



Humphrey[®] Field Analyzer 3 (HFA3)
Instructions for Use – Models 830, 840, 850, 860



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Contents

(1) Introduction	1-1
Operating Principles	1-1
Intended Use	1-1
Indications for Use	1-1
Purpose of This User Manual	1-3
Symbols and Labels	1-4
Instrument Disposition	1-6
Disposal	1-6
User Changes to Software or Hardware	1-6
Instrument Installation	1-7
HFA3 Licenses	1-7
Product Compliance	1-7
Product Safety	1-7
Electromagnetic Compatibility (EMC)	1-9
(2) Getting Started	2-1
Instrument Overview	2-1
Startup	2-6
Settings	2-7
(3) Setup and Testing	3-1
Perform Threshold or Suprathreshold Test	3-1
Perform Kinetic Test	3-13
Create Custom Test Patterns	3-19
Set up Test Profiles	3-21
Delete Test Profiles and Patterns	3-21
(4) Managing Data, Tests, and Reports	4-1
Save Test Reports and Test Data	4-1
Print Test Reports	4-2
Reassign Tests	4-3
Delete Tests	4-3
Import Tests	4-4
View and Generate Test Reports	4-4
Merging and Deleting Patient Records	4-4
Static Threshold Reports	4-5

Report Features	4-11
Suprathreshold Reports	4-14
Kinetic Reports	4-15
(5) Networking	5-1
Network Capabilities	5-1
Configuration to a Pre-existing Office Network	5-1
Connect to a DICOM/EMR Server	5-3
Connect to a Printer	5-7
(6) Maintenance	6-1
Cleaning the Instrument	6-1
Replacing the Stimulus Projection Lamp	6-2
Liquid Trial Lens Care	6-4
Accessories and Supplies List	6-5
(7) Data Transfer from an HFA II or HFA II-i	7-1
Set up a Data Transfer	7-1
(8) Specifications	8-1
HFA3 Instrument	8-1
(A) Test Patterns and Parameter Settings.	A-1
Threshold Test Patterns	A-1
Suprathreshold Test Patterns	A-3
Test Parameters	A-8
(B) Determine the Trial Lens	B-1
Guidelines For Trial Lens Selection	B-1
How to Calculate the Spherical Equivalent	B-1
(C) Troubleshooting	C-1
Error Alerts	C-1
Troubleshooting Table	C-3
(D) Legal Notices.	D-1
Software Copyright	D-1
Software License Agreement	D-1

(1) Introduction

This introductory section covers general information about the Humphrey® Field Analyzer 3 (HFA™3).

Operating Principles

A patient's visual field can be assessed by briefly projecting a spot of light ("stimulus") of known size, brightness, and location on the inside surface of a roughly hemispherical bowl. Bowl illumination is controlled to establish a desired contrast between the stimulus and the area around it. Stimulus location and presentation timing are algorithmically varied to minimize the patient's ability to anticipate stimulus location and timing. Stimulus brightness is algorithmically varied to determine the dimmest stimulus that can be reliably seen at each location. The resulting visual field map is used by a trained and qualified physician as an aid in diagnosis. Historically, also known as the Humphrey Field Analyzer (HFA), this instrument is the gold standard of perimetry worldwide.

In addition to static perimetry, the HFA3 allows you to perform kinetic perimetry that emulates manual standard Goldmann perimetry. You can manually select kinetic isopters, or perform custom scans automatically or step by step.

Intended Use

The Humphrey Field Analyzer is an automatic perimeter which is intended to be used to measure the visual field of the eye.

Indications for Use

The Humphrey Field Analyzer is an automated perimeter intended to identify visual field defects for the purposes of screening, monitoring, and assisting in the diagnosis and management of ocular diseases such as glaucoma and related neurological disorders.

The Carl Zeiss Meditec, Inc. Guided Progression Analysis™ (GPA™) is a software analysis module for the Humphrey Field Analyzer that assists practitioners with the detection, measurement, and management of progression of visual field loss. It aids in assessing change over time, including change from baseline and rate of change. It is intended for use as a diagnostic device to aid in the detection and management of ocular diseases including, but not limited to, glaucoma.



Note: The HFA3 is not intended to be used as the sole diagnostic method for disease.

Patient Population

The HFA3 may be used on all adults and children over the age of six in need of diagnostic evaluation of the eye. This includes (but is not limited to) patients with the following disabilities or challenges:

- Wheelchair user
- Very low or not measurable visual acuity
- Postural problems
- Fixation problems
- Deafness
- Large body, but not those above 99th percentile based on anthropomorphic data

There is a general requirement that the patient be able to sit upright and be able to place his or her face on the chin and forehead rest of the instrument (with or without supplemental human or mechanical support).

Part of the Body

The HFA3 physically interacts with the patient's forehead and chin. The patient's hand and fingers (or similar ability) are also required to press the patient response button.

Application

The HFA3 is designed for continuous use, although it is expected that most sites operate the instrument for 10 hours or less per day, indoors, within a medical office or hospital setting. This setting should have clean air free of soot, vapors from adhesives, grease, or volatile organic chemicals. Other Operating Environment specifications are given in [Chapter \(8\), "Specifications"](#). Application related warnings are given in this chapter and elsewhere throughout the manual.

User Profile

We assume that users are clinicians with professional training or experience in the use of ophthalmic equipment, and in diagnostic interpretation of the test results. Specific assumptions regarding the profiles of individuals performing instrument operation or data interpretation are given below. This manual contains information that will aid in the proper instrument operation and interpretation of the resultant data.

Instrument Operation

Demographic

The user should be an adult, and at least one of the following:

- Ophthalmologist
- Optometrist
- Nurse
- Certified Medical Technician
- Ophthalmic Photographer
- Non-certified Assistant

Occupational Skills (Frequently used functions)

The user should have appropriate training in order to perform all of the following tasks:

- Power on the instrument
- Enter, find, and modify patient identifying data
- Clean surfaces that contact patient
- Position patient with the instrument, including moving the patient, the instrument, the table height, and the patient's chair
- Select and initiate a test
- Review and save a test or try again
- Generate an analysis report
- Review the analysis report for completeness
- Save, print, or export an analysis report
- Archive data
- Power off the instrument

Data Interpretation

Demographic

The user should be one of the following:

- Ophthalmologist or other Medical Doctor
- Optometrist or equivalent

Occupational Skills

The user should have the following skills:

- See [Instrument Operation](#) on page 1-2.
- Ability to work with elderly patients and those with disabilities

Job Requirements

The user should have training and certification in the analysis and treatment of ophthalmic diseases or other eye-related medical issues as required by governing bodies.

Purpose of This User Manual

The HFA3 Instructions for Use instructs the user in the procedures for operating the instrument, testing the patient, and reviewing and printing test reports. The screens presented by the instrument are designed to be intuitive.

Models

This guide contains instructions for Models 830, 840, 850, and 860. Licensed software and various hardware upgrades differentiate models. See [Model Features](#) on page 2-4.

Text Conventions

The terms “select,” “choose,” “touch,” “press,” and “tap” each mean to initiate an operator action using the touch screen, external keyboard, or mouse.

This manual means “left-click” when it says “click,” except where “right-click” is specified.

Electronic User Manual Access

The HFA3 User Manual, created in Acrobat PDF format for use on a computer, is provided on the HFA3 User Documentation USB included in the instrument accessory kit. If necessary, go to www.adobe.com to download and install the free Adobe Reader.

Symbols and Labels

WARNING



CAUTION



Must Follow Instructions For Use.



DisplayPort®



USB Port



Network Port



Power Switch



Type B applied parts



Patient Response Button



Headphones



Direct Current



Alternating Current



CAUTION: Hot Surface



Manufacturer



Date of Manufacture



Serial number



Catalog number / part number



Model number



Patent



Disposal of the Product within the EU. Do not dispose via domestic waste disposal system or communal waste disposal facility.

Safety Information

Warning: Indicates a hazardous situation which may result in death or serious injury if the appropriate safety precautions are not heeded.

Caution: Indicates a hazardous situation which may result in minor or moderate injury or damage to the device if the appropriate safety precautions are not heeded.

Protective Packing Symbols

The protective packing symbols on the shipping carton specify the handling requirements and the transport and storage conditions for the HFA3 as it is shipped from the factory. Note these symbols in the event that the HFA3 must be stored for a period of time prior to its setup and use.

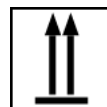
Handling Requirements



Fragile, Handle with Care



Keep Dry

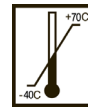


This end up

Transport (Packaged)



Humidity (10% to 95%)



Temperature (−40 to +70 deg. C)



Atmospheric Pressure Limits (500 hPa to 1060 hPa)

Instrument Disposition

When it comes time to upgrade the HFA3, please contact ZEISS to inquire about trade-in or upgrade values we may offer. Should you not wish to trade in the instrument, please see the Disposal section below.

Disposal



CAUTION: This product contains electronic components. At the end of its lifetime, the product should be disposed of in accordance with the relevant national regulations.



Disposal of the Product within the European Union (EU)

Packaging materials should be retained for future relocation or repair.

If you wish to dispose of the packaging material, contact a recognized collection system for recycling.

The device contains electronic components. At the end of its lifetime, the product and its integrated batteries should be disposed of in accordance with the relevant national regulations.

In accordance with applicable EU guidelines and national regulations at the time at which the product was brought onto the market, the product specified on the consignment note is not to be disposed of via the domestic waste disposal system or communal waste disposal facilities.

For further information on disposal of this product, please contact your local dealer or the manufacturer or its legal successor company. Please read the latest Internet information provided by the manufacturer.

Where the product or its components are resold, the seller must inform the buyer that the product is to be disposed of in accordance with the currently applicable national regulations.

User Changes to Software or Hardware

The HFA3 is a medical device. The software and hardware have been designed in accordance with U.S., European and other international medical device standards designed to protect clinicians, users and patients from potential harm caused by mechanical, diagnostic or therapeutic failures.



WARNING: Unauthorized modification of HFA3 software or hardware (including peripherals) can jeopardize the safety of operators and patients, the performance of the instrument, and the integrity of patient data; it also voids the instrument warranty.

Approved Software

Only use of software supplied or approved by ZEISS for the HFA3 is authorized. For the current list of approved software call ZEISS Customer Care: In the U.S., call 800-341-6968. Outside the U.S., contact your local ZEISS distributor.



Note: ZEISS does not provide technical support for the use of unapproved third party software.

Instrument Installation

Only an authorized ZEISS service representative should install the HFA3. In consultation with the buyer, ZEISS schedules one free on-site installation appointment after instrument delivery. System installation and operator training require approximately one-half business day.

Care in Handling

Use extreme care when handling and transporting the HFA3 shipping boxes. The instrument contains fragile optics that have been precisely aligned at the factory.

Installation Requirements

- The HFA3 should be connected to a dedicated power outlet. The HFA3 will operate within its specifications when connected to any AC main supply in the range 90 to 264Vac, 47Hz to 63Hz.
- An isolation transformer is required when connecting peripheral devices that are not Medical Device approved (i.e., printer, USB drive, etc.) within 1.5 meters (4.9 feet) away from the patient, such that the patient cannot touch a peripheral device with any part of his or her body while being examined.

HFA3 Licenses

Each HFA3 is issued with two Windows® operating system licenses: an embedded version and a consumer version.

Product Compliance



Complies with US and Canadian medical electrical system safety requirements.

Product Safety

This instrument is classified as follows:



- Class I Equipment – Protection against electrical shock.
- Type B – Degree of protection against electric shock of applied part (chin and forehead rests, and patient response button).
- Ordinary Equipment (IPX0) – Degree of protection against ingress of liquids (none).
- Continuous Operation – Mode of operation.

General Safety Guidelines



Note: Users are not authorized to dismantle or modify the HFA3 hardware. To transport the instrument outside the office, you must consult with a ZEISS service technician. Failure to do so voids all warranties provided with the HFA3.

- Only ZEISS authorized technicians should disassemble or service this instrument. In the case of malfunction, error messages or operational problems, call ZEISS Customer Care: In the U.S., call 800-341-6968. Outside the U.S., contact your local ZEISS distributor.
- This instrument has no special measures to protect against harmful ingress of water or other liquids (classified IPX0—ordinary equipment). Do not place containers of liquid on or near the instrument, nor use aerosols on or near it.
- In case of emergency related to the instrument, unplug the power cord from the instrument and call for service immediately.

- The projection lamp, Trial Lens holder and Liquid Trial Lens™, patient response button, external keyboard, and fan filter are all user-replaceable parts. For the replacement of any other instrument component, accessory, or peripheral, call ZEISS Customer Care: In the U.S., call 800-341-6968. Outside the U.S., contact your local ZEISS distributor.
- Although this instrument is designed for continuous operation, it should be turned off when not in use for an extended period.
- This instrument operates according to specifications under standard indoor office (fluorescent) lighting conditions, without exposure to any direct sunlight.
- Do NOT place the cover over the instrument when the HFA3 is turned on, as loss of proper airflow can cause overheating and damage to sensitive components.
- Do NOT connect or disconnect cables while power is on.
- Do NOT place any objects on top of the instrument.
- Do NOT place any container holding liquid near the instrument.

Warnings and Cautions



WARNING: Do not block the ventilation openings. These allow for the release of heat generated during operation. A buildup of heat due to ventilation opening blockage can cause failures which may result in a fire hazard.



WARNING: To prevent electric shock, the instrument must be plugged into an earthed ground outlet. Do not remove or disable the ground pin. Only an authorized ZEISS service representative may install the instrument.



WARNING: Do not use the instrument or the optional power table with an extension cord or a power strip (multiple portable socket outlet). Failure to observe this warning could result in electrical shock to the patient and/or examiner.



WARNING: Do not open the instrument covers. Opening the instrument covers could expose you to electrical and optical hazards.



WARNING: If the instrument is externally connected to AC powered, non-medical peripheral devices (i.e. printer, storage devices, etc.), the complete system must comply with the system requirements in standard IEC 60601-1. This standard requires the usage of an Isolation Transformer to power the non-medical peripheral device(s) if located within 1.5 m from the patient. If the peripheral device is located outside the patient environment (beyond 1.5 m) and is connected to the HFA, a separation device must be used or there shall be no electrical connection between the non-medical peripheral device and the HFA. The HFA3 Ethernet port already has the required separation integrated within the HFA3 instrument, and therefore can be directly connected to peripherals located beyond 1.5 meters.

The person or the responsible organization connecting additional devices or reconfiguring the system must evaluate the complete system to ensure compliance to the applicable IEC 60601-1 requirements.

The instrument operator must not touch the patient and the peripheral device simultaneously.



WARNING: Do not reconfigure system components on the table, nor add non-system devices or components to the table, nor replace original system components with substitutes not approved by ZEISS. Such actions could result in failure of the table height adjustment mechanism, instability of the table, tipping and damage to the instrument, and injury to operator and patient.

If the power table or any part of the system is reconfigured or replaced or if any external devices are connected to the instrument, the operator must ensure that the complete system continues to comply with the requirements defined in IEC 60601-1.



CAUTION: The appliance coupler (power cord) is the main disconnect device of the instrument. Position the instrument in such a way to have easy access to disconnect the appliance coupler in case of an emergency.



CAUTION: In case of an emergency, disconnect the appliance coupler.



WARNING: This instrument may cause ignition of flammable gases or vapors. Do not use in the presence of flammable anesthetics or oxidizers such as nitrous oxide or pure oxygen.



WARNING: Avoid tipping. Do not use the instrument on an uneven or sloped surface. Do not roll the table from one location to another while the instrument is on the table. Move the table alone to the new location and then move and place the instrument on top of the table. Failure to observe these precautions could result in tipping of the instrument and/or table and resulting injury to operator or patient and damage to the instrument.



CAUTION: Make sure your USB devices are secured against malware/viruses. Patient data on USB devices can become corrupted when inserting into computers for backup or transfer. The use of anti-virus software on computers is recommended and is the responsibility of the user.

Electromagnetic Compatibility (EMC)



Note: The HFA3 needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided herein.



Note: Portable and mobile RF communications equipment can affect medical electrical equipment.



WARNING: The use of accessories, transducers, and cables other than those specified may result in increased emissions or decreased immunity of the equipment.




WARNING: The HFA3 should not be used adjacent to or stacked with other equipment. If adjacent or stacked use is necessary, the equipment or system should be observed to verify normal operation in the configuration in which it will be used.

Guidance and manufacturer's declaration - electromagnetic emissions		
The HFA3 is intended for use in the electromagnetic environment specified below. The customer or user of the HFA3 should ensure that it is used in such an environment.		
Emissions Test	Compliance	Electromagnetic environment - guidance
RF emissions CISPR 11	Group 1	The HFA3 uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	The HFA3 is suitable for use in all establishments other than domestic establishments and those connected to a low voltage power supply network which supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Complies	

Guidance and manufacturer's declaration - electromagnetic immunity			
The HFA3 is intended for use in the electromagnetic environment specified below. The customer or user of the HFA3 should ensure that it is used in such an environment			
Immunity Test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic Discharge (ESD) IEC 61000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for input/output lines	± 2 kV for power supply lines ± 1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	± 1 kV differential mode ± 2 kV common mode	± 1 kV differential mode ± 2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions, and voltage variations on power supply input lines. IEC 61000-4-11	<5% U_T (>95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (95% dip in U_T) for 5 sec.	<5% U_T (>95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (95% dip in U_T) for 5 sec.	Mains power quality should be that of a typical commercial or hospital environment. If the user of the HFA3 requires continued operation during power mains interruptions, it is recommended that the HFA3 be powered from an uninterruptible source.
Power Frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

Note: U_T is the a.c. mains voltage prior to application of the test level.

Guidance and manufacturer's declaration - electromagnetic immunity			
The HFA3 is intended for use in the electromagnetic environment specified below. The customer or user of the HFA3 should ensure that it is used in such an environment			
Immunity Test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 V	<p>Portable and mobile RF communications equipment should be used no closer to any part of the HFA3, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.</p> <p>Recommended separation distance</p> $d = 1.17 \sqrt{P}$ <p>150 kHz to 80 MHz</p> $d = 1.17 \sqrt{P}$ <p>80 MHz to 800 MHz</p> $d = 2.33 \sqrt{P}$ <p>800 MHz to 2,5 GHz</p> <p>where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,^a should be less than the compliance level in each frequency range.^b Interference may occur in the vicinity of equipment marked with the following symbol:</p> 
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2,5 GHz	3 V/m	
<p>Note 1: At 80 MHz and 800 MHz, the higher frequency applies.</p> <p>Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.</p> <p>^a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM broadcast, cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the HFA3 is used exceeds the applicable RF compliance level above, the HFA3 should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the HFA3.</p> <p>^b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.</p>			

Recommended separation distances between portable and mobile RF communications equipment and the HFA3			
The HFA3 is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the HFA3 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the HFA3 as recommended below, according to the maximum output power of the communications equipment.			
Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150 kHz to 80 MHz	80 MHz to 800 MHz	800 MHz to 2,5 GHz
	$d = 1.17 \sqrt{P}$	$d = 1.17 \sqrt{P}$	$d = 2.33 \sqrt{P}$
0,01	0.117	0.117	0.233
0,1	0.370	0.370	0.737
1	1.170	1.170	2.330
10	3.700	3.700	7.368
100	11.700	11.700	23.300
For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.			
Note 1: At 80 MHz and 800 MHz, the higher frequency applies.			
Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			

Risks of Internet Connectivity



CAUTION: When connected to the Internet, the HFA3 instrument may be vulnerable to serious security risks, including viruses and worms that could disable your system or adversely affect its performance. Internet connectivity enables third party software drivers and updates to be downloaded to your system, either automatically or intentionally. Installation of any unapproved software, including drivers, could degrade the performance of the instrument and/or lead to corrupted diagnostics or therapeutic information and may void the instrument warranty.

(2) Getting Started

This chapter describes instrument features, general operation, and settings of the HFA3.

Instrument Overview

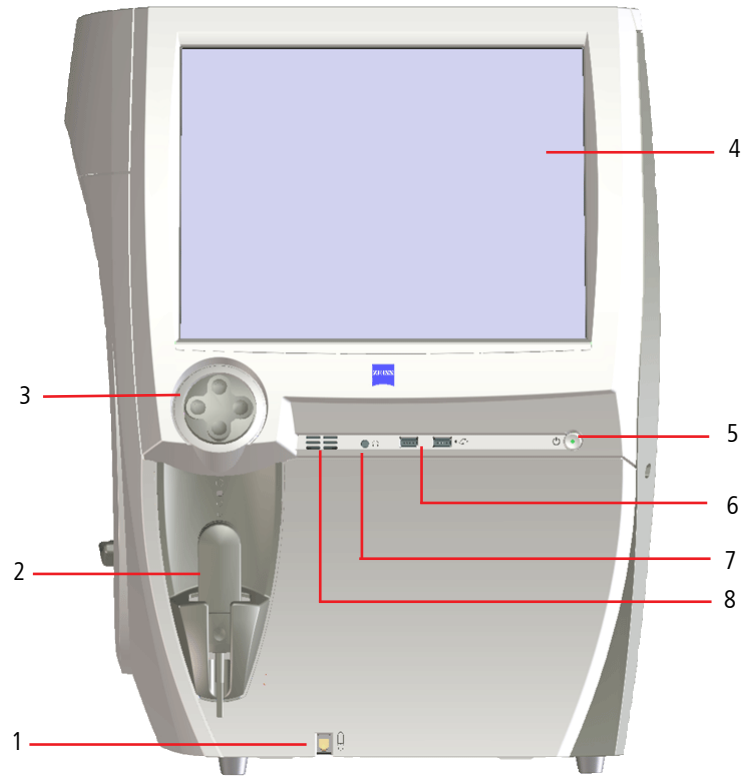
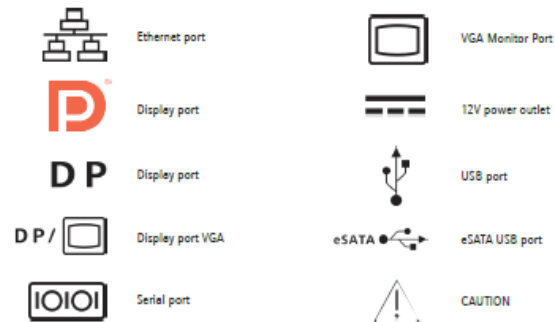


Figure 2-1 The HFA3— Operator Side View

- | | | |
|--|-------------------------|------------------|
| 1 – Patient response button connection | 4 – Touch screen | 7 – Audio output |
| 2 – Patient response button | 5 – On/Off button | 8 – Speaker |
| 3 – Chin rest control | 6 – USB connections (2) | |

• OPERATION UPDATES

The back panel configuration may be different than what appears in the Instruction for Use. Please refer to the symbols shown below for clarification of connectivity.



• SPECIFICATION UPDATES

Computer

- Serial and USB Port Configuration
- Operating System: Windows 7– 64 bit
 - Intel® Core i3-4350T
 - Internal storage: 500 GB
 - 6 external USB ports, Type A (2 USB 2.0 and 4 USB 3.0)
 - Ethernet Port (GbE)
 - DisplayPort video output
 - USB Keyboard & Mouse
 - LCD Display with integrated touch screen

USB Port Configuration

- Operating System: Windows 7– 64 bit
- Intel® Core i7-610E
- Internal storage: 500 GB
- 6 external USB ports, Type A, USB 2.0 specification
- Ethernet Port (4KV isolated GbE)
- DisplayPort video output
- 12V power outlet
- USB Keyboard & Mouse
- LCD Display with integrated touch screen

Figure 2-2 Back Panel Symbols

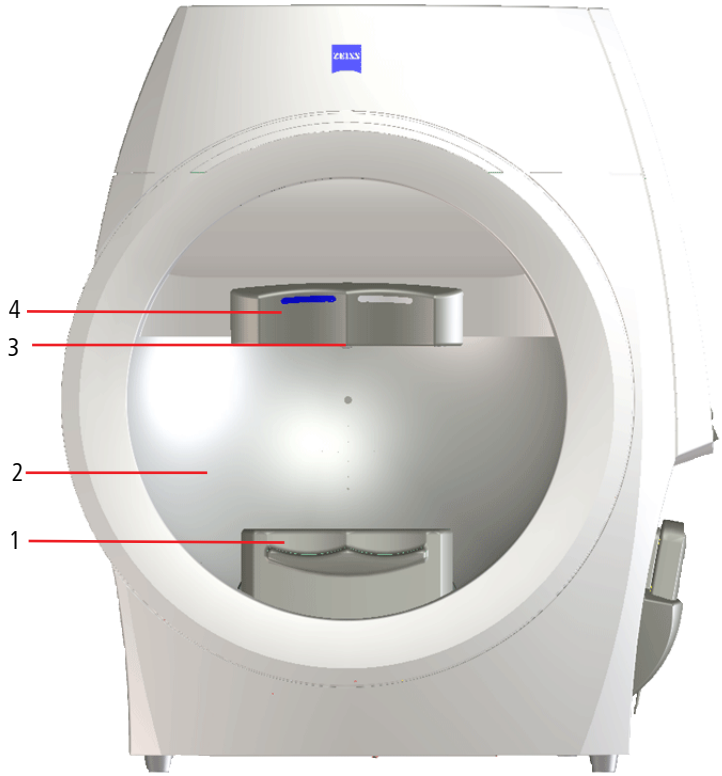


Figure 2-3 The HFA3 – Front View

- 1 – Chin rest
- 2 – Testing bowl
- 3 – Visor handle
- 4 – Forehead rest

Model Features

For a full list of available test patterns and strategies see [Appendix \(A\), "Test Patterns and Parameter Settings"](#).

Feature	Model			
	830	840	850	860
Manual Kinetic	No	License ^a	Standard	Standard
Custom Kinetic Patterns	No	License ^a	Standard	Standard
Custom Static Patterns	No	Standard	Standard	Standard
DICOM OPV (Ophthalmic Visual Field) IOD (Information Object Definition)	Standard	Standard	Standard	Standard
OPV IOD Advanced Indices ^b	License	License	License	License
Remote Diagnostics and Software Loading	Standard	Standard	Standard	Standard
SITA™, STATPAC™	Standard	Standard	Standard	Standard
SITA-SWAP™	No	No	Standard	Standard
Stimulus Size	I–V	I–V	I–V	I–V
Auto Pupil Measurement	No	Standard	Standard	Standard
Stimulus Color	White	White, Red	White, Blue, Red	White, Blue, Red
Foveal Threshold	No	Standard	Standard	Standard
Gaze Tracking	No	Standard	Standard	Standard
Head Tracking	No	Standard	Standard	Standard
Vertex Monitor	No	No	Standard	Standard
GPA™	Standard	Standard	Standard	Standard
Liquid Trial Lens	No	No	No	Standard
RelEYE™ Monitor	No	No	Standard	Standard

a. Available by license only in the U.S., but standard in the rest of the world.

b. Available without license in Germany, Austria, Switzerland, and Japan.

External Keyboard

The HFA3 comes with a standard external keyboard and trackpad combination. Plug input devices into USB ports located on the operator and opposite sides of the instrument.

USB Devices

Use only NTFS formatted USB storage devices for backup.



CAUTION: Make sure your USB devices are secured against malware/viruses. Patient data on USB devices can become corrupted when inserting into computers for backup or transfer. The use of anti-virus software on computers is recommended and is the responsibility of the user.

Surge Protectors

ZEISS recommends the use of surge protectors or UPS (Uninterruptible Power Supply) systems to help isolate the HFA3 from power surges or fluctuations. Hospitals, surgery centers, and offices with instruments which consume large amounts of power, such as surgical lasers, especially should be careful to plug the HFA3 directly into a UPS or adequate surge protector.

Printers

The HFA3 is compatible with PostScript printers, including shared network printers and wireless printers using a wireless USB adapter, or directly connected using the Ethernet port. Direct USB connection is not supported.



WARNING: If any external devices are connected to the instrument, the operator must ensure that the complete system continues to comply with the requirements defined in IEC 60601-1.

Touch Screen

All functions can be performed by touching a command button on the touch screen. Be careful not to press too hard against the screen. To deselect an item, touch on another area of the screen. To return to a previous screen, if applicable, select the Back button on the lower left side.

Screen Keyboard

The screen keyboard is used to fill out the text boxes. It appears automatically as soon as the cursor is inserted into a text box. Touch and hold a character to bring up a menu with all the special characters (umlauts, etc.) belonging to this character. Select the desired special character by tapping it. Not all characters on the keyboard will be associated with special characters.

Keyboard icons:



Switches the keyboard layout from letters to numerals and special characters.



Switches the keyboard layout from numerals and special characters to letters.



Hides the screen keyboard.



Select a flag to switch the language of the keyboard.



Note: The right click key available on some external keyboards will enable or disable the screen keyboard, overriding the instrument setting. Moving the keyboard slider back and forth or pressing the right click key again on the external keyboard will reverse the effect.

Access Menu Options

To access the options offered through each screen, touch or click on an option to select it. Touch or click on menu options again to make the options disappear.

- Some menus are fields tagged with a down arrow (drop-down lists). To access menu options, touch or click on the bar. Select the bar again to close the menu.

Test Profile

24-2, SITA Standard

- Grayed-out menu options or buttons are not available.

Using the External Keyboard and Mouse

You may also use the external keyboard to move from one selection to the next on the HFA3 screen and enter data.

Select the intended data field with the touch screen or a mouse:

- Use the Tab key to move the highlight from one data field to another in a forward direction.
- Hold the Shift key down while pressing the Tab key to move in the opposite direction.
- Arrow keys may be used to move the cursor within a data field.



Note: Selecting Ctrl + Alt + Delete on your keyboard will take you to the Windows lock screen. Select Cancel, or press the Esc button on the keyboard to return to the instrument screen. If you log off in this screen, restart the instrument.

Title Bar

Title bar icons:



This icon will appear if the Liquid Trial Lens is installed (Model 860 only) and will flash red during lens adjustment. Do not touch the Liquid Trial Lens when the icon is blinking.



Tap the Printer button to open the printer status dialog window.



Tap the Help button to open the on-screen user manual.



The Brightness button displays a control for adjusting the brightness.



Tap the Volume button to display a slide control for adjusting the volume.



The Settings button opens the [Settings](#) dialog window. When there is a new alert, an exclamation point appears with the Settings button. Clicking on the exclamation point opens the Message history.



The Close button opens a menu with options for logging out the current user or switching off the device.

Startup

Upon first startup, the instrument will prompt the user to configure or use default settings for Locale, Network setup, User Management configurations, and Users (see [Settings](#) on page 2-7). Leave the field blank or use 0000 when asked for the default password.



CAUTION: To protect patient data change the password. We recommend setting the password strength to HIGH.

1. Switch the instrument on by pressing the On/Off button, located on the operator side of the instrument under the display.
2. Wait five minutes to allow the instrument to perform a self-diagnostic checkup. If the internal computer detects a problem, a message will appear on the startup screen.
3. Select Continue to proceed or Details to view any error messages.
4. Log in by selecting the appropriate user from the drop-down menu and entering the password



Note: The Emergency login allows a person who does not have access privileges to log in and use the instrument. Emergency logins are audited and usage of the instrument is restricted. Emergency login users cannot view or perform exams on existing patients.

If there is a question as to whether the HFA3 is running properly or if there is any question about electrical or fire safety: TURN OFF AND UNPLUG THE INSTRUMENT and call ZEISS customer care as soon as possible: 1-800-341-6968. Outside the U.S., contact your local ZEISS distributor.

Operating Environment


For optimal testing results, the HFA3 should be operated in a dimly lit room with minimal distractions. The patient should be in a comfortable position throughout testing.

Operating Modes

The HFA3 has three modes of operation:

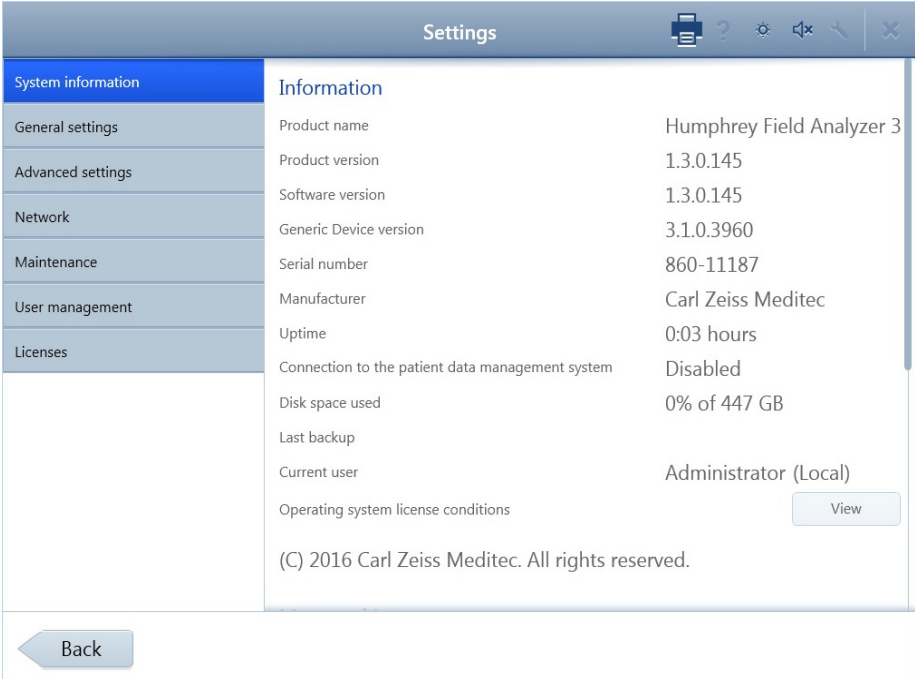
Mode	Description
Local database	Patient records are stored directly on the instrument. All functions, including editing patient data and generating reports, can be done on the instrument.
Connected - FORUM	Data is automatically exported to the FORUM archive and deleted on the instrument.
Connected - DICOM Non-DICOM EMR	Data is automatically exported to a DICOM archive, shared network folder, or FTP folder.

Settings

Select the Settings icon to display the setting types. Select and enter data or choose parameters as needed in each type of setting. When changes are made that require a reboot, a restart symbol  appears on the Back button. The device restarts automatically when you select the Back button.

System Information

The SYSTEM INFORMATION screen displays information about the software, instrument, and connections.



The screenshot shows the 'Settings' application with the 'System information' menu item selected. The 'Information' section is expanded, displaying the following details:

- Product name: Humphrey Field Analyzer 3
- Product version: 1.3.0.145
- Software version: 1.3.0.145
- Generic Device version: 3.1.0.3960
- Serial number: 860-11187
- Manufacturer: Carl Zeiss Meditec
- Uptime: 0:03 hours
- Connection to the patient data management system: Disabled
- Disk space used: 0% of 447 GB
- Last backup: (blank)
- Current user: Administrator (Local)
- Operating system license conditions: (C) 2016 Carl Zeiss Meditec. All rights reserved. (with a 'View' button)

A 'Back' button is located at the bottom left of the screen.

Getting Started

The Message history at the bottom of the screen lists issues and important actions. System messages are marked with the following symbols:



Select a message to see more details.

General Settings

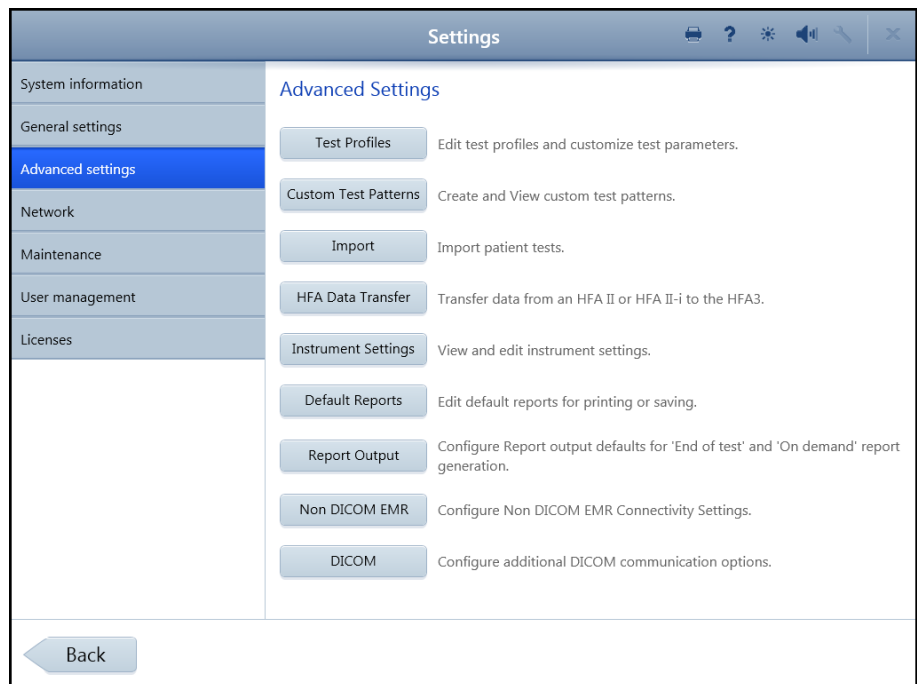
Use the GENERAL SETTINGS screen to configure general settings, such as date and time format, patient identification format, and printing options.

Setting Option	Description
Institution information	Enter information about your clinic, which is printed at the top of reports.
Information messages	Sets the length of time, in seconds, that informational messages are displayed.
Locale settings	Sets the user interface language and the date and time formats.
System date and time	Sets the time zone and current date.
ZEISS Teleservice	Launches the remote maintenance tool.
On-screen keyboard	Enables or disables the onscreen keyboard.
Patient management	Patient identification: Sets whether patients are identified by ID only, or by name and ID. Issuer of patient ID: Identifies where the patient ID originates from. Auto-generate patient ID: When this option is enabled, the HFA3 automatically issues patient IDs for new patients.

Setting Option	Description
Display of patient name	Enables patient names to be displayed using the Latin alphabet, ideographic characters, or a phonetic rendering.
Printout	<p>Show signature field on reports: Sets whether a blank space is included on reports for signatures.</p> <p>Logo of institution: Click Browse... to select an image file of your clinic's logo to include on reports.</p> <p>Report file location: Click Browse... to select a network location or USB drive where reports are exported.</p> <p>Printer setup...: Use this button to view the list of installed printers; add, edit, or delete a printer; set a printer as default or change its settings; or print a test page. See Connect to a Printer on page 5-7 for more information about adding printers.</p>

Advanced Settings

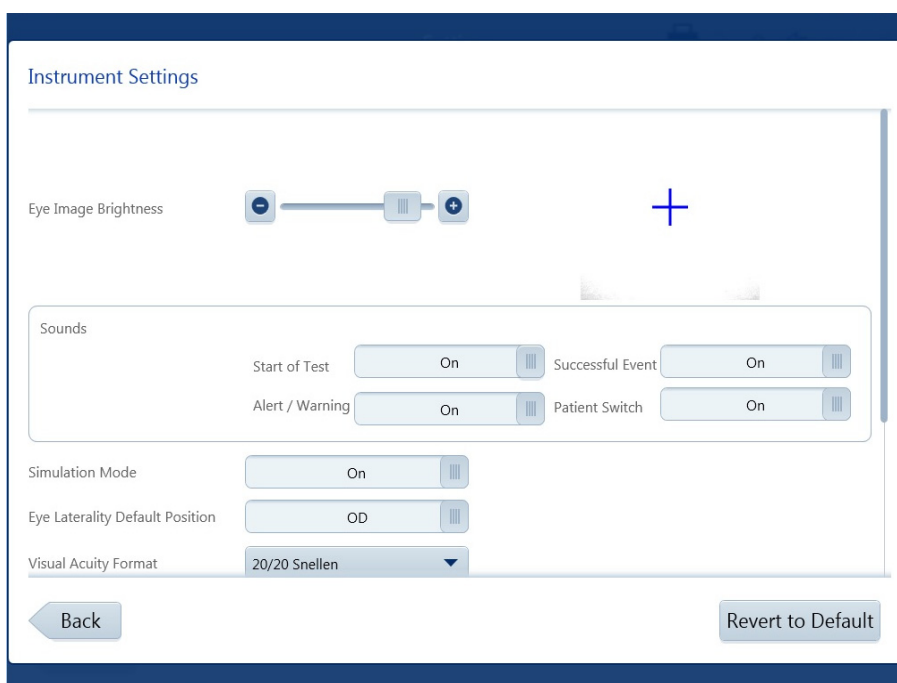
Use the ADVANCED SETTINGS screen to manage test profiles and custom test patterns, import and transfer data, configure reports and instrument settings, and manage EMR settings.



Button	Function
Test Profiles	Select the default test and create new test profiles. See Set up Test Profiles on page 3-21 and Appendix (A), "Test Patterns and Parameter Settings" .
Custom Test Patterns	Create custom Static and Kinetic Test Patterns. See Create Custom Test Patterns on page 3-19. (Not available for Model 830)
Import	Import of patient tests from a shared network folder or USB storage device. See Import Tests on page 4-4.

Button	Function
HFA Data Transfer	Transfer patient data from an HFA II or II-i to the HFA3 instrument database. See Chapter (7), "Data Transfer from an HFA II or HFA II-i" .
Instrument Settings	Adjust instrument settings. See Instrument Settings .
Default Reports	Choose the default report types for manually printing and exporting reports. See View and Generate Test Reports on page 4-4. This setting does not affect the reports that are automatically generated (see Reports on page 3-4).
Report Output	Select to configure the format and destination for automatic and manually generated reports. See Report Output on page 2-12.
Non DICOM EMR	Configure the connection to a non-DICOM EMR system. See Connect to a Non-DICOM EMR on page 5-5. To use the instrument in local database mode, turn Off EMR Mode .
DICOM	Configure the connection to a DICOM system. See Chapter (5), "Networking" for further details.

Instrument Settings



Settings Option	Description
Eye Image Brightness	Move the slider to the right to increase eye image brightness or to the left to decrease brightness. Note that changing the default settings may affect Gaze Tracking.
Sounds	Turns an audible signal on or off at the beginning of a test, for an alert, for a successful action, and/or for a switch to a different patient.
Simulation Mode	Turns simulation mode on or off. Simulation mode must be off to run a test.

Settings Option	Description
Eye Laterality Default Position	Sets the default for which eye will be the first eye tested.
Visual Acuity Format	Sets the format for entering a patient's visual acuity as Snellen (20/20), Metric (6/6), or decimal (1.0)
Head Tracking	Enables the Head Tracking function, which aids in keeping the patient's eye centered behind the trial lens. The trial lens holder must be up and Gaze Initialization must be successful for this feature to work. Head tracking is not available in Model 830.
Vertex Monitor	Enables the Vertex Monitoring feature, which aids in keeping the patient's eye centered behind the trial lens. The trial lens holder must be up and Gaze Initialization must be successful for this feature to work. Head tracking is only available in Model 850 and 860.
RelEYE Eye Monitor	Enables the RelEYE feature, which records an image of the eye each time a stimulus is presented during a Threshold SITA-Standard, Suprathreshold Central 76, or Esterman Monocular test. RelEYE is only available in Model 850 and 860.
Auto Pupil Measurement	Enables automatic pupil diameter measurement, which is indicated on reports with an asterisk. Gaze initialization must be successful for this feature to work. This feature is not available in Model 830.
Default Display for Threshold Test	Sets the default display during Threshold testing to either grayscale or numerical.

Report Output

End of Test Settings

DICOM Output

FORUM Test Database Off

Export EPDF Off

Report Output

Report Output Default

Report Export File Type

Report Export Location ...

Named Patient Folder Off

Patient ID in folder name Off

Back

Settings Option	Description
DICOM Output	Configures settings for export to a DICOM EMR. See Chapter (5), "Networking" for further details.
Report Output Default	Sets the default action to be taken with automatically generated reports.
Report Export File Type	Sets the default format for reports that are exported. Note that DICOM OPV format is supported only for SFA, Three In One, Suprathreshold, and Numeric reports.
Report Export Location	Sets the default location where reports are exported to.
Named Patient Folder	Sets whether a folder with the patient's name is created for a report that's exported.
Patient ID in folder name	If Named Patient Folder is enabled, sets whether the patient ID is also included in the folder name.

Network

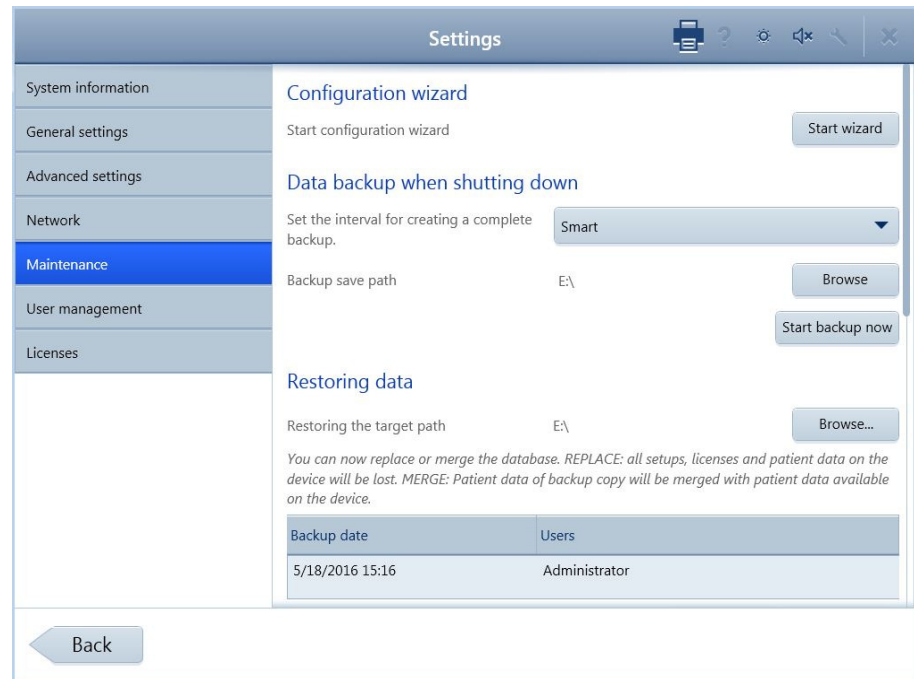
Use the **NETWORK** settings screen to configure network connections.

See [Chapter \(5\), "Networking"](#), for more details about network configuration.

Settings Option	Description
Network Configuration	If DHCP (Dynamic Host Configuration Protocol) is set to Enabled, the Host name, IP address, Subnet mask, Gateway, and DNS are filled in automatically, and cannot be edited. If DHCP is disabled, you can manually enter or edit this information.
Network drive configuration	Available network drives: Lists available network drives and their connection statuses. Connected drives are indicated by a green checkmark. Reconnect: Attempts to reconnect to the highlighted network drive. Disconnect network drive: Removes the highlighted network connection. Map network drive...: Opens a dialog for connecting to a network drive.
Connection configuration	Enables or disables connection to FORUM or an EMR. To use the HFA3 in local database mode, ensure this setting is disabled.
Local application entity	Enter identifying information for the DICOM server. Enable or disable automatic modality worklist (MWL) updates and set their frequency.
Remote application entity	Connect to FORUM or an EMR and configure the connection.
Advanced settings	Configure additional connection settings. The default settings are recommended.
Manual data export	Export all data to the FORUM server.
Storage Commitment	Select the software's behavior in case of failed storage commitment.

Maintenance

Use the MAINTENANCE settings screen to perform system maintenance actions such as database backup and software updates.



Settings Option	Description
Configuration wizard	The Start wizard button launches the configuration wizard, which guides the user through device configuration.
Data backup when shutting down	Set the interval for creating a complete backup: Sets how often to create a complete backup. The Smart option uses an algorithm to determine, at each shutdown, whether it will be more efficient to create a differential backup or a complete backup. To turn off automatic backup, select No backup copy. Backup save path: Use Browse... to select a backup location. Start data backup now: Starts data backup.
Restoring data	Restoring the target path: Use Browse... to select the drive where backup files are located. Backup list: The most current backup is listed by date and time. To restore the database, refer to Restoring the Database .
Update	Select Perform update... to launch the software upgrade wizard.
Audit recordings and other log files	Exports audit recordings or log files, so that they can be viewed.

Restoring the Database

Two options are available for restoring the database:

- Replace - The backup database overwrites the existing database, including patient data, settings, and licenses.
- Merge - The backup database is appended to the existing database.

If the databases are merged, potential duplicate patients are resolved as follows:

Patient ID	Issuer of ID	Name/Date of Birth	Action
Match	Match	Match	Merge
Match	Match	Different	Flagged
Match	Different	Match	Flagged
Match	Different	Different	Separate Patients
Different	Match	Match	Flagged
Different	Match	Different	Separate Patients
Different	Different	Match	Flagged
Different	Different	Different	Separate Patients

When a patient from the backup database is flagged as a potential duplicate of an existing patient, the conflict must be resolved before tests can be run for the patient. See ["Select Patient," on page 3-1](#) for more information about resolving potential duplicates.

To restore the database:

1. Select the backup from the list under **Restoring data**.
2. Select Merge or Replace.
3. Confirm your selection.
4. When the restore operation is complete, a confirmation displays. Select Restart to restart the instrument.

User Management

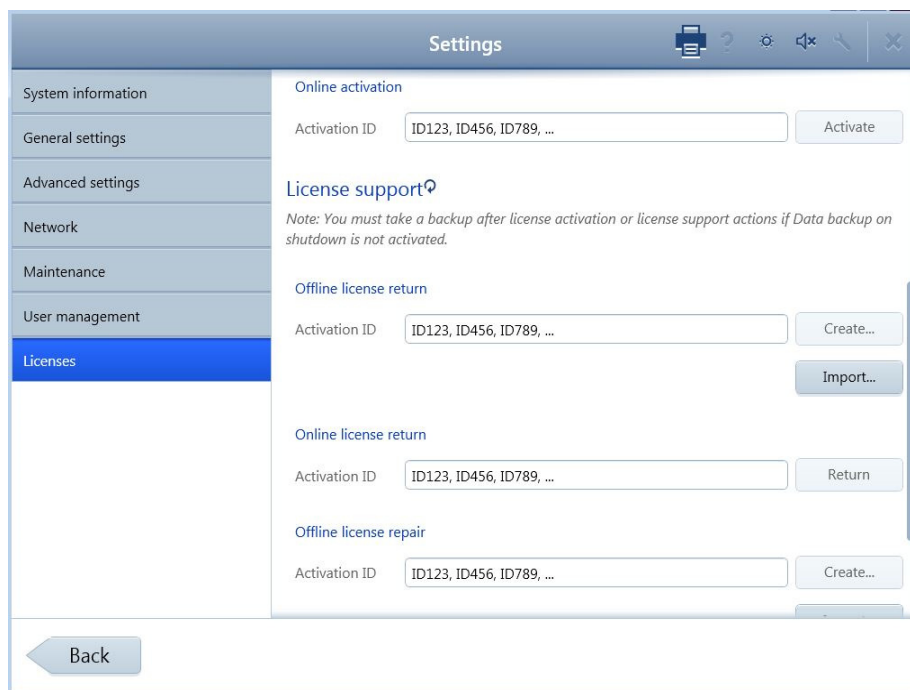
Use the USER MANAGEMENT settings screen to configure security settings and add, delete, or modify users.

The screenshot shows the 'Settings' application interface. The left sidebar contains the following menu items: System information, General settings, Advanced settings, Network, Maintenance, **User management** (highlighted), and Licenses. The main content area is titled 'Settings' and 'General'. It features a note: 'Please note: if settings are marked with this sign, the device must be rebooted so that the settings can become effective.' Below the note are several settings: 'Login without specifying user name, as' is set to 'Disabled'; 'For FORUM user' is set to 'Operator'; 'Automatic logoff time' is set to 10 minutes; and 'Password strength' is set to 'Low'. Under the 'Users' section, there is a table with two rows: 'Administrator' and 'Emergency'. To the right of the table are input fields for 'User name', 'First name', and 'Last name'. An 'Add user...' button is located to the right of the table. A 'Back' button is at the bottom left of the screen.

Settings Option	Description
Login without specifying user name, as	Sets whether user login is required. This setting must be disabled in order to make changes to network, maintenance, or user management settings.
For FORUM user	If the device is in FORUM connected mode, allows you to use your FORUM login as your HFA3 login.
Automatic logoff time	Sets the amount of system idle time before the user is automatically logged off.
Password strength	Sets the requirements for passwords: Low: no requirements High: password must have at least six characters and be either a mix of upper and lower case letters or a mix of letters and numbers
Users	Lists current users and has buttons for adding and deleting users and changing a user password.

Licenses

Use the LICENSES setting screen to manage device licenses.



Settings Option	Description
Licenses	Lists current licenses and their status, expiration, and activation ID.
License activation	Activates new licenses. See License Management .
License support	Returns or repairs existing licenses. See License Management .

License Management

License activation, return, and repair can be done online or offline. To manage licenses online, enter the activation ID for the license in the Activation ID field for the desired action, then click the appropriate button (Activate, Return, or Repair). Contact ZEISS service to obtain an activation ID for a new license.

To manage licenses offline:

1. If the device does not have a network connection, connect a USB drive to the device.
2. Enter the activation ID and select Create... to create a requirement file.
3. Submit the requirement file to ZEISS Service. You will receive an activation file.
4. Select Import... to import the activation file.

(3) Setup and Testing

Perform Threshold or Suprathreshold Test

Overview of patient setup and Threshold or Suprathreshold testing on the HFA3:

1. Select Patient.
2. Test Setup.
3. Set up Patient for Testing.
4. Preliminary Tests (Optional).
5. Administer the Test (one or both eyes).
6. Review and Save Results.

Select Patient


The PATIENT screen displays a list of patients and search options on the left. In local database mode with all DICOM/EMR network settings off, existing patients are listed under All. Patients tested that day and newly created patients are listed under Today. If the HFA3 is connected to FORUM or an EMR system, scheduled patients and newly created patients are listed under Today. To refresh a worklist, select the refresh icon on the Today bar. Patients found through a search are listed under Search Result.

The Reports and Tests buttons are displayed at the bottom of the screen and can be used to print/view/export patient tests and test reports. See [Chapter \(4\), "Managing Data, Tests, and Reports"](#). The Reports and Tests button are not displayed if data are being exported to FORUM. Perform these functions in FORUM using FORUM Glaucoma Workplace.

Once a patient has been selected, patient information and testing options are displayed on the right.

Patient Search

To quickly find a patient:

1. Type a few letters of the last or first name, the ID number, or Date of Birth (DOB) in the search field.
2. Select the Search icon . Any patients containing the search term in any part of any field will be returned.
3. Select the patient from the resulting list.



Note: If the patient was flagged after a database merge, import from another HFA3 instrument, or serial import from an HFA2-i, an exclamation point appears next to the patient. When you select the patient, you must choose whether to merge the patient with the suspected duplicate or maintain the two patients as separate records before proceeding.

To find a patient using additional search options:

1. Select Advanced... to access the SEARCH screen. The advanced search terms on this screen will not affect retrieval of non-DICOM EMR worklists when in Retrieve Only mode.
2. If the HFA3 is connected to FORUM or an EMR system, you may choose between All Patients and Scheduled Patients. Select Scheduled Patients and choose between Today, Tomorrow, Week, or Time Span from the drop-down menu.

3. Enter a combination of Last name, First name, Patient ID, Referring physician, Accession number, Visit date), Date of birth, and Modality.



Note: Many of the search terms listed above are only effective in certain contexts. Referring physician and Date of birth search will work only when All Patients has been selected. You can only search Accession number, Modality, and use a date range when connected to EMR systems that support these searches. Scheduled Patients must also be selected when searching for an Accession number.

4. Select Search to search the patient database.
5. Highlight a patient from the search results and choose the Select button.
6. Select the Reset button to clear all fields.

Add New Patient

If the patient is not in the database create a new patient record by selecting the Add button. Fill in the required entries: Last name, First name, Gender, and Date of Birth (DOB). For DOB, type in month, day, then year, or choose the correct date from the drop-down calendar and select OK. Patient age will then appear. Patient ID is automatically generated if the Auto-generate patient ID setting is turned on under General Settings on page 2-8. The patient is identified in the device by ID and DOB.

If the HFA3 is connected to FORUM, the new patient is saved to the FORUM archive if data export has been enabled. For EMR systems, we recommend adding new patients to the system and importing to the instrument using worklists.



Note: It is possible to create two records for the same patient with the same name, gender, DOB, and Patient ID if the Issuer of ID differs between the two records. Do not add a new patient unless you are sure the patient does not currently exist in the database.

Confirm or Change Patient Information

Review and confirm that the patient information displayed on the screen is correct.

Local Database Mode

Change Patient Information by selecting First Name, Last Name, Gender, ID number and/or Date of birth to edit the fields. Changes are visible only after the patient selection screen is refreshed by navigating away from and back to the screen, or by selecting another patient and then selecting the first patient again.



Note: All changes are logged.

FORUM and EMR Connected Modes

Patient records obtained from FORUM, DICOM compatible, and non-DICOM EMR systems should not be edited on the instrument. Changes should be made to the patient record stored on the server and the patient record retrieved again from the server prior to testing. Patient records will be updated.

When patient records are imported from an EMR, they are reconciled with local records as follows:

- Same ID and Issuer of ID, different name, date of birth, or gender: The local record is updated to match the EMR record.
- Different ID or Issuer of ID: A new patient record is generated.


Some EMR systems allow records that are missing key identifying information. The HFA3 will automatically add a default (Unknown) for missing names, but will reject patient records that do not contain a Patient ID or DOB.

When the same patient has multiple records, reports that include multiple exams, such as a GPA Summary report, will not include all of the patient's data. This may happen, for example, when a practice implements an EMR after records already exist on the HFA3. Each existing patient's new EMR record will then need to be merged with the local record the first time the patient is scheduled for an exam after the EMR is implemented. To merge two patient records, see ["Merge Patients on the HFA3," on page 4-5](#). Merging patients can be done before or after testing; however, if it is done after testing, any reports that include data from multiple exams must be manually regenerated to include all available exams for the patient



Caution: Every patient has an identifier that consists of Name, Date of Birth, Patient ID, and Issuer of ID. To avoid unintentional automatic merging of patient records, VERIFY a unique combination of Name, Date of Birth, Patient ID, and Issuer of ID exists when patients are copied, transferred, retrieved from an archive, or restored from a backup.


Enter Distance Prescription and Trial Lens Data (Optional)

If this is the patient's first visual field test, enter the patient's **Distance Prescription** values for **Sphere**, **Cylinder**, and **Axis** in the corresponding text fields for each eye. For negative prescriptions you must enter a minus (–) as the first character. To delete any entry select the value then select the  icon. Invalid entries will display a red outline. Select the text box to view an error message. Previously entered prescription values will appear automatically.

The HFA3 automatically calculates and displays **Trial Lens** values. You can manually override the Trial Lens value by typing in the desired value, which will then be displayed in blue font. To calculate Trial Lens values manually, see [Determine the Trial Lens](#) on page B-1.

Trial Lens data will be labeled **Liquid Trial Lens** if the Liquid Trial Lens feature is installed on the instrument in place of the manual trial lens holder. This feature is only available on Model 860 and automatically adjusts the lens to the entered prescription. The Liquid Trial Lens does not correct cylinder prescriptions, but you are able to substitute the spherical equivalent within the range of +8.00 and –8.00 diopters (D). To have the trial lens correction include cylindrical correction or for out of range values, use manual trial lenses (see page 3-5). We recommend using manual trial lenses for cylindrical refractive errors >1.75 D.



Note: If there is no prescription, place the Liquid Trial Lens holder in the down position or enter a value of zero (0). If the Distance Prescription fields are left blank they are interpreted as 0 and the Liquid Trial Lens will automatically add an age correction and apply that lens power. Be sure to enter the patient's Distance Prescription as this will avoid the need to enter the prescription at each visit. Do not touch the Liquid Trial Lens if the icon is flashing red .

Test Setup

Select the Test

For an existing patient the previous test information is automatically loaded and displayed. For modality worklists, if the patient has multiple procedures scheduled for the same day, select a test from the list. In the absence of any previous test information the default test profile is displayed.

To change the test, select the **Test Profile** menu to display the list of available tests and select a test from the list. You may also [Select Test Parameters](#) to change the test. The modified test profile will be displayed.


Select Eye

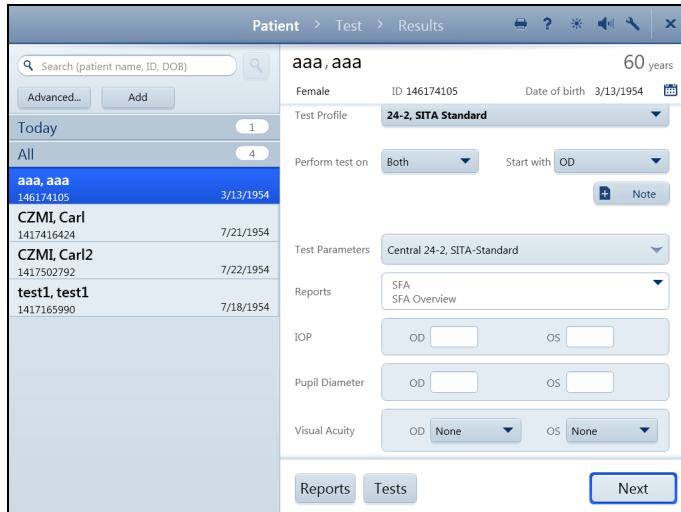
Under the **Perform test on** drop-down menu select which eye to test: OD (Right), OS (Left), or Both (the default). The Binocular option appears when the Suprathreshold Esterman Binocular test pattern is chosen.

Setup and Testing

Under the **Start with** drop-down menu select which eye to test first. Choose the default using the [Advanced Settings](#) on page 2-9.

Note

The Note feature is available on multiple screens. Selecting Note opens a text box for typing notes about the test, which will be displayed on reports. Cancel or Save your note once it is written. Touch or click the  to close the text box.



The screenshot shows a software interface for patient testing. The top navigation bar includes 'Patient', 'Test', and 'Results'. A search bar is present with the text 'Search (patient name, ID, DOB)'. Below the search bar, there are buttons for 'Advanced...' and 'Add'. The main content area is divided into a left sidebar and a main panel. The sidebar lists patient records, with 'aaa, aaa' (ID 146174105, DOB 3/13/1954) selected. The main panel displays details for this patient: 'aaa, aaa', 60 years old, Female, ID 146174105, Date of birth 3/13/1954. The 'Test Profile' is set to '24-2, SITA Standard'. The 'Perform test on' dropdown is set to 'Both', and the 'Start with' dropdown is set to 'OD'. There is a 'Note' button. The 'Test Parameters' dropdown is set to 'Central 24-2, SITA-Standard'. The 'Reports' dropdown is set to 'SFA SFA Overview'. There are input fields for 'IOP' (OD and OS), 'Pupil Diameter' (OD and OS), and 'Visual Acuity' (OD and OS, both set to 'None'). At the bottom, there are buttons for 'Reports', 'Tests', and 'Next'.

Select Test Parameters

To change the parameters of a test, scroll down on the screen and touch or click on the **Test Parameters** menu to view the current settings. Select each drop-down menu to view a list of available options, and make changes as needed by selecting the desired parameters. After making a new selection, each drop-down menu will automatically close. To close the entire **Test Parameters** menu, select the top bar of the menu or select OK.

Under **Test Parameters**, the **Test Type** drop-down menu allows a choice of:

- Threshold
- Suprathreshold
- Kinetic

Selecting the Test Type will automatically display the Test Parameters available for that Test Type. Choosing certain settings will also limit the availability of other choices (see [Appendix \(A\), "Test Patterns and Parameter Settings"](#), for further details).

Test Parameters for Threshold and Suprathreshold Testing are:

- Test Pattern
- Test Strategy
- Suprathreshold Mode (Suprathreshold only)
- Blue-Yellow
- Stimulus Color
- Stimulus Size
- Fixation Monitoring
- Fixation Target
- Test Speed
- Foveal Threshold (Threshold only - Models 840, 850, and 860)
- Fluctuation (Threshold only)



CAUTION: If the Blue-Yellow test parameter has been chosen, allow the lamp used for Blue-Yellow testing to warm-up for seven (7) minutes before proceeding with a test.

Reports

This drop-down menu allows you to select available report types for automatic printing and/or exporting at the end of the test. Change the reports by highlighting the report types of interest. To remove a report from the list, deselect the report type. Reports for automatic end of test printing and/or exporting may also be selected when reviewing test results at the end of testing. See [Review and Save Results](#) on page 3-12.

Additional Information (Optional)

If desired, enter **IOP** (intraocular pressure), **Pupil Diameter** (available only if Auto Pupil is off), and **Visual Acuity** data.

Proceed to Patient Setup

Confirm test information and select the Next button to proceed.



Note: A notice will display to extend the visor if you have chosen the Blue-Yellow test parameter (Models 850 and 860). Extend the visor and allow the patient to adapt to the yellow bowl for about three (3) minutes before testing. A reminder will display to retract the visor when the test is complete.

Set up Patient for Testing

To use manual trial lenses follow the procedure on page 3-6. For Model 860 the Liquid Trial Lens will automatically adjust the lens power. Make sure that the Liquid Trial Lens feature is in the upright position and proceed to [Occlude the Non-Test Eye](#) on page 3-6.

If trial lens data are out of range or the Liquid Trial Lens is not functioning, a notice will display before each eye exam. Follow the procedure in the next section to replace the Liquid Trial Lens with the manual trial lens holder.

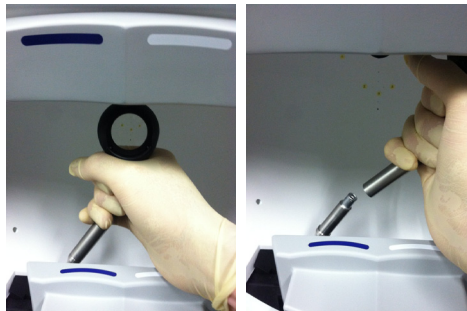


Note: Trial lenses and the Liquid Trial Lens are not needed for peripheral testing. A notice will display requesting that you place the trial lens holder in the down position.

Replace the Liquid Trial Lens with the Manual Trial Lens Holder (Model 860 only)

Remove the Liquid Trial Lens holder. Be careful not to touch the surface of the lens.

1. Move the chin rest to the half-way down position and move the lens holder down slightly from the full upright position.
2. Rest your hand on the chin rest and grasp the upper portion of the holder.
3. Lever the detachable lens holder off the base of the shaft.



Note: Be careful not to touch the inside of the bowl with your hand or the lens holder.

4. Tilt the lens holder and move it out of the bowl.

To attach the manual trial lens holder:

1. Place the end of the manual lens holder over the lower portion of the shaft.
2. Move the detachable lens holder down the shaft until it stops.
3. Turn the detachable lens holder until it is facing front and you feel the positioning notch.
4. Push the detachable lens holder down until it seats in place.
5. Touch the Live Eye monitor located on the left of the screen to move the chin rest back up to the approximate desired location for the patient.

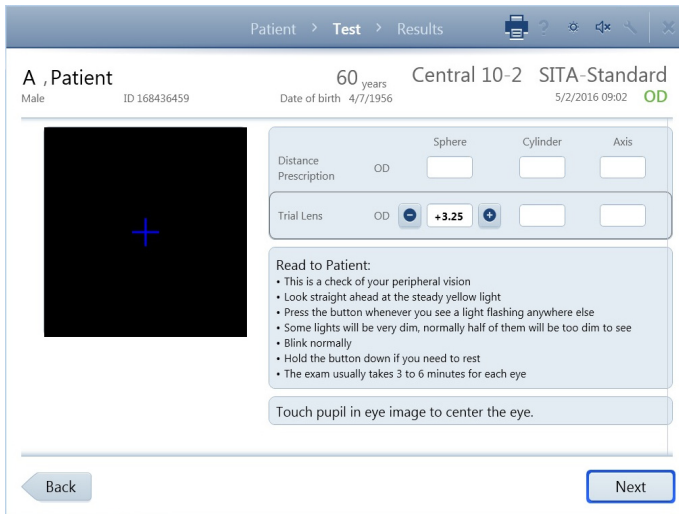
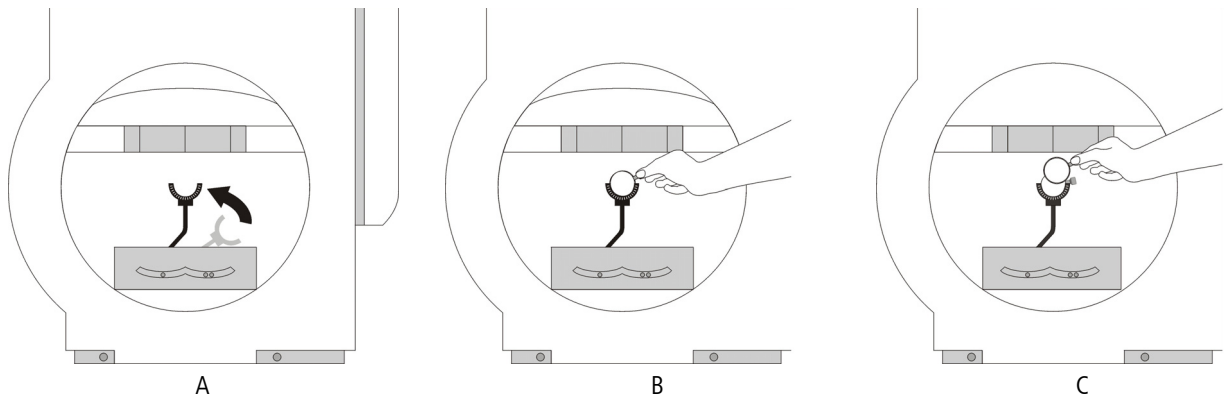


Figure 3-1 Insert the trial lens



Use Manual Trial Lenses

To insert lenses into the manual trial lens holder:

1. Use the Trial Lens values on the TEST screen to locate the correct trial lens for the eye to be tested. Change distance refraction and trial lens information in this screen by selecting a particular field.
2. Move the trial lens holder into an upright position from its storage position in the bottom of the bowl by putting a finger(s) under the lens holder from the outside and lifting (Figure 3-1, A).
3. Place the cylinder lens, if indicated, in the slot farthest away from the patient and align the axis (Figure 3-1, B).
4. Place the sphere lens in the slot closest to the patient (in front of the cylinder lens) (Figure 3-1, C).



Note: Use only the narrow rimmed type of trial lenses. The wide rimmed variety will interfere with the patient's peripheral vision and adversely affect test results. Move the lens handle towards the patient's temporal side so it does not interfere with the patient's eyebrow or nose.

To remove the manual trial lens holder first remove the lenses, then follow the instructions for removing the Liquid Trial Lens holder on page 3-5.

Occlude the Non-Test Eye

Position the eye patch over the non-test eye so that it completely blocks vision from that eye. Make sure nothing interferes with the vision of the test eye.

Esterman Testing

The Esterman tests are designed to be done using a patient's everyday correction. If the patient does not require glasses to function normally perform the test without correction. If the patient does wear glasses to function normally, perform the Monocular or Binocular test using the patient's glasses. Do not use trial lenses or the Liquid Trial Lens. An eye patch must be used when testing with the Monocular version of the Esterman test. Extend the visor during the Binocular test.

To position the patient for the Binocular test, do the following:

1. Move chin rest to the far-right position.
2. Have patient place chin in the chin cup on the left.



3. Move patient's head to center eye monitor between patient's eyes.

Note: You will not be able to monitor the patient's fixation during the Binocular test.

Position the Patient

To facilitate patient positioning, the chin rest is divided into two cups: one marked with BLUE for right eye testing; the other marked with WHITE for left eye testing. We recommend the use of a power table to more easily adjust the instrument to comfortably align with the patient during testing.

1. Seat the patient and adjust the table and seat height to allow the patient to sit comfortably erect.
2. Instruct the patient to place his or her chin on the appropriate side of the chin rest, and then assist with bringing the forehead against the forehead rest.
3. Have the patient slide the chair close to the instrument.
4. Check that the patient is relaxed and holding the patient response button. The instrument will alert you if the patient response button is unplugged.
5. Instruct the patient to look at the fixation light.
6. Touch the center of the pupil in the Live Eye monitor to move the chin rest and align the eye to the cross-hair target. If you are using any kind of trial lens, align the eye to the center of the lens. The chin rest direction controls on the instrument will also move the chin rest.



Note: The HFA3 will save the last chin rest position for each patient eye for a particular patient and will use the saved chin rest position at the start of each eye exam.

7. Ask the patient if the fixation light is in focus. If the fixation light is out of focus you may need to adjust the refractive correction.



Note: When using the Liquid Trial Lens on HFA3 Model 860, move the lens close to the patient's eye but avoid hitting the lashes. If the lens is too close to the eye, the eye will appear too dim on the monitor and may adversely affect Gaze Tracking.

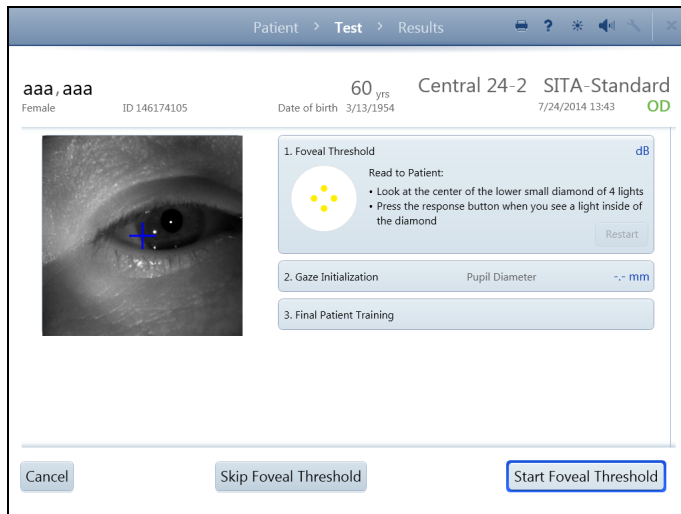
Instruct the Patient

Read the instructions shown on the screen to the patient. The Back button returns to the previous screen. Select Next or Start Test to proceed.

Preliminary Tests (Optional)

Test Foveal Threshold (Models 840, 850, and 860)

This option is only available for Threshold testing. Foveal Threshold setting must be On under **Test Parameters**. The Foveal Threshold test measures the sensitivity of the central part of the macula, the fovea.



1. The Foveal Threshold dialog box should be automatically expanded on the screen. If it is closed, expand the box by touching it to reveal patient instructions.

2. Instruct the patient to look at the center of the lower diamond of fixation lights and press the response button whenever they see a light inside of the diamond.

3. Select Start Foveal Threshold. When Foveal Threshold is complete, the decibel (db) result displays on the top line and an audible signal will occur.

Select Skip Foveal Threshold to proceed with the test without a Foveal Threshold.

Select Cancel to access several options:

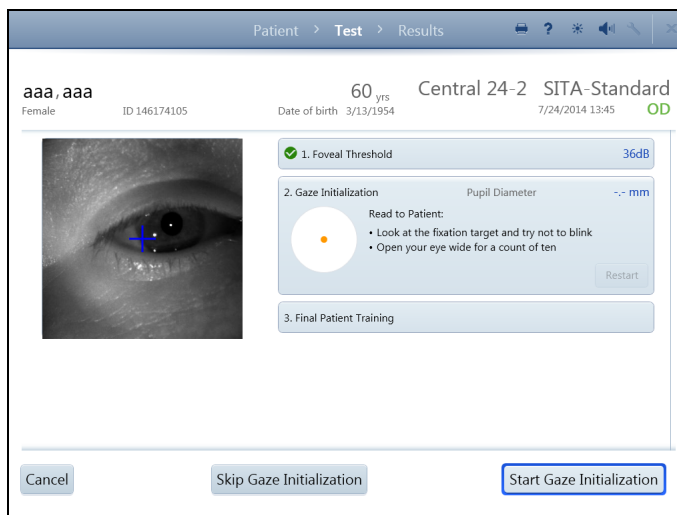
- Cancel Current Eye Test and Test Next Eye (results are not saved)
- Cancel Entire Test (results are not saved)
- Return to Current Eye Test

Select Restart in the Foveal Threshold box to restart the test.



Note: The only way to pause the Foveal Threshold test is by pressing and holding the patient response button. To resume the test release the patient response button.

Perform Gaze Initialization (Models 840, 850, and 860)



To track whether the patient is fixating properly while stimuli are presented select Gaze Tracking or Gaze/Blind Spot from the Fixation Monitoring drop-down menu under Test Parameters.

1. The Gaze Initialization dialog box should be automatically expanded on the screen. If it is closed, touch the box to expand it and read the instructions to the patient.

2. Select Start Gaze Initialization.

Note: Gaze initialization occurs very quickly. Make sure the patient is properly fixating before you select the button.

3. An audible signal will occur when Gaze Initialization is completed.

4. If the Auto Pupil setting is On (see [Advanced Settings](#) on page 2-9) the pupil diameter will display with an asterisk.

To proceed with the test without Gaze Tracking, select Skip Gaze Initialization. If Head Tracking or Vertex Monitoring are on, a pop-up menu will appear with a warning. Choose from:

- Disable Gaze Tracking
- Cancel

Select Cancel for cancellation options or Restart in the Gaze Initialization box to restart the test.

If Gaze Initialization fails a notice displays providing other options:

- Re-Try Gaze Initialization
- Turn Off Gaze Tracking
- Turn On Blind Spot Monitoring (available if blind spot monitoring is disabled). A message will display allowing you to disable Gaze Tracking or Cancel.

or

- Turn Off All Fixation Monitoring (available if blind spot monitoring is enabled). Confirm your choice in the next screen.

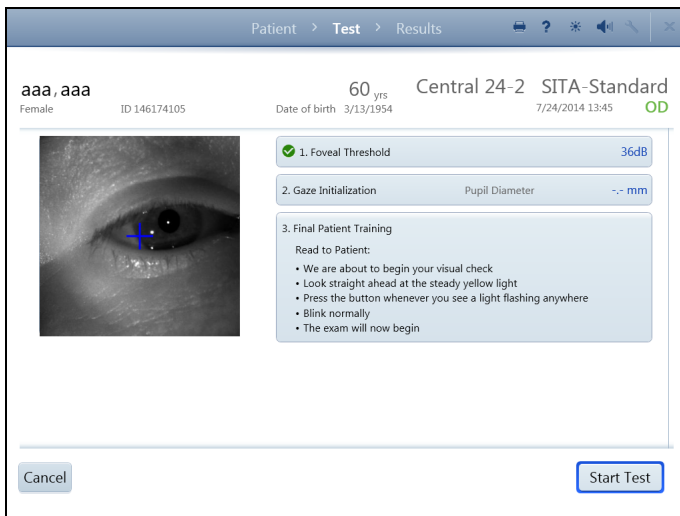
Disabling Gaze Tracking will turn off Head Tracking and Vertex Monitoring (if enabled). Confirm or cancel your choice.

See [Troubleshooting Table](#) on page C-3 for possible causes and solutions for Gaze Initialization failure and Gaze Tracking issues.

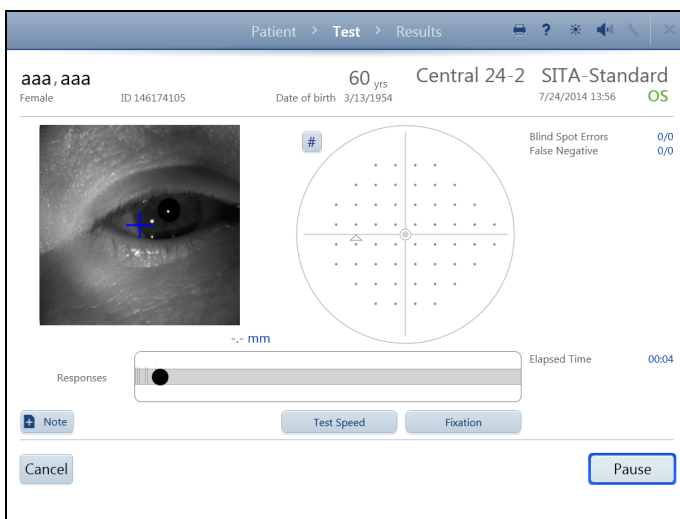


Note: Fixation Monitoring is not available for Esterman Binocular tests.

Administer the Test



The Final Patient Training dialog box should be automatically expanded on the screen. If it is closed, touch the box to expand it and read the instructions to the patient. Select the Start Test button.



Live Eye Monitor

The Live Eye monitor is used to monitor the patient's gaze. Automatic Head Tracking (Models 840, 850, and 860), if enabled, will attempt to keep the eye centered in the Live Eye monitor. Head Tracking will work only if the trial lens/Liquid Trial Lens is in use and Gaze Initialization is successful. Otherwise, touch the center of the pupil on the monitor or use the manual chin rest controls to re-align the eye.

Test Pattern

To the right of the Live Eye monitor is the test pattern, which displays the point pattern and the results in gray scale shading. During Threshold testing the test responses can be toggled to numerical values using the # icon next to the test pattern. See [Advanced Settings](#) on page 2-9 to set the default display.

Reliability Indices

The reliability indices are displayed on the right side of the monitoring screen. The types of indices displayed depends on test type and settings used and include **Blind Spot Errors** (Fixation Losses), **False Positives**, and **False Negatives**. For details see [Reliability Indices](#) on page 4-11. The software will give an audible alert (after waiting for 3 seconds or more) to the user if a Fixation Loss occurs and three or more of the last ten fixation checks have been errors.

Progress Bar

An on-screen progress bar along the bottom of the screen provides a graphic of test progress and records the relative magnitude of gaze errors if Gaze Tracking is active.



Note: Gaze error magnitudes appear larger on the HFA3 than those on older HFA models.

Stimulus responses are recorded on the bar. To the right of the progress bar is the elapsed time. Gaze errors are recorded as red marks at the time point that the gaze error occurred. Upward markings indicate that the test eye deviated from the fixation target at the time of stimulus presentation. The higher the marking, the greater the deviation. Downward marks (Not Detected) indicate that the system was unable to determine the gaze either due to blinks or other reasons.

Suprathreshold Responses

Suprathreshold-specific test responses and values are recorded on the right side of the screen beneath the error responses. The types of responses recorded depend on the test selected and include:

- Points Seen
- Points Not Seen
- Stimulus Int. (Intensity)
- Relative Defects
- Absolute Defects
- Cen.Ref.Lvl (Central Reference Level)
- Per.Ref.Lvl (Peripheral Reference Level)

For further details refer to [Suprathreshold Reports](#) on page 4-14.

Change Fixation

Select Fixation at any time to stop testing and access the following possible options. Different options are available depending on the current settings and parameters:

- Re-Try Gaze Initialization
- Re-Try Blind Spot Detection
- Turn On/Off Blind Spot Monitoring
- Turn Off All Fixation Monitoring
- Turn Off Gaze Tracking
- Turn Off Head Tracking (if enabled)
- Turn Off Vertex Monitoring (if enabled)
- Cancel



Note: Disabling Gaze Tracking will turn off Head Tracking and Vertex Monitoring (if enabled). Confirm or cancel your choice.

Note

See the [Note](#) feature on page 3-4.

Test Speed

Select the Test Speed feature at any time to choose one of the following options:

- Normal
- Slow

Select OK to change the test speed or Cancel to return to the test without changing the test speed.

Pause the Test

If Pause is selected, testing stops and the following options are available:

- Resume — Resumes the test. The Start of Test sound will occur.
- Restart — Select Restart Exam to start the same test over. You will need to confirm your choice. All data from the current exam are deleted. Otherwise, select Return to Current Test. The Start of Test sound will occur when the test is restarted.
- Cancel — Cancel the current eye test and test the next eye (if both eyes were selected for testing), cancel the entire test, or return to the current eye test.

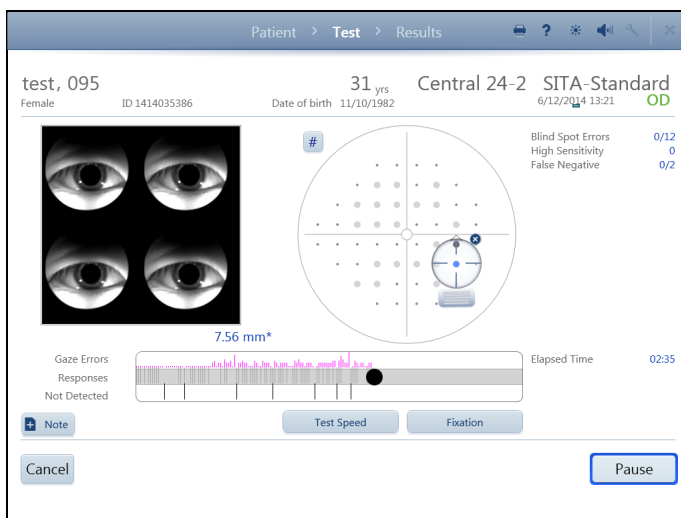


Note: The Cancel option is always available during the test. To change test type or other parameters (except test speed and fixation) the test needs to be canceled.




Note: The patient can pause the test by holding down the response button, which will result in an on-screen message and an audible alert. The Start of Test sound will occur when the patient releases the button and the test is resumed.

RelEYE (Models 850 and 860)



Turn RelEYE on to record images of the patient's eye during the presentation of each stimulus (see [Advanced Settings](#) on page 2-9). This allows the operator to determine how well the patient was fixating at a specific test point. Eye images will be transferred along with the patient exam data to FORUM. When the instrument is in local database mode RelEye images can only be viewed during and directly at the end of a test, prior to selecting Review Results (see page 3-12).

To review RelEye images:

1. Select a tested point on the test pattern. Already tested points are displayed as shaded circles. An icon will appear centered over the point, along with associated, multiple eye images to the left.
2. Drag the targeting icon over different test points to view the recorded eye images. Touch or click the  icon to return to a view of the live eye.

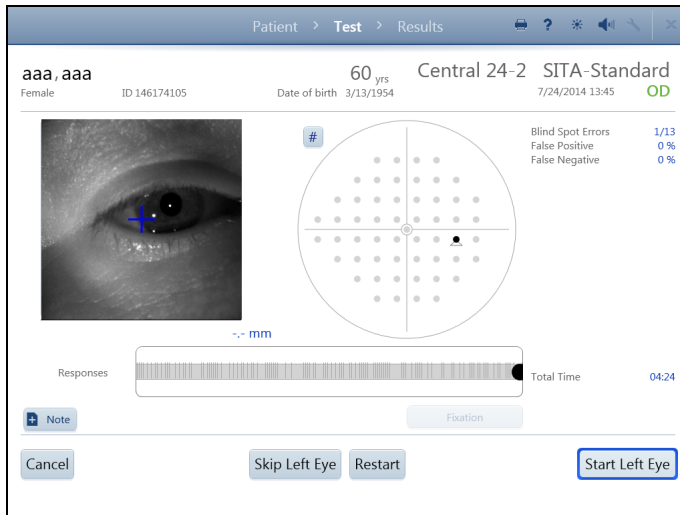
RelEYE is available for the following tests only:

- Threshold SITA-Standard tests (Central 30-2, Central 24-2, Central 10-2, and Peripheral 60-4 test patterns)
- Suprathreshold Central 76
- Suprathreshold Esterman Monocular

Setup and Testing

End the First Eye Test

When the test for the eye is complete, an alert sounds and a message displays. Select OK.



If both eyes were selected for testing, the instrument returns to the TEST screen:

- Select Start (Other) Eye to set up testing for the other eye. Test data for the first eye will be locally saved. To skip the next eye, select Skip (Other) Eye to go directly to the RESULTS screen.
- Select Restart to delete the results and test the first eye again.
- Select Cancel to cancel the entire exam and delete the results.



Note: You must confirm or cancel your choice if you select Restart or Cancel.

Test the Second Eye and End Test

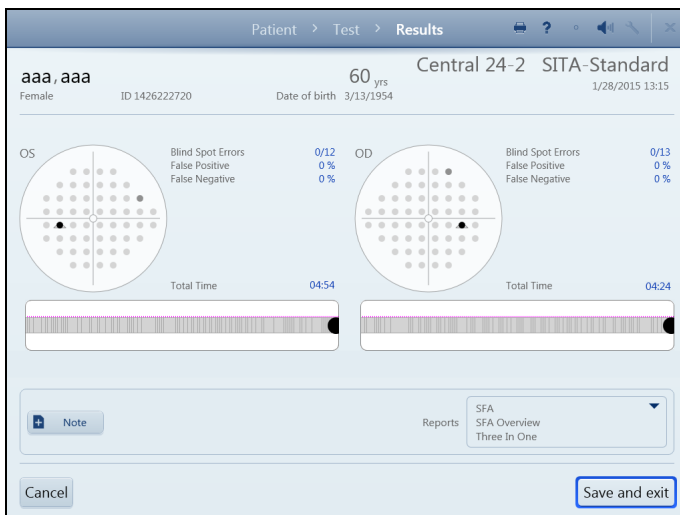
The screen automatically displays the Live Eye image, refractive correction, and trial lens information of the next eye being tested. Set up the patient and test the second eye following the same procedures used for the first eye.

When the second eye is complete, select OK. In the next screen, select Review Results to view test results, restart the test, or cancel the test.



Note: To cancel the entire test including results from the first eye, you will need to manually delete the results from the first eye. See [Delete Tests](#) on page 4-3 to do this on the instrument. If the instrument is set up to export data to FORUM, manually export data to the server (Settings > Network > Manual data export) and delete the exam from FORUM. Results from the first eye should also be manually exported if the second eye exam fails and you would like to save data from the first eye.

Review and Save Results



Review Results displays the test results for each eye tested. The operator can add notes to the exam. Final changes to reports can be made in the Reports drop-down list before saving the exam or sending exam data to the server archive. If you do not want reports to be printed and/or exported automatically, deselect reports.

Select Save and Exit. A message will display when exam data are being successfully saved, either to the local database or to the server archive. A message will also display if the exam has not been successfully saved.

The HFA3 then returns to the PATIENT screen.

Perform Kinetic Test

The HFA3 Kinetic feature emulates manual standard Goldmann perimetry on Models 840, 850, and 860.

Overview of patient setup and testing on the HFA3:

1. Select Patient.
2. Test Setup.
3. Set up Patient for Testing.
4. Administer the Test (one or both eyes).
5. Review and Save Results.

Select Patient

To select, add, and change patient information follow the instructions outlined in the [Perform Threshold or Suprathreshold Test](#) section of this chapter on page 3-1.

Test Setup

This section applies to both Manual Kinetic (see page 3-14) and Preset Kinetic Tests (see page 3-18).

Select the Test

See [Select the Test](#) on page 3-3.

Select Eye

Under the **Perform test on** drop-down menu select which eye to test: OD (Right), OS (Left), or Both (default). The Binocular option appears when Manual Kinetic is chosen as the Test Pattern under **Test Parameters**. This option will also appear if a custom kinetic pattern is chosen. See [Create Custom Test Patterns](#) on page 3-19.

Under the **Start with** drop-down menu select which eye to test first.

Note

See the [Note](#) feature on page 3-4.

Test Parameters

For a new patient, select Kinetic from the **Test Type** drop-down menu under **Test Parameters** and choose the desired Test Pattern. If Manual Kinetic is chosen you will manually determine stimuli and test points during the test.

Reports

See [Reports](#) on page 3-4.

Additional Information (Optional)

If desired, enter IOP (intraocular pressure), Pupil Diameter (available only if Auto Pupil is off), and Visual Acuity data.

Proceed to Patient Setup

Select Start Test to proceed.

Setup and Testing

Set up Patient for Testing

Follow the steps for setting up the patient outlined in the [Perform Threshold or Suprathreshold Test](#) section of this chapter on page 3-1.



Note: You will need to extend the visor for any binocular test. Do not use an eye patch.

Administer the Test (Manual Kinetic)

Use the Manual Kinetic TEST screen to present stimuli to the patient, and to monitor the patient. To test the patient using a preset test pattern, see [Preset Kinetic Tests](#) on page 3-18.

Live Eye Monitor

Use the Live Eye Monitor to center the eye during the test. Touch the on-screen pupil image to move the chin rest and center the pupil on the cross-hair target in the middle of the image. The chin rest control on the instrument is also available to move the chin rest.

Test Pattern

To the right of the Live Eye monitor is the test pattern with labeled meridians and radii.

Stimulus Value

A maximum of 10 different types of stimuli can be used per test. Each stimulus type is identified by a unique icon. When three or more meridian points with the same stimulus parameters are completed, isopter lines will automatically be drawn connecting the points.

The **Stimulus Value** shows the icon and stimuli that have been used during the test. Select a stimulus at any time during the test by touching:

- New button at the top of the list, or
- A stimulus already used in the test and displayed in the legend.

Selecting New to set a new stimulus type opens a window with all the selection parameters, including color, size, intensity, and intensity modifier. Default values are highlighted in blue. Parameter values for size, intensity, and intensity modifier correspond to standard Goldmann values.

- Select new parameters, then OK to accept and close the window. The new Stimulus Value will now be displayed in the stimulus value legend on the TEST screen.
- Select Cancel to return to the TEST screen without choosing a stimulus.

Stimulus Speed

The Speed drop-down menu sets the speed in degrees per second (°/sec), at which the stimulus moves in the test bowl. Touch or click to open the menu and select the setting from the following options:

- 2°/sec
- 3°/sec
- 4°/sec
- 5°/sec
- 10°/sec

The default value is in bold.

Visual Field Size

To choose the visual field size, use the sliding bar located in the bottom right of the screen. The default size is 90 degrees (90°), peripherally. If only the central visual field is being tested choose 30 degrees (30°). Visual field size can be changed during testing. If testing within the central 30 degrees and you choose to use a trial lens, it is suggested you use manual trial lenses, not the Liquid Lens.

Test Mode

Touch on a selection to change from one test mode to another:

- Meridian
- Point to Point
- Static Point
- Blind Spot Map

Test modes are described in following sections.

Grid Menu

The Grid drop-down menu is available with Meridian, Point to Point, and Static Point, and allows several grid resolution settings:

- 1°
- 5°
- 10°
- 15°

The default value is in bold.

Note

See [Note](#) on page 3-4.

Delete Point

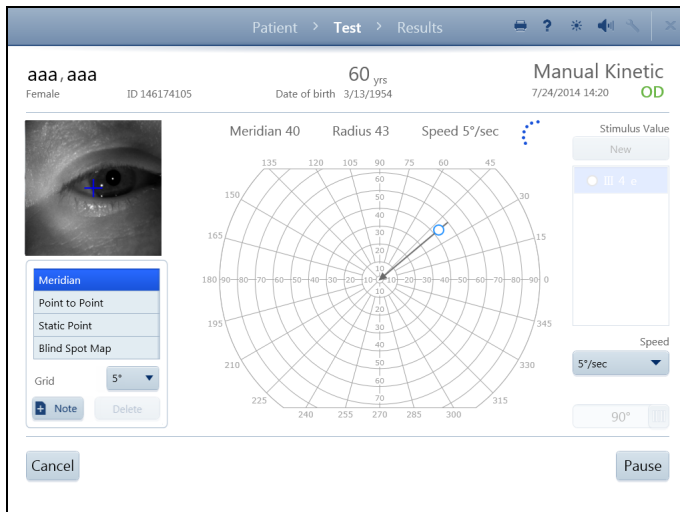
To delete any test point, select the point to highlight it (the point will turn green) and select Delete.



Note: If two test responses overlap during kinetic testing, you will be unable to retest or delete the first point tested.

Isopter Lines

Isopter lines are drawn on the screen to connect three or more points of the same stimulus type.



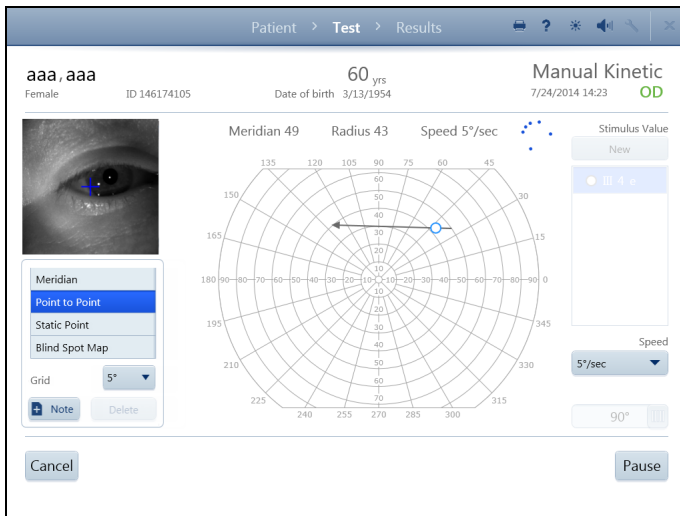
Meridian Mode

While the Meridian test mode is selected, perform the following steps to present a stimulus to the patient:

1. Select a stimulus type from the stimulus legend or choose a New stimulus.
2. Touch the screen or depress the mouse on a point anywhere on the test pattern. The **Meridian** and **Radius** values of the point are displayed above the test pattern.
3. While mouse is left-clicked, or with finger on screen, move finger or mouse to any location. The **Meridian** and **Radius** values update above the test pattern, and a vector line with an arrow is drawn from the point to the center. If the radius position is outside the testable area, the point will automatically be placed at the maximum position.
4. Lift finger or release the mouse to fix the point.
5. The stimulus immediately begins to move down the line to the center.

Setup and Testing

6. The point along the line at which the patient responds is displayed by an icon.



Point to Point Mode

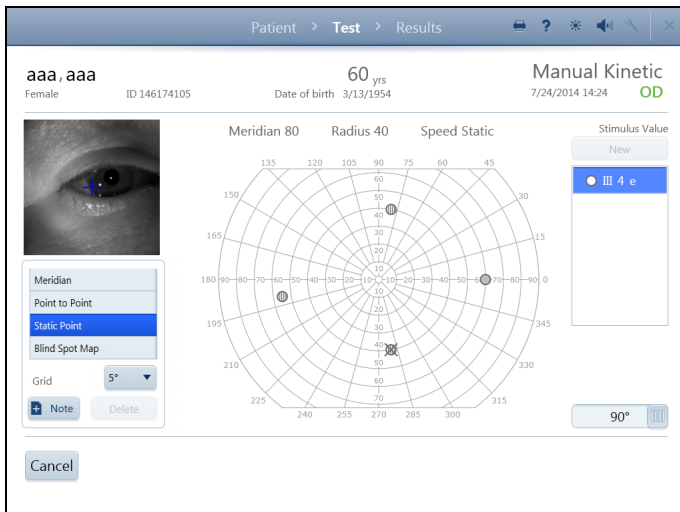
While the Point to Point test mode is selected, perform the following steps to present a stimulus to the patient:

1. Select a stimulus type from the stimulus legend or choose a New stimulus.
2. Touch screen, or click mouse, to place the first point anywhere on the test pattern. If the radius position is outside the testable area, the point will automatically be placed at the maximum position.
3. Lift finger or release the mouse to fix the point.
4. Touch the screen, or click mouse, to place the second point anywhere.
5. A vector line with an arrow is drawn between the two points and is updated as the finger or mouse moves the position of the second point.

6. Lift finger or release the mouse to select the second point.

7. The stimulus immediately starts to move between the two points.

8. The point along the line at which the patient responds is displayed by an icon.



Static Point Mode

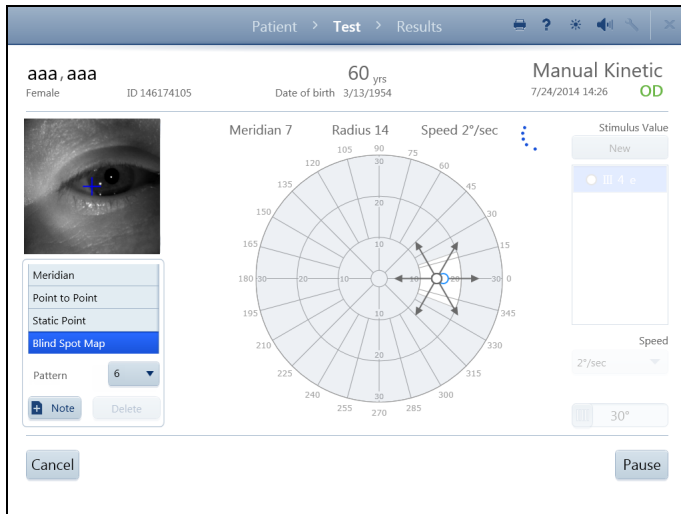
While the Static Point test mode is selected, perform the following steps to present a stimulus to the patient:

1. Select a stimulus type from the stimulus legend or choose a New stimulus.
2. Touch screen, or click mouse, to place a point anywhere on the test pattern. If the point is outside the testable area, it will automatically be placed at the maximum position.
3. Move finger, or depress the mouse, to reposition the point. Meridian and Radius values are updated.
4. Lift finger, or release mouse, to place stimulus.
5. Stimulus begins immediately and shines in place for 0.5 seconds.
6. If the patient sees the stimulus, a gridded icon is displayed. If the stimulus is not seen, an X is drawn over the gridded icon.

The Speed drop-down menu is unavailable while in Static Point mode.




Note: To retest a point where a response was already made, touch or left-click on another area of the screen and move finger or mouse to the point. Direct selection of the point will highlight it for deletion. The HFA3 will only display the retested point once.



Blind Spot Map Mode


When Blind Spot Map is selected, the Grid drop-down menu becomes the Pattern drop-down menu, the visual field automatically zooms to 30 degrees (30°), stimulus speed is automatically set to 2 degrees (2°)/sec (speed), and the scan radius is set to 10 degrees (10°). Speed and Field size settings cannot be changed.

1. Choose from a 4, 6, or 8 meridian pattern, with 6 as the default.

 Note: Each meridian of the 4 meridian pattern is separated by 90 degrees (90°), the meridians in the 6 pattern by 60 degrees (60°), and the meridians in the 8 pattern by 45 degrees (45°).

2. Select a stimulus type from the stimulus legend or choose a New stimulus.

3. Touch screen, or click mouse, to place a point anywhere in the white-shaded region on the test pattern. The stimulus can extend outside the white area.
4. Lift finger or release the mouse to fix the point.
5. The stimulus immediately begins to move from the center, along the line, and stops when the patient responds.

 Note: Standard coordinates for the average anatomical blind spot are: X = 15 degrees (15°), Y = -1 degree (-1°).

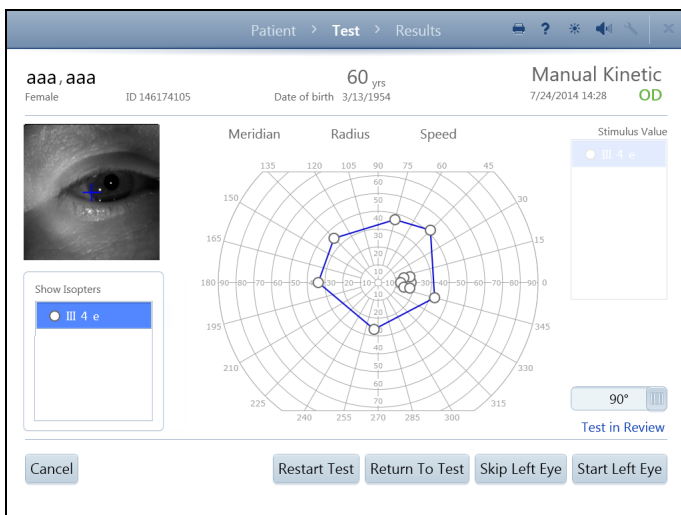
Pause or Cancel the Test

Whether the test is paused or running, select Cancel to access several options:

- Cancel Current Eye Test and Test Next Eye (results are not saved)
- Cancel Entire Test (results are not saved)
- Return to Current Eye Test

Select Pause to pause the test. This will be indicated on the screen. Select Restart Test to delete the results and restart the test. Select Return to Test to go back to the TEST screen.

End the First Test



Select Review Results to end the first test (if both eyes are being tested). In the next screen:

- Show or hide the connecting isopter lines for each stimulus by selecting or deselecting the stimulus in the Show Isopters menu.
- Select Start (Other) Eye to start testing for the other eye. Test data for the first eye will be locally saved.
- Select Skip (Other) Eye to go directly to the RESULTS screen. The skipped eye will not be shown.
- Select Restart Test to delete the results and test the first eye again. Confirm your choice.
- Select Return to Test to go back to testing.
- Select Cancel for cancellation options.

Setup and Testing

Test the Second Eye

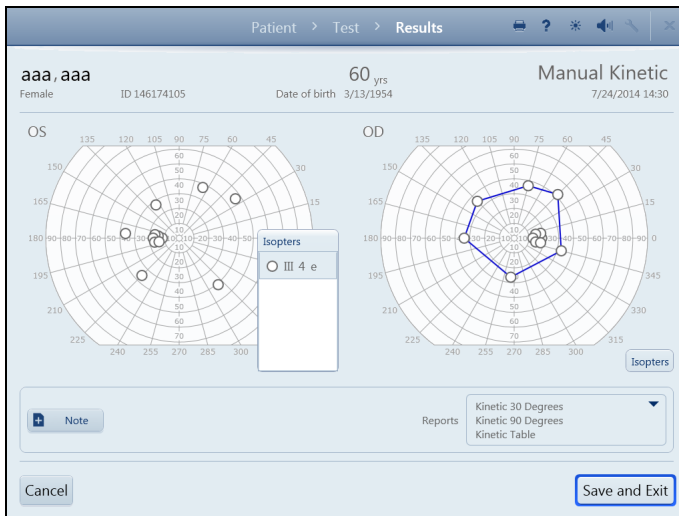
The TEST screen displays for the second eye. Set up the patient and test the second eye following the same procedures used for the first eye.

When the second eye is complete, select Review Results. From the next screen, show or hide isopters, cancel the test, restart the test, return to testing, or end the test.



Note: To cancel the entire test, manually delete the results from the first eye. See [Delete Tests](#) on page 4-3 to do this on the instrument. If the instrument is set up to export data to FORUM, manually export data to the server (Settings > Network > Manual data export), and delete the exam from FORUM. Results from the first eye should also be manually exported if the second eye exam fails.

Final Results



Select End Test for the final review of both eyes before saving. In the RESULTS screen:

- To view isopters select Isopters to expand the Isopters box for each eye. Show or hide the connecting isopter lines for each stimulus by selecting or deselecting the stimulus. Tap the top of the Isopters box again to close the box.
- Add Note to the test if desired
- Select or deselect report formats from the Reports drop-down list.
- Select Cancel for cancellation options.

Complete the test by selecting Save and Exit. Selected reports will be printed and/or exported automatically.

Preset Kinetic Tests

Preset Kinetic test patterns can be run on the HFA3. An example of a preset test pattern is the authorized Social Security Administration (SSA) test. To create a test pattern, refer to [Create Kinetic Test Pattern](#) on page 3-21.

Stimulus Value, Speed, and Visual Field settings cannot be altered during the test. SSA test parameters are III 4 e (size and intensity), 4 degrees (4°)/sec (speed), White (color).



Note: Select Cancel at any time to cancel test results.

To run a preset Kinetic Test:

1. In the PATIENT screen, choose an available preset test pattern from the Test Pattern drop-down menu under Test Parameters.
2. Press Next. The Kinetic TEST screen displays the Live Eye monitor and the test pattern with preset test points.
3. Choose between two test modes:
 - Select Automatic to run all of the test points automatically.
 - Select Step by Step to run each stimulus one at a time.



Note: If desired, switch between Automatic and Step by Step at any time during the test or when the test is paused.

Automatic Mode

- A. Select Start Test.
- B. Each stimulus will automatically move along the line to the center. Coordinates are displayed above the test pattern.
- C. Select Pause to stop the test and choose from the following options:
 - Select Restart Test to delete current test responses and restart the test. Confirm or cancel this selection.
 - Select Return to Test to continue with the test.

Step by Step Mode

- A. Select Start Test to test the first point. The Pause option is available while the test is running.
- B. Select Test Next Point to test each additional point. The Restart Test option is also available.
4. During testing, Points Completed is continuously updated and isopter lines are drawn between completed points. Total Points are also shown.
5. Retest a point by selecting an already tested stimulus, then select Retest Point. This option is available only after all points are tested.



Note: A message will display at the end of testing if points were missed during the test (no response made). The option to retest the points will be provided.

6. Select Review Results when testing is complete to test the other eye.

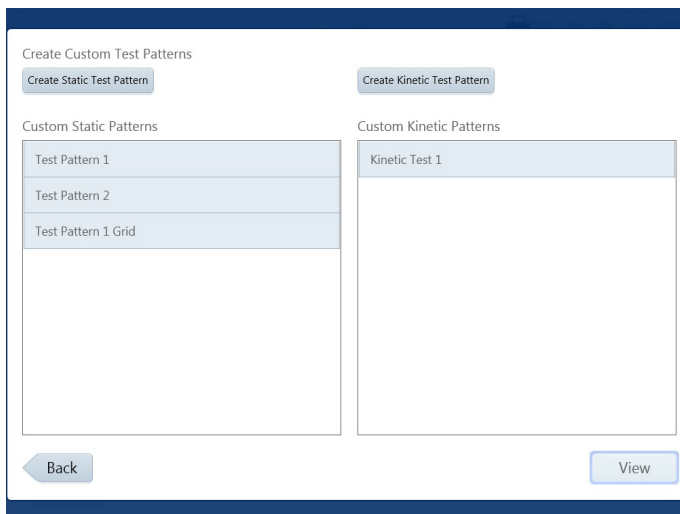
Note

See [Note](#) on page 3-4.


Review Results

Same as Manual Kinetic [Final Results](#) on page 3-18.

Create Custom Test Patterns



To create a custom pattern:

1. Go to Settings  > Advanced settings > Custom Test Patterns. You should see a list of patterns if any exist.
2. To view a pattern, highlight it and select View. To create a new pattern, select Create Static Test Pattern or Create Kinetic Test Pattern.



Note: A custom Static Test Pattern can be used as either a Threshold or Suprathreshold test.



Note: The SITA test strategy cannot be used in a custom test.

Create Static Test Pattern

After Create Static Test Pattern is chosen, a message displays stating that the pattern created will specify the right eye (OD). A mirror image of the pattern will be created for the left eye (OS). Select OK.

Setup and Testing

The next screen displays the following features:

- **Test Field** — Create test points by directly touching or clicking on the test field. X, Y values are displayed to the right.
- **Test Pattern** — Select either Single or Grid to create single points or a grid pattern, respectively. Single points can be added to a Grid Point Pattern and a grid of points can be added to a Single Point Pattern. A test pattern can hold a maximum of 248 points.
- **Field Size** — Changes the field view display. This has no effect on the pattern itself, but point placement is easier in the central portions of the field of view by selecting 10 degrees (10°) or 30 degrees (30°). 90 degrees (90°) displays the entire field in degrees.
- **Point Spacing** — This option is only available when the Grid test pattern is selected and is the distance allowed between points (Two, Four, Six, Eight, Ten, Twelve degrees).
- **Delete Point** — Touch or click on a point to highlight it (the point will turn blue) and delete by selecting Delete Point.



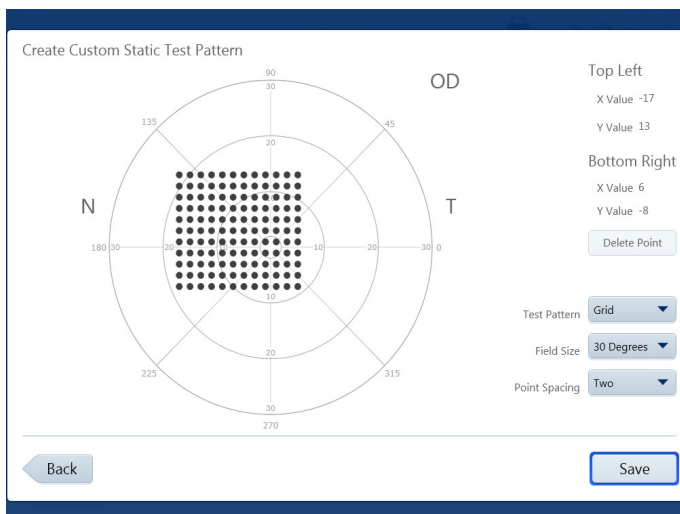
Create a Single Point Pattern

Set the **Test Pattern** to Single. Create single points by touching the test pattern on the screen directly, or by using a mouse.

1. Move your finger or the mouse, while holding the mouse button down, to position the point at the desired X, Y value.
2. Release your finger from the screen or mouse button to fix the point.

 **Note:** The newest point created will be highlighted in blue.


3. Select Save when all the points have been created.
4. Confirm that you have entered all the points for the test.
5. Place cursor in the text box and enter a name for the pattern.
6. Select Save to save the pattern. Select Cancel to cancel the pattern.



Create a Grid Point Pattern

Set the **Test Pattern** to Grid:

1. Position the first point with your finger or mouse and release, as described in [Create a Single Point Pattern](#).
2. Position and fix the second point. A grid of evenly spaced points will be created between the two points. X, Y values of the Top Left and Bottom Right points in the grid are displayed.
3. When the pattern is complete, select Save.

 **Note:** Highlighting one of the grid points will display its X, Y values under Top Left.

4. Confirm that you have entered all the points for the test.
5. Place cursor in the text box and enter a name for the pattern.
6. Select Save to save the pattern. Select Cancel to cancel the pattern.

The created pattern is now displayed in Custom Static Patterns, as well as the **Test Patterns** drop-down menu located under **Test Parameters** on the PATIENT screen and located under Test Profiles in [Advanced Settings](#) (see page 2-9).

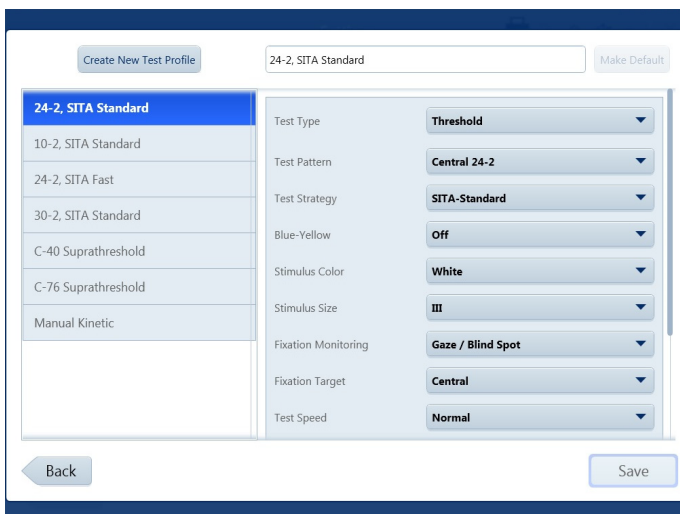
Create Kinetic Test Pattern

1. Select Create Kinetic Test Pattern. A message displays stating that the pattern created will specify the right eye (OD). A mirror image of the pattern will be created for the left eye (OS).
2. Select OK.
3. Select Yes to randomize the order of the meridians for presentation of stimuli. Select No to maintain the order in which the meridians were entered.
4. Choose and add stimuli to the test pattern in the CREATE CUSTOM KINETIC TEST PATTERN screen. The CREATE CUSTOM KINETIC TEST PATTERN screen has the same functionality as the MANUAL KINETIC TEST screen. See [Administer the Test \(Manual Kinetic\)](#) starting on page 3-14.
5. Select Save.
6. Select Yes if all points have been entered. Select No to return to the CREATE CUSTOM KINETIC TEST PATTERN screen.
7. Enter a name for the Custom Test Pattern and select Save.

The created pattern is now displayed in Custom Kinetic Patterns, as well as the **Test Patterns** drop-down menu located under **Test Parameters** on the PATIENT screen and located under Test Profiles in [Advanced Settings](#) (see page 2-9).

Set up Test Profiles

Test Profiles comes with a standard set of tests. Test profiles can be modified or deleted except for the 24-2 SITA Standard test and the default test.



To create a new test profile:

1. Go to Settings > Advanced settings > Test Profiles > Create New Test Profile.
 2. Choose the desired test parameters by using the drop-down menus. See [Appendix \(A\), "Test Patterns and Parameter Settings"](#), for further details about test parameter settings.
- Note: Once a specific test type is selected from the **Test Type** drop-down menu, the screen automatically displays only the options that are available for that test type.
3. Select the **Reports** desired for the new test profile.
 4. Enter a name and select Save to add the new test profile to the list located on the left-hand side of the screen.



Note: To make a test the default, highlight the test name and select Make Default. This test will now be automatically selected when a new patient is created.

The test is now accessible from the **Test Profile** menu on the PATIENT screen.

Delete Test Profiles and Patterns

To delete a custom test profile or test pattern:

1. Go to Settings > Advanced Settings > Test Profiles or Custom Test Patterns.
2. Hold down on the test profile or pattern to be deleted and wait for a circle to be drawn around your finger. Release your finger to bring up a pop-up menu. Select Delete.
or
Right-click on the test profile with a mouse to bring up the pop-up menu. Select Delete.
3. A message will appear to confirm your deletion. Select Yes or No.

(4) Managing Data, Tests, and Reports

See the [Settings](#) section starting on page 2-7 to set up your instrument to backup, archive, retrieve, and restore data.



CAUTION: Routinely back up your data in case it becomes lost or damaged.

To manage data, tests, and print reports in FORUM for a FORUM connected instrument see the user guides for FORUM and FORUM Glaucoma Workplace. To connect the HFA3 to FORUM or EMR systems, see [Chapter \(5\), "Networking"](#). To use the instrument in local database mode, disable DICOM network (Settings > Network), and turn off EMR Mode (Settings > Advanced settings > Non DICOM EMR Settings), and the settings under DICOM Output (Settings > Advanced settings > Report Output).

Save Test Reports and Test Data

The naming convention for test reports is:

Last Name_Test Date_Test Time_Eye (OD or OS)_HFA serial number_Report code_Patient ID. See [Table 4-1](#), [Table 4-4](#), and [Table 4-5](#) for the report codes.

FORUM Connected Mode

When the HFA3 is connected to FORUM, test data are automatically exported to the server archive if data export has been enabled (**FORUM Test Database** setting On under the Report Output settings). If the connection fails, data are saved to the instrument and export continues once the connection is re-established. If the operating mode has been changed from local database mode to FORUM mode, transfer locally stored data to the server archive by selecting the Manual data export button under [Network](#) settings on page 2-13. Once records are transferred to FORUM, local data will be deleted.

Local Database and EMR Connected Modes

For instruments in local database mode or connected to a DICOM compatible or non-DICOM EMR system, data are saved automatically to the HFA3. Reports selected on the PATIENT screen are automatically printed and/or exported at the end of testing to the storage location configured using the settings under Report Output or Printout. Report types for saving and printing from a patient test list can be selected under Default Reports (see pages 2-9).

To automatically export test reports to a DICOM compatible or non-DICOM EMR system, use the procedures in [Chapter \(5\), "Networking"](#). If the connection fails to a DICOM compatible EMR, export will continue once the connection is re-established.

Export Tests Manually

To manually export test data to a shared network folder or USB storage device, use the following procedure. You cannot use this procedure if data export to FORUM has been enabled (**FORUM Test Database** setting On under the Report Output settings).

Tests

aaa, aaa 60 yrs
Female ID 146174105 Date of birth 3/13/1954

Select one or more tests to include in referral. Total Selected: 0

Date	Time	Eye	Parameters
7/25/2014	10:58	OS	SITA-Standard Central 24-2, W-W III Threshold Test
7/25/2014	10:57	OD	SITA-Standard Central 24-2, W-W III Threshold Test
7/25/2014	10:29	OS	Two Zone Central 76 Point, W-W III Suprathreshold Test
7/25/2014	10:28	OD	Two Zone Central 76 Point, W-W III Suprathreshold Test
7/25/2014	09:44	OS	SITA-Standard Central 24-2, W-W III Threshold Test
7/25/2014	09:43	OD	SITA-Standard Central 24-2, W-W III Threshold Test
7/24/2014	14:43	OS	SITA-Standard Central 24-2, W-W III Threshold Test
7/24/2014	14:42	OD	SITA-Standard Central 24-2, W-W III Threshold Test
7/24/2014	14:39	OD	SSA-W Kinetic Test
7/24/2014	14:30	OS	Manual Kinetic-W Kinetic Test
7/24/2014	14:28	OD	Manual Kinetic-W Kinetic Test
7/24/2014	14:09	OS	SITA-Standard Central 24-2, W-W III Threshold Test
7/24/2014	14:08	OD	SITA-Standard Central 24-2, W-W III Threshold Test
7/24/2014	13:56	OS	SITA-Standard Central 24-2, W-W III Threshold Test
7/24/2014	13:45	OD	SITA-Standard Central 24-2, W-W III Threshold Test

Back Delete Select All Clear Selection Save To

1. Select the Tests button at the bottom of the PATIENT screen (see page 3-1).

2. In the TESTS screen:

- Choose Select All to export all of the tests.
- Highlight individual tests to select a limited number of tests to export.
- Choose Clear Selection to clear your choice.
- Select Save To and save selected tests to a USB device or network location. A data transfer summary screen will appear with details of the export process.

Save Test Reports Manually

You can use the following procedure to save test reports to a USB storage device, network shared folder, or an EMR system. You cannot use this procedure if FORUM data export has been enabled.

1. Select the Reports button at the bottom of the PATIENT screen.

Reports

aaa, aaa 60 yrs
Female ID 146174105 Date of birth 3/13/1954

Select one or more tests to generate reports... Total Selected: 1

Date	Time	Eye	Parameters	View	GPA Reliability
3/24/2015	1:33 PM	OS	SITA-Standard Central 24-2, W-W III ThresholdTest		
3/24/2015	1:26 PM	OD	SITA-Standard Central 24-2, W-W III ThresholdTest		

Print
Save
DICOM EPDF
EMR

Back Select Reports Clear Selection Save

2. In the following screen, tests for the patient will be listed. Highlight one or more tests.

3. Select Save (local database mode), DICOM EPDF (for a DICOM EMR), or EMR (non-DICOM EMR). Export will occur automatically if DICOM EPDF or EMR have been chosen.

4. If you selected Save, select/confirm the export location in the next screen. Choose Select if exporting to a mapped shared folder or USB.

5. A progress screen will appear, followed by a message stating export results.

6. Choose Select Reports to change the selection of default report types you wish to save for the selected tests.

7. Clear Selection will clear the highlighted tests.

Print Test Reports

Reports selected on the PATIENT screen are automatically printed at the end of testing. For instruments connected to FORUM, you can print reports from FORUM. For other modes, reports will be printed to a printer connected to your instrument.



Note: If the FORUM connection is lost, print reports by switching the instrument to local database mode. Go to Settings > Network and disable DICOM network. Make sure you have a printer connected to the instrument.

To manually print to a connected printer:

1. In the REPORTS screen switch the Save button to Print by touching or clicking the down arrow and selecting Print from the drop-down menu.
2. Touch or click on the Print button to print the reports.

3. A progress screen will appear, followed by a message that the print process is completed.



Note: The progress screen and print complete message still appear if the printer is disconnected or turned off. When the printer is connected or turned back on, the queued reports will print. Select the printer icon displayed at the top of the screen to display the status of the print job. Selecting the Cancel button in the Print dialog box will not cancel the print job.

Reassign Tests

If the wrong patient was selected at the beginning of a test, the test results can be reassigned to the correct patient. This function is only available if the FORUM test database is not enabled in **Advanced Settings > Report Output**.

1. In the PATIENT screen, select the name of the patient that was incorrectly associated with the test. Click the drop-down menu arrow to the right of the patient name, then select Tests from the menu.
2. Select the test to be reassigned, then click Reassign.
3. Use the search field to find the patient the test should be reassigned to.
4. Select the patient and click Next.
5. Enter a reason for moving the test and click Next. To set a default reason, select the Use this text as default reassign reason checkbox before clicking Next.
6. Confirm that the correct test is being reassigned to the correct patient, and select Reassign Test.

Delete Tests

Tests can be deleted on the instrument if the FORUM test database is not enabled in **Advanced Settings > Report Output**.


1. Select the Tests button on the PATIENT screen.
2. In the TESTS screen highlight the test or tests that need to be deleted.
3. Select Delete and confirm to delete the highlighted tests.

If data are exported to FORUM, delete tests from the archive. Tests are automatically deleted from the instrument once they have been exported.

Import Tests

Test data cannot be directly imported from a DICOM/EMR system to the instrument.

Manually Import Tests

1. Connect a USB storage device containing the data you want transferred to a USB port on the HFA3 (see [Figure 2-3](#)). Data can also be imported from a shared network folder.
2. Go to Settings  > Advanced settings and select Import.
3. In the IMPORT screen, select Import.... to add the tests on the storage device to the HFA3 database.

For instruments connected to a DICOM compatible or non-DICOM EMR system, local data on the instrument are retained. You must manually export/import data to/from an external location to keep multiple instruments synchronized. See [“Confirm or Change Patient Information,”](#) on [page 3-2](#) for more information about how patient records are reconciled.

View and Generate Test Reports

Data analysis and report generation must be conducted directly in FORUM for instruments exporting data to FORUM.

Manually Generate Reports

When connected to an EMR system, conduct all data analysis on the instrument. Reports generated using the following procedure can only be printed to a connected printer, or exported to a USB storage device or shared network folder:

1. Highlight a patient and select the Reports button at the bottom of the PATIENT screen.
2. In the following screen, tests for the patient will be listed displaying **Date, Time, Eye, Parameters, View,** and **GPA Reliability.**
3. To view reports available for a specific test, select the icon in the **View** column.
4. A REPORTS screen will display with a list of report types that are available for that test.
5. Highlight a report type and select Next.
6. If more than one test is required for the report (like GPA and SFA Overview), the next screen displays a list of qualified tests. Confirm or change which tests are included in the analysis.



Note: GPA tests will display an automatic selection of qualified Baseline tests and Follow-up tests. Always review the Baseline and Follow-up test selections before performing a GPA analysis. To change the selection, deselect tests and then reselect tests to include in the analysis. Follow-up tests cannot pre-date Baseline tests. See [GPA Analysis](#) on [page 4-13](#) for more details.

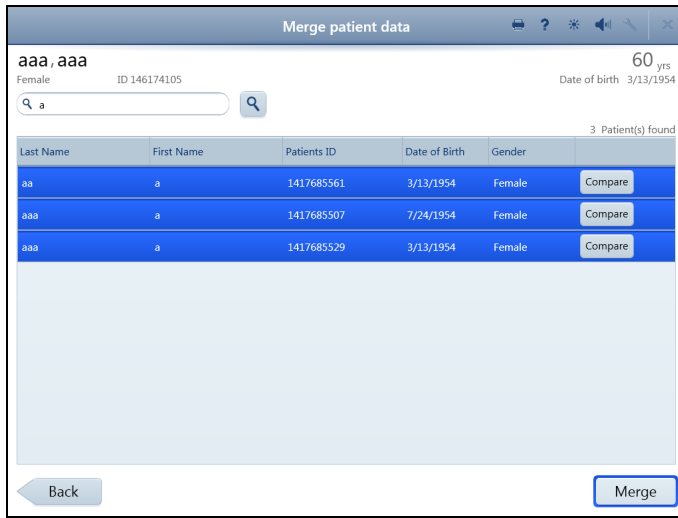
7. Select Next.
8. The REPORT screen displays the report format, viewing magnification options, and printer selection at the top of the page.
9. Select Back to go back to the previous screen or select Print to print the report. The Print button can be changed to Save or Save and print by selecting the down arrow and bringing up the drop-down menu. Reports will be saved/printed in PDF format only.

Merging and Deleting Patient Records

If the HFA3 is connected to an EMR system, patients merged or deleted on the HFA3 are only merged locally; the records on the EMR remain unchanged. If the HFA3 is connected to FORUM, patients cannot be merged or deleted from the local system because the patient database is stored in the FORUM archive. Patient reconciliation must be done in FORUM or the leading system.

Merge Patients on the HFA3

You may merge up to 20 names into one patient file:



1. In the PATIENT screen, select the patient, then click the drop-down menu arrow to the right of the patient name. Select Merge.
2. In the MERGE PATIENT DATA screen, enter search terms to find patient records.
3. Highlight the records of interest from the resulting list. Select Compare to display comparisons of each record with the patient record shown at the top of the screen. Original patient record will be displayed on the right.
4. Select Merge at the bottom of the screen to merge the highlighted records with the original patient record.
5. Enter a reason for merging patient data and select Merge again.

Where there are conflicts between an imported patient record and a local record, the local record is overwritten.

Delete Patients on the HFA3

1. In the PATIENT screen, select the patient, then click the drop-down menu arrow to the right of the patient name. Select Delete.
2. Select Delete again to confirm.

Static Threshold Reports

The HFA statistical software, STATPAC, provides data analysis that is included on most Threshold report formats. STATPAC analysis is available for central field tests using the Size III, White stimulus only. Guided Progression Analysis (GPA) helps identify progressive visual field loss in patients and is available for Central 24-2 and Central 30-2 using the SITA Faster, SITA-Fast, SITA-Standard, and Full Threshold tests. Report examples and brief descriptions of report features are provided in the following sections.

Report (Code)	Description
Single Field Analysis (SFA)	SFA analyzes the results of a single threshold test and provides the most information for a given test. SFA is available for all central test patterns regardless of test strategy.
SFA Overview (OVR)	An overview report presents the results of up to sixteen (16) SFA tests for comparison.
Full GPA (GPA)	GPA assists with detection of glaucoma progression. Full GPA is a multi-page overview of the patient’s entire history.
GPA Summary (GPASUM)	Short GPA report (one page).

Table 4-1 List of Static Threshold Reports

Report (Code)	Description
GPA Last Three Follow Up (GPAL3F)	Follows the same format as the Full GPA, but includes only the three most recent Follow Up tests.
SFA GPA (SFAGPA)	SFA GPA is an SFA report that incorporates a GPA Progression Analysis Probability Plot.
Three In One (3N1)	The Three In One report includes a graytone, numeric, and defect depth presentation of the results of a single test on one page, and is available for all Threshold tests except custom and SITA-SWAP tests.
Numeric (NUM)	The Numeric Report is available for custom threshold tests and displays raw data in table format.

Table 4-1 List of Static Threshold Reports

The SFA and SFA GPA Report

The SFA report displays patient data, test reliability indices, and test results in Grayscale and Numeric formats. STATPAC analysis is found in the lower half of the page and includes the Total Deviation Plot, the Pattern Deviation Plot, Glaucoma Hemifield Test (GHT), Visual Field Index (VFI), Mean Deviation (MD), and Pattern Standard Deviation (PSD) values. For details see [Report Features](#) starting on page 4-11.

The SFA GPA report also includes GPA results in the GPA information box ([Figure 4.1](#)). The GPA information box contains the Progression Analysis Probability Plot for the current test, test dates for the GPA Baseline tests and the two previous Follow-up tests, and the GPA Alert. See [Numerical and Graphical GPA Plots](#) on page 4-12 for further details.

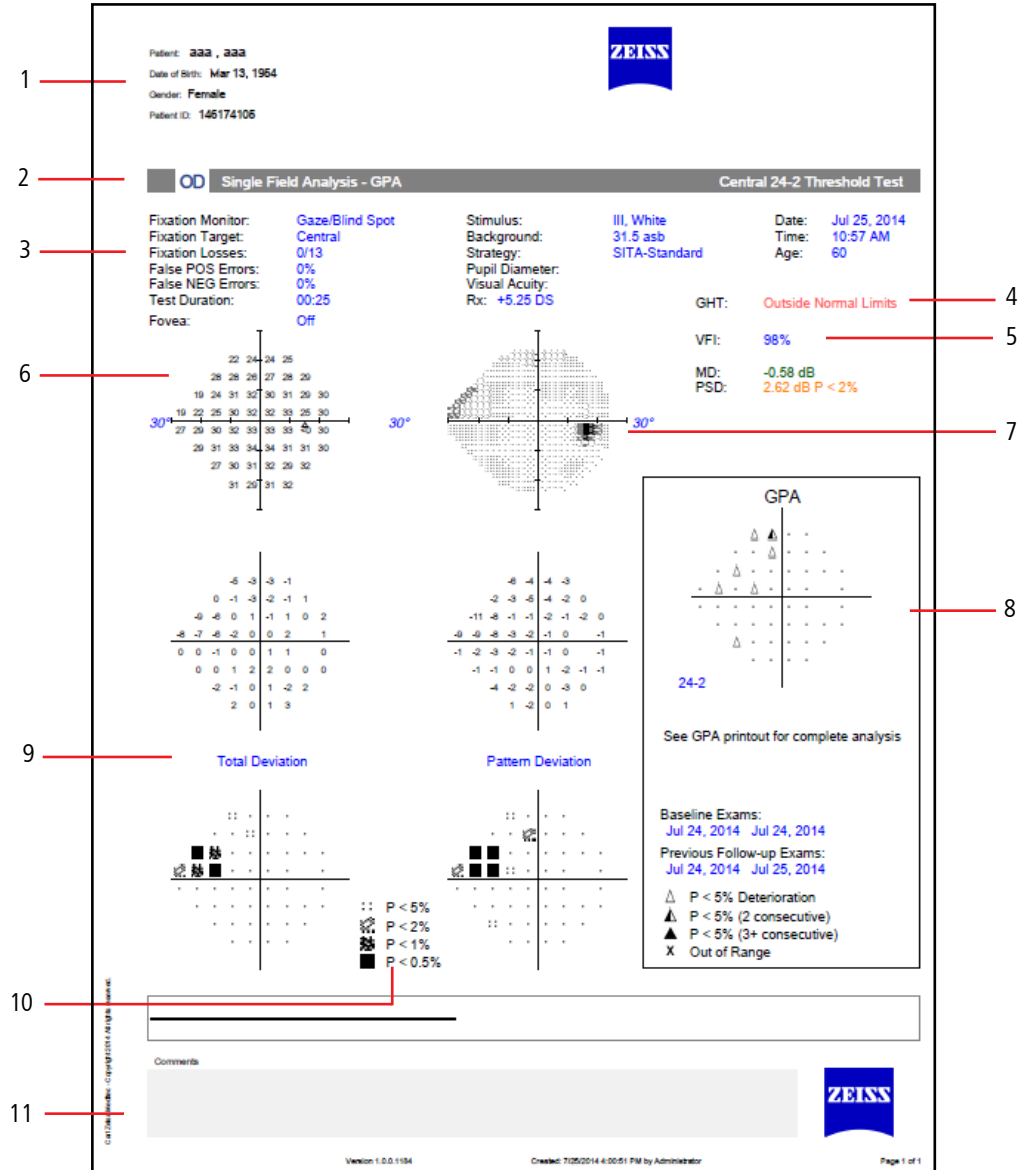


Figure 4.1 Single Field Analysis with GPA (SFA GPA)

- 1 – Patient Data
- 2 – Test and Report Type
- 3 – Reliability Indices
- 4 – Glaucoma Hemifield Test
- 5 – Global Indices
- 6 – Numeric (dB) Results
- 7 – Grayscale Results
- 8 – GPA Information
- 9 – Deviation Plots
- 10 – Probability Symbols
- 11 – Notes Field

The SFA Overview Report

The Overview report shows the results of multiple tests in chronological order. Results from 30-2 and 24-2 tests may be presented in the same report.

The results of each test display Grayscale, Numeric, Total Deviation, and Pattern Deviation Plots, along with test date, GHT, and indices. If available, visual acuity and pupil size are located at the upper right of each Pattern Deviation Plot.

Overview reports are available for non-STATPAC 24-2, 30-2, 10-2, and SWAP tests. No probability plots are available. You cannot mix tests run with different stimulus sizes or colors.

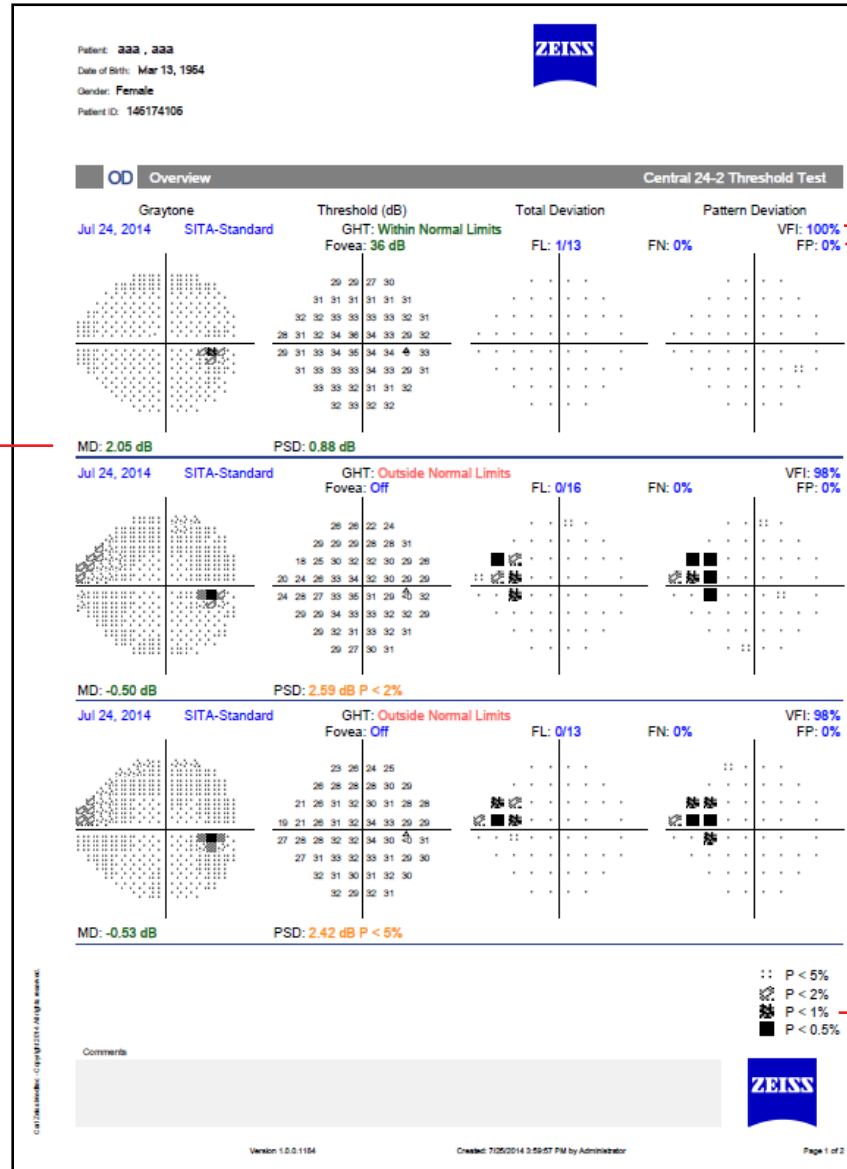


Figure 4.2 SFA Overview

- 1 – VFI
- 2 – Reliability Indices
- 3 – Global Indices
- 4 – Probability Symbols

GPA Summary Report

The GPA Summary report is a one-page report that provides an overview of the patient’s qualified visual field history. At the top of the report, Grayscale and Pattern Deviation Plots are shown for both GPA Baseline tests, along with key indices. The VFI Plot and VFI Bar are located in the center of the page. Results for the current visual field test are shown at the bottom of the report, including

the Grayscale, Pattern Deviation, Deviation from Baseline, and the Progression Analysis Probability Plots. The GPA Alert will appear here as well.

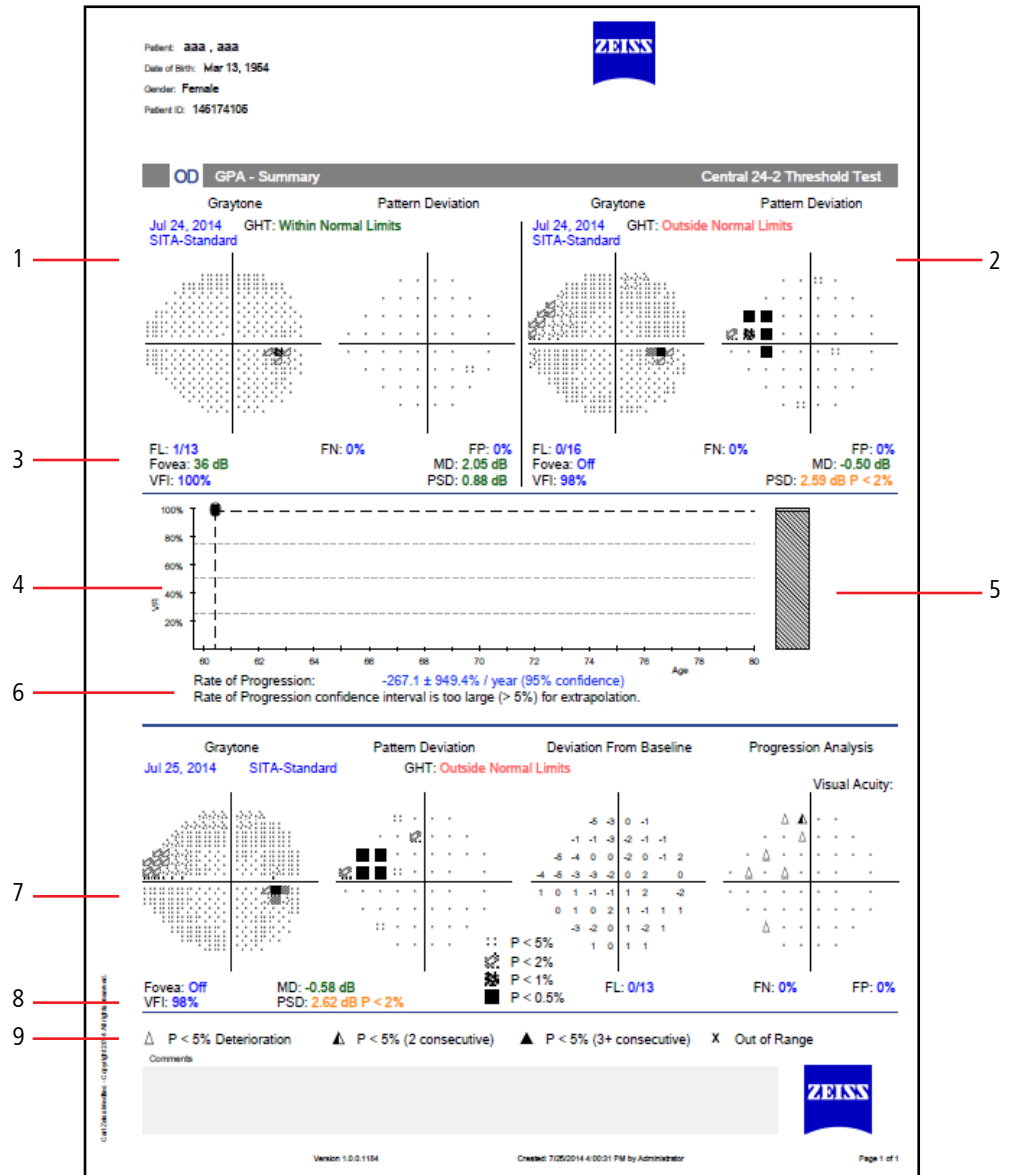


Figure 4.3 GPA Summary

- 1 – Baseline 1
- 2 – Baseline 2
- 3 – Indices
- 4 – VFI Plot
- 5 – VFI Bar
- 6 – VFI Linear Regression Analysis
- 7 – Current Test
- 8 – VFI Value
- 9 – Progression Analysis Symbols

Full GPA and Last Three Follow Up Reports

The Full GPA report is a multi-page overview of the patient’s entire history. The Baseline page provides Grayscale, Numeric, Total Deviation, and Pattern Deviation Plots, as well as key indices for both GPA Baseline tests. The VFI Plot and Bar are displayed at the bottom. Subsequent pages show three Follow-up tests per page in the format: Grayscale, Pattern Deviation, Deviation from Baseline, Progression Analysis, key indices, and the GPA alert. The GPA Last Three Follow Up Report follows the same format, but includes only the three most recent Follow-up tests.

Three in One Report

If a threshold test pattern or test parameters do not meet the criteria for STATPAC analysis, results are presented in Grayscale, Numeric, and Defect Depth formats on the Three in One report. The numbers that appear outside each quadrant of the numeric grid are called quad totals and represent a summation of the threshold values determined in each quadrant. This format is available for 10-2, 24-2, 30-2 central field tests, and for the peripheral 60-4 test. The nasal step Three in One test report displays only threshold and defect depth data.

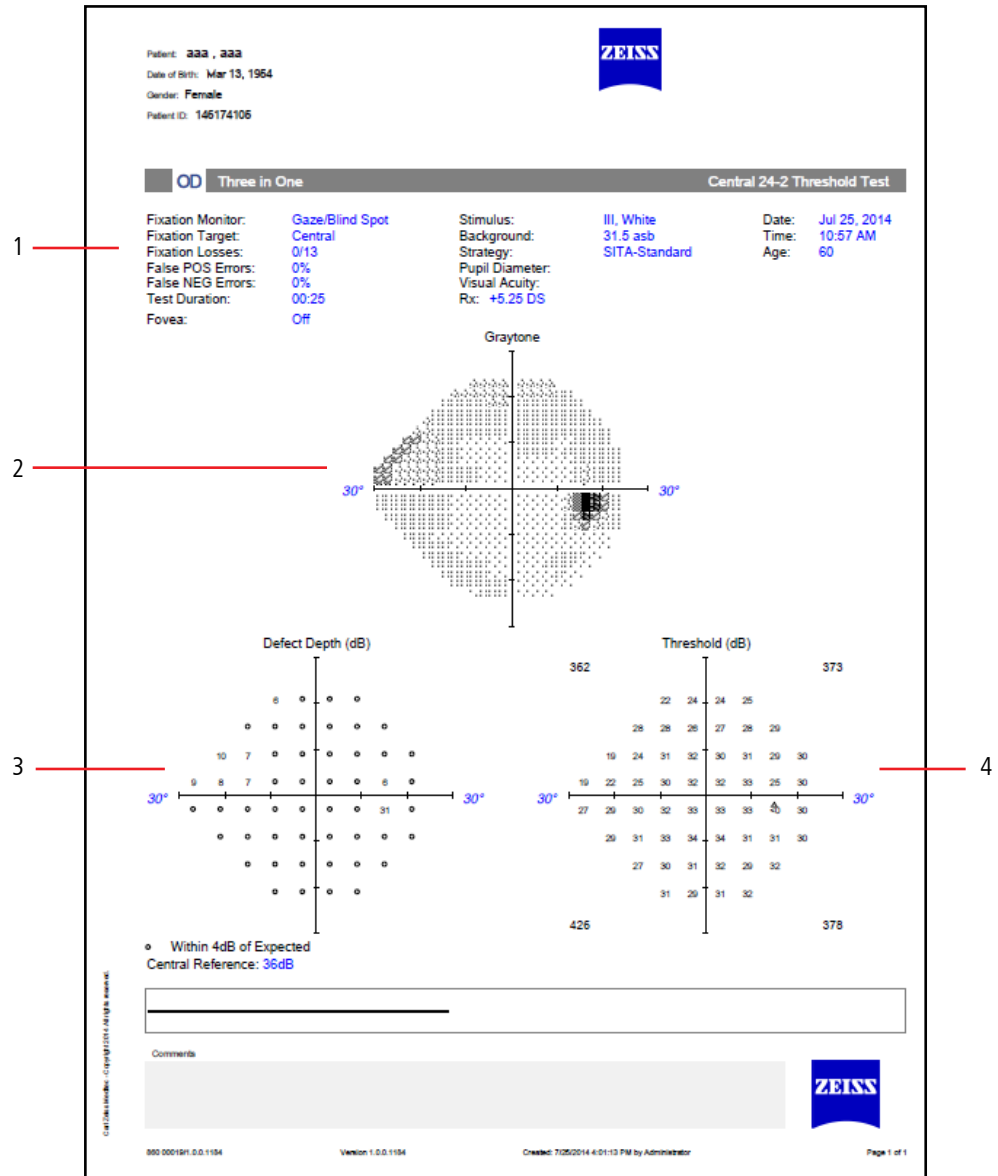


Figure 4.4 Three In One

- 1 – Reliability Indices
- 2 – Grayscale Results

- 3 – Defect Depth
- 4 – Numeric (dB) Results

Report Features

Reliability Indices

Blind Spot Errors (Fixation Losses/FL)

Blind Spot Errors are recorded when Blind Spot monitoring is active and occur when a patient responds to a stimulus presented in the blind spot. The number of responses is recorded over the total number of stimuli presented. A high error rate may mean poor patient fixation during the test or that the blind spot was located incorrectly. Fixation Losses $\geq 20\%$ are indicated by a double X.

False Positives (FP)

False Positive errors occur when a patient responds too quickly to a stimulus or in the absence of a stimulus. In SITA tests False Positives are not calculated until the end of the test and a percentage $\geq 15\%$ will be indicated by a double X. A percentage $\geq 33\%$ will be indicated for non-SITA tests. A high score suggests that the patient may be overly concerned about not seeing all the stimuli. Patients that respond inappropriately may also have abnormally high threshold results.

False Negatives (FN)

A False Negative is recorded if the patient does not respond when a stimulus is repeated at a particular location and at a level much brighter than has already been seen.



Note: Reports will display only one message with the priority given to high False Positives and the message "Excessive High False Positives". Otherwise, the message "Low Test Reliability" is displayed on SITA test reports if Fixation Losses are $\geq 20\%$. For non-SITA tests, the same message will display if either the number of Fixation Losses are $\geq 20\%$ or False Negatives are $\geq 33\%$.

Grayscale and Numeric Formats

The Grayscale format depicts the size and depth of any present field defects. Each pattern variation corresponds to a 5 dB change in sensitivity. The comparative scale in Table 4-2 displays the ten (10) Grayscale patterns and relates them to decibels and apostilbs.

SYM										
ASB	0.8–0.1	2.5–1	8–3.2	25–10	79–32	251–100	794–316	2512–1000	7943–3162	> 10000
DB	41–50	36–40	31–35	26–30	21–25	16–20	11–15	6–10	1–5	≤ 0

Table 4-2 Grayscale Symbols and Numerical Equivalents in Apostilbs (ASB) and Decibels (dB).



Note: The Grayscale in SWAP printouts often looks significantly darker because SWAP testing normally generates lower threshold sensitivity values than does white-on-white testing. The maximum (0 dB) stimulus in SWAP testing is 6 foot-lamberts, not 10,000 apostilbs.

Total Deviation Plots

The numeric values in the upper total deviation plot represents the difference in decibels (dB) between the patient's test results and the age-corrected normal values at each tested point.

The lower total deviation plot, called a probability plot, translates the values from the upper plot into shaded symbols indicating the highlights points falling below specific percentile levels compared to the reference limits. These are explained in the legend labeled "Probability Symbols." For instance, a totally black square indicates that the value observed at that point location occurred in less than 0.5% of the subjects in the reference database.

Pattern Deviation Plots

The Pattern Deviation plots are similar to the total deviation plots, except that STATPAC has adjusted the analysis of the test results for any changes in the height of the measured hill of vision caused, for example, by cataracts or small pupils. STATPAC also corrects for any patients who are "supernormal."

Global Indices

Visual Field Index (VFI): VFI is a weighted average of the ratio of the measured threshold to the age-adjusted normal threshold for all points that have depressions in the Pattern Deviation at the 5% level or higher. The VFI is weighted to give increased importance to thresholds near the point of fixation.

Mean Deviation (MD): MD is the average elevation or depression of the patient's overall field compared to the normal reference field. "P" values are given to significant deviations.

Pattern Standard Deviation (PSD): PSD is a measurement of the degree to which the shape of the patient's measured field departs from the normal, age-corrected reference field. "P" values are given to significant deviations.

Short term fluctuation (SF): SF is used with Full Threshold and FastPac™ tests. When fluctuation is turned on, the threshold is measured twice at 10 preselected points. The HFA then calculates a fluctuation value on the basis of the differences between the first and second measurements at each of the 10 points.

Corrected Pattern Standard Deviation (CPSD): CPSD is PSD corrected for intra-test variability (SF) and is used with Full Threshold and FastPac tests only.

The Glaucoma Hemifield Test

For 24-2 and 30-2 tests, the GHT evaluates five zones in the superior field and compares these zones to their mirrored zones in the inferior field. One of these messages will be displayed: WITHIN NORMAL LIMITS, OUTSIDE NORMAL LIMITS, or BORDERLINE. The message GENERAL REDUCTION OF SENSITIVITY is shown whenever the field is depressed to a level seen in fewer than 0.5% of the normal population in the patient's age range. When the comparison indicates abnormally high sensitivity, the message ABNORMALLY HIGH SENSITIVITY appears.

Note: The GHT is not available with FastPac tests.



Numerical and Graphical GPA Plots

Deviation from Baseline Plot

The Deviation from Baseline Plot compares the pattern deviation of a Follow-up test to the average of the pattern deviation values of two Baseline tests, and indicates changes at each tested point. See [Figure 4.3](#).

Progression Analysis Probability Plots

The Progression Analysis Probability Plot compares the changes between the Baseline and Follow-up tests and highlights points that have worsened by an amount that exceeds the variability in all but the most variable 5% of glaucoma patients in a reference population.

- A single, solid dot | • indicates a point not changing by an amount that exceeds the test-retest variability observed in a reference population.
- A small open triangle \triangle identifies a degree of deterioration expected less than 5% of the time at that location in a reference population of stable glaucoma patients; that is,

deterioration at the 5% level ($p < 0.05$). This symbol is used when the change was not seen on a previous Follow-up test.

- A half-filled triangle ▲ identifies a point changing by an amount that is worse than all but the most variable 5% of glaucoma subjects in a reference population and that is repeated in two consecutive Follow-up tests.
- A solid triangle ▲ identifies a point changing by an amount that is worse than all but the most variable 5% of glaucoma subjects in a reference population and that is repeated in three consecutive Follow-up tests.
- An X signifies that the data at that point was out of range for analysis.



Note: Pattern Deviation plots and GPA Progression Analysis Probability plots are not shown for severely depressed visual fields (MD less than or equal to 20 dB).

VFI Plot

The VFI Plot graphs the VFI values of all tests included in GPA analysis as a function of the patient’s age, and provides a linear regression analysis of the VFI over time (5 tests over 3 years or more are required). VFI values from Full Threshold tests are represented by open squares, and VFI values from SITA tests are represented by filled squares.

To the right of the VFI Plot is the VFI Bar, indicating the patient’s current VFI value. The VFI Bar will graphically indicate the 3 to 5 year projection of the linear regression line, shown as a broken line. The length of projection is equal to the number of years of GPA data available, up to a maximum of 5 years.



Note: GPA reports also include the GPA Alert. In cases where 3 or more points show deterioration in at least 2 consecutive tests, the progression analysis indicates “Possible Progression.” In cases where 3 or more points show deterioration in at least 3 consecutive tests, the progression analysis indicates “Likely Progression.” When neither of the foregoing conditions applies, a message of “No Progression Detected” is displayed.

GPA Analysis

Only SITA tests may be chosen initially for GPA analysis. You may mix any combination of SITA-Standard, SITA-Fast or SITA Faster tests to create a GPA analysis. The HFA3 will automatically choose the two oldest compatible tests to be the Baseline. Tests displaying high False Positives $\geq 15\%$ are excluded by default from GPA analysis. You can manually change the default Baseline tests or exclude specific tests.



Note: Manual Baseline selections may override automatic selection of the two oldest compatible tests. Always review the Baseline and Follow-up test selections before performing a GPA analysis. If the Baseline tests are Full Threshold, then the Follow-up tests may be any combination of SITA Faster, SITA Fast, SITA-Standard, or Full Threshold. If the Baseline tests are any SITA test, then Full Threshold are not allowed as Follow-up tests.

Suprathreshold Reports

The Suprathreshold test strategy determines the type of responses that are displayed on the report (Table 4-3). See [Suprathreshold Test Settings](#) on page A-9 for more details on Suprathreshold test strategies.

Strategy	Response	Format
Two Zone	Point Seen	0
	Point Not Seen	■

Strategy	Response	Format
Three Zone	Point Seen	0
	Relative Defects	X
	Absolute Defects	■
Quantify Defects	Point Seen	0
	Depth of Defect	Numbers in dB (the larger the number the greater the defect)

Table 4-3 Test Response Formats

Suprathreshold reports are listed in Table 4-4.

Report (Code)	Description
Suprathreshold (SCR)	Report that displays a single eye. Two page reports, one displaying the full field and one displaying the central 30 degrees, are generated for the following test patterns performed using the Quantify Defects strategy: <ul style="list-style-type: none"> • Armaly Full Field • Full Field 81 Point • Full Field 120 Point • Full Field 135 Point • Full Field 246 Point
Suprathreshold OU (SC_OU)	Report that displays both eyes (does not include full field patterns). This report is available for the following test patterns: <ul style="list-style-type: none"> • Central 40 Point • Central 64 Point • Central 76 Point • Central 80 Point • Armaly Central • Peripheral 60 Point

Table 4-4 List of Suprathreshold Reports

The type of test and test parameters are printed at the top of the report along with the patient data, test date and test time (Figure 4.5). Suprathreshold reports include the reliability indices (see [Reliability Indices](#) on page 4-11).

When a Suprathreshold test uses the Threshold Related testing mode, the central (and peripheral) reference level values are determined from patient responses and appear on the report. The central reference level is the calculated threshold at the fovea. When the Age Corrected mode is used, the central (and peripheral) reference levels display values based on the patient's age.

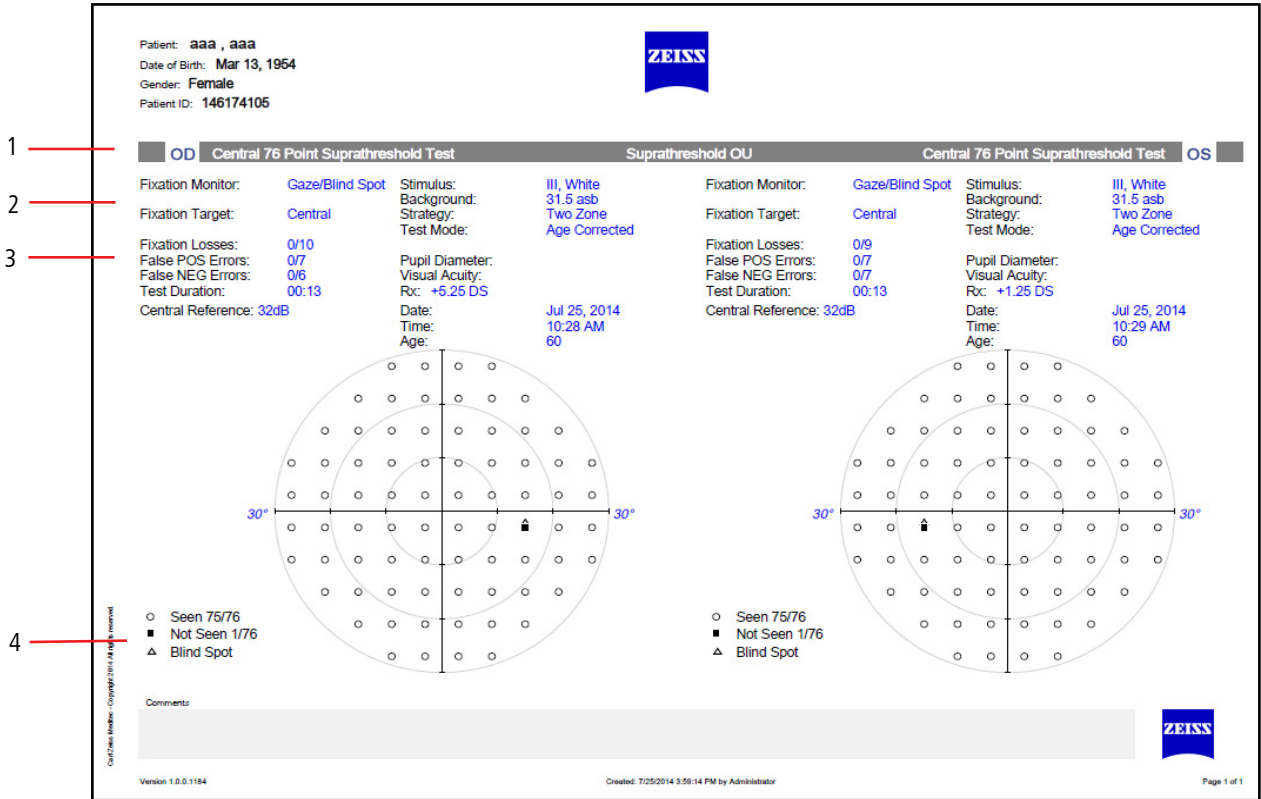


Figure 4.5 Suprathreshold OU Report

- 1 – Eye/Test/Report
- 2 – Test Details
- 3 – Reliability Indices
- 4 – Response Symbols

Kinetic Reports

Report	Description
Kinetic 30 Degrees (KIN30)	Report for a central visual field test.
Kinetic 90 Degrees (KIN90)	Report for a full visual field test.
Kinetic Table (KINTBL)	Report that displays the locations of the starting and ending points of all stimuli presented during the kinetic test. The table also lists all Static Points and whether each point was seen or not.

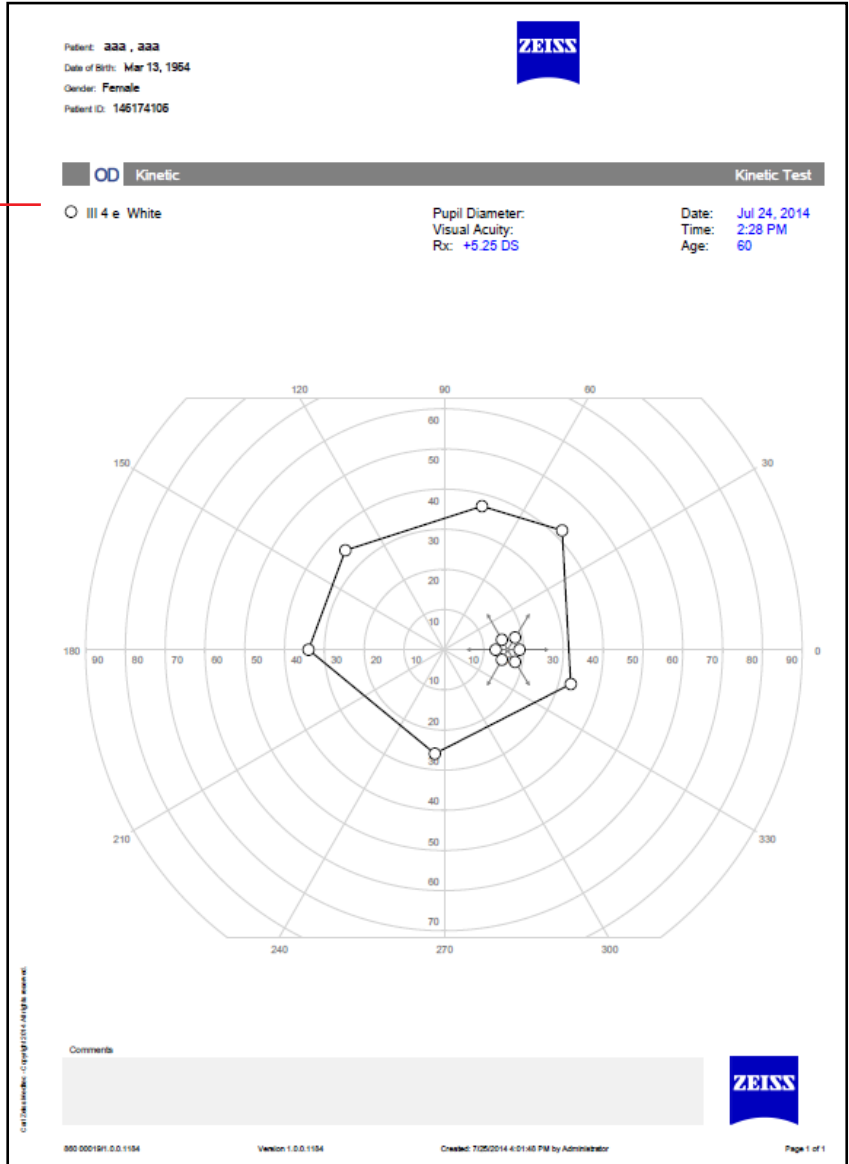
Table 4-5 List of Kinetic Reports

Kinetic 90 Degrees Report

The Kinetic full field report shows all isopters mapped out to the periphery. Some points may be hidden if they are too close together, as is likely in the central 30 degrees of the full field. The 30 degree view will display the hidden points.

Isopter points are connected to form the isopter lines. However, points that define the borders of a blind spot are not connected to each other. Occasionally an isopter point will appear on the report that is not connected to other isopter points. This situation occurs when you have retested a meridian. Only the most recent point on a meridian will be used for the isopter map.

Isopters



(5) Networking

This chapter contains instructions for:

- Networking the HFA3.
- Connecting and exporting to a shared network folder (page 5-2).
- Connecting the HFA3 instrument to FORUM (page 5-4).
- Connecting the HFA3 to a DICOM compatible EMR system (page 5-5).
- Connecting the HFA3 to a non-DICOM EMR system (page 5-5).
- Configuring the instrument to use a printer.

You must log in as a user with Administrator privileges to access network settings.



Note: Users are responsible for network setup and maintenance, including installation and configuration of all necessary hardware and software. ZEISS Customer Support is limited to testing network connectivity of the instrument. Customer Support cannot troubleshoot or repair problems with network connectivity.



Note: Consult an IT, System, or DICOM/EMR network administrator for help in entering correct configuration information. For assistance in the U.S., call ZEISS at 800-341-6968. Outside the U.S., contact a local ZEISS distributor.

Network Capabilities

The HFA3 instrument can connect to local area networks for data storage using an Ethernet port.

Enable the **DICOM network** setting to connect to ZEISS's FORUM or other DICOM/EMR systems.



Note: To use the instrument in local database mode, make sure that all DICOM/EMR settings are off. The HFA3 supports the following:

- Store exams and reports to FORUM, or a LAN (Local Area Network).
- Store test reports to DICOM compatible and non-DICOM EMR systems.
- Import patient scheduling and demographic information from a DICOM Modality Worklist or non-DICOM EMR system.
- Print to PostScript network printers, wireless printers (via a wireless USB adapter) and PostScript printers that are directly wired to the HFA3.




Note: The HFA3 supports Internet Protocol Version 4 (TCP/IPv4), but not IPv6.

Configuration to a Pre-existing Office Network

This section explains how to configure the HFA3 to communicate via a pre-existing office network (LAN). To do this, the instrument must be connected to the office network by a standard network patch cable. Make sure to plug one end of your standard network patch cable into the HFA3 Ethernet port (see [Figure 2-3](#)). Be sure to handle the cable connector gently. It is the user's responsibility to install the necessary cables.

Configure Network Settings on the HFA3

1. Start the instrument and log in as an Administrator user. If the instrument is already on, you may log in as another user by selecting Change user from the Close button menu while in the PATIENT screen.
2. Select Settings  > Network to display the NETWORK screen (see page 2-13).
3. Ensure that DHCP (Dynamic Host Configuration Protocol) is Enabled to automatically assign an IP address to the instrument.
4. If the network uses static IP addresses, contact a network administrator to have the HFA3 added, or set DHCP to Disabled and fill in the IP Address, Subnet Mask, and Default Gateway fields.

Add Network Shared Folders



1. Make sure you are logged in as an Administrator user.
2. In the NETWORK screen select Map network drive.... under Network drive configuration.
3. Perform the following steps in the resulting dialog window:
 - A. Enter the network shared folder address in **Network path**.



Note: You may only map a shared folder where the target is a root directory, or a subdirectory owned by a root directory. Attempting to map lower level folders will result in a user name and password error message. You can navigate to lower level folders to save reports using the Printout and Report Output settings. See [Settings](#) on page 2-7.

- B. Select an unused drive letter.
 - C. Enter **User name** and **Password** for the shared folder. Do not enter either if no password is required.
 - D. Select Map.
4. You will return to the NETWORK screen. Make sure that the mapped drive appears under **Available network drives**.

Export to a Network Shared Folder

1. Select Settings  > Advanced settings to display the ADVANCED SETTINGS screen (see page 2-9).
2. Select Report Output.
3. In the END OF TEST SETTINGS screen select Print, Export, or Export and Print under **Report Output Default**.
4. Under **Report Export File Type** select file types.
5. **Report Export Location** lists the current export location. Select the  button to change the export location from the SELECT FOLDER screen:
 - A. Choose the left folder icon to navigate to the shared network folder. Select the mapped folder.
 - B. Choose the right folder icon to add a folder to the selected export location.
 - C. Choose Select.
6. You will return to the END OF TEST SETTINGS screen.

Patient Folders

You may also automatically create patient folders while exporting reports and XML files to a shared network folder or USB storage device. Turn On **Named Patient Folder** in the **END OF TEST SETTINGS** screen. An automatically created patient folder name will consist of the patient's last name, first name, and date of birth. The patient ID will be added to the beginning of the folder name if the appropriate setting is enabled.

Connect to a DICOM/EMR Server

This section contains instructions to connect the HFA3 instrument to a DICOM/EMR system including FORUM. Once connected, the instrument can display a list of patients who are scheduled for visual field exams from a worklist. When a patient is selected from this list, all demographic data are entered automatically into the local HFA3 database.

Connection Settings

This section provides a description of the settings required to connect to a DICOM/EMR system. The majority of these settings do not affect or must be disabled when connecting to a non-DICOM EMR system (see page 5-5).

Local Application Entity Settings

Station name: Typically a unique name for the exam lane or instrument. Enter a total of up to 16 characters and spaces.

AE title: Enter a unique AE title for the instrument. Each instrument must have its own unique AE title which needs to be registered with the DICOM system. Input a total of up to 16 characters (text is case-sensitive).

Port: Enter the Local Port number that the DICOM/EMR system connects to.

Automatic MWL update: Set to Enabled to automatically update Modality Worklists.

Frequency of MWL updates: If **Automatic MWL update** is enabled, the Modality Worklist refresh rate can be changed to the desired time period.

Remote Application Entities

MWL: Enable this service to be able to import a worklist from the DICOM/EMR system.

Storage: Allows storage to the DICOM server.

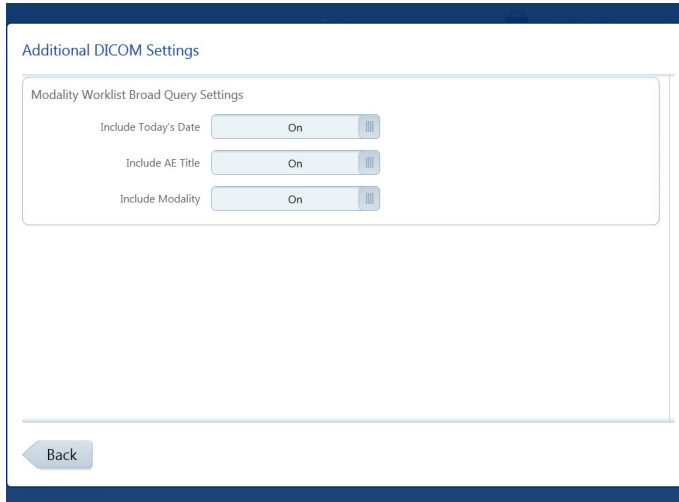
Query: Enable this service to allow a patient search to FORUM.

Retrieve: Enable this service to automatically retrieve patient information.


Storage Commitment: Enable this service to perform a storage commitment request. This service is used to confirm that exam data have been permanently stored by the DICOM system.

Advanced DICOM Settings

We recommend that you use the default values shown in the Advanced settings dialog. Experienced network administrators may adjust these settings to optimize performance or allow for slow network connections.



Configure DICOM

Select Settings  > Advanced settings > Report Output > DICOM to access the ADDITIONAL DICOM SETTINGS screen.

Use these settings to adjust the configuration to your DICOM system. Consult your service provider for query settings that are specifically required by your DICOM compatible system.

Include Today's Date: Includes/excludes today's system date in the worklist query.

Include AE Title: Includes/excludes HFA3's AE title in the worklist query.

Include Modality: Includes/excludes OPV in the worklist query.


DICOM Configuration Overview

The process for a complete DICOM solution includes the following steps:

1. DICOM Server Setup: Set up the DICOM storage to recognize the AE titles of the instruments that will be connecting to the server. Please consult your DICOM user manual or system administrator to configure your system.
2. Network the HFA3: Configure the HFA3 instrument to connect to the network with an Ethernet cable. See your IT administrator and [Configure Network Settings on the HFA3](#) on page 5-2 for more information.
3. Configure the DICOM System: Configure your system to communicate with the designated Storage and Modality Worklist servers and perform a connection test.
4. Use DICOM: Query the Modality Worklist server for scheduled exams, perform these exams, and export the results back to the DICOM server.

Connect to FORUM

Configure Network Settings

1. Make sure you are logged in as an Administrator user.
2. Select Settings  > Network to display the NETWORK screen.
3. Under Connection Configuration, set **DICOM network** to Enabled to display connection settings.
4. Enter values for **Station name**, **AE title**, and **Port**. Enable **Automatic MWL update**.
5. Configure DICOM Services automatically or manually.

Configure DICOM Services automatically:

1. Select the AutoConnect... button to display a list of detected FORUM servers.
2. Highlight the desired server and touch or click on Select. The DICOM system's **AE title**, **Host-Name**, and **Port** will automatically populate their fields.


Configure DICOM Services manually:

1. Check the DICOM services radio button to configure **MWL** and **Storage** services only. The **Retrieve**, **Query**, and **Storage Commitment** settings will be configured from Storage. Leave the radio button unchecked if you wish to configure all services separately.
2. Highlight a service to configure from the **Service** list and select the Manual connect... button.

3. In the resulting dialog window, perform the following steps:
 - A. Enable or disable the service.
 - B. Enter the DICOM system's **AE title**. Input a total of up to 16 characters (text is case-sensitive).
 - C. Enter the DICOM system's **Host-Name**.
 - D. Enter the DICOM system's **Port** number.
 - E. Select OK.
4. Test connections to each service by using the Test connection button. A check mark will appear if the connection is successful.
5. Repeat steps 2.– 4. for each service

Enabled services display a check mark to the left.

Configure Export Settings

1. Select Settings  > Advanced settings> Report Output.
2. In the END OF TEST SETTINGS screen under DICOM Output turn On **FORUM Test Database** to enable archiving to FORUM and subsequent deletion of exam data from the instrument. Export EPDF will be automatically disabled.

Connect to a DICOM Compatible EMR

Follow these recommended settings to connect to a DICOM compatible EMR system. Settings may need to be configured differently depending on your system. Consult your system manual or administrator.

Configure Network Settings

Follow the same procedure used to connect to FORUM. Configure DICOM services manually and make sure that **MWL**, **Storage**, and **Storage Commitment** are enabled. **Query** and **Retrieve** settings do not need to be configured.

Configure Export Settings

1. Select Settings  > Advanced settings> Report Output.
2. In the END OF TEST SETTINGS screen under DICOM Output turn Off **FORUM Test Database**.
3. Turn On **Export EPDF** to enable automatic export of EPDF at the end of testing.

Connect to a Non-DICOM EMR

Before configuring the HFA3 instrument:

- Make sure the EMR system is set up and running.
- Ensure that the HFA3 is connected to the network (page 5-1).
- Configure a shared network or FTP folder on the PC/Server that is accessed by the EMR system. Consult your IT administrator.

Configuring Export to an EMR

1. Select Settings  > Advanced settings> Report Output.
2. In the END OF TEST SETTINGS screen under DICOM Output turn Off **FORUM Test Database**. If **FORUM Test Database** is enabled, the Reports and Tests buttons will not be visible in the PATIENT screen.


3. Select Settings  > Advanced settings > Non DICOM EMR Settings.

4. Turn on **EMR Mode**.

5. Under **Export**, select the export settings.

To export to a shared folder:

A. Select **Shared Folder** from the **Folder** drop-down menu.

B. In the **NETWORK** screen, map a path to the shared folder previously set up on the PC/Server (see page 5-2). Select the mapped folder by selecting the  button.

C. Initiate a test connection to the HFA3 on your EMR system. Then select **Test Connection** on the HFA3. If you do not initiate a test on the EMR system, the connection will fail.

D. Select the export format.

To export to an already existing FTP (File Transfer Protocol) folder:

A. Select **FTP** from the **Folder** drop-down menu.

B. Enter the FTP server address in **FTP Server**. Begin the address with ftp://. Do not enter a backslash at the end, or the address will be invalid.

C. Enter the folder name in the **Folder** field.

D. Enter **User name** and **Password** for the FTP folder.

E. Initiate a test connection to the HFA3 on the EMR system. Then select **Test Connection** on the HFA3.

F. Select the export format.

6. Under **Worklist**, select the **Worklist Mode**. If you select **Query Retrieve** you can limit the selection by **Accession Number**, **Last Name**, **First Name**, and **Patient ID**.

7. Map the location of the worklist, either to a shared folder or an FTP folder (see step 5).

Configure Network Settings

1. Select Settings  > **Network** to display the **NETWORK** screen.

2. Scroll down to **Connection Configuration** and enable **DICOM network**.

3. Under **Local application entity**, disable **Automatic MWL update**.

4. Under **Remote application entity**, manually disable **Storage**, **Retrieve**, **Query**, and **Storage Commitment** services (see steps 1.–3. on page 5-4).

5. Highlight the **MWL** service and select **Manually connect...**

6. Enable **MWL** and enter these values in the next screen:

A. Enter **EmrSCP** under **AE title**.

B. Enter **localhost** under **Host name**.

C. Enter **2112** under **Port**.

D. Select **OK**.

7. Ensure that the EMR is integrated into the shared/FTP export and worklist folders before selecting **Test connection** on the instrument. A check mark will appear if the connection is successful.

8. Do not change the default values under **Advanced settings**.

Enabled services display a check mark to the left.

Troubleshooting the Connection



If the connection is unsuccessful, take the following actions:

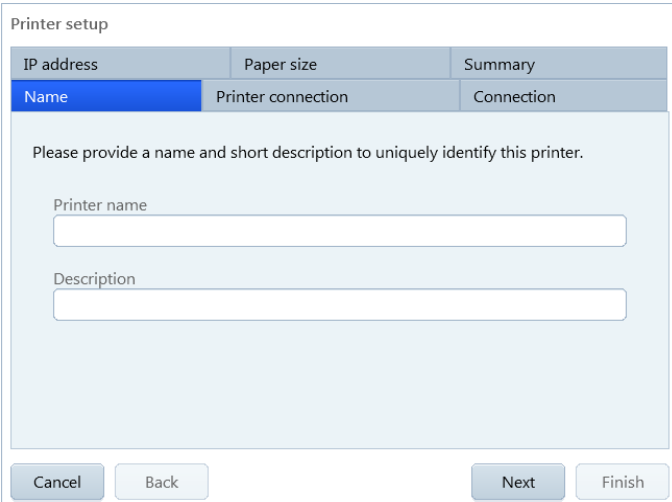
- Check with your network administrator to verify that the instrument is connected to the network.
- Retry.
- Make sure the appropriate servers are running.
- The storage provider hard drive(s) may be full. Add more hard drives or make more space available.
- Refer to the DICOM/EMR system manual for a possible resolution of the problem.
- Call Customer Service.

Connect to a Printer

Wired Printers

To connect directly to a PostScript printer when an HFA3 is in local database mode:

1. Ensure that the HFA3 has not been connected to a local network.
2. Connect the appropriate cable to the Ethernet port on the instrument (see [Figure 2-3](#)) and the printer (refer to manufacturer's instructions).
3. If not already on, turn on the printer and the HFA3 (ensure that both devices are plugged in), and log into the instrument as Administrator.
4. Select Settings  > Network and note the HFA3 IP address. The IP address should be in the range of 169.254.1.0 – 169.254.1.255 if the instrument has not previously been connected to a network.
5. Select Settings  > General settings and scroll down to Printout.
6. Select Printer setup.... and select Add printer.
7. Select Next to move between the tabs in the following screen:



Name — Enter a printer name (required) and optional description. Name and description are for your reference only.

Printer connection — Select Directly.

Connection — Printer port number should be automatically entered.

IP Address — Enter the printer IP address. Retrieve this address from network information on the printer (see manufacturer's instructions). Make sure that the printer IP address is within the range of the HFA3 IP address. Alternatively, select Browse, then either enter a server path or select Browse again to search for the printer. Once IP address is entered, select Test to test the printer connection. A green check mark will appear if the connection is good.

Paper size — Select paper size.

Summary — Displays a summary of all entered information.

8. Select Finish once you have entered all of the settings to add the printer to the printer list.
 9. Highlight the printer in the printer list and select Print test page to test the printer.
- Any printer in the printer list can be set as the default.



WARNING: If the instrument is externally connected to AC powered, non-medical peripheral devices (i.e. printer, storage devices, etc.), the complete system must comply with the system requirements in standard IEC 60601-1. This standard requires the usage of an Isolation Transformer to power the non-medical peripheral device(s) if located within 1.5 m from the patient. If the peripheral device is located outside the patient environment (beyond 1.5 m) and is connected to the HFA, a separation device must be used or there shall be no electrical connection between the non-medical peripheral device and the HFA. The HFA3 Ethernet port already has the required separation integrated within the HFA3 instrument, and therefore can be directly connected to peripherals located beyond 1.5 meters.





Shared Network Printers

To connect to a shared network printer:

1. Verify the IP addresses of both the HFA3 and the printer to ensure that they are on the same local network.
2. On the instrument, log in as Administrator.
3. To set up the printer on the instrument follow steps 5.–9. under [Wired Printers](#) on page 5-7. In step 7., select Print server as the Printer connection.

Wireless Printers

Connect the HFA3 to a wireless printer using a wireless adapter:

1. Ensure that both the HFA3 and printer are plugged in and turned on.
2. Open the back panel of the instrument to access the USB ports (see [Figure 2-3](#)).
3. Plug the USB wireless adapter into an HFA3 USB port.
4. Refer to the manufacturer's printer instructions to configure the printer. For the HP Officejet Pro 251dw Wireless Color Printer use the following instructions:
 - A. On the printer screen select Setup > Network > Wireless. Set Wireless to On.
 - B. Use the Back button  to return to the previous screen.
 - C. Select Wireless Direct to access the Wireless Direct Settings. Select On.
 - D. Set Security to On.
 - E. Select Security Passcode and record the printer passcode visible on the screen. Select OK.
 - F. Select Wireless Direct Name and record the printer name. Select OK.
 - G. Return to the Setup Menu using the Back button. Select Print Reports.
 - H. Select Network Configuration Page to print the page and obtain the printer IPv4 IP address.
5. Access the Windows desktop on the HFA3:
 - A. In the PATIENT screen select Change user from the Close button menu . Log in as Service using 0000 as the password.
 - B. Select Settings  > Service.
 - C. In the SERVICE screen select Start service mode and log off.
 - D. Select the ITAdministrator login and enter Admin@123 as the password. The Windows desktop appears.
6. Click on the network icon  located on the Task Bar in the Windows desktop.
7. Select the network connection for the wireless printer recorded in step 4.
8. Ensure that **Connect automatically** is checked and select Connect.

9. Enter the printer passcode recorded in step 4 as the **Security key** and select OK. A progress dialog box will appear.
10. Once the progress dialog box has closed and the connection has been established, restart the HFA3 by selecting the On/Off button. Cover the instrument or dim the room before restarting the HFA3.
11. Log in as Administrator.
12. Follow steps [5.–9.](#) under [Wired Printers](#) on page [5-7](#).

(6) Maintenance

This chapter discusses instrument cleaning and customer-replaceable parts.

ZEISS recommends routine yearly service and maintenance of the HFA3 by a qualified ZEISS Field Service Engineer.

Only an authorized ZEISS service representative should calibrate the HFA3. Contact a ZEISS service technician if you think your instrument requires calibration.

Cleaning the Instrument

Clean as often as is necessary. Use the methods and cleaners shown in the table below.

Surface	Cleaner	Method
Exterior Panels	Mild detergent or appliance cleaner or glass cleaner containing no ammonia.	Dampen a soft cloth with cleaner and gently wipe the surfaces. Never spray the cleaner directly on the exterior surfaces.
Bowl (Please review the two cautionary Notes that follow this table)	Dust cloth Distilled water 70% Isopropyl alcohol in H ₂ O (Rubbing alcohol)	Remove accumulated dust from the bowl periodically. Wipe the bowl gently with a clean, dry, soft cotton cloth. Use downward strokes that move the dust toward the front edge of the bottom of the bowl, where there is a small opening around the base of the lens holder. If dusting the bowl is inadequate, slightly moisten the cloth with distilled water. Whether using a dry or a dampened cloth, always avoid excessive rubbing in one area, as this can create shiny spots or wear through the specially painted surface of the bowl. For small spots on the bowl surface caused by sneezing or coughing during a test, slightly dampen a cotton-tipped applicator with isopropyl alcohol and gently remove the spot. It is best to wet the spot with the tip of the dampened swab first and let it soak briefly. Then, use the swab very gently to remove the deposit.
Touch Screen	Mild glass cleaner containing no ammonia.	Turn off the HFA before cleaning the touch screen. Wipe gently with a moistened cloth. Do not spray cleaner directly on the touch screen.
Forehead & Chin Rests	Mild detergent, alcohol wipes	After each patient, wipe gently using a dampened soft cloth.
Patient Response Button	Mild detergent, alcohol wipes	After each patient, wipe gently using a dampened soft cloth.

Table 6.1



Note: Be careful to avoid scratching, discoloring, or staining the bowl surface. Prior to cleaning the bowl surface, remove all jewelry as it can permanently scratch or damage the painted surface. Be especially careful of long fingernails and fingernail polish contacting the bowl surface, as these can mark or damage the painted surface permanently.



Note: During any bowl cleaning process, be careful to avoid getting either the distilled water or isopropyl alcohol cleaning liquid inside of the fixation target openings or on mirrored surfaces.

Air Intake Filter

To ensure proper cooling of the instrument, the air filter must be cleaned or replaced every three months (Part Number 2660021149222).

1. Locate the air filter cover on the side of the instrument.
 - Push down on the filter cover latch and open the cover.
 - Remove the air filter.

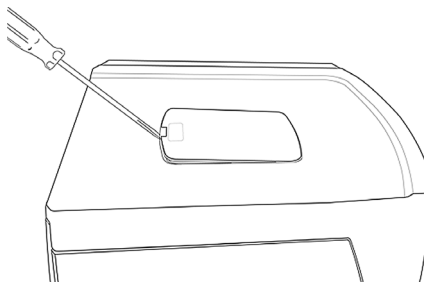


Note: The air filter is marked with a notch on the bottom. Observe the proper orientation of the air filter before removal and replace the air filter in the same orientation.

2. Clean or replace the air filter.
 - For cleaning, shake the air filter a few times to dislodge trapped dust.
 - The filter may be rinsed with water, but make sure the filter is completely dry before installing.
 - To replace the air filter, call the Carl Zeiss Meditec Parts Department and order a "Fan Filter" (PN 2660021149222).
3. Return the new air filter or the clean and dry air filter to its proper location.
4. Close and latch the air filter cover.

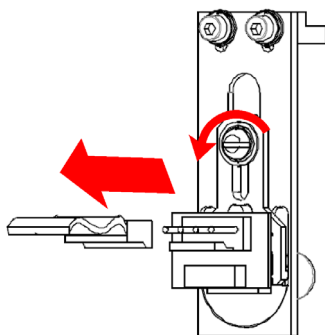
Replacing the Stimulus Projection Lamp

This lamp is responsible for projecting the standard white stimulus. With the aid of color filters, it is also used to create red and blue stimuli for color testing. If needed, order a new lamp by calling the Carl Zeiss Meditec Parts Department and asking for PN 2660021148110 (Projection Lamp).



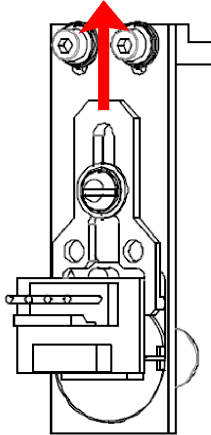
1. Turn off the HFA3 and lower the table. Open and remove the top access panel using an implement to release the catch mechanism.

2. Standing in front of the bowl opening, the projection lamp is located inside the open case top, at the 12 o'clock position. Allow the lamp to cool completely (approximately five minutes) before handling it. Do NOT touch the two disk-shaped filters.

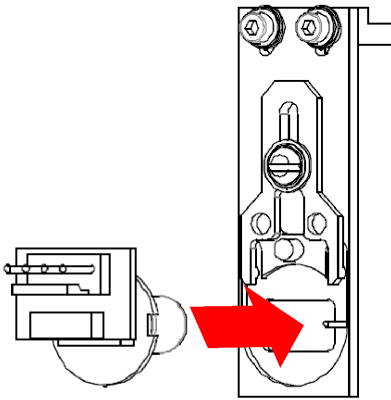


3. Remove the connector cable by pulling its connector straight upward. Then use a screwdriver to loosen the screw.

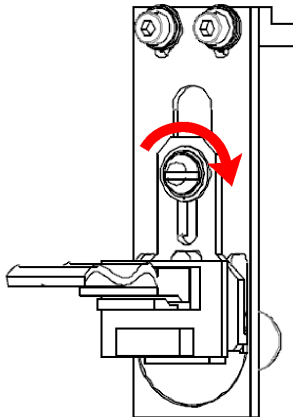
4. Now, slide the wishbone-shaped plate that holds the lamp assembly in place away from you.



5. Remove the old expended lamp assembly. Insert the replacement lamp into the housing. Note the notch in the base of the lamp housing lines up with the pin to the right of the assembly. Do NOT touch the glass part of the lamp with your fingers, as this will shorten the life expectancy of the lamp. If your finger touches the glass portion of the lamp, wipe the lamp clean with a soft cloth.



6. Slide plate back into position, tighten screw and replace connector cable.



7. To replace the top access panel, insert the panel into the opening.

Background Illumination Lamps

The lamps responsible for illuminating the bowl surface are a fluorescent type (not incandescent) and have a long life expectancy. If you get a bowl illumination error, darken the room and restart the instrument to see if this corrects the problem. If the bowl illumination error continues, do NOT attempt to replace the lamp. These highly specialized lamps are to be replaced only by a ZEISS Field Service Engineer. Contact ZEISS Customer Service to arrange for a service call.

Patient Response Button

Should the response button malfunction, disconnect it and replace it with a new response button. The Patient Response Button is PN 2660100029575 and it can be ordered from the Carl Zeiss Meditec Parts Department.

Liquid Trial Lens Care

Check Liquid Trial Lens Using a Lens Analyzer

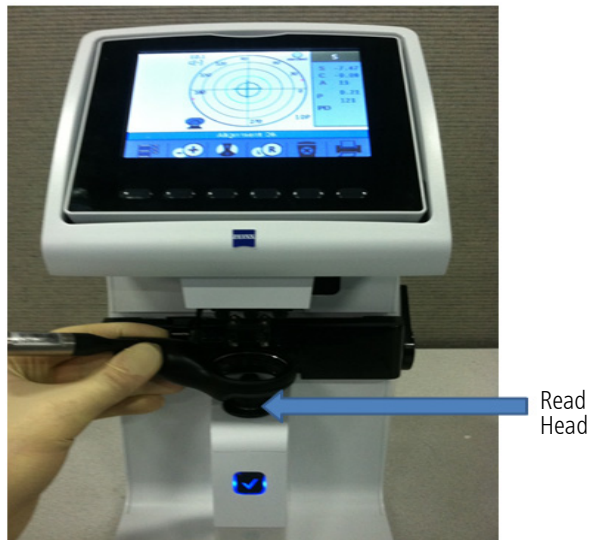
The Liquid Trial Lens calibration can be verified on a lensometer used to check spectacle lenses.



Note: The Liquid Trial Lens does not require periodic maintenance.

Use gloves during the procedure to avoid soiling the lens surface. Be careful not to touch the inside of the bowl with your hand or the lens holder.

1. Add a test patient to the HFA3 while in the PATIENT screen (see [Add New Patient](#) on page 3-2).
2. Set the Liquid Trial Lens to the desired spherical correction (see page 3-3 for how to enter distance prescription). The full range of the Liquid Trial Lens is -8.00 to $+8.00$ D.
3. Wait 5 seconds for the Liquid Trial Lens to position itself.
4. Remove the Liquid Trial Lens from the HFA3 (see page 3-3).
5. Holding the Liquid Trial Lens by hand, place the lens so that the surface nearest to the patient's eye during a perimetry test is in contact with the lensometer read head. Make sure that the lens surface is flat and in contact with the read head.



6. Center the lens following the lensometer protocol. Most lensometers will show a cross representing the lens center and a target. The lens center should be aligned to the center of the target.
7. If a cylinder is present, calculate the spherical equivalent power as $SEP = Sph + 0.5Cyl$.
8. The measured spherical equivalent power of the Liquid Trial Lens should be within ± 0.25 Diopters of the set value. The measured cylinder should be less than ± 0.25 Diopters from -5.00 to $+5.00$ Diopters and less than ± 0.375 Diopters outside of that range.

Cleaning the Liquid Trial Lens

Clean the lens with a soft cloth or tissue and one of the following cleaners: 70% isopropyl alcohol in water (rubbing alcohol), or mild glass cleaner containing no ammonia.

Accessories and Supplies List

Part Number (PN)	Description
2660021148110	Projection Lamp
2660021149222	Air Filter, Rear Fan
2660100014176	Anti-static Wipes (10)
2660021146660	HFA3 Dust Cover
2660100008025	Eye Patch
2660100029575	Patient Response Button
2660021150432	Liquid Trial Lens
2660021154571	Manual Trial Lens

Table 6.2



Note: Item part numbers and descriptions are subject to change.

To order parts, call ZEISS Customer Care at 1-800-341-6968. Outside the U.S., contact your local ZEISS distributor.

(7) Data Transfer from an HFA II or HFA II-i

This chapter describes how to move tests from an older Humphrey Field Analyzer model (either the HFA II or an HFA II-i) to an HFA3 in local database mode. You cannot transfer data from an HFA3 to an earlier model. Transfer data by using the instrument's network connection, a USB device, or by connecting a serial cable to the Data Transfer ports of two HFA instruments. Serial connections can be: HW COM port, COM-USB adapter or COM-Network adapter. The HFA3 is able to combine HFA II, HFA II-i and HFA3 data to create reports.




Note: Patient records can only be imported one at a time.

To transfer data from an HFA II or HFA II-i to the FORUM server see the Humphrey® HFA™ Connect Software Installation Instructions. Data on the server can then be accessed by an HFA3 in FORUM connected mode.

Set up a Data Transfer

To set up a data transfer from an HFA II or HFA II-i:

1. Go to Settings  > Advanced settings > HFA Data Transfer.
2. Follow the detailed instructions on the screen to set up a serial transfer between an HFA II or HFA II-i and an HFA3.
3. Select Next once the two instruments are connected.

4. In the next screen, choose On to add a patient ID number during data transfer. This feature is required for data import.



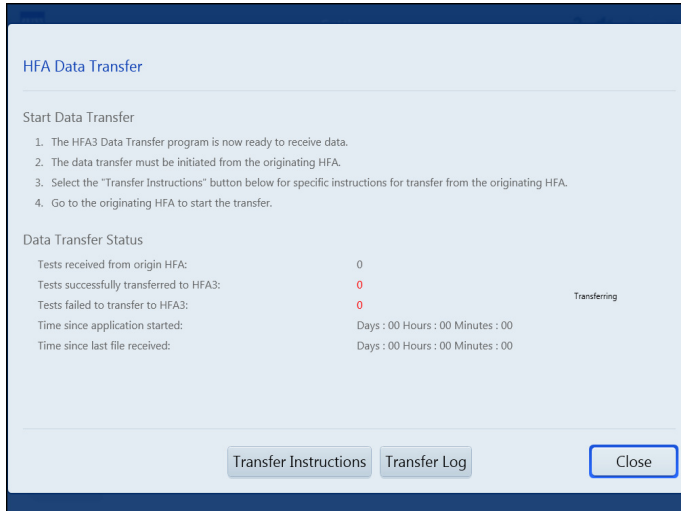
Note: A unique 29-character Patient ID will be automatically created for the patient from the patient's name and date of birth.

5. Select On or Off to add name splitting during data transfer. This feature is not required for data import.

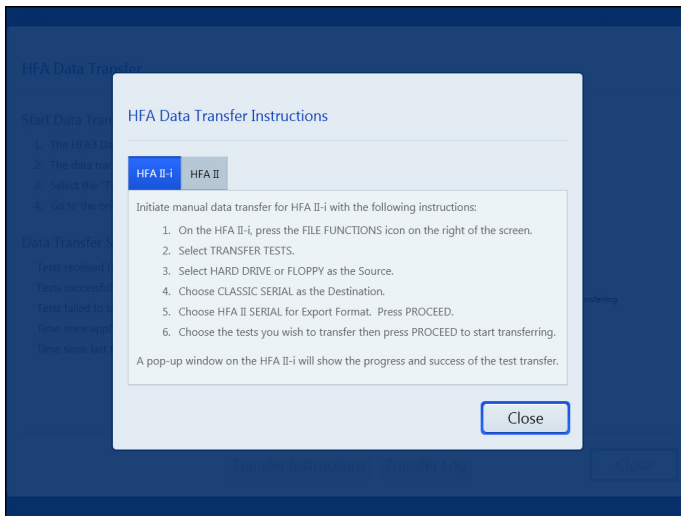


Note: HFA II and HFA II-i (software versions before 5.0) used one name field for patient records. To generate a report using patient data on the HFA3, you must change the patient record to include a separate first and last name. See [Name Splitting](#) on page 7-2.

6. Select Next to proceed to the next screen.



7. Follow the detailed instructions on the screen.
8. Select Transfer Instructions for specific instructions on initiating manual data transfer from an HFA II or HFA II-i.
9. Select Transfer Log to view a summary of the data transfer.
10. Select Close to close the screen.



11. Follow the detailed instructions on the HFA DATA TRANSFER INSTRUCTIONS screen.
12. Select Close to return to the previous screen to monitor the transfer process on the HFA3.

To consolidate patient data see [Merge Patients on the HFA3](#) on page 4-5.



Note: Reports generated on the HFA3 after importing kinetic data from an HFA II or HFA II-i may be different from reports generated on the HFA II or HFA II-i using the same data. These differences are due to retested points not being displayed on the HFA3.

Name Splitting

When patient records created in HFA II or HFA II-i (software versions before 5.0) are transferred to the HFA3, the entire patient name will appear in the Last Name field when the Name Splitting feature is off. To automatically split the name, turn on the Name Splitting feature during data transfer.

The preprogrammed rules for name splitting are:

1. Read from the end of the name to the first delimiter (comma, space, or caret character) and assign those characters to the **Last Name** field on the HFA3.
2. Continue reading from right to left and assign all remaining characters to the **First Name** field.
3. If no delimiter is found, all characters will be assigned to the **Last Name** field.
4. No information is added or removed in the process of Name Splitting.
5. In HFA software version 5.0 or higher, names will be split according to DICOM conventions.

(8) Specifications

HFA3 Instrument

Stimulus

- Maximum Intensity: 10,000 ASB
- Duration: 200 msec, 500 msec for Esterman tests, continuous for kinetic tests
- Wave Length: Broadband visible light

Visual Field Testing Distance

- 30 cm

Bowl Illumination

- 31.5 ASB


Maximum Temporal Range

- 90 degrees (°)

Dynamic Range

- 50 dB

Computer

- Operating System: Windows 7– 64 bit
- Intel® Core i7-610E
- Internal storage: 500 GB
- 6 external USB ports, Type A, USB 2.0 specification
- Ethernet Port (4KV isolated GbE)
- DisplayPort video output
- 12V  power outlet
- USB Keyboard & Mouse
- LCD Display with integrated touch screen

Physical

- Dimensions: 46 L x 52 W x 58 H (cm)
- Weight: 28.7 kg (63 lbs.)

Electrical Requirements

Electrical Rating

- 100–120V~, 50/60Hz, 4.0A
- 230V~, 50/60Hz, 1.8A

Environmental Conditions

Transport (Packaged)

- Temperature: –40 to +70°C
- Humidity: 10% to 95%
- Atmospheric Pressure: 500 to 1060 hPa
- Vibration, sinusoidal: 10 Hz to 500 Hz: 0,5 g
- Shock: 30 g, duration 6 ms
- Bump: 10g, duration 6 ms

Specifications

Storage (Unpacked)

- Temperature: –10 to +55°C
- Humidity: 10% to 95%
- Atmospheric Pressure: 700 to 1060 hPa

Operation

- Temperature: +10 to +40°C
- Relative Humidity: 30% to 90%, excluding condensation
- Atmospheric Pressure: 700 to 1060 hPa
- Altitude: Up to 3000 m above sea level
- Max. wet bulb: 78°F (26°C)



WARNING: If any part of the system is reconfigured or replaced or if any external devices are connected to the instrument, the operator must ensure that the complete system continues to comply with the requirements defined in IEC 60601-1.

(A) Test Patterns and Parameter Settings

This appendix describes Threshold and Suprathreshold test parameters and test patterns.

Threshold Test Patterns

Default pattern is shown in bold.

Test Pattern	Extent of Visual Field Tested / Number of Points Tested	Application
Central 30-2	30 degrees/76 point grid	Glaucoma, retinal, neurological, general
Central 24-2	24 degrees/54 point grid	Glaucoma, general, neurological
Central 10-2	10 degrees/68 point grid	Macula, retinal, neurological, advanced glaucoma
Peripheral 60-4	30 to 60 degrees/60 points	Retinal, glaucoma
Macula	5 degrees/16 points, 2 degrees spacing	Macula
Nasal Step	50 degrees/14 points	Glaucoma

Table A-1

Threshold Test Pattern Diagrams

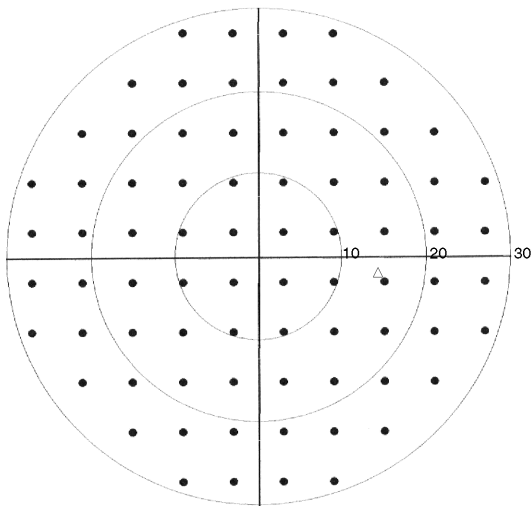


Figure A-1 Central 30-2 Test Pattern, Right Eye

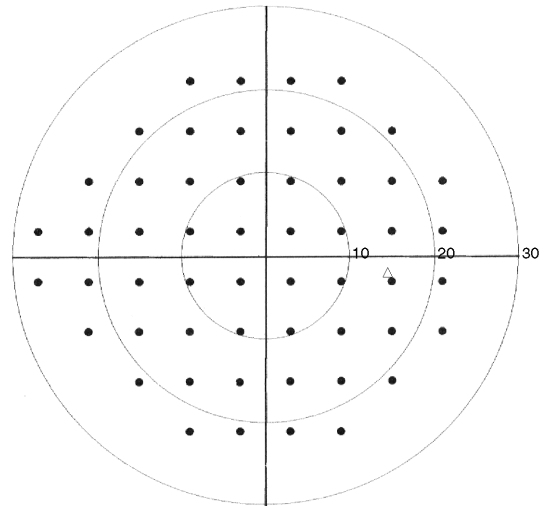


Figure A-2 Central 24-2 Test Pattern, Right Eye

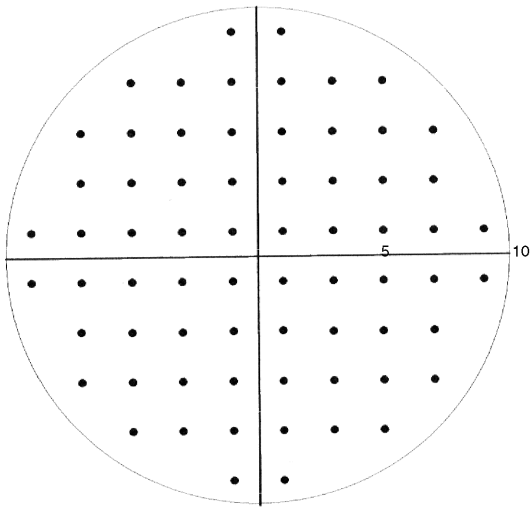


Figure A-3 Central 10-2 Test Pattern

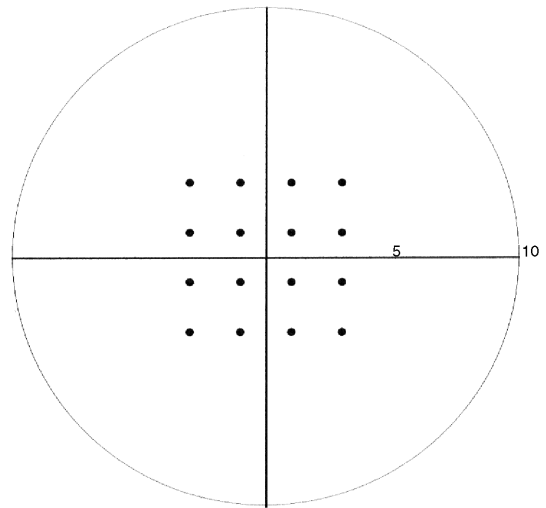


Figure A-4 Macula Test Pattern

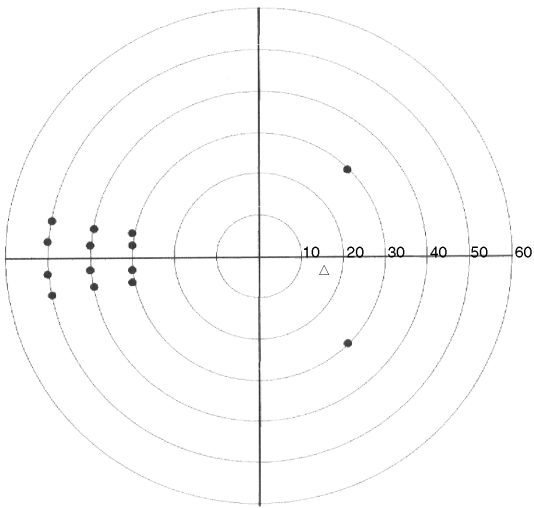


Figure A-5 Nasal Step Test Pattern, Right Eye

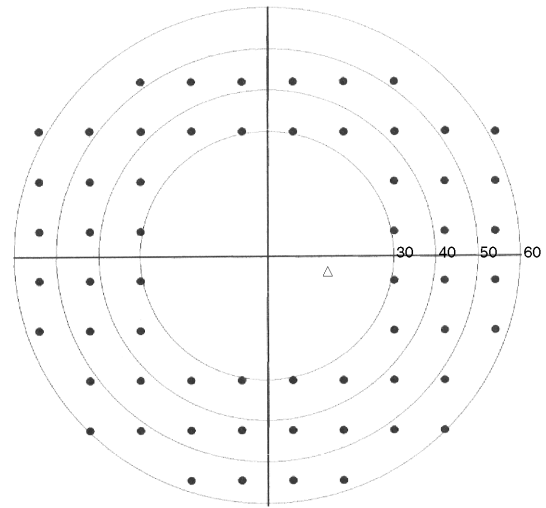


Figure A-6 Peripheral 60-4 Test Pattern, Right Eye

Suprathreshold Test Patterns

Default pattern is shown in bold.

Test Pattern	Extent of Visual Field Tested / Number of Points Tested	Application
Central 40 Point	30 degrees/40 points	General screening
Central 64 Point	30 degrees/64 points	General, glaucoma, neurological
Central 76 Point	30 degrees/76 points	General, glaucoma, neurological
Central 80 Point	30 degrees/ 80 points	General Screening
Armaly Central	30 degrees/84 points	Glaucoma
Nasal Step	50 degrees/14 points	Glaucoma
Peripheral 60 Point	30 to 60 degrees/60 points	General, neurological with central exam, retinal, glaucoma
Full Field 81 Point	55 degrees/81 points	General, retinal, glaucoma, neurological
Full Field 120 Point	55 degrees/120 points	General, retinal, glaucoma, neurological
Full Field 135 Point	87 degrees/135 points 87 degrees temporally	Full Field Screening
Full Field 246 Point	60 degrees/246 points	Full Field Screening
Armaly Full Field	50 degrees/98 points	Glaucoma
Superior 36 Point	60 degrees, superior hemifield/36 points	Superior Field Screening, Ptosis
Superior 64 Point	60 degrees, superior hemifield/64 points	Superior Field Screening, Ptosis
Esterman Monocular	75 degrees temporal 60 degrees nasal/100 points	Functional disability
Esterman Binocular	150 degrees bitemporal/ 120 points	Functional disability
Blindengeldgutachten	50 degrees/68 points	German Disability Test
Fuehrerscheingutachten	80 degrees temporal, 60 degrees nasal/105 points	German Drivers License Test

Table A-2

Suprathreshold Test Pattern Diagrams

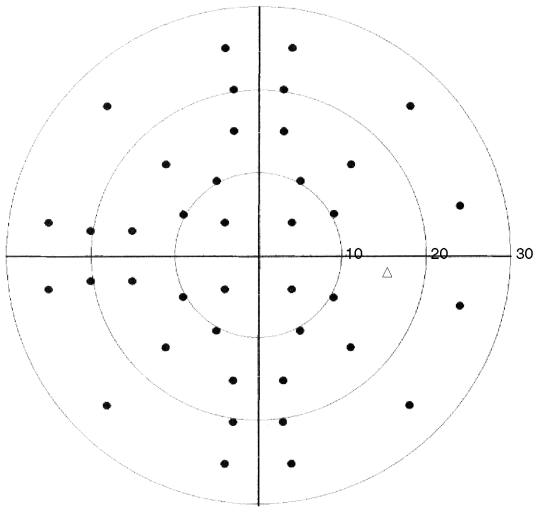


Figure A-7 Central 40-Point Test Pattern, Right Eye

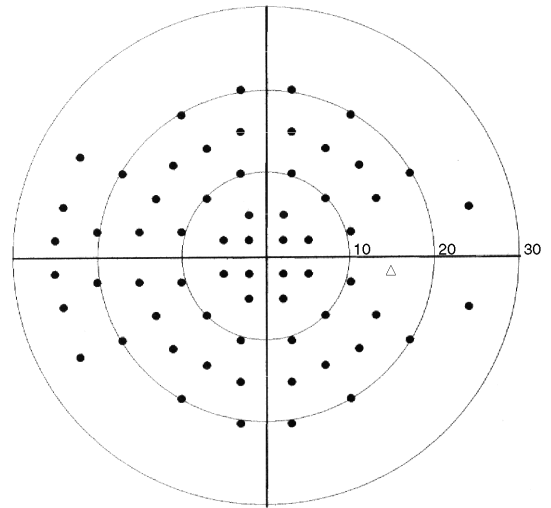


Figure A-8 Central 64-Point Test Pattern, Right Eye

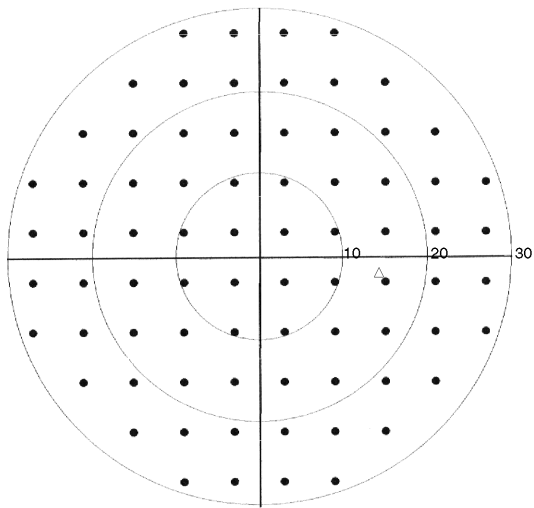


Figure A-9 Central 76-Point Test Pattern, Right Eye
(This is the same pattern as the 30-2 Threshold test)

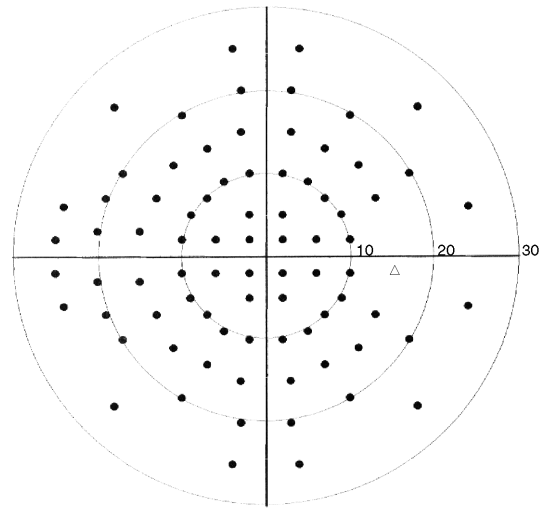


Figure A-10 Central 80-Point Test Pattern, Right Eye

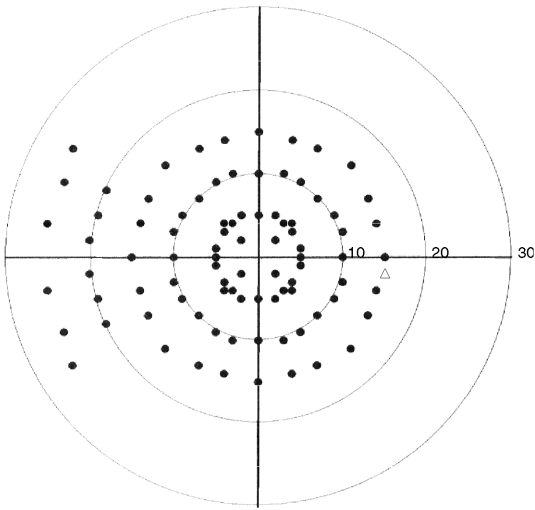


Figure A-11 Central Armaly Test Pattern, Right Eye

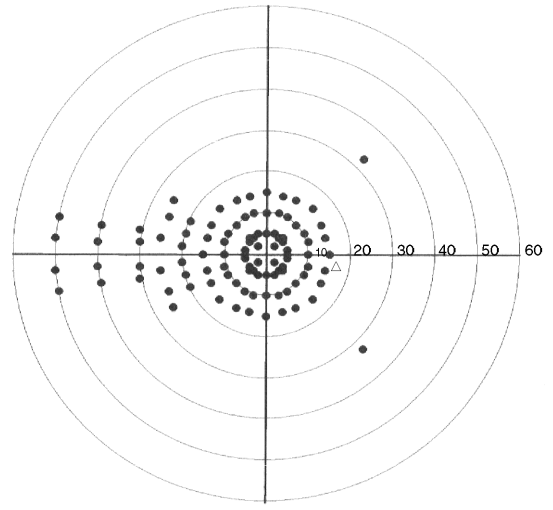


Figure A-12 Full Field Armaly Test Pattern, Right Eye

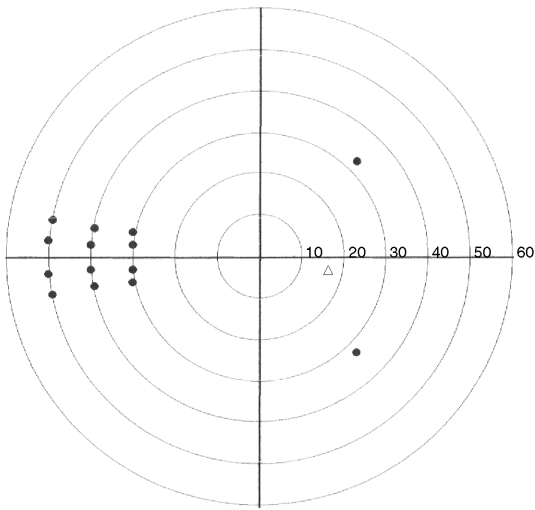


Figure A-13 Nasal Step Test Pattern, Right Eye

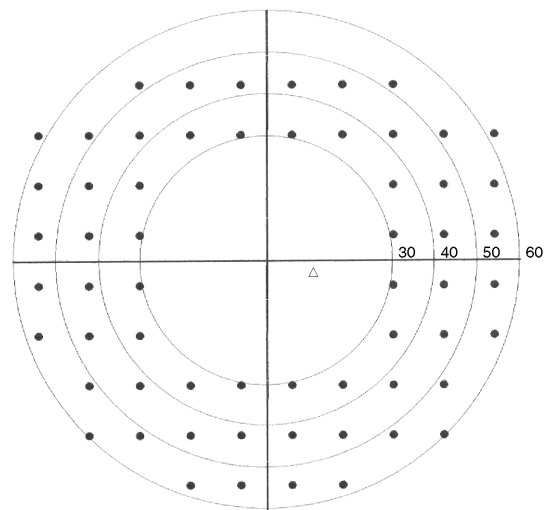


Figure A-14 Peripheral 60 Test Pattern, Right Eye

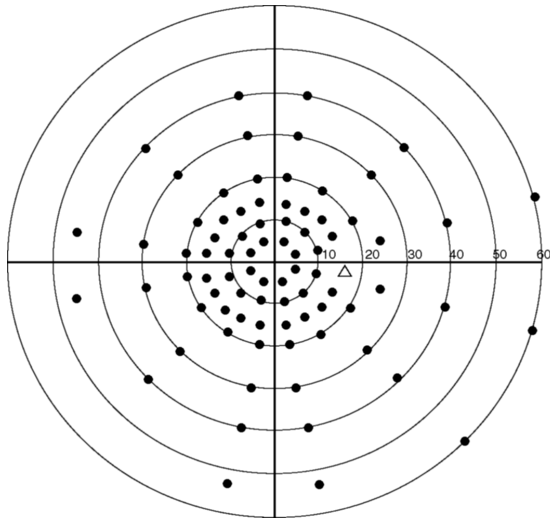


Figure A-15 Full Field 81 Test Pattern, Right Eye

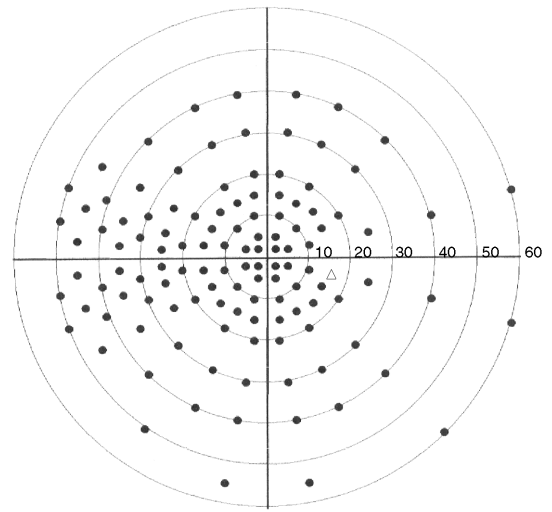


Figure A-16 Full Field 120 Test Pattern, Right Eye

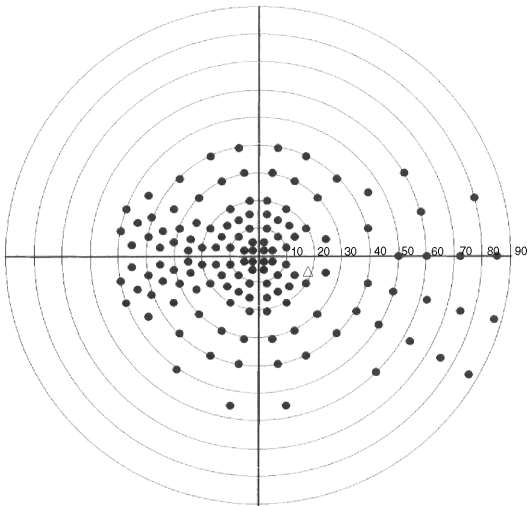


Figure A-17 Full Field 135 Test Pattern, Right Eye

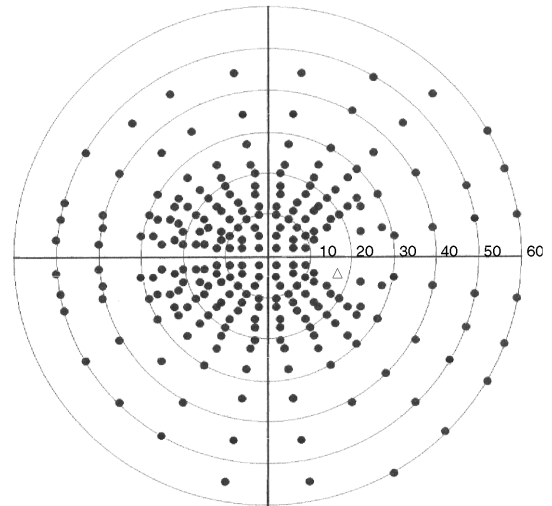


Figure A-18 Full Field 246 Test Pattern, Right Eye

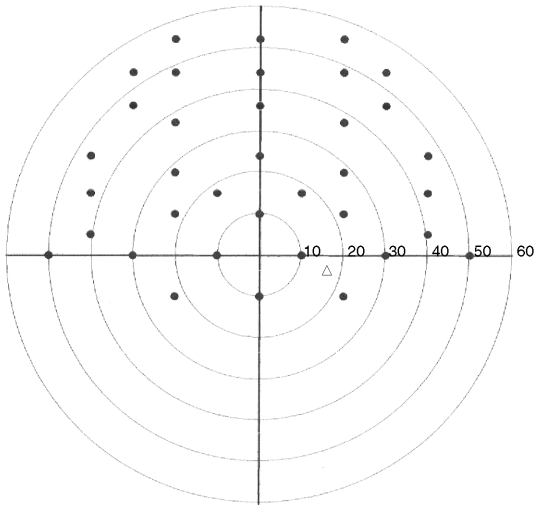


Figure A-19 Superior 36 Test Pattern, Right Eye

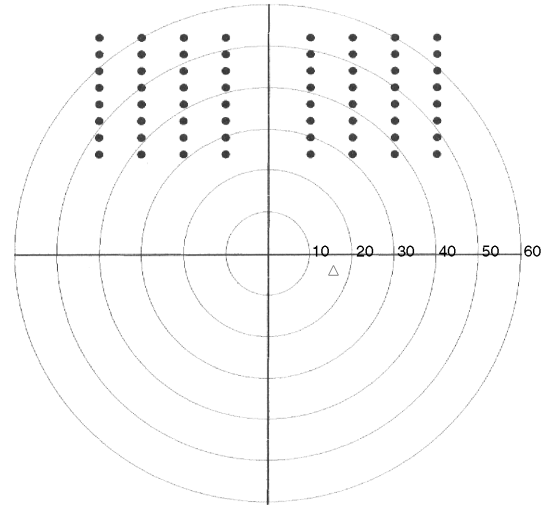


Figure A-20 Superior 64 Test Pattern, Right Eye

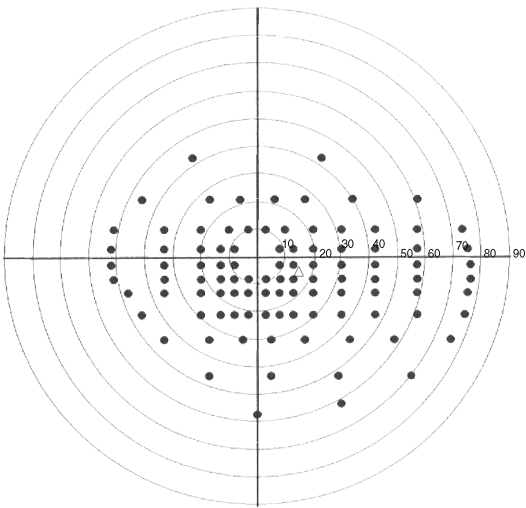


Figure A-21 Esterman Monocular Test Pattern, Right Eye

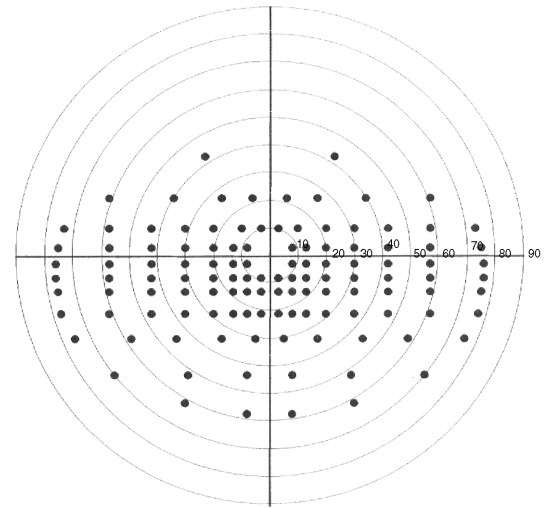


Figure A-22 Esterman Binocular Test Pattern

Test Parameters

Threshold Test Settings

The following table displays parameter settings available only when Static Threshold Testing is chosen. Default values are shown in bold.

Parameter	Parameter Settings	Description
Test Strategy	SITA-Faster	SITA Faster reduces test time approximately 30% faster than SITA Fast and 50% faster than SITA Standard for the same patient tests. It is available with the Central 24-2 pattern only.
	SITA-Fast	SITA-Fast cuts testing time in half relative to the FastPac testing strategy, and is available for use with the Central 30-2, Central 24-2, Central 10-2, and Peripheral 60-4 test patterns.
	SITA-Standard	SITA-Standard cuts testing time in half relative to the Full Threshold strategy, and is available for use with the Central 30-2, Central 24-2, Central 10-2, and Peripheral 60-4 test patterns.
	SITA-SWAP (Models 850 and 860)	This strategy uses SITA with Blue-Yellow testing (see page A-10). SITA-SWAP testing is only available for use with the Central 24-2 test pattern.
	Full Threshold	The test strategy used prior to the adoption of SITA. Use with all Threshold test patterns. In Full Threshold testing, an initial stimulus is presented at a level the patient is expected to see. If seen, the stimulus intensity is decreased in 4 dB steps (0.4 log units) until the patient no longer sees the stimulus; if not seen, it is increased in 4 dB steps until seen. The instrument then changes direction, moving in 2 dB steps until a change in patient response occurs. The last stimulus seen by the patient is recognized as the threshold for that point.
	FastPac	FastPac is similar to the Full Threshold strategy, but decreases test time by about 40%. Use with all Threshold test patterns. It follows a similar stair-stepping technique as in Full Threshold, but uses 3 dB increments instead of 4 dB and crosses the threshold only once.
Foveal Threshold (Models 840, 850, and 860)	Off	A threshold value for the fovea will not be measured.
	On	A threshold value for the fovea will be determined at the beginning of the test. The foveal threshold test presents stimuli inside the Small Diamond fixation target; the Small Diamond will automatically be illuminated.
Fluctuation	Off	Threshold values for preselected points will not be determined twice. Some points may be retested even if fluctuation is turned off.
	On	Threshold values for ten (10) preselected points are retested to determine the variability of the patient's responses. Threshold values for the retested points are printed on the numeric printout and appear in parentheses directly below the first test result. Fluctuation values which differ significantly from normal are flagged with appropriate "p" (probability) values. Available for Full Threshold and FastPac tests only.

Table A-3

Suprathreshold Test Settings

The following table displays parameter settings available only when Suprathreshold Testing is chosen. Default values are shown in bold.

Parameter	Parameter Settings	Description
Test Strategy	Two Zone	For each point in the test pattern, a stimulus is presented 6 dB brighter than the expected threshold. Since testing is done with an intensity 6 dB brighter than the expected threshold, Points Not Seen are known to be at least 6 dB deep. Use with all Suprathreshold test patterns. Esterman tests use only the Two Zone test strategy.
	Three Zone	Same as Two Zone, except each missed point is measured again at a maximum intensity of 10,000 apostilbs (0 dB) to determine if the defect is absolute. Use with all Suprathreshold test patterns except the Esterman tests.
	Quantify Defects	Same as Two Zone, except the sensitivity at each missed point is measured relative to the expected threshold. Use with all Suprathreshold test patterns except the Esterman tests.
Test Mode	Age Corrected	Vision is most acute at the fovea and decreases toward the periphery of the retina resulting in a hill of vision with the peak occurring at the fovea. A hill of vision is assigned to the patient based on the patient's age. Age Corrected mode is used only with Size III, White stimuli, and can be used with all Suprathreshold test patterns except the Esterman tests.
	Threshold Related	A hill of vision is assigned only after threshold values for 4 primary points are determined. Use with all Suprathreshold test patterns except the Esterman tests.
	Single Intensity	Available only with the Two Zone test strategy. Esterman tests use only the Single Intensity test mode. The HFA uses a default intensity level of 10 dB to test the entire visual field. The default can be changed except with the Esterman tests.

Table A-4

Test Patterns and Parameter Settings

Shared Settings

The following table displays parameter settings available for both Static Threshold and Suprathreshold testing. Default values are shown in bold.

Parameter	Parameter Settings	Description
Blue-Yellow/Short-Wave length Automated Perimetry or SWAP (Models 850 and 860)	Off/On	Blue-Yellow testing uses a blue stimulus presented on a yellow background.
Stimulus Color	White (all models)	White stimulus projected onto white bowl background. White is used only for the SITA-Standard, SITA-Fast, and Suprathreshold Age Corrected test strategies, as well as the Esterman test patterns.
	Red (Models 840, 850, and 860)	Red stimulus projected onto white bowl background.
	Blue (Models 850 and 860)	Blue stimulus projected onto white bowl background. Background is yellow, if Blue-Yellow is On.
Stimulus Size	I, II, III, IV, V	Five stimulus sizes (diameters) are available, ranging from Size I (smallest) to Size V (largest). SITA-Standard, SITA-Fast, and Suprathreshold Age Corrected test strategies, as well as the Esterman test patterns use only Size III. SITA-SWAP uses only Size V.
Fixation Monitoring	Gaze/Blind Spot	The Blind Spot and Gaze Tracking system are both activated.
	Gaze Tracking (Models 840, 850, and 860)	The Gaze Tracking system automatically measures gaze direction at the time of stimulus presentation.
	Blind Spot	The test program periodically presents a stimulus in the patient's blind spot. If the patient is fixating well, he or she should not see the blind spot check stimulus. The blind spot check stimulus always matches the test stimulus size.
	Off	Disables all fixation monitoring. The operator should monitor fixation with the video eye monitor.
Fixation Target	Central	Yellow light in the center of the bowl. This is the only option available for the Threshold Peripheral 60-4, and the Suprathreshold Esterman tests.
	Small Diamond	The Small Diamond is located below the Central target, and should be used when a patient cannot see the central fixation light (e.g. macular degeneration). The patient should look in the center of the diamond formed by the four lights.
	Large Diamond	The Large Diamond is located below the Central target and is useful for patients with central scotoma who cannot see either the Central fixation light or the Small Diamond.
	Bottom LED	Some tests have points in the superior visual field that require a lower fixation light than the central target. The target used is the Bottom LED of the Large Diamond. When testing with the Superior 64 or Superior 36 Suprathreshold tests, the Bottom LED is the default fixation target. It is illuminated automatically at the start of a test.
Test Speed	Normal	Two stimulus presentation speeds are available.
	Slow	The test speed may be changed while a test is in progress to allow the patient some additional time to respond.

Table A-5

(B) Determine the Trial Lens

If you are not using the automatic trial lens calculation refer to the following guidelines for selecting manual trial lenses.

Guidelines For Trial Lens Selection

1. Ignore cylinders of 0.25 D or less.
2. For cylinder errors of up to 1.75 D use the spherical equivalent. Use the full cylinder correction for cylinder errors of 1.75 D or more.
3. Refer to [Table B-1](#) for hyperopic or emmetropic patients, or [Table B-2](#) for myopic patients, to determine the power of the spherical trial lens needed.
4. Verify that the patient can see the fixation light clearly through the trial lens before beginning testing. Young myopes may need additional minus power if the target appears blurry to them, prior to beginning testing. Many 30–40 year olds may not need the full trial lens correction.

How to Calculate the Spherical Equivalent

The spherical equivalent is equal to half of the power of the cylinder (DC) correction. For example, the spherical equivalent of +1.00 DC is +0.50 D. The spherical equivalent of –0.50 DC is –0.25 D. Add the spherical equivalent of the cylinder power to the original spherical power to get the overall spherical equivalent.

Age	Hyperopic Distance R _x is Greater than Zero	Emmetropic Distance R _x is Zero (Plano)
Under 30	Distance R _x only	No correction
30 –39	(Dist. R _x) + (1.00 D) = trial lens	+1.00 D trial lens
40–44	(Dist. R _x) + (1.50 D) = trial lens	+1.50 D trial lens
45–49	(Dist. R _x) + (2.00 D) = trial lens	+2.00 D trial lens
50–54	(Dist. R _x) + (2.50 D) = trial lens	+2.50 D trial lens
55–59	(Dist. R _x) + (3.00 D) = trial lens	+3.00 D trial lens
60 & Over	(Dist. R _x) + (3.25 D) = trial lens	+3.25 D trial lens

Table B-1 Spherical Trial Lens Correction for Central Visual Field Testing of Hyperopic and Emmetropic Patients

Determine the Trial Lens

Age	Distance R _x is -0.50	Distance R _x is -1.00	Distance R _x is -1.50	Distance R _x is -2.00	Distance R _x is -2.50	Distance R _x is -3.00	Distance R _x is over -3.00
Under 30	No trial lens needed	No trial lens needed	No trial lens needed	No trial lens needed	No trial lens needed	No trial lens needed	(Dist. R _x) + (+3.25 D) for trial lens
30-39	+0.50 D	No trial lens needed	No trial lens needed	No trial lens needed	No trial lens needed	No trial lens needed	(Dist. R _x) + (+3.25 D) for trial lens
40-44	+1.00 D	+0.50 D	No trial lens needed	No trial lens needed	No trial lens needed	No trial lens needed	(Dist. R _x) + (+3.25 D) for trial lens
45-49	+1.50 D	+1.00 D	+0.50 D	No trial lens needed	No trial lens needed	No trial lens needed	(Dist. R _x) + (+3.25 D) for trial lens
50-54	+2.00 D	+1.50 D	+1.00 D	+0.50 D	No trial lens needed	No trial lens needed	(Dist. R _x) + (+3.25 D) for trial lens
55-59	+2.50 D	+2.00 D	+1.50 D	+1.00 D	+0.50 D	No trial lens needed	(Dist. R _x) + (+3.25 D) for trial lens
60 & Over	+2.75 D	+2.25 D	+1.75 D	+1.25 D	+0.75 D	No trial lens needed	(Dist. R _x) + (+3.25 D) for trial lens

Table B-2 Spherical Trial Lens Correction for Central Visual Field Testing of Myopic Patients



Note: If the patient is aphakic or needs a high refractive power such as +8.00 D, contact lenses may provide the best visual field testing conditions.

(C) Troubleshooting

In the case of malfunction, error messages or operational problems, call ZEISS Customer Care: In the U.S., call 800-341-6968. Outside the U.S., contact your local ZEISS distributor. Know the HFA3 model, serial number, and current software revision before calling Customer Service.

The HFA3 model and serial numbers are found on the rear panel of the instrument (Figure 2-2 on page 2-2). Software revision is located under **System Information** (see page 2-7). To provide a copy of the log files see **Maintenance** on page 2-14.

Record these numbers here for future reference:

Model Number: _____

Serial Number: _____

Error Alerts

Error messages will appear on the HFA3 in response to certain issues. Follow the directions stated in the alert text.

Alert Title	Alert Text
System Initialization Not Completed.	An unexpected error occurred during initialization. Reboot device, if problem persists service may be required.
	Instrument may need calibration. Reboot device, if problem persists service may be required.
	Bowl light is too high. Please dim room lights and retry.
	Aperture alignment check failed. Reboot device, if problem persists service may be required.
	Required projector lamp intensity could not be achieved. Power down device and replace projection lamp, if problem persists service may be required.
	Projector lamp unplugged. Power down device and ensure projector lamp connection is secure. If problem persists, service may be required.
	Shutter alignment check failed. Reboot device, if problem persists service may be required.
	Calibration data error. Reboot device, if problem persists service may be required.

Table C-1

Alert Title	Alert Text
Test Failed	System Encountered a Serious Error. Reboot device, if problem persists service may be required.
	Failed to Run Kinetic Test. You may retry the test and/or reboot device. If problem persists service may be required.
	Failed to Initialize Kinetic Test. You may retry the test and/or reboot device. If problem persists service may be required.
	Failed to Initialize Isopter. You may retry the test and/or reboot device. If problem persists service may be required.
	Failed to run a scan. You may retry the test and/or reboot device. If problem persists service may be required.
	Patient switch unplugged. Verify switch is properly connected and reboot device. If problem persists service may be required.
	Patient switch not functioning. Replace patient switch.
Test Initialization Failed	An error occurred while preparing for test. You may retry the test and/or reboot device. If problem persists service may be required.
	Ambient light is too high. Please dim room lights and retry.
TLC (Trial Lens Correction) Error	TLC is not fully inserted. Please remove and re-insert the TLC again.
	Manual TLC unspecified error. Please remove and re-insert the Manual TLC again.
	TLC is not functioning. Please remove the TLC and use a different trial lens holder.
	Auto TLC unspecified error. Please remove and re-insert the Auto TLC again.
	TLC unspecified error. Please remove and re-insert the TLC again.

Table C-1

Troubleshooting Table

Not all potential situations are listed in Table C-2, nor are all of the possible solutions.

Table C-2

Startup Difficulties	
HFA3 will not turn on.	<ul style="list-style-type: none"> • Check power cord connections to HFA3 and wall outlet. • Check power switch on optional power table.
HFA3 turns on but initial screen never appears.	<ul style="list-style-type: none"> • Call Customer Service and mention the error code.
Touch Screen	
Wrong button activated when pressed.	<ul style="list-style-type: none"> • Make sure finger is perpendicular to the touch screen.
Patient Response Button	
Does not beep when pressed.	<ul style="list-style-type: none"> • Check patient response button connection to HFA3. • Verify patient is properly pressing and releasing response button.
Time and Date	
Time/date display on screen is incorrect.	<ul style="list-style-type: none"> • Correct by changing time and date under General Settings on page 2-8.
Printer	
Does not print.	<ul style="list-style-type: none"> • No power to printer (no lights visible on front panel). <ul style="list-style-type: none"> - Check to ensure power cord is attached and check power switch. • No paper in printer.
No signal from HFA3.	<ul style="list-style-type: none"> • Check printer cable connection. • Check cable is correct and not damaged. • Check to ensure correct printer is selected under General Settings on page 2-8. • No printout selected to print. • Consult specific printer manuals.
Improper printout.	<ul style="list-style-type: none"> • Random characters or multiple pages printed. <ul style="list-style-type: none"> - Check to ensure correct printer is selected under General Settings on page 2-8.
System hangs during printer configuration.	<ul style="list-style-type: none"> • Invalid printer name or IP address entered. <ul style="list-style-type: none"> - Press the Esc button on the keyboard to exit the locked printer setup screen or restart the instrument. Enter a valid printer name and/or IP address. • Editing printer settings particularly if the printer has documents in the queue. <ul style="list-style-type: none"> - Restart the instrument. To edit a printer, create a new printer and use the IP address of the existing printer. You may then delete the old printer.
New printer cannot be set up.	<ul style="list-style-type: none"> • Occurs if you are using the same name as a deleted printer. Deleting a printer does not always delete the port it used. <ul style="list-style-type: none"> - Use another printer name or manually delete the port in Windows.
Report Problems	
No SFA report.	<ul style="list-style-type: none"> • Test pattern not eligible for STATPAC analysis. • One or more test parameters not valid for STATPAC.
Quad totals not shown.	<ul style="list-style-type: none"> • Available on Three in One printout only.
No SF or CPSD values on threshold report.	<ul style="list-style-type: none"> • SF and CPSD are not displayed when SITA test strategy is used. • Fluctuation was turned off for the test (CPSD is not calculated when fluctuation is off).
Glaucoma Hemifield Test (GHT) results not displayed.	<ul style="list-style-type: none"> • FastPac test strategy used (GHT not available with FastPac). • Test not eligible for STATPAC analysis.
Report does not include all eligible tests for a patient when printing Overview or GPA printout.	<ul style="list-style-type: none"> • Some test parameters not valid for STATPAC or GPA. • Patient name or date of birth incorrect on some tests. Correct patient data.
Inconsistent labeling on the SFA GPA report.	<ul style="list-style-type: none"> • Only occurs on 30-2 tests generated on the HFA3. If GPA analysis is based on prior 24-2 tests, pattern label for the Progression Analysis Probability Plot should be 24-2 but is displayed as 30-2.

Table C-2

Blind Spot Monitor	
Cannot change Blind Spot size.	<ul style="list-style-type: none"> • HFA3 uses same stimulus size for testing and Blind Spot check.
Cannot locate blind spot.	<ul style="list-style-type: none"> • Realign patient. • Verify that proper eye is being tested. • Check to make sure the patient's non-testing eye is occluded. • Make sure patient is fixating on fixation light. • Select Restart in the Gaze Initialization box to restart the test. • Turn off Blind Spot Monitoring.
Gaze Tracking	
Gaze Tracking will not initialize.	<ul style="list-style-type: none"> • HFA3 is Model 830. • Make sure that three distinct corneal reflections are visible when using no lenses or a manual trial lens. Two reflections should be visible with the Liquid Trial Lens. • Make sure that the center of the pupil is aligned with the monitor or the center of the lens and that the edges of the pupil are clearly visible. • Avoid spurious reflections near the pupil by adjusting patient alignment and/or trial lens. • High power trial lens being used may cause large corneal reflections. Try moving the lens away from the eye by 3mm. To avoid trial lens artifacts do not move too far back. • Droopy eyelid - ask patient to open eye wider during initialization. • Interfering eyelashes - ask patient to open eye wider during initialization. • Small pupils. • Excessive eye movement or blinking. • Excessively large or dilated pupils. • Dry eyes, cloudy media or dark iris. • Deep-set eyes.
Large Gaze Tracking errors or Not Detected marks.	<ul style="list-style-type: none"> • Gaze errors on the HFA3 graph look larger than those on older HFA models. • Patient not fixated properly at the central location during gaze initialization. • Eye position has drifted away from the original position. Realign the patient. • Make sure that three distinct corneal reflections are visible when using no lenses or a manual trial lens. Two reflections should be visible with the Liquid Trial Lens. • Make sure that the center of the pupil is aligned with the monitor or the center of the lens and that the edges of the pupil are clearly visible. • Avoid spurious reflections near the pupil by adjusting patient alignment and/or trial lens. • Droopy eyelid - ask patient to open eye wider. • Interfering eyelashes - ask patient to open eye wider. • Small pupils. • Excessive eye movement or blinking. • Excessively large or dilated pupils. • Dry eyes, cloudy media or dark iris. • Deep-set eyes.
Head Tracking	
Head Tracking does not work.	<ul style="list-style-type: none"> • HFA3 not Models 840, 850, or 860. • Head Tracking not turned on. • Trial lens holder not in up position. • Gaze Tracking was not initialized at the start of the test.
Head Tracking alarm activates too often.	<ul style="list-style-type: none"> • Patient's chin not moving with the chin rest - re-instruct patient. • Reset Head Tracking. • Turn off Head Tracking.
Vertex Monitoring	

Table C-2

Vertex Monitoring does not work.	
Vertex Monitoring does not work.	<ul style="list-style-type: none"> • HFA3 not Models 850 or 860. • Vertex Monitoring not turned on. • Trial lens holder not in up position. • Gaze Tracking was not initialized at the start of the test.
Vertex Monitoring alarm beep goes off too often.	
Vertex Monitoring alarm beep goes off too often.	<ul style="list-style-type: none"> • Patient moving away from trial lens - reposition patient. • Vertex Monitoring needs to be reset. • Turn off Vertex Monitoring.
Pupil Size	
Not being automatically displayed on printout or on screen.	<ul style="list-style-type: none"> • HFA3 not Models 840, 850, or 860. • Gaze Tracking was not initialized. • Auto pupil turned off.
Liquid Trial Lens	
Error messages occurring.	<ul style="list-style-type: none"> • Do not move the Liquid Trial Lens when it is being adjusted (icon flashing red). <ul style="list-style-type: none"> - To resolve error messages, lower then raise the lens. If errors persist, remove the Liquid Trial Lens holder completely and then reattach it.
External Keyboard	
Does not work.	<ul style="list-style-type: none"> • May not be compatible with HFA3. <ul style="list-style-type: none"> - Try another keyboard. • Not plugged in properly.
Trackpad, Trackball or Mouse	
Does not work.	<ul style="list-style-type: none"> • May not be compatible with HFA3. <ul style="list-style-type: none"> - Try a different trackball/mouse.
SWAP (Short-Wavelength Automated Perimetry)	
SITA-SWAP not available with Blue-Yellow switched to on.	<ul style="list-style-type: none"> • Wrong test pattern used. <ul style="list-style-type: none"> - Choose a 24-2 Threshold test, then turn Blue-Yellow on.
Grayscale looks very dark.	<ul style="list-style-type: none"> • May be normal for Blue-Yellow. The eye is less sensitive to the blue stimulus. <ul style="list-style-type: none"> - Gray scale is the same one used for White-on-White. - Use Total and Pattern Deviation plots for diagnosis. • Patient had difficult time recognizing when to respond. <ul style="list-style-type: none"> - Re-instruct the patient and repeat the test.
Blind spot monitor reports many Fixation Losses.	<ul style="list-style-type: none"> • Size V blind spot check size may be too easy to see at blind spot. <ul style="list-style-type: none"> - Consider using Gaze Track only and turn off Blind Spot.
Blue stimulus is on but bowl is not yellow.	<ul style="list-style-type: none"> • Blue stimulus color was chosen instead of Blue-Yellow parameter. <ul style="list-style-type: none"> - Blue Yellow parameter set to On will give yellow bowl and Blue Size V stimulus.
Illumination from yellow lamp at top of bowl annoying to patient.	<ul style="list-style-type: none"> • Visor not extended during testing procedure.
Testing Problems	
Test completes immediately after Start button is pressed.	<ul style="list-style-type: none"> • Simulation Mode is on. <ul style="list-style-type: none"> - Turn Simulation Mode off.
Full field test stops before complete.	<ul style="list-style-type: none"> • Trial lens holder in up position for peripheral portion of test. <ul style="list-style-type: none"> - Test peripheral field without a trial lens and put holder down.
Hard Disk Problems	
Message indicates hard disk failure.	<ul style="list-style-type: none"> • Call Customer Service and mention the error code.
Patient names exist in database without test data.	<ul style="list-style-type: none"> • Test results not saved with patient information. <ul style="list-style-type: none"> - Delete patient record.
USB Media Problems	

Table C-2

USB device does not show up on the HFA3, or a USB media error is indicated.	<ul style="list-style-type: none"> The USB device may be incompatible with the HFA.
Data Transfer Problems	
Transfer of files from HFA II/HFA II - i to HFA3 via serial cable does not work.	<ul style="list-style-type: none"> Check cable attachments. RS-232 port settings are incorrect.
Tests missing after data transfer.	<ul style="list-style-type: none"> Tests were ineligible to be transferred. See Set up a Data Transfer on page 7-1.
Data transfer to file server does not work.	<ul style="list-style-type: none"> Transfer fails due to network error. <ul style="list-style-type: none"> Re-establish the connection. Interrupted data transfer should restart. To print reports when disconnected from the file server, print reports directly from the instrument.
Routine Cleaning	
Air Intake Filter.	<ul style="list-style-type: none"> Clean every 3 months or when dirty.
Cleaning other components.	<ul style="list-style-type: none"> See Chapter (6), "Maintenance".

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FORUM, FORUM Glaucoma Workplace



Carl Zeiss Meditec AG
Goeschwitzer Strasse 51-52
07745 Jena
Germany
Phone: +49 36 41 22 03 33
Fax: +49 36 41 22 01 12
info.meditec@zeiss.com
www.zeiss.com/med



Humphrey Field Analyzer 3 (HFA3)



Carl Zeiss Meditec, Inc.
5160 Hacienda Drive
Dublin, CA 94568
USA
Toll Free: 1 800 341 6968
Phone: +1 925 557 4100
Fax: +1 925 557 4101
info.meditec.us@zeiss.com
www.zeiss.com/med

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