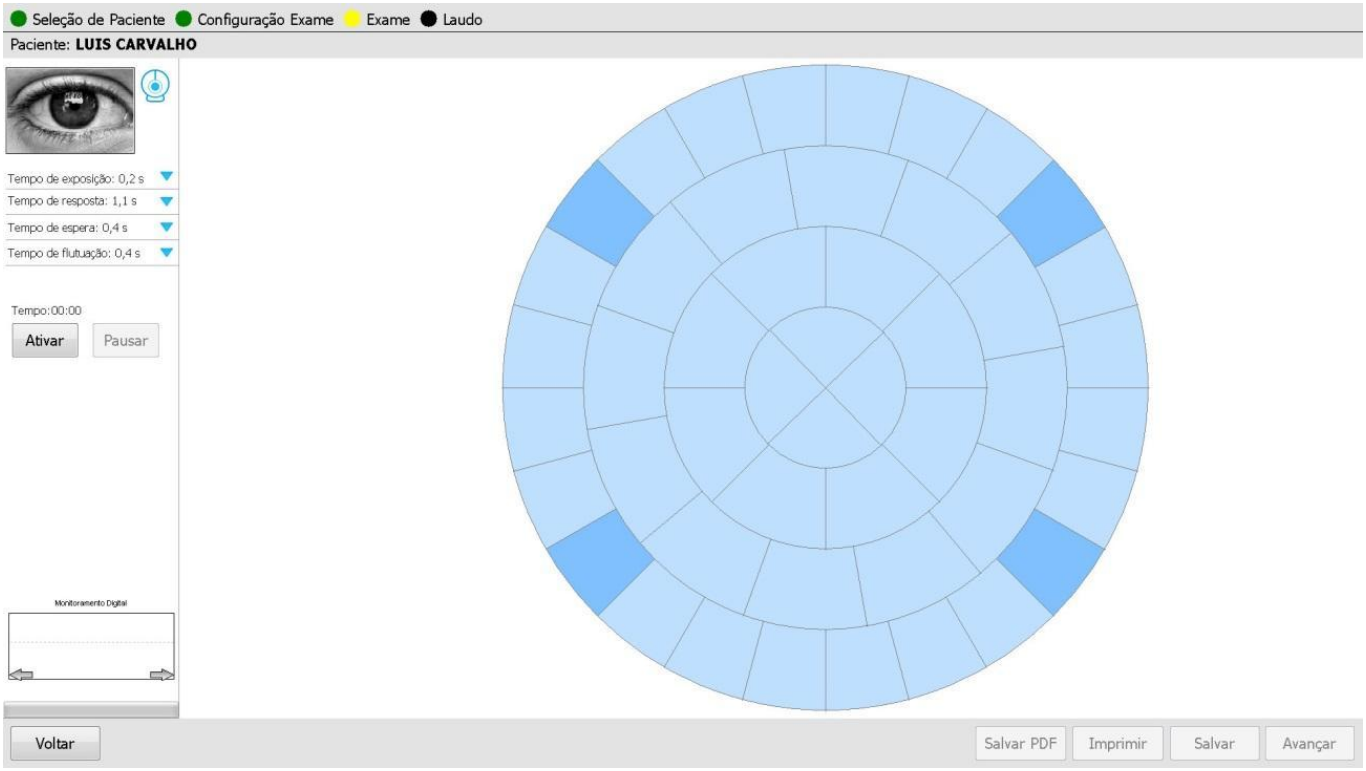
SOURCE SECTION 73

11.1. EXAM SCREEN

The exam screen displays a graphical bowl representation with every point to be tested, and either the blind-spot diagram or digital-monitoring graph. It also allows changes to examination timing, starting or pausing the exam, and access to image settings for correct patient-eye positioning.

Figure 44 - Exam screen.

Illustrations - source section 73



Original instrument or software illustration. See the English instructions and interface labels in this section.

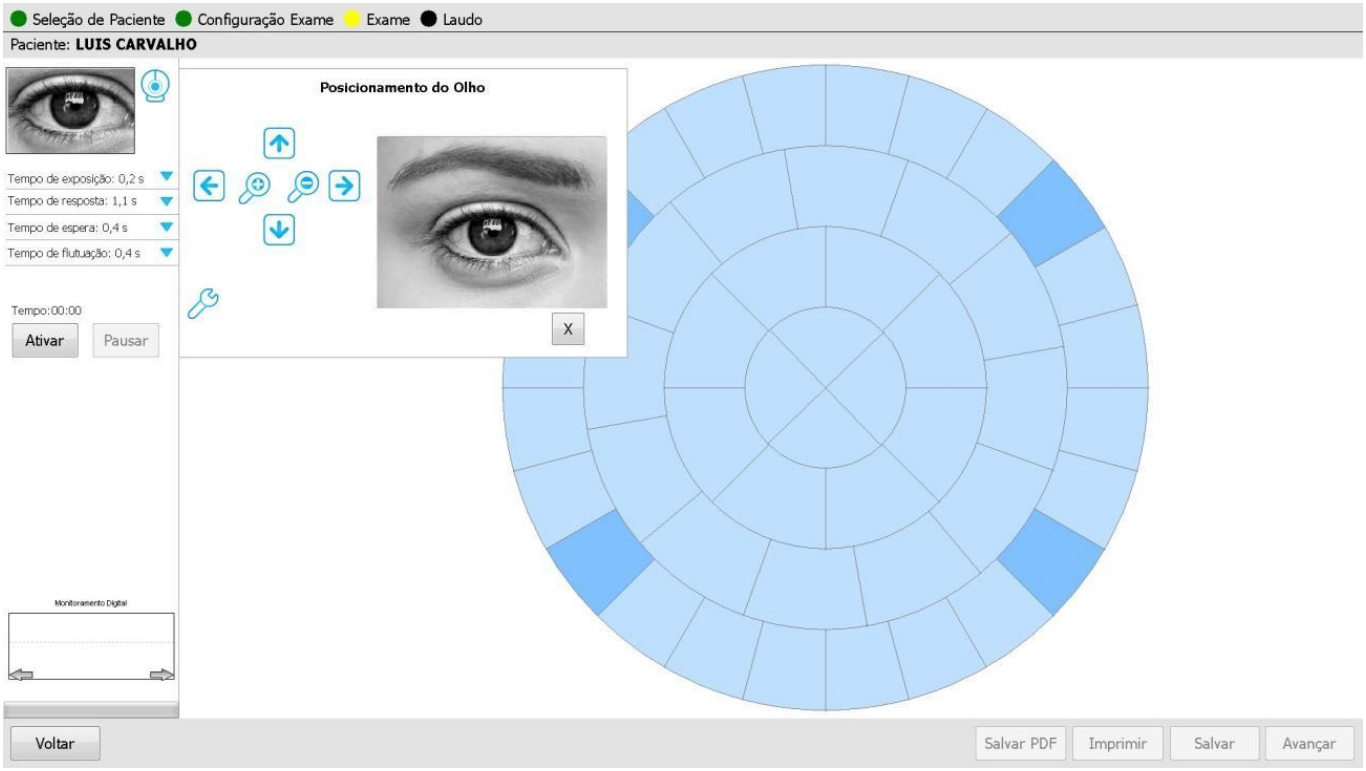
SOURCE SECTION 74

11.2. EXAM SCREEN - CAMERA ADJUSTMENT

Clicking the camera-settings button opens a panel with zoom and directional controls and an enlarged camera image. The directional controls operate the chinrest and forehead-rest motors to position the patient's eye correctly.

Figure 45 - Camera adjustment.

Illustrations - source section 74



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 75

11.3. EXAM SCREEN - GRAPHICAL DISPLAY OF EXAM PROGRESS

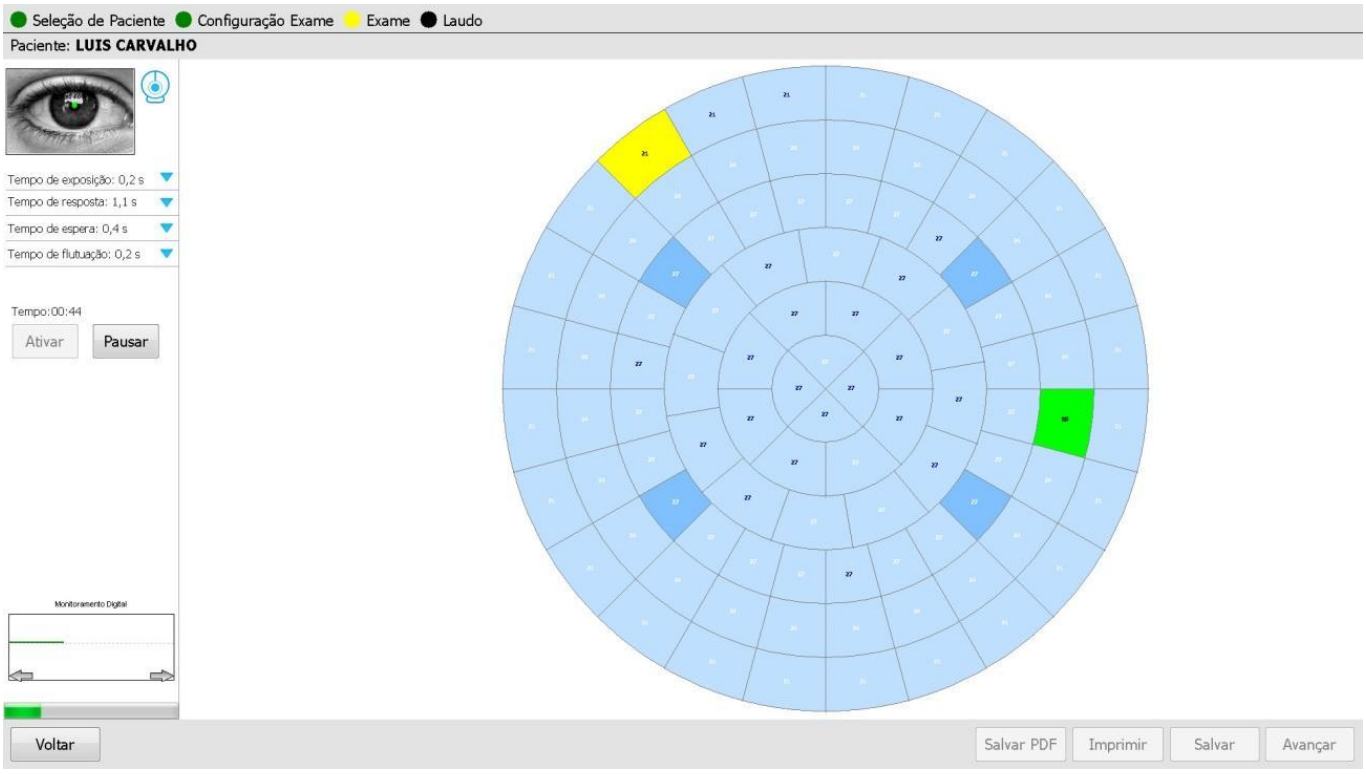
During testing, progress is shown on the progress bar and graphical bowl display. The display identifies points already tested, completed, not yet tested and marked for retesting under the selected strategy. Blind-spot stimuli or the digital-monitoring graph can also be followed, depending on the selected monitoring type.

With digital monitoring, the eye image is processed in real time to locate the pupil center and plot values on the graph. A green dot represents the pupil center. If necessary, the chinrest and forehead rest may be moved during testing to readjust the eye.

Remember that the patient uses the joystick button to indicate whether a stimulus was seen. Each press produces a feedback beep.

Figure 46 - Graphical display of exam progress.

Illustrations - source section 75



Original instrument or software illustration. See the English instructions and interface labels in this section.

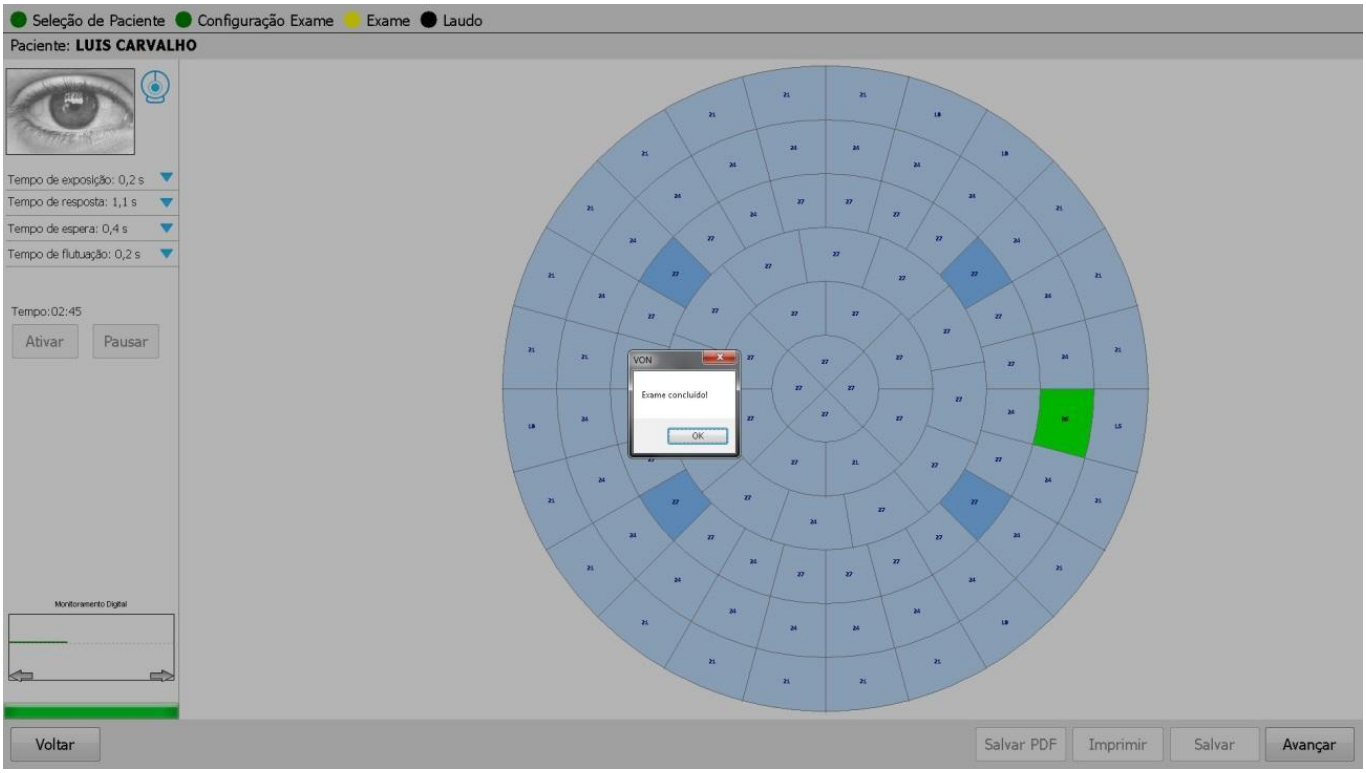
SOURCE SECTION 76

11.4. EXAM SCREEN - COMPLETION MESSAGE

When the exam ends, a continuous beep sounds and a dialog reports completion. Click OK to close it. Proceeding to the next stage opens the Report screen (Laudo).

Figure 47 - Completion message.

Illustrations - source section 76



Original instrument or software illustration. See the English instructions and interface labels in this section.

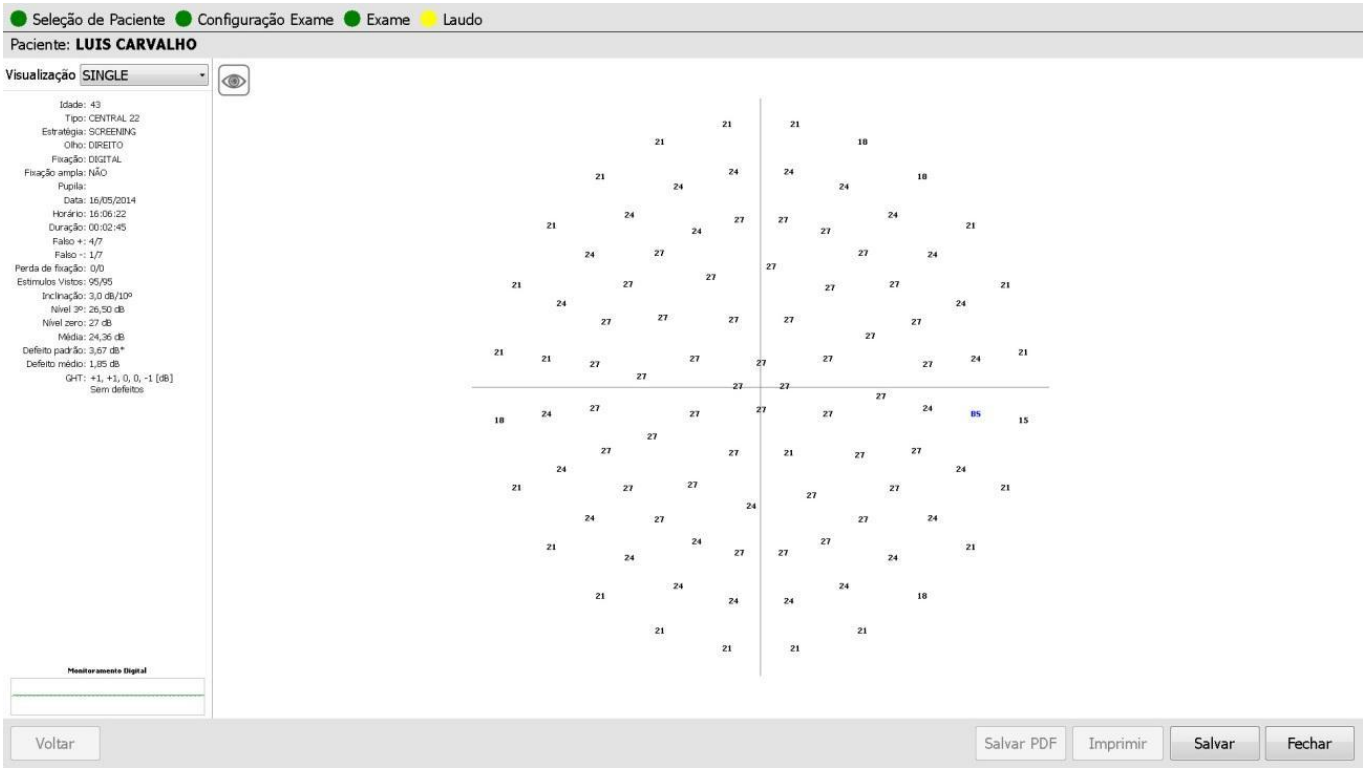
SOURCE SECTION 77

11.5. REPORT SCREEN

Examination parameters and results appear on the left, together with the graphical-map type selection. The rest of the screen shows the map, its menu (eye icon), and Save Exam (Salvar o exame) and Close (Fechar) options.

Figure 48 - Report screen.

Illustrations - source section 77



Original instrument or software illustration. See the English instructions and interface labels in this section.

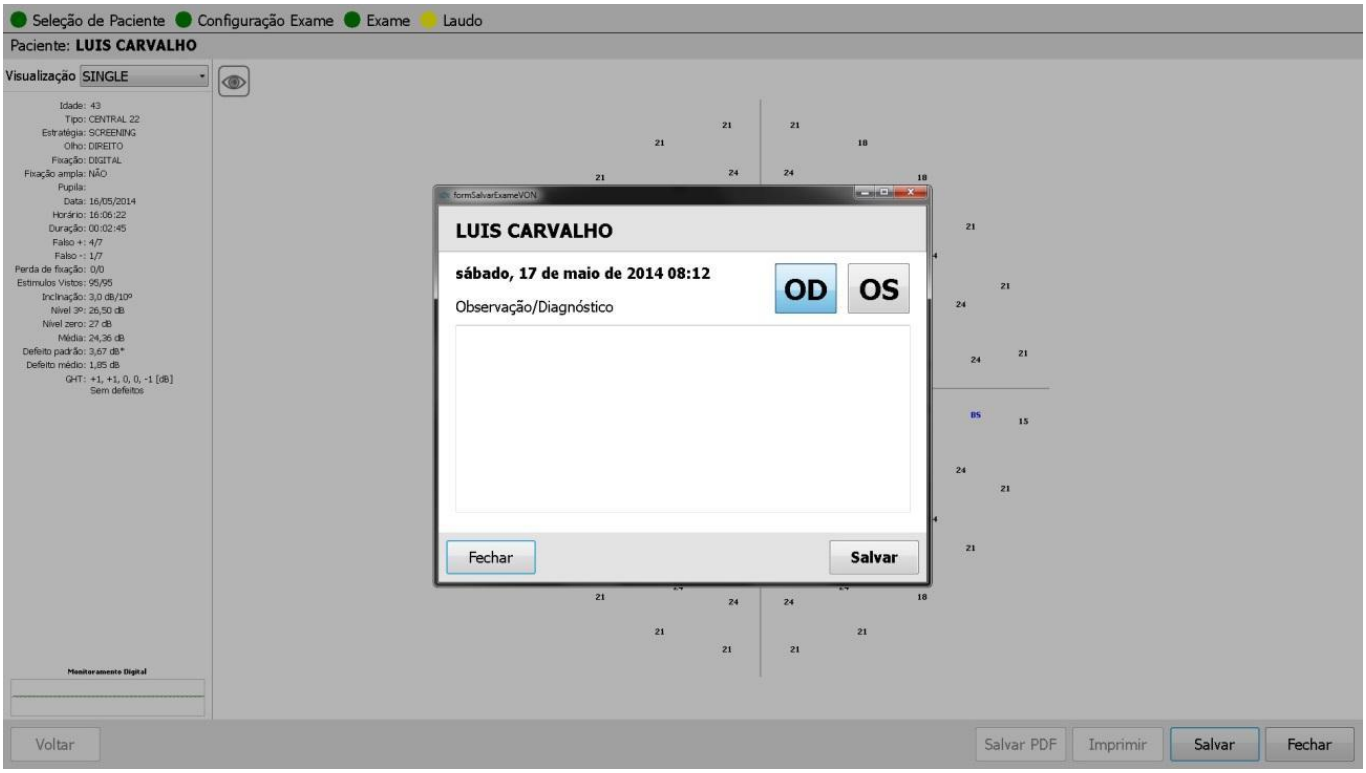
SOURCE SECTION 78

11.6. SAVING AN EXAM

Click Save (Salvar) to open a screen for adding an examination note and changing the eye on which the exam was performed.

Figure 49 - Saving exams.

Illustrations - source section 78



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 79

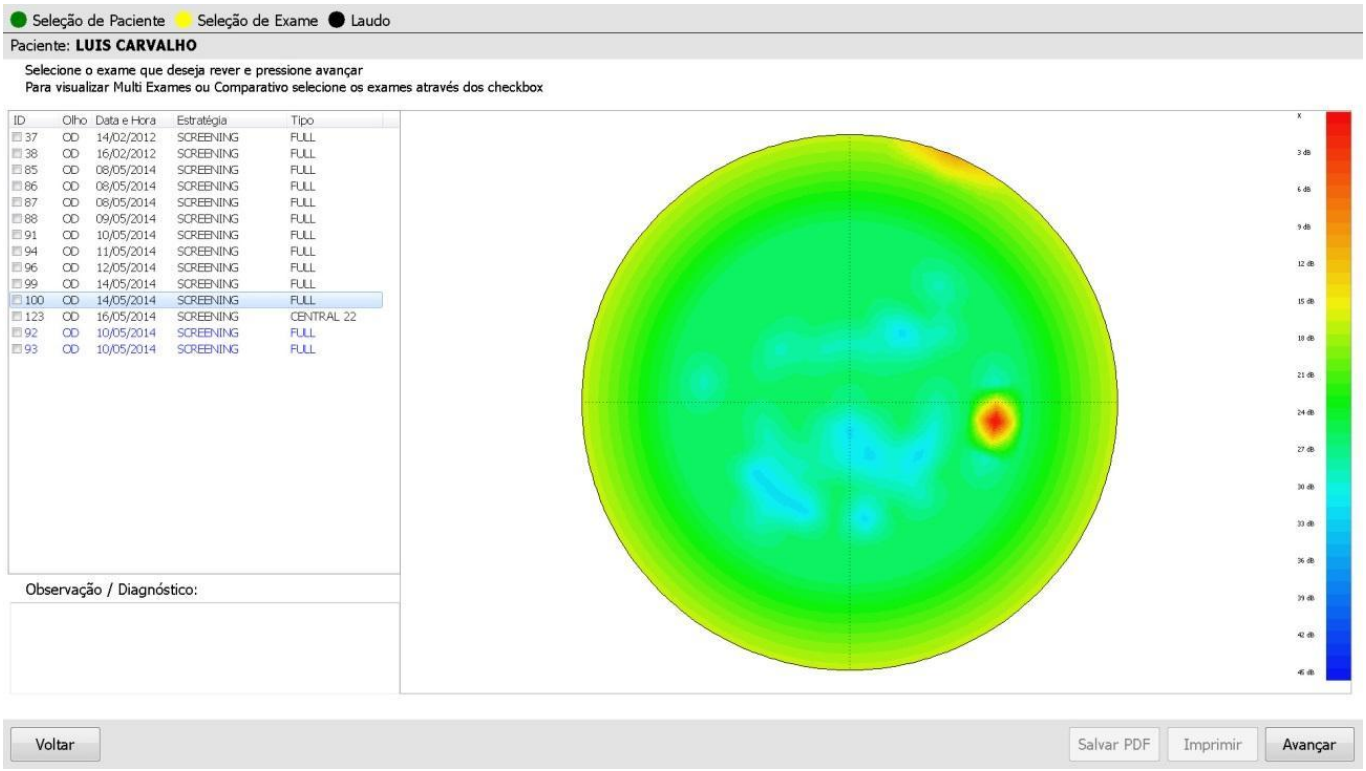
11.7. REVIEWING AN EXAM

From the main menu, choose Review Exam (Rever Exame). Select a patient and click Next (Avançar). All of that patient's exams appear in a list. Select an exam and click Next to review it. To view Multi Exams or a Comparison map, select more than one exam using the list's checkboxes.

Selecting two exams of the same eye and strategy permits a Comparison report or Multi Exams report. Selecting two to four differing exams permits only a Multi Exam report.

Figure 50 - Reviewing an exam.

Illustrations - source section 79



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 80

12. REPORT - DISPLAY

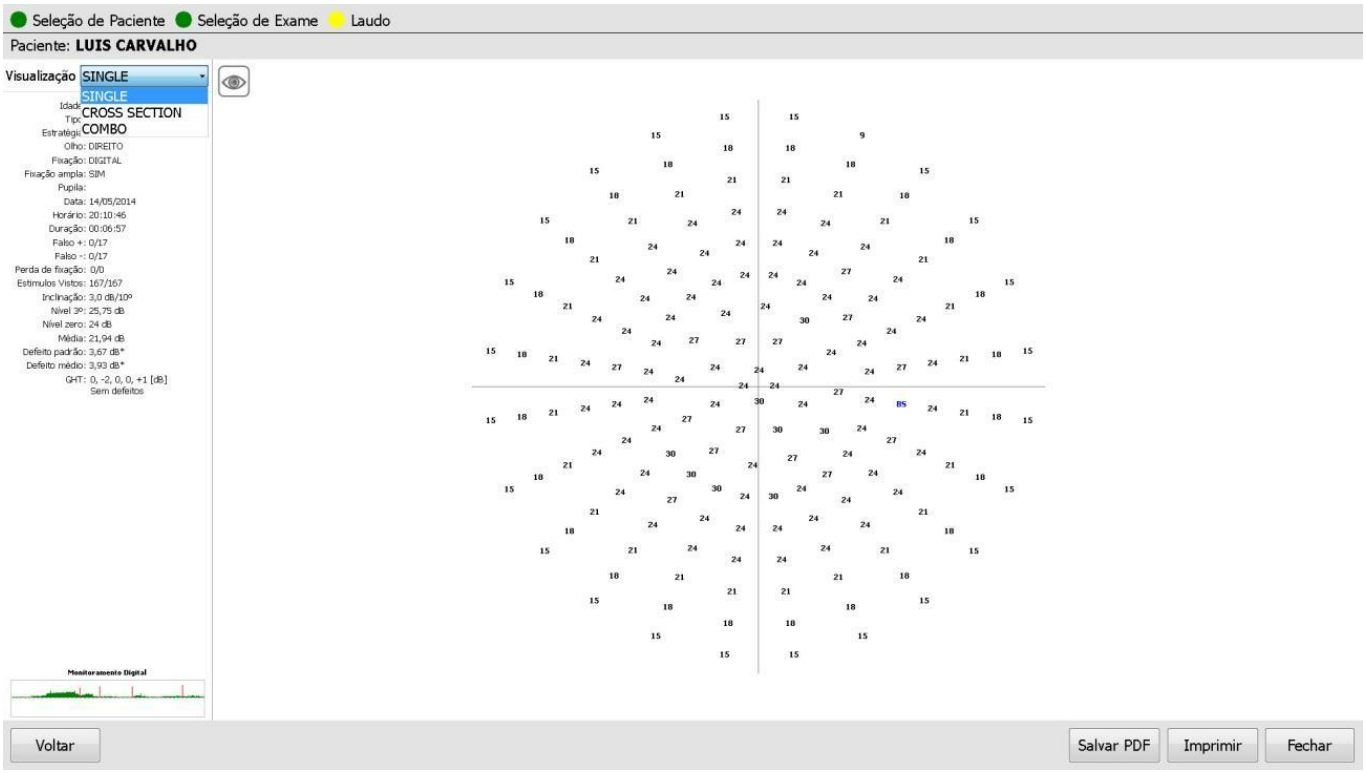
The Display menu offers three views: Single, Cross Section and Combo.

The graphical-map menu offers these data types: Level [dB], HoV, Age Normal, HoVProb, Age Prob, Abs, Normalized and BebieGraph. Display/print types are Values, Gray, Color, Pattern, 3D Gray and 3D Color.

Available data and display/print types may vary with the strategy used for the examination.

Figure 51 - Report display.

Illustrations - source section 80



Original instrument or software illustration. See the English instructions and interface labels in this section.

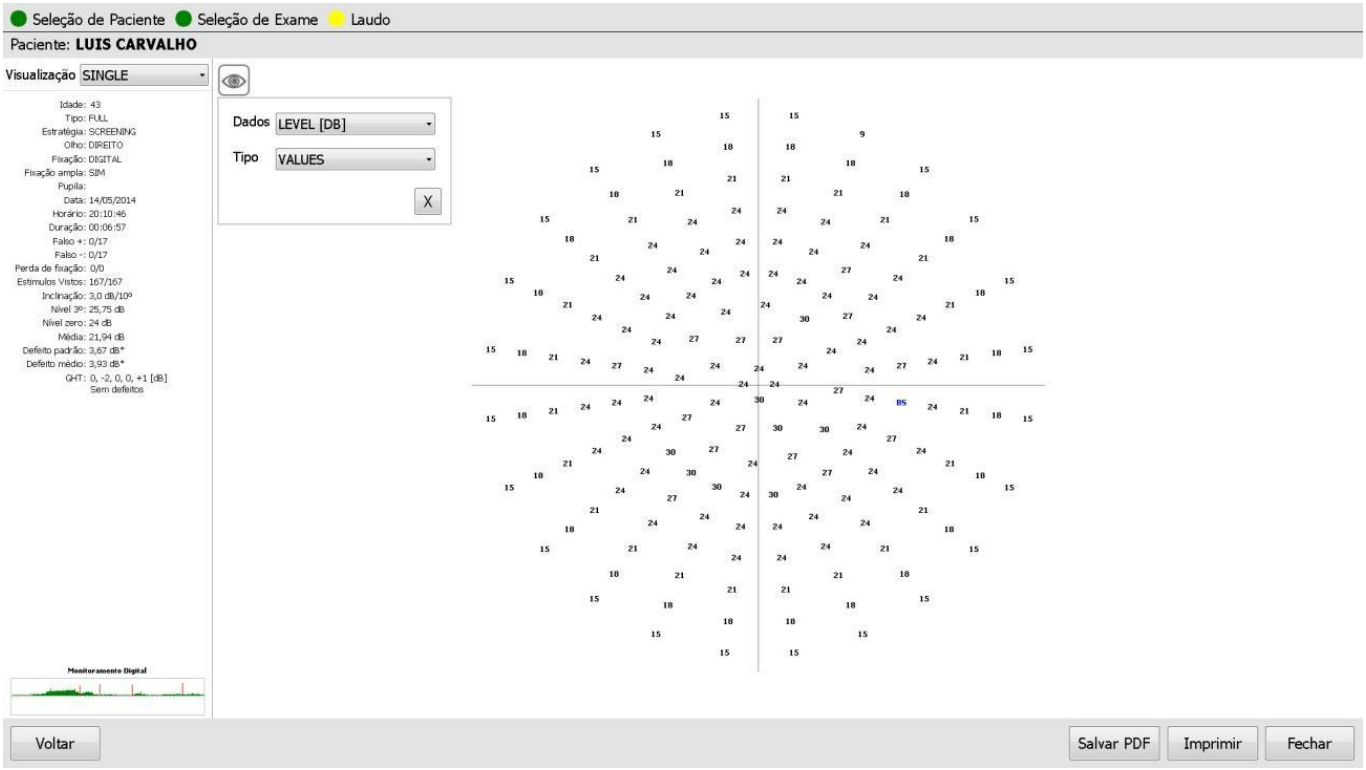
SOURCE SECTION 81

12.1. REPORT - VALUE MAP

The image above shows an example of a graphical map of dB values.

Figure 52 - Value map.

Illustrations - source section 81



Original instrument or software illustration. See the English instructions and interface labels in this section.

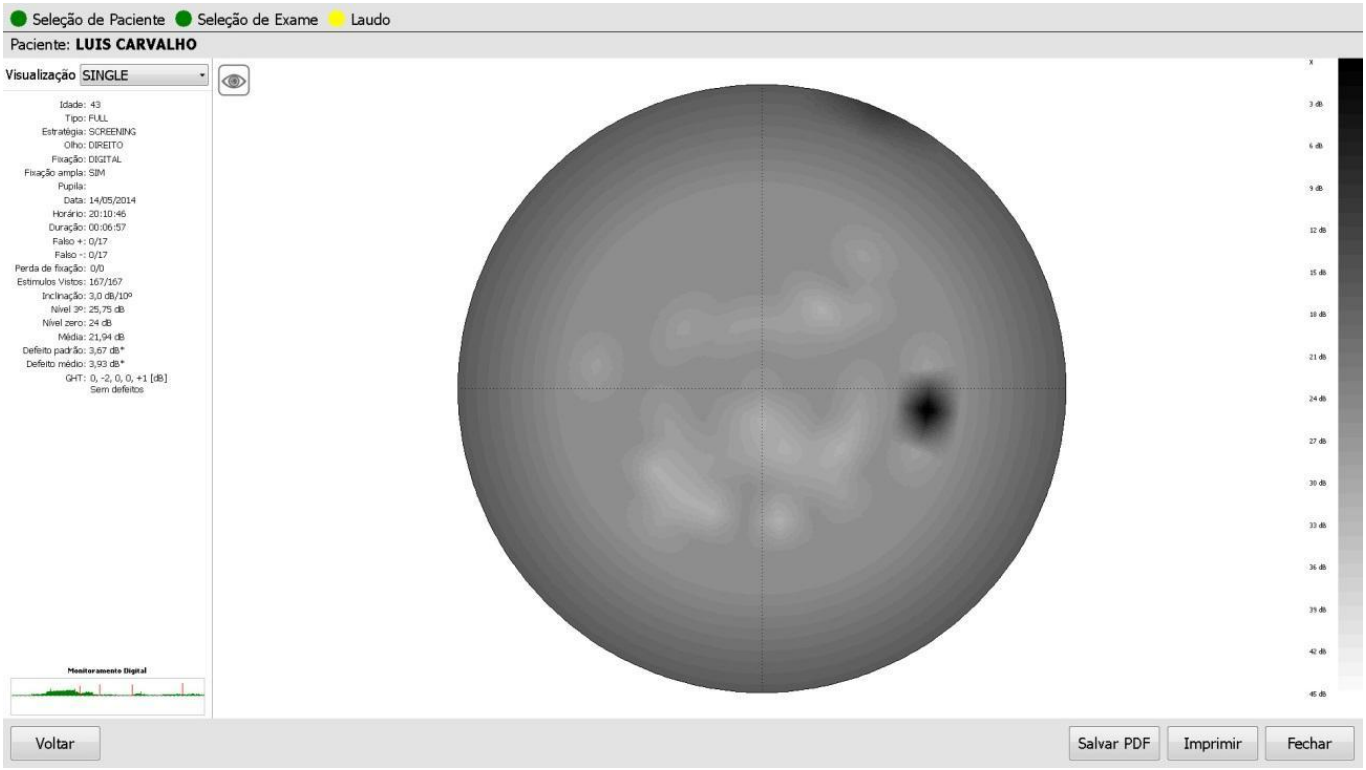
SOURCE SECTION 82

12.2. REPORT - GRAYSCALE MAP

The image above shows an example of a grayscale graphical map.

Figure 53 - Grayscale map.

Illustrations - source section 82



Original instrument or software illustration. See the English instructions and interface labels in this section.

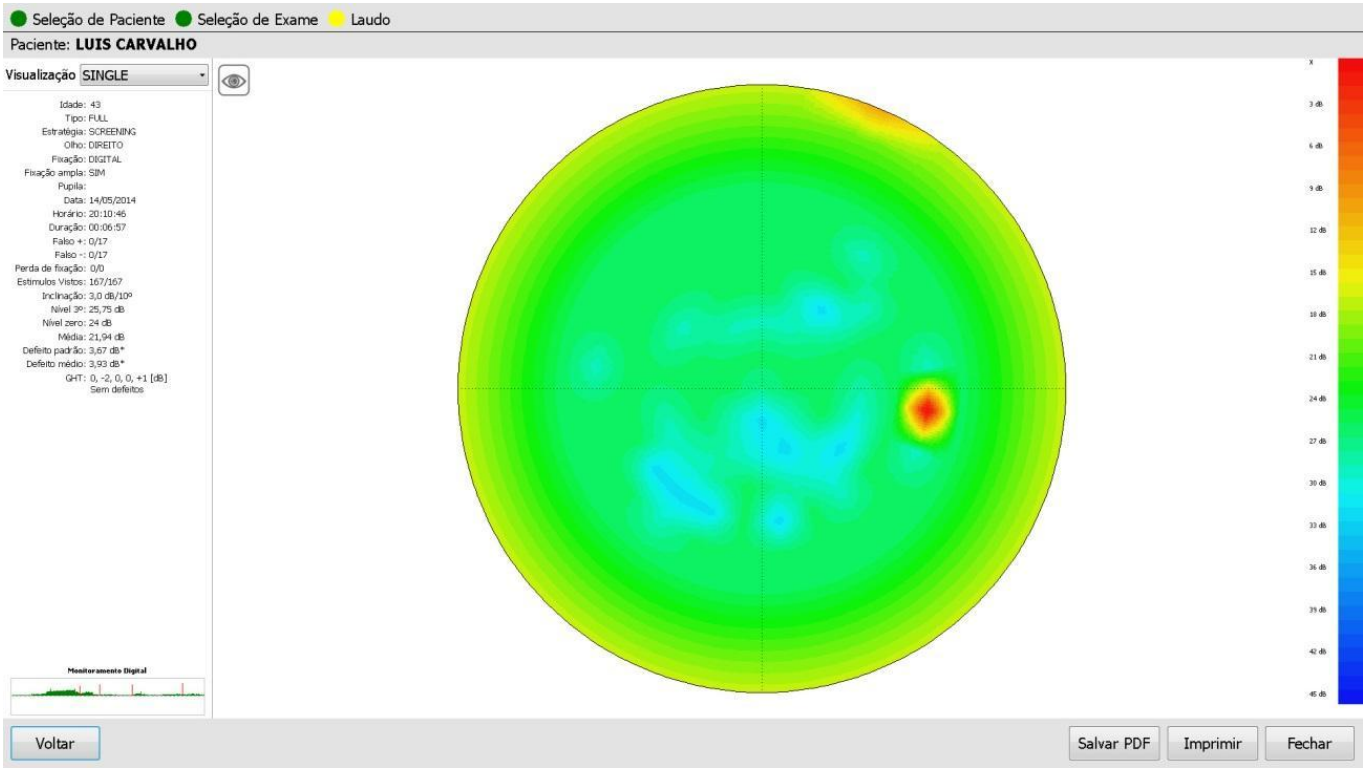
SOURCE SECTION 83

12.3. REPORT - COLOR SCALE MAP

The image below shows an example of a color-scale graphical map.

Figure 54 - Color scale map.

Illustrations - source section 83



Original instrument or software illustration. See the English instructions and interface labels in this section.

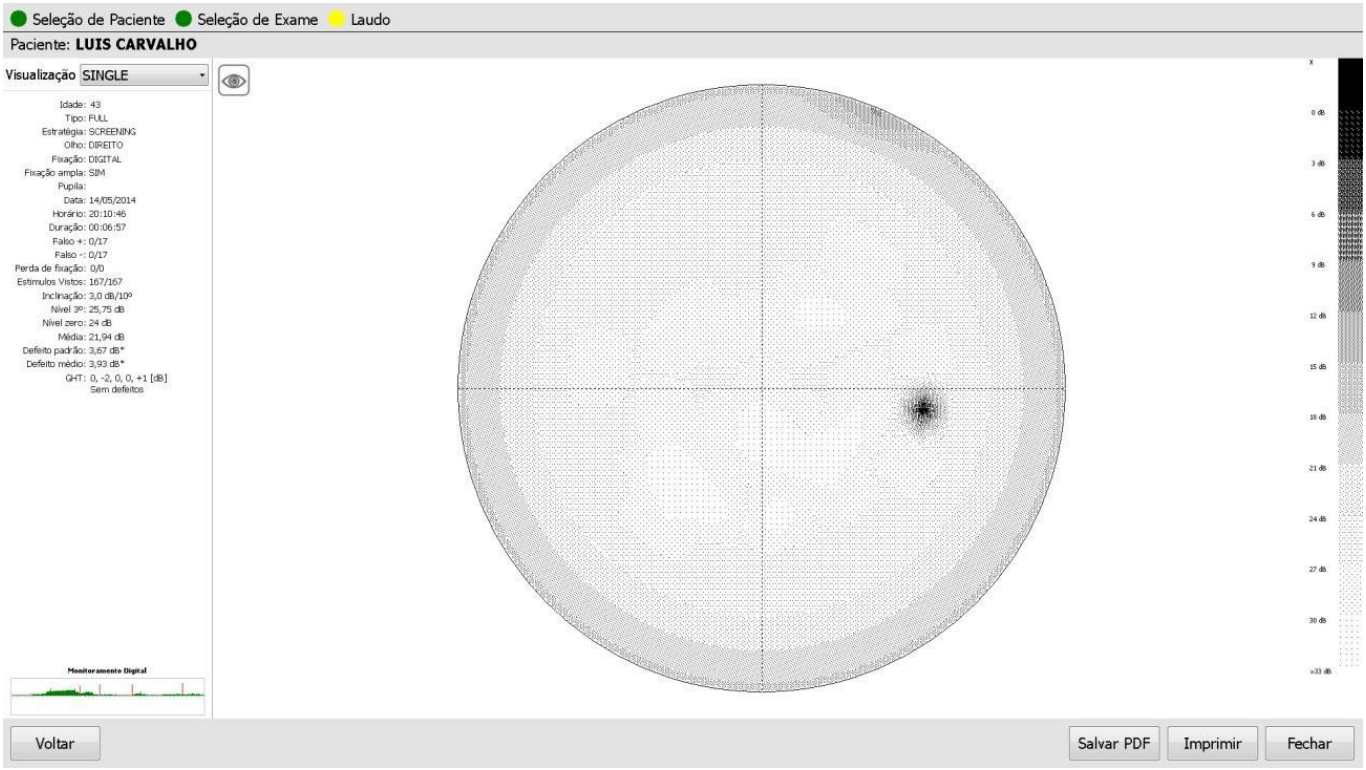
SOURCE SECTION 84

12.4. REPORT - PATTERN SCALE MAP

The image above shows an example of a pattern-scale graphical map.

Figure 55 - Pattern scale map.

Illustrations - source section 84



Original instrument or software illustration. See the English instructions and interface labels in this section.

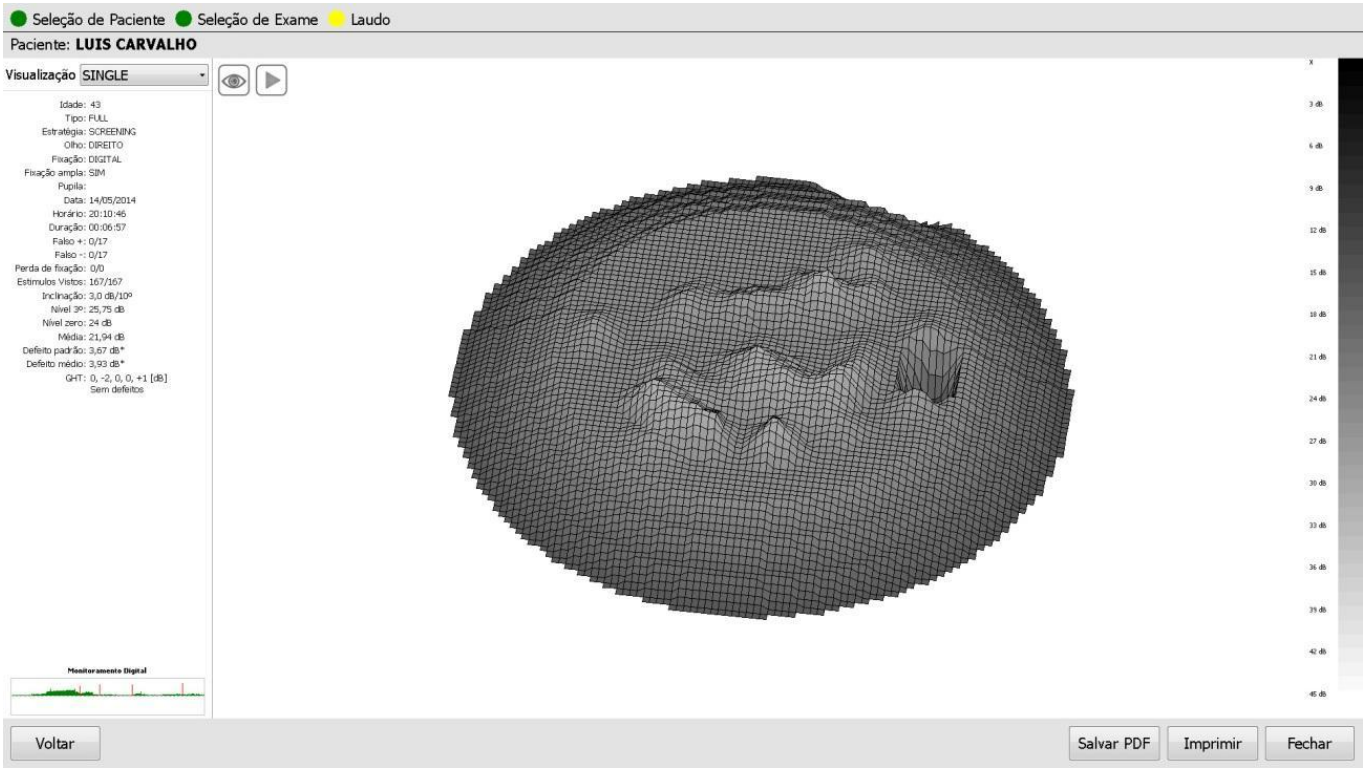
SOURCE SECTION 85

12.5. REPORT - 3D GRAYSCALE MAP

The image above shows an example of a 3D grayscale graphical map.

Figure 56 - 3D grayscale map.

Illustrations - source section 85



Original instrument or software illustration. See the English instructions and interface labels in this section.

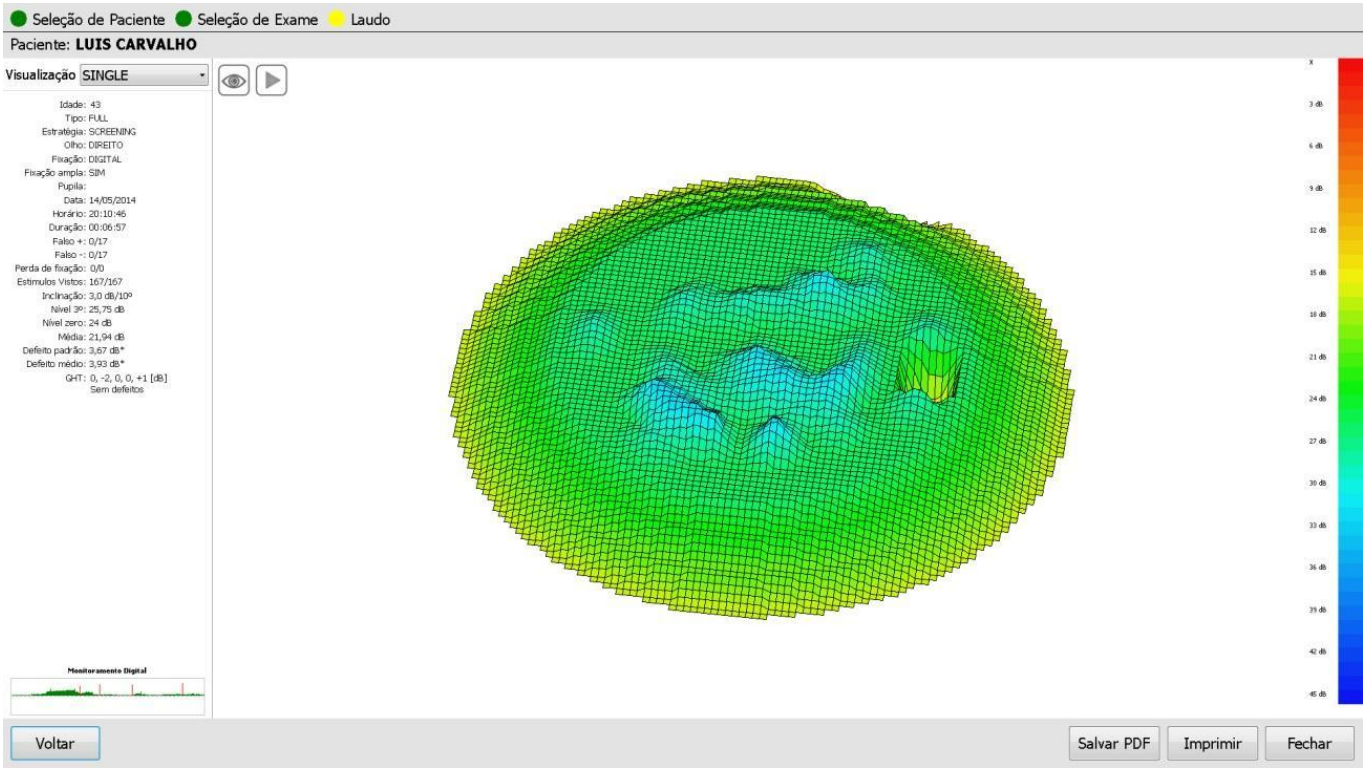
SOURCE SECTION 86

12.6. REPORT - 3D COLOR SCALE MAP

The image above shows an example of a 3D color-scale graphical map.

Figure 57 - 3D color scale map.

Illustrations - source section 86



Original instrument or software illustration. See the English instructions and interface labels in this section.

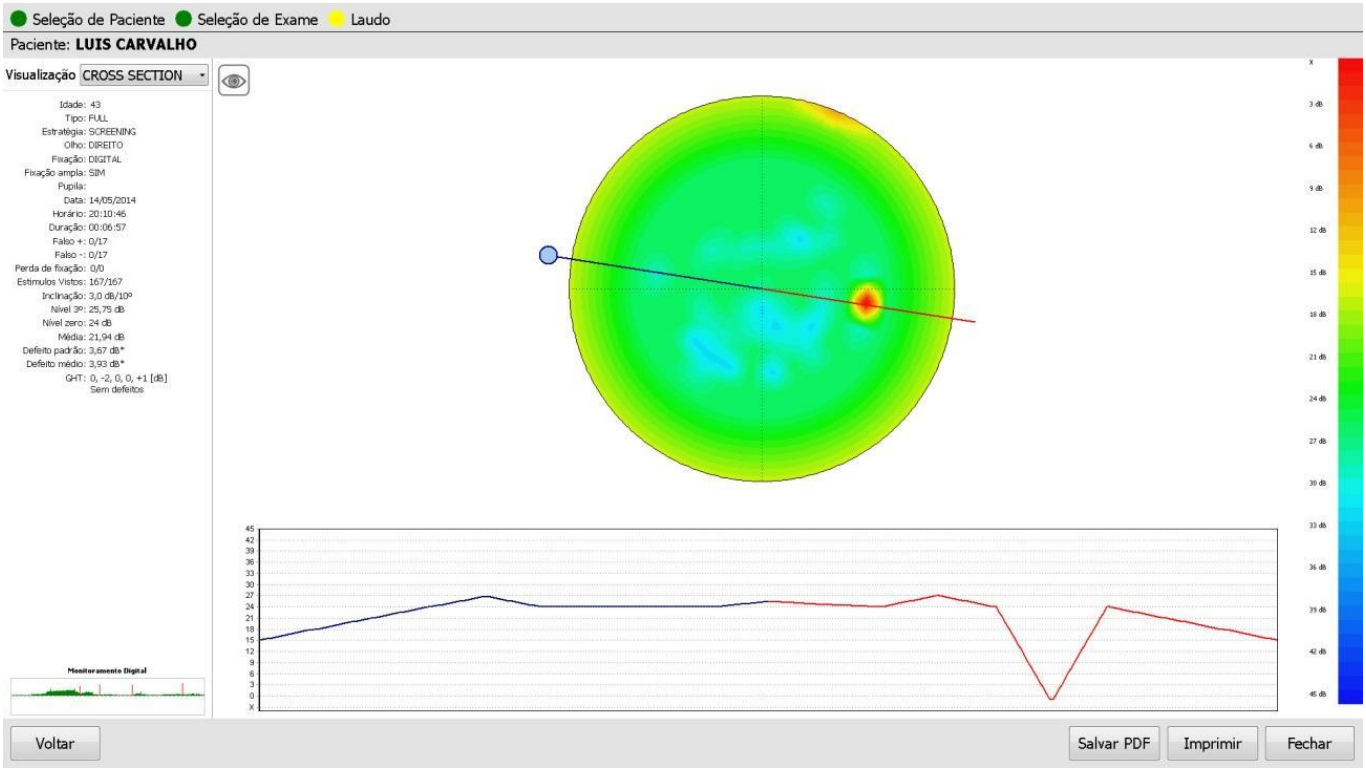
SOURCE SECTION 87

12.7. REPORT - CROSS SECTION MAP VIEW

The image above shows a Cross Section view with a color-scale map. The blue circle is the user's reference point for moving the cross-section through the map.

Figure 58 - Cross Section map view.

Illustrations - source section 87



Original instrument or software illustration. See the English instructions and interface labels in this section.

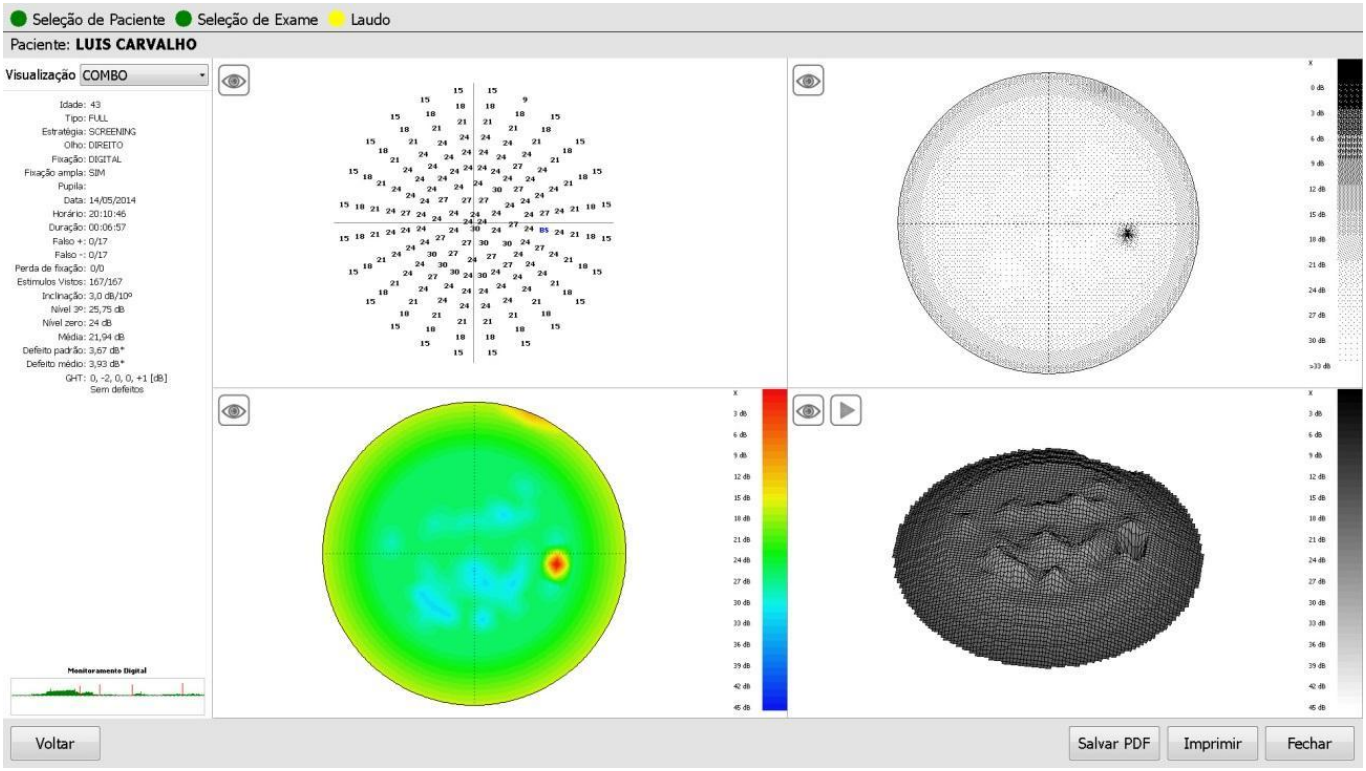
SOURCE SECTION 88

12.8. REPORT - COMBO MAP VIEW

Combo displays four maps from the same examination. The printed report is generated from the view defined on this screen.

Figure 59 - Combo map view.

Illustrations - source section 88



Original instrument or software illustration. See the English instructions and interface labels in this section.

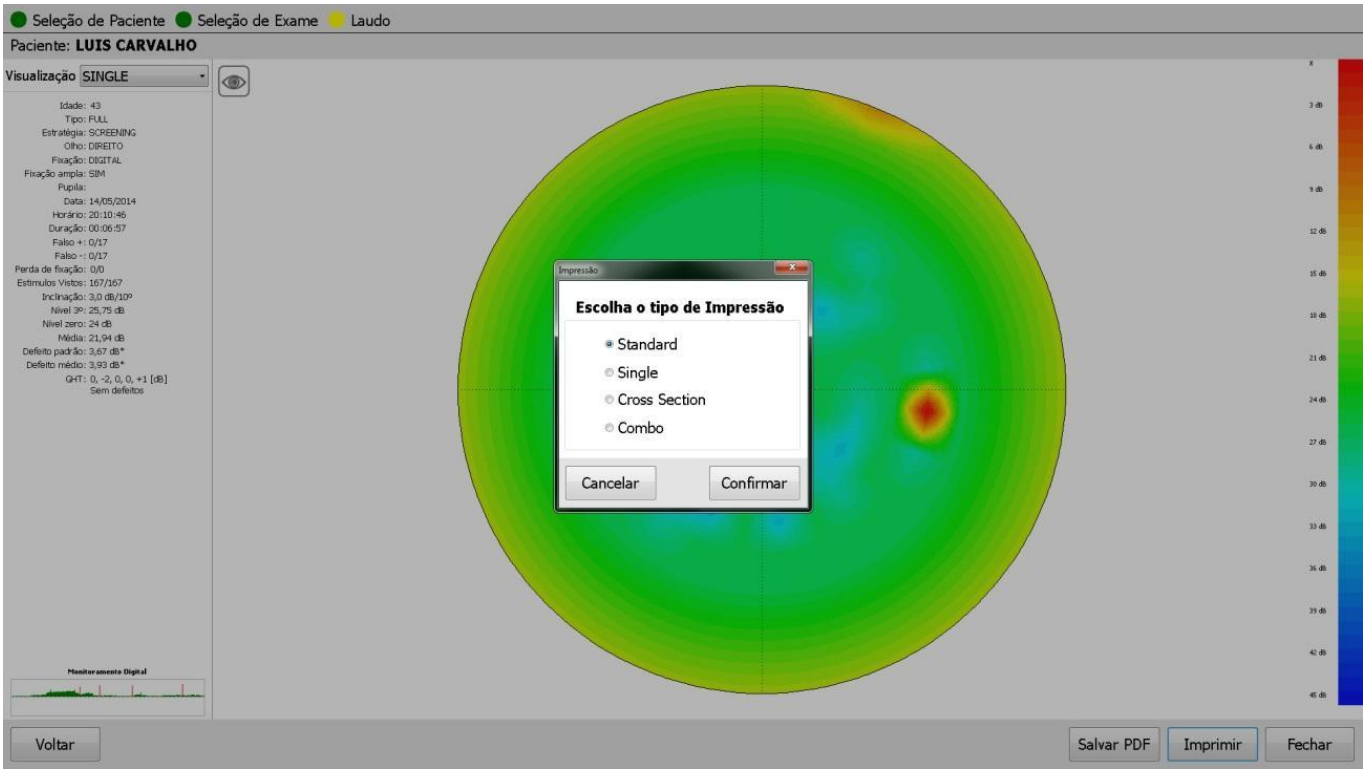
SOURCE SECTION 89

12.9. REPORT - CHOOSING THE PRINT TYPE

Click Print (Imprimir) on the report screen to display a print-type selection menu. Choose the type and click Confirm (Confirmar).

Figure 60 - Choosing the print type.

Illustrations - source section 89



Original instrument or software illustration. See the English instructions and interface labels in this section.

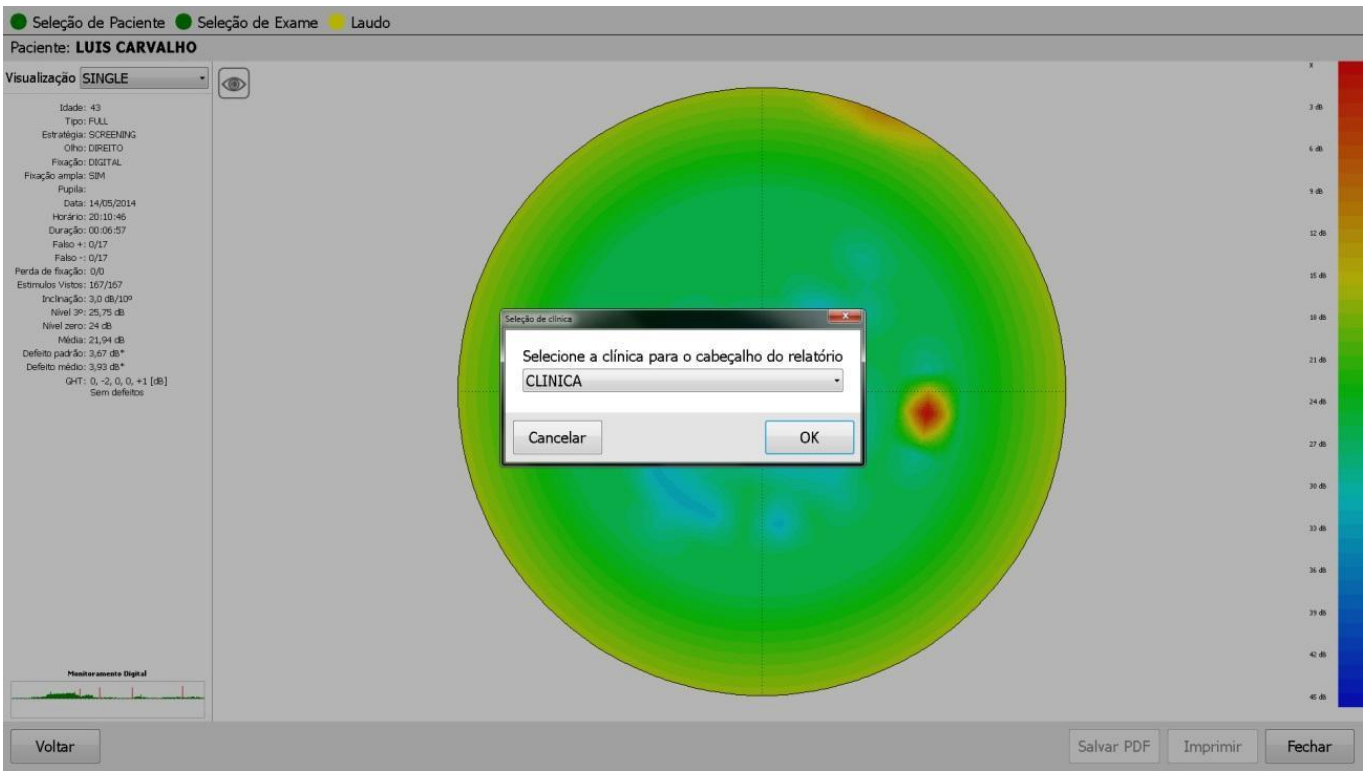
SOURCE SECTION 90

12.10. REPORT - CHOOSING THE CLINIC FOR THE REPORT HEADER

After confirming the print type, select the clinic to appear in the printed report header.

Figure 61 - Choosing the clinic for the report header.

Illustrations - source section 90



Original instrument or software illustration. See the English instructions and interface labels in this section.

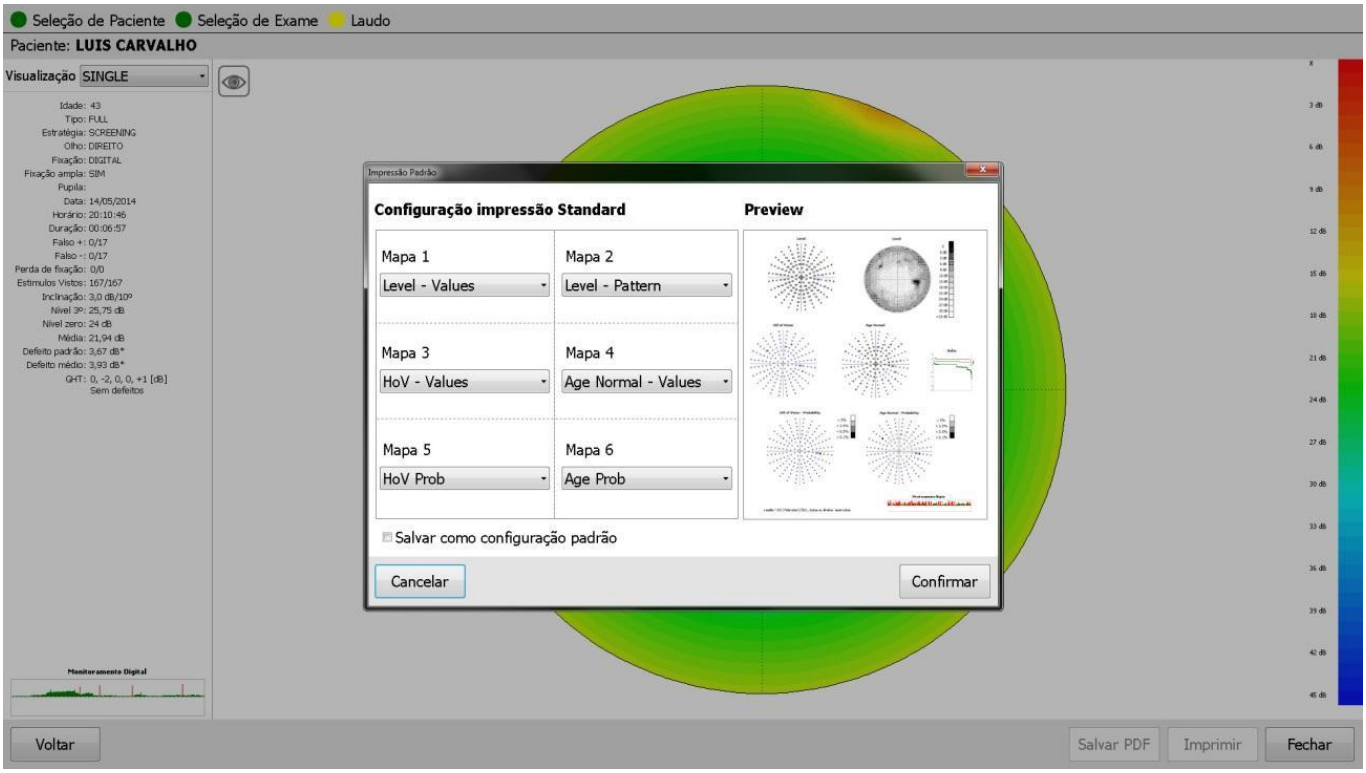
SOURCE SECTION 91

12.11. REPORT - CHOOSING STANDARD PRINT SETTINGS

Selecting Standard printing opens a menu for configuring report printing.

Figure 62 - Choosing Standard print settings.

Illustrations - source section 91



Original instrument or software illustration. See the English instructions and interface labels in this section.

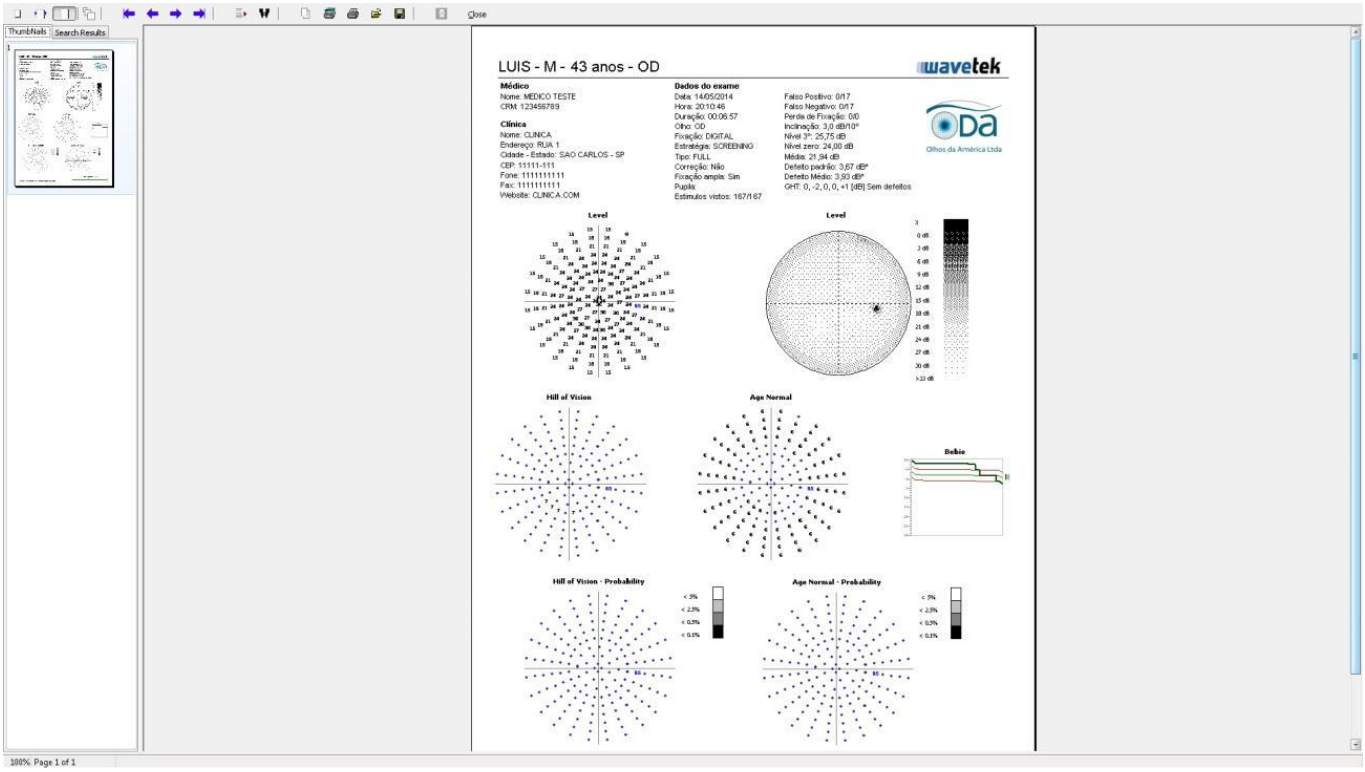
SOURCE SECTION 92

12.12. PRINTING THE STANDARD REPORT

The image above shows a report generated using Standard. It may be printed or saved as PDF.

Figure 63 - Printing the Standard report.

Illustrations - source section 92



Original instrument or software illustration. See the English instructions and interface labels in this section.

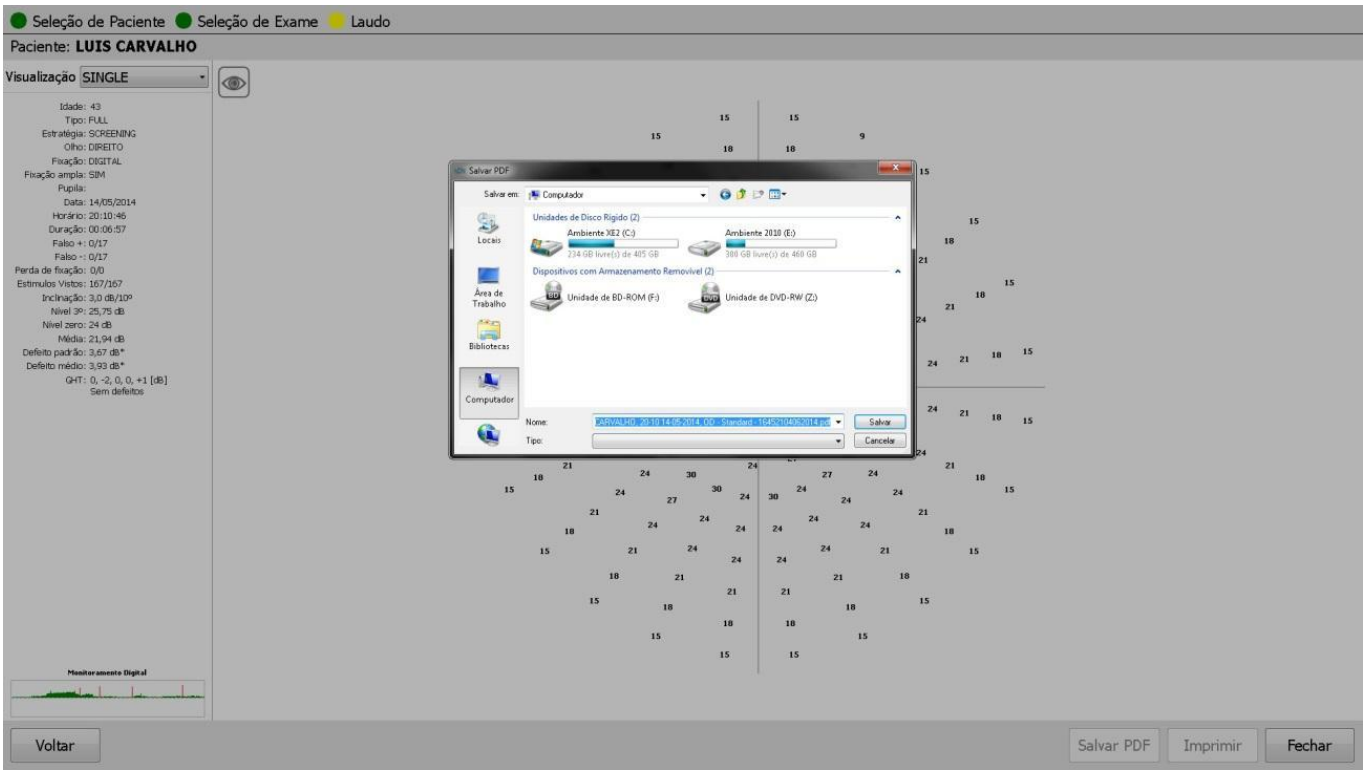
SOURCE SECTION 93

12.13. SAVING A REPORT AS PDF

To save as PDF, click Save PDF (Salvar PDF) on the Report screen. The same print-type and clinic selection process appears, followed by a dialog for saving the PDF in the desired directory. The file name is already specified to avoid overwriting any previously saved file.

Figure 64 - Saving a report as PDF.

Illustrations - source section 93



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 94

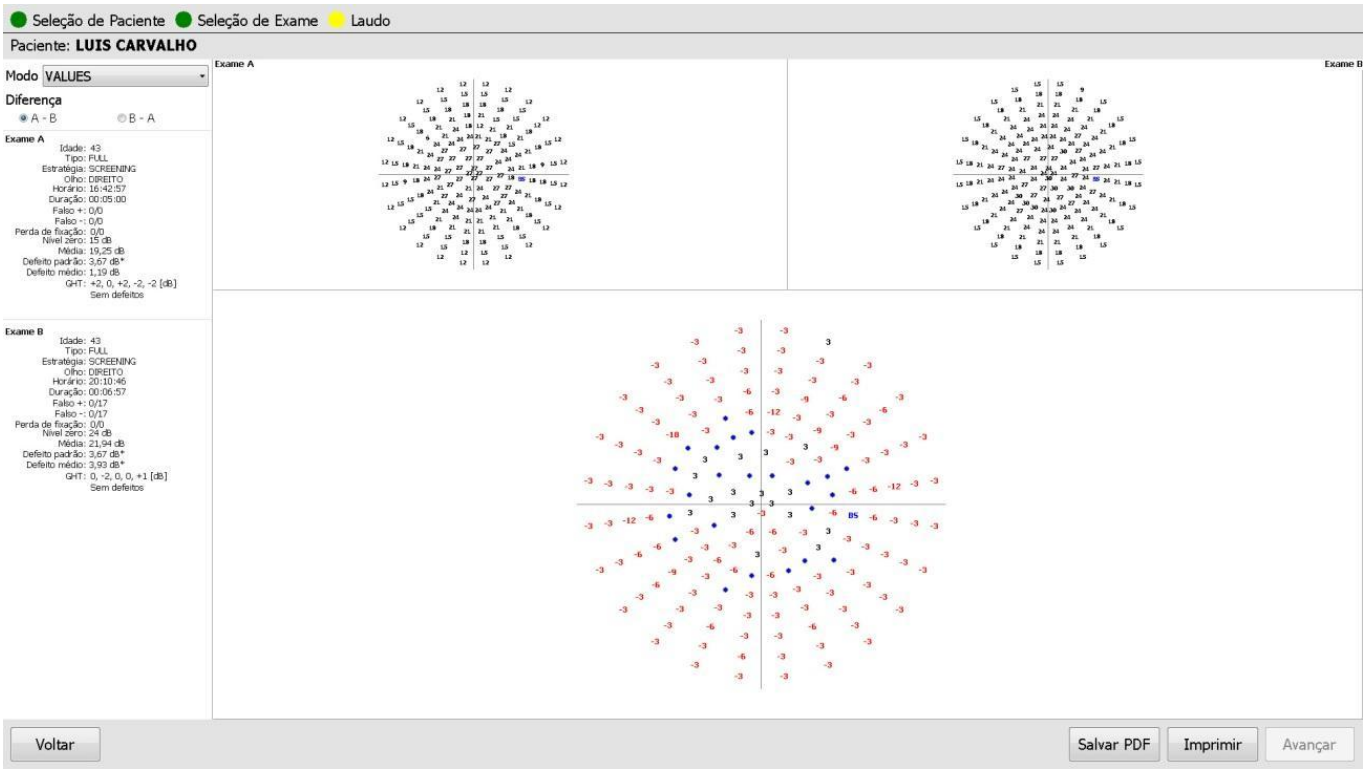
12.14. REPORT - COMPARISON OF 2 EXAMS

Selecting two exams for a Comparison Report in Review Exams opens the screen above. Data for the two exams and the display mode appear on the right.

Three graphical maps are shown: Exam A, Exam B and the difference map of the two exams. Like other reports, it may be printed and saved as PDF.

Figure 65 - Comparison of 2 exams.

Illustrations - source section 94



Original instrument or software illustration. See the English instructions and interface labels in this section.

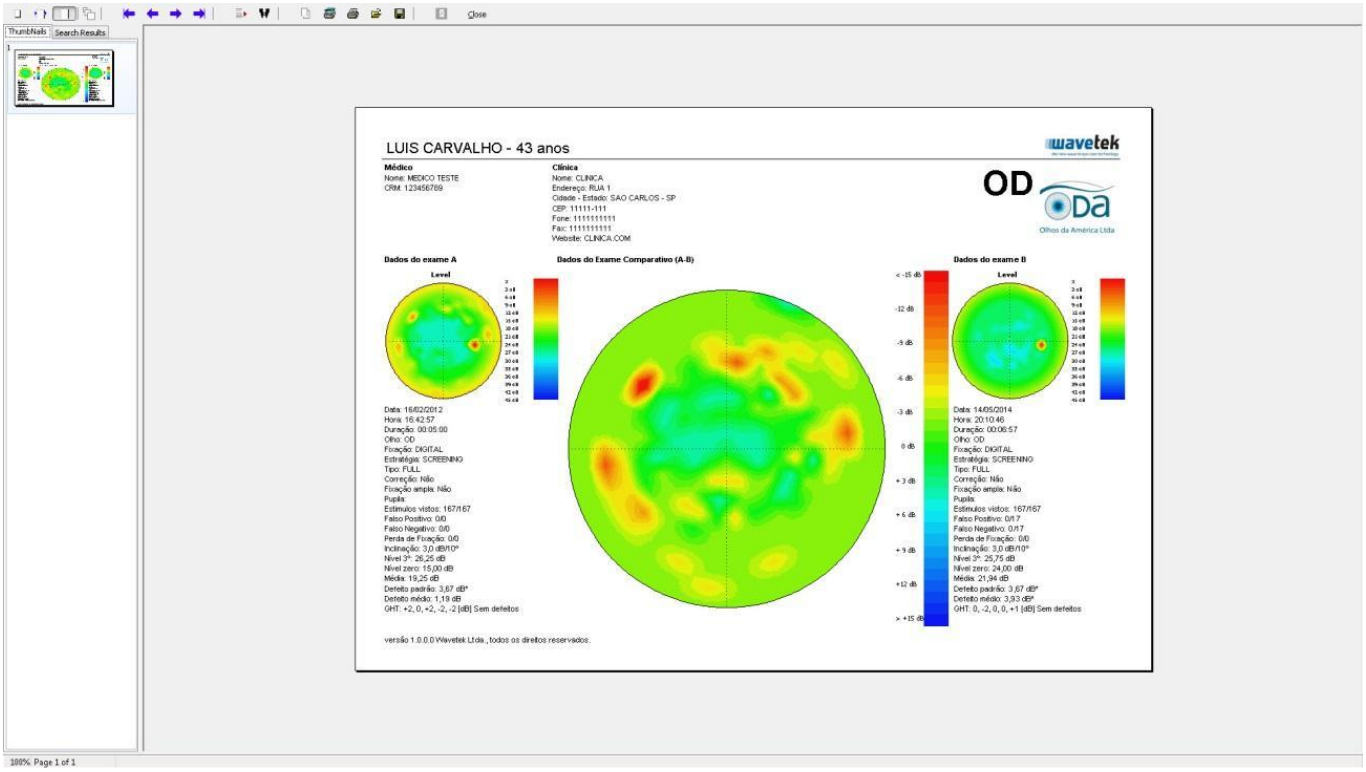
SOURCE SECTION 95

12.15. PRINTING THE COMPARISON REPORT

Below is an example of a comparison report with color-scale maps.

Figure 66 - Printing the Comparison Report.

Illustrations - source section 95



Original instrument or software illustration. See the English instructions and interface labels in this section.

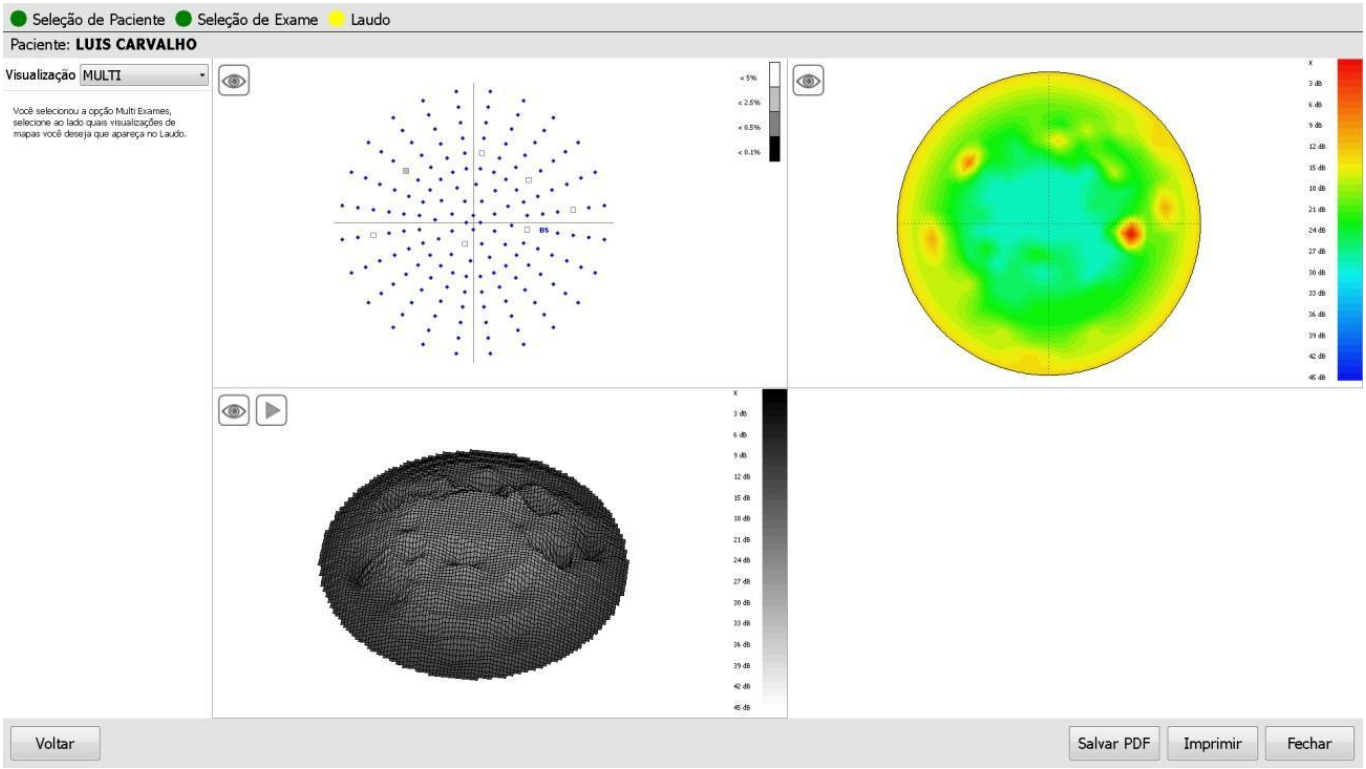
SOURCE SECTION 96

12.16. REPORT - MULTI EXAM

Selecting two to four exams for a Multi Exam report in Review Exams opens the screen above. Three graphical maps of a single exam are shown so the user can choose the map types for the printed report. Like other reports, it may be printed and saved as PDF.

Figure 67 - Multi Exam.

Illustrations - source section 96



Original instrument or software illustration. See the English instructions and interface labels in this section.

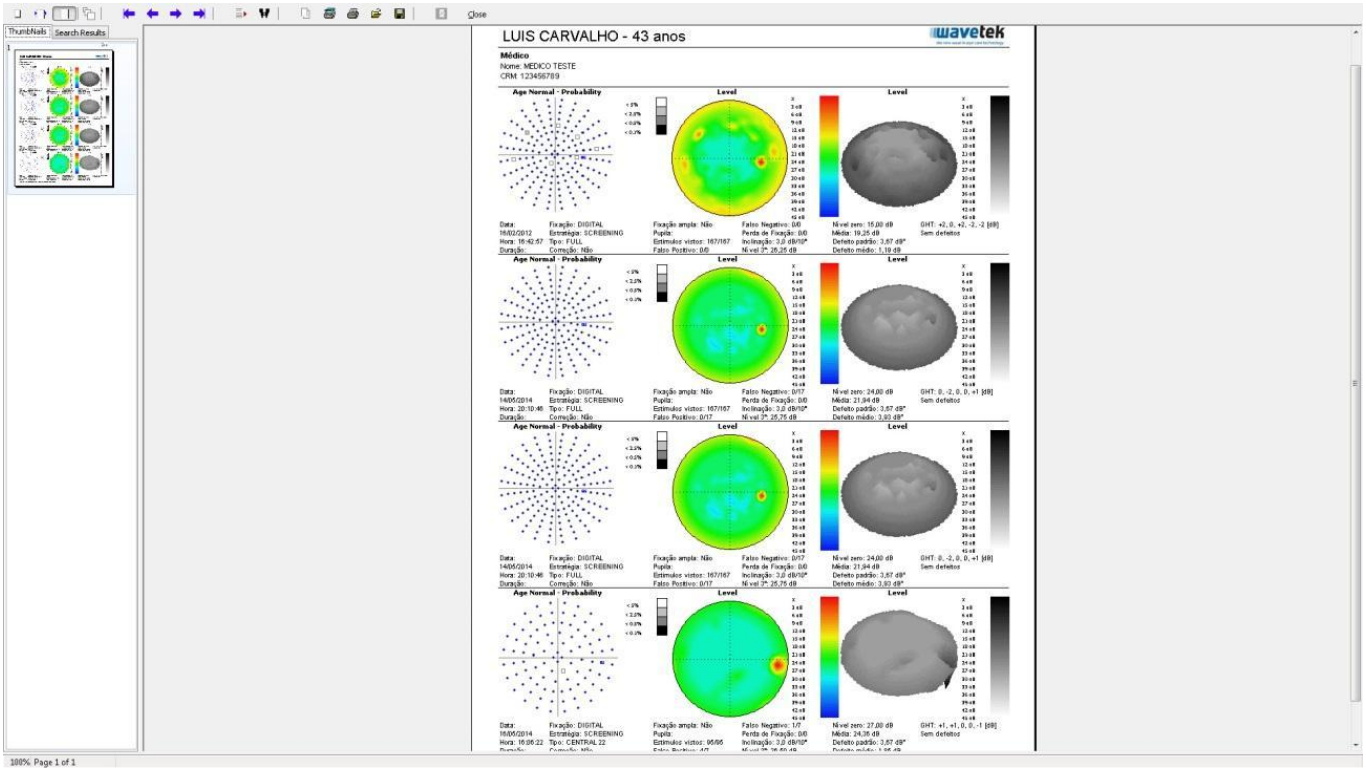
SOURCE SECTION 97

12.17. PRINTING THE MULTI EXAM REPORT

Below is an example of a comparison report displaying three graphical maps for every selected examination, together with their respective information and parameters.

Figure 68 - Printing the Multi Exam report.

Illustrations - source section 97



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 98

13. TECHNICAL SPECIFICATIONS

Photographic coverage	10 × 10 mm
Magnification	2-4×
Working distance	35 mm
Image processing	Automatic/manual
Database	Thousands of patients, virtually unlimited; backup to different media, including USB flash drives
Monitor	15-inch color LCD
Computer	DELL or equivalent, Windows 7/Vista
Supply voltage	Automatic dual voltage, 100-240 V (50/60 Hz)
Power consumption	Normal 65 VA; maximum 190 VA
Dimensions	274 × 485 × 200 mm (W × D × H)
Net weight	2.100 Kg
Gross weight	20 kg
Packaging type	Executive-style case made of 4 mm marine plywood, aluminum profiles, high-impact nylon corners and joint covers
Total visual field angle	100°

STANDARD TEST	Value / count as shown in source
Full	50° / 160
Central	30° / 120
Glaucoma	22°/50 / 100
Central	22° / 96
Wide	22°/50° / 128
Peripheral	72
Macula	10° / 48

SOURCE SECTION 99

Exposure time	Adjustable: 0.1-10 s
Response time	Adjustable: 0.1-10 s
Inter-test delay time	Adjustable: 0.1-10 s
Stimulus source	Green posterior projection LEDs
Stimulus size	Goldmann III standard
Stimulus intensity	0.03-1000 asb
External (ambient) lighting	Modern acrylic system with ultrabright blue LEDs indicates equipment on/off status and also provides turquoise-blue ambient illumination during the examination
Background illumination	10 asb (3.2 cm/m2); automatic level control, ultrabright LEDs and modern acrylic system
Fixation-control method	Blind-spot-based method; high-resolution monochrome CCD camera
Fixation monitor	Yellow LED
Trial-lens diameter	38 mm

OPTIONAL FEATURES

Ambient temperature	+10 to +40 °C
Atmospheric pressure	700-1,060 hPa
Ambient transport and storage temperature	-10 to +40 °C
Relative humidity	30-85%
Atmospheric pressure	500 to 1.60 hPa
ISM classification	1B
Historical original-instrument conformity reference	CE marking 1434, as stated in the original manual; not an EVOptica US clearance or current certification assertion
Other technical data - dimensions H/W/L	780 × 710 × 550 mm

Table 12 - Product specifications.

Notes: Do not allow third parties or unauthorized persons to perform any maintenance, as this will void the equipment warranty.

If the problem is not resolved as described in the table above, immediately contact EVOptica Authorized Technical Assistance: https://evoptica.com, contact@evoptica.com, +1-315-210-8976 (call/text).

SOURCE SECTION 100

14. SPECIAL STORAGE, PRESERVATION AND/OR HANDLING CONDITIONS

14.1. PACKAGING

Information on precautions during transport and storage is shown on the packaging using standardized symbols, described below:

Symbol	Description
Fragile	Handle carefully during transport and storage.
Maximum stacking quantity	No more than 2 identical units may be stacked one on the other.
Keep dry	Protection from moisture is required during transport and storage.
This way up	Packaging orientation during transport and storage.
Temperature limit	0-55° for transport and storage.

14.2. STORAGE

Keep the product in its original packaging, protected from moisture and excessive heat.

If several packaged instruments must be stored, stack no more than two units, as indicated by the symbol.

SOURCE SECTION 101

14.3. TRANSPORT

Avoid vibration, drops and direct impacts to the packaging during transport. Fragile product.

Always take great care when handling the equipment outside its original packaging to prevent accidental damage.

During transport and storage, verify that environmental conditions are within these ranges:

Ambient temperature for transport and storage	0 to +55 °C
Relative humidity for transport and storage	0-90%
Atmospheric pressure	375-795 mmHg

14.4. AFTER INSTALLATION

14.4.1. PLACEMENT

Keep the product protected from moisture, excessive heat and direct sunlight.

During placement and operation, verify that environmental conditions are within these ranges:

Ambient temperature for transport and storage	+10 to +35 °C
Relative humidity for transport and storage	30-75%
Atmospheric pressure	375-795 mmHg

SOURCE SECTION 102

14.4.2. PRESERVATION

After every use, clean with a soft cloth lightly moistened with alcohol to keep the equipment clean and disinfected.

Do not insert or spill liquids inside the equipment.

Do not clean with organic solvents (thinner) or chlorine-releasing products.

Keep the equipment in a clean, dust-free place.

SOURCE SECTION 103

15. WARNINGS AND/OR PRECAUTIONS

15.1. USER WARNINGS AND/OR PRECAUTIONS

This equipment must be used only by trained personnel under the direction of a qualified medical team familiar with the known risks and benefits of using a Specular Microscope and Slit Lamp.

15.2. EXPLOSION HAZARD WARNINGS AND/OR PRECAUTIONS

The VON Automated Perimeter is unsuitable for use in the presence of flammable anesthetic gases or other flammable materials, including some cleaning products.

Do not connect or operate the VON Automated Perimeter in areas where an explosion hazard may exist.

15.3. ELECTRICAL HAZARD WARNINGS AND/OR PRECAUTIONS

Verify that the outlet has a properly installed protective-earth connection for correct operation and equipment safety, in accordance with the applicable ABNT technical standard referenced in the original instrument manual.

At the end of work, switching off with the main switch before unplugging is essential. This avoids a possible overload when the equipment is next switched on.

If power fails or a fuse blows, switch off with the main switch to prevent damage from a possible overload when power is restored.

Replace fuses only with the manufacturer's specified type and rating to maintain electrical protection.

SOURCE SECTION 104

Before replacing a fuse, switch off with the on/off switch and then unplug the equipment to avoid electric shock.

Do not use the power cord if any part is pinched or its insulation is damaged.

15.4. WARNINGS AND/OR PRECAUTIONS DURING TRANSPORT AND STORAGE

Store and transport the product with a maximum stack of two units, protected from moisture. Do not expose it to rain, splashes, etc.

The product is fragile; take the necessary precautions to prevent impacts during transport.

15.5. WARNINGS AND/OR PRECAUTIONS DURING EQUIPMENT MAINTENANCE

Do not attempt to repair or replace defective or inoperative components with similar parts from other equipment. Only EVOptica and its distributors may perform repairs using original parts and guarantee correct equipment operation.

15.6. WARNINGS AND/OR PRECAUTIONS DURING CLEANING

Switch off the VON Automated Perimeter and disconnect it from mains power before any cleaning procedure.

Follow these instructions:

Do not use high-pressure or steam cleaning equipment.

Do not use cleaning agents that release chlorine and/or peracetic acid!

Do not use wet chemical-process cleaning agents or agents containing

SOURCE SECTION 105

abrasive substances.

Always keep the equipment clean and disinfected after every medical procedure.

SOURCE SECTION 106

16. PRODUCT PERFORMANCE

16.1. PRODUCT INDICATION AND INTENDED USE

INDICATION:

Assist ophthalmic medical professionals in diagnosing vision problems. It is useful in pre- and postoperative ophthalmic assessment, including transplant, refractive surgery and cataract.

PURPOSE:

Allows cells of the retina of the cornea to be counted from a photographic image. The equipment counts within an area established by the examiner and subsequently provides the density of cells present in the tissue.

16.2. UNDESIRABLE SECONDARY OR SIDE EFFECTS

Not applicable to this product.

SOURCE SECTION 107

17. PRODUCT SAFETY AND EFFECTIVENESS

The VON Automated Perimeter was designed and developed with nontoxic materials and rigorous technical quality standards to provide user safety and functionality.

When used according to this manual's instructions, the equipment will not cause any problems or lose or change its physical or dimensional characteristics.

SOURCE SECTION 108

18. INSTALLATION OR CONNECTION TO OTHER PRODUCTS

IMPORTANT RECOMMENDATIONS

Do not use other models or brands of Slit Lamp with the VON Automated Perimeter or change its original factory configuration. The instrument is calibrated and tested at the factory to reach the user in perfect working condition. Because the Slit Lamp is specifically calibrated to work with this equipment, modifying it or using it for other examinations is not recommended, as this could compromise the system's intended use.

Do not allow games, chat software or any other software to be installed on the computer supplied with the VON 1.0 Automated Perimeter. Doing so voids the product warranty.

ATTENTION!!

Use of any part, accessory or material with this equipment other than those specified by the manufacturer is entirely the user's responsibility.

SOURCE SECTION 109

19. PROBLEMS AND SOLUTIONS

PROBLEM	POSSIBLE CAUSE	SOLUTION
Lighting system does not turn on	Power cord is not properly connected to the outlet	Connect the power cord correctly. Verify that the equipment is powered; check whether the cord is incorrectly connected to the outlet; check for a disconnected or broken equipment power cord; check that the outlets work correctly. If no irregularity is found, contact EVOptica technical assistance.
Lighting system does not turn on	Main switch (02) is at “O”	Set main switch (02) to “I”.
Lighting system does not turn on	Cable plug disconnected from power supply	Insert the plug correctly into its connector.
Lighting system does not turn on	Cable plug disconnected from lamp compartment	Insert the plug correctly into its connector.
Lighting system does not turn on	Super LED burned out	Replace the super LED.
Lighting system does not turn on	Fuse damaged	Replace the damaged fuse.

SOURCE SECTION 110

Fuse keeps blowing	Voltage selector is not set to the correct voltage	Set the voltage selector to the correct voltage.
Fuse keeps blowing	Fuse is outside specifications	Replace it with a fuse meeting the specifications.

Table 13.

SOURCE SECTION 111

20. EQUIPMENT CLEANING PROCEDURES

20.1. CLEANING THE EYEPIECE LENS

If dirt adheres to the eyepiece lens, clean it with a small soft-bristled brush.

If dirt remains after brushing, use a small piece of the softest possible paper towel moistened with isopropyl alcohol.

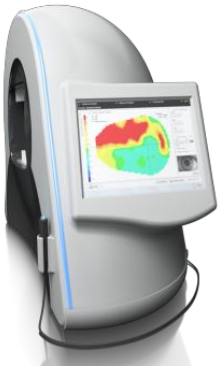
20.2. CLEANING THE SLIDING PLATE, RAILS AND SHAFT

Accumulated dirt on the sliding plate, rails or shaft may impair horizontal and vertical movement. Clean them frequently with a clean, soft cloth.

20.3. CLEANING AND SANITIZING PLASTIC PARTS

Clean plastic parts, such as the chinrest support and forehead rest, with a soft cloth moistened with water and neutral detergent, then sanitize with medicinal alcohol.

Illustrations - source section 111



SOURCE SECTION 112

21. PRECAUTIONS IN THE EVENT OF CHANGES IN PRODUCT OPERATION

If the equipment overheats, makes unusual noises or operates abnormally, check whether the problem matches those in the table in item 11, Troubleshooting. If it cannot be resolved, immediately switch off, unplug the power cord and contact EVOptica Authorized Technical Assistance for assessment and repair.

22. SENSITIVITY TO ENVIRONMENTAL CONDITIONS DURING NORMAL USE

The VON perimeter was specifically designed and developed to avoid sensitivity to electromagnetic interference, external electrical influences, electrostatic discharge, and pressure and temperature variations. The equipment must therefore be transported, installed, handled and maintained according to this manual.

23. PRECAUTIONS WHEN DECOMMISSIONING THE PRODUCT

To avoid environmental contamination or misuse when the product is decommissioned, segregate, package, identify and send it, at the customer's expense and risk, to EVOptica premises for safe disposal.

SOURCE SECTION 113

24. PRECAUTIONS WHEN DECOMMISSIONING THE PRODUCT

To avoid environmental contamination or misuse when the product is decommissioned, segregate, package, identify and send it, at the customer's expense and risk, to EVOptica premises for safe disposal.

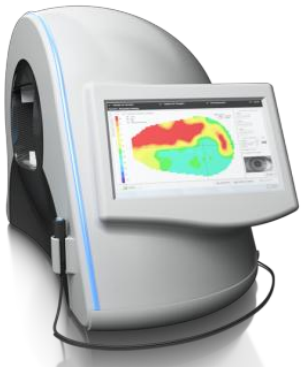
25. INSTALLATION OF VON EQUIPMENT

All assembly and installation procedures are performed by a specialized technician during the installation visit. The customer should check with the technician that all parts, accessories and optional items ordered at purchase are present and in perfect condition inside the packaging. If not, contact the company immediately to resolve the problem.

Once the technician completes installation, the VON Automated Perimeter is ready for use. The technician is not expected or permitted to return for “retraining” or to train physicians or technologists who did not attend the initial training.

The clinic or hospital must pay separately for any additional technical visit. If misalignment or a loose connection occurs during use, carefully read “Techniques for Image Capture in the Papillary Perimeter” so the user can make the necessary equipment adjustments and calibration.

Illustrations - source section 113



SOURCE SECTION 114

26. VERIFICATION PROCEDURE AFTER ASSEMBLY IN THE PHYSICIAN'S OFFICE

26.1. ELECTRICAL OUTLET

The equipment is supplied with a three-conductor power cord (2P+T). Choose an outlet suitable for its connector.

Ensure that the outlet has suitable protective grounding for the equipment and user.

ATTENTION!! Use only the cord supplied with the equipment.

26.2. PREPARING THE VON AUTOMATED PERIMETER FOR EXAMS

First check that the unit is correctly switched on (see the main power button) and that the retinal-illumination light is also on. Press the “re-set” button to do this.

Main button - main power-supply activation.

Reset button.

Computer power button.

Figure 69 - VON instrument buttons.

Illustrations - source section 114



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 115

Always press re-set and check that the machine is on, because VON has an energy-saving timer that switches off every half hour.

26.3. PREPARING THE PATIENT FOR THE EXAM

Patients may not know exactly what to do during the examination. Explain that they must keep the head positioned firmly, with forehead against the forehead rest and chin well supported on the chinrest (Figure 12). During the exam, the patient should keep the eye as open as possible and feel free to blink.

A useful tip is to keep the table below the person's natural face height, so the head is supported and the muscles relaxed.

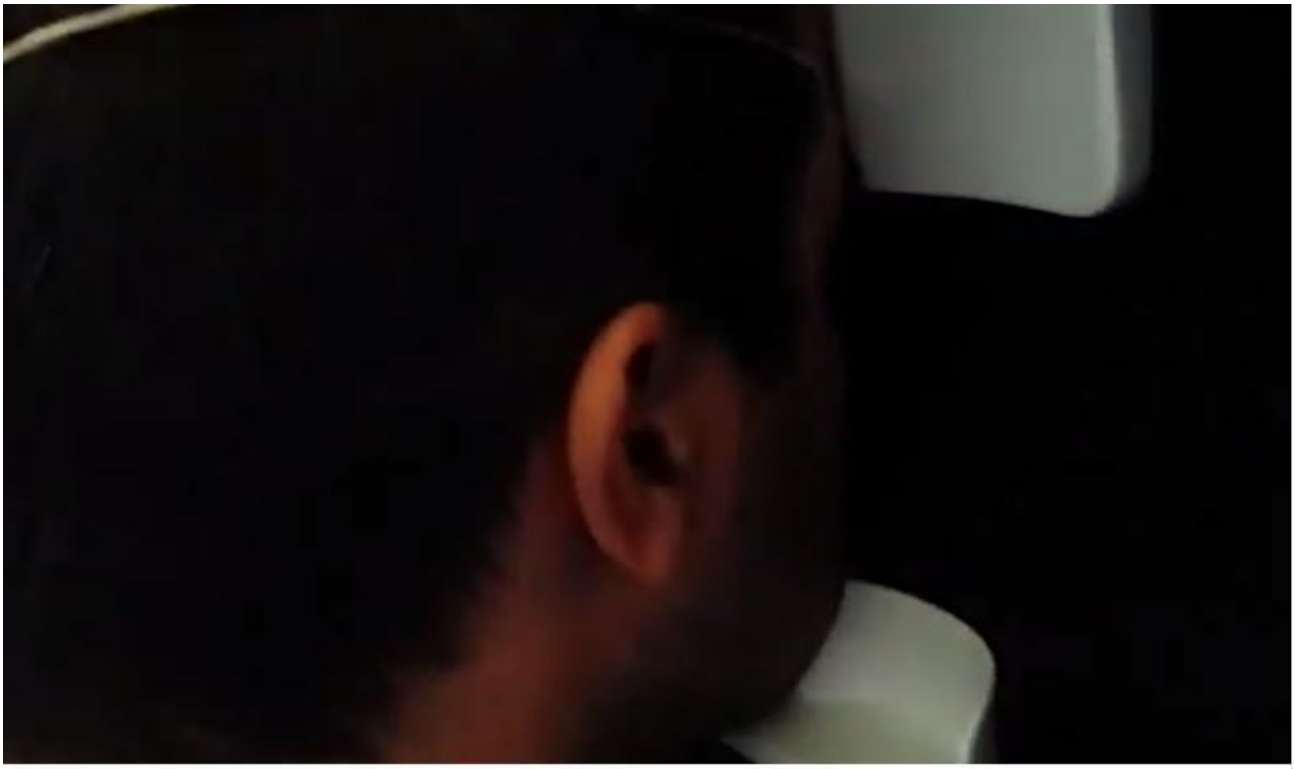
Correct face positioning on the chinrest.

Figure 70 - Ideal chinrest position.

I. Seat the patient facing the perimeter. Place the chin on the left chinrest when examining the right eye, and vice versa.

II. Explain the test calmly and in detail, emphasizing full cooperation, pressing the joystick

Illustrations - source section 115



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 116

button whenever a green stimulus is seen, and the importance of maintaining central fixation.

III. Select appropriate lenses only for central 30° examinations. More peripheral examinations do not require corrective lenses. Take the patient's current spherical-diopter value and add the spherical power shown in Goldmann's table below. If the exact trial lens is unavailable, round upward by 0.25 diopter or to the nearest available power.

GOLDMANN'S TABLE

Age	Add (spherical lens)
40-44	+1.50
45-49	+2.00
50-54	+2.50
>55 or cyclopleged	+3.00

Correct astigmatism only if the patient has +1.00 D or more. For less than 1.00 D of astigmatism, add 0.25 D to the sphere and use spherical correction only.

Trial-lens correction example for a 41-year-old patient:

OD -2.00 +2.00 × 120

OS -3.25 +0.75 × 090

Use:

OD -0.50 +2.00 × 120

OS -1.50 sphere

Remove the lenses FOR EXAMINATIONS OF THE PERIPHERAL RETINA, THAT IS, beyond the central 30 degrees!

I. Switch on the equipment in a darkened or dim room.

II. Cover the untested eye with an eye patch. Generally, the right eye is tested first.

III. Bring the patient to the instrument. Adjust chinrest and table height for correct alignment and comfort. Take care not to press the patient's forehead against the instrument's upper part.

SOURCE SECTION 117

IV. First view the monitor without the corrective lens in front, so the patient's pupil can be well centered.

V. If pupil diameter is <3.0 mm, dilate using Neosinefrina 2.5%, unless contraindicated. If the pupil does not dilate, add one cycloplegic drop and wait 20 minutes before testing.

VI. Start the test.

26.4. PROCEDURES FOR PERFORMING AN EXAM

The main VON examination steps are:

I. First switch on according to the VON preparation instructions, Figure 10.

II. Position the patient's head according to the patient-preparation instructions, using Figure 12 as reference.

III. Most remaining procedures concern alignment and software; complete the examination using the other items below.

26.5. USING THE VON AUTOMATED PERIMETER HARDWARE

Specifications of the supplied computer and peripherals.

Every computer supplied with the VON Automated Perimeter has a factory warranty. EVOptica supplies DELL computers (www.dell.com.br) or equivalent with genuine Windows and the manufacturer's warranty seal. If a problem arises during warranty, contact the computer manufacturer directly.

EVOptica does not use generic or undocumented computer components without invoices or proof of origin. Any fault or problem covered by the computer manufacturer's warranty must be reported directly to that manufacturer's service network. EVOptica does not supply

SOURCE SECTION 118

the instrument with a printer. The physician must purchase one and have it installed by a specialized technician from the clinic.

SOURCE SECTION 119

NOTES:

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SOURCE SECTION 120

27. EVOptica TECHNICAL ASSISTANCE

EVOptica has a technical-assistance department to meet your needs, with qualified technicians to address technical problems relating to our products.

All products are installed by authorized personnel.

Customer service may be provided in the office, clinic or hospital, according to the service and previously agreed quotation.

Request technical assistance: +1-315-210-8976 (call/text), contact@evoptica.com, https://evoptica.com.

Specialized equipment-maintenance assistance for all EVOptica customers.

Figure 71 - Installing our equipment at customer locations.

Figure 72 - Installation and technical assistance throughout Brazil, as shown in the original instrument manual.

Illustrations - source section 120





Original instrument or software illustration. See the English instructions and interface labels in this section.



Original instrument or software illustration. See the English instructions and interface labels in this section.

SOURCE SECTION 121

WARRANTY TERMS

INVOICE NUMBER: _____

PURCHASED BY: _____

MANUFACTURE DATE: _____

PERSON RESPONSIBLE FOR DELIVERY: _____

INSTRUMENT SERIAL NUMBER: _____

O.P.: _____

CNPJ: _____

CUSTOMER NAME: _____

CUSTOMER ADDRESS: _____

EVOptica provides a warranty against manufacturing defects in the VON perimeter for one year from purchase. Service requires that the claim be within that period and that the product serial number match the serial number on this certificate.

27.1. FACTORS THAT VOID THE WARRANTY

Failure to observe this manual's recommended transport, installation, use and maintenance precautions.

Accident, dropping, improper installation or any damage caused by misuse or natural agents.

Tampering, repairs or other modifications or alterations to the equipment or its parts by personnel not authorized by EVOptica.

After the warranty expires, all services, parts and expenses will be charged according to the company's current policy.

27.2. PERMANENT TECHNICAL ASSISTANCE

SOURCE SECTION 122

ATTENTION: Maintenance of the VON instrument by anyone other than EVOptica is expressly prohibited because it may negatively affect operation. The warranty is void if maintenance by third parties or unauthorized persons is found. Tampering with security labels or equipment seals also voids the warranty.

27.3. THE WARRANTY DOES NOT COVER

Labor for reinstallation, if needed.

Transportation to warranty repair; freight is the customer's responsibility.

New training or retraining for technicians and secretaries absent on installation day.

27.4. THE WARRANTY WILL BE VOIDED WHEN

The instrument is connected to the wrong voltage and/or the specifications and recommendations in the user manual's technical specifications are not observed.

The equipment is tampered with; its seal must not be opened by unauthorized persons.

The instrument is damaged by mechanical shock, drops or impacts, moisture, sea air, excessive heat or incorrect handling.

Intervention or repair is performed by persons or companies not accredited by EVOptica.

The user, an unaccredited person or company installs devices, parts, equipment, accessories or software that prevent correct operation.

SOURCE SECTION 123

I acknowledge receipt of the Warranty Certificate for the equipment bearing the serial number shown on this certificate.

Date: ____ / ____ / _____

SÃO CARLOS, _____, _____

_____

Customer signature

_____

Signature of EVOptica representative

SOURCE SECTION 125

28. STATEMENT OF RESPONSIBILITY

Original instrument statement of responsibility:

The original manufacturer, represented by its Technical Officer, Engineer Elizeu Ramos, and Legal Representative, Luis Alberto Vieira de Carvalho, the undersigned, assumes full technical and legal responsibility for the product and declares that all information concerning the VON 1.0 Automated Perimeter in these Instructions for Use is true.

_____

Original instrument Legal Representative

Prof. Dr. Luis Alberto V. de Carvalho

CPF/MF 168601838-11

_____

Original instrument Technical Officer

Engineer Elizeu Ramos

CREA-SP 5061454507

Configuration and source-review notes

Source limitations requiring technical review

Source section 23: Source names 'HVON' and a retinal-photography USB pedal; apparent copy contamination retained. Pages 15-23 also mix LED/projection and static/kinetic claims.

Source section 26: Source age ranges overlap at ages 45 and 65. Original bounds retained, not resolved.

Source section 29: Calibration pages 29-30 alternate minimum versus maximum brightness for the selected point. Source ambiguity retained without selecting a setting.

Source section 34: Binocular strategy describes single/double responses but does not explain entry of D. No missing response procedure was invented.

Source section 36: Wide-field description states horizontal extension to 50° but only 30° temporally. Ambiguity retained; brochure/manual also differ in some Wide test angle descriptions.

Source section 42: Average Defect probability table contains malformed brackets and '-3N dB'; literal intervals retained. Source probability-symbol tables on pages 50-54 were supplemented by OCR/visual review.

Source section 53: Cross-page table coverage checked: medium-defect '<2.5%' cell begins on page 53 and continues on page 54 in source; translation completes it on page 53, so absence of 2.5 on page 54 is not an omission. Dark-gray <0.5% and black <0.1% rows remain on page 54.

Source section 98: Specifications appear copied from another imaging instrument: 10 × 10 mm coverage, 2-4× magnification, 35 mm working distance, 274 × 485 × 200 mm, '2.100 Kg' net weight, 20 kg gross weight, 65/190 VA. Page 99 instead gives 780 × 710 × 550 mm; brochure gives 700 × 650 × 500 mm and 14 kg/30 W. Preserve all source configurations; do not adopt one as a validated current perimeter specification.

Source section 99: Transport/storage pressure '500 to 1.60 hPa' and luminance parenthesis '3.2 cm/m2' are malformed. CE 1434 qualified as historical original-instrument reference. All technical table row arrays retained.

Source section 100: Environmental conflicts: page 99 operation +10-40°C, storage -10-40°C, RH30-85%; pages100-101 storage0-55°C/RH0-90%, operation+10-35°C/RH30-75%. Source ranges retained without selecting current limits.

Source section 103: User warning names a Specular Microscope and Slit Lamp instead of perimeter. Source contamination retained; electrical/explosion prohibitions preserved in translation.

Source section 106: Intended purpose says counting 'cells of the retina of the cornea,' anatomically incoherent and apparently copied from microscopy material. Must remain an identified source defect, not a current VON intended-use assertion.

Source section 108: Installation section describes a specially calibrated slit lamp used with VON. Source copy contamination retained, not validated as a perimeter connection procedure.

Source section 110: Troubleshooting requires setting a voltage selector, conflicting with automatic dual-voltage description on page98. Both source statements retained.

Source section 112: Troubleshooting cross-reference incorrectly says item11 instead of actual section19. Page113 references missing image-capture instructions for a 'Papillary Perimeter.'

Source section 116: Age-based correction table omits age exactly55 by stating '>55'. Prescription examples retained without clinical reinterpretation.

Source section 117: Historical dilation instructions retain <3.0mm threshold, Neosinefrina2.5%, 'unless contraindicated', one cycloplegic drop and20-minute wait. This is source clinical content requiring qualified clinical review before any released IFU; not a new prescribing recommendation.

Source section 121: Original warranty terms and page117 computer-supply/support statements have not been confirmed as current EVOptica sales terms. Original signatories on page125 are not current EVOptica signatures.

EVOptica

Ophthalmic instruments. Science, engineering and experience connected.

Contact sales, distribution and product support

evoptica.com

contact@evoptica.com

Call or text +1-315-210-8976

221 S Main St
Fairport, NY 14450
United States

Explore VON resources

Request a demonstration or quotation

Configuration and market information

US regulatory clearance is in progress. The original ophthalmic product line held clearances in South American markets. Contact EVOptica for the product configuration, documentation and availability relevant to your destination market.

This is a full English technical-review edition of the supplied source document. It preserves source procedures, warnings, values and unresolved source differences. It is not a manufacturer-released clinical IFU for a new US product configuration.

Document information

English EVOptica edition: 05 November 2026.

Source revision: Not stated in extracted source

Original technical illustrations are retained for traceability. Some legacy interface screenshots show Portuguese controls; English instructions and label glossaries accompany them. Product and software names are retained. Third-party marks identify their respective owners.