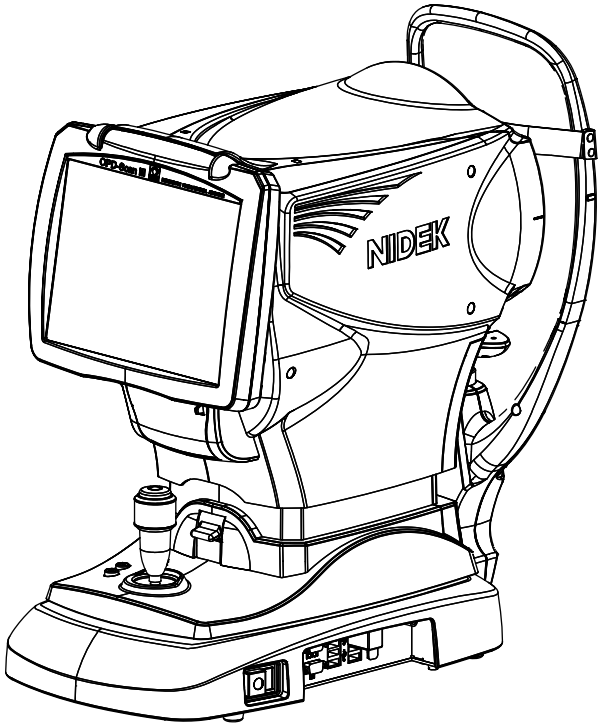
NIDEK

REFRACTIVE POWER / CORNEAL ANALYZER

OPD-Scan III VS

OPERATOR'S MANUAL



Be sure to read the SOFTWARE LICENSE AGREEMENT (page Ⅰ) before using this product.

Original instructions

NIDEK CO., LTD.

NIDEK CO., LTD. **(Manufacturer)**	: 34-14 Maehama, Hiroishi-cho, Gamagori, Aichi 443-0038, JAPAN Telephone: +81-533-67-6611 URL: https://www.nidek.com/
NIDEK INC. **(United States Agent)**	: 2040 Corporate Court, San Jose, CA 95131, U.S.A. Telephone: +1-800-223-9044 (USA Only) URL: https://usa.nidek.com/
NIDEK S.A. **(EU Authorized Representative)**	: Ecoparc, rue Benjamin Franklin, 94370 Sucy En Brie, FRANCE

CE
0344

2023-03-31
32186-P972-B0
Printed in Japan

IMPORTANT - READ CAREFULLY

THIS AGREEMENT APPLIES TO THE NIDEK SOFTWARE AND ACCOMPANYING DOCUMENTS. PLEASE READ THIS AGREEMENT CAREFULLY AND THOROUGHLY BEFORE USING SOFTWARE.

SOFTWARE LICENSE AGREEMENT

This SOFTWARE LICENSE AGREEMENT (this "Agreement") is an agreement between you, whether person or legal entity, and NIDEK CO., LTD., a Japanese corporation, ("NIDEK") for software (including but not limited to software linked dynamically or statically with other software) supplied by NIDEK or its designee pursuant to this Agreement, whether software alone or embedded software in a NIDEK hardware product, whether on disk or in read only memory, or on other media, or through an authorized website or network, and any accompanying documents or materials (including, but not limited to, operation manuals and electronic documents for such software, and other software for displaying or saving the data acquired from or through other NIDEK hardware product) (collectively, the "Software").

The Software and NIDEK hardware product (collectively, "NIDEK product") may include a third party's software which is linked, whether dynamically or statically, with the Software (the "Third-Party-Software"). The Third-Party-Software shall not be included in the definition of the "Software" in this Agreement. The rights and title of the Third-Party-Software belong to the third party, and the terms of use of the Third-Party-Software are set forth separately from this Agreement. The terms in this Agreement will not apply to the use of the Third-Party-Software except as expressly stipulated herein.

By using or installing the Software, you agree to be bound to the terms and conditions of this Agreement. If you do not agree with this Agreement, please do not use or install the Software and return the Software to the company from which you obtained the Software.

1. GRANT OF LICENSE

1.1. Subject to the terms and conditions set forth in this Agreement, NIDEK grants to you, and you accept, a limited, non-transferable and non-exclusive license to use the Software.

1.2. Unless otherwise agreed in writing by NIDEK or its designee, the license is limited to using the Software on a single computer or a single NIDEK hardware product and if you replace such computer or NIDEK hardware product, you may not use the Software without a new license of the Software.

1.3. Notwithstanding the provision of 1.2, if you connect a single server computer with the Software installed to a plurality of client computers, you may use the Software on such client computers; provided, however, that the upper limit of the number of said client computers will be determined by NIDEK in writing separately and individually from this Agreement.

1.4. Notwithstanding the provision of 1.2, if NIDEK permits you to install the Software on a plurality of computers using one license key of the Software, you may install and use the Software on such computers up to the upper limit of the number determined by NIDEK in writing separately and individually from this Agreement.

1.5. The Software is only to be used for its intended purpose provided in the specifications, operation manual or related documents in accordance with applicable laws and regulations. If the Software is embedded software in a NIDEK hardware product, you will use such Software only as embedded software for the use of such NIDEK hardware product.

1.6. For the license of the Software granted in this Agreement, unless the license is granted by NIDEK or its designee explicitly free of charge, you will pay to NIDEK or its designee the price for the Software, or if the Software is embedded software in a NIDEK hardware product, the price for the NIDEK hardware product in which the Software is embedded.

2. INTELLECTUAL PROPERTY RIGHTS

2.1. NIDEK, or an owner of the Third-Party-Software, retains any and all legal rights, title and interests in and to the Software or the Third-Party-Software. Any and all rights under copyright law, patent law, design law and other intellectual property laws not expressly granted herein are reserved by NIDEK or the owner of the Third-Party-Software. The license granted herein will not be intended as, or construed to be, any assignment of the rights of NIDEK or the owner of the Third-Party-Software. The Software and the Third-Party-Software are protected by copyright and other intellectual property laws and international treaties.

3. LIMITATIONS

3.1. You may not use the Software for any products without a license of the Software.

3.2. Unless otherwise permitted and other than the part specified by NIDEK in operation manuals or any accompanying documents for the Software, you may not analyze, reverse-engineer, decompile, disassemble or otherwise attempt to discover the source code of the Software.

3.3. You may not alter, reproduce, modify, translate, adapt, or divert the Software.

3.4. You may not remove, delete or change the copyright notice or other legends of the Software.

3.5. You may not sell, distribute, rent, license, sublicense, lease, assign or otherwise transfer the Software to third parties, or operate the Software for the benefit of third parties without prior written consent of NIDEK.

3.6. You may not create derivative works or cause or permit others to create derivative works based upon the Software without prior written consent of NIDEK.

3.7. You may not disclose operation manuals for the Software to any third party without prior written consent of NIDEK; provided, however, for the avoidance of doubt, the "third party" in this section will not include doctors, examiners, nurses, employees, patients and other persons who need to know the Software.

3.8. You may not use NIDEK’s trademarks or trade names without prior written consent of NIDEK.

4. CONDITIONS OF USE

4.1. You shall take necessary measures (including but not limited to antivirus software) to prevent failure of NIDEK product due to external factors; provided, however, that in the case where it is otherwise provided in the provisions of operation manuals for NIDEK product or other documents, you shall take such necessary measures to the extent not inconsistent with such provisions.

4.2. If you enter data into NIDEK product or obtain data by the use of NIDEK product, you shall obtain and save backup of such data.

5. EXPORT RESTRICTIONS

5.1. If you export or re-export, directly or indirectly, the Software, you must comply with applicable export laws and regulations of Japan and other countries, and obtain any licenses or approvals required by governmental authorities.

6. UPDATES

6.1. The Software and/or the Third-Party-Software may be, at NIDEK's own discretion, changed, updated or modified from time to time without any prior notice to you. If such changes, updates, and modifications are applied to the Software licensed to you under this Agreement, such changes, updates, and modifications will be deemed a constituent part of the Software, and the terms and conditions of this Agreement will apply to such changes, updates, and modifications.

6.2. NIDEK may, at its own discretion, make amendments to any provisions of this Agreement (the "Amendments"), if NIDEK deems that:

a) such Amendments are appropriate in terms of interests for customers of this Software; or

b) such Amendments are commercially reasonable and not contrary to the objective of this Agreement, even if such Amendments are disadvantageous to you.

Prior to the amendments, NIDEK will notify you of the terms and the effective date of such Amendments on the website or by any other means.

6.3. If you use the Software after the effective date of such Amendments, you shall be deemed to have agreed to such Amendments.

7. TERMINATION

7.1. This Agreement is effective until terminated. If you breach any term or condition of this Agreement, NIDEK may, without giving any prior notice to you, terminate this Agreement with immediate effect. Upon termination of this Agreement due to the breach of this Agreement, NIDEK reserves all the rights to claim damages resulting from such breach.

7.2. If this Agreement is terminated in accordance with the provision of 7.1., you must immediately cease the use of the Software, and delete, destroy and erase all the Software. Any fees paid by you for the license of the Software will not be refund for any reasons.

8. NO WARRANTIES

8.1. NIDEK MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, CONCERNING THE SOFTWARE AND THE THIRD-PARTY-SOFTWARE, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NON-INFRINGEMENT OF THIRD PARTY RIGHTS, INCLUDING, WITHOUT LIMITATION, THIRD PARTY INTELLECTUAL PROPERTY RIGHTS, ACCURACY, RELIABILITY OR AVAILABILITY, ABSENCE OF OR RECOVERY FROM ANY INTERRUPTION, ERROR-FREE OPERATION OR CORRECTION OF DEFECTS OR MALFUNCTIONS.

9. LIMITATION OF LIABILITY

9.1. EXCEPT OTHERWISE EXPRESSLY STIPULATED IN THIS AGREEMENT, IN NO EVENT WILL NIDEK BE LIABLE FOR ANY INCIDENTAL, INDIRECT, SPECIAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES, LOSS, CLAIMS OR COSTS WHATSOEVER, INCLUDING, WITHOUT LIMITATION, ANY LOST DATA, PROFITS, REVENUES, BUSINESS OPPORTUNITIES OR INFORMATION, LOSS OF USE OF ANY PRODUCT, PROPERTY OR EQUIPMENT, DOWNTIME COST , COST OF PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES, OR ANY CLAIMS BY A THIRD PARTY, ARISING OUT OF OR RELATED TO THE USE OR INABILITY TO USE THE SOFTWWARE AND/OR THE THIRD-PARTY-SOFTWARE, CHANGES, UPDATES OR MODIFICATIONS OF THE SOFTWARE AND/OR THE THIRD-PARTY-SOFTWARE, OR MAINTENANCE OR REPAIR SERVICE OF THE SOFTWARE IF ANY (collectively, the "DAMAGES"). THE ABOVE LIMITATIONS WILL APPLY REGARDLESS OF THE FORM OF ACTION, WHETHER IN CONTRACT, TORT, STRICT PRODUCT LIABILITY, OR OTHERWISE, EVEN IF NIDEK IS NOTIFIED OF THE POSSIBILITY OF SUCH DAMAGES.

9.2. THE LIMITATIONS PROVIDED IN THE PROVISION OF 9.1. SHALL NOT APPLY IN THE CASE WHERE THE DAMAGES ARE ATTRIBUTABLE TO NIDEK OR NIDEK IS LIABLE FOR SUCH DAMAGES IN ACCORDANCE WITH THE LAWS. EVEN IN SUCH CASE, NIDEK SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INDIRECT, INCIDENTAL, PUNITIVE OR SPECIAL LOSS OR DAMAGE. NIDEK'S TOTAL AGGREGATE LIABILITY FOR THE DAMAGES SHALL NOT EXCEED AN AMOUNT ACTUALLY PAID BY YOU FOR PURCHASE OF NIDEK PRODUCT; PROVIDED, HOWEVER, THAT THE LIMITATION OF THE AMOUNT SHALL NOT APPLY IN THE CASE WHERE THE APPLICABLE LAW PROHOBITS SUCH LIMITATION OR THE DAMAGES ARISING FROM NIDEK'S GROSS NEGLIGENCE OR WILLFUL MISCONDUCT.

10. GOVERNING LAW AND ARBITRATION

10.1. This Agreement will be governed by and construed in accordance with the laws of Japan.

10.2. All disputes arising between you and NIDEK relating to this Agreement or the interpretation or performance thereof will be finally settled by binding arbitration in Tokyo in accordance with the Commercial Arbitration Rules of The Japan Commercial Arbitration Association. Judgment upon the award rendered by arbitration will be final and may be entered in any court having jurisdiction thereof.

11. SEVERABILITY

11.1. If any provision or any portion of any provision of this Agreement will be held to be invalid or unenforceable, that provision will be severed from this Agreement and such invalidity or unenforceability will not affect the remaining provisions of this Agreement. The remaining provisions of this Agreement will continue in full force and effect.

12. SURVIVAL

12.1. The provisions of 2, 3, 5, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 19 and this provision will survive the termination of this Agreement and will be binding after the termination of the Agreement.

13. ASSIGNMENT

13.1. This Agreement or any part of this Agreement may not be assigned or transferred without prior written consent of NIDEK. The permitted assignee or transferee must agree to all the terms and conditions of this Agreement prior to the assignment or transfer.

13.2. This Agreement will be binding upon the permitted assignee or transferee and be enforceable by NIDEK.

14. ENTIRE AGREEMENT

14.1. This Agreement constitutes the entire agreement between you and NIDEK concerning the Software, and supersedes any prior written or oral agreement between you and NIDEK. No modification of this Agreement will be binding unless otherwise agreed in writing.

15. NO WAIVER

15.1. The failure of NIDEK to enforce at any time or for any period the provisions hereof in accordance with its terms will not be construed to be a waiver of such provisions or of the rights thereafter to enforce each and every provision.

16. NO THIRD PARTY RIGHTS

16.1. This Agreement is intended to be solely for the benefit of you and NIDEK and is not intended to confer any benefits upon or create any rights in favor of any person other than you and NIDEK.

17. HEADINGS

17.1. All headings are for convenience only and will not affect the meaning of any provision of this Agreement.

18. LANGUAGE

18.1. The license agreement for the Software may be provided in multiple languages. In such event, unless otherwise agreed in writing, the following shall apply:

a) If you use the Software in any countries outside Japan, the license agreement for the Software shall be executed and delivered in a text using the English language. The text using the English language shall prevail and control; and

b) If you use the Software in Japan, the license agreement for the Software shall be executed and delivered in a text using Japanese language. The text using the Japanese language shall prevail and control.

19. APPLICATION OF SOFTWARE LICENSE AGREEMENT

19.1. If the terms and conditions of the "Software License Agreement" included in operations manuals for NIDEK product are inconsistent with the terms and conditions of the "Software License Agreement" displayed on NIDEK product, the terms and conditions of the "Software License Agreement" included in operations manuals for NIDEK product prevail.

MICROSOFT SOFTWARE LICENSE TERMS for Microsoft embedded software

Microsoft OS (Windows 10 IoT Enterprise LTSC 2019 64bit) is embedded in this device. Read the Microsoft software license terms before using the device at our web-site shown below.

http://www.nidek-intl.com/aboutus/entry-3001.html/

Use this device properly and safely.

⚠ **BEFORE USE, READ THIS MANUAL.**

This operator's manual includes operating procedures, safety precautions, and specifications for the NIDEK REFRACTIVE POWER / CORNEAL ANALYZER, OPD-Scan III.

Cautions for safety and operating procedures must be thoroughly understood before using this device.
Keep this manual handy for reference.

The device complies with ISO 10342 subclause 4: 2010 (Ophthalmic instruments - Eye Refractometers) and ISO 10343 subclause 4: 2009 (Ophthalmic instruments - Ophthalmometers). The dioptric powers are indicated with reference wavelength λd = 587.56 nm.

There are no parts within the device that requires replacement by the user other than printer paper.

If you encounter any problems or have questions about the device, please contact NIDEK or your authorized distributor.

Safety precautions

In this manual, signal words are used to designate the degree or level of safety alerting. The definitions are as follows.

⚠ **WARNING** • Indicates a potentially hazardous situation which, if not avoided, may result in death or serious injury.

⚠ **CAUTION** • Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damage accident.

Even situations indicated by CAUTION ⚠ may result in serious injury under certain conditions. Safety precautions must be strictly followed at all times

Usage precautions

Before use

⚠ WARNING

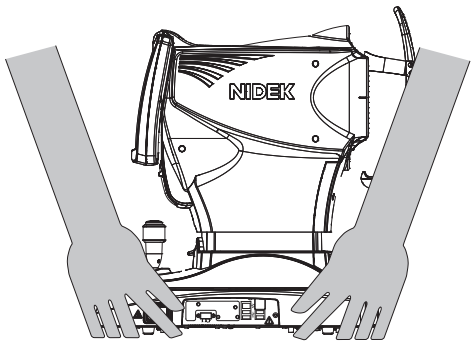
- **If any serious device-related incident occurs, report it to NIDEK and the competent authority in the country where the user or patient, or both reside.**
- **Be sure to use a grounded power outlet.**
  Electric shock or fire may result in the event of malfunction or power leakage.

⚠ CAUTION

- **Do not use the device for other than the intended purpose. This medical device should be used by licensed health professionals.**
  NIDEK does not assume any responsibility for accidents or malfunctions caused by misuse.
- **The safety precautions and operating procedures must be thoroughly understood prior to operation of the device. Never use accessories other than those specified by NIDEK.**
  Use of the device outside the scope may cause adverse events and adverse device effects.
- **Never modify or touch the internal structure of the device.**
  Electric shock or malfunction may result.
- **Install the device in an environment that meets the conditions listed below.**
  The following conditions must be maintained during use.
  Ambient temperature: 10 to 35ºC (50 to 95ºF)
  Humidity: 30 to 90% (Non-condensing)
  Atmospheric pressure: 800 to 1,060 hPa
  No harmful dust or smoke
  No exposure to water
  No exposure to interference light
  Level and stable surface free from vibration and shock
  If the device is not installed and used under the above conditions, the reliability of measurement results is lowered, and malfunction may result. In addition, injury may result if the device is bumped or topples over.
- **Install the device in an environment where no contaminants such as corrosive gas, acid, or salt particles are present.**
  Corrosion or malfunction of the device may occur.
- **Avoid installing the device where it is exposed to direct air flow from an air conditioner.**
  Changes in temperature may result in condensation or adversely affect functions of the device.
- **Avoid installing the device where sunlight or intense light directly strikes upon the measuring window.**
  Intense light entering the measuring window may result in inaccurate measurements.

⚠ CAUTION

- **Insert the power plug fully into the power outlet.**
  Imperfect connection may result in fire.
- **Never use power strips or extension cables for the power supply of the device.**
  The electrical safety may be lowered.
- **Do not use any power cord other than the one provided. Do not use the provided power cord for any other instrument.**
  Malfunction or fire may result.
- **Install the device in an area where the outlet that the mains plug is inserted into is easily accessible during use. In addition, ensure that the power cord can be disconnected without the use of a tool.**
  Otherwise, it may interfere with disconnecting of the power from the input power source in case of abnormality.
- **Never crush or pinch the power cord with heavy objects.**
  It may be damaged, resulting in electric shock or fire.
- **Before connecting any cables to the device, be sure to turn off power to the device and unplug the power cord.**
  Malfunction may result.
- **When carrying the device to another location, its base should be held by two hands from both sides by two persons as indicated by (A) and (B) in the figure shown to the right.**
  Never hold any parts other than the base such as the forehead rest, main body, or measuring unit.
  If the device is carried by only one person or any parts other than the base are held, the device may fall and injury or malfunction may result.



- **Keep the LCD touch-screen away from direct sunlight or excessive ultraviolet rays.**
  They will damage the LCD touch-screen.

During use

⚠ **CAUTION**

- **Perform visual and operational checks before using the device. Do not use the device if any abnormality is found.**
  Continued use under abnormal condition will not produce the expected results and may cause troubles or lead to inappropriate diagnoses that may induce health hazards.
- **After confirming that each cable is correctly and securely connected, use the device.**
- **Be sure not to touch the patient's face during alignment or when switching the right and left of the patient's eye.**
- **Before and after use of the device, and before measuring each patient, clean the chinrest and forehead rest with clean gauze or absorbent cotton. If necessary, dampen a cloth with rubbing alcohol and gently wipe them off.**
  If the chinrest paper is used, remove a sheet after each patient.
  For severe stains, wipe with a clean cloth dampened with rubbing alcohol instead of wiping them repeatedly with a dry cloth.
- **Do not perform servicing or maintenance on the device during use.**
- **Take care not to catch hands or fingers in moving parts (such as the measuring unit, main body, or chinrest). Pay particular attention to the measuring unit as it moves in each direction during auto alignment. Be sure to also give this caution to patients.**
  Hands or fingers may be pinched resulting in injury.
- **Keep the measuring window free of fingerprints and dust. Confirm that the measuring window is clean before use.**
  The measurement accuracy may decrease substantially.
- **In the event of smoke or strange odors, immediately turn off the device and disconnect the power plug from the outlet. After you are sure that the smoke has stopped, then contact NIDEK or your authorized distributor.**
  Continued use under abnormal condition may result in electric shock or fire. In case of fire, use a dry chemical (ABC) extinguisher to extinguish the fire.
- **Before measurement, explain the measurement purpose and method sufficiently to the patients.**
- **When moving the chinrest during measurement, let the patient know before moving it.**
- **Instruct the patient to fix on the fixation light with their eyes wide open. Start the measurement after confirming that the instruction is properly followed by the patient.**
  Proper measurement may not be performed.

⚠ **CAUTION**

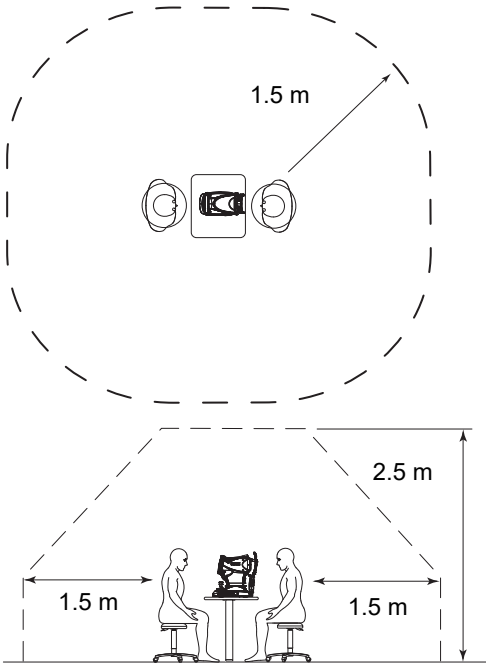
- **Immediately replace the power cord if the internal wires are exposed, the power turns on or off when the power cord is moved, or the cord or plug is too hot.**
  Failure to do so may result in electric shock or fire.
  Should the device fail, disconnect the power cord from the power outlet and contact NIDEK or your authorized distributor without touching the interior of the device.
- **Never touch the LCD monitor with wet hands.**
  Water may leak into the interior of the device resulting in malfunction.
- **There may be a few bright or dark dead pixels on the LCD monitor which are a characteristic of the LCD monitor manufacturing process. This does not represent a failure of the LCD monitor, and the monitor can be used without any problem.**
- **When turning off the device, be sure to follow the instructions in"2.2.3 Shut down" (page 42) instead of turning off the power switch.**
  Turning off the power switch before Windows is shut down may result in a loss of data or a malfunction.
- **While the pointer ( ) is displayed as an hourglass ( ), do not perform any operation through the LCD touch-screen.**
  A malfunction may result or the system may lock up.
- **Operators are responsible for managing their data.**
  NIDEK does not assume any responsibility for any loss of data.
- **Be sure to back up measurement data on removal storage drives such as a removal hard disk drive or USB flash drive.**
  In case of the corruption of the built-in SSD (Flash Solid State Drive), saved data will never be usable again.
- **Never touch the LCD touch-screen with any object other than your finger or the touch pen.**
  Touching the LCD-touch screen with any hard pointed object such as a ball-point pen may scratch the touch screen. Never touch the LCD touch-screen with the touch pen strongly. The tip of the touch pen is made of resin chip that may damage the touch screen if it is pressed strongly against the screen.
- **Never press two or more points on the LCD touch-screen at the same time.**
  A malfunction may result.
- **Do not install Windows application software other than the OPD-Scan III software.**
  Installing any other Windows application software may lead to abnormal operation of the OPD-Scan III and loss of stored data.
  In addition, the warranty may not cover the OPD-Scan III if Windows application software other than the OPD-Scan III software is installed.
- **Should the device fail, disconnect the power cord from the power outlet and contact NIDEK or your authorized distributor without touching the interior of the device.**

⚠ **CAUTION** • **If the device is connected to a computer that does not comply with IEC 60601-1 (except one that uses an AC adapter that meets the Class II requirements of IEC 60950-1 or IEC 62368-1), supply power to the device and computer through an isolation transformer.**

Electrical shock may result. For installation of the isolation transformer, contact NIDEK or your authorized distributor.

• **Use devices that comply with IEC 60601-1 in the patient environment. If any device that does not comply with IEC 60601-1 is to be used, install the device outside the patient environment. For a generalized information system, use the device that complies with IEC 60950-1 or IEC 62368-1. For other devices, use any separation device that complies with IEC 60601-1 and keep sufficient distance between the device and patient environment.**

The patient environment where any contact can occur between the patient and any part of the device (including connecting devices) or between the patient and any other person(s) touching the device (including connecting devices) is as shown to the right.

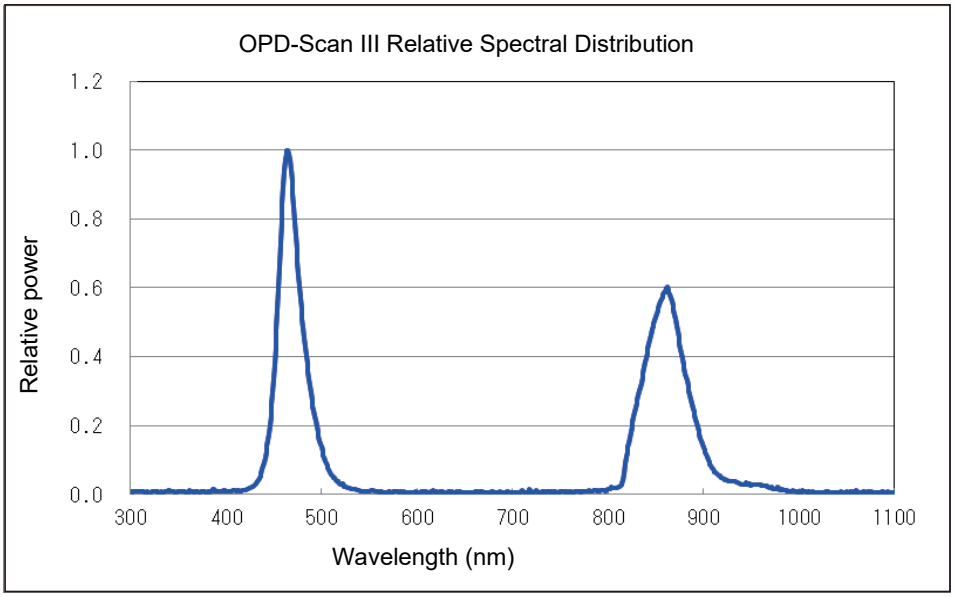


⚠ **CAUTION** • **Provision of information on the avoidance of light hazard from the optical device is required in ISO 15004-2 (2007) "Ophthalmic instruments - Fundamental requirements and test methods -".**

The light emitted from this device is potentially hazardous. The greater the number of times, the greater the risk of ocular damage. Exposure to light from this device when operated at maximum intensity will exceed the guideline in 18 seconds. However, because exposure to light lasts only about 0.45 second in a single CT measurement, 18 seconds of exposure is not reached until the measurement is executed about 40 times.

Spectrum output of all light source during measurement

(maximum light intensity)



* The values in the graph were obtained using separate measurement devices.

After use

⚠ **CAUTION**

- **This device uses a heat-sensitive printer paper. The paper degrades over time and the printed characters may become illegible. If glue containing organic solvents or adhesives such as on adhesive tape comes in contact with the printer paper, the printed characters may become illegible.**

  To keep the printed data for a long period of time, make copies of the printouts or write the measured results down.

- **When the device is not in use, turn off power to the device and place the dust cover over the device.**

  Dust may affect the accuracy of measurement.

- **Always hold the power plug, not the cord, when disconnecting it from the power outlet.**

  The metal core of the cord may be damaged and electric shock, malfunction, or fire may result.

- **Occasionally clean the prongs of the power plug with a dry cloth.**

  If dust settles between the prongs, the dust could collect moisture, and short circuit or fire may occur.

- **If the device will not be used for an extended period of time, disconnect the power cord from the power outlet.**

  Failure to do so may leave the device vulnerable to electric disturbances which may result in fire.

- **If the device is used after a long period of disuse, check for any abnormality before use.**

- **When transporting or storing the device, pack it. In addition, maintain the following environmental conditions.**

  Ambient temperature: -10 to 55ºC (14 to 131ºF)
  Humidity: 10 to 95% (non-condensing)
  Atmospheric pressure: 700 to 1,060 hPa
  No large amount of dust content in the air
  No exposure to water
  No exposure to direct sunlight

- **When transporting, set the device to packing mode and pack it using the specified packing materials with the main body locking lever unlocked. In addition, avoid vibration or bumps to the device.**

  Excessive vibration or bumps may reduce the device reliability.
  See “4.7.6 Packing mode” (page 170) to set the device to packing mode.

Maintenance

⚠ **CAUTION**

- **To ensure the continued safe use of the device, it is recommended that the manager of this device make sure that maintenance and preventive inspection (and calibration if necessary) are performed at least once a year.**

  For details of maintenance and preventive inspection, ask NIDEK or your authorized distributor.

  If the manager of this device cannot perform the maintenance and preventive inspection, contact NIDEK or your authorized distributor.

- **Only service personnel trained by NIDEK are allowed to repair and service the device.**

  NIDEK does not assume any responsibility for accidents caused by improper servicing.

- **When performing maintenance work, secure a sufficient maintenance space.**

  Maintenance work in an insufficient space may result in injury.

- **Before performing maintenance, clean the surface of the device properly with a clean cloth dampened with rubbing alcohol.**

- **Use only the printer paper (80620-00001) specified by NIDEK.**

  Any paper other than the specified one may damage the printer head due to improper printing or paper jammed. Printing may fade quickly as well.

- **Never use organic solvents such as a thinner, or detergents with abrasives to clean the covers, LCD touch-screen, and placido rings.**

  The covers or LCD touch-screen may be corroded or scratched. Especially, cleaning of the placido rings with organic solvents or detergents with abrasives will disturb concentric ring shapes, which may lower measurement accuracy.

- **Blow the dust off the placido rings with a blower.**

  Careless wiping may disturb concentric ring shapes, and may lower the measurement accuracy.

- **When sending the device back to NIDEK for repair or maintenance, clean the surfaces of the device (especially, the areas that come into contact with the patient) with a clean cloth dampened with rubbing alcohol.**

- **Contact NIDEK or your authorized distributor to check whether the device needs measurement accuracy calibration if the AR measurement results are substantially different from subjectively measured results.**

- **Do not use the device beyond its service life.**

  Even with proper maintenance and check, after time, the device reliability or safety may begin to fail to achieve the target values.

Disposal

⚠ **CAUTION**

- **To prevent the leakage of data such as personal information (patient information) to any unauthorized third party, it is the customer's responsibility to dispose of the device after making sure that data on the built-in memory (SSD) cannot be read or restored.**

  When the disposal is conducted by an industrial disposal service, data may be physically destroyed to make it unreadable. Select the disposal method that suits the purpose.

- **Follow local governing ordinances and recycling plans regarding disposal or recycling of device components.**
  Particularly when disposing of the lithium ion batteries, circuit boards, plastic parts that contain brominated flame retardant, LCD, or power cord.

  It is recommended to entrust the disposal to a designated industrial waste disposal contractor.
  Inappropriate disposal may contaminate the environment.

- **When disposing of packing materials, sort them by material and follow local ordinances and recycling regulations.**

  Inappropriate disposal may contaminate the environment.

Connection to Network

⚠ **CAUTION**

- **Incorrect network setting may result in malfunction of a part or the whole of the network. Under the supervision by network administrator, confirm that the network settings are correct.**
- **If the network is disconnected or fails, check the network connection. If necessary, consult with network administrator.**
- **When connecting a network with a device other than the OPD-Scan III, be sure to consult with a network administrator and confirm that the network to be connected functions normally. Connection with a network in abnormal state may result in computer virus infection or data falsification caused by external factors.**
- **To use network devices such as switching hubs or routers, use devices whose security has been ensured.**
- **When connecting to peripheral equipment such as a computer through LAN of a medical facility network, insert and connect an isolation transformer between the medical electrical equipment and network devices (such as a hub), and between the network devices and other electrical equipment.**

  Depending on the types or numbers of other electrical equipment connected to the network, electric shock or malfunction and failure of the electrical equipment may result.

  For installation of the network isolation transformer, contact NIDEK or your authorized distributor.
- **To share the database by connecting the device and OPD Web Viewer System-installed computers to a network, do not connect them to the network that allows connection to the Internet.**

  Configure a local network only with the device and OPD Web Viewer System-installed computers, and other related devices. NIDEK will not assume any responsibility or compensate for damages caused by any virus infection occurs due to that connection of the device to a network that allows connection to the Internet.

  The device is a medical device. If the user changes the setting of the device by installing other software such as antivirus software, NIDEK will not guarantee proper operation of the device.
- **To prevent unauthorized access to the network or information leakage, be sure that the network administrator provides the facility with an appropriate and secure network.**
- **If the medical system is to be configured using an IT network, implement IT security measures with the network administrator, and check that the system operates properly.**

  Virus infection, unauthorized access, or data tampering may result.

Table of Contents

1. BEFORE USE

1.1 Device Outline

The NIDEK REFRACTIVE POWER / CORNEAL ANALYZER OPD-Scan III VS[*1] (hereafter referred to as “the device”) measures objective refractive error, corneal curvature, shape of the anterior corneal surface (topography), and pupil size of the patient’s eye, and analyzes wavefront aberration.
The measured refractive error can be used for reference when prescribing corrective lenses such as glasses or contact lenses.
The measured corneal curvature and shape of the anterior corneal surface can be used for reference when selecting the base curve of contact lenses.

1.1.1 Intended use

The REFRACTIVE POWER / CORNEAL ANALYZER OPD-Scan III is a medical device intended for measuring and analyzing refraction condition and corneal shape of patient's eye.

1.1.2 Intended patient population

- Age
  Adult/infant
- Health condition
  Able to undergo an examination in a sitting position
- Conditions - Visual function
  One or both eyes are normal or have disease.
  Eyes that have lost the visual function are not targeted.

1.1.3 Intended user profile

Ophthalmologist or nurse, orthoptist / OD, or optician

***1. The OPD-Scan III VS is a model of OPD-Scan III used for prescription glasses. The official name of this product is “Refractive Power / Corneal Analyzer OPD-Scan III”.**

1.1.4 Intended use environment

• Location

Medical facility / Optical store

The device is a stationary type that is supposed to be installed on a table in a stable manner.

• Power supply

Power should be supplied from a medical power supply or isolation transformer regardless of whether any external computer is connected.

For conditions such as power supply, frequency, power consumption, see “5.2 Specifications” (page 230).

• Hygienic conditions

Clean room in which eyes can be safely measured or examined

• Illumination

50 lx or less is recommended.

The light should not be too intense, but should be intense enough to allow clear recognition of human face or movement.

• Ambient conditions

For conditions such as temperature, humidity, and atmospheric pressure, see “5.2 Specifications” (page 230).

⚠ **CAUTION** • **If the device is used outside the specified use location, intended performance and security level cannot be maintained.**

1.1.5 Principles

○ Refractive error measurement

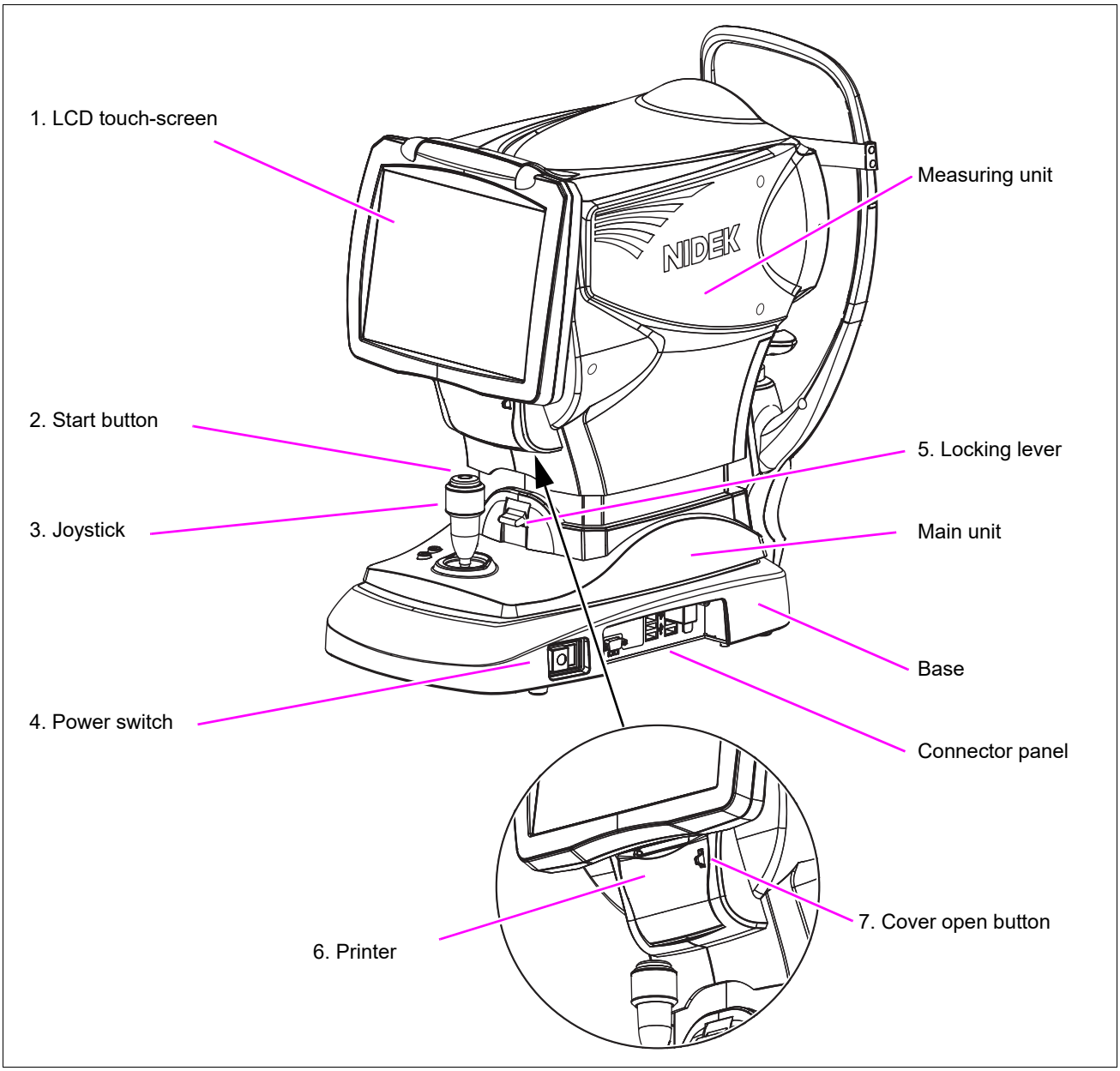
Measurement light emitted in a grid-like pattern is scanned on the retina, and the light reflected from the retina is received by multiple pairs of photodetectors. Refraction of the eye causes time (phase) difference in the signals issued by the pairs of photodetectors. The device calculates the refraction (spherical and cylindrical refractive errors, and cylinder axis angle) of the patient using these phase differences.

○ Corneal topography

Placido ring images are projected onto the cornea and the reflected light is captured with a CCD camera. The device measures the distances between the captured placido rings and calculates the shape (curvature radius and refraction) of the cornea.

1.2 Device Configuration

○ Front view



1. LCD touch-screen

Displays various operation screens, examination data, and maps.

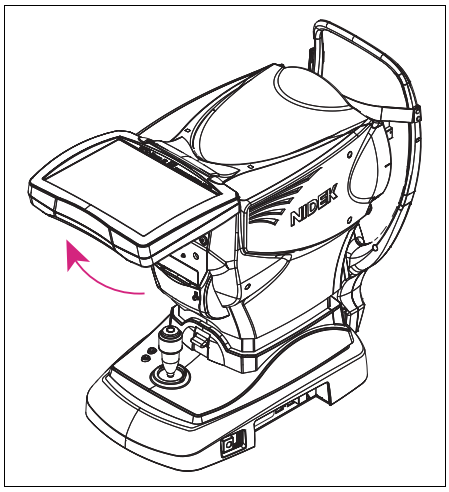
The device can be operated by pressing the buttons on the screen.

The LCD display is a 10.4-inch color LCD. It can be tilted by pulling its bottom and fixed at various angles.

If the operator uses the device in a standing posture, tilt the screen at a suitable angle.

To return the screen to the original position, raise it to the horizontal position, then slowly lower it.

The screen is fastened to the original position by magnet.



2. Start button

Used to start measurement.

3. Joystick

Used for alignment and focusing.

For horizontal alignment, move the joystick to the right and left. For vertical alignment, rotate the joystick. For focus adjustment, move the joystick forward and back.

4. Power switch

Flip the power switch to the on side (|) to turn on power to the device.

Do not use the power switch to turn off power to the device. Be sure to use the Exit button on the LCD touch-screen to turn off power to the device. The power is turned off automatically.

5. Locking lever

Used to lock the main unit to the base.

To lock the main unit, press down the locking lever.

6. Printer

This internal printer is used to print the AR and KM values (equivalent to values measured with a keratometer).

7. Cover open button

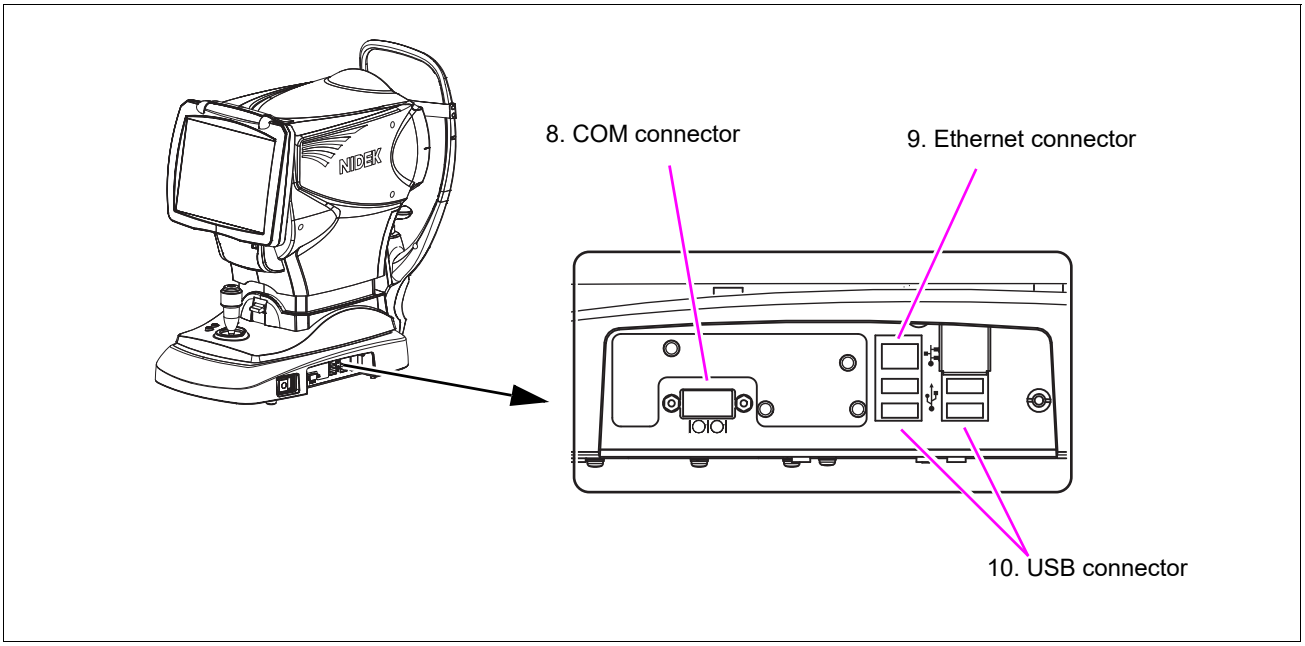
Used to open the printer cover for replacement of the printer paper.

○ Connector panel

Provides the connectors for the keyboard, mouse, and external devices.

⚠ CAUTION

- **Equipment connected to the analog or digital interfaces must be certified according to the representative appropriate national standards (such as EN 60601-1 and IEC 60601-1). Furthermore, all configurations must comply with the system standard IEC 60601-1. Anyone who connects additional equipment to the signal input part or signal output part configures a medical system is therefore responsible that the system complies with the requirements of the system standard IEC 60601-1. If you have any questions, contact NIDEK or your authorized distributor.**
- **While connecting any connector, never touch the terminal (plug or connector) and patient at the same time.**

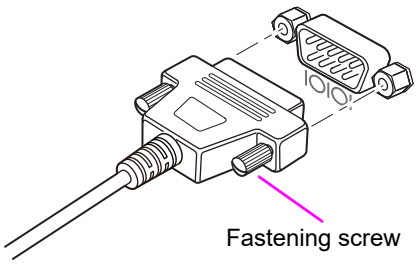


8. COM connector |○|○|

This COM connector is a 9-pin, D-sub serial port to which the RS-232C cable is connected to transfer data to a NIDEK RT-5100, or Eye Care card system, or to an external computer.

Be sure to connect or disconnect the connector with the device power turned off.

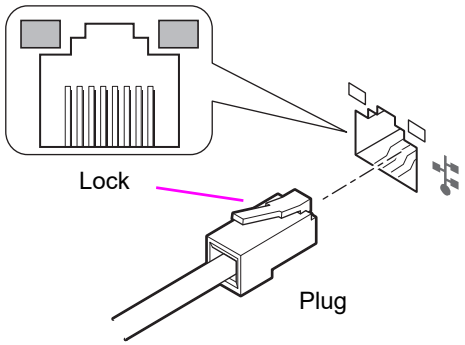
Insert the COM connector straight according to the proper orientation. After insertion, tighten the fastening screws.



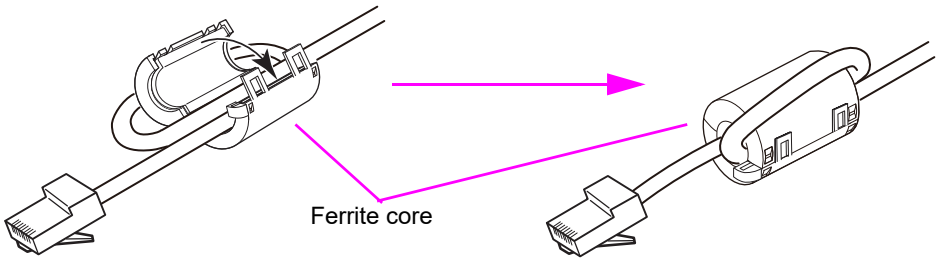
9. Ethernet connector

Used to connect the device to an Ethernet network.

Setting up of a LAN is required for connection to an Ethernet network. Set up a LAN in the LAN Settings window that appears by pressing the LAN button on the Maintenance screen.
Insert the plug with its lock facing up until it is snapped into the LAN connector.
To disconnect, pull out the plug while holding its lock.



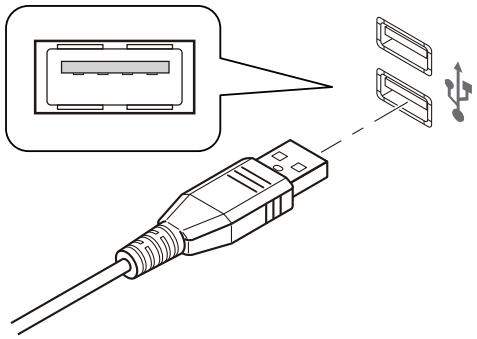
When using a commercial LAN cable, attach the provided ferrite core near the plug to be inserted into the device.
Wrap the cable once around the ferrite core.



10. USB connector

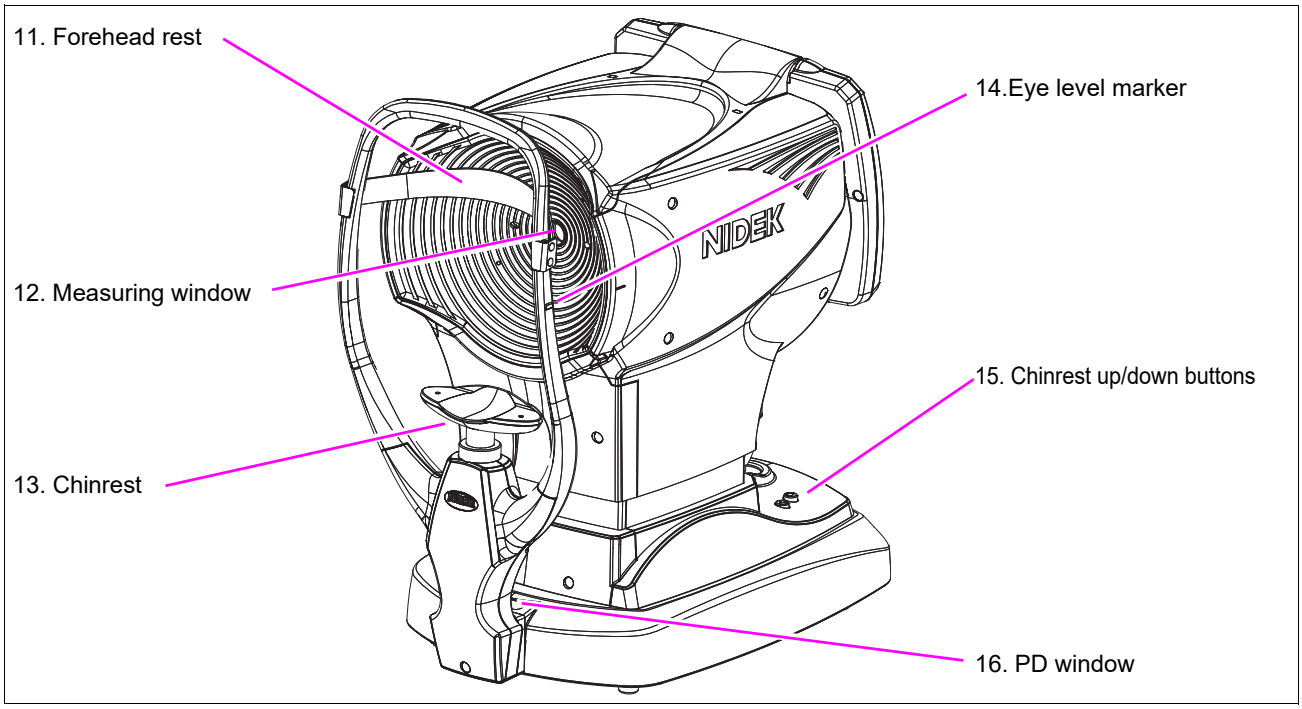
Used to connect USB devices. There are four ports of them. (USB 2.0 ports)

They can be used to connect a mouse, keyboard, external color printer, barcode reader, magnetic card reader, and external hard drive.
The USB connector is designed for hot-plugging. The USB plugs can be connected or disconnected with the device turned on.
Insert the USB connector straight according to the proper orientation.



⚠ CAUTION • **Do not connect the USB devices other than the specified one.**
They may not be recognized or malfunction may result.

○ Rear view



11. Forehead rest

Used to rest the patient's forehead to restrict head movement during measurement.

Clean it for each patient.

12. Measuring window

Check the window cleanliness before measurement.

13. Chinrest

Clean it for each patient.

14. Eye level marker

Used as a guide to adjust the patient's eye level.

Adjust the height of the chinrest so that the patient's eyes are roughly aligned to this line.

15. Chinrest up/down buttons (▲ , ▼)

Used to move the chinrest up and down.

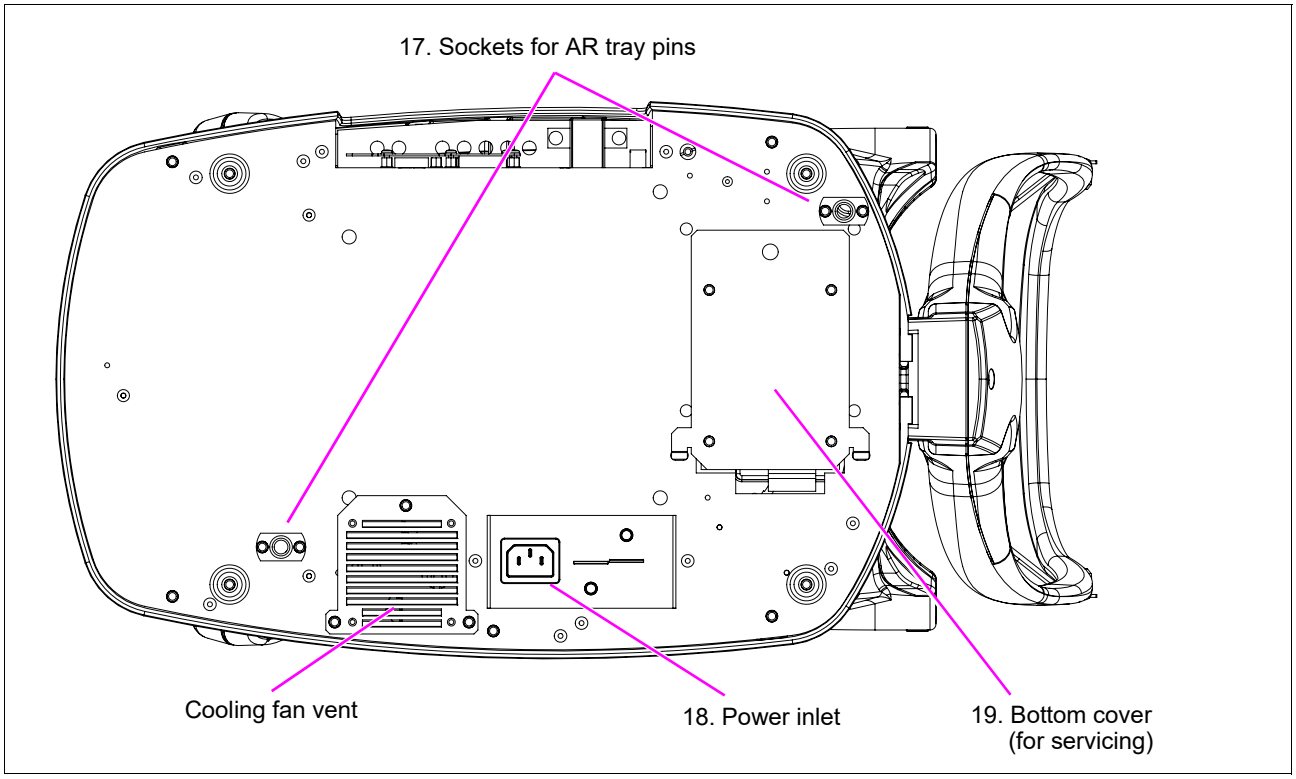
16. PD window

An LED is provided to detect the PD value.

Note

- Parts that come into contact with the patient or the operator during measurement are composed of the following materials:
  - Forehead rest - Fluorocarbon resin
  - Forehead rest frame, locking lever - Aluminum
  - Chinrest, start button, chinrest up/down button - ABS resin
  - Joystick - ABS resin, synthetic rubber, polycarbonate
  - LCD touch screen - Polyester
  - Power switch - Nylon
  - Power switch cover - Steel

○ Bottom view



17. Sockets for AR tray pins

When placing the device on the AR tray of the NIDEK system table, place it so that the pins on the AR tray are inserted into these sockets.

18. Power inlet

A detachable power cord is connected here.

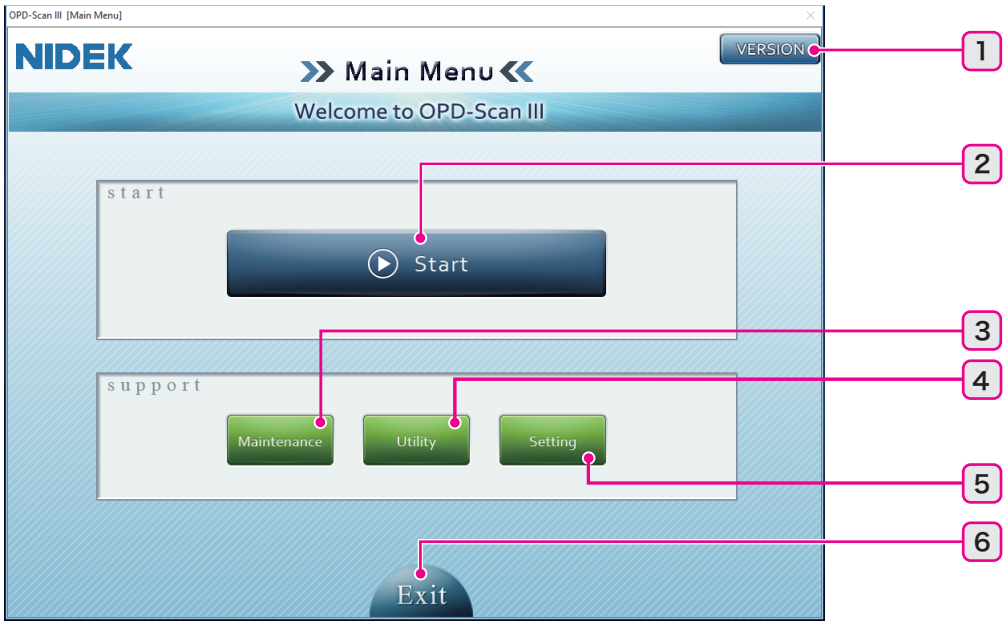
19. Bottom cover (for servicing)

This cover is opened by a service personnel to access the interior of the device. Only service personnel are allowed to open this cover.

1.3 Screen Configuration

1.3.1 Main Menu screen

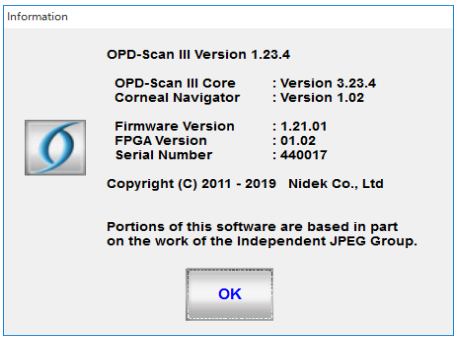
The Main Menu screen is displayed when the OPD-Scan III is activated. This screen allows selection of which screen to proceed to.



1	VERSION button	2	Start button	3	Maintenance button
4	Utility button	5	Setting button	6	Exit button

1. VERSION button

Used to display the software version of the device.



2. Start button

Used to access the Patient List screen.

3. Maintenance button

Used to access the Maintenance screen.

The Maintenance screen allows maintenance of the database, backup and restoration of the device settings, LAN setting, date and time setting, touch screen calibration, setting of the device to Packing mode, and display of the OPD Web Viewer System management window.

4. Utility button

Used to access the Utility screen.

The Utility screen allows import and export of the measurement data, setting of barcode or magnetic card readers, and setting of the on-screen keyboard.

5. Setting button

Used to access the Settings screen.

The Settings screen allows setting of the measurement conditions, communication, color scale, OPD Web Viewer System, and other setting conditions.

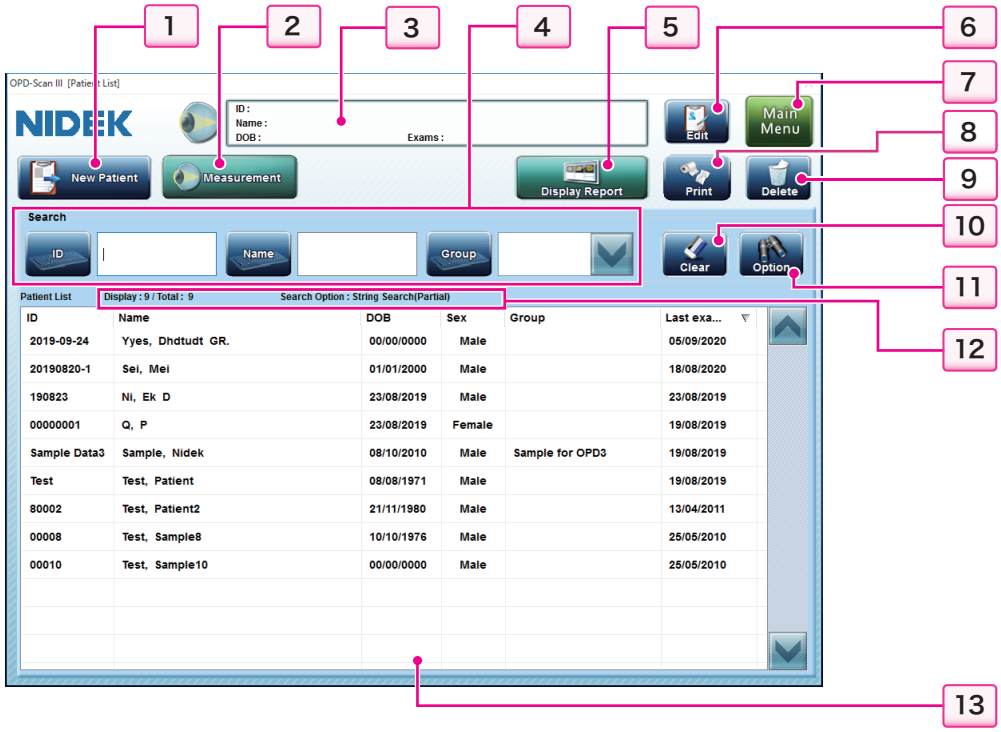
6. Exit button

Used to close the OPD-Scan III software and turn off power to the device.

Be sure to use this button, not the power switch, to turn off power to the device. Turning off power to the device using the power switch may cause malfunction of the device.

1.3.2 Patient List screen

The Patient List screen allows selection of the patient on whom the measurement is going to be performed and displays the report for that selected patient. This screen also allows creation, editing, or deletion of patient data.



1	New Patient button	2	Measurement button	3	Patient data brief information box
4	Easy search boxes	5	Display Report button	6	Edit button
7	Main Menu button	8	Print button	9	Delete button
10	Clear button	11	Option button	12	Number of listed data sets
13	Patient list				

1. New Patient button 

Used to create new patient data.

Pressing this button displays the Create Patient window to enter new patient information.

2. Measurement button 

Used to display the Measurement screen and start measurement for the patient selected on the patient list.

The measurement is performed for the patient being selected on the patient list.

3. Patient data brief information box

Displays the ID, name, date of birth (only when set to be displayed), and number of examination data sets for the patient selected on the patient list.

4. Easy search boxes

Used to display data sets that match the search conditions entered in the ID, Name, and Group boxes.

When a hardware keyboard is used, characters can be directly entered in the box.
The search results are cleared when the Patient List screen is closed.

ID button	Used to display the on-screen keyboard for entering the ID.
ID box	Used to enter the ID of the patient to search for the patients whose ID begins with the entered ID.
Name button	Used to display the on-screen keyboard for entering the name.
Name box	Used to enter the patient name to search for the patients whose names begin with the entered name.
Group button	Used to display the on-screen keyboard for entering the group.
Group box	Used to enter the group of the desired patient. Pressing the down arrow (V) button displays the existing registered groups that can be selected. The patients belonging to the group whose name begins with the entered characters are displayed.

If multiple search conditions are entered, the AND search is executed.

5. Display Report button 

Used to display the report for the patient selected on the patient list on the report screen.

6. Edit button 

Used to display the Edit Patient Information window that displays detailed information of the patient selected on the patient list. In this window, patient information can be changed.

7. Main Menu button 

Used to return to the Main Menu screen.

8. Print button 

Used to print the saved AR values, KM values, and such using the internal printer.

When multiple examination data sets are saved, pressing this button displays the list of examination data. Select the data to be printed from the list.

9. Delete button 

Used to delete the patient selected on the patient list.

When a patient is deleted, all examination data sets for that patient are deleted.

10. Clear button 

Used to clear the current search conditions.

When the search conditions for “Sex” and “Last Exam Date” are specified in the Search Option window, they are not cleared by pressing this Clear button. To clear the search conditions for “Sex” and “Last Exam Date”, press the Clear button in the Search Option window.

11. Option button 

Used to display the Search Option window.

The desired patient can be searched for by sex or last examination date of that patient. The search conditions specified in this window are maintained even when the Patient List screen is closed or the device power is turned off.

12. Number of listed data sets

Shows the total number of data sets (A) and the number of data sets being displayed on the list (B). Search conditions specified in the Search Option window are shown as well.

Number of data sets being displayed on the list (B) / Total number of data sets (A)
If a search has not been executed, (B) equals (A).

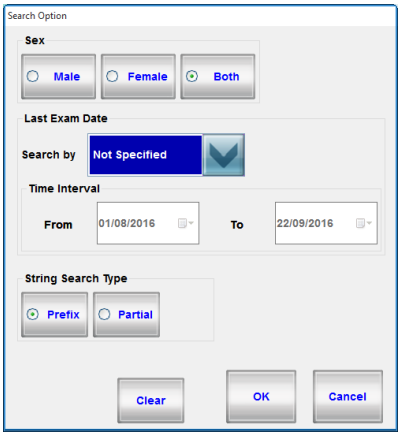
13. Patient list

Shows the existing patients. Select the patient on the list for whom the measurement is going to be performed.

Pressing an item name (ID, Name, date of birth [only when set to be displayed], Sex, Group, or Last exam date) on top of the patient list sorts the data in ascending order. Pressing the item name once again sorts the data in descending order. The sort order is indicated by △ (ascending order) or ▽ (descending order) to the side of the item name.
When extracted data is shown, the background of the patient list changes from white to yellow.
If the extracted data sets cannot be displayed in a single screen, the list can be scrolled using the scroll bar.

○ Search Option window

Used to facilitate patient selection by searching patients using optional search conditions and displaying the patients matching the specified search conditions. The AND search is executed together with the search conditions specified in the easy search boxes.



1) Press the Option button to display the Search Option window.
2) Specify the desired search conditions and press the OK button.

Sex	Select from among “Male”, “Female”, and “Both”.

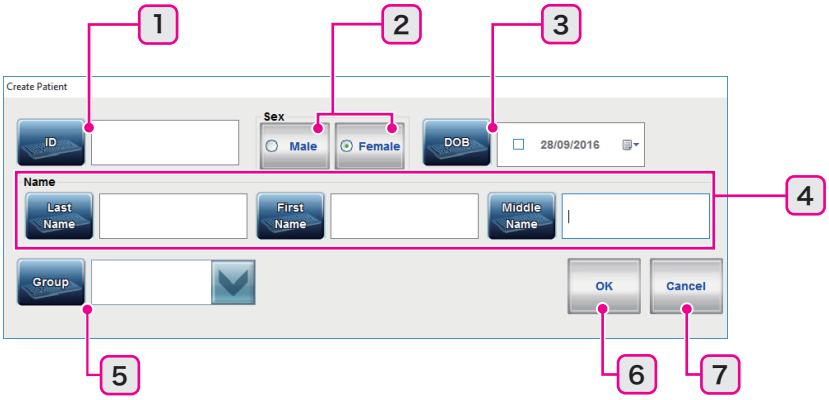
Last Exam Date	Select from among “Not Specified”, “Today”, “Last Week”, “Last Month”, “Last 3 Month”, and “Time Interval”. When other than “Not Specified” is selected for “Search by” in the Last Exam Date box, only patient data whose last examination date fall within the specified range are extracted. When “Time Interval” is selected, data can be searched within a specific period of time by entering “From” and “To”. Press the From and To buttons, then enter the desired values, or press the down arrow (V) button to select the desired dates.
String Search Type	Select the method of easy search from “Prefix” (right truncation) and “Partial” (simultaneous left and right truncation).

All specified conditions are joined by AND, and only patient data sets matching all conditions are displayed.

Clear button	Used to restore the initial conditions. “Both” is selected for “Sex”. “Not Specified” is selected for “Search by”. The first day of the previous month is selected for “From”. The current day is selected for “To”.
OK button	Used to enable the specified search conditions and close the Search Option window.
Cancel button	Used to cancel the specified search conditions and return to the Patient List screen.

1.3.3 Create Patient window

Used to create new patient data. This window is displayed by pressing the New Patient button on the Patient List screen.



1	ID button/box	2	Sex selection button	3	DOB button/box
4	Name button/box	5	Group button/box	6	OK button
7	Cancel button				

1. ID button/box

Press this button to display the on-screen keyboard, then enter the desired ID. If a hardware keyboard is used, the ID can also be directly entered in the box.

2. Sex selection button

Press this button to select the sex of the patient.

3. DOB button/box

Used to enter the patient's birth of date.

Press the DOB button to display the window to enter the date of birth. The date of birth can also be selected from the calendar displayed by pressing the down arrow (V) button.

4. Name button/box

Press this button to display the on-screen keyboard, then enter the name of the patient. If a hardware keyboard is used, the name can also be directly entered in the box.

A maximum of 20 characters can be entered in each field.
Selecting "Last, First MI." or "Last First MI." for "Name" on the Settings screen (Other tab) displays the patient name in the order of last name, first name, and middle name with or without a comma. If "First Last MI." is selected, the patient name is displayed in the order of first name, last name, and middle name.

5. Group button/box

Press this button to display the on-screen keyboard, then enter the name of the group. The name can also be entered using a hardware keyboard or selected from a list that appears by pressing the down arrow (V) button.

A maximum of 20 characters can be entered.

6. OK button

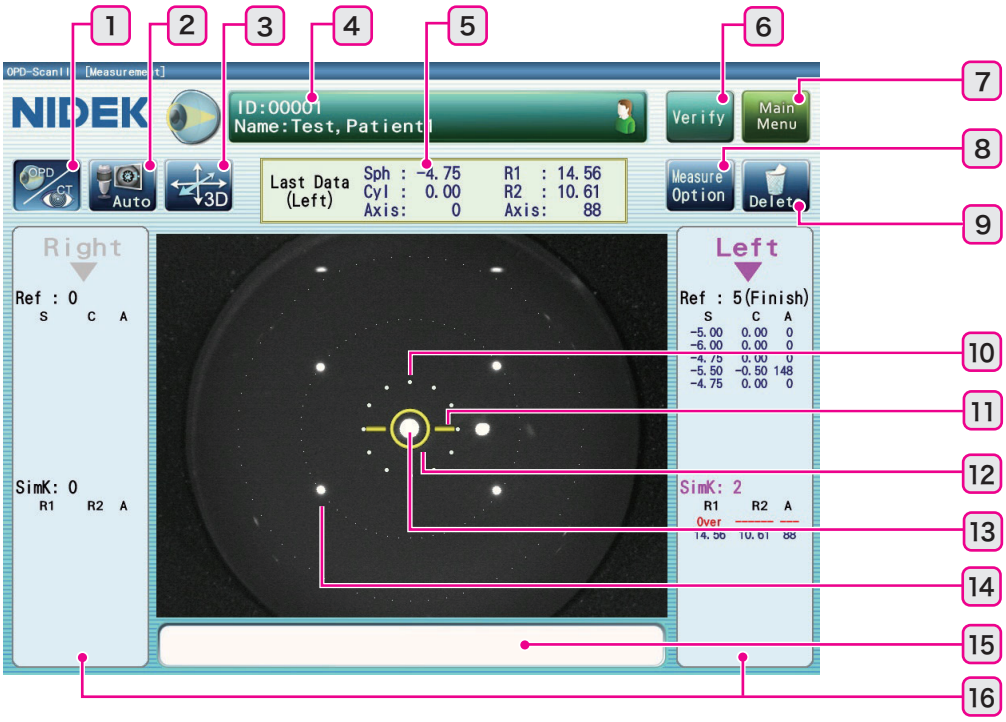
Used to register the entered patient information and return to the Patient List screen

7. Cancel button

Used to clear the entered patient information and return to the Patient List screen

1.3.4 Measurement screen

The Measurement screen allows measurement of the corneal curvature and whole eye refractive error.



1	Measurement mode button	2	Auto shot button	3	Tracking button
4	Patient information button	5	Latest data display	6	Verify button
7	Main Menu button	8	Measure Option button	9	Delete button
10	Minimum pupil mark	11	Focusing indicator	12	Target mark
13	Alignment guide mark	14	Anterior segment illumination spots	15	Message box
16	Eyes/Measurement data display				

1. Measurement mode button

Each pressing of this button toggles measurement mode in the order of OPD/CT measurement ( ), OPD measurement ( ), and CT measurement ( ).

2. Auto shot button

Used to enable or disable the auto shot function that automatically starts OPD measurement when proper vertical and horizontal alignment, and focus are achieved.

Manual	The auto shot function is disabled.
Auto	The auto shot function is enabled.

3. Tracking button

Used to enable or disable the auto tracking function (automatic alignment).

3D	The auto tracking function in the forward/backward, right/left, and up/down directions is enabled.
2D	The auto tracking function in the right/left, and up/down directions is enabled. The focus is manually adjusted.
OFF	The auto tracking function is disabled. The alignment and focus are manually adjusted.

4. Patient information button

Used to display the information of the patient currently under measurement. Pressing this button stops the measurement and displays the Patient List screen.

5. Latest data display

Displays the latest measurement data.

6. Verify button Verify

Used to access the Verify Examination Quality screen.

7. Main Menu button Main Menu

Used to access the Main Menu screen.

Data of unfinished measurement is not saved.

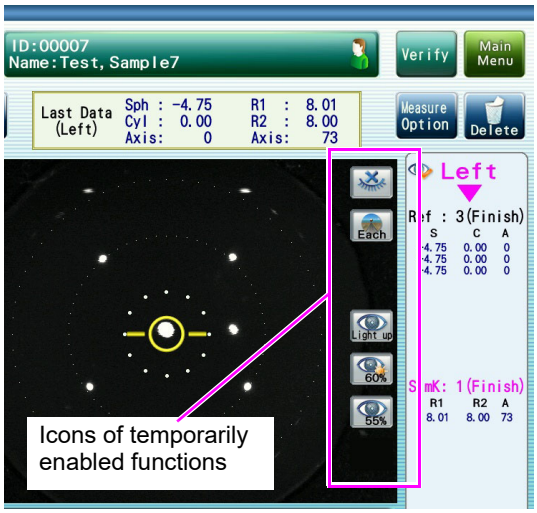
8. Measure Option button Measure Option

Used to temporarily enable the desired functions.

Pressing this button displays available functions and settings. Press to enable the desired function and setting. These temporarily enabled functions are disabled when the Measurement screen is closed.

The available functions are: “Print (internal printer)”, “Eyelid check”, “Fogging mode”, “Placido light”, and “Placido intensity”. Icons on the screen indicate the functions that differ from those set in the Settings screen.

When “Print (internal printer)” is selected, the values bracketed with < > in the printout are the intermediate values, not the S, C, and A values of the best measurement data selected in the Verify Examination Quality screen.



9. Delete button 

Used to delete the measurement data being displayed.

Pressing this button displays “Are you sure you want to delete the measurement data? Yes/No”.
Pressing the Yes button deletes the measurement data being displayed.

10. Minimum pupil mark

Indicates the minimum pupil size measurable.

If the pupil is smaller than this circle or eyelashes cover this circle, measurement may not be possible.

11. Focusing indicator

Indicates the distance between the measuring unit and the patient’s eye.

Manipulate the joystick until the (—○—) mark, indicating that focus is in optimum condition, appears.

12. Target mark

Used as a guide to center the patient’s eye on the screen.

13. Alignment guide mark

This bright light reflected from the cornea that indicates the center (apex) of the cornea.

14. Anterior segment illumination spots

If these four light spots around the alignment guide mark reflected from the anterior segment are obscured by eyelid or eyelashes, a measurement error may occur.

15. Message box

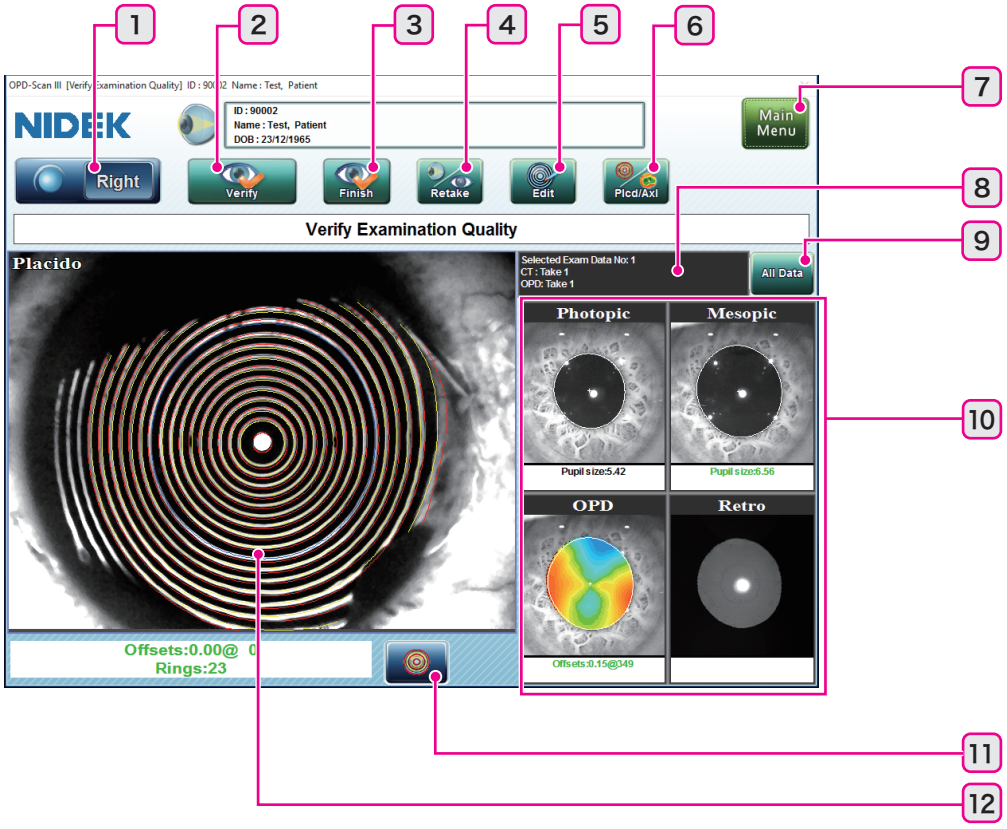
Displays error messages and other indications.

16. Eyes/Measurement data display

Shows which eye (left or right) is being displayed, and displays the number and results of OPD and CT measurements respectively whether the conditions for completing the measurement are satisfied.

1.3.5 Verify Examination Quality screen

The Verify Examination Quality screen allows verification of the measurement data.
This screen is automatically displayed when measurement is complete. This screen can also be set to be displayed when the Verify button on the Measurement screen is pressed.
The displayed measurement data is the best data selected from multiple results.



1	Right/Left button	2	Data verification button	3	Finish button
4	Retake button	5	Edit button	6	Plcd/Axl button
7	Main Menu button	8	Measurement data display	9	All Data button
10	Thumbnail button	11	Edge display button	12	Map verification area

1. Right/Left button

Indicates the eye (right/left) for which measurement data is being displayed. Pressing this button displays the measurement data of the other eye.

The measurement data of the other eye displayed by pressing this button has already been verified, so the data verification button is not displayed and the Retake button is disabled.
If the other eye has not been measured, “No data is found.” is displayed.

2. Data verification button  / 

Used to verify the measurement data being displayed as being proper and save it to the database. Printing or communication with external devices are executed in accordance with the settings in “Verify Exam Window - Options” on the Settings screen (Measurement tab).

Verify	Displayed when measurement of an eye is complete. Verifies the measurement data to be proper for saving to the database, then returns to the Measurement screen for measurement of the other eye.
Verified & Save	Displayed when measurement of both eyes is complete. Verifies the measurement data to be proper for saving to the database, and displays the Verify Result window that shows the progress of printing and communication with external devices.

3. Finish button 

Used to verify the measurement data being displayed as being proper, save it to the database, and choose not to perform measurement for the other eye.

This button is displayed when measurement for one eye only is complete. Pressing this button displays the Verify Result window that shows the progress of printing and communication with external devices.

4. Retake button 

Used to return to the Measurement screen to perform the measurement again. “Finish” indicated for the selected measurement mode is deleted.

In OPD/CT measurement mode, either OPD or CT measurement mode needs to be selected before returning to the Measurement screen.

Pressing the Retake button displays the options: “Retake OPD/CT”, “Retake OPD”, and “Retake CT”. Select the desired measurement mode.

Retake OPD/CT	Returns to the Measurement screen in OPD/CT measurement mode.
Retake OPD	Returns to the Measurement screen in OPD measurement mode.
Retake CT	Returns to the Measurement screen in CT measurement mode.

The Measurement screen is displayed without “Finish” indicated for the selected measurement mode, allowing additional measurements.

In OPD or CT measurement mode, pressing the Retake button returns to the Measurement screen.

The Measurement screen is displayed without “Finish” indicated for the measurement mode, allowing additional measurements.

5. Edit button 

Used to access the screen that allows editing of placido ring edge or such.

6. Plcd/Axl button 

Used to toggle the image displayed on the map verification area between the Placido image and the Axial map.

The Plcd/Axl button is displayed when a placido ring image is displayed in OPD/CT or CT measurement mode.

7. Main Menu button 

Used to access the Main Menu screen.

"Data has not been saved. Are you sure you want to return to Main Menu? Yes/No" is displayed. Press the Yes button to access the Main Menu screen.

8. Measurement data display

Shows the order in which the data being displayed was obtained.

9. All Data button 

Used to access the Verify Multi Measurement screen.

The Verify Multi Measurement screen allows verification of all measurement results and changing of measurement data to be selected.

10. Thumbnail button

Used to display the measurement results as thumbnails.

Map images (OPD, Placido, Photopic, Mesopic, or Retro) other than the one being displayed on the map verification area are displayed as thumbnails.

Pressing the desired thumbnail displays it on the map verification area and reduces the previously displayed map to a thumbnail.

Below each thumbnail, the pupil diameter and amount of alignment error are displayed.

11. Edge display button 

Used to display or hide the detected placido ring edges on the placido image.

This button is displayed when a placido ring image is displayed on the map verification area.

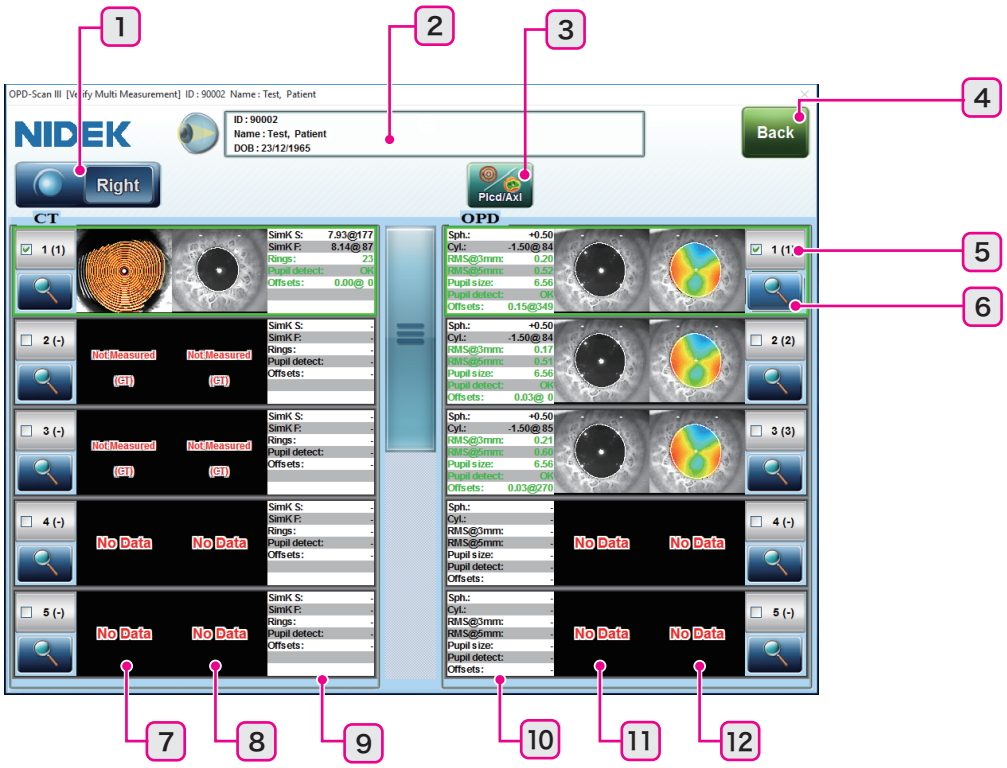
12. Map verification area

Displays the map to be in a large frame.

OPD/CT measurement CT measurement	The placido image is displayed by default.
OPD measurement	The OPD map is displayed by default.

1.3.6 Verify Multi Measurement screen

The Verify Multi Measurement screen allows selection of data to be saved to the database.
This screen is displayed by pressing the All Data button on the Verify Examination Quality screen.
Pressing the check box (☐) of the measurement data or any part of the measurement data to be saved selects that data and the check box. Pressing any other data cancels the selection.



1	Right/Left button	2	Patient data brief information box	3	Plcd/Axl button
4	Back button	5	Check mark	6	Verify examination quality button
7	Placido ring image	8	Pupil image (photopic vision)	9	CT measurement data
10	OPD measurement data	11	Pupil image (mesopic vision)	12	OPD map image

1. Right/Left button

Used to toggle display of right or left eye on the Verify Multi Measurement screen.

If the other eye has not been measured, “No data is found.” is displayed.

2. Patient data brief information box

Used to display the ID, name, and date of birth (only when set to be displayed) of the patient.

3. Plcd/Axl button 

Used to toggle the image displayed on the placido ring image area between the Placido image and the Axial map.

The Plcd/Axl button is enabled only when a placido ring image is displayed in OPD/CT or CT measurement mode.

4. Back button 

Used to return to the Verify Examination Quality screen.

5. Check mark

Displayed when data to be saved is selected.

The number in parentheses to the side of the image number indicates the order in which the measurement was executed.

6. Verify examination quality button 

Used to access the Verify Examination Quality screen for the selected data.

7. Placido ring image

Shows the eye image overlaid with the placido rings. Pressing the Plcd/Axl button displays the Axial map.

8. Pupil image (photopic vision)

Shows the pupil image in photopic vision.

White line	Pupil contour in photopic vision
White cross	Pupil center in photopic vision

9. CT measurement data

SimK S	“Refractive power@Angle” in steepest meridian direction
SimK F	“Refractive power@Angle” in flattest meridian direction
Rings	Shows the number of consecutive solid rings without any gaps counted from the inner side.
Pupil detect	Pupil contour detection result
Offsets	Shows the amount of alignment error in the CT measurement. The amount of alignment error is indicated in green when it is less than 0.3 mm, and in orange or red as the amount increases.

10. OPD measurement data

Sph.	Spherical refractive error in AR measurement values (S)
Cyl.	Cylindrical refractive error in AR measurement values (C) @ Angle (A)
RMS@3mm	RMS (Root Mean Squared fit error) on the circumference of a 3 mm-diameter circle
RMS@5mm	RMS (Root Mean Squared fit error) on the circumference of a 5 mm-diameter circle
Pupil size	Pupil size
Pupil detect	Pupil contour detection result
Offsets	Shows the amount of alignment error in the OPD measurement. The amount of alignment error is indicated in green when it is less than 0.3 mm, and in orange or red as the amount increases.

11. Pupil image (mesopic vision)

Shows the pupil image in mesopic vision.

White line	Pupil contour in mesopic vision.
White cross	Pupil center in mesopic vision.

12. OPD map image

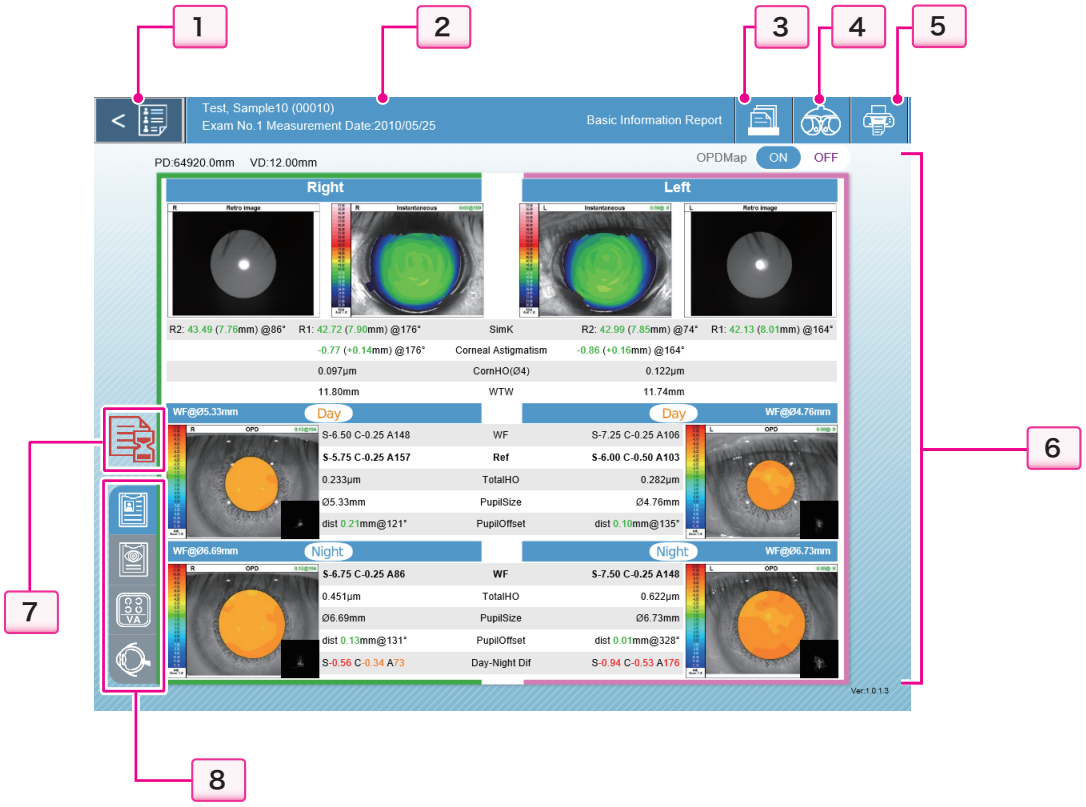
Shows the OPD map

1.3.7 Report screen

The report screen displays four types of reports.

Basic Information Report	Various maps and measurement values
Topography Report	Various maps and measurement values showing the shape of cornea
Simulation Report	Patient vision simulation map during day and night
Eye Diagram Image Report	Various day and night maps arranged in an eye diagram image

Pressing any map within the report enlarges the pressed map.



1	Patient list button	2	Patient data brief information box	3	Examination data selection button
4	Send button	5	Print button	6	Report selection
7	Data conversion icon	8	Report buttons		

1. Patient list button 

Used to return to the Patient List screen from the report screen.

2. Patient data brief information box

Displays the patient name (ID), examination number, and measurement date of the examination data being displayed on the screen.

The name of the report being displayed is indicated to the right of the information box.

3. Examination data selection button

Used to display the Examination Data Selection window to select the desired examination data.

4. Send button

Used to transfer refractive error measurement data to the RT-5100, MEM-200 (RT-6100), or such. Before data is transferred, ID and day/night measurement values are displayed in the Sending Data to RT window. When transferring to MEM-200 (RT-6100), the report image data can be transfered alone or along with the refractive error measurement data.

Note

- To display the report image data to the RT-6100, connect the device with the RT-6100 via MEM-200. Report image data is saved to the MEM-200 and read by the operation of the RT-6100.

5. Print button

Used to print the report with an external printer.

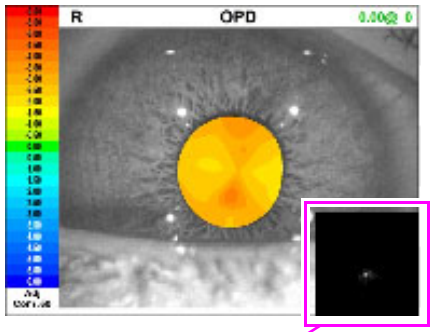
6. Report selection

The buttons to switch the report to be displayed are displayed on the report screen.

Basic Information Report	The OPD map can be displayed or hidden.
Simulation Report	Display of left eye / right eye and VA/PSF map
Eye Diagram Image Report	Display of left eye / right eye and unaided eye / day glasses

Pressing any map or PSF mini map displayed on the report screen enlarges it.

When the PSF mini map is displayed on the screen, pressing it opens the mini map image.



Mini map

7. Data conversion icon

Indicates that the settings of data being displayed are not in accordance with the current settings (Settings screen). Pressing the icon displays the message, “The displayed data was generated using prior settings. Generate the data again using the current settings?”. Pressing the Yes button recalculates and displays the report using the current settings.

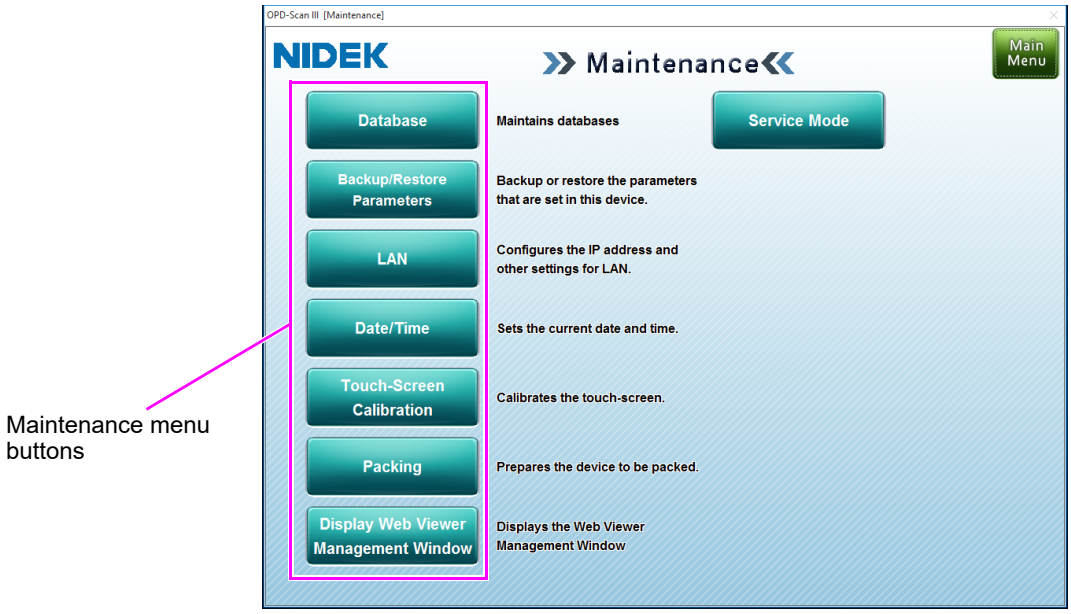
8. Report buttons

Press the button of the report to be displayed to switch the report. The button of the report currently displayed is highlighted in blue.

	Basic Information Report
	Topography Report
	Simulation Report
	Eye Diagram Image Report

1.3.8 Maintenance screen

The Maintenance screen allows selection and execution of various maintenance tasks.

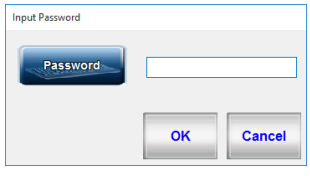


Maintenance menu buttons

Used to display the screen of the selected maintenance menu.

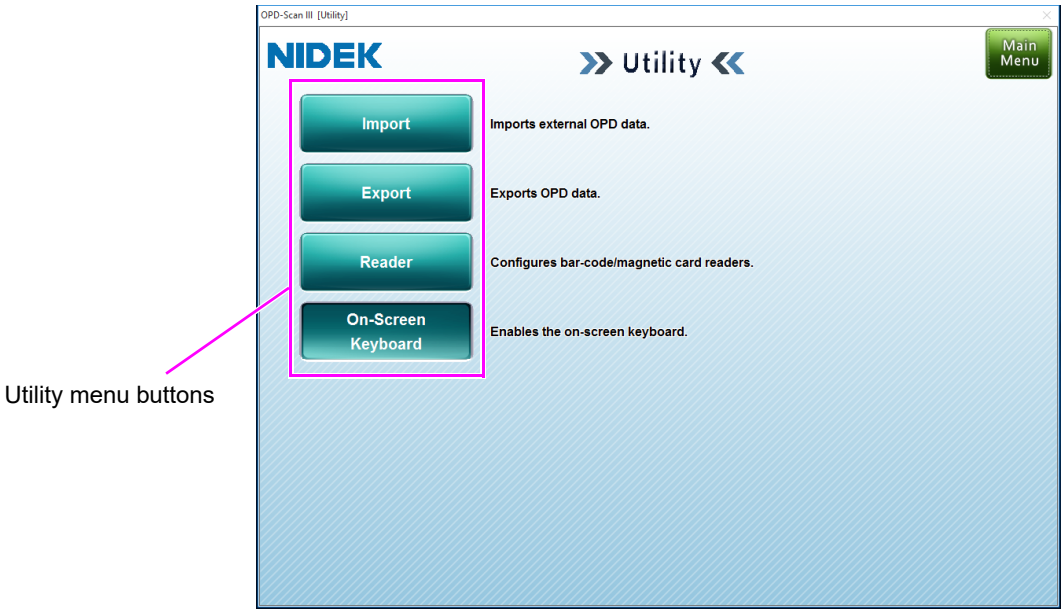
Database	Used to perform database maintenance.
Backup/Restore Parameters	Used to back up or restore the setting information for this device. A file containing various settings of the device is stored on an external storage device to be used to restore those settings. Reading of the file is also executed with this button.
LAN	Used to configure the IP address and other settings for LAN connection.
Date/Time	Used to set the current date and time.
Touch-Screen Calibration	Used for setting the touch screen.
Packing	Used to prepare the device for packing. Pressing the Packing button displays the message, “Do you prepare packing? Yes/No”. Pressing the Yes button displays “Packing Finish” followed by “Please Wait”, and turns off power to the device.
Display Web Viewer Management Window	Used to perform OPD Web Viewer System maintenance.

The Service Mode button is not for customer use.

Service Mode	Used to enter Service mode that only properly trained service personnel are allowed to operate. Pressing the Service Mode button displays the Input Password window. Press the Cancel button to close this window. 

1.3.9 Utility screen

The Utility screen allows operation of auxiliary functions of the OPD-Scan III.



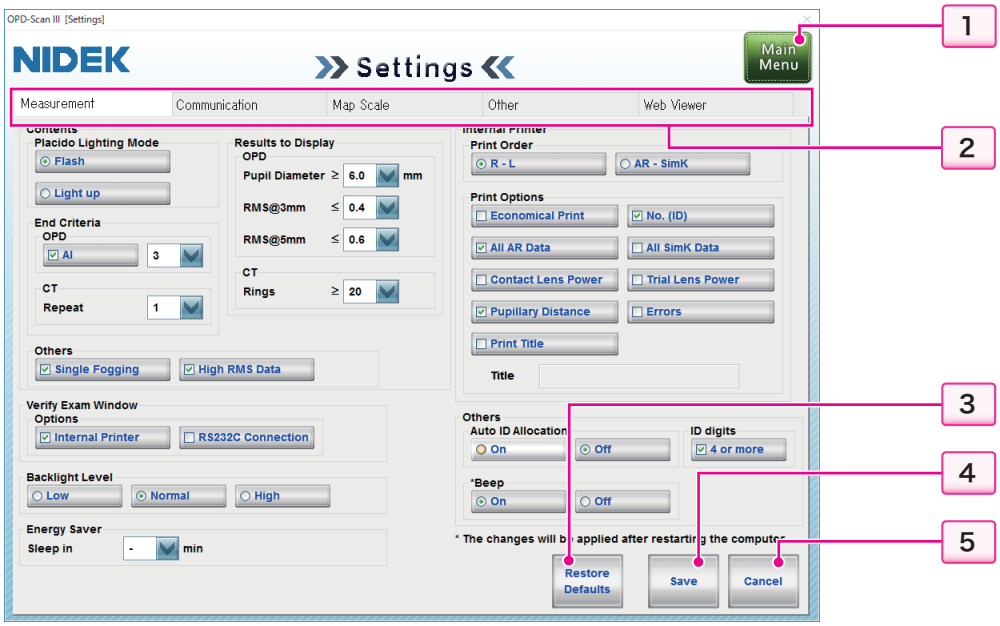
Utility menu buttons

Used to display the screen of the selected utility menu.

Import	Used to import external OPD measurement data.
Export	Used to export OPD measurement data.
Reader	Used to configure settings for the barcode or magnetic card reader.
On-Screen Keyboard	Used to enable the on-screen keyboard. Each pressing of this button enables or disables the on-screen keyboard. If the on-screen keyboard is set to be disabled, no buttons are displayed to call up the on-screen keyboard. Fields are identified by labels instead.

1.3.10 Settings screen

The Settings screen allows various settings that can be set on its Measurement, Communication, Map Scale, Other, and Web Viewer tabs.



1	Main Menu button	2	Setting tabs	3	Restore Defaults button
4	Save button	5	Cancel button		

1. Main Menu button 

Used to return to the Main Menu screen.

When the settings are changed, a confirmation message asking whether or not to save the changes is displayed.

2. Setting tabs

Used to select different setting contents

There are five tabs: “Measurement”, “Communication”, “Map Scale”, “Other”, and “Web Viewer”. The Map Scale tab is further divided into the CT-A and OPD tabs while the Web Viewer tab is divided into the Report, Map Scale, and Other tabs.

3. Restore Defaults button

Used to restore the settings to their defaults for the tab currently displayed.

4. Save button

Used to save the setting changes to the tab currently displayed.

After changing any setting, if another tab is opened or the Main Menu button is pressed without pressing the Save button, a confirmation message asking whether to save the changes is displayed.

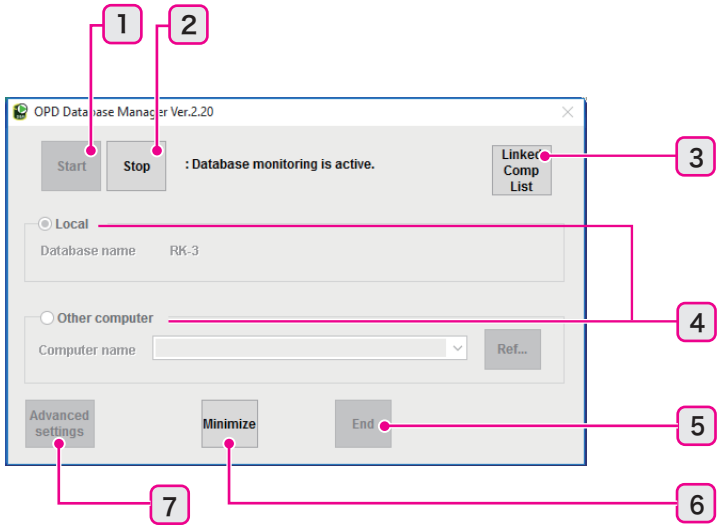
5. Cancel button

Use to cancel all setting changes to the tab currently displayed and leave them as they were before the tab was displayed.

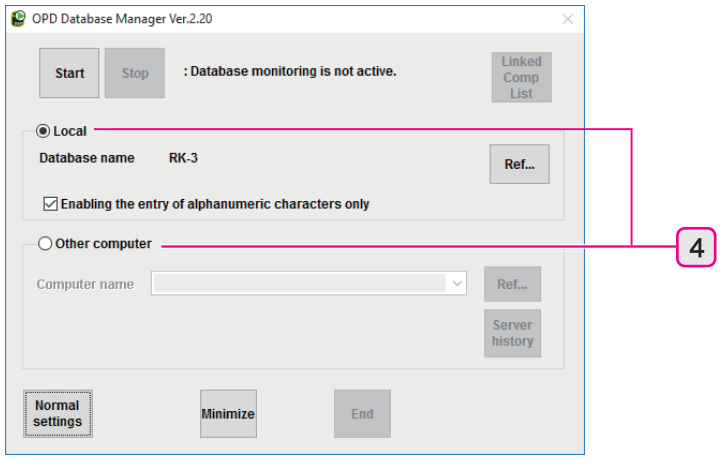
1.3.11 OPD Database Manager screen

The OPD Database Manager screen allows selection and backup of the database. This screen is displayed by pressing the Database button on the Maintenance screen.

Normal settings mode display



Advanced settings mode display



1	Start button	2	Stop button	3	Linked Comp List button
4	Local and Other computer radio buttons	5	End button	6	Minimize button
7	Advanced settings / Normal settings button				

1. Start button

Used to start connection to the database.

After changing the settings on this screen, press this button to resume connection to the database.

2. Stop button

Used to stop connection to the database.

Before selecting or backing up the database, press this button to stop connection between the device and the database.

3. Linked Comp List button

Used to display a list of computers currently connected to the database.

This button is enabled only when the radio button for “Local” is selected.

4. Local and Other computer radio buttons

Selects whether to use the local database or database on other computer.

Local: Select the radio button to use database on the OPD-Scan III.

The buttons below are displayed on the screen only when it is displayed in advance settings mode.

Ref... button	Used to display the Select Database window that allows selection of database.
Backup button	Used to display the Database Backup window that allows backup of database.
Setting button	Used to display the Backup Settings window that allows setting of the criteria for deleting data in the database.
Rebuild button	Used to display the Rebuild Database window that allows rebuilding of database.
Enabling the entry of alphanumeric characters only	When the check box is not selected, patient names can be entered in Japanese.

Note

- The Backup, Settings, and Rebuild buttons are enabled when the database setting is other than “RK-3”.

See “4.9 OPD Database Manager” (page 198), for details of creation or selection of databases.

Other computer: Select the radio button to use database on another OPD Database Manager-installed computer.

Ref... button	Used to display the Network screen for browsing other computers that allows selection of the computer on which the database to be used is stored.

The button below is displayed on the screen only when it is displayed in advance settings mode.

Server history button	Used to display the Server history window that lists the computers that the device has been connected to. The computers on the list can be selected to be connected to or to be deleted from the list.

5. End button

Used to close OPD Database Manager.

This button cannot be operated from the device.

6. Minimize button

Used to minimize the OPD Database Manager screen to the taskbar.

When using the OPD-Scan III regularly, keep OPD Database Manager resident and minimized to the taskbar.

7. Advanced settings / Normal settings button

Used to toggle the display of the OPD Database Manager screen between advanced settings mode and normal settings mode.

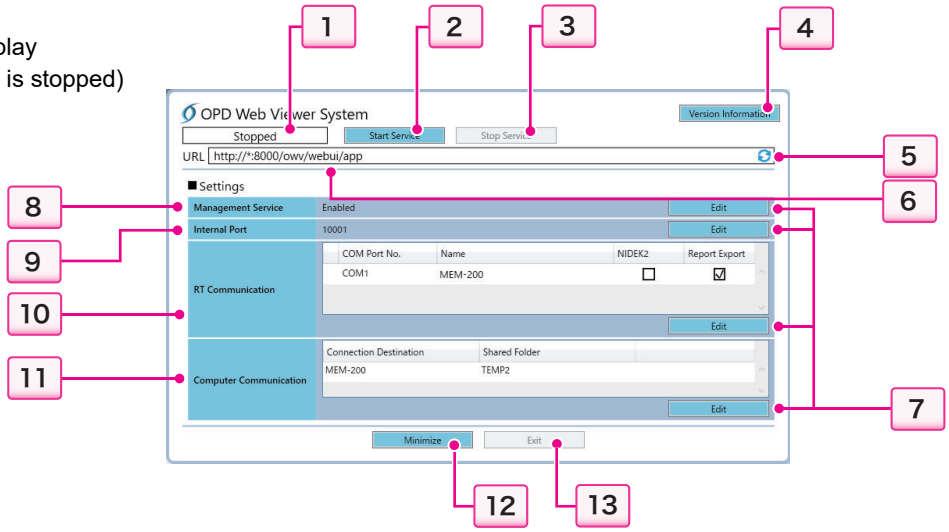
1.3.12 OPD Web Viewer System management window

The OPD Web Viewer System management window allows starting and stopping of the management service, URL display of WEB UI, and display or editing of settings.

Note

- Web UI allows computers or tablets connected over a LAN to access the operation screens in the server in order to display or operate the measurement results obtained.

Normal mode display
(when the service is stopped)



1	Status display	2	Start Service button	3	Stop Service button
4	Version Information button	5	URL refresh button	6	URL display
7	Edit button	8	Management Service display	9	Internal Port display
10	RT Communication list	11	Computer Communication	12	Minimize button
13	Exit button				

1. Status display

Shows the status of the management service.

Indicates the status of the service from among “Running”, “StartPending”, “Stopped”, and “StopPending”.

2. Start Service button

Used to start the management service.

3. Stop Service button

Used to stop the management service.

4. Version Information button

Used to display the version information window.

5. URL refresh button

Used to reload the URL of Web UI from the IIS manager, and display it.

6. URL display

Shows the URL of Web UI.

When “http://*:…”is displayed, enter the IP address in “*”.

7. Edit button

Used to display the OPD Web Viewer System management window in settings editing mode. This button is displayed on the screen when the service status is “Stopped”.

8. Management Service display

Used to display and set the automatic operation type for management service.

Enabled	Enables the selection of management service operation types from among “Auto” (automatic operation), “System” (delayed automatic operation) and “Manual” (manual operation). The management service is automatically operated (Auto) when it is set to “Enabled”. However, when the operator changes the setting to “System” or “Manual”, “Enabled” is displayed as well.
Disabled	Sets the management service to be disabled.

9. Internal Port display

Used to display and set the port number used for the OPD Web Viewer System internal communication.

10. RT Communication list

Used to display and set the RT information to be transferred from Web UI.

11. Computer Communication

Shows connection destination information of the computer that transfers data from Web UI.

12. Minimize button

Used to minimize the OPD Web Viewer System management window. The button is enabled only when the management service is running or disabled.

13. Exit button

Used to close the OPD Web Viewer System management window.

This button cannot be operated from the device. In the computer server, this button is enabled when the management service is disabled or stopped.

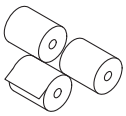
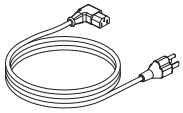
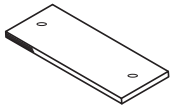
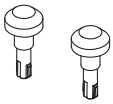
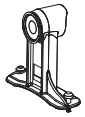
1.4 Symbols

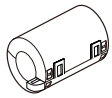
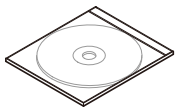
To call attention to users, labels and indications are provided on the device. If labels are peeling off, characters are fading, or otherwise becoming illegible, contact NIDEK or your authorized distributor.

	Indicates that the operator is advised to refer to the related instructions in the operator's manual.
	Indicates the network connector.
	Indicates the state of the power switch. When this symbol side of the switch is pressed down, power is not supplied to the device.
	Indicates the state of the power switch. When this symbol side of the switch is pressed down, power is supplied to the device.
	Indicates the connector for data communication.
	Indicates the connector for a USB device.
	Indicates that the device must be supplied only with alternating current.
	Indicates that the form of protection against electric shock is of a Type B applied part. * The applied parts are the chinrest and the forehead rest (see 11 and 13 in "1.2 Device Configuration").
	Indicates the date of manufacture.
	Indicates the manufacturer.
	Indicates that this product must be disposed of in a separate collection of electrical and electronic equipment in EU.
MD	Medical device
EC REP	EU Authorized Representative
UDI	Unique Device Identifier
REF	Catalog number
SN	Serial number

1.5 Packed Contents

The following are included in the standard configuration. Check the contents before use.

	Part name	Quantity	Appearance
☐	Main body	1	
☐	Printer paper	3	
☐	Power cord	1	
☐	Dust cover	1	
☐	Chinrest paper	1	
☐	Fixing pin for chinrest paper	2	
☐	Spherical model eye	1	

	Part name	Quantity	Appearance
☐	Ferrite core (for LAN cable)	1	
☐	Touch pen	1	
☐	Touch pen stand	1	
☐	Operator’s manual (this book)	1	
☐	Installation CD for OPD Web Viewer System	1	
☐	Installation manual for OPD Web Viewer System	1	

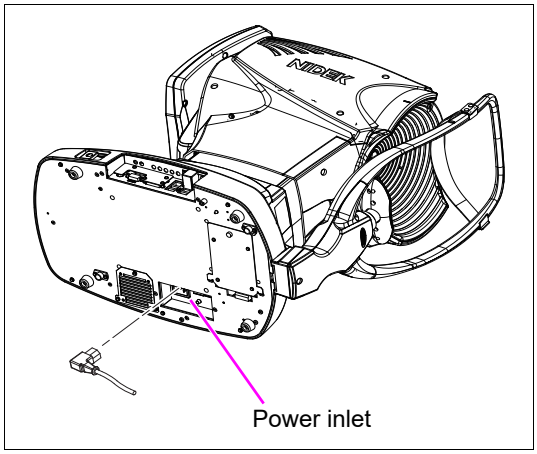
1.6 Before First Use

Place the device on a stable table and connect its power cord.

1 Place the main body on a stable table.

2 Move the main unit fully to the side on which the device will be laid, then gently lay down the device on its side.

3 Connect the power cord to the power inlet.



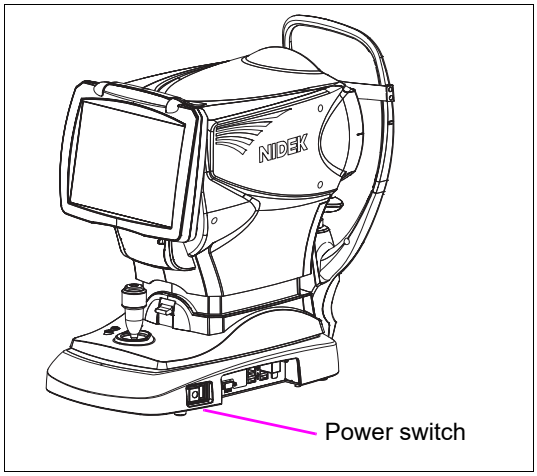
4 Stand the device upright.

5 Connect peripheral equipment as necessary.

Be sure to connect the RS-232C cable before turning on power to the device. USB devices can be connected even when power to the device is turned on.

See “○ Connector panel” (page 5) of “1.2 Device Configuration” for the connection procedure of peripheral equipment.

6 Confirm that the power switch is turned off (○), then connect the power cord to the power outlet.



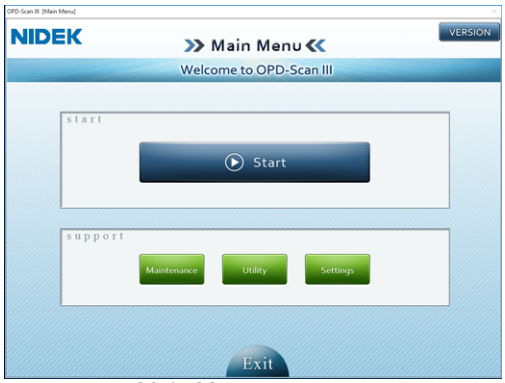
⚠ WARNING • **Be sure to connect the power plug to a grounded outlet.**
Electric shock or fire may result in the event of malfunction or power leakage.

7 Turn on (|) the power switch.

The title screen is displayed and the device is initialized.

Title screen

8 Confirm that the Main Menu screen is displayed.



Main Menu screen

9 Load the printer paper.

See “4.3 Printer Paper Replacement” (page 147) for details on the printer paper loading procedure.

This completes the setup procedure.

Note

- Change the settings on the Settings screen as necessary or desired.

  See “4.8 Changing Device Settings” (page 172) for the setting contents and their setting procedures.

2. OPERATING PROCEDURE

2.1 Operation Flow

[Measurement and printing → Saving of measurement result in database]

Turning on the device

2.2.1 Start up (see page 40)

Turn on power to the device and change the parameter settings of the device as necessary.

Entering patient name

2.3 Patient List Screen Operation (see page 43)

Measurement

2.4 Measurement (see page 53)
2.5 Measurement in OPD/CT Measurement Mode (see page 59)
2.6 OPD Measurement (see page 71)
2.7 CT Measurement (see page 75)

Printing

2.11 Printing Measurement Data (Internal Printer) (see page 93)

After measurement, measurement data can be automatically printed at the same time as data is saved.

After the data is saved, it can be printed again.

Turning off the device

2.2.3 Shut down (see page 42)

[Reading data from the database to display a report]

Patient selection

3.1.1 Displaying report screen (see page 98)

Report screen operation

3.1.2 Report screen common operations (see page 102)
3.2.1 Basic Information Report (see page 108)
3.2.2 Topography Report (see page 113)
3.2.3 Simulation Report (see page 117)
3.2.4 Eye Diagram Image Report (see page 119)

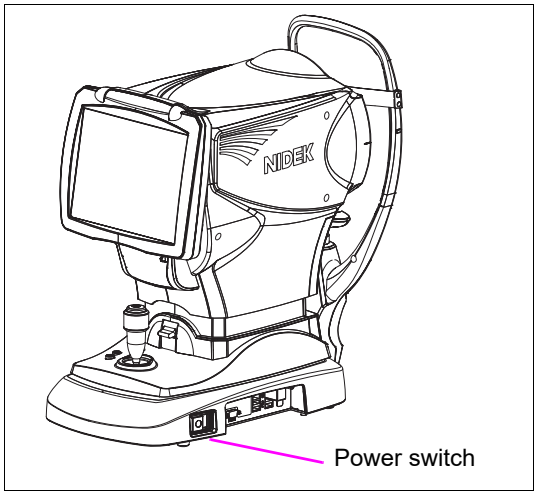
2.2 Start Up and Shut Down

2.2.1 Start up

1 To use an external printer, turn on power to the printer.

2 Turn on (|) the power switch of the device.

The device starts up.



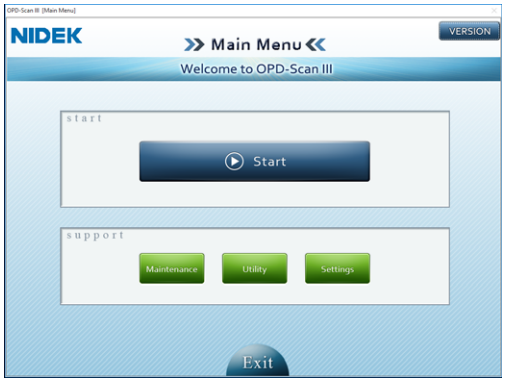
The title screen is displayed and the device is initialized.

Wait until the Main Menu screen is displayed.

When the device is turned on, the measuring unit slightly moves forward and backward, and right and left to determine the initial position for auto tracking. It is not a malfunction of the device.

Title screen

3 The Main Menu screen is displayed.



Main Menu screen

Note

- If the internal solid state disk (SSD) space is insufficient, a message appears during the startup of the device recommending to free up the SSD space by the following methods.
  1. Delete unnecessary patient data by pressing the Delete button on the Patient List screen.
  2. Export data to a USB flash drive or a shared folder from the Export screen that appears by pressing the Export button on the Utility screen. After that, delete the data by pressing the Delete button on the Patient List screen.

4 Perform checks before use.

Perform the following checks before use.

- ☐ No error message appears.
- ☐ The main body moves smoothly when operated with the joystick.
- ☐ The measuring window is clean.
- ☐ The chinrest moves up and down by pressing the chinrest up/down button.
- ☐ Printer paper is sufficient.
- ☐ Measurement accuracy (See “4.5 Checking Measurement Accuracy” (page 150).)

If any abnormality is found, stop using the device, and refer to “4.1 Troubleshooting” (page 141).

2.2.2 Recovery from power saving mode

The device automatically enters power saving mode when it is left idle for a preset period of time. In power saving mode, “Power saving mode...” is displayed on the title screen.

Note

- This idle time can be selected from among 5 minutes, 10 minutes, 15 minutes, and “-” in “Sleep in” (No power saving mode) on the Settings screen (Measurement tab). (Factory setting “-”)

  See “4.8 Changing Device Settings” (page 172) for the setting procedure.

To recover from power saving mode, perform any of the following operations:

- •Touch the touch screen.
- •Press any key of the keyboard.
- •Press the start button.
- •Manipulate the joystick to move the measuring unit so that the eye detected by the device is switched (from right to left, or left to right).

Note

- Depending on the screen condition, the device may not enter power saving mode.

2.2.3 Shut down

⚠ CAUTION • **Be sure to shut down the device according to the procedure described below. Do not turn off the power switch (○).**

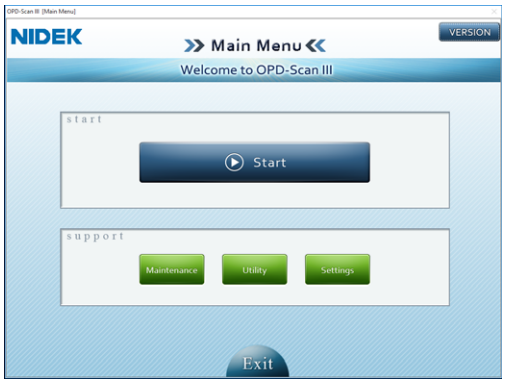
If neither touch screen nor keyboard can be operated, and the device cannot be shut down, turn off the power switch. After that, make sure to turn on the device again to confirm that the device can be operated properly.

Note

• When packing the device, turn off power to the device in Packing mode.

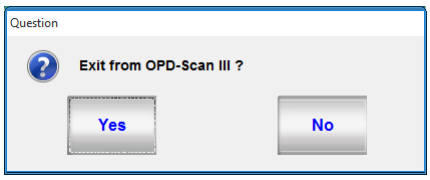
For details of Packing mode, see “4.7.6 Packing mode” (page 170).

1 Return to the Main Menu screen.



2 Press the Exit button.

A confirmation message, “Exit from OPD-Scan III? Yes/No” is displayed.



3 Press the Yes button.

The OPD-Scan III is shut down, and the power switch is automatically turned off.

Pressing the No button returns to the Main Menu screen.

4 If an external printer is connected, turn off power to the printer.

5 Check the cleanliness of the measuring window. Clean it if necessary.

See “4.11.1 Cleaning the measuring window” (page 226).

6 Clean the forehead rest and chinrest. Then place the dust cover over the device.

Gently wipe the surface of the device with clean gauze or absorbent cotton dampened with rubbing alcohol.

Always keep them clean for the next use.

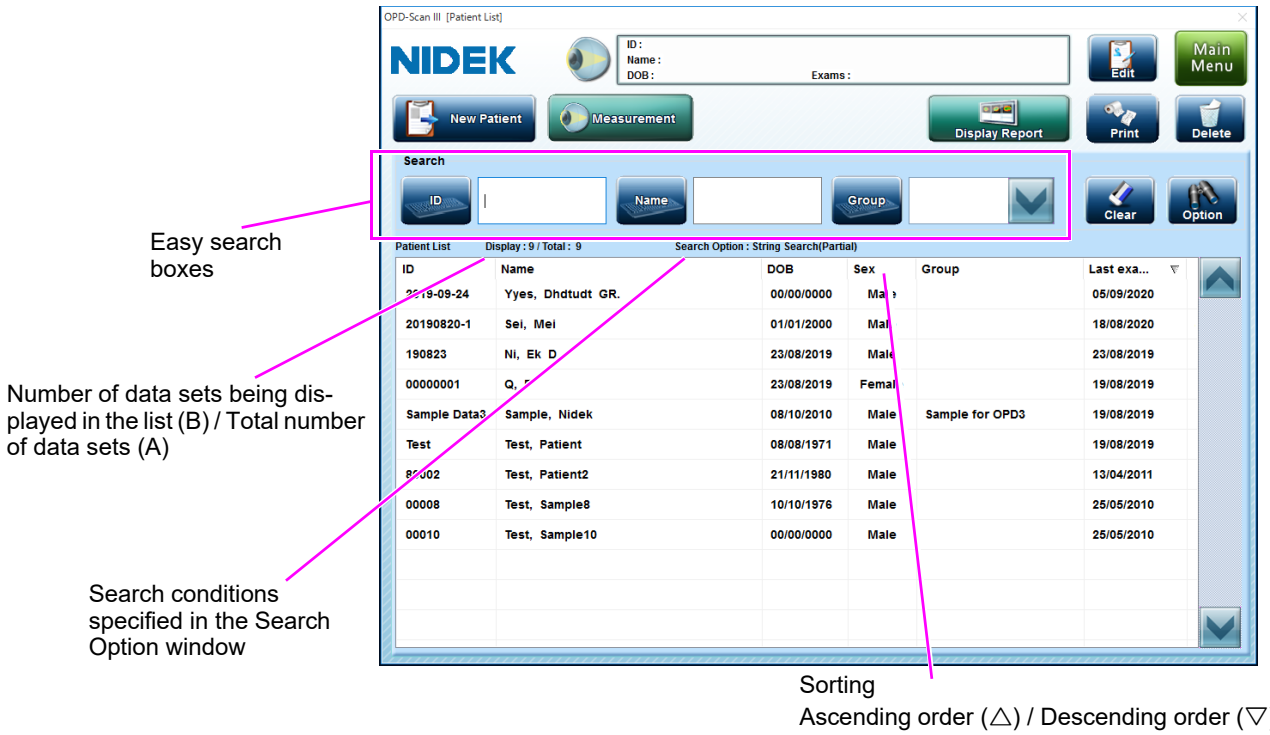
Note

• Be sure to always place the dust cover over the device when it is not in use.

2.3 Patient List Screen Operation

2.3.1 Patient List screen operation

The Patient List screen allows selection of the patient on whom measurement is going to be performed, or whose previous measurement data is going to be viewed. This screen also allows creation, editing, or deletion of patient information.



New Patient button	Used to display the Create Patient window to enter new patient information. See “2.3.2 Registering a new patient” (page 44) for details.
Measurement button	Used to start measurement for the patient selected on the patient list.
Display Report button	Used to display the measurement data for the patient selected on the patient list on the report screen.
Print button	Used to print the measurement data for the patient selected on the patient list using the internal printer. When multiple examination data sets are saved, pressing this button displays the list of examination data. Select the data to be printed from the list.
Easy search boxes	Used to display data sets that match the search conditions entered in the ID, Name, and Group boxes.
Edit button	Used to displays the Edit Patient Information window that displays detailed information of the patient selected on the patient list. In this window, patient information can be changed.
Main Menu button	Used to return to the Main Menu screen.
Delete button	Used to delete the patient information / examination data selected on the patient list. When a patient is deleted, all examination data sets for that patient are deleted. This button cannot be used to delete a specified examination data.

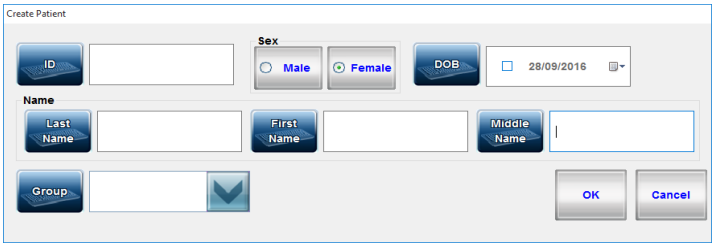
Clear button	Used to clear the current search conditions.
Option button	Used to display the Search Option window.

2.3.2 Registering a new patient

Used to create new patient information.

1 Press the New Patient button on the Patient List screen.

The Create Patient window is displayed.



2 Enter the patient information.

Enter the ID, sex, first name, last name, middle name, date of birth, and group.

Pressing the button to the left of each text box displays the on-screen keyboard used for entering the information. If the hardware keyboard is used, the information can be directly entered in each text box.

1) Enter the patient ID. (Compulsory)

By default, a sequential number starting from “000001” is entered as the ID. To set so that the default sequential number is not automatically entered, select “Off” for “Auto ID Allocation” on the Settings screen (Measurement tab).

2) Select the sex by pressing the Male or Female button.

3) Enter the date of birth in the DOB box. (There are three methods for entering the date of birth.)

See “〇 Entering date” (page 47) for entry method.

Note

- For patient ID, it is recommended to use unique IDs such as medical record numbers to prevent duplication.

  If the entered ID already exists, the message, “The patient ID already exists.” is displayed, and the entered ID is rejected.

  Pressing the OK button displays “Assign unique ID automatically?”. Pressing the Yes button closes the message and automatically creates an ID.
- When data is transferred to RT-5100 or MEM-200 (RT-6100) using RS-232C, the patient ID needs to consist of four or more digits.

  If the patient ID consists of less than four digits, the message, “The data cannot be sent because the ID has less than 4 digits.” is displayed.
- The dates following the current date cannot be entered for the date of birth.

3 Press the OK button to register the patient information.

The screen returns to the Patient List screen.

The registered patient is added to the patient list and selected. If the patient is registered from the Patient List screen (before measurement), the Measurement screen is automatically displayed.

Pressing the Cancel button closes the Create Patient window without registering the entered new patient information.

○ Entering characters

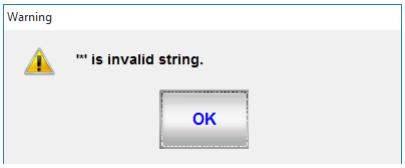
To enter characters and symbols in the text box, hardware keyboard, on-screen keyboard, or drop-down list can be used.

Entering using a hardware keyboard

Texts can be edited in the same manner as with a keyboard for a computer.

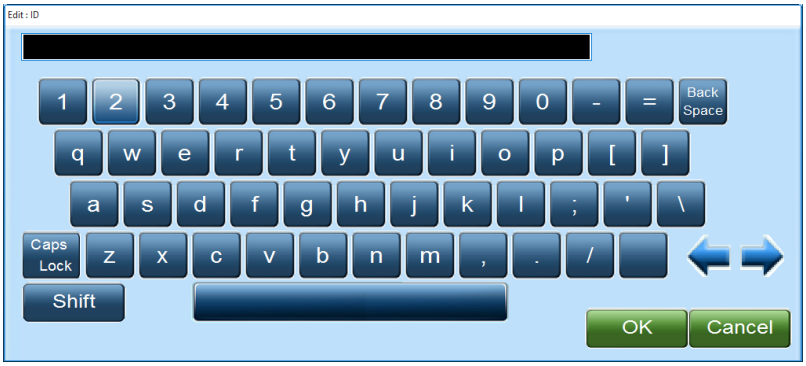
Press the text box or click it with a mouse to directly enter it using a keyboard.

If invalid characters or symbols are entered, pressing the OK button displays a message "'*' is invalid string.", and the entered characters or symbols are rejected.



Entering using on-screen keyboard

Pressing the ( ) button with a keyboard illustration to the left of each text box displays the on-screen keyboard.



,	Used to move the cursor to right or left by one position.

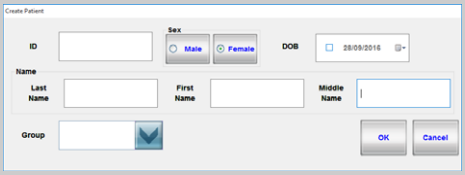
Other keys are used as with a standard keyboard.

If invalid characters or symbols are entered, pressing the OK button displays a message "'*' is invalid string.", and the entered characters or symbols are rejected.

Note

- If the on-screen keyboard is set to be disabled, no buttons are displayed to call up the on-screen keyboard. Text boxes are identified by labels instead.

  For the setting to enable the on-screen keyboard, see "4.6.3 Use of on-screen keyboard" (page 160).



Example of the window when its text boxes are identified by labels

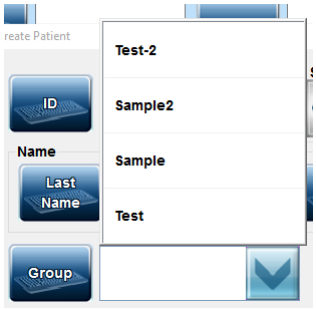
- When the on-screen keyboard is displayed, any hardware keyboard is disabled. However, the mouse can be used.
- If the on-screen keyboard is displayed to edit existing information, all the information becomes automatically highlighted. Therefore entering a character deletes all of the existing information. To change only a part of the existing information, press any part of the text box or the arrow button to display a cursor before entering any characters.

Selecting from drop-down list

If there is the down arrow (V) button to the side of the text box, the information to be entered can be selected from the drop-down list.

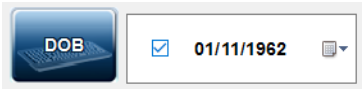
Select the desired item from the list that appears by pressing the down arrow (V) button.

Information can be directly entered in the text box as well. If new information is entered, it is added to the list.



○ Entering date

There are three methods to enter dates such as the date of birth and dates for searching interval specified in “From” and “To” of “Time Interval”.

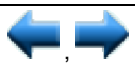


If the date of birth has not been entered, selecting the check box enters the current date. Entering a birth of date automatically selects the check box.

Entering using a numeric keypad

Use the numeric keypad that appears by pressing the DOB button (or the button next to any other date button).

Select the Day, Month, or Year text box respectively to enter the date.

	Used to delete a character to the left of the cursor. If characters are selected, they will be deleted.
	Used to move the cursor to right or left by one position.
OK button	Used to save the entered date and close the numeric keypad.
Cancel button	Used to cancel the entered date and close the numeric keypad.

Entering using a hardware keyboard

If a hardware keyboard is used, the information can be directly entered in each text box.

Press the day, month, and year to select them, then overwrite them using the keyboard.

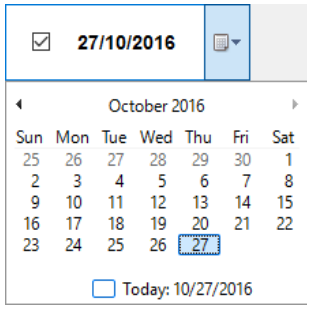
If an inappropriate number is entered, it will be automatically corrected and entered.

Entering using calendar

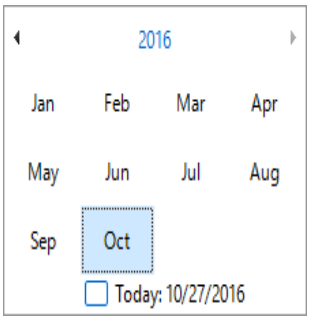
A calendar appears by pressing the down arrow (V) button.

Select the day by pressing the desired one in the calendar.

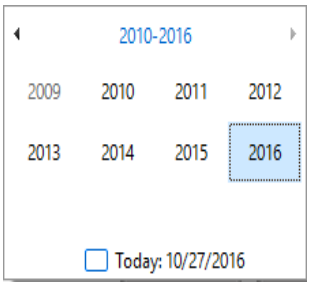
The highlighted day is the selected day.



Select the desired month from the list that appears by pressing the month and year indication. Pressing the (◄) or (►) buttons displays the previous or following year.



Select the desired year from the list that appears by pressing the year indication while the months are displayed. Pressing the (◄) or (►) buttons displays the previous or following 12 years.



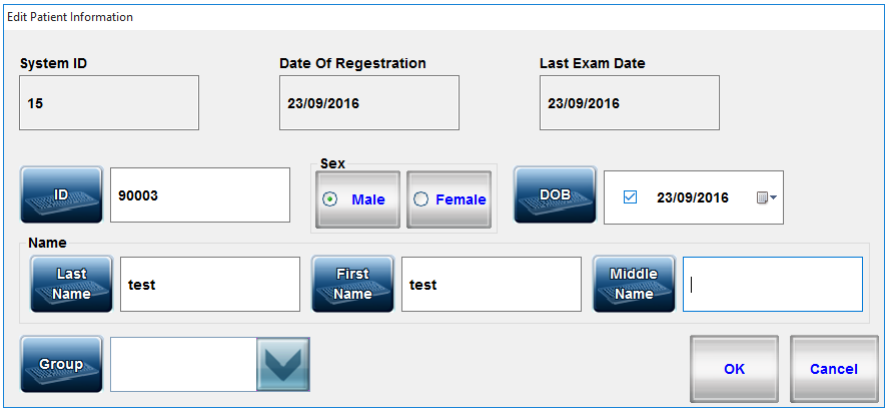
2.3.3 Editing patient information

The existing patient information can be edited.

1 In the Patient List screen, select the patient whose information is to be edited.

2 Press the Edit button.

The Edit Patient Information window is displayed.



3 Edit the existing information displayed in the text boxes.

Edit the existing information in the same manner as when entering new information.

Information in white text boxes can be edited. Information in gray text boxes (System ID, Date of Registration, and Last Exam Date) cannot be edited.

4 Press the OK button to register the edited patient information.

The Edit Patient Information window is closed and the Patient List screen is displayed.

2.3.4 Deleting patient data

The existing patient information can be deleted.

When a patient is deleted, all examination data sets for that patient are deleted.

1 In the Patient List screen, select the patient whose information is to be deleted.

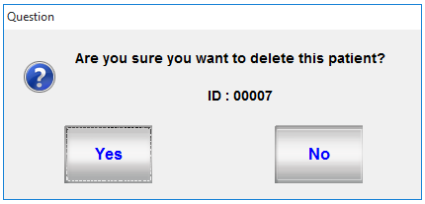
Multiple patients can be selected on the patient list using the Shift + Ctrl key on the keyboard (when using the optional keyboard).

Selecting multiple consecutive rows	Press the first or last of the rows to be selected, then, while pressing the Shift key, press the row on the other end of the range.
Selecting multiple non-consecutive rows	While pressing the Ctrl key, select the desired rows. The selected rows are added to the multiple selection.

2 Press the Delete button 

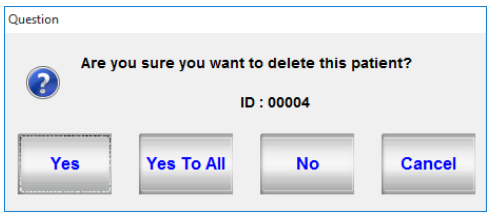
.

The confirmation message, “Are you sure you want to delete this patient? ID:***** Yes/No” is displayed.



When multiple patients are selected

The confirmation message, “Are you sure you want to delete this patient? ID:***** Yes / Yes To All / No / Cancel” is displayed.



3 Press the Yes button to delete the data for the selected patient.

The message is closed and the Patient List screen is displayed.

Pressing the No button cancels the deletion and closes the message.

When multiple patients are selected

Yes button	Deletes the patient data whose ID displayed in the message, then displays the confirmation message for the next patient.
Yes To All button	Deletes all the selected patients, and closes the message.
No button	Cancels the patient data whose ID displayed in the message, then displays the confirmation message for the next patient.
Cancel button	Cancels deletion of all the selected patients, and closes the message. Patients deleted before pressing the Cancel button cannot be restored.

2.3.5 Patient search

The desired patient data can be searched for by easy search on the Patient List screen or optional search in the Search Option window.

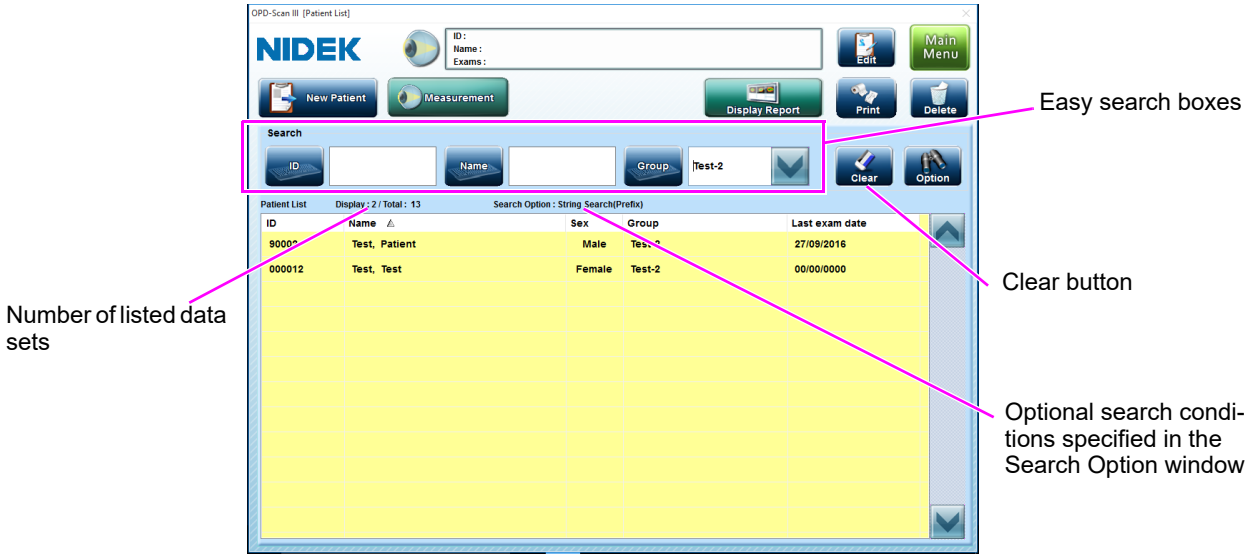
○ Easy search

Entering the search conditions in the Search boxes (ID, Name, and Group) on the Patient List screen displays only the patient data that matches the search conditions with right truncation on the patient list. When multiple search conditions are entered, the AND search is executed.

Patients can be searched for only by their first or last names. They cannot be searched for by their middle names.

When the search results are displayed, the background of the patient list is yellow. If no data matches the entered search conditions, no data is displayed on the patient list shown in yellow background.

On the top of the patient list, the number of the extracted data sets is shown as “Display: ** / Total: **”.



Pressing the Clear button 

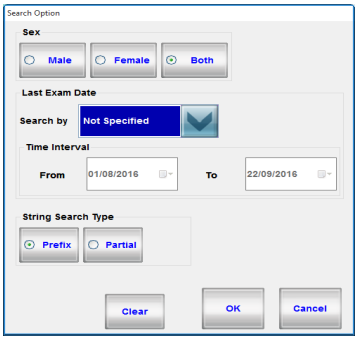
clears the search conditions specified in the Search boxes (ID, Name, and Group).

The optional search conditions specified in the Search Option window cannot be cleared with the Clear button on the Patient List screen. They can only be cleared in the Search Option window.

○ Optional search

Patient data can be searched for furthermore using optional search conditions in the Search Option window. In addition to the easy search conditions specified in the Search boxes, sex and the last examination date can be specified.

1) Press the Option button to display the Search Option window.



2) Specify the desired search conditions in the boxes.

When search conditions are added, the patient list is refreshed to reflect the new search conditions.

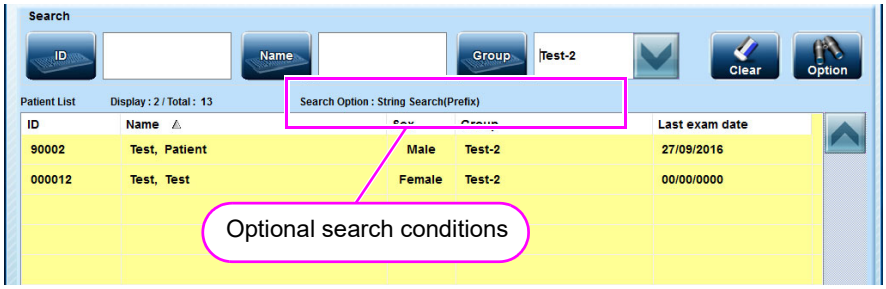
Sex	Select from among “Male”, “Female”, and “Both”.
Last Exam Date	Select from among “Not Specified”, “Today”, “Last Week”, “Last Month”, “Last 3 Month”, and “Time Interval”. When other than “Not Specified” is selected for “Search by”, only patients whose last examination date fall within the specified range are extracted. When “Time Interval” is selected, data can be searched for within a specific period of time by entering “From” and “To”. Press the From and To buttons, then enter the desired values, or press the down arrow (V) button to select the desired dates.
String Search Type	Select the method of easy search from “Prefix” (right truncation) and “Partial” (simultaneous left and right truncation).

See “○ Entering date” (page 47) for entry method.

3) Press the OK button to execute the search.

The extracted patients are listed on the Patient List screen.

When the optional search is used, the optional search conditions are shown above the patient list.



The optional search conditions specified in the Search Option window cannot be cleared with the Clear button (Clear) on the Patient List screen.

To cancel the search result and restore the patient list to the original condition, press the Clear button in the Search Option window to initialize the search conditions (Sex: Both, Last Exam Date: Not Specified), then press the OK button.

2.4 Measurement

Corneal curvature radius and distribution of refractive power are measured.

Measurement mode

Two types of measurement are available: OPD and CT measurements. The measurement mode button allows selection of the OPD measurement mode, CT measurement mode, or OPD/CT measurement mode.

Measurement mode button	Measurement type	See
OPD/CT	OPD measurement and CT measurement	"2.5 Measurement in OPD/CT Measurement Mode" (page 59)
OPD	OPD measurement	"2.6 OPD Measurement" (page 71)
CT	CT measurement	"2.7 CT Measurement" (page 75)

Explanation of measurement

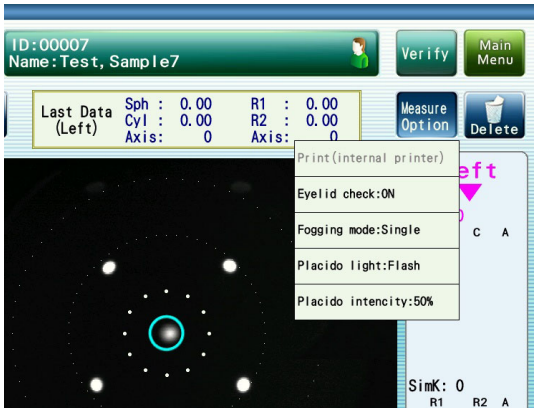
OPD measurement	Calculates the AR values (refractive error as obtained with an auto-refractometer) by scanning the retina with slit-shaped ray bundles and taking measurements in increments of 1° within a 2 to 9.5 mm-diameter area. In addition, refractive error (D) is calculated at multiple points within the central 9.5 mm-diameter area and shown as the OPD map.
CT measurement	Calculates keratometry and produces maps that show the corneal curvature radius and distribution of refractive powers on the cornea by analyzing the placido rings captured after projection on the cornea.

Temporarily enabled function

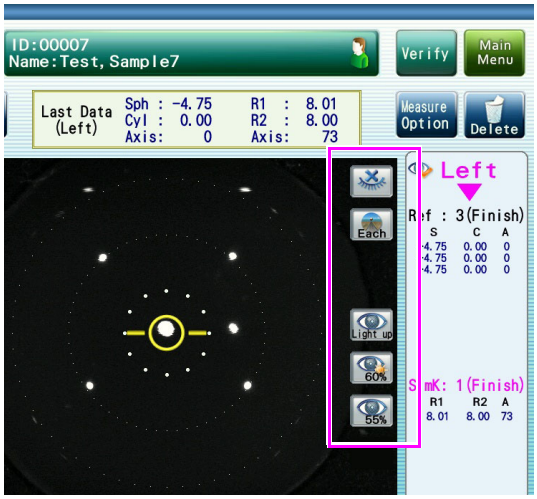
For convenience, some functions can be temporarily enabled without displaying the Settings screen (Measurement tab). The same button operation offers an option to print the measurement data with the internal printer.

Select the desired functions to be temporarily enabled from the pop-up menu that appears by pressing the Measure Option button.

These temporarily enabled functions are disabled when deletion or printing of data is performed in the Measurement screen.



Icons appear on the screen indicate the functions that differ from those on the Settings screen.

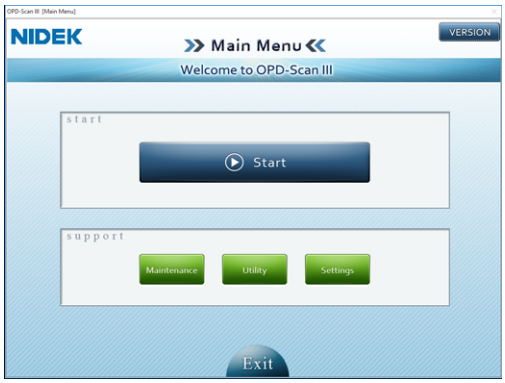


Print (internal printer)	Used to print the current measurement data with the internal printer and clears the measurement data. Selecting “Print (internal printer)” immediately starts printing. If there is no measurement data, this option is grayed out and cannot be selected.
Eyelid check 	Used to toggle display of the error due to eyelid detection between “ON” and “OFF”. This setting is not available on the Settings screen. The default setting is “ON”.
Fogging mode 	Used to toggle use of fogging for every OPD measurement between “Single” and “Each”.
Placido light 	Used to toggle lighting of the placido light between “Flash” (lit only during measurement) and “Light up” (always lit).
Placido intensity 	Used to set the intensity of the placido rings. Selecting this function displays the on-screen numeric keypad. Enter the intensity by percentage. Change the intensity if detection of the placido ring fails.
CT measurement internal LED intensity 	Used to set the CT measurement internal LED intensity (central light). Selecting this function displays the on-screen numeric keypad. Enter the intensity by percentage in the range from 0 to 100%. Detection of the entire placido ring edges may fail if the internal LED (central light) spots cannot be detected properly due to reflection of light by IOL or cataract. In such a case, perform the measurement with the intensity of the LED (central light) lowered, for example, from 50% (initial value) to 30%. That may reduce reflection of light during the measurement.

2.4.1 Measurement procedure

1 Turn on power to the device.

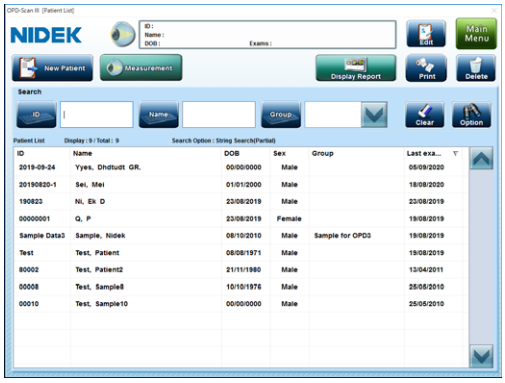
The device starts up, and the Main Menu screen is displayed.



Main Menu screen

2 Press the Start button to access the Patient List screen.

The Patient List screen is displayed.



3 Select the desired patient from the patient list.

Existing patient	Press a patient on the list to select that patient.
Unregistered patient	Register as a new patient. See “2.3.2 Registering a new patient” (page 44).

Pressing an item name (ID, Name, Sex, Group, or Last exam Date) on top of the patient list sorts the data in ascending order. Pressing the item name once again sorts the data in descending order. The sort order is indicated by △ (ascending order) or ▽ (descending order) to the side of the item name.

To search any patient data, specify the easy search conditions in the Search boxes (ID, Name, Group). Additionally, optional search conditions can be specified in the Search Option window.

For details of patient search, see “2.3.5 Patient search” (page 51).

4 Press the Measurement button to access the Measurement screen.

Pressing the desired patient twice (double-click) on the Patient List screen also displays the Measurement screen.

5 Conduct patient preparation.

1) Clean the forehead rest and chinrest that come into contact with the patient with clean gauze or absorbent cotton dampened with rubbing alcohol.

   If a stack of chinrest paper is on the chinrest, remove one sheet.

2) Instruct the patient to remove glasses or contact lenses, and sit on the chair.

Note

- To obtain accurate measurement from patients who wear contact lenses on a daily basis, it is recommended to have them wear glasses instead of contact lenses for a week before the measurement.

  The shape of the cornea altered by the contact lenses needs to be restored to the original condition.

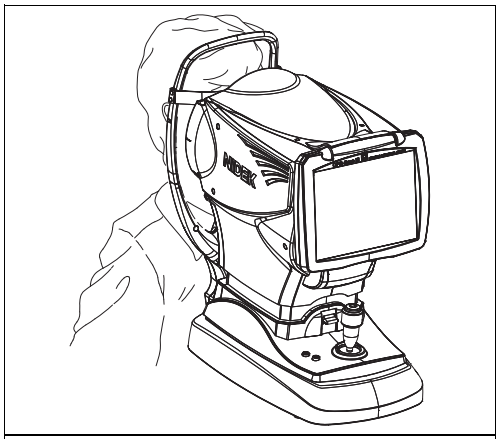
[Over-refraction]

Should case of over-refraction occur (measurement with glasses worn), the focusing indicator may not appear (see page 61).

Execute the OPD measurement at the position where the alignment light appears the smallest. However, reflection of the measurement light by the glasses may interfere with proper OPD measurement.

CT measurement cannot be executed properly due to causes such as alteration of image magnification by the glasses.

3) Have the patient place their chin on the chinrest as deeply as possible, and their forehead gently on the forehead rest.

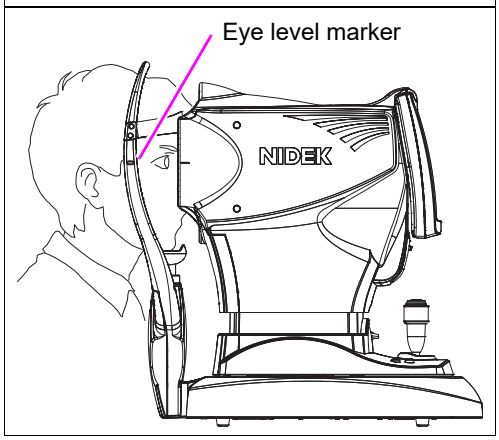


4) Adjust the height of the chinrest with the chinrest up/down button (▲ , ▼) so that the patient's eyes are roughly aligned to the eye level marker.

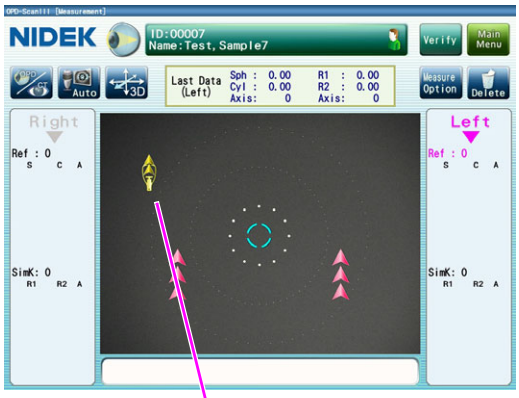
   Before adjusting the height of the chinrest, let the patient know that the chinrest moves up and down.

   Move the chinrest up or down while checking the patient condition directly.

   If a large deviation with the eye level marker is found, release the chin from the chinrest and then move the chinrest up or down.



When the chinrest is at the upper (or lower) mechanical limit, the upper limit indicator (or lower limit indicator) is displayed on the screen.



Note

- To relax the patient, explain the following before measurement:
  This measurement is for determining the best lens for the patient and for measuring the corneal shape. The weak infrared light and blue light used for measurement do not harm the eyes.

6 Set the measurement conditions as necessary.

Measurement mode

Each pressing of the measurement mode button changes the selected mode as OPD/CT → OPD → CT → OPD/CT...

The button whose display indicates the selected measurement mode is displayed on the screen.

Auto shot function

Press the button to enable or disable the auto shot function.

Manual	The auto shot function is disabled. Press the start button to start measurement.
Auto	The auto shot function is enabled. Measurement starts automatically when the eye is best aligned and focused. In the CT measurement, the auto shot function is disabled.

Note

- When the auto shot function is used, any other operation cannot be performed during the time from the auto alignment to the start of the measurement.

Auto tracking function

Press the button to enable or disable the auto tracking function.

3D	The auto tracking function in the forward/backward, right/left, and up/down directions is enabled.
2D	The auto tracking function in the right/left, and up/down directions is enabled.
OFF	The auto tracking function is disabled. The alignment and focus are manually adjusted.

Note

- Once the measurement settings above are set, they are maintained in the subsequent measurements.

7 Start the measurement.

For details of each measurement, see the following.

"2.5 Measurement in OPD/CT Measurement Mode" (page 59)

"2.6 OPD Measurement" (page 71)

"2.7 CT Measurement" (page 75)

Note

- Instruct the patient not to blink during measurement. For successful measurement, it is recommended to have the patient blink once then open their eyes wide just before measurement.
- Instruct the patient to open both eyes wide during measurement.

  Closing one eye may cause unstable fixation and insufficient opening of the other eye.
- For patients who have difficulty fixating their eyes, the operator should guide the patient's gaze direction by voice.
- If necessary, temporarily enable the desired functions by pressing the Measure Option button.

  See "2.4 Measurement" (page 53) for details.

After verifying the measurement result, save data to the database by operating the specific button on the screen.

⚠ **CAUTION** • **Do not save excessively many measurement data sets for a single patient ID. It is recommended to determine the limit of the number of data sets to 100 for the right and 100 for the left eye.**

If a large amount of data is saved for a single patient ID and the data processing becomes heavy, the processing may become slow and an error may occur.

8 Release the patient from the chinrest.

Instruct them to remain seated when removing their head from the chinrest. If they stand up at this time, their head may hit the headrest.

9 To measure the next patient, repeat from Step 3.

See "2.2.3 Shut down" (page 42) for details on finishing measurement.

To print the measurement result, see "2.11 Printing Measurement Data (Internal Printer)" (page 93).

2.5 Measurement in OPD/CT Measurement Mode

In OPD/CT measurement mode, OPD measurement and CT measurement are successively executed.
The OPD/CT measurement mode screen displays “Ref: S, C, A” (OPD measurement), and “SimK: R1, R2, A (or AVG, CYL, A)” (CT measurement) on both sides.
Both in OPD and CT measurement modes, only the best measurement data (one data set for each mode) is saved to the database.

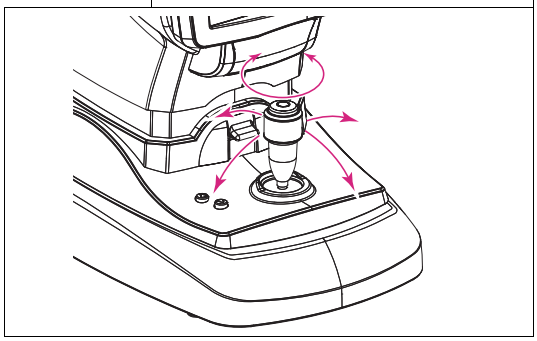
1 Instruct the patient to look into the measuring window, relax, and stare at the picture of balloon with eyes wide open.

Scenery chart

2 Manipulate the joystick so that the patient’s eye is displayed on the screen.

Moving the joystick right, left, forward, and back moves the main body of the device in the same direction. Rotating the knob of the joystick moves the measuring unit up and down.

Move the main body up, down, right and left to align it with the patient’s eye. Then adjust the focus to the patient’s eye by moving the main body forward and back.



3 Perform alignment and focus adjustment.

The procedure of alignment and focus adjustment varies depending on the setting of the auto tracking function.

* See “2.4.1 Measurement procedure” (page 55) for details.

Perform alignment by bringing the alignment guide mark (center of the eye) reflected on the patient's eye inside the target mark.

Adjust the focus while referring to the focusing indicator displayed in the center of the screen.

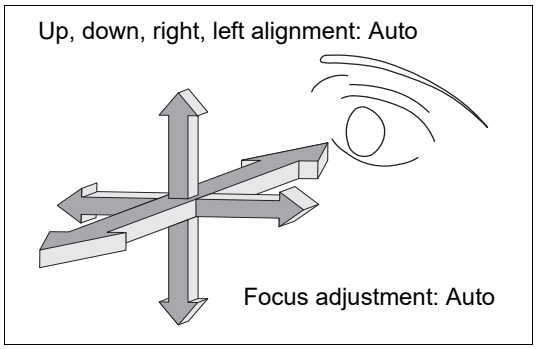
Confirm that the patient’s pupil is larger than the minimum pupil mark.

Note

- Auto tracking or auto shot may not function due to the condition of the patient's eye.
  In such a case, turn off the auto tracking and auto shot functions before measurement.

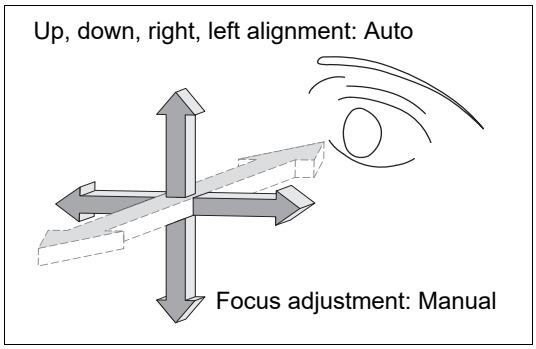
3D auto tracking 

1) Perform rough alignment and focus adjustment to the working range of the auto tracking function.
2) When the main body is brought into the working range of the auto tracking function, fine alignment and focus adjustment automatically starts.



2D auto tracking 

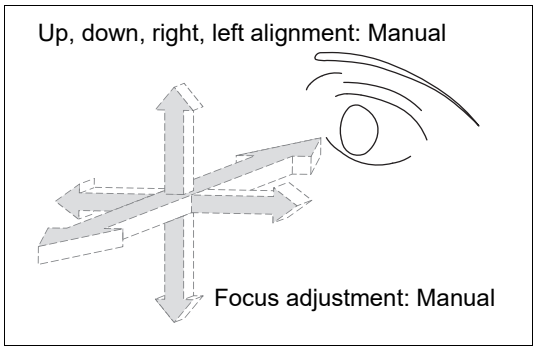
1) Perform rough alignment and focus adjustment to the working range of the auto tracking function.
2) When the main body is brought into the working range of the auto tracking function, fine alignment automatically starts.
3) As the focusing indicator is displayed, manipulate the joystick until the optimum focusing indicator is displayed.



Auto tracking OFF 

1) Perform alignment and focus adjustment.
2) Manipulate the joystick to bring the alignment guide mark reflected on the patient's eye inside the target mark.
3) As the focusing indicator is displayed, manipulate the joystick until the optimum focusing indicator is displayed.

   During the focusing, maintain the alignment between the device and the patient's eye.



Note

- If eyelashes cover the minimum pupil circle, proper measurement may not be achieved.

  In such a case, instruct the patient to open their eyes wider.

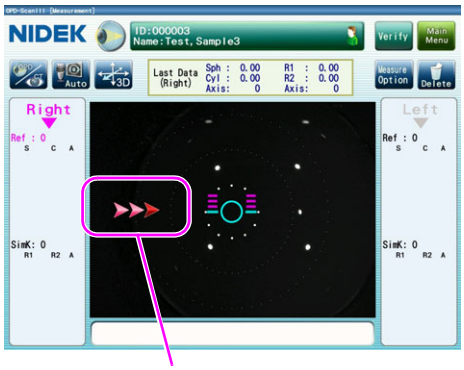
  If the patient cannot open their eyes wider, lift the patient's eyelid while paying attention not to press against the eyeball.

If the alignment is outside the working range of the auto tracking function

The limit indicator appears. Manipulate the joystick or press the chinrest up/down button while referring to the limit indicator.

<Example of limit indicator>

The measuring unit is too high from the patient's eye. Move the measuring unit down.

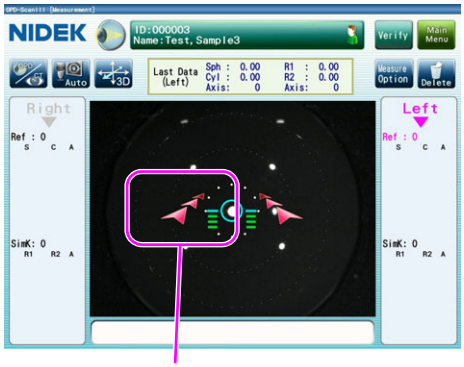


The measuring unit is too far to the left from the patient's eye. Tilt the joystick to the right to move the measuring unit to the right.

	Move the measuring unit up.
	Move the measuring unit down.
	Tilt the joystick slightly to the right.
	Tilt the joystick slightly to the left.

○ Focusing indicator displays

If the focus is outside the working range of the auto tracking function, the limit indicator appears.

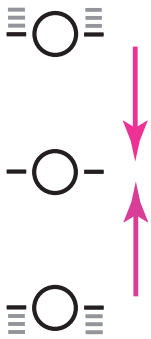


Limit indicator

When the focusing indicator appears, manipulate the joystick while referring to it.

	Push the joystick away from you to move the measuring unit closer to the patient.
	Pull the joystick toward you to move the measuring unit away from the patient.

Refer to the focusing indicator for the amount to move the joystick forward and back.



Too close to the patient's eye

Pull the joystick toward you to move the measuring unit away from the patient's eye.

Optimum focus condition

Push the joystick away from you to move the measuring unit closer to the patient's eye.

Too far from the patient's eye

4 Start measurement.

To measure both right and left eyes in OPD/CT measurement mode, either of the following procedure (A) or (B) can be used.

(A) First the OPD and CT measurements are performed for one eye, then the same measurements are performed for the other eye.

Example: OPD measurement (right eye) → CT measurement (right eye) → OPD measurement (left eye) → CT measurements (left eye)

(B) The OPD measurement is performed for both eyes, then the CT measurement is performed for both eyes.

Example: OPD measurement (right eye) → OPD measurement (left eye) → CT measurement (right eye) → CT measurements (left eye)

In this manual, the measurement procedure is explained with procedure (A).

When procedure (A) is used, the accuracy of the PD measurement executed at the same time as the OPD measurement may be lowered. This is because the time difference between the OPD measurements for right and left eyes is greater in procedure (A) than (B), and the probability of shift in the pupil position is higher.

Note

- Fogging is applied when the OPD measurement starts. Instruct the patient not to blink and keep staring at the balloon although it appears blurry to the patient.

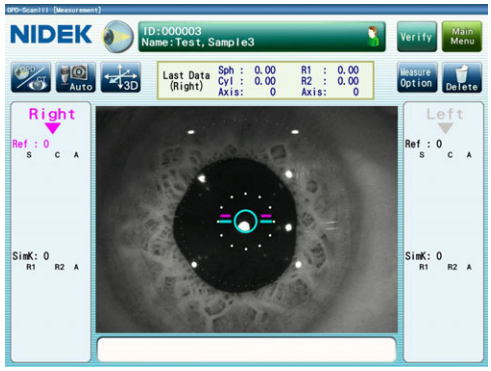
The eye to be measured is automatically switched between the right and left eyes when the measuring unit is moved and the eye to be measured is displayed on the screen.

The currently displayed eye (Right/Left) and measurement mode (Ref/SimK) are shown in pink on the Measurement screen.

① When the optimum alignment and focus conditions are achieved, the OPD measurement automatically starts (when the auto shot function is enabled).

When the auto shot function is disabled, press the start button to start the measurement.

When the OPD measurement is executed for a specified number of times, "(Finish)" appears on the side of number of measurements for "Ref", and the OPD measurement is complete.



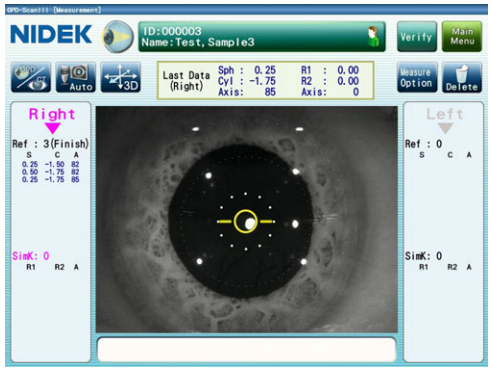
▼

② When the OPD measurement is complete, "SimK" for the selected eye in the eye/measurement display is shown in pink.

▼

③ To prepare for the next measurement, have the patient slowly blink once or twice.

▼



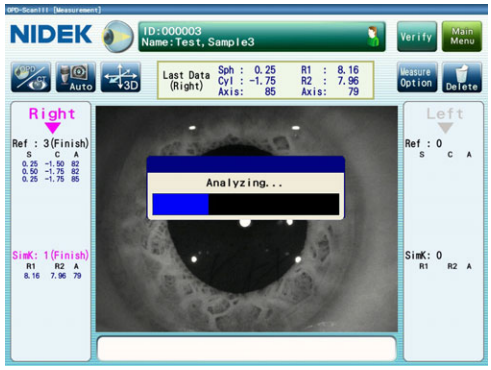
2

Note

- The placido rings light up in blue when the CT measurement starts. Instruct the patient not to blink and keep staring at the balloon although the placido rings appear brightly blue to the patient.

④ After confirming that the optimum alignment and focus conditions are achieved, press the start button to start the CT measurement.

Press the start button to start the CT measurement regardless of the auto shot function setting.



The latest OPD measurement and the latest keratometry simulated based on the CT measurement result are displayed in the latest data display in the upper part of the screen.

When the CT measurement is executed for a specified number of times, "(Finish)" appears on the side of number of measurements for "SimK", and the CT measurement is complete.

Inform the patient that the measurement is complete and have them rest comfortably.

Note

- Even when the auto shot function is enabled, the operator can start measurement by pressing the start button.

  If the measurement does not start automatically due to frequent blinks or other causes, the measurement can be started by pressing the start button.
- Instruct the patient not to blink or move their head or eyes during the measurement.
- If the measurement resulted in an error, the possible causes are as shown below. If the error occurs successively, find the cause.
  a. Patient's blink during measurement
  b. Eyelid or eyelashes covering the minimum pupil mark during OPD measurement
  c. Eyelid or eyelashes covering the anterior segment illumination spots during CT measurement
  d. Patient's pupil smaller than the minimum pupil mark

     Have the patient sit in a dark room for a while until the pupil becomes large enough, then try measurement again.
  e. Extremely low retinal reflection due to eye disease such as cataract
  f. Extraneous reflection of light on the cornea during measurement
  g. Extremely distorted cornea

Note

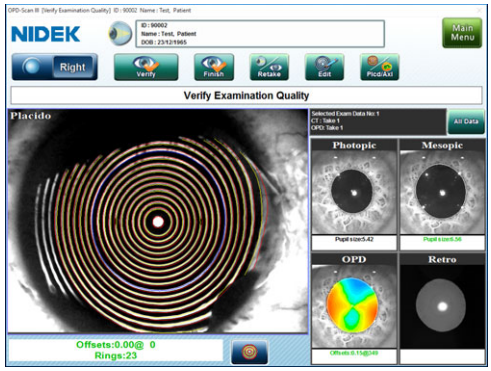
- The measurement stops if the device loses alignment or focus. However, when the alignment and focus are achieved again and the measurement is performed, the measurement data is added to the memory together with the previous measurement data.
- A maximum of 10 measurement data sets can be saved in the memory for the right and left eyes each. When a measurement data set is added to the memory that already contains 10 measurement data sets, the oldest data is deleted.
- The criteria for completing the OPD measurement is set with “End Criteria - OPD” on the Settings screen (Measurement tab).
- The OPD measurement can be repeated successively with the fogging condition maintained by selecting the check box for “Single Fogging” on the Settings screen (Measurement tab).

[OPD measurement value display]

If the reliability of the measurement result is low or the measurement was executed under different measurement conditions than the usual, any of the following symbols appears to the right of the AR value on the screen.

E	Indicates high RMS measurement values. (Only when the check box for “High RMS Data” on the Settings screen (Measurement tab) is selected.) The measurement value is displayed in orange.
*	Indicates that the measurement was executed in Cataract mode. If measurement cannot be executed due to cataract or any other eye abnormality, the measurement conditions are automatically changed to allow the measurement.
#	Indicates that the measurement was executed in Small Pupil mode. If measurement cannot be executed due to a small pupil, the measurement conditions are automatically changed to allow the measurement. The measurement value is shown in red. This data cannot be saved to the database.
Ef	Indicates that the measurement was executed without the focusing indicator being displayed on the Measurement screen. The error message “No.413:Focus alignment is too off-centered.” is displayed in the message box of the Measurement screen. The Offsets indication is shown in red on the Verify Examination Quality screen. The Offsets values displayed in the upper right corner of each map on the report screen are shown in red.

5 The Verify Examination Quality screen is displayed.



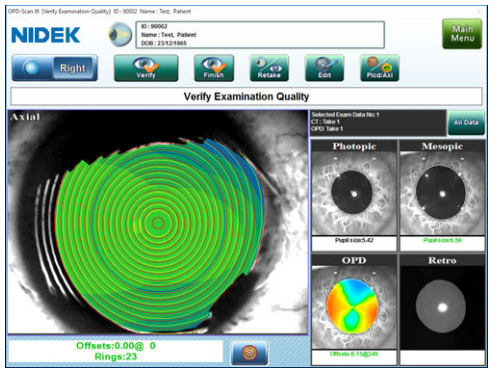
When the CT measurement is executed the specified number of times, the Verify Examination Quality screen is automatically displayed.

If the CT measurement is not complete, press the Verify button to display the Verify Examination Quality screen.

Note

- When the OPD and CT measurements for an eye is complete, the Verify Examination Quality screen is displayed.

6 In the Verify Examination Quality screen, verify the result of image capture and ring edge detection.



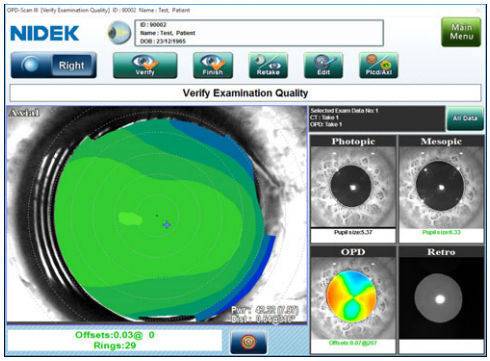
Verify the result based on the following criteria.

- •No influence from patient's blinking or eyelashes
- •Eye opened wide (No gaps in ring)
- •No influence from insufficient or excessive tears (No distortion in ring)
- •Appropriate alignment ("Offsets" is shown in green.)
- •Precisely detected ring edge (Correctly traced)
- •No abnormality in map

Detected placido ring edges are shown with red and yellow lines.

The operations shown below are available in the Verify Examination Quality screen.

When the captured image and detected edges are satisfactory	Press the Verify button to return to the Measurement screen, then perform measurement of the other eye.
If edges need to be edited	Select the Placido map and press the Edit button. See "2.8 Editing Placido Ring Edges" (page 79).
If OPD measurement data needs to be edited	Select the OPD map and press the Edit button. See "2.10 Editing OPD Analysis Area" (page 90).
If the detected pupil contour needs to be edited	Select the Photopic or Mesopic map and press the Edit button. See "2.9 Editing Detected Pupil Contour" (page 85).
Temporarily enabling the color scale of OPD map	Select the OPD map to display it and press the color scale indication area. The Select Scale window that allows changing of the color scale settings is displayed. See "○ Changing the color scale of an OPD map" (page 69).
When the captured image and detected edges are not satisfactory	Press the Retake button. Pressing this button displays the options: "Retake OPD/CT", "Retake OPD", and "Retake CT". Select the desired measurement mode. The Measurement screen is displayed. Perform additional measurement.

Finishing measurement with only one eye	Press the Finish button. The Verify Result window is displayed. Verify the measurement result.
Displaying or hiding the placido ring edge detection result	Press the edge display button  . Each pressing of this button displays or hides the edge detection result.
Displaying the Axial map and reviewing it	Press the Plcd/Axl button  . Each pressing of this button switches between the Placido image and the Axial map. Review the Axial map to confirm that it is not affected by tear fluid or such. 
Viewing all measurement data	Press the All Data button to access the Verify Multi Measurement screen and display all measurement data. The selected data to be saved can be changed. 
Stopping measurement	Press the Main Menu button to access the Main Menu screen without saving the measurement data. The message, ‘Data has not been saved. Are you sure you want to return to “Main Menu”? Yes/No’ appears. Press the Yes button to access the Main Menu screen.

Note

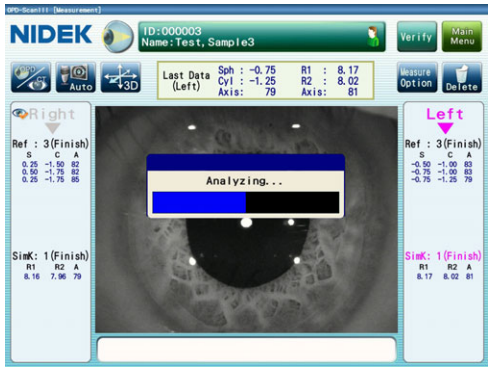
- The placido rings will be illuminated for about 15 seconds before the second CT measurement to prevent the patient from becoming surprised and blinking. Measurement can be started by pressing the start button while the placido rings are illuminated or in 15 seconds after they are turned off.

7 Press the Verify button to complete measurement of one eye and return to the Measurement screen.

Pressing the Delete button 

displays the message, “Are you sure you want to delete the measurement data? Yes/No”. Pressing the Yes button deletes all data being displayed.

8 Switch the eye to be measured, and measure the other eye in the same manner.

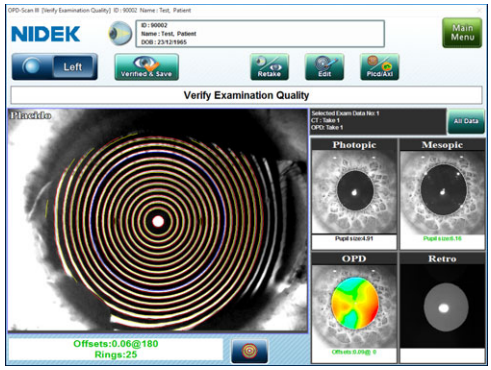


9 When “Finish” is indicated for the CT measurement, the Verify Examination Quality screen is displayed. Verify the result of image capture and ring edge detection.

Verify them in the same manner as Step 6.

The Verify Examination Quality screen displayed after measurement of both eyes differs from that displayed after measurement of one eye.

Instead of the Verify button, the Verified & Save button is displayed. The Finish button is not displayed.



The operation shown below is available in the Verify Examination Quality screen.

When the captured image and detected edges are satisfactory	Press the Verified & Save button. The Verify Result window is displayed. Verify the measurement result.

In addition, verify the results of image capture and ring edge detection in the same manner as Step 6.

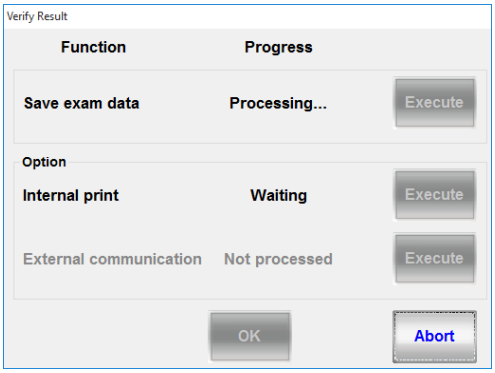
Note

- If the eye (Right/Left) indication on the screen is switched, the Verified & Save button is not displayed and the Retake button becomes disabled.

10 Pressing the Verified & Save button displays the Verify Result window to show the progress of the processing after the measurement.

The progresses of data saving and optional functions are displayed.

Wait until the selected functions are complete.

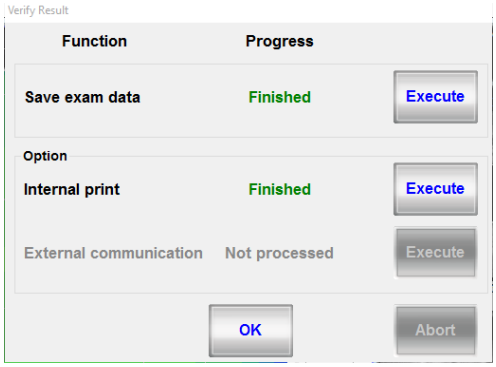


Internal print	Printing of measurement data with the internal printer
External communication	Data output to NIDEK system table using RS-232C

The processing is complete when the indication "Processing..." changes to "Finished".

Pressing the Abort button before the processing completes stops the processing.

After "Finished" is displayed, pressing the Execute button to the right of "Finished" in the Verify Result window executes the processing again.



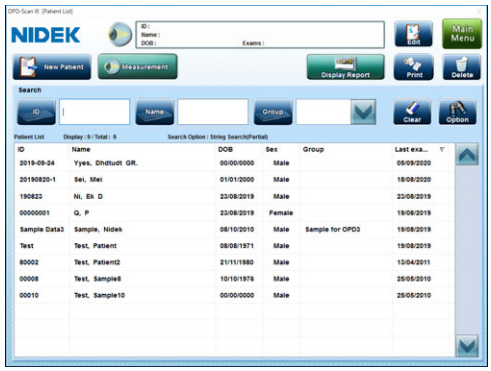
Note

- The optional functions of "Internal print" and "External communication" are enabled by selecting the check boxes for "Internal Printer" and "RS232C Connection" of "Verify Exam Window - Options" on the Settings screen (Measurement tab).

11 Press the OK button to close the Verify Result window.

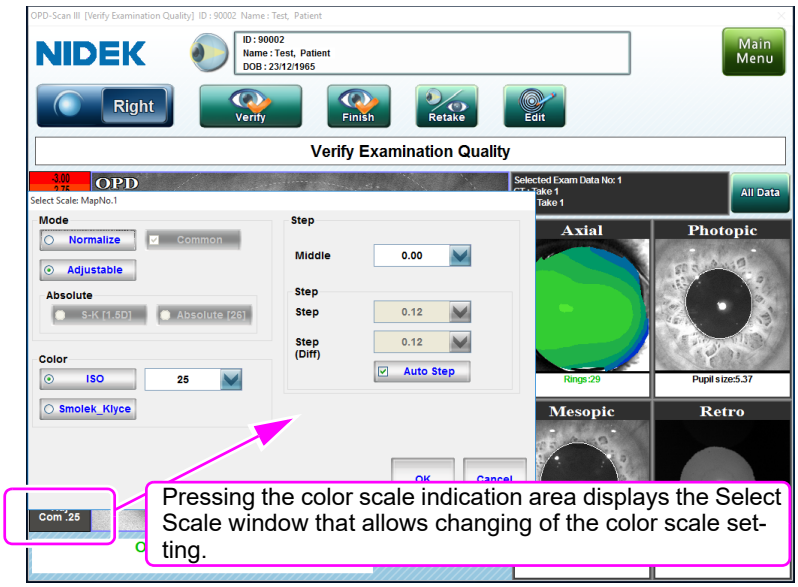
The Patient List screen is displayed.

Perform selection of the next patient, checking of reports, or printing.



○ Changing the color scale of an OPD map

When the Verify Examination Quality screen is displayed, the setting of the color scale can be temporarily enabled. The setting changes made here are not reflected to the settings on the OPD tab under the Map Scale tab on the Settings screen.



In the Select Scale window, the color scale mode, color scheme, middle value, and increments can be changed.

The settings of the color scale in this window are the same as those for the OPD map in the Settings screen. See “4.8.4 Map Scale tab” (page 181) for details.

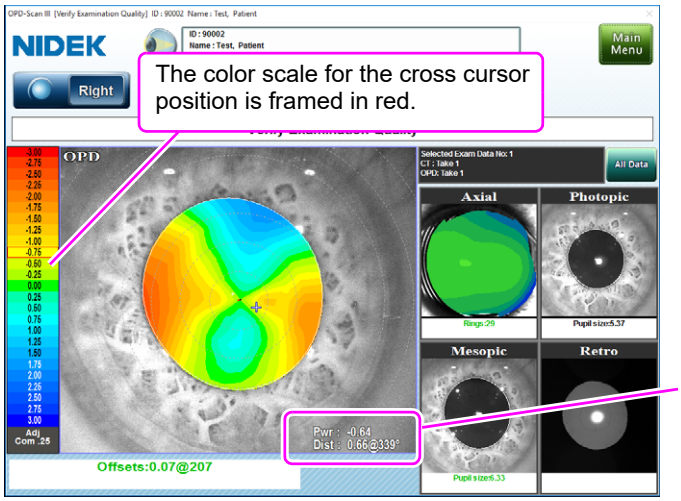
OK button	Used to save the current settings and close the Select Scale window. The setting changes are effective only for the OPD map currently displayed.
Cancel button	Used to cancel the setting changes and close the Select Scale window.

○ Displaying the cross cursor and its values on an OPD or Axial map

When an OPD map or an Axial map is displayed on the Verify Examination Quality screen, a cross cursor is displayed on the map.

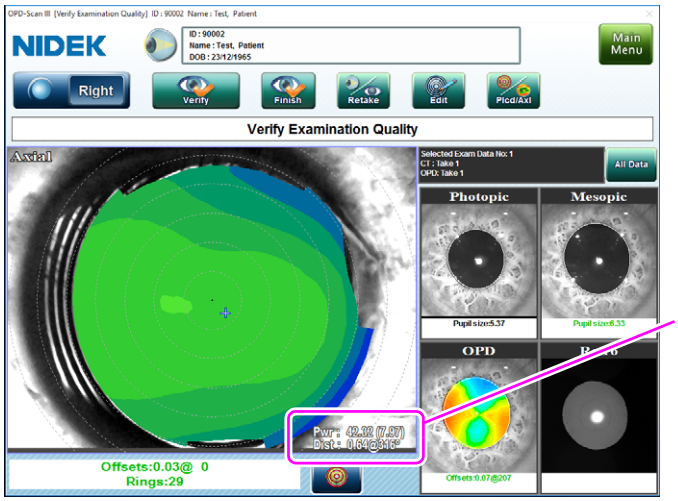
The cross cursor can be moved and shows the values of its position at the bottom right of the map.

OPD map



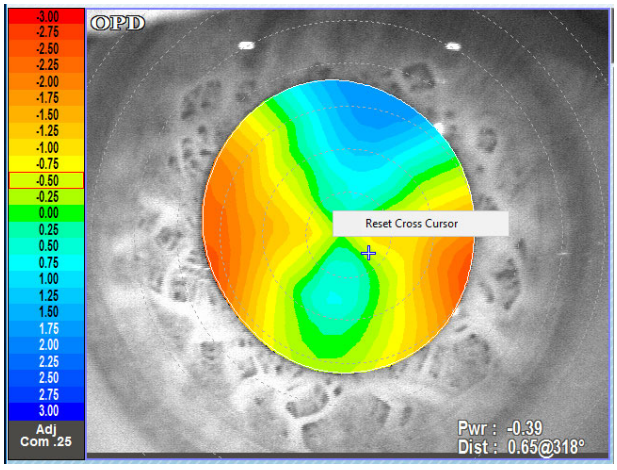
Values at the cross cursor position
Corneal refractive power of OPD (VD = 0: Fixed)
Distance from the center to the cross cursor@Angle

Axial map



Values at the cross cursor position
Corneal refractive power of Axial (Corneal curvature radius)
Distance from the center to the cross cursor@Angle

To return the cross cursor to the center of the map, right-click the map and select “Reset Cross Cursor”.



2.6 OPD Measurement

In OPD measurement mode, only the OPD measurement (objective refractive error measurement) is performed.
Only the best measurement data is saved to the database.

1 Perform alignment and focusing, then start measurement.

For the procedure up to start of the measurement, see “2.5 Measurement in OPD/CT Measurement Mode” (page 59).

Note

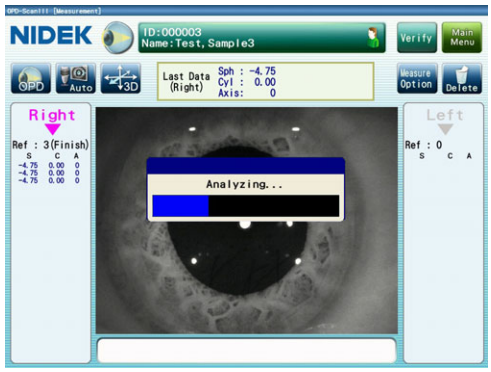
- Fogging is applied when the OPD measurement starts. Instruct the patient not to blink and keep staring at the balloon although it appears blurry to the patient.

2 Start the measurement.

When the optimum alignment and focus conditions are achieved, the OPD measurement automatically starts (when the auto shot function is enabled).

When the auto shot function is disabled, press the start button to start the measurement.

The latest OPD measurement values are displayed in the latest data display in the upper part of the screen.



When the OPD measurement is executed for a specified number of times, “(Finish)” appears on the side of number of measurements for “Ref”, and the OPD measurement is complete.

Note

- The measurement stops if the device loses alignment or focus. However, when the alignment and focus are achieved again and the measurement is performed, the measurement data is added to the memory together with the previous measurement data.
- A maximum of 10 measurement data sets can be saved in the memory for the right and left eyes each. When a measurement data set is added to the memory that already contains 10 measurement data sets, the oldest data is deleted.
- The criteria for completing the OPD measurement is set with “End Criteria - OPD” on the Settings screen (Measurement tab).
- The OPD measurement can be repeated successively with the fogging condition maintained by selecting the check box for “Single Fogging” on the Settings screen (Measurement tab).

[OPD measurement value display]

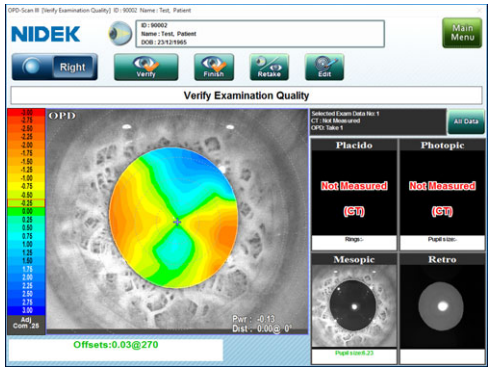
If the reliability of the measurement result is low or the measurement was executed under different measurement conditions than the usual, any of the following symbols appears to the right of the AR value on the screen.

E	Indicates high RMS measurement values. (Only when the check box for “High RMS Data” on the Settings screen (Measurement tab) is selected). The measurement value is displayed in orange.

*	Indicates that the measurement was executed in Cataract mode. If measurement cannot be executed due to cataract or any other eye abnormality, the measurement conditions are automatically changed to allow the measurement.
#	Indicates that the measurement was executed in Small Pupil mode. If measurement cannot be executed due to a small pupil, the measurement conditions are automatically changed to allow the measurement. The measurement value is shown in red. This data cannot be saved to the database.
Ef	Indicates that the measurement was executed without the focusing indicator being displayed on the Measurement screen. The error message “No.413:Focus alignment is too off-centered.” is displayed in the message box of the Measurement screen. The Offsets indication is shown in red on the Verify Examination Quality screen. The Offsets values displayed in the upper right corner of each map on the report screen are shown in red.

3 The Verify Examination Quality screen is displayed.

When the OPD measurement is complete, the Verify Examination Quality screen is automatically displayed.



Note

- When the OPD measurement for an eye is complete, the Verify Examination Quality screen is displayed.

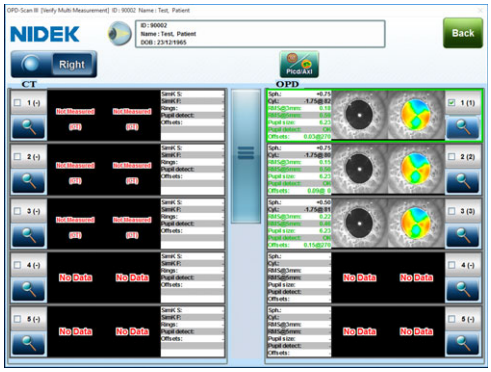
4 Verify the result of image capture.

Verify the result based on the following criteria.

- •No influence from patient’s blinking or eyelashes
- •Eye opened wide
- •Appropriate alignment (“Offsets” is shown in green.)
- •No abnormality in map

The operations shown below are available in the Verify Examination Quality screen.

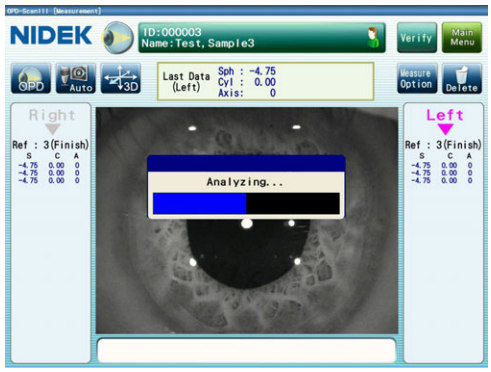
When captured image is proper	Press the Verify button. The Measurement screen is displayed. Perform measurement of the other eye.
If OPD measurement data needs to be edited	Press the Edit button. See “2.10 Editing OPD Analysis Area” (page 90).
Temporarily enabling the color scale of OPD map	Select the OPD map to display it and press the color scale indication area. The Select Scale window that allows changing of the color scale settings is displayed. See “〇 Changing the color scale of an OPD map” (page 69).

If captured image is improper	Press the Retake button. The Measurement screen is displayed. Perform additional measurement.
Finishing measurement with only one eye	Press the Finish button. The Verify Result window is displayed. Verify the measurement result.
Viewing all measurement data	Press the All Data button. The Verify Multi Measurement screen is accessed to display all measurement data. The selected data to be saved can be changed. 
Stopping measurement	Press the Main Menu button to access the Main Menu screen without saving the measurement data. The message, ‘Data has not been saved. Are you sure you want to return to “Main Menu”? Yes/No’ appears. Press the Yes button to access the Main Menu screen.

5 Press the Verify button to complete measurement of one eye and return to the Measurement screen.

Pressing the Delete button  displays the message, “Are you sure you want to delete the measurement data? Yes/No”. Pressing the Yes button deletes all data being displayed.

6 Switch the eye to be measured, and measure the other eye in the same manner.

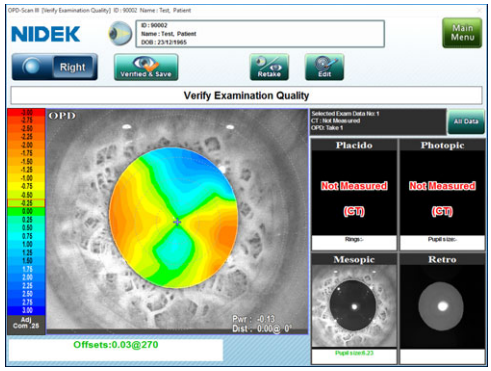


7 When “Finish” is indicated for the OPD measurement, the Verify Examination Quality screen is displayed. Verify the result of image capture.

Verify them in the same manner as Step 4.

The Verify Examination Quality screen displayed after measurement of both eyes differs from that displayed after measurement of one eye.

Instead of the Verify button, the Verified & Save button is displayed. The Finish button is not displayed.



The operation shown below is available in the Verify Examination Quality screen.

When captured image is proper	Press the Verified & Save button. The Verify Result window is displayed. Verify the measurement result.

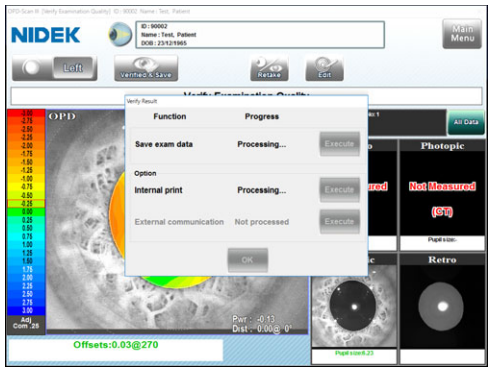
In addition, verify the result of image capture in the same manner as Step 4.

Note

- If the eye (Right/Left) indication on the screen is switched, the Verified & Save button is not displayed and the Retake button becomes disabled.

8 Pressing the Verified & Save button displays the Verify Result window to show the progress of the processing after the measurement.

The procedure for saving the subsequent data is the same as that in OPD/CT measurement mode.



2.7 CT Measurement

In CT measurement mode, only the CT measurement (corneal topography measurement) is performed.
Only the best measurement data is saved to the database.

1 Perform alignment and focusing, then start measurement.

For the procedure up to start of the measurement, see “2.5 Measurement in OPD/CT Measurement Mode” (page 59).

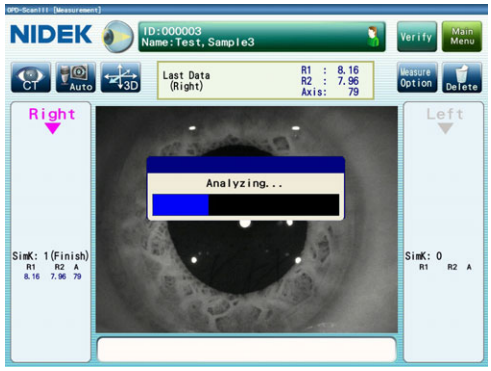
Note

- The placido rings light up in blue when the CT measurement starts. Instruct the patient not to blink and keep staring at the balloon although the placido rings appear brightly blue to the patient.

2 Start the measurement.

When the optimum alignment and focus conditions are achieved, press the start button on the joystick to start the CT measurement.

In the CT measurement, the auto shot function is disabled. Press the start button to start the CT measurement regardless of the auto shot function setting.



① To prepare for the next measurement, have the patient slowly blink once or twice.

▼

② When the optimum alignment and focus conditions are achieved, press the start button to start the CT measurement.

▼

③ Repeat Steps ① and ② to perform the CT measurement several times.

The latest keratometry simulated based on the CT measurement result is displayed in the latest data display in the upper part of the screen.

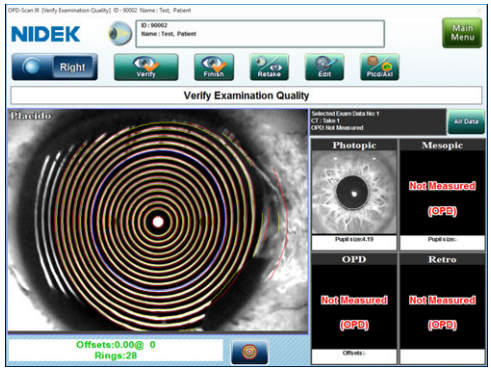
When the CT measurement is executed for a specified number of times, “(Finish)” appears on the side of number of measurements for “SimK”, and the CT measurement is complete.

Note

- A maximum of 10 measurement data sets can be saved in the memory for the right and left eyes each. When a measurement data set is added to the memory that already contains 10 measurement data sets, the oldest data is deleted.

3 The Verify Examination Quality screen is displayed.

When the CT measurement is complete, the Verify Examination Quality screen is automatically displayed.



Note

- When the CT measurement for an eye is complete, the Verify Examination Quality screen is displayed.

4 Verify the result of image capture and ring edge detection.

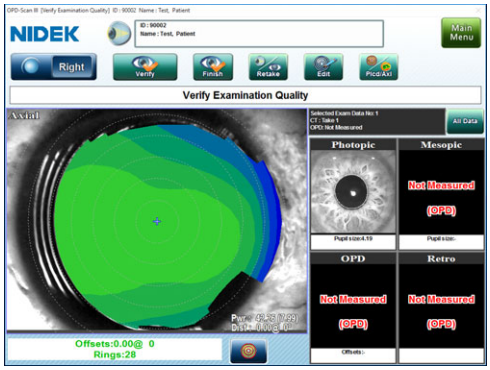
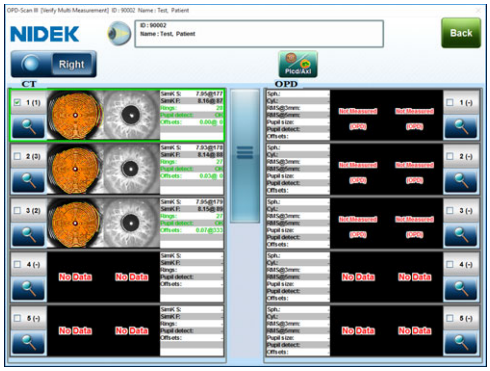
Verify the result based on the following criteria.

- •No influence from patient's blinking or eyelashes
- •Eye opened wide (No gaps in ring)
- •No influence from insufficient or excessive tears (No distortion in ring)
- •Appropriate alignment ("Offsets" is shown in green.)
- •Precisely detected ring edge (Correctly traced)
- •No abnormality in map

Detected placido ring edges are shown with red and yellow lines.

The operations shown below are available in the Verify Examination Quality screen.

When the captured image and detected edges are satisfactory	Press the Verify button to return to the Measurement screen, then perform measurement of the other eye.
If edges need to be edited	Press the Edit button. See "2.8 Editing Placido Ring Edges" (page 79).
If the detected pupil contour needs to be edited	Select "Photopic" and press the Edit button. See "2.9 Editing Detected Pupil Contour" (page 85).
When the captured image and detected edges are not satisfactory	Press the Retake button. The Measurement screen is displayed. Perform additional measurement.
Finishing measurement with only one eye	Press the Finish button. The Verify Result window is displayed. Verify the measurement result.
Displaying or hiding the placido ring edge detection result	Press the edge display button  . Each pressing of this button displays or hides the edge detection result.

Displaying the Axial map and reviewing it	Press the Plcd/Axl button  . Each pressing of this button switches between the Placido image and the Axial map. Review the Axial map to confirm that it is not affected by tear fluid or such. 
Viewing all measurement data	Press the All Data button to access the Verify Multi Measurement screen and display all measurement data. The selected data to be saved can be changed. 
Stopping measurement	Press the Main Menu button to access the Main Menu screen without saving the measurement data. The message, ‘Data has not been saved. Are you sure you want to return to “Main Menu”? Yes/No’ appears. Press the Yes button to access the Main Menu screen.

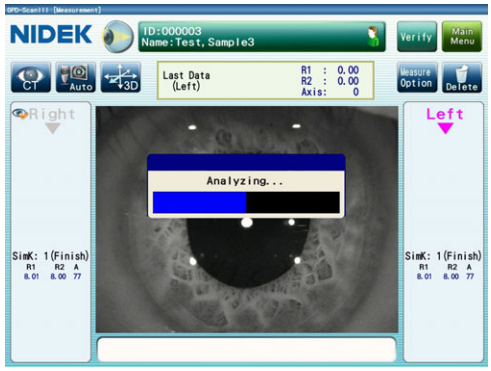
Note

- The placido rings will be illuminated for about 15 seconds before the second CT measurement to prevent the patient from becoming surprised and blinking. Measurement can be started by pressing the start button while the placido rings are illuminated or in 15 seconds after they are turned off.

5 Press the Verify button to complete measurement of one eye and return to the Measurement screen.

Pressing the Delete button  displays the message, “Are you sure you want to delete the measurement data? Yes/No”. Pressing the Yes button deletes all data being displayed.

6 Switch the eye to be measured, and measure the other eye in the same manner.

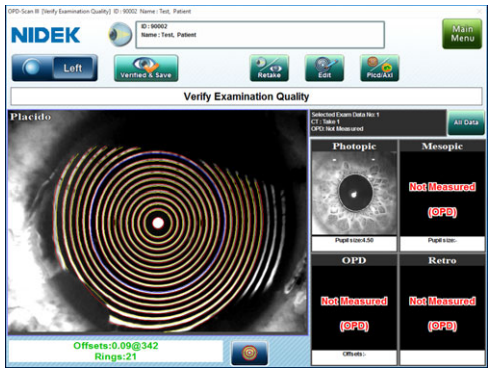


7 When “(Finish)” is indicated for the CT measurement (SimK), the Verify Examination Quality screen is displayed. Verify the result of image capture and ring edge detection.

Verify them in the same manner as Step 4.

The Verify Examination Quality screen displayed after measurement of both eyes differs from that displayed after measurement of one eye.

Instead of the Verify button, the Verified & Save button is displayed. The Finish button is not displayed.



The operation shown below is available in the Verify Examination Quality screen.

When the captured image and detected edges are satisfactory	Press the Verified & Save button. The Verify Result window is displayed. Verify the measurement result.

In addition, verify the result of image capture and ring edge detection in the same manner as Step 4.

Note

- If the eye (Right/Left) indication on the screen is switched, the Verified & Save button is not displayed and the Retake button becomes disabled.

8 Pressing the Verified & Save button displays the Verify Result window to show the progress of the processing after the measurement.

The procedure for data saving is the same as that in OPD/CT measurement mode.

2.8 Editing Placido Ring Edges

Edges (red and yellow lines) of the detected placido rings may be significantly deviated from the captured placido ring images or partly broken. Such edges can be corrected using the edge editing function.
There are four tools for edge editing: Moving, extending, closing and erasing.

Edge editing procedure

① Entering the edge edit mode.
↓
② Specifying the edge to be edited.
↓
③ Edit the edges using the edge edit function.
↓
④ Saving the modified data.

Moving	Used to move the center of the selected arc to align it to the captured placido ring.
Extending	Used to change the length or direction of the selected line by moving its ends.
Closing	Used to fill gaps of broken edges.
Erasing	Used to erase unnecessary parts of edges.

Note

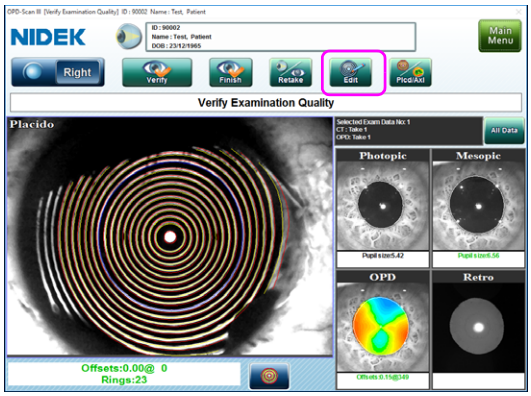
- The edited placido ring edges are used for calculations for maps or other data. Be sure to edit the placido ring edges so that they match the placido ring image captured in the CT measurement.

Edge edit mode (Reprocess screen) is entered to edit measurement data before saving it. Pressing the Edit button on the Verify Examination Quality screen displays the Reprocess screen to perform editing.

2.8.1 Entering edge edit mode

1 In the Verify Examination Quality screen on which the measurement data to be edit is displayed, press the Edit button to display the Reprocess screen.

To change selection of measurement data, access the Verify Multi Measurement screen.

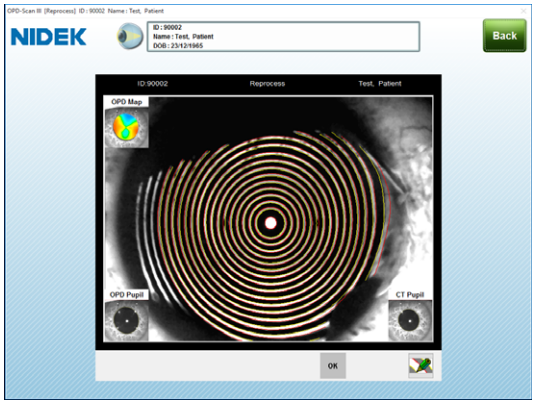


Note

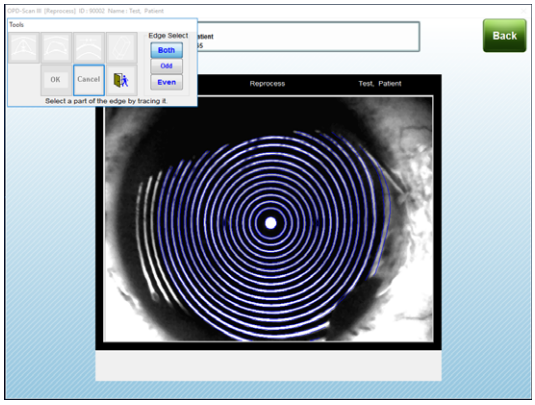
- Thumbnails of the OPD pupil (pupil image at the time of OPD measurement), OPD map (OPD measurement data), and CT pupil (pupil image at the time of CT measurement) images are displayed in the corners of the screen.

  When any of the thumbnails is pressed, the pupil image of the pressed thumbnail replaces the image in the center of the screen.

2 Press the edge button  on the Reprocess screen to activate edge edit mode.



The Tools dialog box is displayed and the detected edges are shown in blue.



2.8.2 Selecting edges

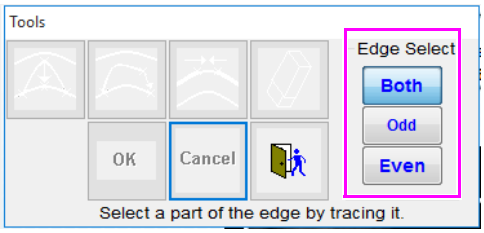
Available tool buttons become automatically enabled depending on the condition of the selected edge. Select appropriate tools.

Shape of selected edges	Available tools
Edge with no gap 	Moving, erasing
Edge with an open end 	Extending, erasing
Edge with a gap 	Closing, erasing
Edge with more than one gap 	Erasing

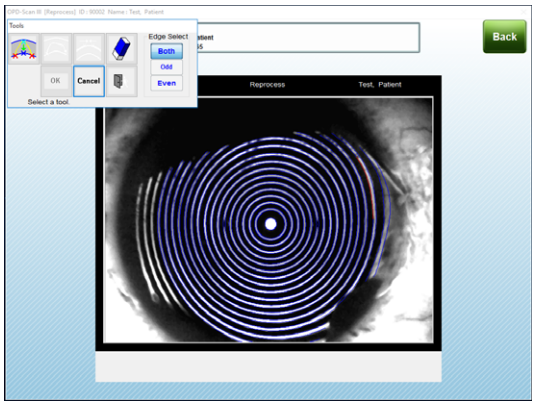
As necessary, select the edge to be edited with the Edge Select buttons.

Select the button from among “Both”, “Odd” and “Even”. The edges being selected are displayed in blue.

The Edge Select buttons are used to make tracing of the intended edge easier.



Select the desired edge by tracing.

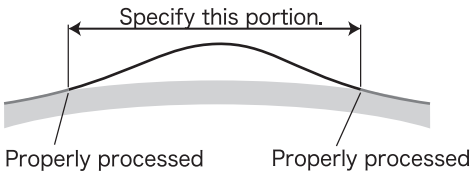


The selected portion of the edge turns red.

To cancel selection of the edge (to change the red edge to blue), press the Cancel button.

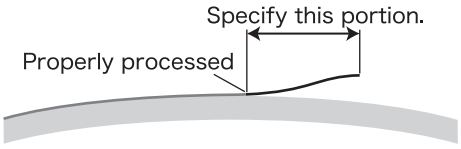
○Selecting edge to move it (moving)

Select the portion of the edge that is deviated from the placido ring image.



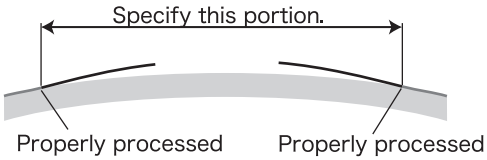
○Selecting edge to move its end (extending)

Left-click to select the portion of the edge whose end to be moved.



○Selecting edge to close gaps in edges (closing)

Trace both of the edges of the broken line to select them.

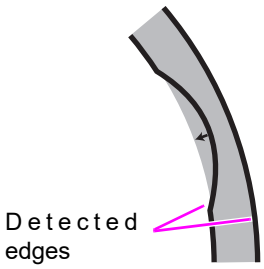


2.8.3 Editing edges

The selected portion of an edge can be edited.

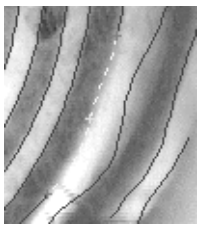
○Moving tool

The moving tool is used when a portion of the detected edge is deviated from the placido ring image.



1 Press the  button.

The selected portion of the edge becomes yellow, and the cyan cross mark appears in the center of the portion.



2 Move the cyan cross mark to the edge of the captured placido ring.

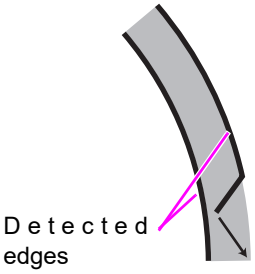
3 Confirm that the yellow portion is aligned to the captured placido ring edge, then press the OK button.

The detected edge is edited in accordance with the yellow line.

To cancel editing, press the Cancel button.

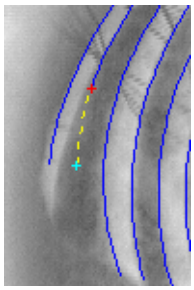
○Extending tool

The extending tool is used when an open end in the detected edges is deviated from the captured placido ring image. Used to change the length or direction of the selected line by moving its ends.



1 Press the  button.

The selected portion of the edge becomes yellow, and the cyan cross mark appears at the open end.



2 Move the cyan cross mark to the desired position so that the yellow line is aligned to the captured placido ring.

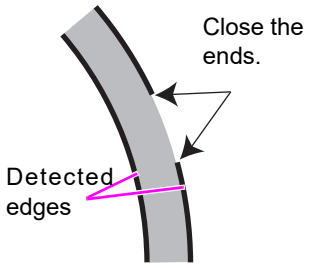
3 Confirm that the yellow portion is aligned to the captured placido ring edge, then press the OK button.

The detected edge is edited in accordance with the yellow line.

To cancel editing, press the Cancel button.

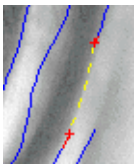
○Closing tool

The closing tool is used when there are any gaps in the detected edge.



1 Press the  button.

The selected lines and the gap are connected by a yellow line.



2 Confirm that the yellow portion is aligned to the captured placido ring edge, then press the OK button.

The detected edge is edited in accordance with the yellow line.

To cancel editing, press the Cancel button.

○Erasing tool

The erasing tool is used when there are any improper portions in the detected edge.

1 Press the  button.

The selected portion of an edge becomes yellow.

2 Confirm that the yellow portion is the portion to be erased, then press the OK button.

The yellow portion of the edge is erased.

To cancel the selected portion to be erased, press the Cancel button.

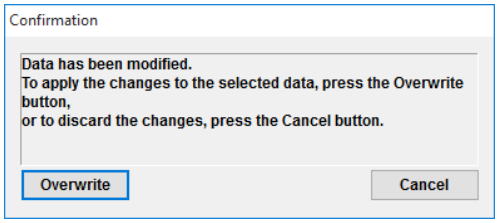
2.8.4 Saving data after edge editing

1 Press the  button to close edge edit mode.

The screen returns to the Reprocess screen.

2 After checking the edited edges, press the OK button.

The Confirmation dialog box appears.



3 Press the Overwrite button to save the edited data.

Overwrite	Overwrites the original data. (The original data is deleted.)
Cancel	Cancels saving of the edited data.

The Reprocess screen is closed, and the Verify Examination Quality screen is displayed.

2.9 Editing Detected Pupil Contour

If the eyelid or shadow of the eyelid partially covers the pupil, the pupil contour may not be traced properly. In such a case, the traced contour of the pupil can be corrected using pupil contour editing function.
If the pupil contour is not detected properly, the position and size of the pupil cannot be calculated accurately, making the analysis results less reliable.
There are two tools for editing pupil contour: Moving and erasing.

 Moving	Used to move the pointers on the line to align the line to the pupil contour.
 Erasing	Used to erase portions of the line that are deviated from the pupil contour. Pressing the OK button after erasing a line places a new arc in place of the erased line.

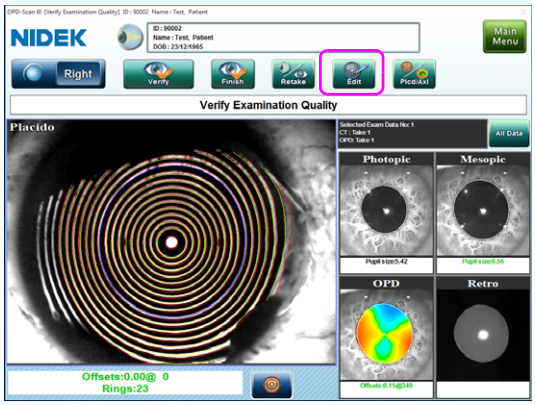
Note

- To edit the pupil contour, the data needs to satisfy the following condition.
  There is a pupil image obtained in the CT or OPD measurement.
- The edited pupil contour is used to calculate values such as the pupil diameter and pupil position. Be sure to edit the pupil contour so that it matches the pupil image captured in the CT or OPD measurement.

2.9.1 Entering pupil contour edit mode

1 In the Verify Examination Quality screen on which the measurement data to be edit is displayed, press the Edit button to display the Reprocess screen.

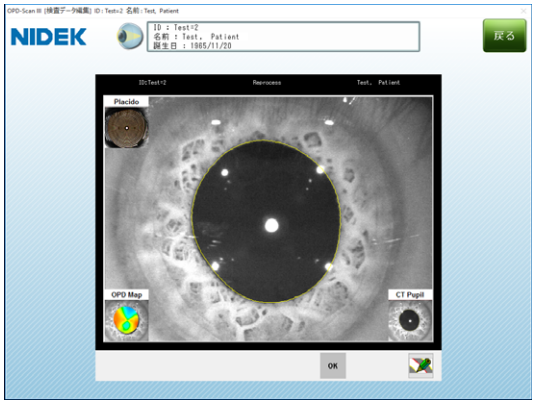
To change selection of measurement data, access the Verify Multi Measurement screen.



Note

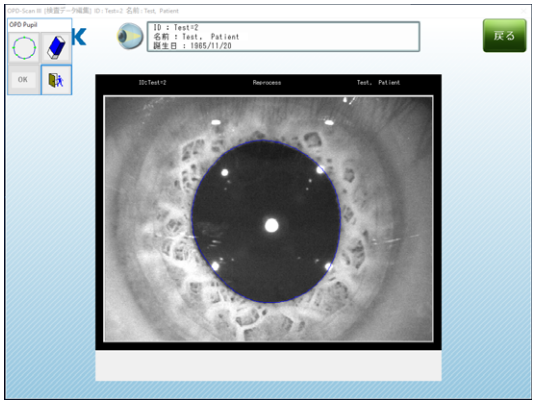
- Thumbnails of the OPD pupil (pupil image at the time of OPD measurement), OPD map (OPD measurement data), and CT pupil (pupil image at the time of CT measurement) images are displayed in the corners of the screen.
  When any of the thumbnails is pressed, the pupil image of the pressed thumbnail replaces the image in the center of the screen.

2 Press the thumbnail of the OPD pupil (pupil image at the time of OPD measurement) or CT pupil (pupil image at the time of CT measurement) image to display it in the center of the screen.



3 Confirm that the yellow line is run properly along the pupil contour. If the line is deviated from the pupil contour, press the  button to enter pupil contour edit mode.

The edit tools are displayed, and the detected pupil contour becomes blue.



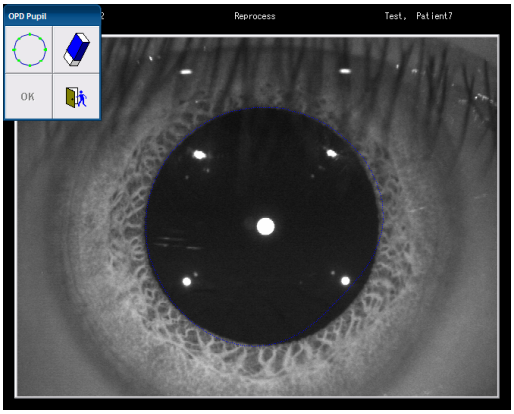
2.9.2 Erasing tool

Used to erase portions of the line that are deviated from the pupil contour.

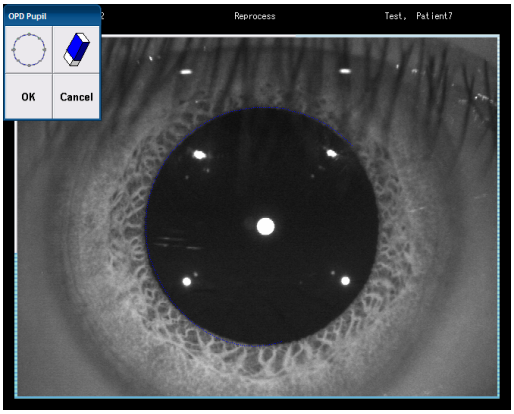
1 Enter pupil contour edit mode.

See “2.9.1 Entering pupil contour edit mode” (page 85).

2 Press the  button.

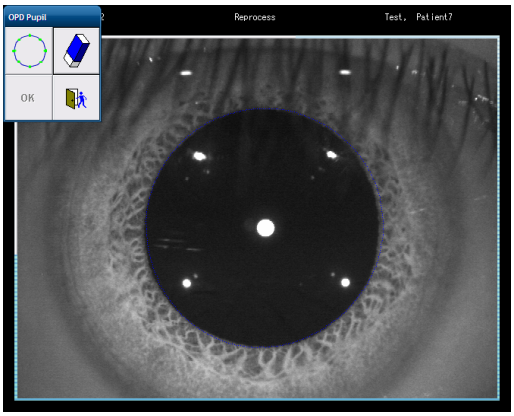


3 Trace the portion of the detected pupil contour to be erased.



4 Press the OK button.

A new arc is drawn for the erased portion.



Note

- Even if the entire pupil contour is erased, a new pupil contour is drawn by pressing the OK button.

2.9.3 Moving tool

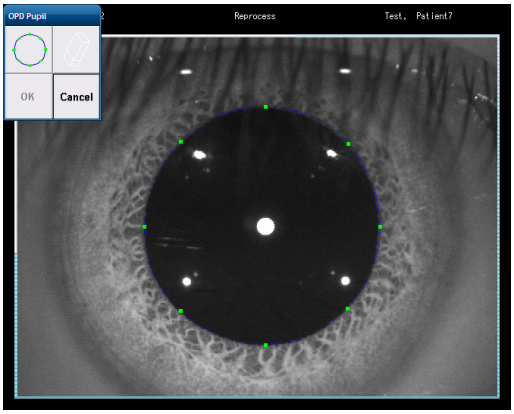
The moving tool is used to move portions of the detected pupil contour that are deviated from the actual pupil contour.

1 Enter pupil contour edit mode.

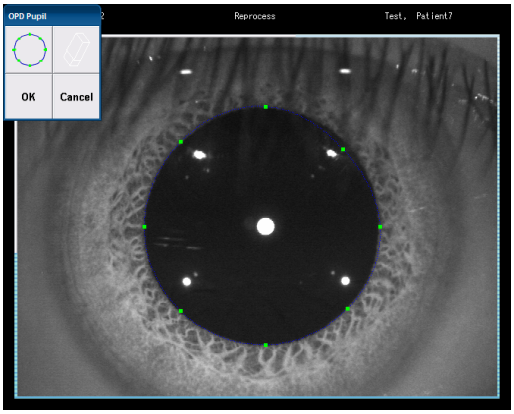
See “2.9.1 Entering pupil contour edit mode” (page 85).

2 Press the  button.

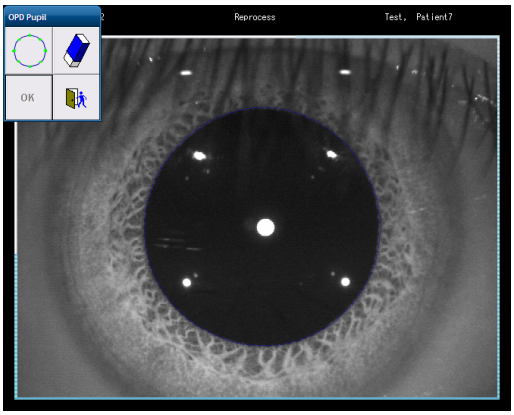
Eight pointers (green points) are displayed.



3 Hold and drag the pointer on the deviated portion of the detected pupil contour so that the deviated portion is aligned to the actual pupil contour.



4 After the deviation of the detected pupil contour is corrected, press the OK button.



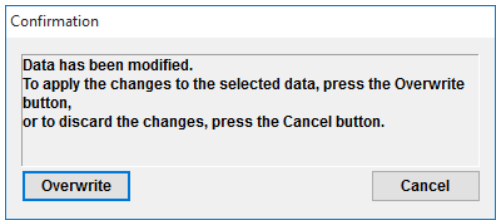
2.9.4 Saving edited data

1 Press the  button to close edit mode.

The screen returns to the Reprocess screen.

2 After checking the edited contour, press the OK button.

The Confirmation dialog box appears.



3 Press the Overwrite button to save the edited data.

Overwrite	Overwrites the original data. (The original data is deleted.)
Cancel	Cancels saving of the edited data.

The Reprocess screen is closed, and the Verify Examination Quality screen is displayed.

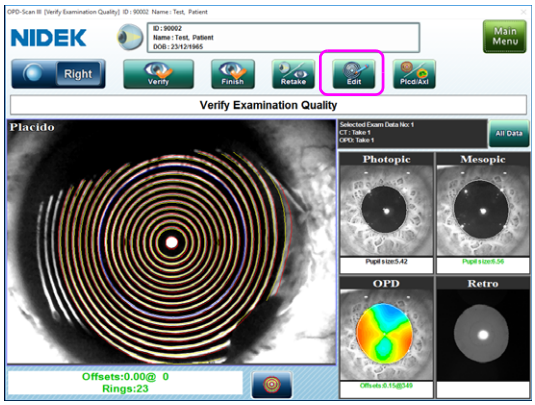
2.10 Editing OPD Analysis Area

If the eyelid or shadow of the eyelid partially covers the pupil, the analysis area within the pupil may not be detected properly. In such a case, the area to be excluded from the analysis can be specified. The erasing tool is used to edit the OPD analysis area.

Erasing	Shades the area to be excluded from the analysis. Pressing the OK button executes analysis again excluding the specified area.

1 In the Verify Examination Quality screen on which the measurement data to be edit is displayed, press the Edit button to display the Reprocess screen.

To change selection of measurement data, access the Verify Multi Measurement screen.



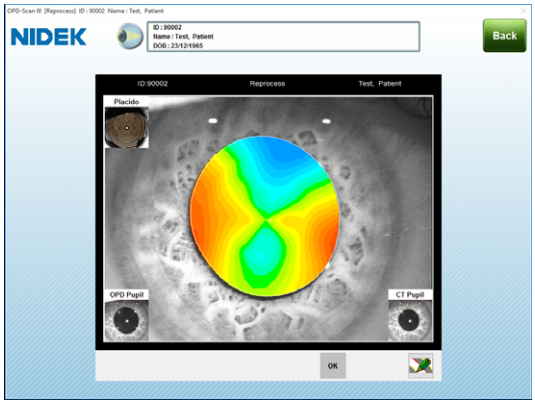
Note

- Thumbnails of the OPD pupil (pupil image at the time of OPD measurement), OPD map (OPD measurement data), and CT pupil (pupil image at the time of CT measurement) images are displayed in the corners of the screen.

  When any of the thumbnails is pressed, the pupil image of the pressed thumbnail replaces the image in the center of the screen.

2 Press the OPD measurement data (OPD map) to display it in the center of the screen.

3 Confirm that the yellow line is run properly along the pupil contour. To exclude any portion of the area from the analysis, press the button to enter OPD analysis area edit mode.

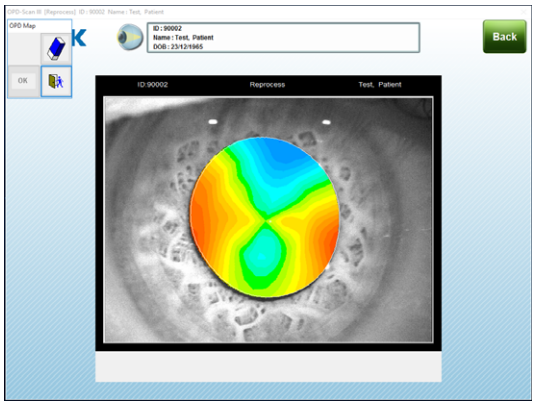


2.10.1 Erasing tool

The specified area can be excluded from the analysis.

1 Enter OPD analysis area edit mode.

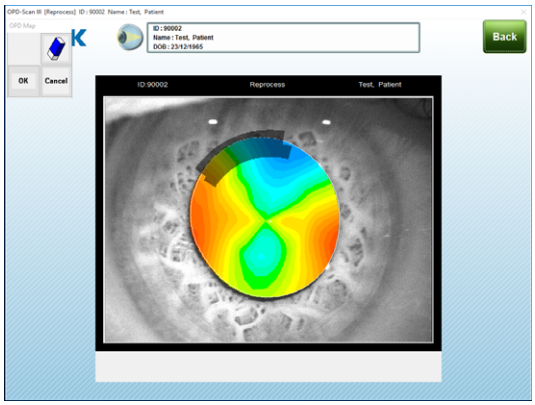
See “2.8.1 Entering edge edit mode” (page 79).



2 Press the  button.

3 Trace the area on the map to be erased.

The traced area is shaded along the pupil contour.



4 Press the OK button.

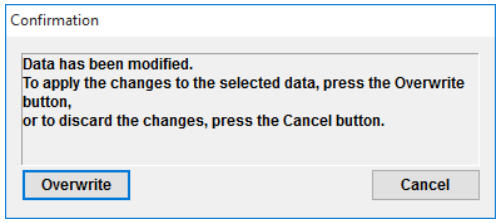
The data of the shaded area is cleared, and the OPD map is recalculated.

5 Press the  button to close edit mode.

The screen returns to the Reprocess screen.

6 Press the OK button.

The Confirmation dialog box appears.



7 Press the Overwrite button to save the edited data.

Overwrite	Overwrites the original data. (The original data is deleted.)
Cancel	Cancels saving of the edited data.

The Reprocess screen is closed, and the Verify Examination Quality screen is displayed.

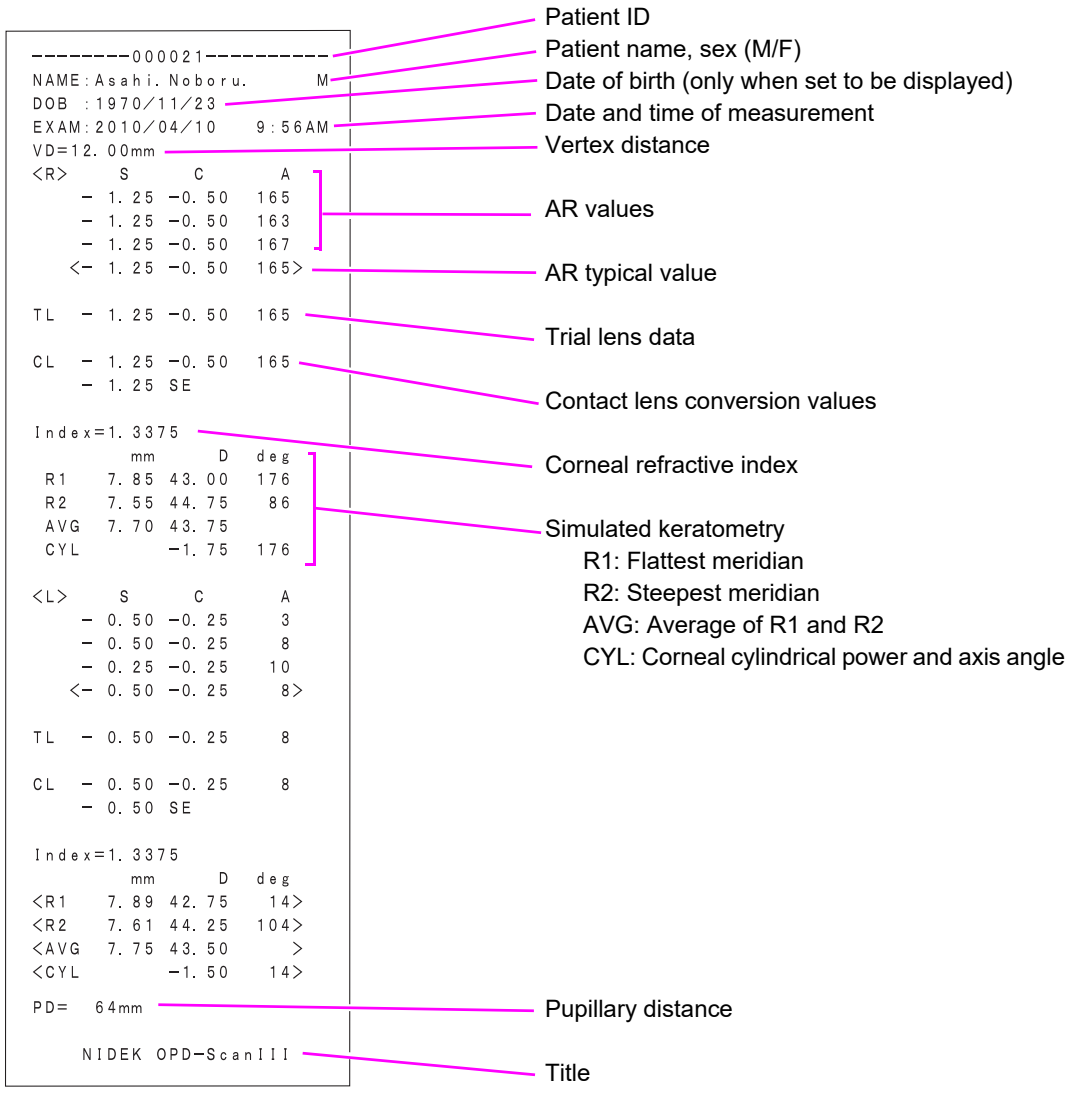
2.11 Printing Measurement Data (Internal Printer)

Pressing the Verified & Save button after measurement prints the measurement data using the internal printer.
However, printing is not executed if the check box for “Internal Printer” in “Verify Exam Window - Options” on the Settings screen (Measurement tab) is not selected.
AR values and KM values (simulated keratometry) are printed.

Note

- Do not touch the printer paper while the printer is in operation.
  Printed characters may become blurred or obscured.

[Sample printout 1]



*1	Vertex distance	Distance from the corneal vertex to the inner surface of a glasses lens.
*2	AR typical value	Printed out when there are three or more AR measurement values.
*3	Trial lens data	The value that automatically converts the CYL value based on the AR typical value (or the latest value if there is no typical value) so that the trial lens sphere value becomes smaller.
*4	Contact lens conversion values	The values that convert the vertex distance (VD) to 0 mm for the AR typical value (or the latest value if there is no typical value).
*5	Title	The desired characters and symbols can be entered for the title. See “4.8.2 Measurement tab” (page 174) for entry method.

Note

- In the example, the data is printed in the order of right eye AR values, right eye KM values, left eye AR values, and left eye KM values. However, the order can be changed in the Settings screen to the order of right eye AR values, left eye AR values, right eye KM values, and left eye KM values.

  The order can be changed by selecting the check box of the desired order in “Internal Printer - Print Order” on the Settings screen (Measurement tab).
- If “E” is indicated to the right end of an AR value, the reliability of that indicated value is low.

  When the check box for either “High RMS Data” or “Errors” on the Settings screen (Measurement tab) is not selected, such low-reliability measurement results are not printed.
- For details of setting for the internal printer, see “4.8.2 Measurement tab” (page 174).

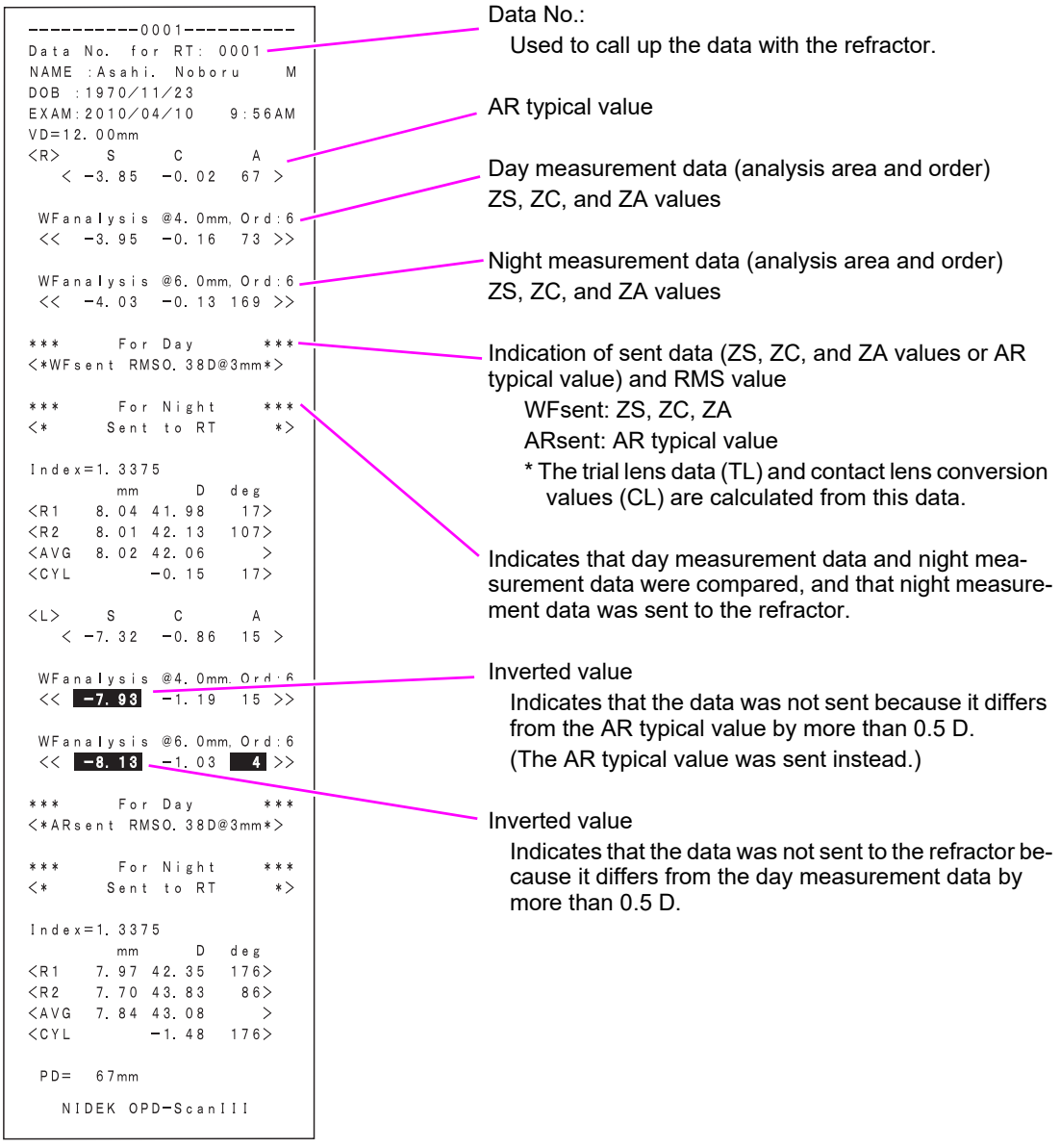
[Sample printout 2]

When the check box for either "Send HD Exam Data" or "Send 30sec Refraction" on the Settings screen (Communication tab) is selected, additional data is printed.

Send HD Exam Data	Send 30sec Refraction	Data to be transmitted
---	---	ZS, ZC, ZA values (Day measurement data)
---	○	ZS, ZC, ZA values (Day measurement data)*1
○	---	ZS, ZC, ZA values (Day measurement data) and ZS, ZC, ZA values (Night measurement data)
○	○	ZS, ZC, ZA values (Day measurement data)*1 and ZS, ZC, ZA values (Night measurement data)

*1: Depending on the measurement results, the AR typical value may be transmitted instead of the ZS, ZC, and ZA values.

For details of setting, see "4.8.3 Communication tab" (page 178).

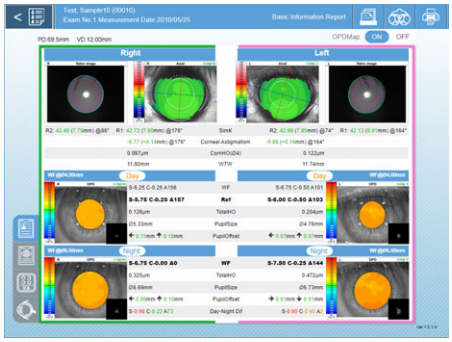
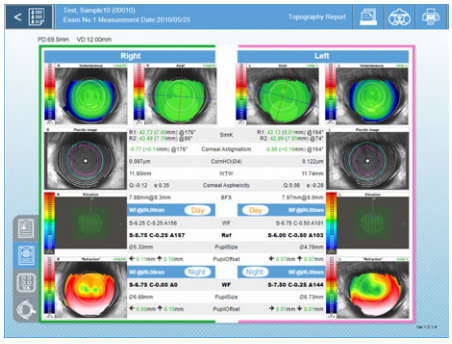


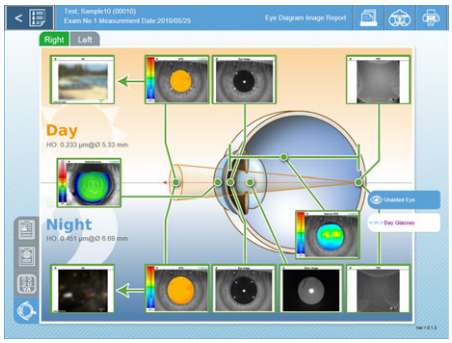
3. DISPLAY AND OPERATION OF REPORT

3.1 Report Screen Operation

The Web UI of OPD Web Viewer System (report screen) displays four types of reports comprised of various maps and measurement value displays.
Pressing any map within the report enlarges the pressed map.

When the measurement data is OPD/CT measurement data, all maps and measurement values are displayed.

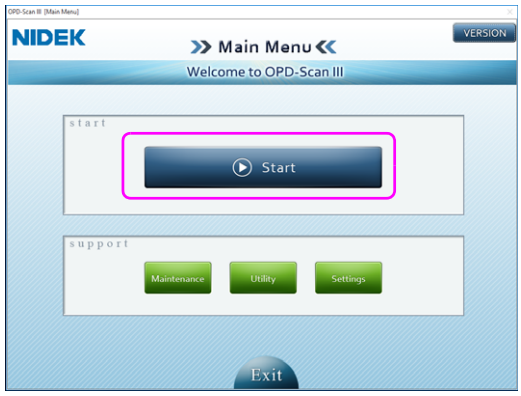
Basic Information Report 	Various maps and measurement values Used to check the effectiveness of correction with glasses. This can be checked visually using the displayed topographic maps and retroillumination images. Any difference of refractive errors between the right eye and left eye or day vision and night vision can be checked with this report.
Topography Report 	Various maps and measurement values Used to check the effectiveness of correction with contact lens. This can be checked visually using the displayed topographic maps and corneal shape. Any difference of refractive errors between the right eye and left eye or day vision and night vision can be check with this report.
Simulation Report 	Patient view simulation map during day and night How the patient visualizes can be determined by performing patient view simulation. Additionally, by performing view simulation using day glasses under night view condition, recommendation as to whether night glasses are necessary becomes possible.

Eye Diagram Image Report 	Various day and night maps arranged in an eye diagram image The eye condition from fundus to cornea can be understood visually in this report. Explanations regarding the advantages of correcting refractive error with glasses or regarding refractive error differences due to different pupil diameters between day and night become possible with this report.

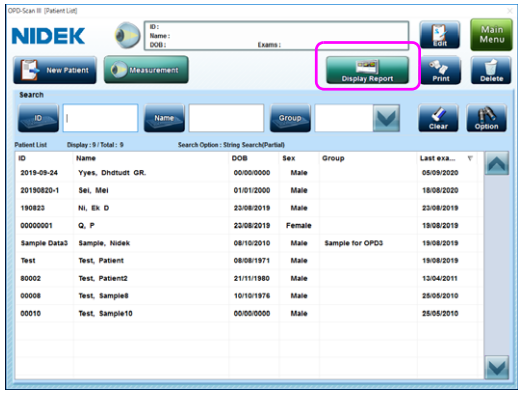
3.1.1 Displaying report screen

The saved measurement data is displayed as a report on this screen.

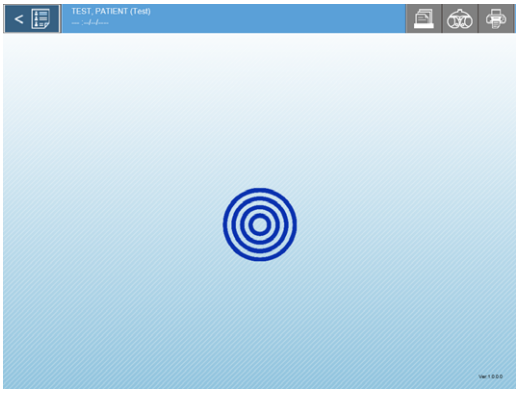
1 Press the Start button on the Main Menu screen to display the Patient List screen.



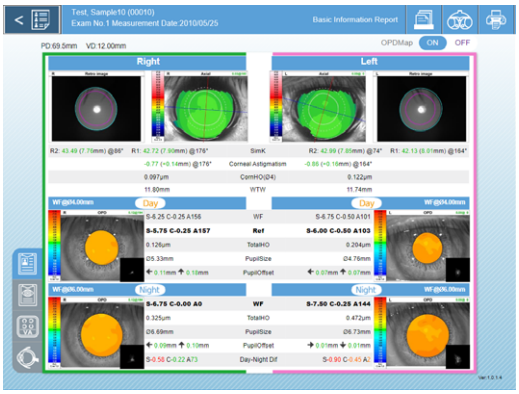
2 In the Patient List screen, select a patient and press the Display Report button.



3 Wait until the data of the selected patient is displayed on the report screen.



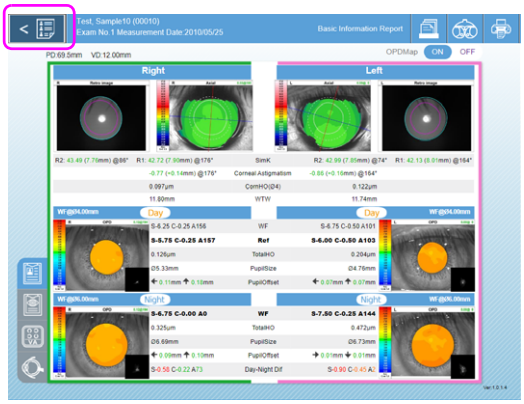
The latest measurement data is displayed as the initial display on the Basic Information Report screen.



4 The report screen allows toggling of display, sending data to the RT devices, and printing of reports.

See “3.1.2 Report screen common operations” (page 102) for the operation of the report screen.

5 To close the report screen, press the patient list button . The screen returns to the Patient List screen.



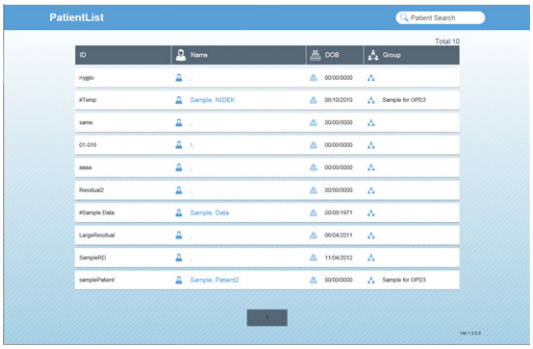
○ Operation from a tablet or external computer

1 Confirm that power to all components are turned on, then start the browser.

2 Enter the URL of Web UI to access OPD Web Viewer System.

Wait until the Patient List screen is displayed.

Check the URL of Web UI in the URL field in the OPD Web Viewer System management window.



3 In the Patient List screen, select a patient by tapping (or clicking) it.

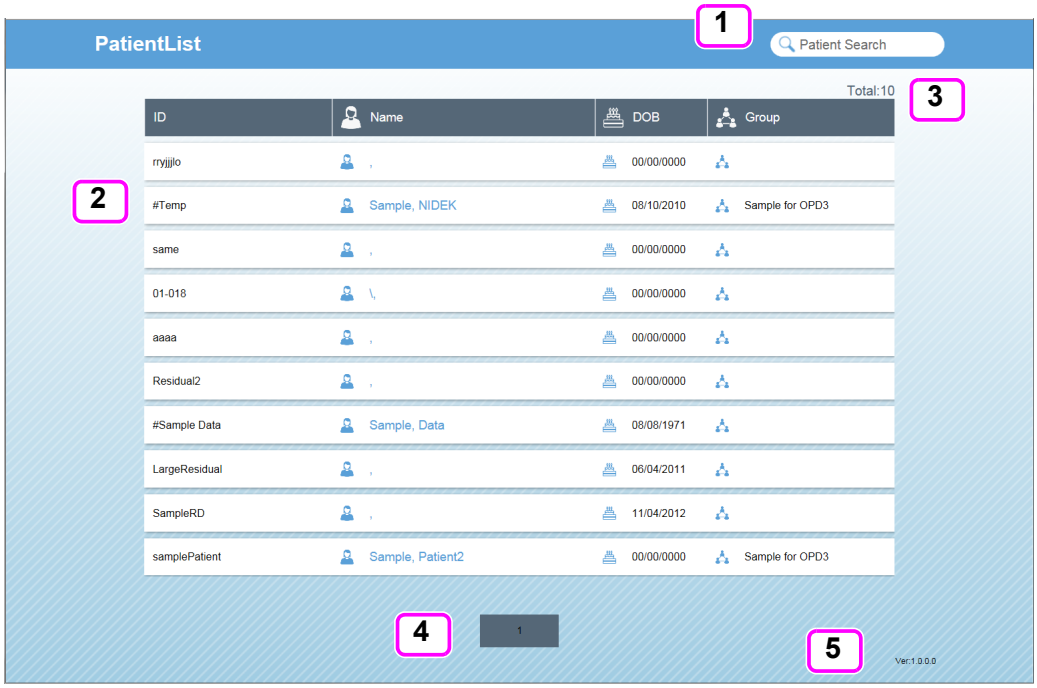
The data of the selected patient is displayed on the report screen.

The latest measurement data is displayed as the initial display on the Basic Information Report screen.

4 The report screen allows toggling of display, sending data to the RT devices, and printing of reports.

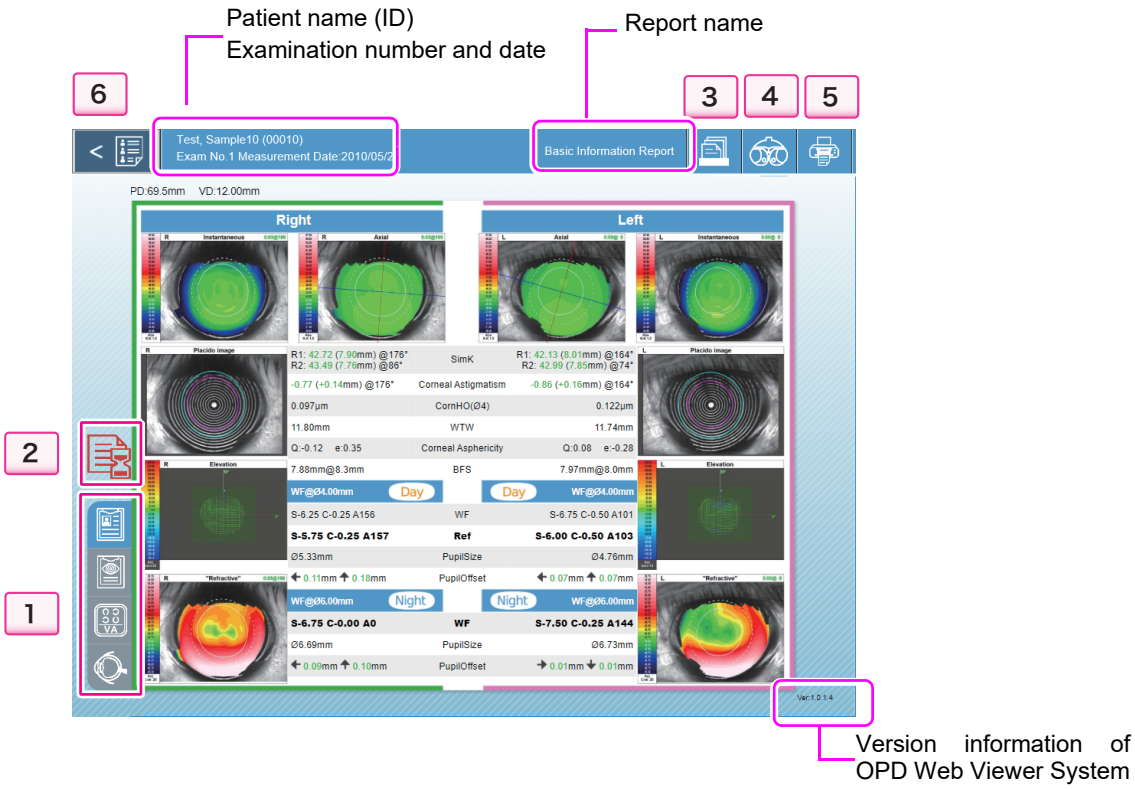
5 To close the report screen, tap (or click) the patient list button. The screen returns to the Patient List screen.

Patient List screen operation



1	Patient Search box	Used to extract patients whose ID, first name, last name, middle name, date of birth, or group match the input characters (left and right truncation). To cancel searching, tap (or click) the "×" button displayed while patient searching is in progress.
2	Patient list	Displays 10 patient data sets on each page. Tapping (or clinking) a patient on the list opens the report screen for that patient.
3	Total	Displays the total number of patient data sets saved in the database.
4	Page button	Used to change the page of the Patient List screen. The page number is displayed on the button. The button of the page currently displayed is darkened.
5	Version display	Displays the version information of OPD Web Viewer System.

3.1.2 Report screen common operations



1. Changing displayed report

Press the button of the report to be displayed. The button of the report currently displayed is highlighted in blue.

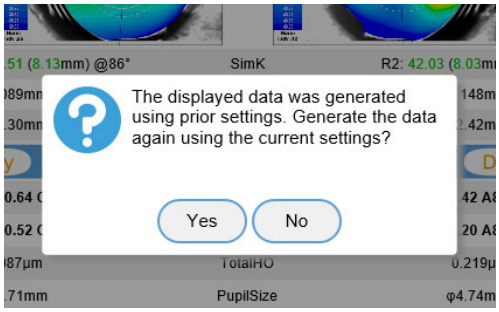
	Basic Information Report
	Topography Report
	Simulation Report
	Eye Diagram Image Report

“Loading..” is displayed on the map area until a report is created and redisplayed.

2. Converting data generated using the prior settings

When the settings of data being displayed are not in accordance with the current settings (Settings screen), a data conversion cautionary icon appears.

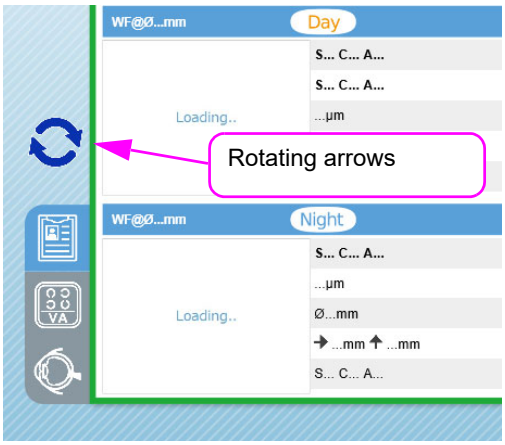
Pressing the icon displays the message, “The displayed data was generated using prior settings. Generate the data again using the current settings?”. Pressing the Yes button recalculates and displays the report using the current settings.



While recalculation is in progress, a rotating arrow icon is displayed while “Loading..” is displayed on the map area.

Recalculation may take about 30 to 60 seconds for each report. Wait until the display changes.

Once the data is converted, the cautionary icon will not be displayed again for the same data.

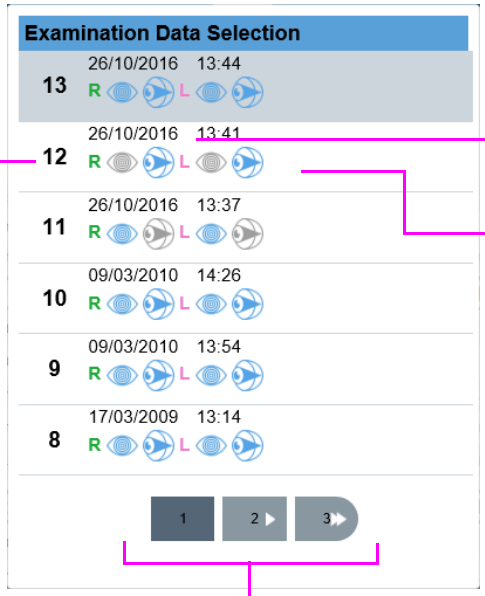


3. Displaying previous examination data set

The latest measurement data is displayed as the initial display in a report. Refer to previous measurement data sets as necessary.

Press the examination data selection button to display the Examination Data Selection window. Selecting an examination data set in the Examination Data Selection window displays the report for the selected data.

The oldest examination data is displayed as “1”.



Examination number

Measurement date and time

Contents of data (right eye/left eye)

CT examination data

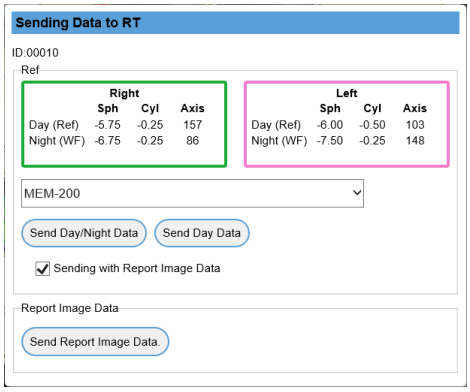
OPD examination data

When the examination data is present, the icon is displayed in blue. When it is not, the icon is grayed out.

Page changes when the number of data sets exceeds six.

4. Sending data to the RT devices

Press the send button  to transfer data to an RT device.



1) Press the send button to display the Sending Data to RT window.

   ID, day/night measurement values, and the list of devices to which data can be transferred are displayed.

2) Select the device to which data is to be transfered as necessary.

   Set the devices to which data can be transferred in the management window. “4.10.3 Editing settings in OPD Web Viewer System management window” (page 221)

3) To transfer along with the report image data, select the check box for “Sending with Report Image Data”.

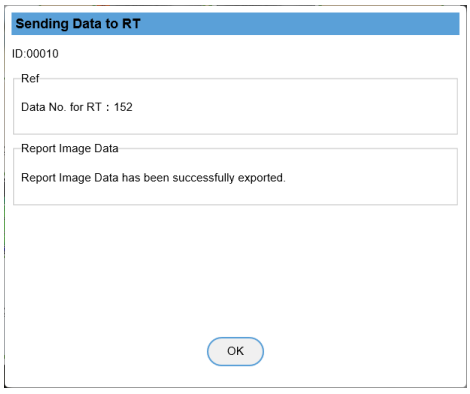
   Report image data can be transferred when the transfer destination is MEM-200.

4) Press the Send Day/Night Data or Send Day Data button according to the selection of data to be transferred.

   The same data is going to be transferred regardless of which report is being displayed.

   In addition, press the Send Report Image Data button when transferring only the report image data that is currently displayed.

5) The sending result is displayed.



6) Press the OK button to close the Sending Data to RT window.

Note

- If the display format of Web UI is not the latest one, the following message is displayed in the Sending Data to RT window. Restart or refresh the browser to update the display format.

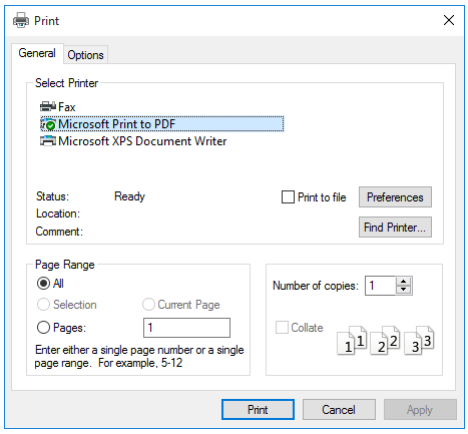
  “Since the display format settings have been changed, restart or update the browser to update the display format.”

5. Printing reports

The report being displayed can be printed. The report is going to be printed in the way it is being displayed.

The print setting screen for the printer set to the terminal is displayed. Set the printing conditions.

Set the paper size to “A4” and orientation to “Landscape”.



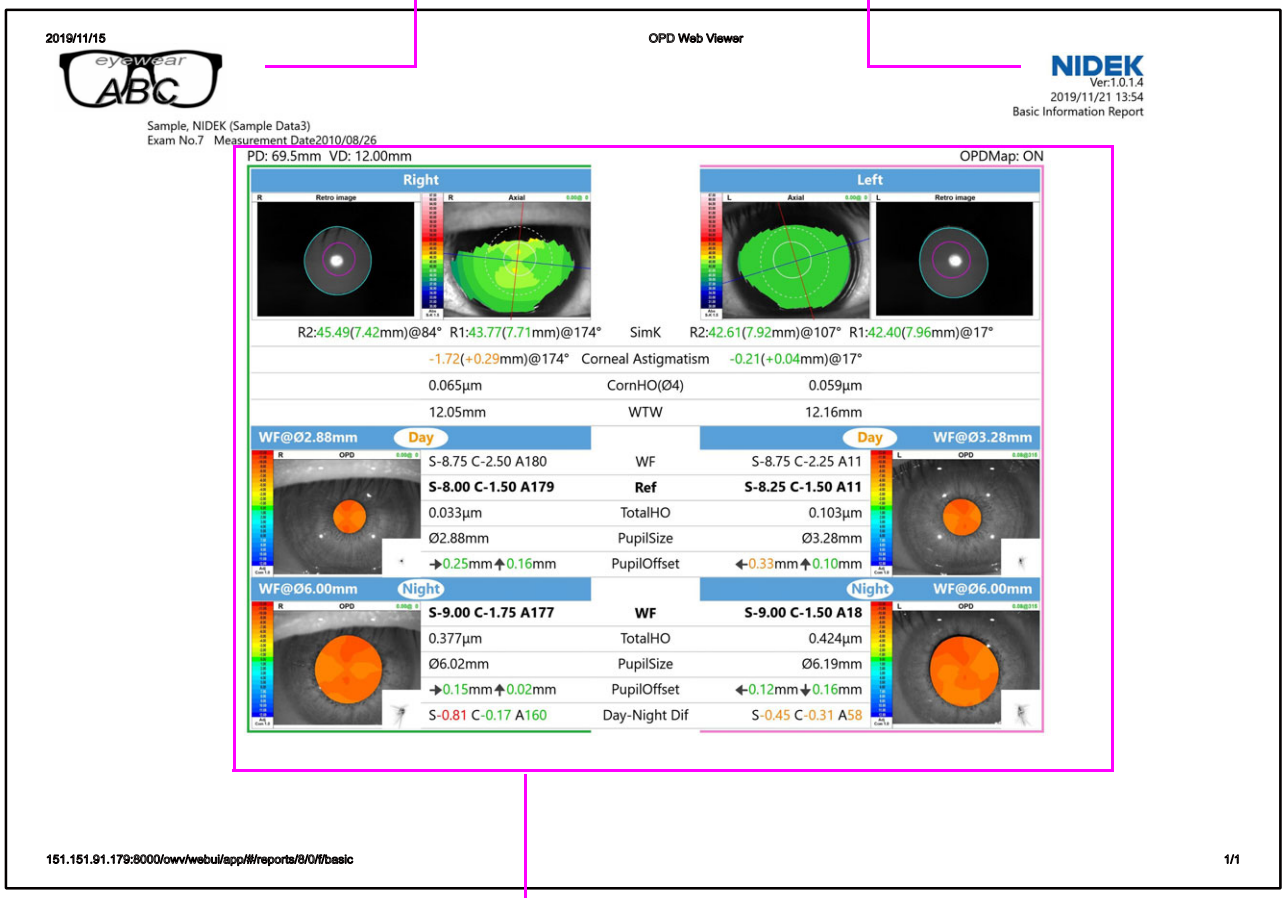
Note

- If the display format of Web UI is not set to the latest one, the following messages are displayed. After printing is complete, restart or refresh the browser to update the display format.
  - “The display format settings have been changed.”
  - “The report will be printed according to the changed settings.”
  - “After printing is complete, restart or refresh the browser to update the display format.”
- When printing data from an iPad, the print orientation cannot be changed from “Portrait”.
- Use the print button  to print a report.
  Printing the report using the print function of the browser or shortcut key disables report to be printed to fit one page or printed in a correct print layout. In addition, do not print using the print function of the browser or shortcut key when the print button  is disabled. Maps or numeric values may not be printed.

Sample printout

Retailer logo
* The logo image is set in the Retailer Logo Setting field on the Settings screen.

Version of OPD Web Viewer System
Printing date and time
Report name



Printout of the report screen
* Each screen is printed on one sheet.

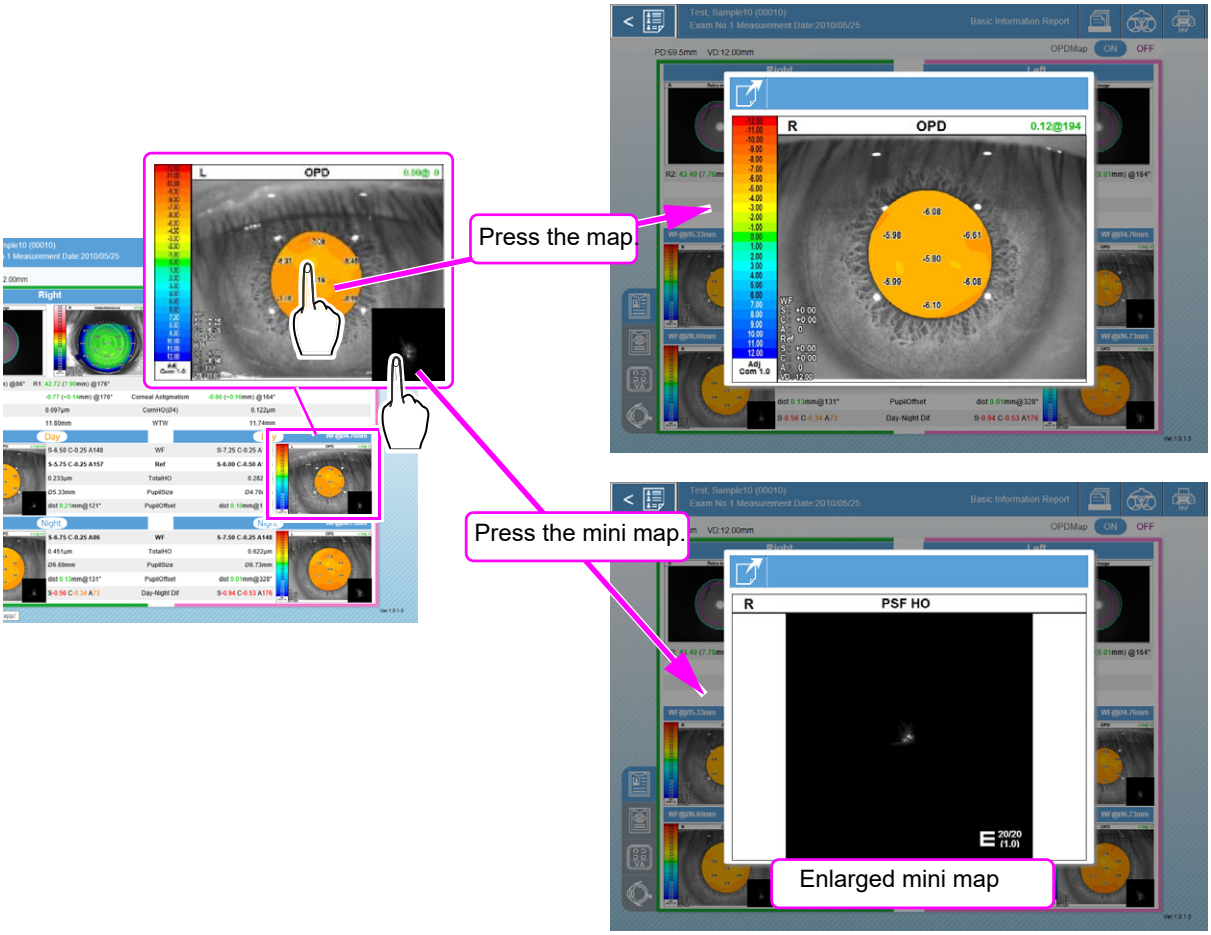
6. Closing report screen

Press the patient list button < to return to the Patient List screen.

7. Enlarging maps and mini maps

Press any displayed map or mini map to enlarge it. Pressing outside (dark area) of the enlarged map closes it.

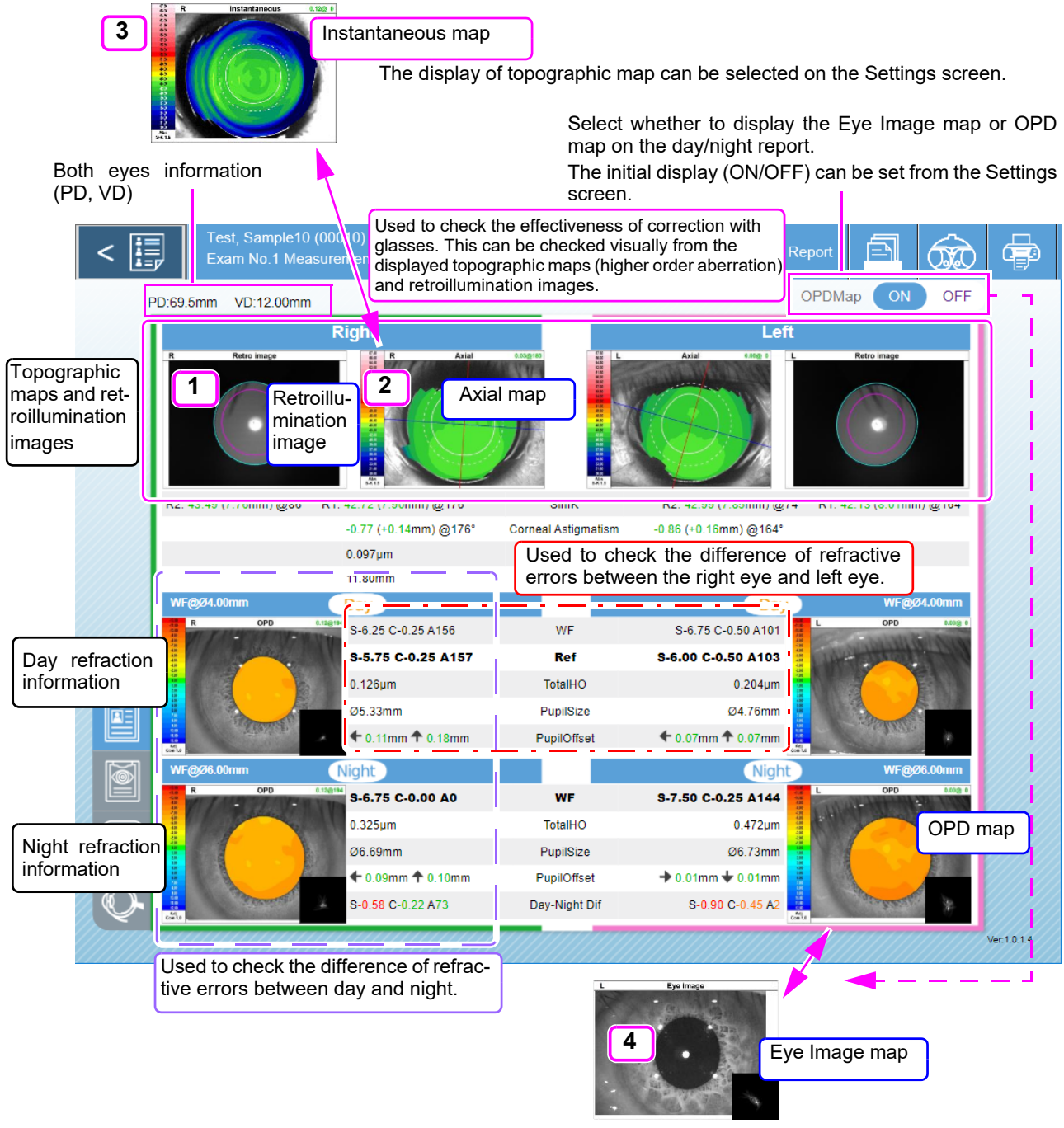
Pressing the image export button  of an enlarged map exports the image data of the enlarged map to the specified computer. The setting of export destination is performed in the OPD Web Viewer System management window.



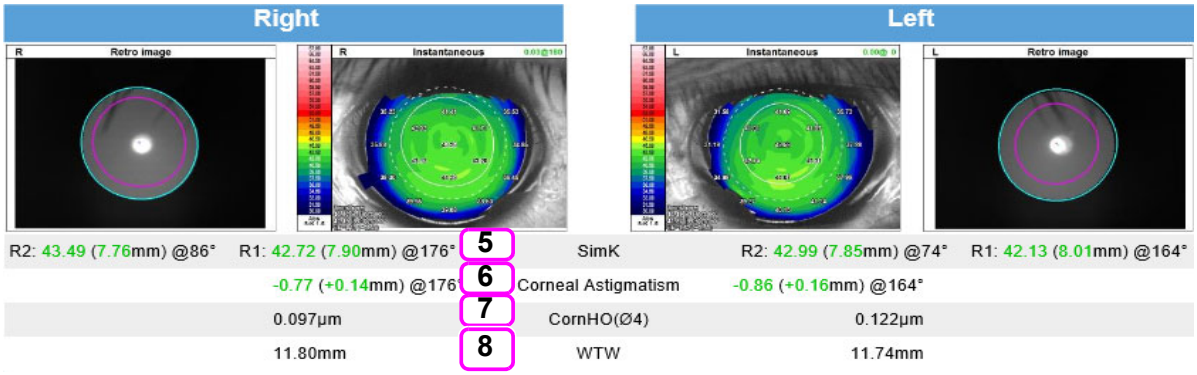
3.2 Report Configuration

3.2.1 Basic Information Report

Used to check the presence of factors (higher order aberrations or cataracts) that may interfere with correction of refractive errors with glasses and the difference of refractive errors between the right eye and left eye based on the maps and measurement values or to check the necessity for the night glasses based on the day and night measurement values.



Topographic maps and retroillumination images



1	Retro Image map (Retroillumination image)	Used to observe opacity in the lens using an image reflected from the fundus. In this image, opaque portions appear as black shadows. The pupil contour in the photopic vision (purple) and mesopic vision (cyan) can be displayed.
2	Axial map	Displays the distribution of the corneal curvature in a color map.
3	Instantaneous map	Displays the distribution of the corneal curvature in a color map. This map is useful for observation of local or small variations in the shape of the cornea.
4	Eye Image map	Displays the anterior eye segment image in the photopic vision and mesopic vision.
5	SimK	Corneal refractive power, corneal curvature radius, and cylinder axis of R1 and R2
6	Corneal Astigmatism	Indicates the corneal cylindrical power (CYL) and R1 axis angle.
7	CornHO (Φ4)	Corneal higher order aberration measured in a 4 mm-diameter area
8	WTW	Corneal diameter measurement value (WTW measurement) If the corneal diameter cannot be detected automatically, “Detection failed” appears.

The SimK and Corneal Astigmatism values can be displayed in different colors depending on the range.

SimK

Character color	Red	Orange	Green	Orange	Red
Corneal refractive power (D)	Up to 3.99	4.00 to 40.65	40.66 to 46.48	46.49 to 70.00	70.01 or greater
Corneal curvature radius (mm)	84.39 or greater	84.38 to 8.31	8.30 to 7.26	7.25 to 4.82	Up to 4.81

Corneal Astigmatism

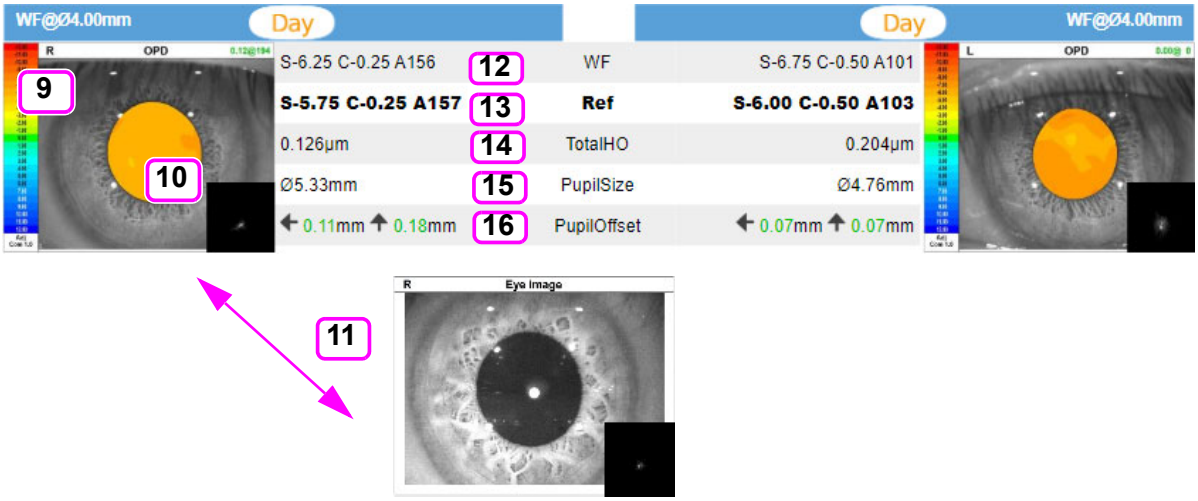
Character color	Green	Orange	Red
Corneal refractive power (D)	Up to 1.42	1.43 to 1.78	1.79 or greater

* Absolute value of the difference between R1 and R2

Note

- The color code of corneal curvature radius for corneal astigmatism is displayed according to that of corneal refractive power.

Day refraction information



9	OPD map	Displays the distribution of the refractive error in a color map. The value in the upper right corner of the map indicates the amount of alignment error (distance from center to cross cursor@Angle) during measurement.
10	PSF (HO) mini map	Only in case of higher order aberration (when correction with glasses is not possible), it displays the simulation on how blurry a point source light appears to the patient. Blurry visions that cannot be corrected with glasses are displayed.
11	Eye Image map	Displays the anterior eye segment image in the photopic vision.
12	WF	Refractive error measured in a 4 mm-diameter (or diameter of photopic vision [*1]) aberration analysis area If the diameter of the photopic vision is less than 4 mm even when the diameter is set to 4 mm, the calculation is performed using that pupil diameter.
13	Ref	Refractive error measured by a general refractometer Displays the refractive error value measured within the measurement range (a 2.3 mm-diameter area).
14	TotalHO	Higher order aberration in a 4 mm-diameter (or diameter of photopic vision [*1]) area
15	PupilSize	Pupil diameter in photopic vision If the diameter cannot be detected, “Detection failed” appears.
16	PupilOffset	Shifting amount of pupil center from the corneal vertex in photopic vision The orientation of the arrow indicates the shifting direction of pupil center. The display for Pupil offset can be selected between “XY coordinates” and “Polar coordinates” under the “Web Viewer” tab (Other) on the Settings screen. (Default: XY coordinates) If the diameter cannot be detected, “Detection failed” appears.

*1: Set by selecting the radio button of the desired option in the Analysis Area box under the Web Viewer tab (Report tab) on the Settings screen.

If the diameter of the photopic vision is less than 4 mm even when the diameter is set to 4 mm, the calculation is performed using that pupil diameter.

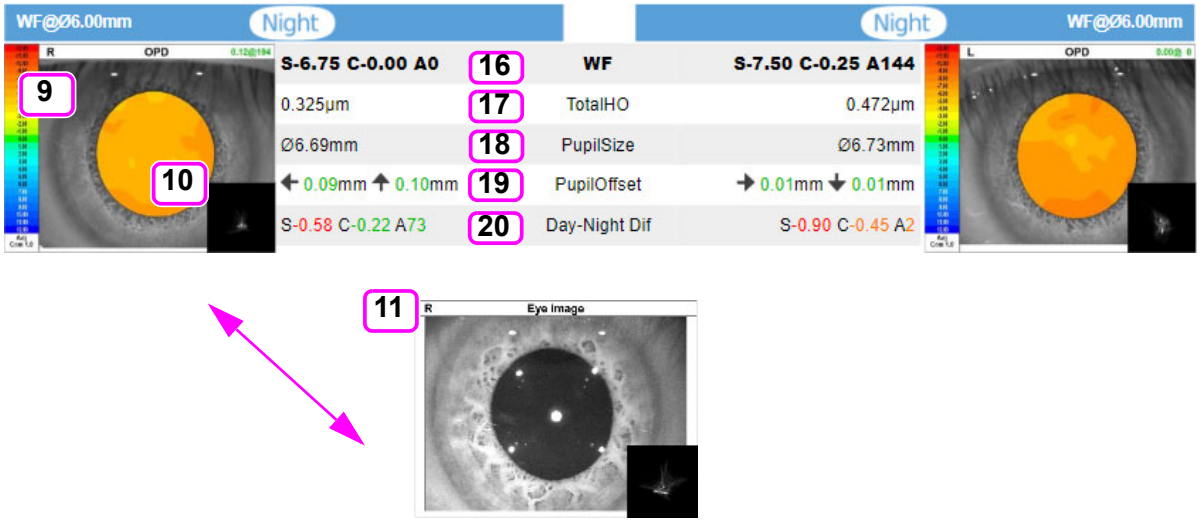
When the diameter of the photopic vision is set, the pupil diameter becomes an analysis area diameter. However, for data sets whose detection of pupil diameter failed, a 4 mm-diameter is set as the analysis area diameter.

The value of PupilOffset can be displayed in different colors depending on the range.

Character color	Green	Orange	Red
mm	Up to 0.29	0.30 to 0.49	0.50 or greater

Night refraction information

Displays the night refraction information in a 6 mm-diameter aberration analysis area.



9	OPD map	Displays the distribution of the refractive error in a color map. The value in the upper right corner of the map indicates the amount of alignment error (distance from center to cross cursor@Angle) during measurement.
10	PSF (HO) mini map	Only in case of higher order aberration (when correction with glasses is not possible), it displays the simulation on how blurry a point source light appears to the patient. Blurry visions that cannot be corrected with glasses are displayed.
11	Eye Image map	Displays the anterior eye segment image in the mesopic vision.
16	WF	Refractive error measured in a 6 mm-diameter (or diameter of mesopic vision *2) aberration analysis area
17	TotalHO	Higher order aberration in a 6 mm-diameter (or diameter of mesopic vision *2) area
18	PupilSize	Pupil diameter in mesopic vision If the diameter cannot be detected, “Detection failed” appears.

19	PupilOffset	Shifting amount of pupil center from the corneal vertex in mesopic vision The orientation of the arrow indicates the shifting direction of pupil center. The display for Pupil offset can be selected between “XY coordinates” and “Polar coordinates” under the “Web Viewer” tab (Other) on the Settings screen. (Default: XY coordinates) If the diameter cannot be detected, “Detection failed” appears.
20	Day-Night Dif	Difference between the day Ref value (or day WF value) and night WF value The night WF value when corrected by day Ref value (or day WF value) The selection of the day Ref value or day WF value depends on the value transferred to the RT. In day refraction information, the value is displayed in boldface.

*2: Set by selecting the radio button of the desired option in the Analysis Area box under the Web Viewer tab (Report tab) on the Settings screen.

If the diameter of the mesopic vision is less than 6 mm even when the diameter is set to 6 mm, the calculation is performed using that pupil diameter.

When the diameter of the mesopic vision is set, the pupil diameter becomes an analysis area diameter. However, for data sets whose detection of pupil diameter failed, a 6 mm-diameter is set as the analysis area diameter.

The value of PupilOffset can be displayed in different colors depending on the range.

Character color	Green	Orange	Red
mm	Up to 0.29	0.30 to 0.49	0.50 or greater

The value of Day-Night Dif (absolute value) for Sph and Cyl can be displayed in different colors depending on the range.

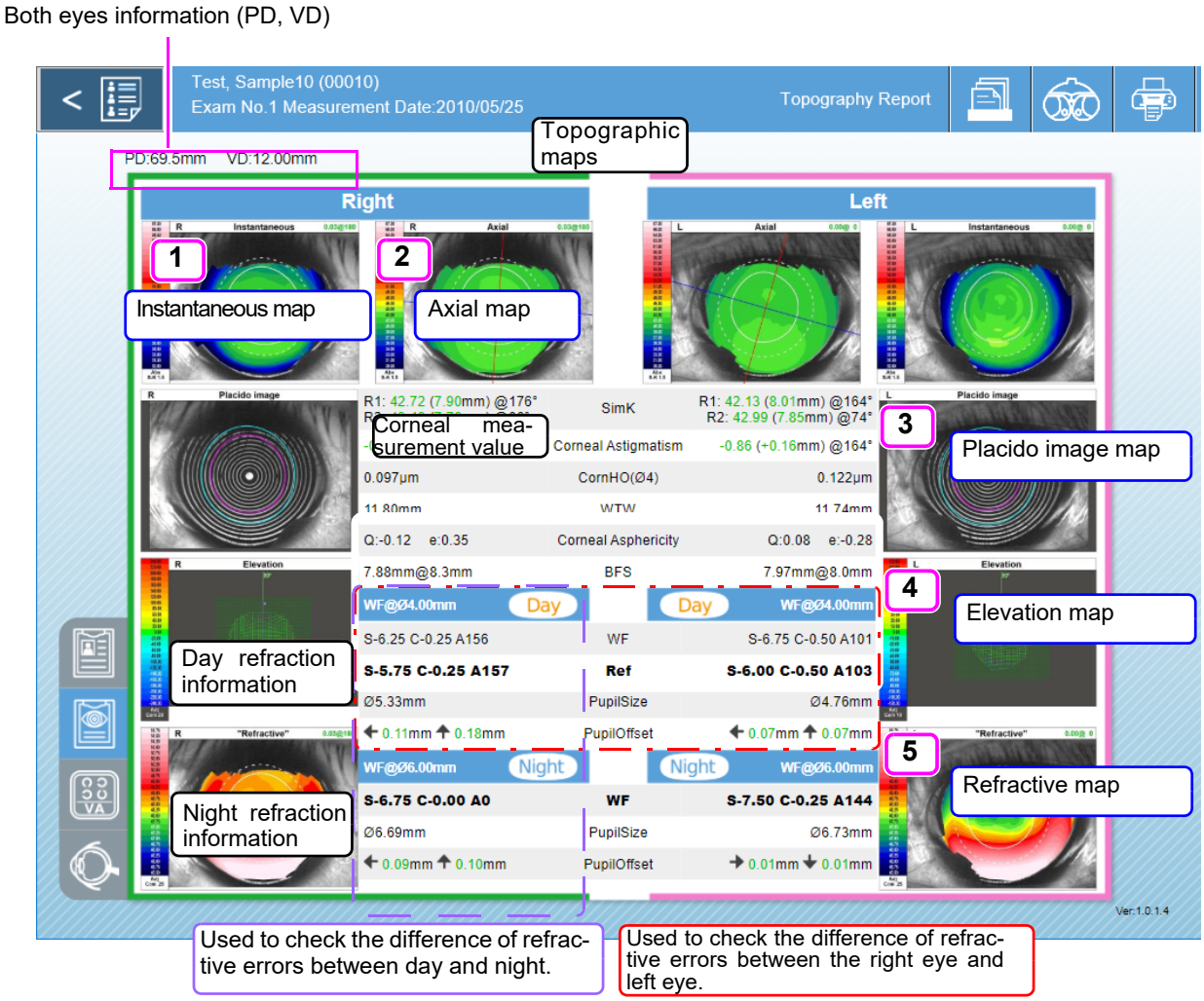
Character color	Green	Orange	Red
D	Up to 0.24	0.25 to 0.49	0.50 or greater

The value of Day-Night Dif (absolute value) for Axis can be displayed in different colors depending on the range.

Character color	Green	Orange	Red
° (Degree)	Up to 4	5 to 9	10 or greater

3.2.2 Topography Report

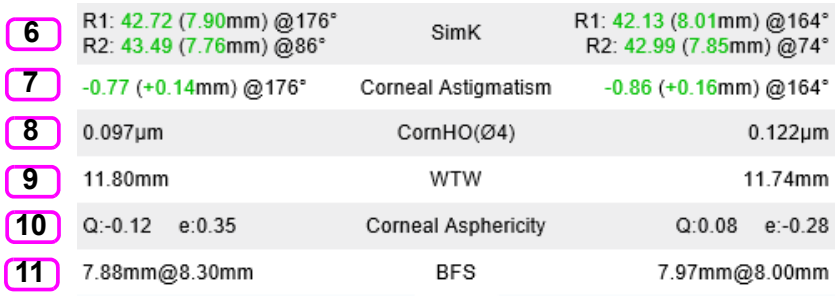
Used to check the presence of factors (higher order aberrations or such) that may interfere with correction of refractive errors with contact lenses and the difference of refractive errors between the right eye and left eye based on the topographic maps and corneal shape images or to check the necessity for the night glasses based on the day and night measurement values.



Topographic maps

1	Instantaneous map	Displays the distribution of the corneal curvature in a color map. This map is useful for observation of local or small variations in the shape of the cornea.
2	Axial map	Displays the distribution of the corneal curvature in a color map.
3	Placido image map	Displays the corneal shape as placido ring images.
4	Elevation map	Displays the unevenness of the corneal shape when overlaid with the reference sphere in wire frames.
5	Refractive map	Displays the distribution of the corneal refractive power in a color map.

Corneal measurement value



6	SimK	Corneal refractive power, corneal curvature radius, and cylinder axis of R1 and R2
7	Corneal Astigmatism	Indicates the refractive power, curvature radius, and cylinder axis of cornea only
8	CornHO (Φ4)	Corneal higher order aberration measured in a 4 mm-diameter area
9	WTW	Corneal diameter measurement value (WTW measurement) If the corneal diameter cannot be detected automatically, "Detection failed" appears.
10	Corneal Asphericity	Q value and eccentricity indicating the asphericity of the cornea
11	BFS	Reference sphere (best-fit sphere) and its target area

The value of SimK can be displayed in different colors depending on the range.

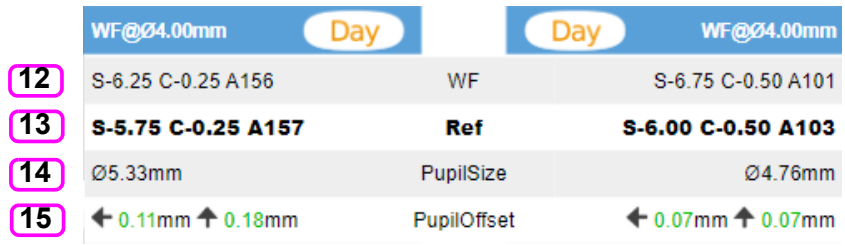
Corneal refractive power

Character color	Red	Orange	Green	Orange	Red
D	Up to 3.99	4.00 to 40.65	40.66 to 46.48	46.49 to 70.00	70.01 or greater

Corneal curvature radius

Character color	Red	Orange	Green	Orange	Red
mm	84.39 or greater	84.38 to 8.31	8.30 to 7.26	7.25 to 4.82	Up to 4.81

Day refraction information



12	WF	Refractive error measured in a 4 mm-diameter (or diameter of photopic vision *1) aberration analysis area If the diameter of the photopic vision is less than 4 mm even when the diameter is set to 4 mm, the calculation is performed using that pupil diameter.
13	Ref	Refractive error measured by a general refractometer Displays the refractive error value measured within the measurement range (a 2.3 mm-diameter area).
14	PupilSize	Pupil diameter in photopic vision If the diameter cannot be detected, "Detection failed" appears.
15	PupilOffset	Shifting amount of pupil center from the corneal vertex in photopic vision The orientation of the arrow indicates the shifting direction of pupil center. The display for Pupil offset can be selected between "XY coordinates" and "Polar coordinates" under the "Web Viewer" tab (Other) on the Settings screen. (Default: XY coordinates) If the diameter cannot be detected, "Detection failed" appears.

*1: Set by selecting the radio button of the desired option in the Analysis Area box under the Web Viewer tab (Report tab) on the Settings screen.

If the diameter of the photopic vision is less than 4 mm even when the diameter is set to 4 mm, the calculation is performed using that pupil diameter.

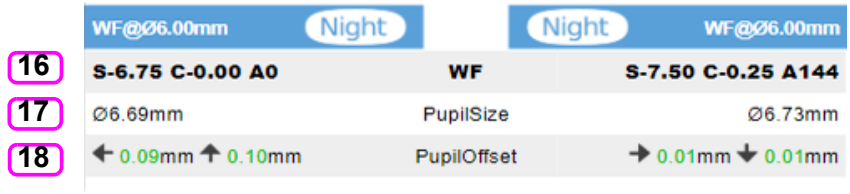
When the diameter of the photopic vision is set, the pupil diameter becomes an analysis area diameter. However, for data sets whose detection of pupil diameter failed, a 4 mm-diameter is set as the analysis area diameter.

The value of PupilOffset can be displayed in different colors depending on the range.

Character color	Green	Orange	Red
mm	Up to 0.29	0.30 to 0.49	0.50 or greater

Night refraction information

Displays the night refraction information in a 6 mm-diameter aberration analysis area.



16	WF	Refractive error measured in a 6 mm-diameter (or diameter of mesopic vision *2) aberration analysis area
17	PupilSize	Pupil diameter in mesopic vision If the diameter cannot be detected, "Detection failed" appears.
18	PupilOffset	Shifting amount of pupil center from the corneal vertex in mesopic vision The orientation of the arrow indicates the shifting direction of pupil center. The display for Pupil offset can be selected between "XY coordinates" and "Polar coordinates" under the "Web Viewer" tab (Other) on the Settings screen. (Default: XY coordinates) If the diameter cannot be detected, "Detection failed" appears.

*2: Set by selecting the radio button of the desired option in the Analysis Area box under the Web Viewer tab (Report tab) on the Settings screen.

If the diameter of the mesopic vision is less than 6 mm even when the diameter is set to 6 mm, the calculation is performed using that pupil diameter.

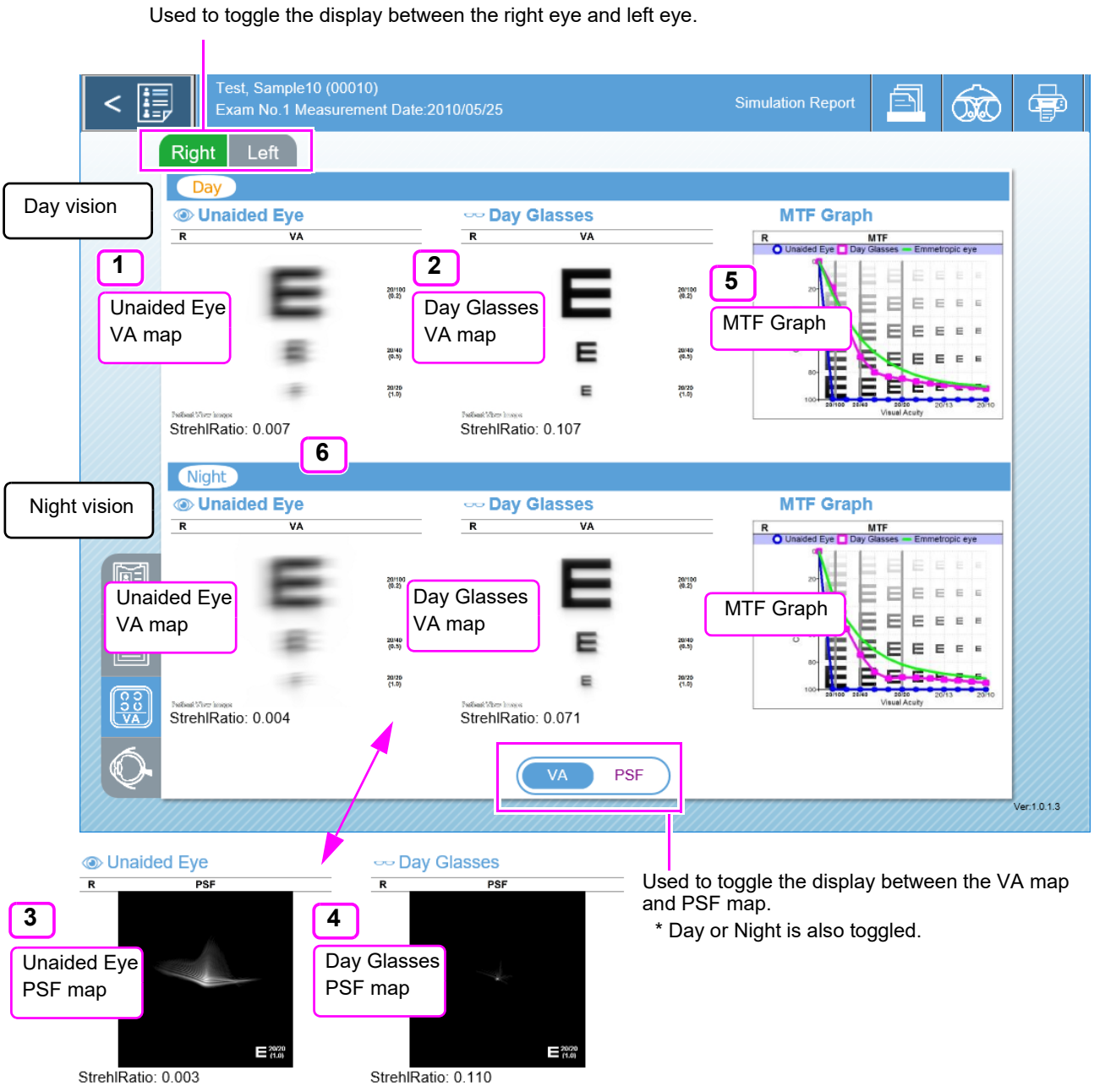
When the diameter of the mesopic vision is set, the pupil diameter becomes an analysis area diameter. However, for data sets whose detection of pupil diameter failed, a 6 mm-diameter is set as the analysis area diameter.

The value of PupilOffset can be displayed in different colors depending on the range.

Character color	Green	Orange	Red
mm	Up to 0.29	0.30 to 0.49	0.50 or greater

3.2.3 Simulation Report

How the patient visualizes can be determined by performing patient view simulation. Additionally, by performing view simulation using day glasses under night view condition, recommendation as to whether night glasses are necessary becomes possible.



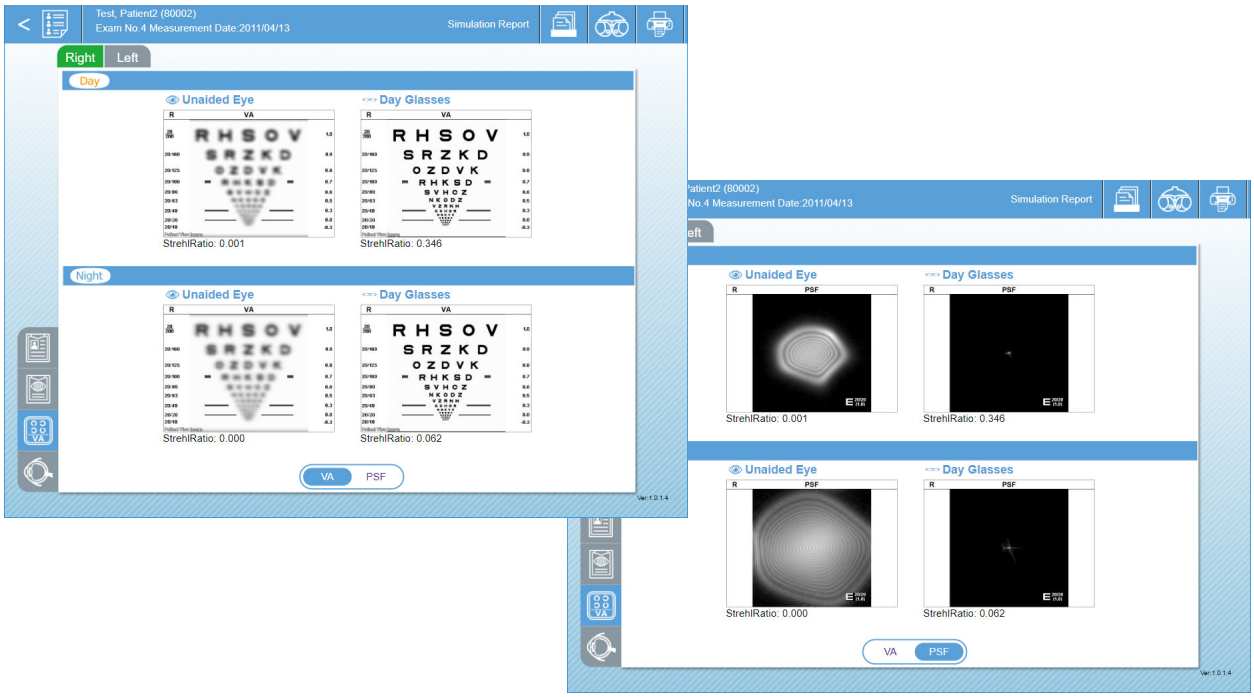
1	VA map (Unaided Eye)	Displays the simulation on how a VA chart appears to the patient's unaided eye.
2	VA map (Day Glasses)	Displays the simulation on how a VA chart appears to the patient wearing corrective glasses.
3	PSF map (Unaided Eye)	In case of unaided eye, it displays the simulation on how blurry a point source light appears to the patient.

4	PSF map (Day Glasses)	In case of wearing corrective glasses, it displays the simulation on how blurry a point source light appears to the patient.
5	MTF Graph	Displays the contrast needed for the patient to visually identify figures in a visual acuity chart.
6	StrehlRatio	Displays the ratio of the PSF value to the theoretical diffraction limit. The ratio is displayed in the range from 1 to 0. If this value is 0.8 or larger, the eye can be considered as having almost no aberration.

○ Hiding MTF Graph

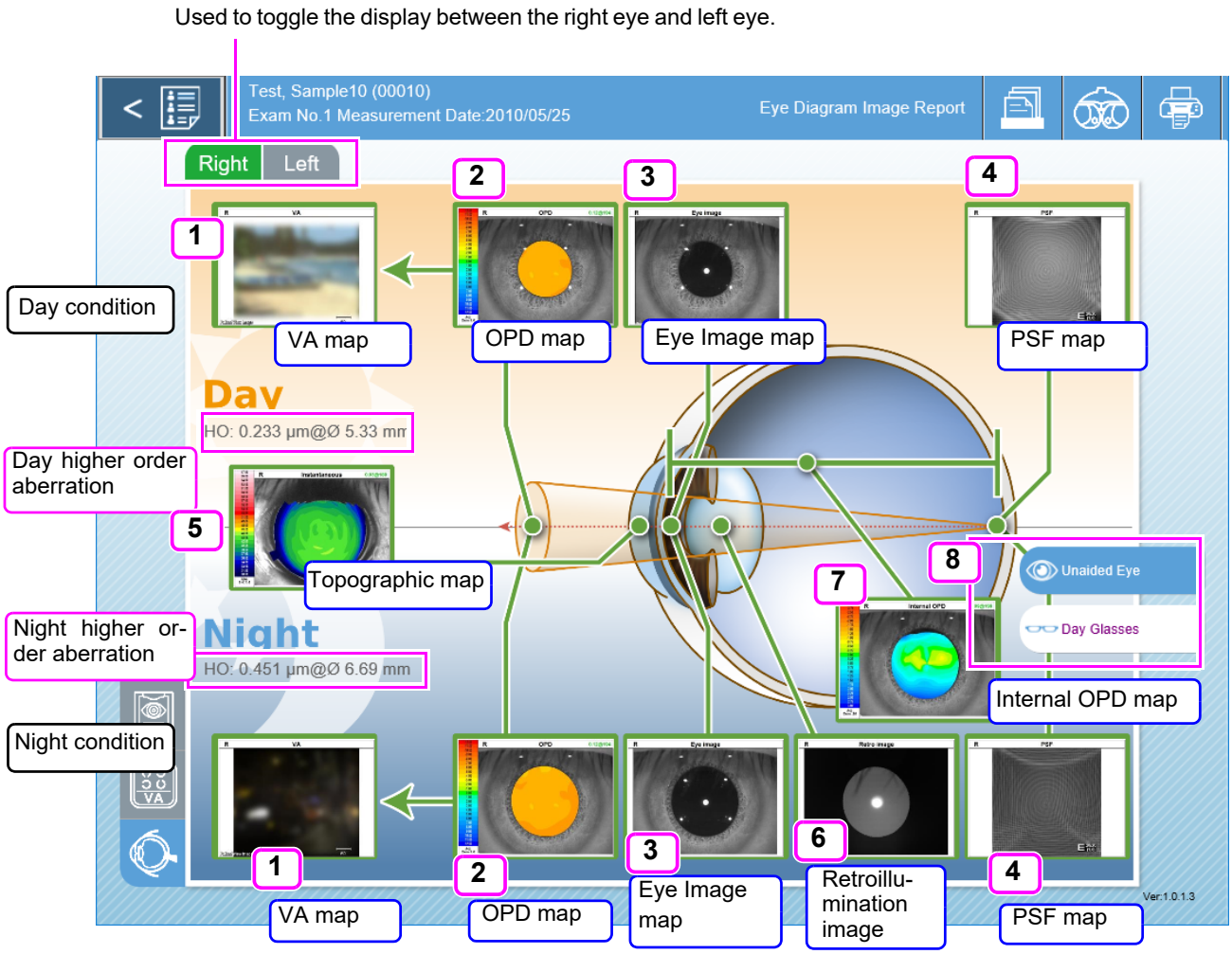
The display of MTF Graph can be set not to be visible on the Simulation Report screen.

Open the Settings screen, press the Web Viewer tab (Report tab), then set “MTF Graph Display” to “Hide”.



3.2.4 Eye Diagram Image Report

This report is used when giving explanation to patients. The eye condition from fundus to cornea is displayed in various maps. Explanations regarding the advantages of correcting refractive error with glasses or refractive error differences due to different pupil diameters between day and night is performed visually with this report.



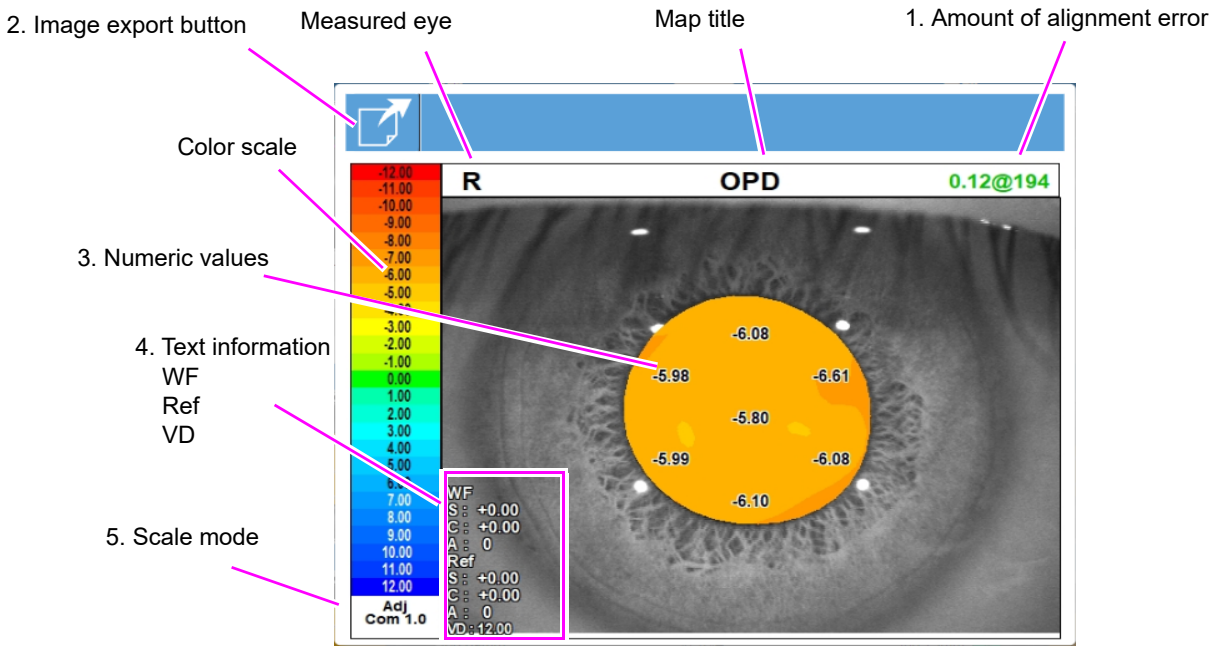
1	VA map	Displays the simulation on how a VA chart appears to the patient.
2	OPD map	Displays the distribution of the refractive error in a color map. The value in the upper right corner of the map indicates the amount of alignment error (distance from center to cross cursor@Angle) during measurement.
3	Eye Image map	Anterior eye segment image (Used to observe the pupil size.)
4	PSF map	Displays the simulation on how blurry a point source light appears to the patient.
5	Topographic map	Displays the distribution of the corneal curvature in a color map. (Axial or Instantaneous map)

6	Retro Image map (Retroillumination image)	Used to observe opacity in the lens using an image reflected from the fundus. In this image, opaque portions appear as black shadows. The pupil contour in the photopic vision (purple) and mesopic vision (cyan) can be displayed.
7	Internal OPD map	Used to check the presence of astigmatism interior of the eye based on the distribution of refractive error interior of the eye. Internal OPD map is hidden by default.
8	Unaided Eye / Day Glasses button	Used to toggle the VA map and PSF map between unaided eye vision and day glasses vision. The displays can be toggled to show the differences between photopic vision and mesopic vision or unaided eye vision and day glasses vision, or to show night vision when wearing day glasses.

3.3 Color Maps

3.3.1 OPD map (Distribution of refractive error)

The OPD map displays the distribution of refractive error obtained in the OPD measurement. It shows the amount of correction needed at each point within the 9.5 mm-diameter area to achieve emmetropia (for the whole eye taking into consideration the corneal and internal refractive errors).
Unlike conventional auto-refractometers that measure the refractive error of the central part of the eye, the device measures refractive error of the peripheral area as well, enabling display of the distribution of refractive power needed to correct the visual acuity.
The OPD map also shows optical aberration and other information.
The values shown on the map are calculated regarding the vertex distance (VD) as 0 (zero). (Fix)



1. Amount of alignment error

Displays “Distance@Angle” between the measurement optical axis and the corneal vertex.

Amount of alignment error (mm)	Color of characters
0 ≤ amount of alignment error < 0.3	Green
0.3 ≤ amount of alignment error < 0.4	Yellow
0.4 ≤ amount of alignment error	Red

If the amount of alignment error cannot be detected, any of the following appears in red.

Offsets: ---@--	The amount of alignment error during measurement cannot be detected.
Offsets: No data	There is no information on the amount of alignment error because the data was obtained with the ARK-10000 of a version earlier than Ver. 1.12.
Offsets: *.**@*	Measurement is executed without the focus indicator being displayed.

2. Image export button 

Used to export the image data of an enlarged map to the specified folder. The setting of export destination is performed in the OPD Web Viewer System management window.

The export file format of image data can be selected between Bitmap or JPEG.

3. Numeric values

Displays the refractive power (Pwr) at each position numerically on the map.

Note

- "3. Numeric values" and "4. Text information" are not displayed by default.
  The display setting can be changed from the Web Viewer tab on the Settings screen.

4. Text information

Day	WF	Refractive errors measured in aberration analysis area (a 4 mm-diameter or diameter of photopic vision)
	Ref	Refractive errors measured by a general refractometer Displays the refractive error value measured within the measurement range (a 2.3 mm-diameter area).
	VD	Vertex distance calculated for the S, C, and A values The vertex distance is the value set in the Settings screen.

Night	WF	Refractive errors measured in aberration analysis area (a 6 mm-diameter or diameter of mesopic vision).
	VD	Vertex distance calculated for the S, C, and A values The vertex distance is the value set in the Settings screen.

Note

- For the setting of analysis area, select the parameter "Analysis Area" from among "4.0mm/6.0mm" and "Photopic/Mesopic".
  For details of setting, refer to "Analysis Area" under the Web Viewer tab (Report tab) on the Settings Screen.

5. Scale mode

Shows the color scale mode.

The color scale can be set to each map from the Web Viewer tab (Map Scale tab) on the Settings screen.

Abbreviation of scale mode

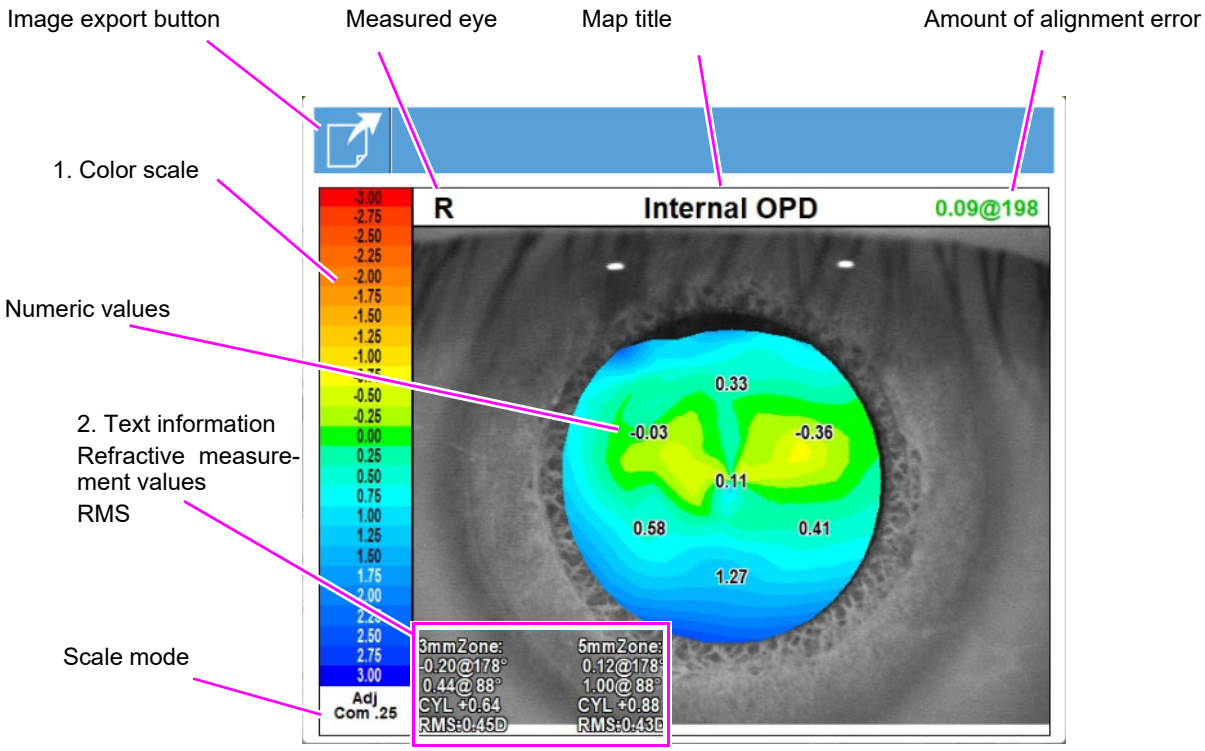
Norm (Normalize)	Indv (Individual)	Numeric (Increments)	Relative scale (differs for each map data)
	Com (Common)	Numeric (Increments)	Relative scale (differs for each map type)
Adj (Adjustable)	Com (Common)	Numeric (Increments)	Adjustable scale (relative) (differs for each map type) (Setting is changeable.)
Abs (Absolute) * This setting is not available for OPD map.	S-K 1.5 (Smolek-Klyce [1.5 D])		Absolute scale, Smolek Klyce scale, 1.5 D increments
	Abs 26 (Absolute [26])		Absolute scale with 26 colors

Note

- To compare changes in a patient's eye over time, or eyes of different patients, it is recommended to always use the same color scale.

3.3.2 Internal OPD map (Distribution of internal eye refractive error)

The Internal OPD map displays the distribution of internal eye refractive error within the area ranging from the posterior surface of the cornea to the retina.
Of the refractive power of the whole eye, the cornea is considered to be responsible for 75% of it, and the crystalline lens to be 25%.
The device measures the distribution of refractive error on the cornea from the corneal topography, and that in the whole eye on the OPD map. These measurements are used to calculate the distribution of the internal eye refractive error and present it as the Internal OPD map. This map shows presence or absence of astigmatism inside the eye (mainly crystalline lens). In most cases, astigmatism occurs on the corneal surface. However, there are cases where lenticular astigmatism cancels out the corneal astigmatism. (About 20% of eyes with astigmatism have internal eye astigmatism.)
When prescribing contact lenses, or performing corneal refractive surgery, it is important to consider both corneal and internal astigmatism.



The items common to those for the OPD map are omitted (see page 121).

1. Color scale

The Internal OPD map color-codes the distribution of internal eye refractive error.
The average refractive error is regarded as 0 D (green). The greater refractive error becomes in the negative direction, the warmer the colors on the map become. The greater refractive error becomes in the positive direction, the cooler the colors on the map become.

.

Note

- In this map, missing data is interpolated and extrapolated to display the data of the 6 mm diameter area.
  Only the measurement data within the detected ring within the pupil is reliable.

2. Text information

Displays measurement values obtained within the 3 mm- and 5 mm- diameter circles around the center of the cornea

Refractive error along the steepest meridian@Angle

Refractive error along the flattest meridian @ Angle

CYL: Difference in refractive errors between the flattest and steepest meridians

(Data is shown in yellow if no pupil contour is obtained.)

The sign of the Cyl data of the internal OPD map is determined by the formula: (dk in "Refractive" map) + (CYL in Internal OPD map) ≒ (CYL in OPD map)

The sign shows whether the internal astigmatism increases or cancels out the total astigmatism. (See the table below.)

CYL data sign	CYL setting in the Settings screen (Other tab)	
	+	−
+	The internal refractive errors increase total astigmatism.	The internal refractive errors counteract total astigmatism.
−	The internal refractive errors counteract total astigmatism.	The internal refractive errors increase total astigmatism.

RMS: RMS (Root Mean Squared fit error) on the circumference

Eyes with regular astigmatism show the RMS value of less than 0.5. If the RMS value is larger than 0.5, the eye is suspected to have irregular astigmatism.

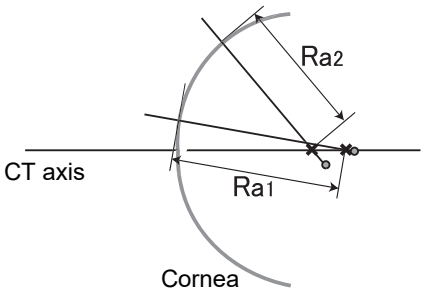
	Normal	Suspect	Abnormal
3 mm- diameter area	＜ 0.41	0.41 ≤ ＜ 0.50	0.50 ≤
5 mm- diameter area	＜ 0.63	0.63 ≤ ＜ 0.77	0.77 ≤

3.3.3 Axial map (Corneal curvature radius / Corneal refractive power)

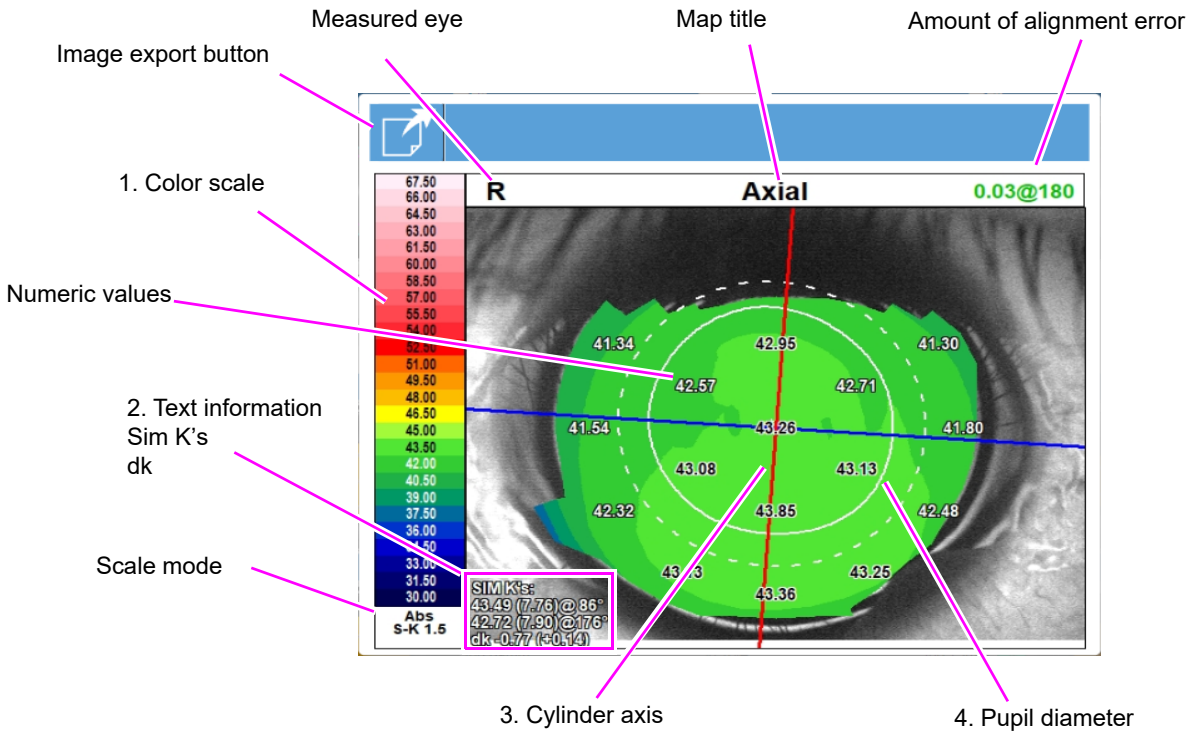
The Axial map shows corneal curvature in diopter.

The unit can be changed to mm.

An eye image captured during the CT measurement is analyzed, and the corneal curvature radius (mm) is measured relative to the measurement axis. The corneal curvature is converted into refractive power (D) using the following formula:



$$P\ [\text{Corneal refractive power (D)}] = \frac{337.5}{r\ [\text{Corneal curvature radius (mm)}]}$$



The items common to those for the OPD map are omitted (see page 121).

1. Color scale

The Axial map color-codes the corneal refractive powers or curvature radiuses. The higher the refractive powers become (smaller curvature radiuses), the warmer the colors on the map become; the lower the refractive powers become (larger curvature radiuses), the cooler the colors on the map become.

2. Text information

Similar with a general keratometer, SIM K's values include the curvature radiuses along the steepest and flattest meridians that cross each other at right angles and corneal refractive powers based on the data in the 3 mm area in the center on the Axial map.

Refractive power along the steepest meridian (Corneal curvature radius)@Angle
Refractive power along the flattest meridian (Corneal curvature radius)@Angle
dk: Difference in refractive powers between the steepest and flattest meridians (Curvature radius: mm)

3. Cylinder axis

Shows the corneal astigmatism. (Red: Steepest meridian, Blue: Flattest meridian)

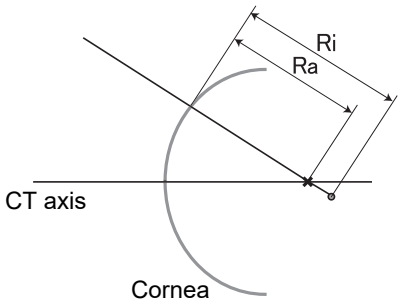
4. Pupil diameter

Shows the pupil contour. (Solid line: Photopic pupil contour, Broken line: Mesopic pupil contour)

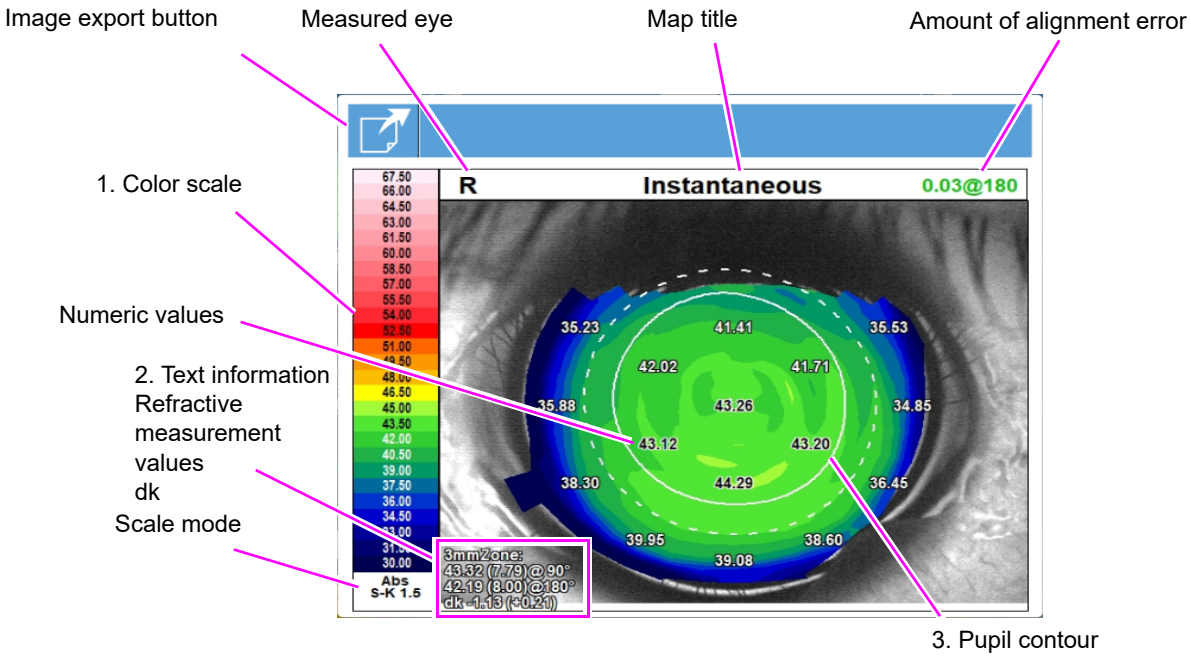
3.3.4 Instantaneous map (Corneal curvature radius / Corneal refractive power)

The Instantaneous map calculates corneal curvature radiuses of localized areas along the meridians whereas the Axial map measures the corneal curvature radiuses relative to the measurement optical axis. Therefore, the Instantaneous map shows in details the actual geometry of the cornea.
The same formula used with the Axial map is used to convert the corneal curvature obtained in the Instantaneous map into corneal refractive power.

Ra: Axial radius (mm)
Ri: Instantaneous radius (mm)
Da: Axial power
Da = 1000 × (n-1)/Ra
Di: Instantaneous power
Di = 1000 × (n-1)/Ri
n: Corneal refractive index (1.3375)
Equivalent refractive index of the entire cornea (Cornea Index A)



The Instantaneous map is useful in observation of small variations in the shape of the cornea for purposes such as detection of early keratoconus.



The items common to those for the OPD map are omitted (see page 121).

1. Color scale

The Instantaneous map color-codes the corneal refractive powers or the curvature radiuses. The higher the refractive powers become (smaller curvature radiuses), the warmer the colors on the map become; the lower the refractive powers become (larger curvature radiuses), the cooler the colors on the map become.

2. Text information

Displays refractive information obtained within the 3 mm-diameter circle around the center of the cornea.

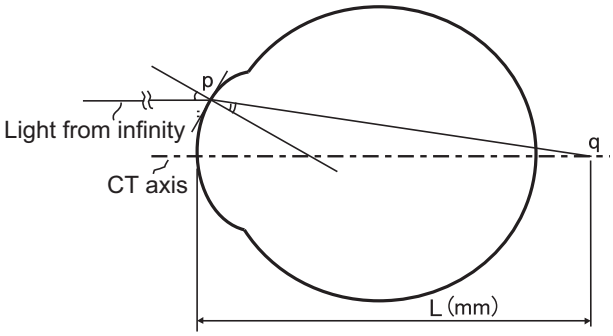
Refractive power along the steepest meridian (Corneal curvature radius)@Angle
Refractive power along the flattest meridian (Corneal curvature radius)@Angle
dk: Difference in refractive power between the flattest and steepest meridians (Corneal curvature radius mm)

3. Pupil contour

Shows the pupil contour. (Solid line: Photopic pupil contour, Broken line: Mesopic pupil contour)

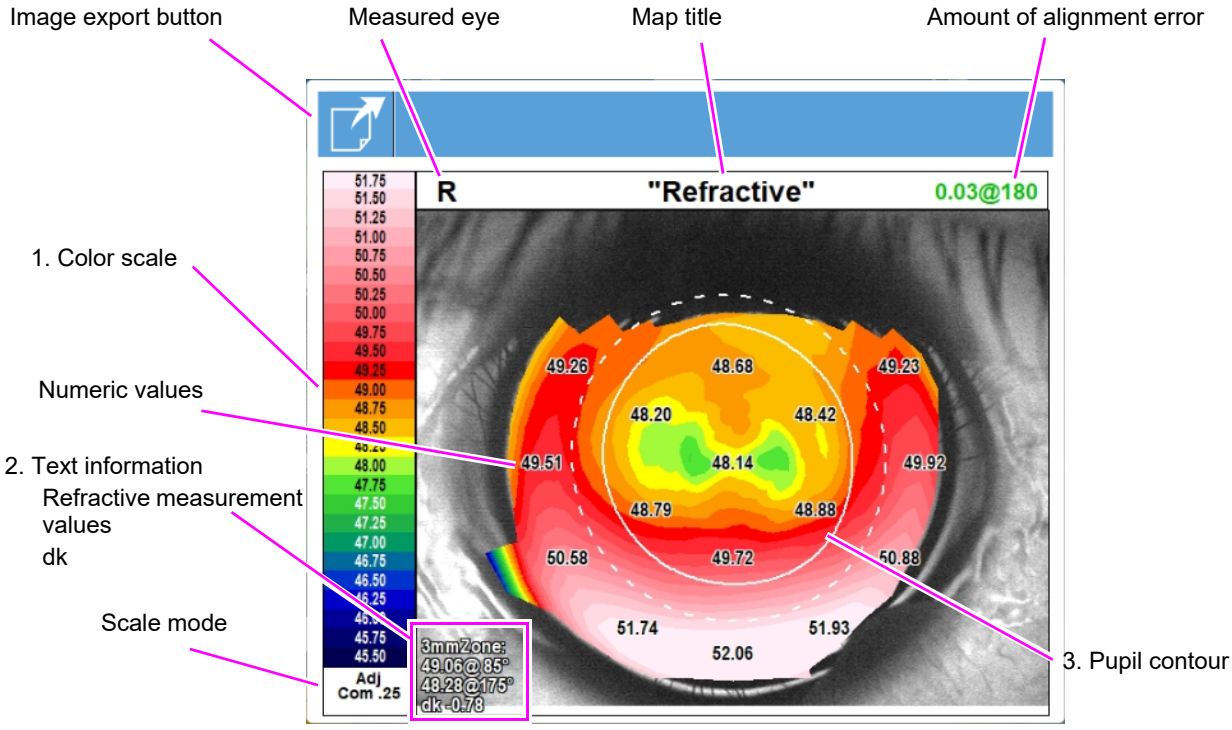
3.3.5 “Refractive” map (corneal surface refractive power)

The “Refractive” map shows the distribution of corneal refractive power calculated using Snell's law.
Because the refractive power is calculated taking into consideration the corneal refractive index (1.3760), the refractive power closer to the actual value is obtained.
The refractive power in air is displayed in this map. The distribution of corneal refractive power shows information such as the degree of spherical aberration. This map in useful in observing the influence of abnormalities in corneal shape on refractive power.



De (in the eye) = 1,000/L
Dc (In the air) = NR × De
Refractive index of cornea
(Default: 1.376)
Refractive index of corneal stroma
(Cornea Index B)

For eyes that underwent refractive surgery, the amount of correction can be observed by comparing the preoperative and postoperative eyes using this map. (A small amount of error may occur because the measurement axis may differ between the preoperative and postoperative eyes.)



The items common to those for the OPD map are omitted (see page 121).

1. Color scale

The “Refractive” map color-codes corneal refractive power. The higher refractive power becomes, the warmer the colors on the map become. The lower refractive power becomes, the cooler the colors on the map become.

2. Text information

Displays refractive information obtained within the 3 mm-diameter circle around the center of the cornea.

Refractive power along the steepest meridian@Angle
Refractive power along the flattest meridian@Angle
dk: Difference in refractive power between the flattest and steepest meridians

3. Pupil contour

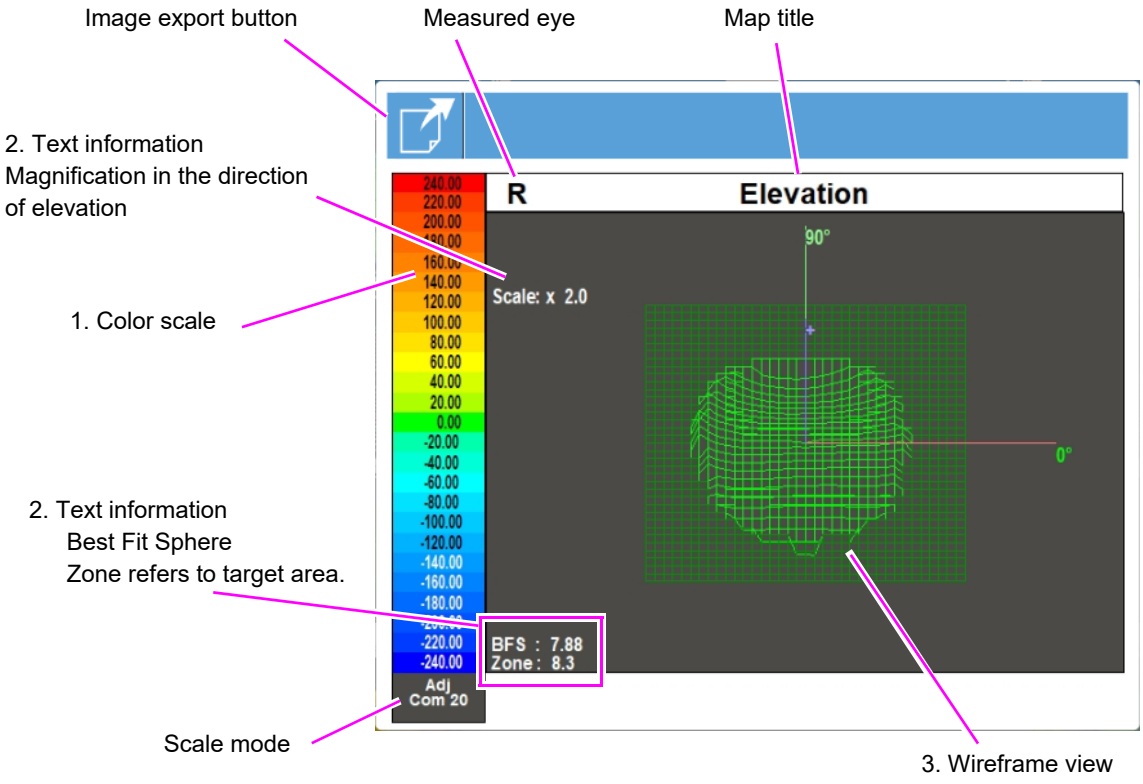
Shows the pupil contour. (Solid line: Photopic pupil contour, Broken line: Mesopic pupil contour)

3.3.6 Elevation map

The Elevation map shows the difference in elevation between the cornea and an overlaid reference sphere.
Usually, the best-fit sphere is used as the reference sphere. However, the reference sphere can be changed as desired.
Because this map shows the difference in elevation, astigmatic components can be observed from the shape. In the case of keratoconus, the cone shape protrudes out of the reference sphere, making it easy to observe the progress.

Note

- The best-fit sphere is a sphere that can be best fit to the cornea of the applicable area. By default, the best-fit sphere is a circle relative to the measurement axis that is enlarged to the maximum as long as the effective area (area not obscured by eyelashes or such) is 60% or larger.



The items common to those for the OPD map are omitted (see page 121).

1. Color scale

The greater the protrusion is, the warmer the colors in the map become.

The smaller the protrusion is, the cooler the colors become. For example, keratoconus is shown with a protrusion in red.

2. Text information

Magnification in the direction of elevation is displayed in the upper-left side of the screen.

The curvature radius and target area of the best-fit sphere used as the reference sphere is displayed at the lower-left side of the screen.

3. Wireframe view

Displays the difference in elevation between the cornea and an overlaid reference sphere.

The display angle is fixed.

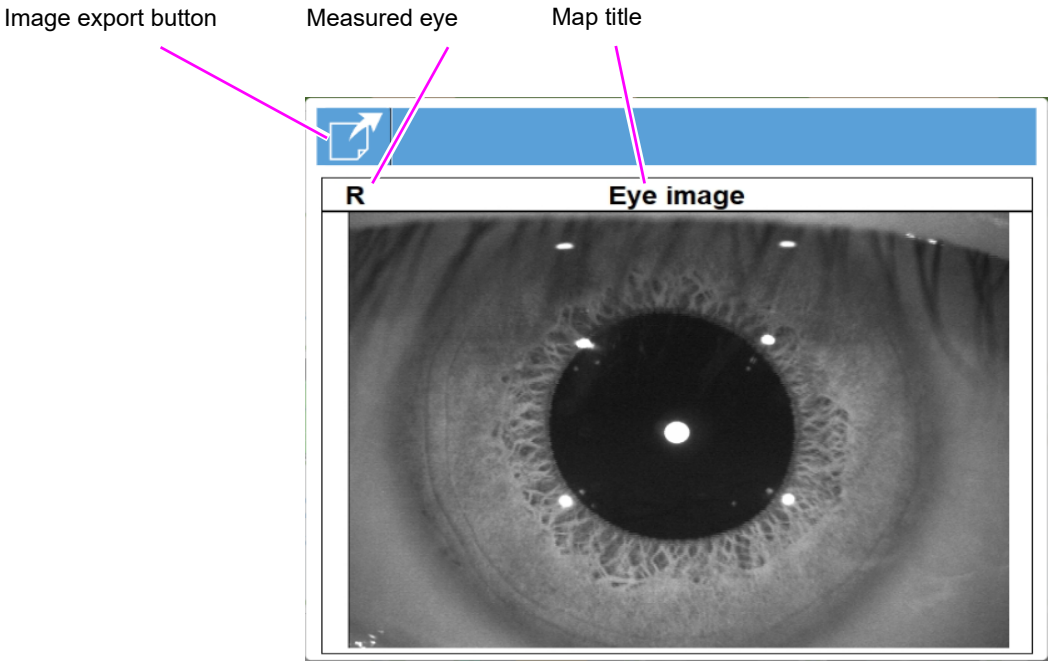
3.3.7 Eye image (Anterior eye segment image)

The Eye image map displays the image captured during measurements.

This image allows the operator to check the alignment and focus conditions.

There are two types of Eye image map: Photopic (Day) and Mesopic (Night).

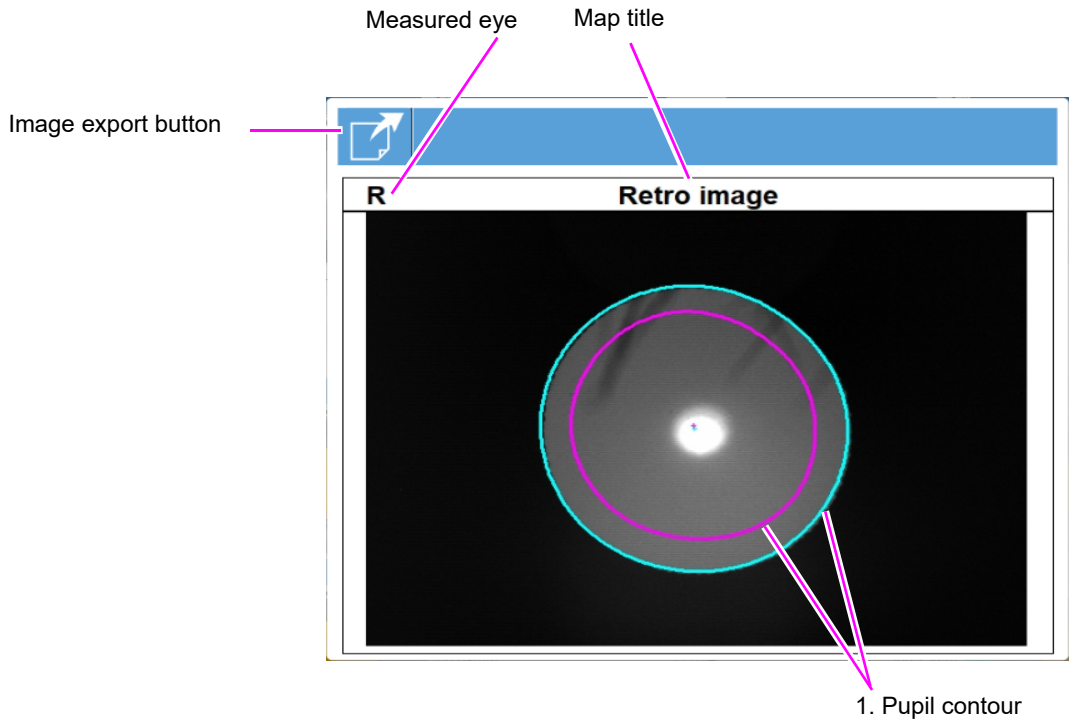
Photopic	Photopic pupil image (Pupil image during the CT measurement) Displayed as Photopic on the Verify Examination Quality screen.
Mesopic	Mesopic pupil image (Pupil image during the OPD measurement) Displayed as Mesopic on the Verify Examination Quality screen.



The description of image export button is the same as that indicated for the OPD map (see page 121).

3.3.8 Retro image (Retroillumination image)

A retroillumination image is an image obtained using the OPD measurement light reflected from the fundus. Opaque portions are displayed as shadows.
The bright spot in the middle of the retroillumination image is light reflected from the cornea. It is not related to the image of the eye interior.



The description of image export button is the same as that indicated for the OPD map (see page 121).

1. Pupil contour

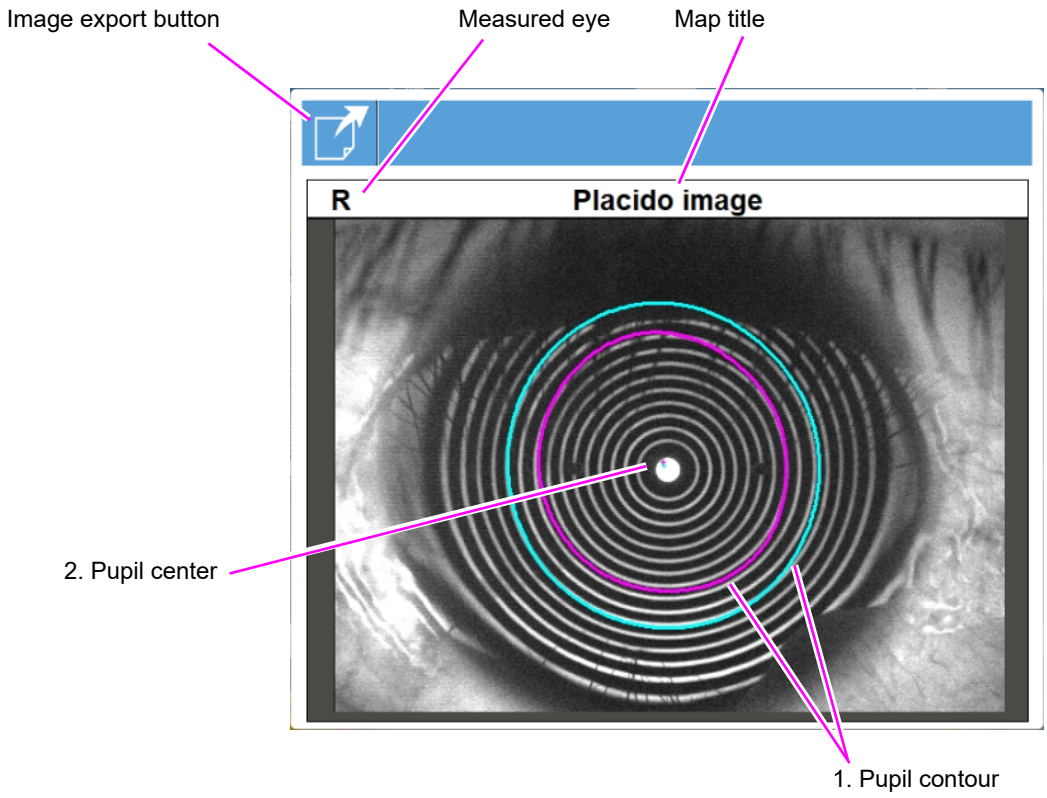
Shows the pupil contour. (Pink outline: Photopic pupil contour, Cyan outline: Mesopic pupil contour)

Note

- Set whether to display the pupil contour in the Display Options box under the Web Viewer tab (Report tab) on the Settings screen.
- The retroillumination image is an image of the illuminated fundus observed through the lens. If there are any clouded portion in the lens, they are observed as shadows.

3.3.9 Placido Image (placido rings)

The Placido image map displays the placido image captured during CT measurement. This map is used to observe the corneal shape to detect irregular astigmatism or keratoconus.



The description of image export button is the same as that indicated for the OPD map (see page 121).

1. Pupil contour

Shows the pupil contour. (Pink outline: Photopic pupil contour, Cyan outline: Mesopic pupil contour)

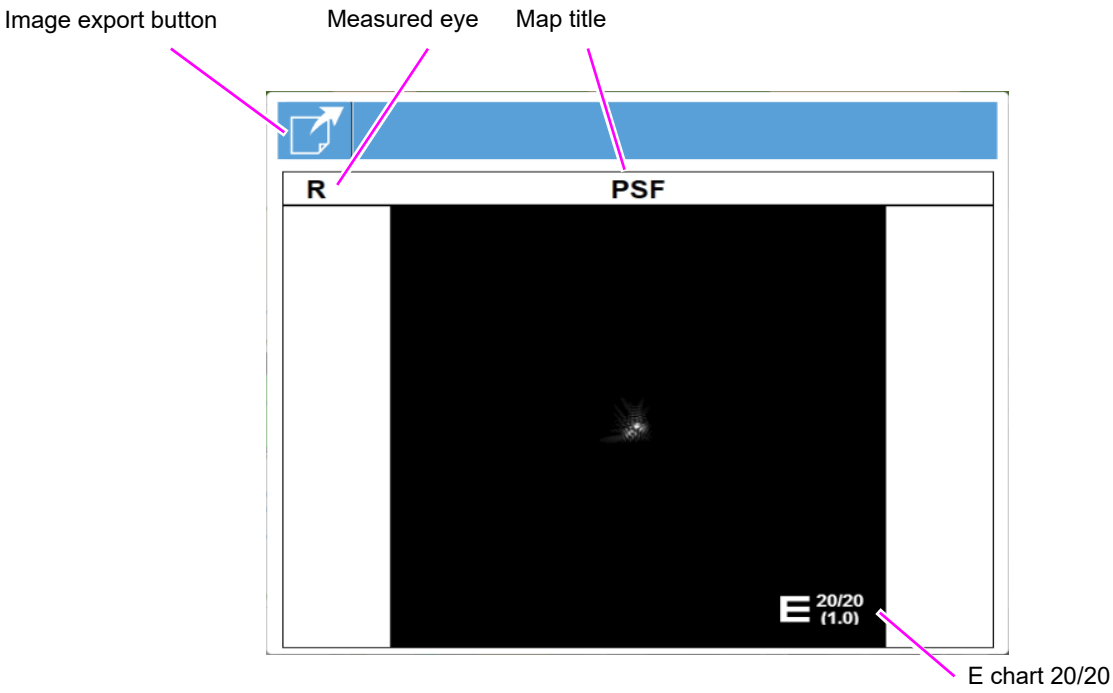
2. Pupil center

Shows the pupil center with crosses. (Pink outline: Photopic pupil contour, Cyan outline: Mesopic pupil contour)

3.3.10 PSF map

The Point Spread Function (PSF) simulates how a point source light like a star appears to the patient when they look at it.
This function calculates how a point at far appears to the patient based on the amount of optical aberration of the eye. Take notice that the processing by the optic nerve system of how the brain recognizes the point formed on the retina is not taken into consideration in this calculation. For this reason, the simulation result may differ from the view the patients actually see.

This map shows that the point looks clearer the smaller it becomes.



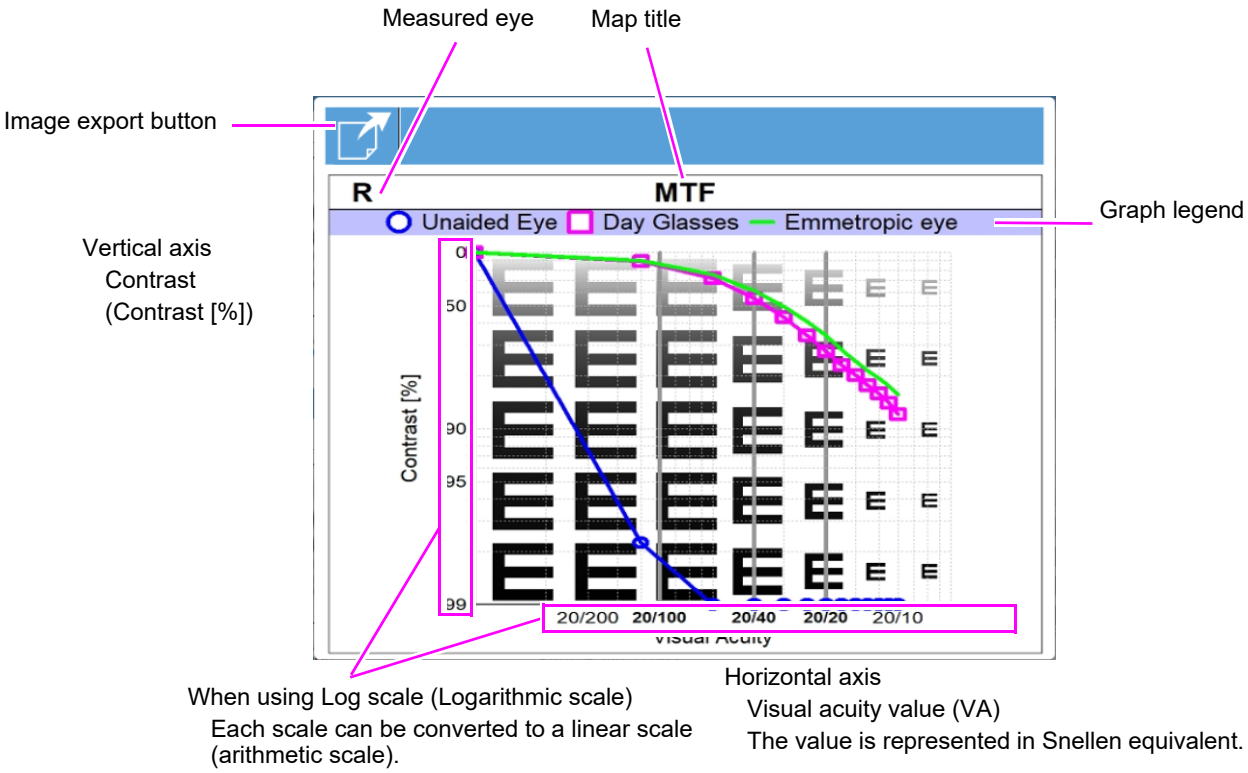
The description of image export button is the same as that indicated for the OPD map (see page 121).

3.3.11 MTF graph (Contrast analysis graph)

The Modulation Transfer Function (MTF) graph shows the contrast needed for the patient to visually identify figures in a visual acuity chart that plots contrast (%) along the vertical axis and visual acuity (VA) along the horizontal axis.

On the graph, the representative curve of human emmetropic eye are also plotted.

Modulation Transfer Function (MTF) displays the contrast sensitivity that is objectively simulated based on wavefront aberrations.



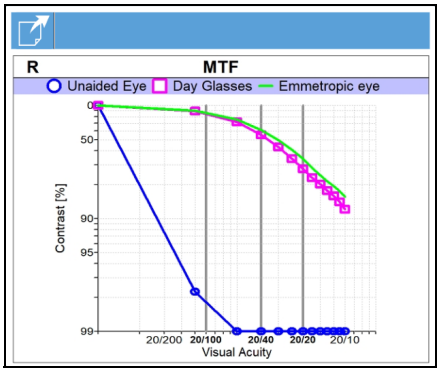
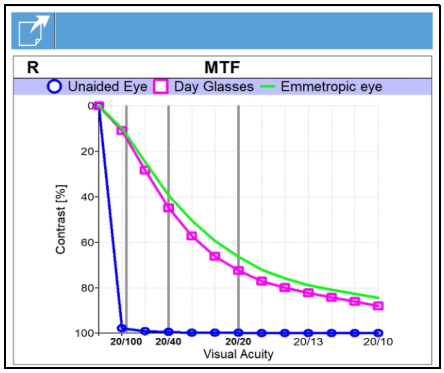
Unaided Eye (blue)	Patient's MTF curve (unaided eye, all aberration components)
Day Glasses (pink)	Patient's MTF curve for higher order aberration only (when fully corrected)
Emmetropic Eye (green)	Curve of typical emmetropic eye

Note

- When the standard value (green line) and day glasses (pink square) are wide apart, use of lenses that are effective in increasing contrast should be considered.

The description of image export button is the same as that indicated for the OPD map (see page 121).

Changing display of MTF graph

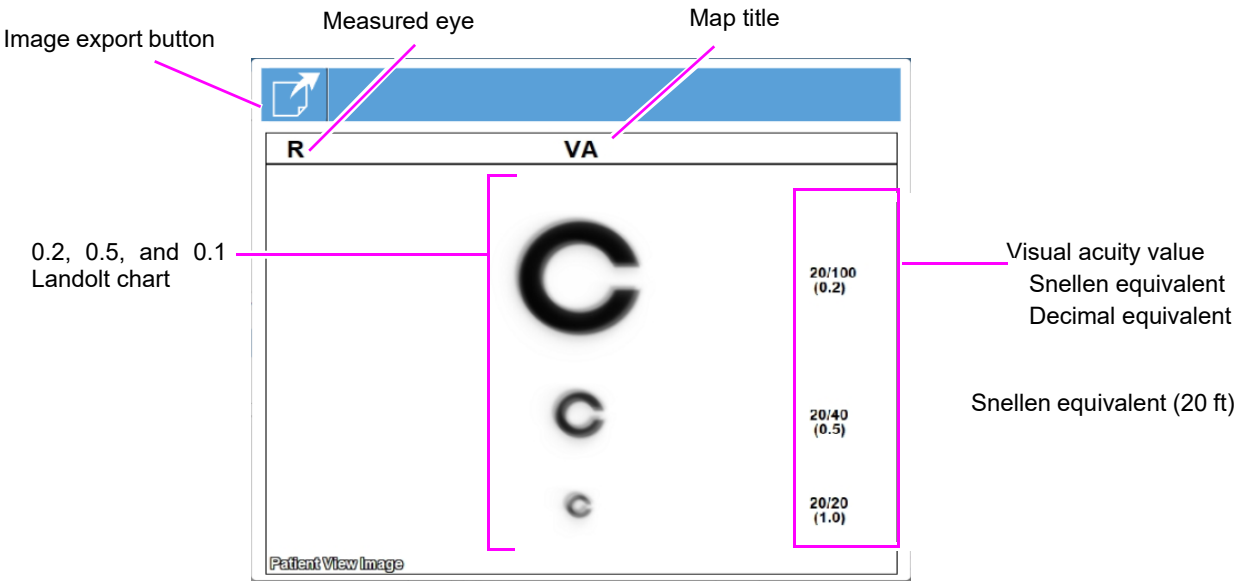
Hiding chart  	Hiding the background chart of the graph Set whether to display/hide the background chart in the Display Options box under the Web Viewer tab (Report tab) on the Settings screen.
Changing scale to linear scale  	Displaying vertical axis and horizontal axis with linear scales (arithmetic scale) Set the vertical axis and horizontal axis respectively. Select the scale to be displayed in the Display Options box under the Web Viewer tab (Report tab) on the Settings screen.

3.3.12 VA (Visual Acuity) map

The Visual Acuity chart simulation objectively displays how a VA chart appears to the patient based on wavefront aberrations. The patient view simulation can be performed using the ETDRS chart, Snellen chart, Landolt chart, or Image chart.

Note

- The VA map displays an image simulated based on PSF and charts showing how a point appears to the patient.

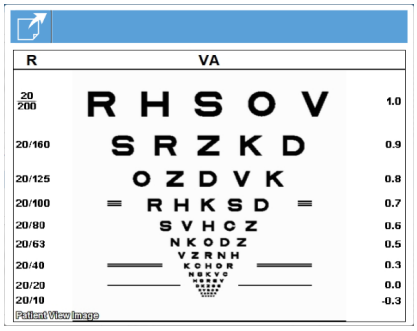


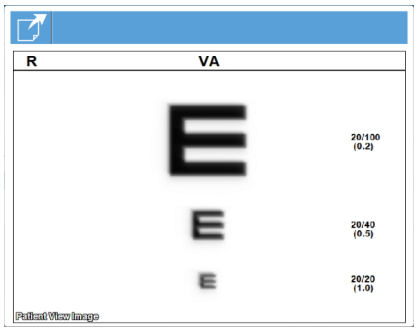
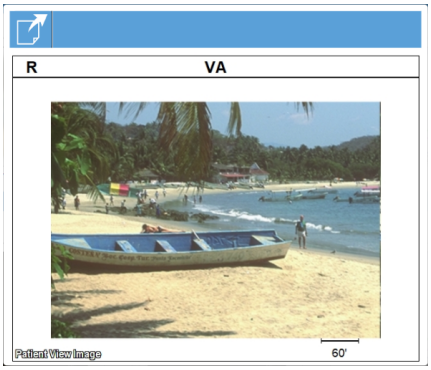
Note

- The chart display can be changed in the Visual Acuity Map Display box under the Web Viewer tab (Report tab) on the Settings screen.

The description of image export button is the same as that indicated for the OPD map (see page 121).

Changing VA chart used for display

ETDRS chart 	Displaying VA map using ETDRS chart Change the chart used for display in the Visual Acuity Map Display box under the Web Viewer tab (Report tab) on the Settings screen.

Snellen chart 	Displaying VA map using 0.2, 0.5, and 1.0 Snellen chart Change the chart used for display in the Visual Acuity Map Display box under the Web Viewer tab (Report tab) on the Settings screen.
Image chart (day) 	Displaying VA map using the day scenery The scale bar indicates 60 minutes.
Image chart (night) 	Displaying VA map using the night scenery The scale bar indicates 60 minutes.

Note

- The image charts are not the simulation of when an actual scenery is viewed. They are a simulation of when a scenery photo attached to a wall or such is viewed from 5 m away.

4. MAINTENANCE

4.1 Troubleshooting

In the event that the device does not work correctly, attempt to correct the problem according to the following table before contacting NIDEK or your authorized distributor.

Symptom	Remedy
The LCD does not turn on.	• The power cord may not be connected properly. Reconnect it securely. • The power switch may not have been turned on. Check the power switch.
The screen suddenly changes.	• Power saving mode may have been activated. Press any button to exit power saving mode.
The main body cannot be moved laterally.	• The locking lever may be locked. Flip up the locking lever.
Data is not printed out.	• Check the printer paper. If the paper has been used up, load a new printer paper roll. • The check box for “Internal Printer” in the Options field on the Settings screen (Measurement tab) may not be selected. Check the settings.
The printer does operate, however, printed results cannot be obtained.	• The printer paper may be loaded with the wrong side up. Load the printer paper with the correct side up.
Printer paper does not feed.	• The printer paper roll may be loaded at an angle or its core may be misaligned. Open the printer cover and make sure that printer paper is properly loaded.

Symptom	Remedy
The auto tracking function or auto shot function does not work.	• The auto tracking function or auto shot function may not have been enabled. Enable them with the tracking button or auto shot button. • Room illumination may be reflecting on the cornea. Change the location and try measurement again. • The auto tracking function or auto shot function may not work on some eyes such as keratoconus or recently-operated cornea. In such cases, disable the auto tracking function and start measurement. • The patient who has substantial ocular ataxia or who cannot fixate his or her eyes, the auto tracking function or auto shot function may not work. In such cases, disable the auto tracking function and start measurement. • If the device is installed near a window causing it to be exposed to sunshine or directly under a bright light, interference light may adversely affect these functions. Change the location and try measurement again.
A measurement error appears.	• The patient may have blinked during measurement. Instruct the patient not to blink and try measurement again. • The eyelid or eyelashes may obstruct measurement. Instruct the patient to open his/her eye wider. If the patient cannot open wider, lift the patient’s lid, paying attention not to press against the eyeball. • The pupil may be too small for measurement. Have the patient sit in a dark room for a while until the pupil becomes large enough and try measurement again. • The data may exceed the measurable limit.

If the symptom cannot be corrected with the above remedies, contact NIDEK or your authorized distributor.

4.2 Error Messages and Remedy

If one of the following error message is displayed on the screen or printed out, follow the suggestions in the cause and remedy column.
The error code, detailed indications and serial number of your device are useful for proper servicing.

Error message	Cause and remedy
No.001:EEPROM Error.	• Data error of backup memory (EEPROM) Data loss due to exogenous noise such as static electricity or malfunction of the electric circuit board or EEPROM on the electric circuit board is probable. • If the same error code is displayed again even after the device is turned off and on again, shut off the device and contact NIDEK or your authorized distributor.
No.002:Time error (Firmware error).	• Date and time setting error It is possible that the date and time settings have become in error due to the built-in battery having become discharged after non-use of about one month or longer, or a malfunction of the timer IC or the electric circuit board itself. • If the same error code is displayed again even after the date and time are reset in parameter setting mode, shut off the device and contact NIDEK or your authorized distributor.
No.003:Base temperature is too high.	• If the same error code is displayed again even after the device is turned off and on again, shut off the device and contact NIDEK or your authorized distributor.
No.100:Internal printer is down. No.105:Connection error occurred, or the internal printer is down.	• The internal printer is out of order. • Confirm that the printer cover is securely closed. • If the same error code is displayed again even after the device is turned off and on again, shut off the device and contact NIDEK or your authorized distributor.
No.106:No Paper:Load paper.	• Check the printer paper. Confirm that the printer cover is closed. When all is correct, press the Execute button (OPD/CT mode) to resume printing from where the error occurred.
No.107:Printer cover is open.	• Close the printer cover.
No.108:Head temperature is too high.	• The head temperature increased due to continuous printing. Wait for a while.
No.109:The reprint data is invalid or corrupted.	• Data measured in previous software versions or data edited after the measurement cannot be reprinted with the internal printer.
No.300 Update failed (read error). Would you like to try again? No.301 Update failed (invalid file). Would you like to try again? No.302 Update failed (write error). Would you like to try again?	• Data processing error inside the device • Shut off the device and contact NIDEK or your authorized distributor.

Error message	Cause and remedy
No.310 Restoration failed (unknown error). Would you like to try again? No.311 Restoration failed (unknown error). Would you like to try again? No.312 Restoration failed (unknown error). Would you like to try again? No.313 Restoration failed (unknown error). Would you like to try again?	• Data processing error inside the device • Shut off the device and contact NIDEK or your authorized distributor.
No.320 Backup failed. The serial No. may have not been entered. Would you like to try again?	• The device serial number is not entered. • Shut off the device and contact NIDEK or your authorized distributor.
No.321 A removable disk cannot be found. Insert a removable disk, and then try again.	• Removable media such as a USB flash drive is not connected. Connect the USB flash drive.
No.380:Internal communication error: Disconnected. No.381:Internal communication error: Cable failure. No.382:No response from SBC. No.383 No response from Measuring Unit. No.384 Network initialization failed. Measurement cannot be taken.	• The Windows application or firmware application may have abended. Restart the device. • If the same error code is displayed again even after the remedy above is performed, shut off the device and contact NIDEK or your authorized distributor.
No.400:Light adjustment failed.	• The patient's eye may have a severe cataract. Perform measurement again. Check the patient's eye with other refraction devices.
No.401:The pre-measurement result is out of range. No.402:Chart failed. No.403:Pre-measurement failed.	• The patient's eye may be abnormal. Perform measurement again. Check the patient's eye with other refraction devices.
No.404:Failed to detect data.	• Shut off the device and contact NIDEK or your authorized distributor.
No.405:Eyelid has been detected. No.406:Blinking occurred during measurement. No.407:Blinking occurred during imaging of the eye.	• OPD measurement was not performed properly due to blinking or such. Perform measurement again.
No.408:Right\Left Sensor Error - no signal	• Check the PD window. If it is blocked by any object, remove it. If dust has settled on it, wipe it gently with a cloth dampened with rubbing alcohol. • The cause of the error may be interference light. Place the device where there is little interference light. • Shut off the device and contact NIDEK or your authorized distributor.
No.409:Chopper motor error occurred.	• A device internal error was detected. • Shut off the device and contact NIDEK or your authorized distributor.
No.410:Measurement failed:Time out. No.411:Alignment is off-centered. No.412:Alignment is too off-centered. No.413:Focus alignment is too off-centered.	• Perform measurement again.

Error message	Cause and remedy
No.420:Initializing error(Minus Shutter) No.421:Initializing error(Zero Shutter) No.422:Initializing error(Plus Shutter) No.423:Initializing error(Rotator) No.424:Initializing error(Chart) No.425:Initializing error(Chopper) No.426:Initializing error(UD Tracking Motor) No.427:Initializing error(RL Tracking Motor) No.428:Initializing error(FB Tracking Motor) No.429:Initializing error(Chinrest Motor)	• A device internal error was detected. • Shut off the device and contact NIDEK or your authorized distributor.
No.430:Eyelid has been detected. No.431:Blinking occurred during imaging of the eye.	• CT measurement was not performed properly due to blinking or such. Perform measurement again.
No.432:Right\Left Sensor Error - no signal	• Check the PD window. If it is blocked by any object, remove it. If dust has settled on it, wipe it gently with a cloth dampened with rubbing alcohol. • The cause of the error may be interference light. Place the device where there is little interference light. • Shut off the device and contact NIDEK or your authorized distributor.
No.433:Error occurred while receiving data.	• The Windows application may have abended. Restart the device.
No. 500 The error occurred by LAN connection confirmation. No. 501 The error occurred by LAN connection confirmation. No. 502 The error occurred by LAN connection confirmation. No. 503 The file output to the shared folder cannot be done.	• Communication with the destination computer failed. Check the LAN setting or interface cable connection. • In addition, check that settings related to communication are set properly.
No.600 Unable to connect to the specified computer. The OPD-Scan III is shutdown.	• Connection to the database failed at device start-up. Check the destination database condition.
No.601 Communication with the computer to refer to the database has been disrupted. The OPD-Scan III is shutdown.	• Connection to the database was shut down after device start-up. Check the destination database condition.
No.700 RS232C is not connected.	• Connection to the connected computer via RS-232C is not established. Check the connection to the connected device.
No.701 The RS232C communication end error occurred.	• The connected device did not respond to the OPD-Scan III during RS-232C communication. Check the interface cable connection.
No.800 The file for the update was not found.	• Message during servicing.
No.801 Software for the Touch-Screen Calibration cannot be started.	• The calibration software did not start. • Shut off the device and contact NIDEK or your authorized distributor.
No.803 Access denied. Measurement cannot be taken.	• No calibration file exists. The serial number of the calibration file does not match that of the device. • Shut off the device and contact NIDEK or your authorized distributor.

OPD Web Viewer System errors

Database inactive.	• The destination database is not active. Activate the database.
Management service inactive.	• The destination OPD Management Service is stopped. Start the OPD Management Service.
Management service is not installed.	• The OPD Management Service is not installed. Reinstall it.
Service Unavailable	• The OPD Web Viewer Service is stopped. Reboot the server. If the error is not remedied, reinstall the OPD Web Viewer software.
Unanticipated error occurred.	• An internal error is probable. Return to the Patient List screen and start the operation again. If the error is not remedied, reboot the server.
Other errors	• A communication error is probable. Check the communication condition, then return to the Patient List screen and start the operation again.

4.3 Printer Paper Replacement

When a red line appears along the edge of the printer paper, it means that paper is running short. In such a case, stop using the printer and replace the printer paper with a new roll.

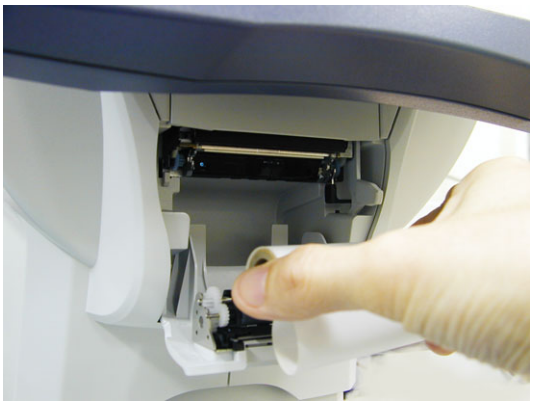
⚠ CAUTION • **Be sure to use only the printer paper (80620-00001) specified by NIDEK.**
Any paper other than the specified one may damage the printer head.

Note

- Do not use the printer without printer paper loaded.
  It may damage the printer head.
- Do not pull the paper in the printer forcefully.
  This may cause malfunction of the printer.

1 Press the cover open button to open the printer cover.

2 Remove the remaining printer paper.



⚠ CAUTION • **When replacing printer paper, be sure not to touch the printer head on the upper part inside printer cover.**
The printer head is extremely hot immediately after printing. Injury may occur.

3 Load a new printer paper roll.

Load the printer paper as shown in the picture to the right.

Extend the end of paper beyond the cover.

Note

- If the roll is loaded with the wrong side up, printing is not possible.
- Confirm that the printer paper roll is not loaded at an angle or its core is not misaligned.

  Printer paper may not be fed properly.

4 Close the printer cover.

Press the printer cover on both sides to close the cover securely.

Note

- Confirm that the cover is securely closed.

  If the cover is not closed securely, the auto cutter may not operate properly. In addition, when an error message is displayed, printing may not be performed.

4.4 Chinrest Paper Attachment

Note

- The fixing pins for chinrest paper (two units) are packed together with the spherical model eye at shipment.

1 Remover the two fixing pins from the chinrest.

To attach a stack of chinrest paper for the first time, remove the fixing pins from the spherical model eye.

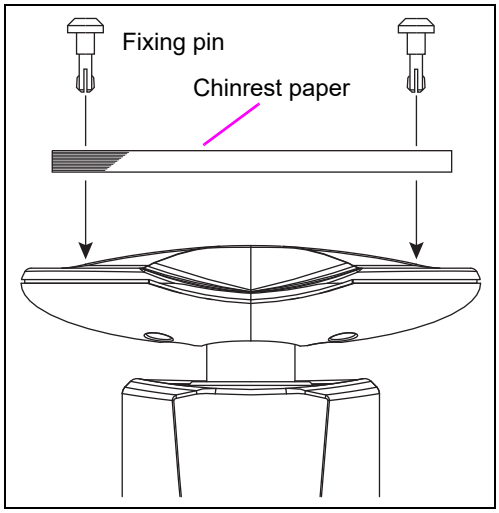
2 Take a proper amount of chinrest papers out of the pack.

An entire pack of chinrest paper cannot be attached. Be sure to attach a stack of chinrest paper with a thickness of 6 mm or less.

Pay attention not to scatter the sheets of chinrest paper.

3 Pass the fixing pins through the holes in the paper.

Pass the fixing pins through the holes on either side of the stack of paper.



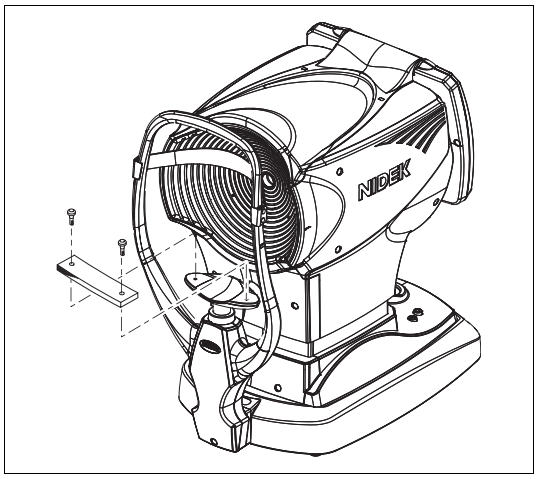
4 Attach the stack of chinrest paper onto the chinrest.

1) Insert a fixing pin into the a hole in the chinrest while holding the pin and stack of paper.
2) Insert the other pin into the hole of the chinrest as well.

4.5 Checking Measurement Accuracy

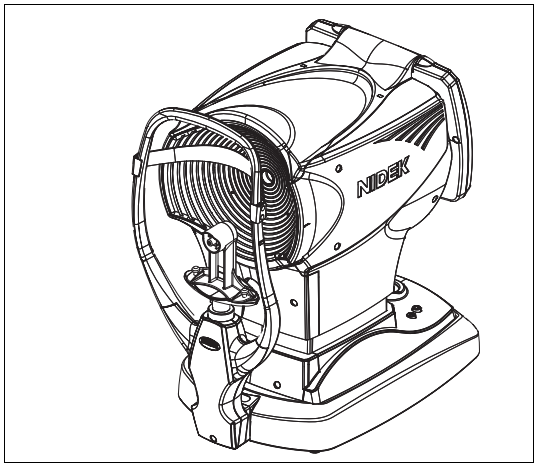
To check the accuracy of measurement data (OPD measurement or CT measurement), use the provided spherical model eye.

1 Remove the two fixing pins to remove the stack of chinrest paper from the chinrest.



2 Remove the cap from the spherical model eye and place the model eye on the chinrest with its lens facing toward the measuring window, and then insert the fixing pins.

Confirm that the lens surface of the model eye is clean.



3 Align the level of the spherical model eye to the eye level marker with the chinrest up/down button ▲ or ▼.

4 Select “0.01” for “Display / Print Format - Step” on the Settings screen (Other tab).

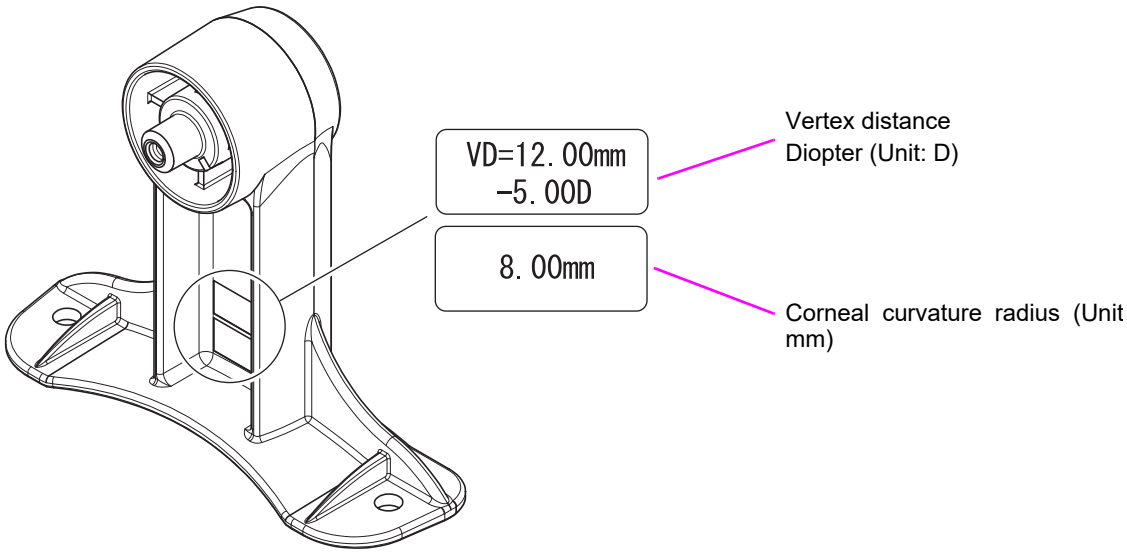
See “4.8 Changing Device Settings” (page 172) for the setting procedure.

5 Perform OPD and CT measurements in the same manner as the normal OPD and CT measurements.

Note

- If there is a disparity between the measurement values and the values indicated on the model eye, after confirming that “0.01” is selected for “Display / Print Format - Step” and that the model eye is properly attached, perform measurement again.
  If the disparity is 0.25 D or greater in the AR measurement, and 0.03 mm or greater in the CT measurement, contact NIDEK or your authorized distributor.
- Always store the model eye with the cap on.
  If the lens surface is soiled or flawed, measurement accuracy cannot be properly checked.

○ Values indicated on the labels of the spherical model eye



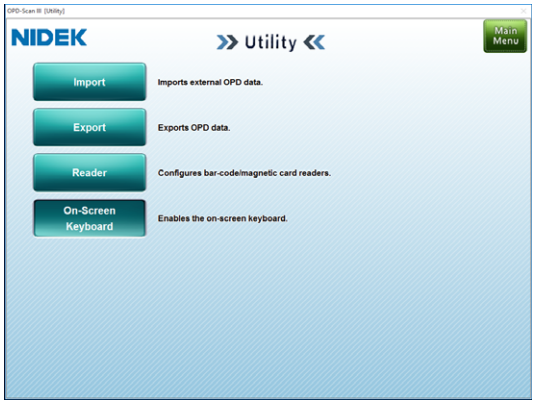
Note

- When the vertex distance is set to a value other than 12 mm, select “12.0” for “VD” on the Settings screen (Other tab) before performing OPD/CT measurement.
- Do not touch the lens of the model eye with fingers. If the body oil smeared on the lens, clean it with a gauze dampened with a light amount of alcohol.

4.6 Utility Screen Operation

Select the desired menu from the Utility screen for importing/exporting the measurement data or setting optional connection.

Pressing the Utility button on the Main Menu screen displays the Utility screen.



Utility menu buttons	Maintenance description
Import	Used to import the external OPD measurement data into the database.
Export	Used to export the OPD measurement data in the database to the specified folder (or device).
Reader	Used to configure settings for the barcode or magnetic card reader.
On-Screen Keyboard	Used to enable or disable the on-screen keyboard.

4.6.1 Import/export of measurement data

The selected measurement data can be imported or exported to the specified folder. Importing or exporting data is performed using the specified file format.

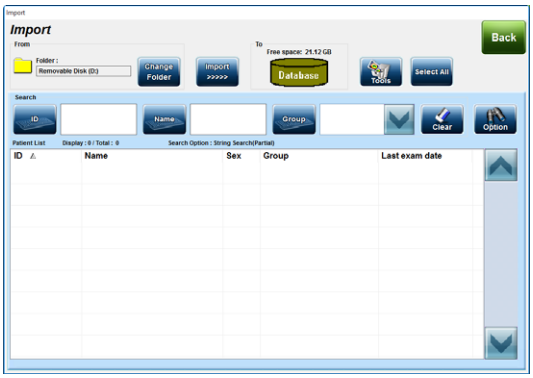
○ Import

The specified external data can be imported to the database.

1 Connect the device on which the data to be imported is saved to the OPD-Scan III.

2 Press the Import button.

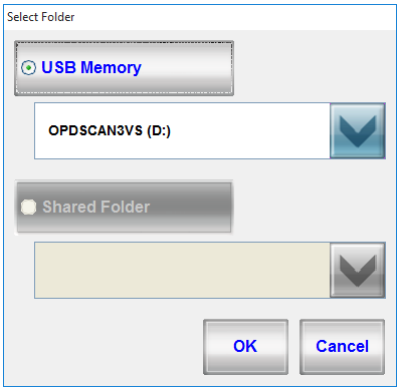
The Import screen is displayed.



3 Specify the folder in which the data to be imported is saved in “Folder:” in the From box.

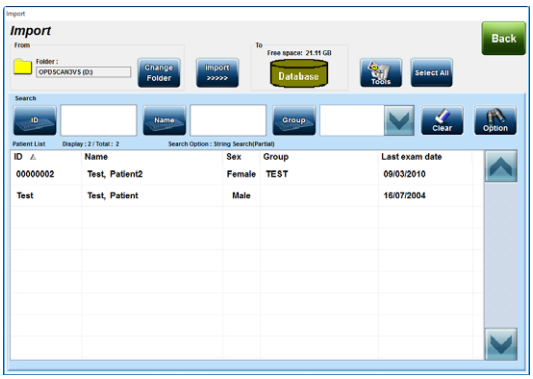
Specify the desired folder in the Select Folder window that appears by pressing the Change Folder button.

Select the desired folder from “USB Memory” or “Shared Folder”. When multiple folders are present at each destination, the desired folder can be selected from the list that appears by pressing the down arrow (V) button.



4 Specify the destination to which the data is to be imported, and then press the OK button.

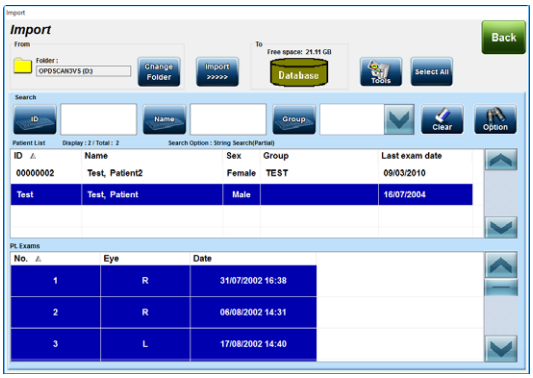
The Select Folder window is closed, and the data saved in the specified folder is displayed on the Patient List.



5 Select the patient whose data to be imported from the Patient List.

Easy search, optional search, and selecting/deselecting all data can be performed using the same operation as for the Patient List screen.

Selecting a patient displays the exam list for that patient in the lower part of the screen.



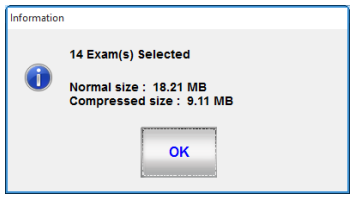
Note

- With the Shift and Ctrl keys, multiple patients or examination data to be imported or exported can be selected.

Tools button operation

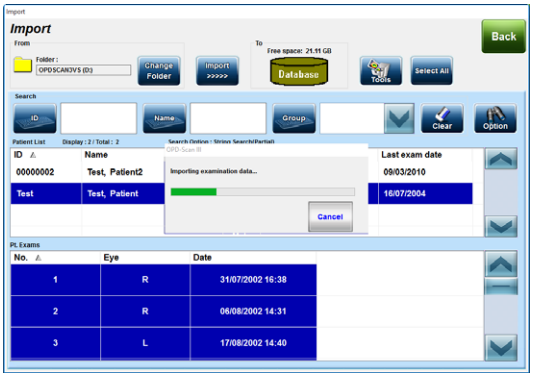
Select the desired function from among “Edit Patient info”, “Edit Exam info”, and “Calculate file size” that appear by pressing the Tools button.

Edit Patient info	Displays the Edit Patient Information window to edit the patient information.
Edit Exam info	Displays the Edit Exam Information window to edit the examination information. Select the desired examination data to be edited.
Calculate file size	Calculates the size of the selected examination data.



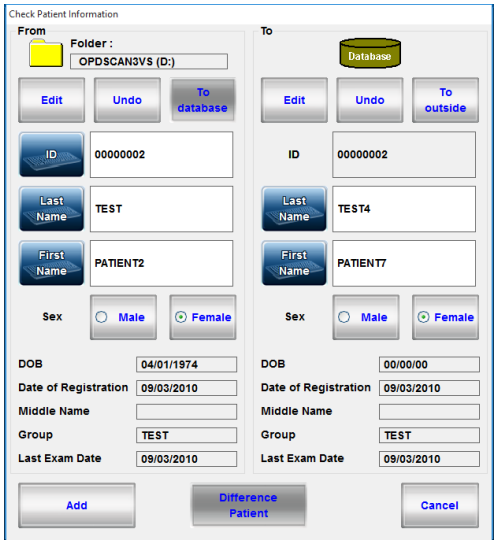
6 Press the Import button.

Data import starts.



If there is other data that has the same patient ID as that of the data to be imported, the Check Patient Information window appears.

If no patient data is selected, the message, “Please first select a patient!” is displayed.

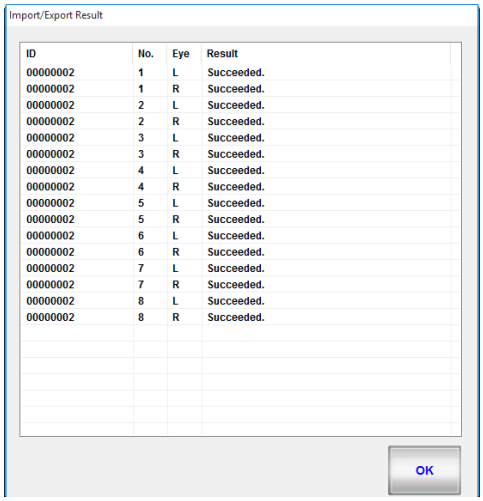


Edit	Displays the Edit Patient Information window. The items other than the ID, sex, first name, and last name cannot be edited.
Undo	Undoes the previous editing process.
To database	(This button is always disabled.)

To outside	Copies the patient information of the destination of import to the patient information to be imported.
Add	Imports the data to the same patient ID.
Difference Patient	Imports the data with a different patient ID. The button is enabled when the patient ID for the data to be imported is changed.
Cancel	Cancels import.

7 After import is complete, the Import/Export Result window is displayed.

The imported data is displayed.



8 Press the OK button to close the Import/Export Result window.

4

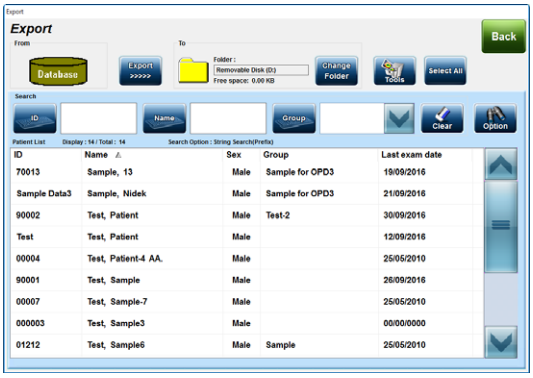
○ Export

The specified data in the database can be exported to the external folder.

1 Press the Export button.

The Export screen is displayed.

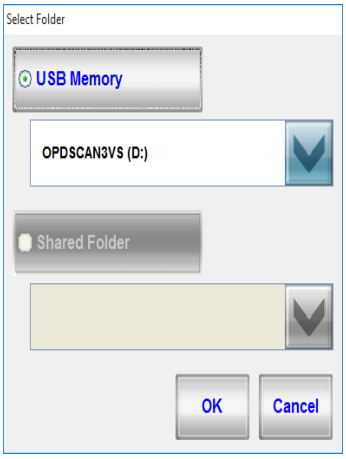
The patient data saved in the database is displayed on the Patient List.



2 Specify the folder to save the exported data in "Folder:" in the To box.

Specify the desired folder in the Select Folder window that appears by pressing the Change Folder button.

Select the desired folder from "USB Memory" or "Shared Folder". When multiple folders are present at each destination, the desired folder can be selected from the list that appears by pressing the down arrow (V) button.



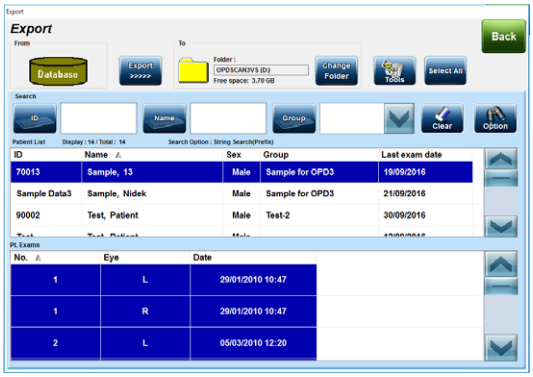
3 Specify the destination to which the data to be exported, and then press the OK button.

The Select Folder window is closed.

4 Select the patient whose data to be exported from the Patient List.

Easy search, optional search, and selecting/deselecting all data can be performed using the same operation as for the Patient List screen.

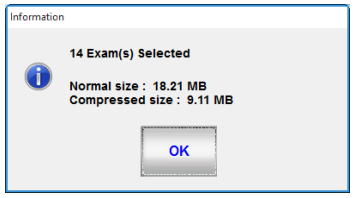
Selecting a patient displays the exam list for that patient in the lower part of the screen.



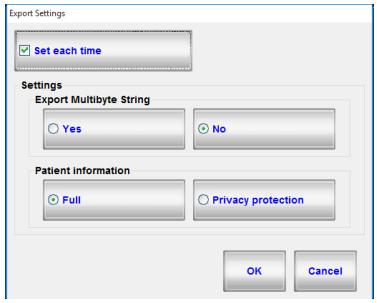
Tools button operation

Select the desired function from among "Edit Patient info", "Edit Exam info", "Calculate file size", and "Export Settings" that appears by pressing the Tools button.

Edit Patient info	Displays the Edit Patient Information window to edit the patient information.
Edit Exam info	Displays the Edit Exam Information window to edit the examination information. Select the desired examination data to be edited.
Calculate file size	Calculates the size of the selected examination data.



Export Settings	Displays the Export Settings window to set the data to be exported. Select “Yes” or “No” for “Export Multibyte String” and “Full” or “Privacy protection” for “Patient information”. The Export Settings window is displayed automatically in case of export.



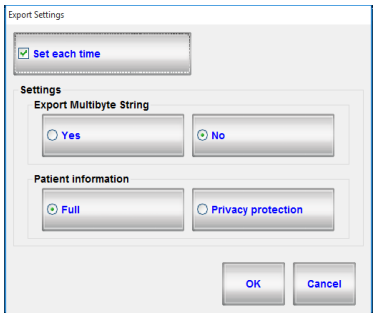
Note

- When the Export Settings window is displayed by pressing the Tools button, data is not exported even if the OK button is pressed.

5 Press the Export button.

The Export Settings window is displayed.

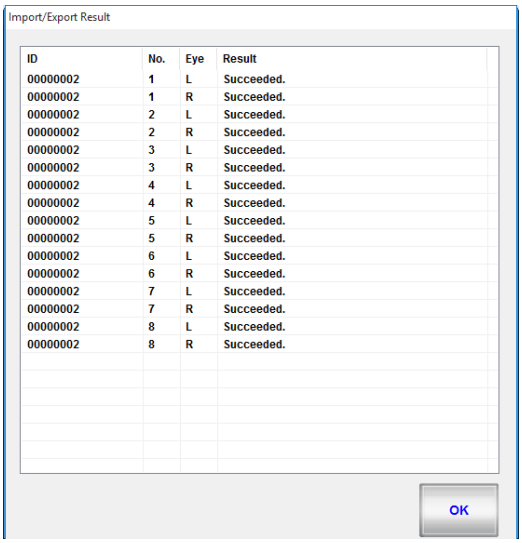
Select “Yes” or “No” for “Export Multibyte String” and “Full” or “Privacy protection” for “Patient information”.



6 Edit the export settings and press the OK button to execute data export.

The Import/Export Result window is displayed.

Press the OK button to close the Import/Export Result window.



4.6.2 Barcode reader and magnetic card reader settings

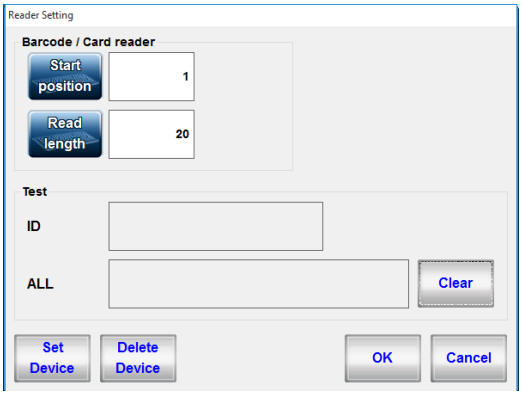
The barcode reader and magnetic card reader to be used for entering the patient ID can be set.
When the barcode reader or magnetic card reader is set, the following function are enabled.

New patient registration	When a new patient ID is read, if it has not been registered on the Patient List screen, the Create Patient window is displayed.
Patient selection	When a patient ID that has been registered on the Patient List screen is read, the Measurement screen is displayed.

1 Connect the barcode reader or magnetic card reader to the USB connector.

2 Press the Reader button.

The Reader Setting window is displayed.



3 Press the Set Device button.

The message, “Please input data on barcode or card reader.” is displayed on the screen.

4 Scan the barcode with the barcode reader. Or scan the card with the magnetic card reader.

The message, “Finish changed to input device.” is displayed on the screen and the screen returns to the previous screen.

This completes the device setting.

5 Scan the barcode with the barcode reader again. Or scan the card with the magnetic card reader.

The scanned data is displayed in the ID and ALL boxes in the Test field.

6 Specify the data number to be imported.

The number of characters set in “Read length” is read as an ID from the position set in “Start position”.

Start position	Specifies the reading start position of the ID.
Read length	Specifies the data length to be read as the ID. The data is read up to the specified data length or return code.

Pressing the Clear button clears the ID and ALL boxes. After setting change, read the ID again and confirm that the correct ID is displayed in the ID box.

7 Press the OK button to close the Reader Setting window.

8 Display the Patient List screen and confirm that the correct ID is displayed in the ID box when the barcode reader or magnetic card reader were used to read the patient ID.

4.6.3 Use of on-screen keyboard

The on-screen keyboard can be enabled or disabled. When a hardware keyboard is set for use, the buttons used to call up the on-screen keyboard are not displayed.

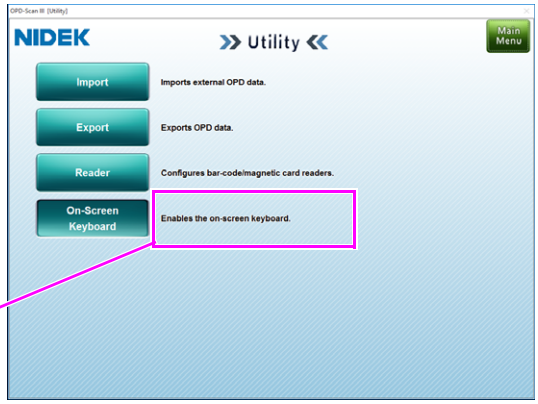
Note

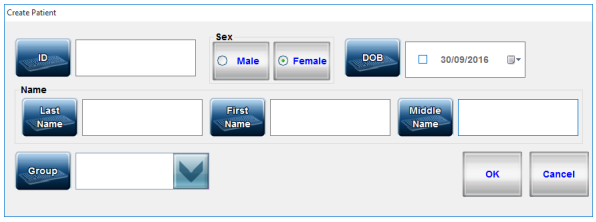
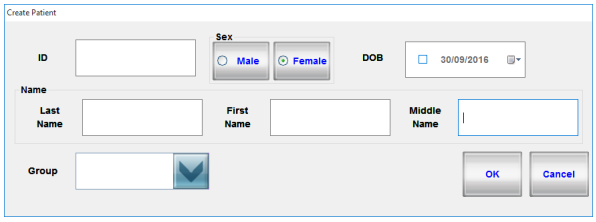
- When the on-screen keyboard is displayed on the screen, the hardware keyboard cannot be used for entering text or numbers. However, the mouse can be used regardless of the keyboard setting.

1 Each pressing of the On-Screen Keyboard button enables or disables the on-screen keyboard.

The setting status is displayed to the right of the On-Screen Keyboard button and the screen does not change.

Check the setting status here.

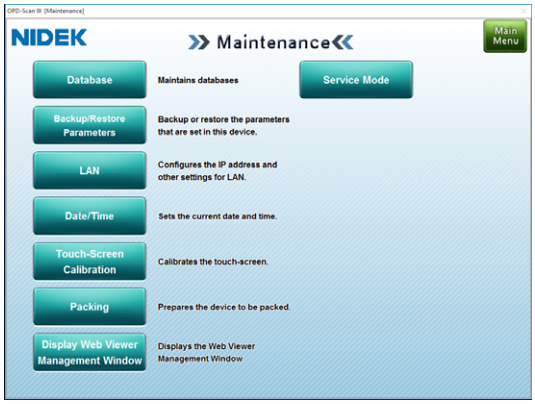


When the on-screen keyboard is used	“Enables the on-screen keyboard.” The buttons to call up the on-screen keyboard are displayed as blue buttons with a keyboard illustration. 
When the on-screen keyboard is not used	“Disables the on-screen keyboard.” Text boxes are identified by labels instead of the buttons for calling the on-screen keyboard. 

4.7 Maintenance Screen Operation

Select the desired maintenance task from the menu on the Maintenance screen.

Pressing the Maintenance button on the Main Menu screen displays the Maintenance screen.



Maintenance menu buttons	Maintenance description
Database	Used to perform the database maintenance.
Backup/Restore Parameters	Used to back up or restore the setting information for this device.
LAN	Used to configure the IP address and other settings for LAN connection.
Date/Time	Used to set the current date and time.
Touch-Screen Calibration	Used to perform setting of the touch screen.
Packing	Used to prepare the device to be packed.
Display Web Viewer Management Window	Used to display the management window of OPD Web Viewer System.

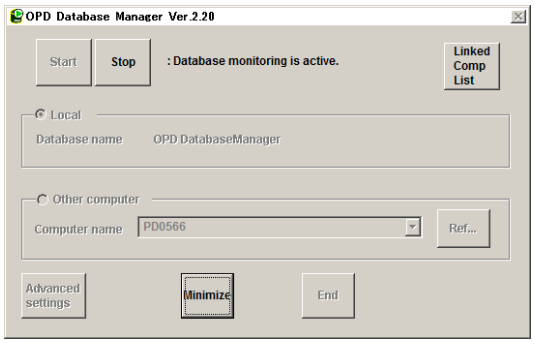
Note

- When the device is connected to a database in any other computer available on the network, OPD Web Viewer System becomes unusable, and the Display Web Viewer Management Window button becomes disabled.
- The Service Mode button is not for customer use. If the Input Password window appears by pressing the button, press the Cancel button to close the window.

4.7.1 Database maintenance

The OPD Database Manager allows the specification of the OPD database (device interior / external computer) and switching of the database monitoring between on and off. It is necessary to turn off the database monitoring before changing the database settings.

1 Press the Database button to display the OPD Database Manager screen.



2 Press the Stop button to stop the database monitoring.

3 To change the database

1) Select the destination to which the database is to be saved using the radio button for “Local” or “Other computer”.

   Pressing the Linked Comp List button displays a list of the computers on the same network.

2) Press the Start button to restart the database monitoring.

3) Press the Minimize button to minimize the OPD Database Manager screen.

   The task button of the resident OPD Database Manager cannot be observed on the screen.

Note

- For details of OPD Database Manager, see “4.9 OPD Database Manager” (page 198).

4.7.2 Backup/restoration of setting information

Various settings can be saved/restored as a backup file. This file may be used to restore previously saved settings or to use the same settings in other devices.
The backup file is saved on a USB flash drive.

Note

- The backup file is not automatically generated. Perform backup for the settings as necessary.

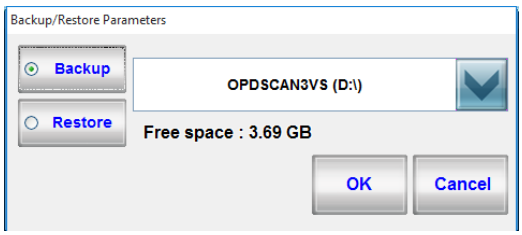
○ Saving setting file

1 Connect the USB flash drive to the USB connector.

2 Press the Backup/Restore Parameters button.

The Backup/Restore Parameters window is displayed.

If the USB flash drive is not connected, the message, “A removable disk cannot be found. Insert a removable disk, and then try again.” is displayed.



3 Press the Backup button to select backup.

4 Press the OK button to execute backup.

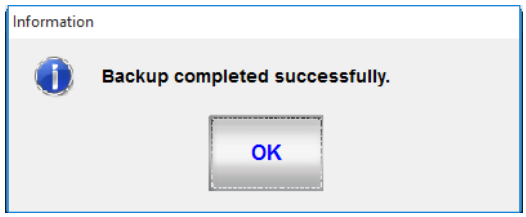
A progress bar is displayed to show the progress status.

The Scan3BackupOpt folder is created on the USB flash drive to save the setting files.

If there is not enough free space in the USB flash drive, the message, “There is not enough disk space on this disk. Insert a different removable disk and then try again.” is displayed.

5 When the message, “Backup completed successfully.” is displayed, press the OK button.

6 Remove the USB flash drive.

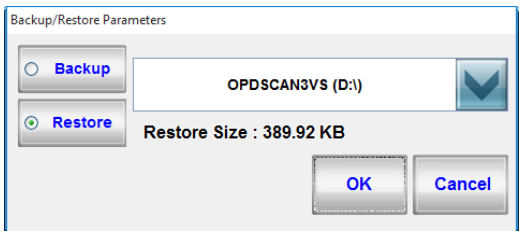


○ Restoring setting file

1 Connect the USB flash drive with the setting files to the USB connector.

2 Press the Backup/Restore Parameters button.

The Backup/Restore Parameters window is displayed.



3 Press the Restore button to select restore.

If there are no settings files, the message, “Restore files cannot be found.” is displayed. Check the files saved on the USB flash drive.

4 Press the OK button to execute the restoration.

A progress bar is displayed to show the progress status.

The settings file is read into the device.

5 Remove the USB flash drive.

6 The device automatically restarts.

Note

- The setting information of OPD Web Viewer System is reflected in the server setting.
- When switching the database to be used, back up the setting information before switching the database and restore it after switching the database.
- Restoring the setting information returns the connection destination of the database to that before switching. Therefore, switch the database again.

4.7.3 LAN setting

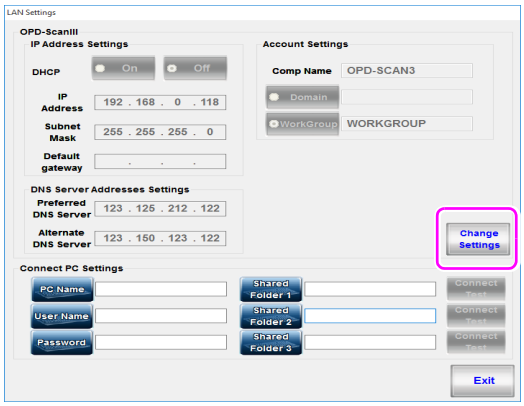
When connecting the device to an external computer over a LAN, set the IP address, subnet mask, and account.
If the OPD-Scan III and the external computer belong to a domain or workgroup different from those on the network, set the account so that access between each other becomes possible.
Set the shared folder so that it is accessible from both, the OPD-Scan III and the external computer.
*Connection to the internal LAN or external network is not covered under warranty by NIDEK.

Note

- For detailed LAN setting, contact the network administrator of the facility.
- Check the computer name, login user name, login password and set the shared folders, used for saving the database, on the computer to be connected in advance.

1 Press the LAN button to display the LAN Settings window.

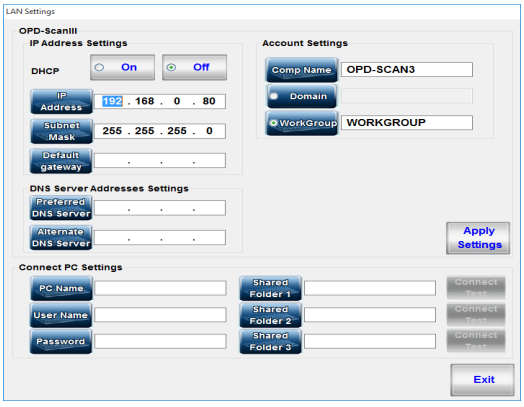
In this stage, only fields in “Connect PC Settings” can be entered.



2 To enable setting, press the Change Settings button. When the message as shown to the right is displayed, press the OK button.

The device automatically restarts and the LAN Settings window is displayed again.

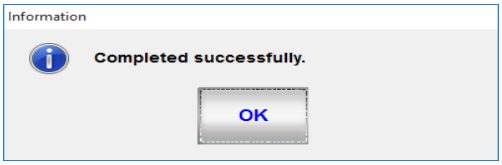
All setting fields become enabled.



3 Perform the necessary settings for the device and the computer to be connected.

IP Address Settings	DHCP	Sets whether to use the DHCP by selecting “On” or “Off”. Select “On” when connecting to a computer with the DHCP server function. When “On” is selected, the IP Address, Subnet Mask, Default gateway, Preferred DNS Server, and Alternate DNS Server entry fields cannot be entered.
	IP Address	Used to enter the IP address. Change the default “192.168.0.80” as necessary. Do not use “172.30.30.30” and “172.30.30.31” because they have been already used in the device internal communication.
	Subnet Mask	Used to enter the subnet mask. Change the default “255.255.255.0” as necessary.
	Default gateway	Used to enter the default gateway. This setting is unnecessary when outputting data within the network to which the device belongs. This field is blank by default.
Account Settings	Comp Name	Used to enter the computer name of the device. Change the default “OPD-Scan3” as necessary.
	Domain	Used to enter the domain name of the destination network.
	WorkGroup	Used to enter the workgroup name of the destination network. Change the default “WORKGROUP” as necessary.
DNS Server Addresses Settings	Preferred DNS Server	Used to enter the IP address of the preferred DNS (Domain Name System) server. This field is blank by default.
	Alternate DNS Server	Used to enter the IP address of an additional DNS server as the alternative server, in case of the preferred DNS server cannot be used. This field is blank by default.
Connect PC Settings	PC Name	Used to enter the name of the destination computer.
	User Name	Used to enter the user name of the destination computer.
	Password	Used to enter the login password for the user name of the destination computer.
	Shared Folder 1	Used to enter the shared folder name of the destination computer.
	Shared Folder 2	Used to enter the shared folder name of the destination computer.
	Shared Folder 3	Used to enter the shared folder name of the destination computer.

4 After changing the settings, press the Apply Settings button. When the message as shown to the right is displayed, press the OK button.



5 Press the Connect Test button to the right of the shared folders (Shared Folder 1 to 3) to test the connection.

Performing connection test saves the settings of the shared folders.

6 When the LAN setting is complete, press the Exit button. When the message as shown to the right is displayed, press the OK button.

The device automatically restarts and the title screen is displayed.

If an error occurs, check the setting.

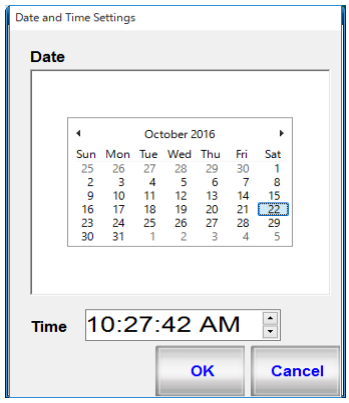
Error message	Cause and remedy
No. 500 The error occurred by LAN connection confirmation.	• Communication with the destination computer failed. Check the LAN setting or interface cable connection. In addition, check that settings related to communication are set properly.
No. 501 The error occurred by LAN connection confirmation.	• Connection to the destination computer is not possible with the current settings. Confirm that the settings related to communication are set properly.
No. 502 The error occurred by LAN connection confirmation.	• An error such as LAN communication error occurred. Check the interface cable connection.
No. 503 The file output to the shared folder cannot be done.	• The destination user account is invalid.

4.7.4 Setting date and time

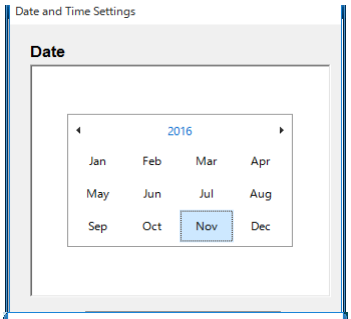
The date and time displayed on the screen and printing can be set.

1 Press the Date/Time button to display the Date and Time Settings window.

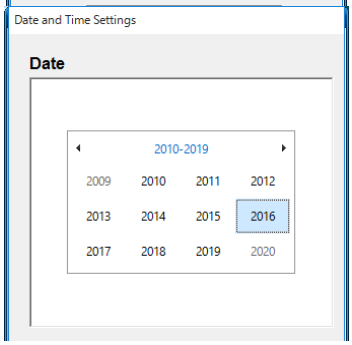
2 Set the date and time by operating the buttons on the Date and Time Settings window.



Select the desired month from the list that appears by pressing the month and year indication. Pressing the (◀) or (▶) buttons displays the previous or following year.



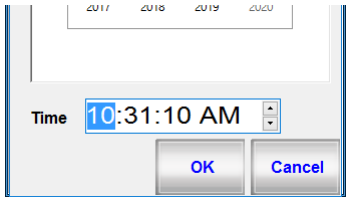
Select the desired year from the list that appears by pressing the year indication while the months are displayed. Pressing the (◀) or (▶) buttons displays the previous or following 12 years.



Select the day by pressing the desired one in the calendar.

Hour, minute, second, or PM/AM is changed using the (▼) and (◀) buttons while the item to be changed is selected in the Time box.

If the hardware keyboard is used, the time can be entered directly.



3 Press the OK button to close the Date and Time Settings window.

The clock is updated to the set time.

Note

- The device is equipped with a rechargeable lithium battery to maintain clock. (The lithium battery is not user-replaceable.)

4.7.5 Touch screen calibration

If the response to the position pressed on the screen is not aligned to the position of the button displayed on the screen when operating the touch screen, perform calibration for the touch screen.

1 Prepare the provided touch pen.

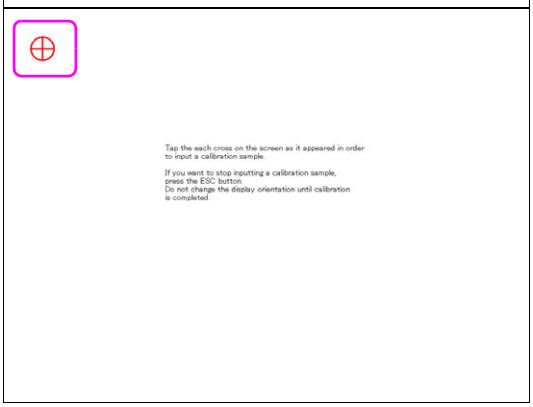
2 Press the Maintenance button on the Main Menu screen to display the Maintenance screen.

3 Press the Touch-Screen Calibration button to start the calibration.

4 The screen is switched, and the message as shown to the right is displayed in the center of the screen. Press the screen twice.

To cancel the calibration, press the Enter or Esc key on the keyboard.

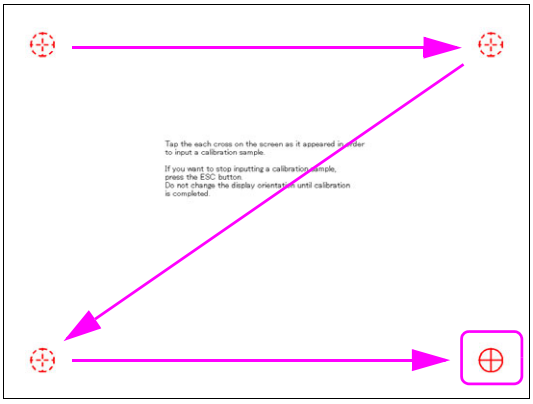
5 The message as shown to the right is displayed in the center of the screen while a cross mark ⊕ is displayed in the upper left corner of the screen. Press the center of the cross mark ⊕ using the touch pen.



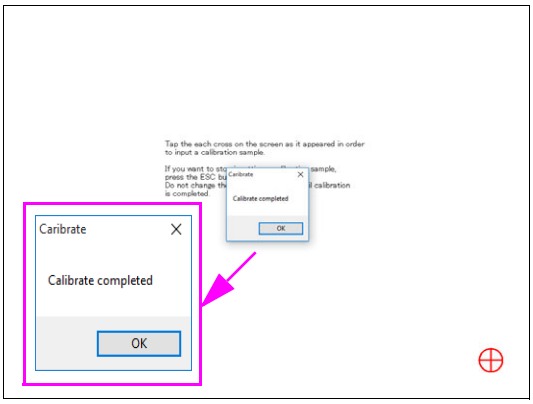
6 The cross mark ⊕ is now displayed in the upper right corner. Press the center of the cross mark using the touch pen.

7 In the same manner, press the center of the cross mark ⊕ using the touch pen as it is displayed in the center, lower left, and lower right of the screen.

Pressing the center of the cross mark ⊕ in the lower right corner of the screen completes the calibration.



The message as shown to the right is displayed. Pressing the OK button returns to the Maintenance screen.



4.7.6 Packing mode

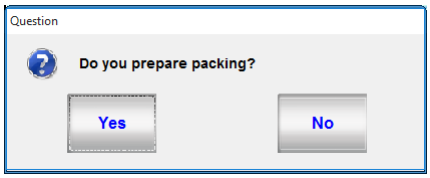
When packing the device to transport, set the internal mechanism to the position suitable for transport.

CAUTION • **When transporting, set the device to packing mode and pack it using the specified packing materials with the main body locking lever unlocked.**

Excessive vibration or bumps may reduce the device reliability.

1 Press the Packing button on the Maintenance screen.

The message, “Do you prepare packing? Yes/ No” is displayed.



2 Press the Yes button to access packing mode.

The device is automatically set to packing mode, and the measuring unit and chinrest are moved to the lowest position.

The device is turned off, and the power switch is automatically flipped to the off side.

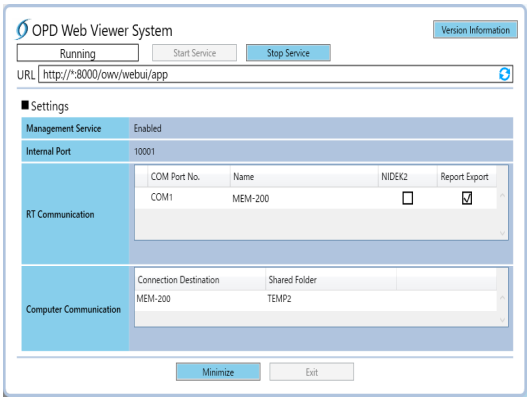
Note

- To return from Packing mode, flip the power switch to the on side in the same manner as the normal start-up.

4.7.7 Displaying OPD Web Viewer System management window

The OPD Web Viewer System management window is displayed to perform setting of the system. Perform setting after stopping the management service in this window.

1 Press the Display Web Viewer Management Window button to display the OPD Web Viewer System management window.



2 Press the Stop Service button to stop the management service.

3 Edit the settings of OPD Web Viewer System.

See “4.10 OPD Web Viewer System Setting” (page 218) for detailed setting of management window.

4.8 Changing Device Settings

4.8.1 Changing various settings

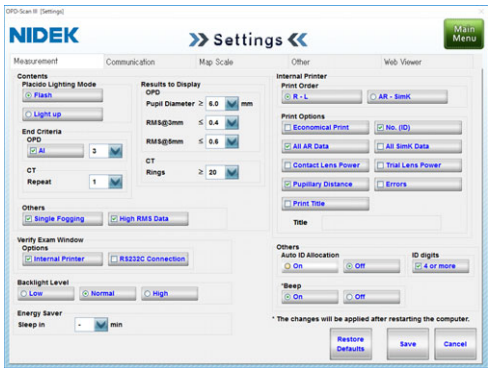
The OPD-Scan III is equipped with the function to change the device settings in accordance with the needs of the operator. Follow the procedure below to check and change the settings.

Note

- When settings of Web Viewer is changed, be sure to restart or refresh the browser.
  The display format of Web UI may differ from that of the printed out data or output image data.

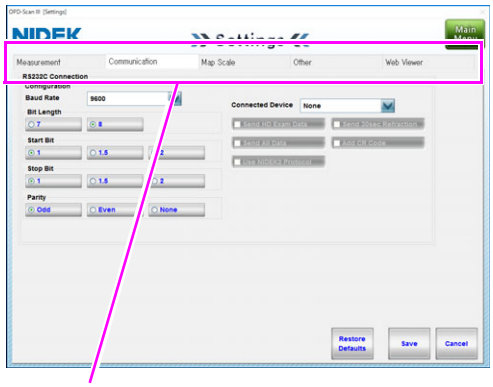
1 Press the Setting button on the Main Menu screen to display the Settings screen.

The selected item is displayed in the check box, radio button, or selection box.



2 Press the tab of the item to be changed.

See “4.8.2 Measurement tab” (page 174) to “4.8.6 Web Viewer tab” (page 187) for detailed settings.



Press the desired tab.

Tab	Settings
Measurement	Measurement settings such as measurement mode and the number of measurements
Communication	Communication settings for RS-232C communication
Map Scale	Color scale settings for displaying maps
Other	Settings for data format, name, measured eye, or date
Web Viewer	Various settings for Web UI (report screen)

3 Specify the setting item to be changed.

Specify the setting item by selecting the desired item from the check box, radio button, drop-down list of the selection box, or entering the desired contents in the text box.

See “4.8.2 Measurement tab” (page 174) to “4.8.6 Web Viewer tab” (page 187) for detailed settings.

Note

- For the explanation about the settings, “ON” is displayed when the check box is selected, and “OFF” is displayed when it is not selected.
- The underlined setting are the defaults.

4 After changing the settings, press the Save button to save them.

The changed settings are saved.

Changing the tab or pressing the Main Menu button before saving the setting changes displays the confirmation message, “Would you like to save the changes? Yes/No/Cancel”.

Yes button	Saves the settings and switches the screen.
No button	Switches the screen without saving the settings.
Cancel button	Closes the message dialog box without saving the settings.

5 Press the Main Menu button to return to the Main Menu screen.

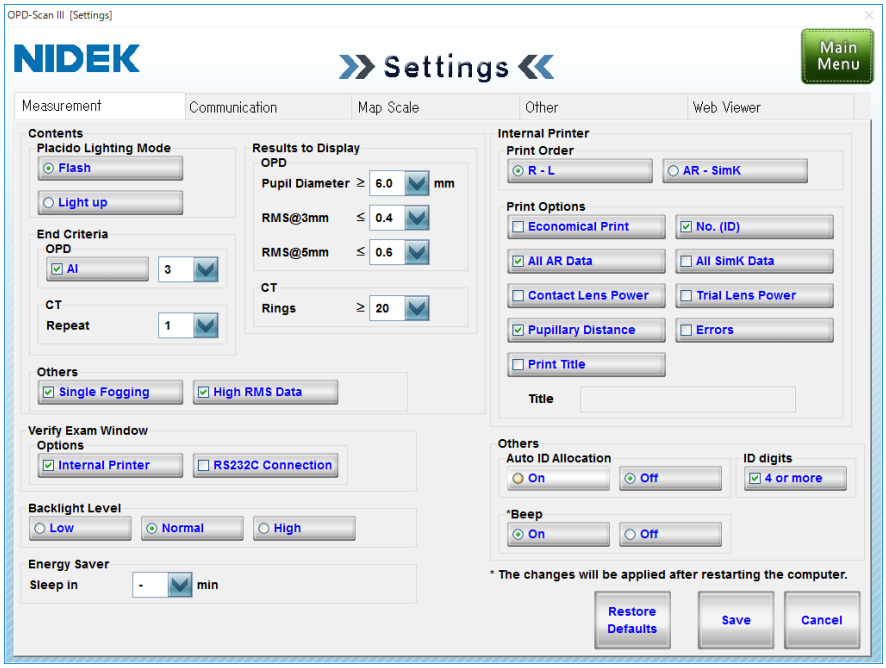
Note

- The setting changes are retained even when the device is turned off.

○ Other button operations on the Settings screen

Restore Defaults button	Restores the settings to their defaults for the tab currently displayed.
Save button	Saves the settings currently displayed on the screen.
Cancel button	Restores the settings to those when the Settings screen was just displayed.
Main Menu button	Switches the screen to the Main Menu screen. If there is any unsaved setting, the confirmation message is displayed.

4.8.2 Measurement tab



Contents

Placido Lighting Mode: Flash, Light up

Sets the timing when the placido rings light up on the Measurement screen.

Flash	The placido rings light up during measurement.
Light up	The placido rings light up continuously after measurement mode change.

End Criteria - OPD: AI, Repeat

Sets the number of times of OPD measurement until it is automatically completed.

AI	When the obtained measurement data is stable without variation after the measurements are performed for the specified number of times or more, the measurement is automatically completed. If the obtained measurement data contains the unstable one, an additional measurement is performed and finished automatically when the entire data obtained is stable.
Repeat	Performs measurement for the specified number of times. The number of times can be specified from one to ten. (The default is three times.)

End Criteria - CT Repeat: 1 to 10 (The default is 1.)

Sets the number of times of CT measurement until it is automatically completed.

Results to Display

OPD - Pupil Diameter: 3.0 to 9.0 mm or more (The default is 6.0 mm or more.)

When the measured pupil diameter in OPD measurement is smaller than the setting, the pupil diameter value is displayed in red on the Verify Examination Quality screen.

OPD - RMS@3mm: 0.2 to 1.5 or less (The default is 0.4 or less.)

When the analysis value of RMS@3mm in OPD measurement is greater than the setting, the value is displayed in red on the Verify Multi Measurement screen.

OPD - RMS@5mm: 0.2 to 1.5 or less (The default is 0.6 or less.)

When the analysis value of RMS@ 5 mm in OPD measurement is greater than the setting, the value is displayed in red on the Verify Multi Measurement screen

CT - Rings: 1 to 39 rings or more (The default is 20 rings or more.)

When the number of the detected placido rings in CT measurement is smaller than the setting, the number of the detected rings is displayed in red on the Verify Examination Quality screen.

Others

Single Fogging (The check box is selected by default.)

Sets whether to apply fogging each time of OPD measurement or to maintain fogging condition from the second measurement when performing OPD measurement successively.

The measurement time without “Single Fogging” selected is longer than that with “Single Fogging” selected.

High RMS Data (The check box is selected by default.)

Sets the measurement data display method when the RMS value of AR measurement is 1.0 or higher.

Selected	The S, C, and A values are displayed in orange and “E” is displayed next to “A” on the Measurement screen.
Cleared	“Low conf.” is displayed in red.

Verify Exam Window - Options

Sets any of the following option functions to be executed simultaneously with the saving of measurement data being displayed in the Verify Exam Window (Verify Examination Quality screen).

Internal Printer	Prints the measurement data using the internal printer. (The check box is selected by default.)
RS232C Connection	Outputs measurement data to the devices connected using RS-232C. (The check box is not selected by default.) Set the device to be connected and measurement data to be output on the Communication tab.

Backlight Level: Low, Normal, High

Sets the backlight brightness of the touch screen. Select from among “Low”, “Normal”, and “High”.

Energy Saver: -, 5, 10, 15 (min)

Sets the duration until the device enters power saving mode after being left idle for the set period of time. When “-” is selected, the power saving mode is not taken effect.

Internal Printer

Print Order: R-L, AR-SimK

This is the print order setting for the measurement data.

R-L	Prints the measurement data in the order of right eye (AR/KM measurement value) to left eye (AR/KM measurement value).
AR-SimK	Prints the measurement data in the order of AR measurement value (right/left) to KM measurement value (right/left).

Print Options

The checked option function becomes enabled. As defaults, the checked boxes for “No. (ID)”, “All AR Data”, and “Pupillary Distance” are selected while check boxes for the remaining options are not.

Economical Print	Lessens the space between lines of printout when the check box is selected. It reduces printer paper consumption.
No. (ID)	Prints the patient ID number when the check box is selected.
All AR Data	Prints the AR typical value and all measured AR values when the check box is selected. When the check box is not selected, only the typical value (or the latest value if there is no typical value) is printed.
All SimK Data	Prints the SimK typical value and all measured SimK data when the check box is selected. When the check box is not selected, only the typical value (or the latest value if there is no typical value) is printed.
Contact Lens Power	Prints the value that converts the vertex distance (VD) to 0 mm for the AR typical value (or the latest value if there is no typical value) and its SE when the check box is selected.
Trial Lens Power	Prints the value that automatically converts the CYL value based on the AR typical value (or the latest value if there is no typical value) so that the trial lens sphere value becomes smaller when the check box is selected.
Pupillary Distance	Prints the measured PD when the check box is selected. The PD (pupillary distance) is measured automatically when measuring both eyes in OPD and CT measurements.
Errors	Sets whether to print any error that occurred during OPD or CT measurement when the check box for “All AR Data” or “All SimK Data” is selected.
Print Title	Sets whether to print any desired text as a title when printing the measurement data on an internal printer. When the check box for “Print Title” is selected, a maximum of 24 characters can be entered. Enter the title using the on-screen keyboard displayed by pressing the Title button in the entry field. If the hardware keyboard is used, the title can be directly entered in the entry field.

Others

Auto ID Allocation: On, Off (Default for Marco: On)

Selects whether to number the patient ID automatically when registering a new patient. When “Off” is selected, the initial display in the ID field is blank.

ID digits: 4 or more

Selects whether to set restrictions to patient IDs consisting of less than four digits. (The check box is selected by default.)

When data is transferred to the refractor with “RT-5100 Support” selected for “Connected Device” in “RS232C Connection”, data transfer cannot be executed with the patient ID consisting of less than four digits. To prevent patient IDs consisting of less than four digits from being registered, selecting this check box during connection with the RT-5100 is recommended.

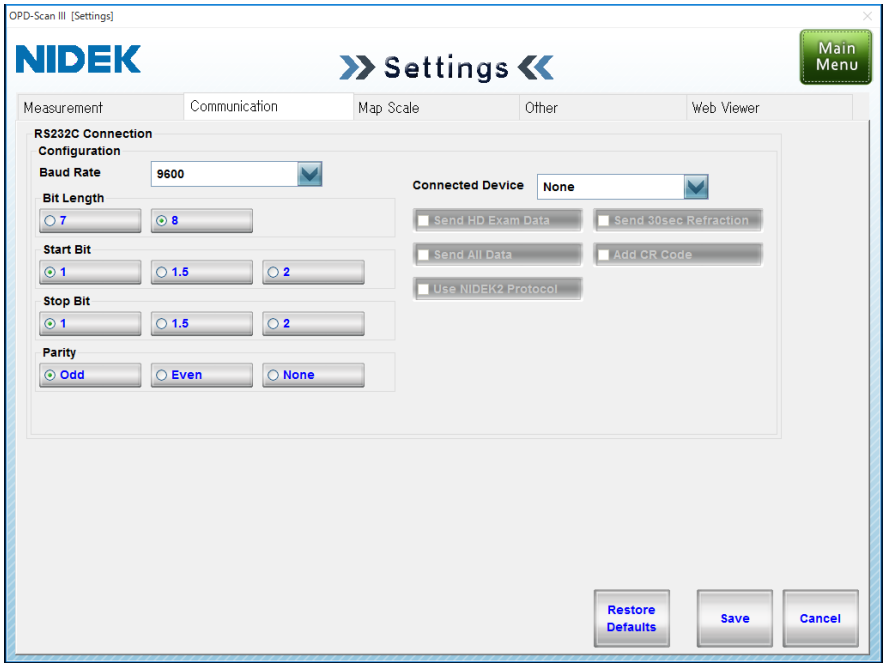
Selected	Registration of new patient information is not allowed with a patient ID consisting of less than four digits. If any patient ID consisting of less than four digits is edited, the confirmation message, “The ID you entered has less than 4 digits. Are you sure you want to proceed with this ID?” is displayed.
Cleared	No restrictions are set for the number of digits comprising patient IDs.

Beep: On, Off

Sets whether the device produces any beep(s) when being operated.

When this setting is changed, restart the device.

4.8.3 Communication tab



Note

- The settings on the Communication tab are for outputting saved measurement data using RS-232C.

RS232C Connection

Configuration

Baud Rate	Sets the baud rate (bit transmission speed) for communication. Select from among 110, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200. The default is “9600”.
Bit Length	Sets the bit number for a single character used in communication. Select from among 7 and 8. The default is “8”.
Start Bit	Sets the starting bit in communication. Select from among 1, 1.5, and 2. The default is “1”.
Stop Bit	Sets the stopping bit in communication. Select from among 1, 1.5, and 2. The default is “1”.
Parity	Sets the parity check in communication. Select from among Odd, Even, and None. The default is “Odd”.

Connected Device (Default: RT-5100 Support)

Select from among “None”, “Previous RT Series”, “RT-5100 Support”, “Eye Care Card”, and “Computer”. The available options vary depending on the connected device.

	Send HD Exam Data	Send 30sec Refraction	Send All Data	Add CR Code	Use NIDEK2 Protocol
None	Not available	Not available	Not available	Not available	Not available
Previous RT Series	Not available/ Available	Available	Available	Available	Available
RT-5100 Support *3	Available*1	Available	Available	Available	Available
Eye Care Card	Available*1 *2	Available	Available	Available	Not available
Computer	Not available	Not available	Available	Available	Not available

*1: The CB version is Ver. 1.18 or 1.09 Lite or later.

*2: The EyeCa-RW2 version is Ver. 1.01 or later.

*3: The supported devices are the RT-5100, RT-3100, and MEM-200 (RT-6100).

The selected function becomes enabled by these settings for transferring measurement data to the refractor such as the RT-5100. By default, only the check box for “Send HD Exam Data” is selected while others are not.

Send HD Exam Data	Select this check box to compare the night and day measurement data sets and choose one to transmit to other systems such as the RT-5100. When it is not selected, only the day measurement data will be transmitted. The day measurement data indicates the AR measurement data (typical value or latest value) or the SPH, CYL, and AXIS (ZS, ZC, and ZA) values obtained by Zernike polynomials within the 4 mm-diameter analysis area (depending on the setting of “Send 30sec Refraction”). The night measurement data indicates the SPH, CYL, and AXIS (ZS, ZC, and ZA) values obtained by Zernike polynomials within the pupil in mesopic vision (maximum 6 mm in diameter).
Send 30sec Refraction	Select this check box to transmit more appropriate data for subjective optometry between ZS, ZC and ZA data (SPH, CYL and AXIS data obtained by Zernike polynomials within the set Zernike analysis area) and AR-measured data. When it is not selected, the ZS, ZC, and ZA data will be transmitted. When the analysis area diameter obtained by Zernike polynomials is less than 4.0 mm, the AR measurement value will be transmitted at all times. The ZS, ZC and ZA data is calculated from the average map data and AR measurement data to be transmitted is the typical value (or the latest value). Whether the ZS, ZC, and ZA data or AR measurement data was transmitted is indicated in the printout by an internal printer. See “2.11 Printing Measurement Data (Internal Printer)” (page 93).
Send All Data	Sets the method to transmit the measurement values via communication channels. If this setting is selected, all measurement data sets will be transmitted. If it is not, only the typical value (or the latest value if there is no typical value) will be transmitted.
Add CR Code	Sets whether to add a CR code to the end of the measurement data to be transmitted.

Use NIDEK2 Protocol	"Use NIDEK2 Protocol" is displayed when other than "Computer" is selected for "Connected Device". It can be selected when "Previous RT Series" or "RT-5100 Support" is selected for "Connected Device". This protocol is for extending the waiting time of communication (time-out). It is for a communication environment where a time-out occurs without selecting this protocol.

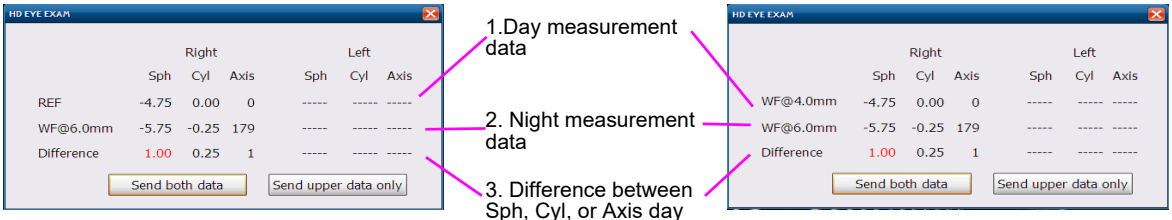
Note

- To enable "Send HD Exam Data" and "Send 30sec Refraction", select "RS232C Connection" in "Verify Exam Window - Options" on the Measurement tab.
- When data is transferred with "RT-5100 Support" selected for "Connected Device", the patient ID needs to consist of four or more digits. If the patient ID consists of less than four digits, the message, "The data cannot be sent because the ID has less than 4 digits." appears.

  To prevent patient IDs consisting of less than four digits from being created or edited, select "4 or more" for "ID digits" in "Others" on the Measurement tab. (See "4.8.2 Measurement tab" (page 174).)

○ Transferring HD Exam data

When "Send HD Exam" is selected, saving the examination data after the measurement is complete displays the HD EYE EXAM window.



When AR values (REF) are transferred as day measurement data

When ZS, ZC, and ZA values (WF@4.0 mm) are transferred as day measurement data

Select data to be transferred by pressing the Send both data or Send upper data only button.

Pressing either button prints the measurement data with the internal printer (when "Internal Printer" is selected on the Settings screen [Measurement tab]), and transfers data to the specified refractor.

Send both data	Both "1. Day measurement data" and "2. Night measurement data" are transferred to the specified refractor.
Send upper data only	Only "1. Day measurement data" is transferred to the specified refractor. "2. Night measurement data" is not transferred.

If the difference between "1. Day measurement data" and "2. Night measurement data" is large, "3. Difference (absolute value)" is displayed in red. In such a case, it is recommended to press the Send both data button to transfer the night measurement data as well.

4.8.4 Map Scale tab

The settings on the Map Scale tab are for editing of color scale on each map.
The Map Scale tab is divided into the tabs for each map. Select the desired map tab to change the color scale.

Tab	Target map
CT-A	Axial and Instantaneous maps
OPD	OPD map

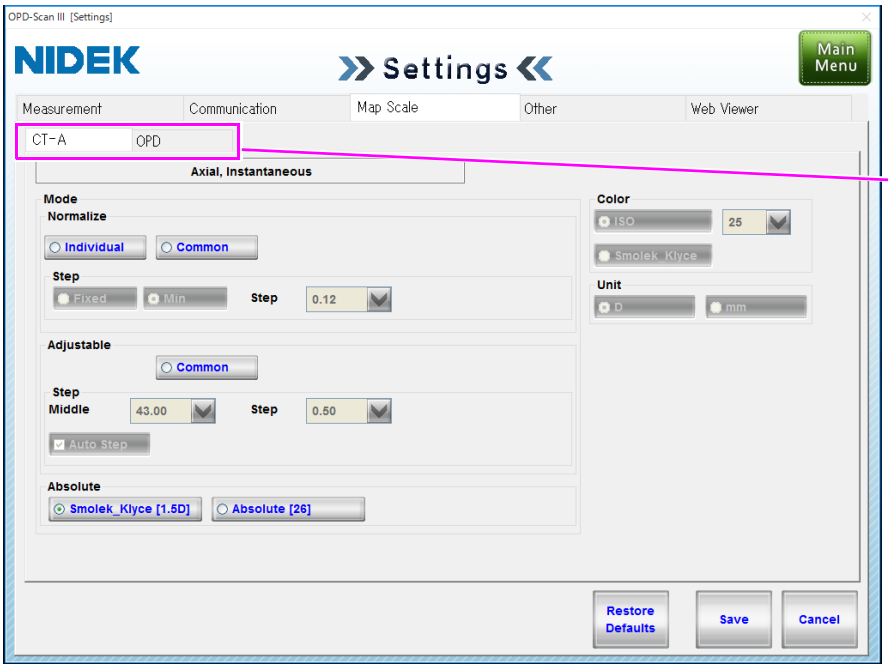
The scale mode, middle value, increments, color, and unit are input in the same manner for both tabs.

Note

- The unchangeable settings on the tab are grayed out.
- The color scale of the report display for the OPD Web Viewer System can be set separately on the Web Viewer tab.

◆ CT-A tab

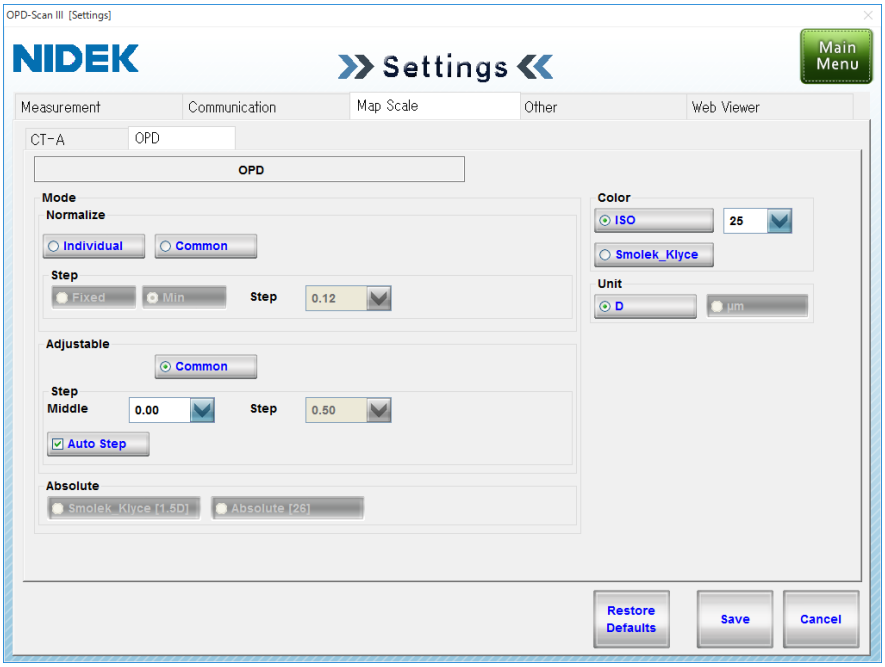
Target map	Axial and Instantaneous maps				
Default	Adjustable/Smolke_Klyce [1.5D]				
Selectable scale mode	Normalize		Adjustable	Absolute	
	Individual	Common	Common	Smolek_Klyce [1.5D]	Absolute [26]
	○	○	○	○	○



The maps corresponding to the selected tab are displayed.

◆ OPD tab

Target map	OPD map				
Default	Adjustable/Common			Step Middle	0.00
				Auto Step	Selected (On)
				Color	ISO/25
				Unit	D
Selectable scale mode	Normalize		Adjustable	Absolute	
	Individual	Common	Common	Smolek_Klyce [1.5D]	Absolute [26]
	○	○	○	-	-



○ Color scale settings

Color scale type

The color scale is broadly divided into the relative scale and absolute scale.

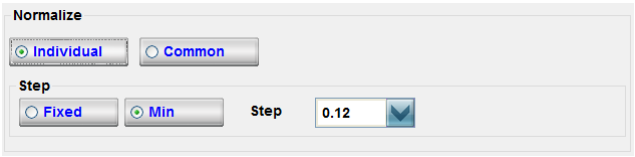
Relative color scale

In the relative color scale, the map histogram is calculated and the appropriate increments and middle scale are automatically selected so that the color scale can be used effectively.

Select the scale unit (D or mm) in the Unit field and color scheme (ISO or Smolek_Klyce) and color number in the Color field.

Color scale mode		Description
Normalize	Individual	The increments and middle value are calculated so that the color scale can be used most effectively based on the maximum and minimum values on each map. The middle value cannot be changed.
	Common	The increments and middle value of the color scale are calculated based on the maximum and minimum values on each map. The middle value cannot be changed.
Adjustable	Common	This is one of the relative scales, the difference from the Normalize (Common) one is that the calculated middle value and increments can be changed. Selecting the check box for “Auto Step” automatically selects the increments appropriate for the specified middle value.

Settings of Normalize (Individual/Common)



Selects whether to fix the increments or set the minimum increments.

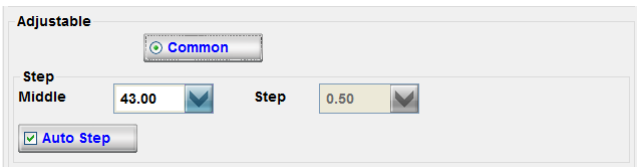
Fixed	The scale is displayed in the specified increments at all times.
Min	The minimum value of automatically calculated increments is selected. The automatically calculated increments do not become smaller than the value specified here.

Select the Step setting value from each drop-down list. The setting values on the list vary depending on the selected unit (D or mm).

The calculated increments do not become smaller than the value specified here.

D	0.12, 0.25, 0.50, 0.75, 1.00, 1.50, 2.00, 5.00 (“5.00” is displayed only when “Min” is selected.)
mm	0.02, 0.05, 0.10, 0.15, 0.20, 0.30, 0.40, 1.00 (“1.00” is displayed only when “Min” is selected.)

Settings of Adjustable (Common)



Select the Step setting value from each drop-down list. The setting values on the list vary depending on the selected unit (D or mm).

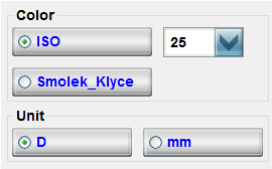
D	0.12, 0.25, 0.50, 0.75, 1.00, 1.50, 2.00, 5.00
mm	0.02, 0.05, 0.10, 0.15, 0.20, 0.30, 0.40, 1.00

Select the middle value from the drop-down list. The setting values on the list vary depending on the selected unit (D or mm).

D (CT-A)	10.00 to 100.00 (in 0.25 D increments)
D (OPD)	-20.00 to 20.00 (in 0.25 D increments)
mm	3.0 to 39.95 (in 0.05 mm increments)

When the check box for “Auto Step” is selected, the Step entry field is filled automatically and become unchangeable.

Color: Sets the color scheme and number of colors to be displayed.



ISO	Colors conforming to the color scale recommended by ISO standards Specify the number of colors in the color number field. (The number of colors can be selected in the range from 15 to 25 colors while the scheme is in the order of red, green, and blue.)
Smolek_Klyce	The color scheme is the same as that of the absolute color scale (in the order of pink, red, yellow, green, blue, and dark blue). The number of colors is 26 colors and unchangeable.

Unit: Sets the color scale unit. Select from among D (diopter) and mm (curvature radius).

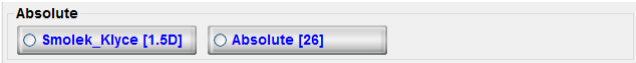
The unit can be changed on the Axial and Instantaneous maps only. The unit is fixed to “D” (diopter) on the OPD map.

When the unit setting is changed, the middle value and increments are changed as well.

Absolute color scale

The absolute color scale has the fixed increments and range. Regardless of the patient’s eye conditions, the same diopter is always displayed in the same color. Therefore, this is effective for comparing several maps. The absolute color scale can be selected from the following two types.

On the OPD map, the absolute color scale cannot be selected.

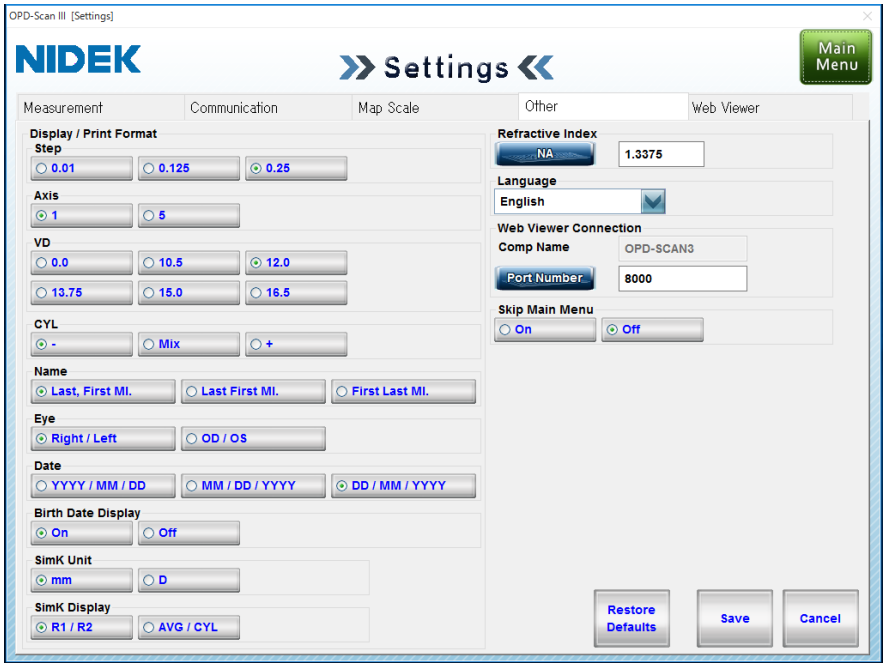


Color scale mode		Description
Absolute	Smolek Klyce [1.5D]	Smolek Klyce scale This scale is displayed with the fixed color scale of 26 colors in 1.5 D increments within the range of 30 to 67.5 D.
	Absolute [26]	The color scheme is as the same as that of the Smolek Klyce. However, the increments are enlarged in the periphery and displayed with the fixed color scale of 26 colors within the range of 9 to 101.5 D.

Note

- In the absolute color scale, the color cannot be changed.

4.8.5 Other tab



Display / Print Format

Step: 0.01, 0.125, 0.25 (D)

Selects the indication increments of SPH and CYL data for AR measurement

Printed keratometry data is also based on the indicated increments.

Axis: 1, 5 (°)

Selects the indication increments of AXIS data for AR measurement.

VD: 0.0, 10.5, 12.0, 13.75, 15.0, 16.5 (mm) (Default for USA: 13.75)

Selects the distance from the corneal vertex to the inner surface of a glasses lens

CYL: -, Mix, +

Selects reading mode for the CYL values from among “-”, “Mix” and “+”.

For keratometry data, when the radio button for “+” is selected, the data is indicated with “+”. When the radio button for “Mix” or “-” is selected, the data is indicated with “-”.

Name: Last, First MI., Last First MI., First Last MI.

Last, First MI.	Displays name in the order of last name, first name middle name.
Last First MI.	Displays name in the order of last name first name middle name.
First Last MI.	Displays name in the order of first name last name middle name.

Eye: Right / Left, OD / OS

Selects the right and left eye indication format of the patient’s eye from among “Right / Left” and “OD / OS”.

Date: YYYY / MM / DD, MM / DD / YYYY, DD / MM / YYYY (Default for USA: MM / DD / YYYY)

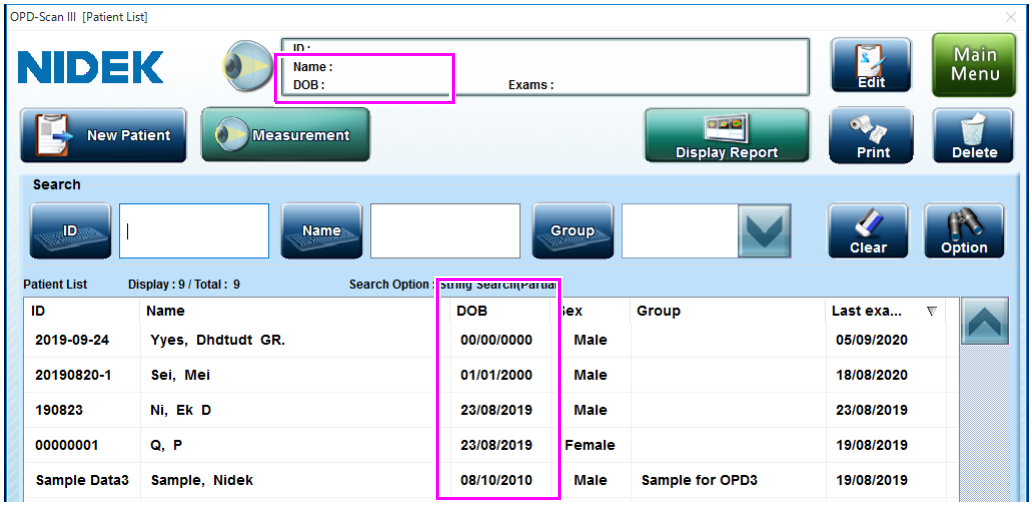
Selects the print date format.

YYYY / MM / DD	Year. Month. Day
MM / DD / YYYY	Month/Day/Year
DD / MM / YYYY	Day/Month/Year

Birth Date Display: On, Off

When “On” is selected, date of birth of the selected patient is displayed in the patient data brief information box (or the patient information button) on the screens such as the Measurement screen, Patient List screen, and report screen. On the Patient List, the date of birth is displayed between the name and sex. (When the date of birth has not been entered, “00/00/0000” is displayed.)

The date of birth is also added to the patient information printed or output.



SimK Unit: mm, D (Default for Marco: D)

Sets the display unit of the keratometry value simulated from CT measurement on the measurement screen.

SimK Display: R1 / R2, AVG / CYL

Sets the display format of the keratometry value simulated from CT measurement on the measurement screen.

R1 / R2	The flattest meridian value (R1), the steepest meridian value (R2), and R1 axis angle
AVG / CYL	The average between R1 and R2 (AVG), corneal cylindrical power (CYL), and R1 axis angle

Refractive Index - NA: 1.0001 to 2.0000 (Default: 1.3375)

Selects the corneal refractive index to be used for calculating the Axial and Instantaneous maps.

Language: English, German

Selects the display language.

Web Viewer Connection - Port Number (Default: 8000)

Sets the port number of the computer used for connection with OPD Web Viewer System.

Skip Main Menu: On, Off

When “On” is selected, the Patient List screen is displayed without displaying the Main Menu screen at start-up.

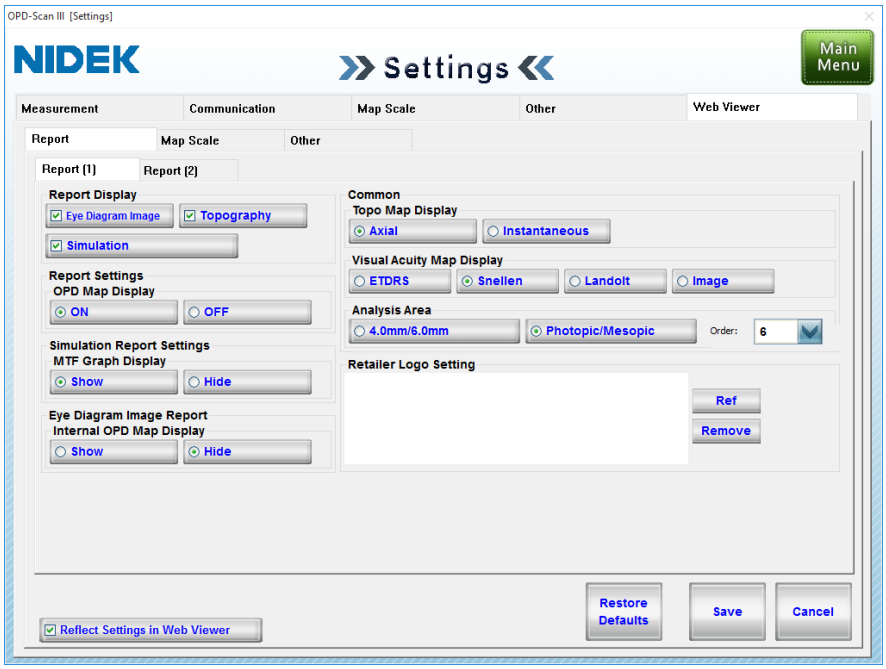
4.8.6 Web Viewer tab

The Web Viewer tab allows various Web UI settings of OPD Web Viewer System (report screen).
The Web Viewer tab is divided into the Report, Map Scale, and Other tabs.
Selecting “Reflect Settings in Web Viewer” at the bottom of the screen enables the settings specified for this tab.

4

○ Report tab

◆ Report (1)



Report Display (The check boxes for “Eye Diagram Image”, “Topography”, and “Simulation” are selected by default.)

Sets the report to be displayed other than Report Display from “Eye Diagram Image”, “Topography”, or “Simulation”.

Omitting the number of reports to be displayed shorten the time until the report is displayed.

Report Settings

OPD Map Display: ON, OFF

Selects whether to set the OPD map as the initial display for the Eye Image map on the Basic Information Report screen.

Simulation Report Settings

MTF Graph Display: Show, Hide

Selects whether to display the MTF graph on the Simulation Report screen.

Eye Diagram Image Report

Internal OPD Map Display: Show, Hide

Selects whether to display the Internal OPD map on the Eye Diagram Image Report.

Common

Topo Map Display: Axial, Instantaneous

Selects whether to display the Axial map or Instantaneous map on the report screen.

Visual Acuity Map Display (Default: Snellen)

Selects the chart type to be displayed on the map from among “ETDRS”, “Snellen” and “Landolt”.

Analysis Area: 4.0mm/6.0mm, Photopic/Mesopic

Selects the analysis area setting from among “4.0mm/6.0mm”and “Photopic/Mesopic”.

4.0mm/6.0mm	The analysis area is set to 4.0 mm for daytime and 6.0 mm for nighttime. However, if the pupil diameter for daytime is less than 4 mm or less than 6 mm for nighttime, the calculation is performed using the diameter of the photopic vision or that of the mesopic vision respectively.
Photopic/ Mesopic	The analysis area is set to Photopic for daytime and Mesopic for nighttime. However, for data sets whose detection of pupil diameter failed, a 4 or 6 mm-diameter is set as the analysis area diameter.

Order: 3 to 8 (Default: 6)

Selects the order to be set in the Order field within the range of 3 to 8.

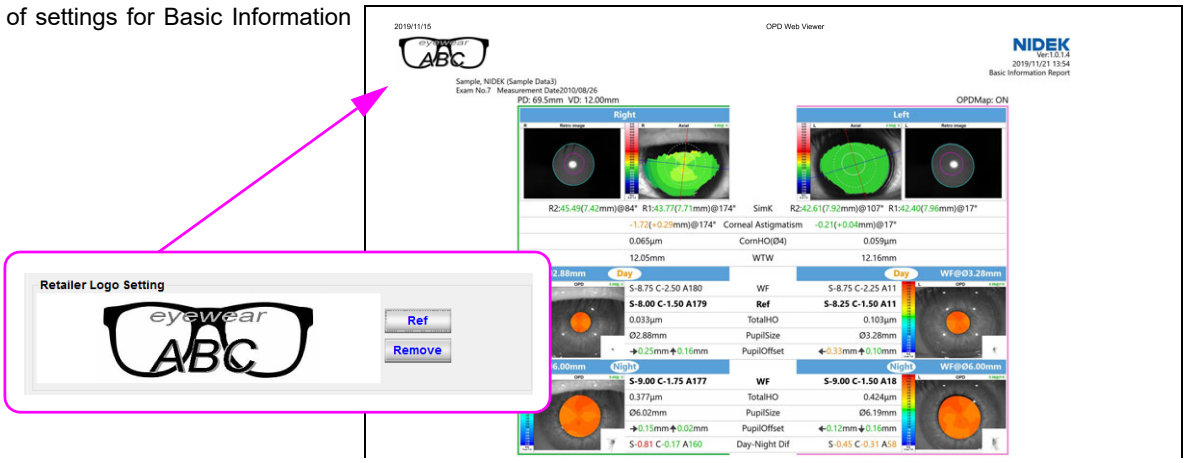
Retailer Logo Setting

Sets the file of the image to be displayed and printed as a logo on a printed report.

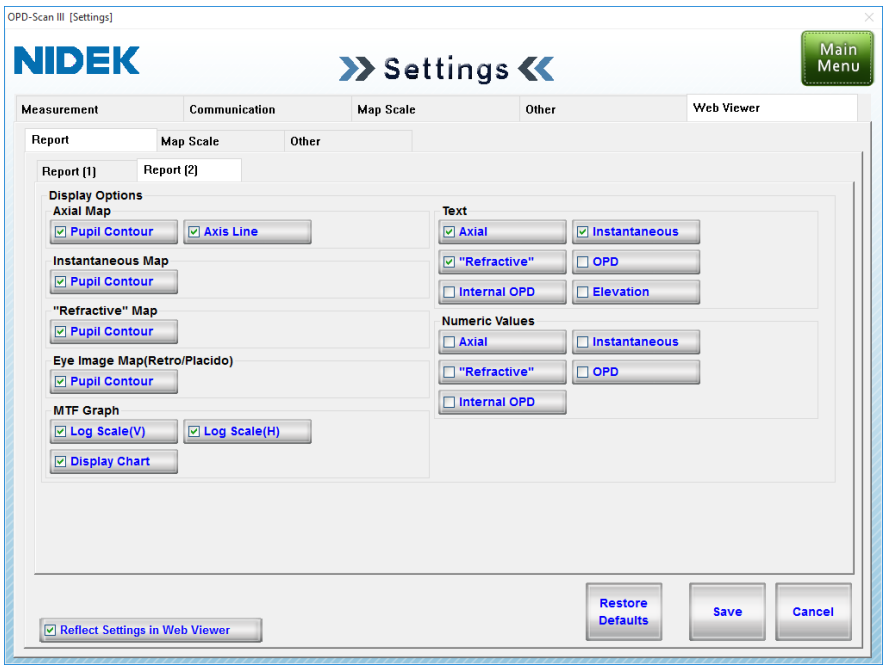
Ref button	Pressing this button displays the Open dialog box for selecting the image file (in JPG, BMP, or PNG format) to be read. The selected image is displayed on the retailer logo display area.
Remove button	Deletes the image displayed on the retailer logo display area.

Retailer logo display area	The selected image is displayed. The dimension of the image is automatically adjusted according to that of the retailer logo display area. To change the displayed image, perform reading of image again.

Example of settings for Basic Information Report



◆ Report (2)



Display Options

Axial Map: (The check boxes for “Pupil Contour” and “Axis Line” are selected by default.)

Selects whether to display the pupil contour or cylinder axis on the map.

Instantaneous Map: (The check box for “Pupil Contour” is selected by default.)

Selects whether to display the pupil contour on the map.

“Refractive” Map: (The check box for “Pupil Contour” is selected by default.)

Selects whether to display the pupil contour on the map.

Eye Image Map(Retro/Placido): (The check box for “Pupil Contour” is selected by default.)

Selects whether to display the pupil contour on the map.

MTF Graph: (The check boxes for “Log Scale(V)”, “Log Scale(H)”, and “Display Chart” are selected by default.)

Selects whether to use the log scale (vertical) or log scale (horizontal), or to display the chart on the MTF graph.

Text: (The check boxes for “Axial”, “Instantaneous”, and “Refractive” are selected by default.)

Selects whether to display the measurement values and such by text display on each map. Settings are reflected on all of the reports.

The maps to which the text display can be set are the Axial, Instantaneous, “Refractive”, OPD, Internal OPD, and Elevation maps.

Numeric Values: (None of the check boxes are selected by default.)

Selects for each map whether to display the refractive power (Pwr) for each position by numeric value on the color map. Settings are reflected on all of the reports.

The maps to which the numeric display can be set are the Axial, Instantaneous, “Refractive”, OPD, and Internal OPD maps.

○ Map Scale tab (CT-A, CT-R, OPD, Elevation, and Internal OPD tabs)

The settings on this tab are for editing of color scale on each map to be displayed on the Web UI report screen.

The Map Scale tab is divided into the tabs for each map. Select the desired map tab to change the color scale.

Tab	Target map
CT-A	Axial and Instantaneous maps
CT-R	“Refractive” map
OPD	OPD map
Elevation	Elevation map
Internal OPD	Internal OPD map

The scale mode, middle value, increments, color, and unit are input in the same manner for both tabs.

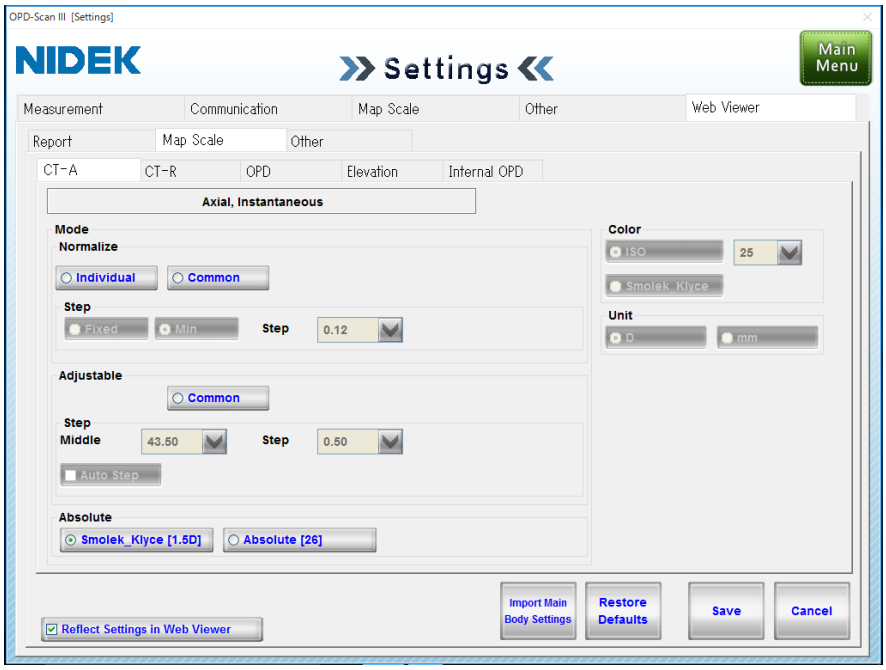
The Web Viewer “Map Scale” tab settings are the same as those in the device “Map Scale” tab. To reflect settings in the device “Map Scale” tab to the Web Viewer “Map Scale” tab, press the Import Main Body Settings button.

Note

- Changes to the settings on the Map Scale tab under the Web Viewer tab are only reflected on the display of the report screen. Perform setting of display for other screens of the device such as the Verify Examination Quality screen from the Map Scale tab for the device.
- To synchronize the Web UI (report screen) settings of OPD Web Viewer System with those of the device, from the Web Viewer tab select the Map Scale tab and press the Import Main Body Settings button.

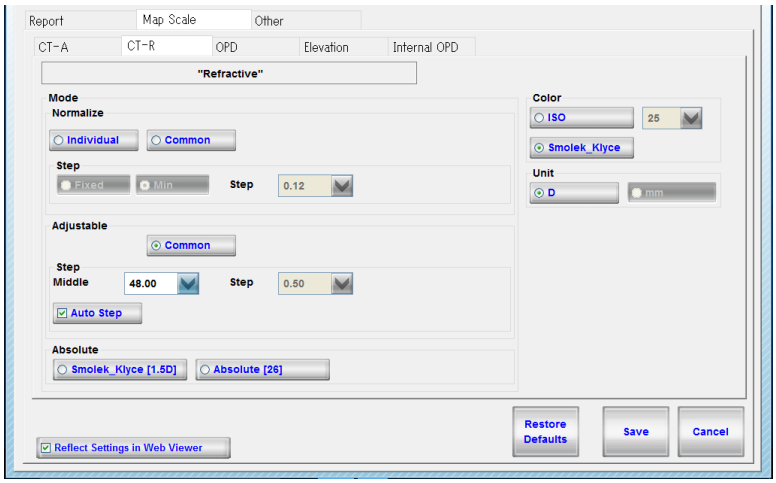
◆ CT-A tab

Target map	Axial and Instantaneous maps				
Default	Adjustable/Smolke_Klyce [1.5D]				
Selectable scale mode	Normalize		Adjustable	Absolute	
	Individual	Common	Common	Smolek_Klyce [1.5D]	Absolute [26]
	○	○	○	○	○



◆ CT-R tab

Target map	“Refractive” map				
Default	Adjustable/Smolke_Klyce [1.5D]				
Selectable scale mode	Normalize		Adjustable	Absolute	
	Individual	Common	Common	Smolek_Klyce [1.5D]	Absolute [26]
	○	○	○	○	○

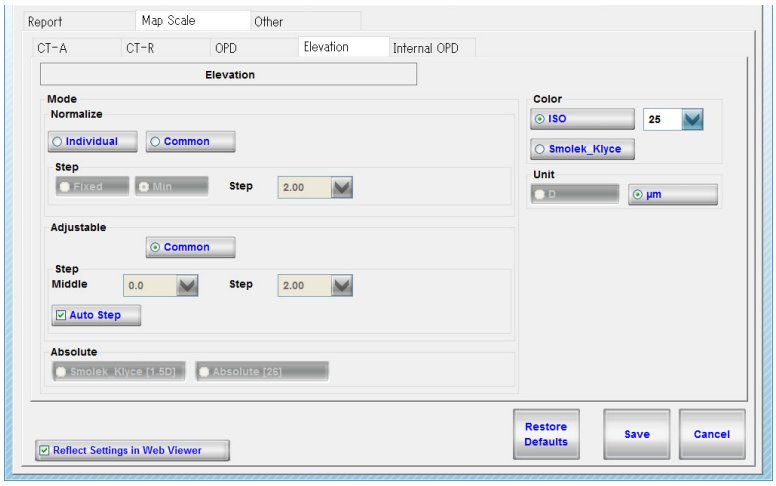


◆ OPD tab

<table>
<tr><td>Target map</td><td colspan="5">OPD map</td></tr>
<tr><td rowspan="3">Default</td><td colspan="3" rowspan="3">Adjustable/Common</td><td>Step Middle</td><td>0.00</td></tr>
<tr><td>Color</td><td>ISO/25</td></tr>
<tr><td>Unit</td><td>D</td></tr>
<tr><td rowspan="3">Selectable scale mode</td><td colspan="2">Normalize</td><td>Adjustable</td><td colspan="2">Absolute</td></tr>
<tr><td>Individual</td><td>Common</td><td>Common</td><td>Smolek_Klyce [1.5D]</td><td>Absolute [26]</td></tr>
<tr><td>○</td><td>○</td><td>○</td><td>-</td><td>-</td></tr>
</table>

◆ Elevation tab

<table>
<tr><td>Target map</td><td colspan="5">Elevation map</td></tr>
<tr><td rowspan="3">Default</td><td colspan="3" rowspan="3">Adjustable/Common</td><td>Auto Step</td><td>Selected (On)</td></tr>
<tr><td>Color</td><td>ISO/25</td></tr>
<tr><td>Unit</td><td>μm</td></tr>
<tr><td rowspan="3">Selectable scale mode</td><td colspan="2">Normalize</td><td>Adjustable</td><td colspan="2">Absolute</td></tr>
<tr><td>Individual</td><td>Common</td><td>Common</td><td>Smolek_Klyce [1.5D]</td><td>Absolute [26]</td></tr>
<tr><td>○</td><td>○</td><td>○</td><td>-</td><td>-</td></tr>
</table>



◆ Internal OPD tab

Target map	Internal OPD map				
Default	Adjustable/Common			Auto Step	Selected (On)
				Color	ISO/25
				Unit	D
Selectable scale mode	Normalize		Adjustable	Absolute	
	Individual	Common	Common	Smolek_Klyce [1.5D]	Absolute [26]
	○	○	○	-	-

4

○ Other tab

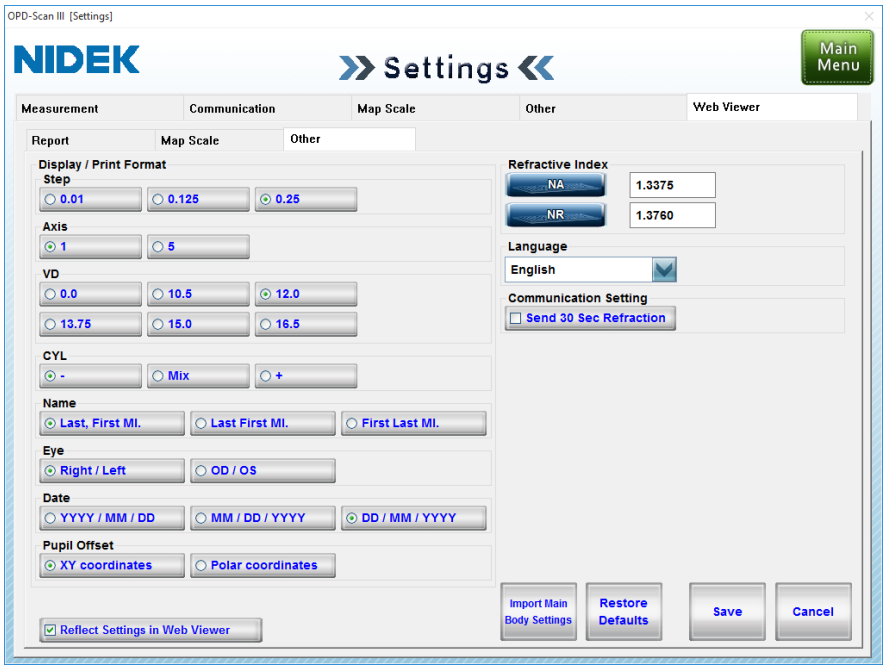
In this tab display settings are selected for the type of the report to be displayed in the Web UI (report screen) of OPD Web Viewer System.

The contents of the Web Viewer “Other” tab settings other than “Pupil Offset Display”, “Refractive Index”, and “Communication Setting” are the same as those in the device “Other” tab. However, “Birth Date Display”, “SimK Unit”, “SimK Display”, “Web Viewer Connection”, and “Skip Main Menu” are not available on this tab.

To reflect settings in the device “Other” tab to the Web Viewer “Other” tab, press the Import Main Body Settings button.

Note

- The setting of the main body is reflected in “Send 30sec Refraction” when “RT-5100 Support” is selected for “Connected Device” on the Communication tab.



Display / Print Format

Pupil Offset: XY coordinates, Polar coordinates

Selects the numeric display for pupil offset between “XY coordinates” and “Polar coordinates”.

Refractive Index

NA: 1.0001 to 2.0000 (Default: 1.3375)

Selects the corneal refractive index to be used for calculating the Axial and Instantaneous maps.

NR: 1.0001 to 2.0000 (Default: 1.3760)

Selects the corneal refractive index to be used for calculating the “Refractive” and Internal OPD maps.

Communication Setting

Send 30 Sec Refraction: (The check box is not selected by default.)

Selects whether to perform “Send 30sec Refraction” to transfer data to the RT.

For details on “Send 30 Sec Refraction”, see “4.8.3 Communication tab” (page 178).

4.9 OPD Database Manager

The device manages data using the database management software, OPD Database Manager. Operations of database such as setting, selection, and backup are performed in the OPD Database Manager screen.

Note

- A hardware keyboard is necessary for entering the database name, folder name, and such.

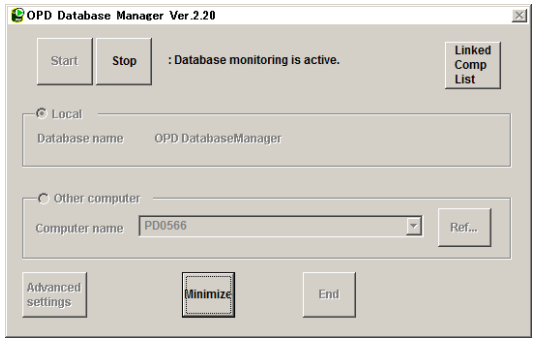
4.9.1 Creating database

Multiple databases can be created and the desired database can be selected to be used by the device. (For the selection method, see “4.9.2 Switching database (Local database)” (page 201).)
A maximum of five databases can be newly created.

However, a new database cannot be created in the device (SSD). A new database can be created on an external hard disk connected to the device.

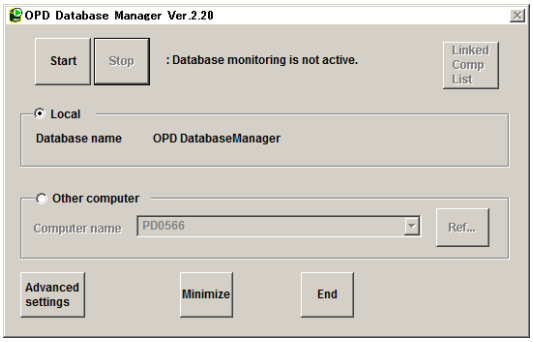
New database cannot be created on the computers selected for “Other computer” on the OPD Database Manager screen. Create a new database with the OPD Database Manager-installed computer on which the database is to be stored.

1 Press the Database button on the Maintenance screen to display the OPD Database Manager screen.

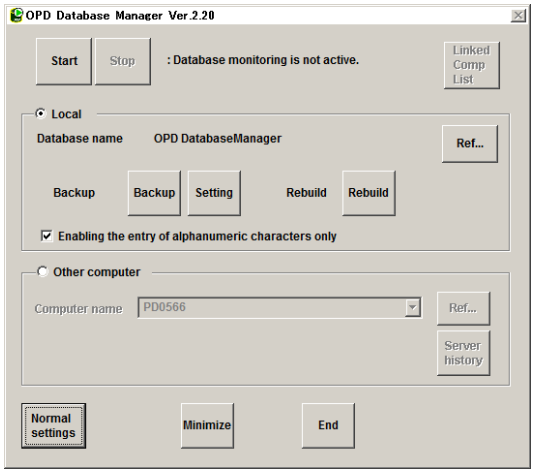


2 Press the Stop button to stop connection to the database.

If other network-connected OPD-Scan IIIs are using the database on the device, stop connection to the database with all the OPD-Scan IIIs in advance. (Press the Stop button on the OPD Database Manager screen with each device.)

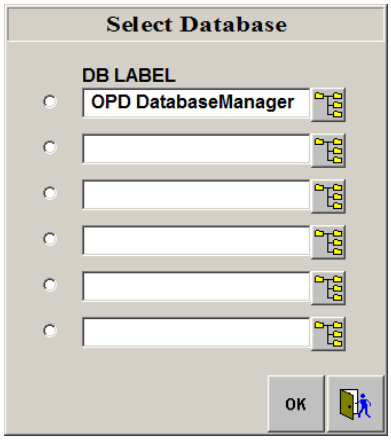


3 Press the Advanced settings button in the lower left of the screen to display the screen in advanced settings mode.



4 Press the Ref... button.

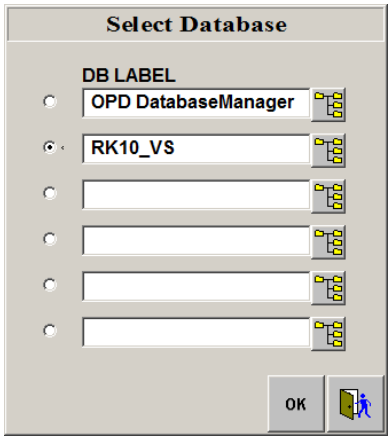
The Select Database window is displayed.



5 Select the radio button to the left of any blank DB LABEL field.

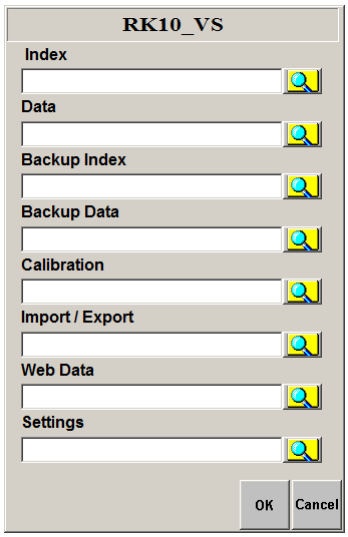
6 Enter the database name in the selected DB LABEL field.

Example: RK10_VS



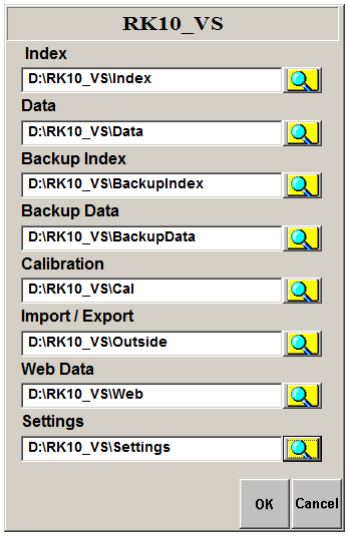
7 Press the button to the right of the field.

The window listing the folder fields to store the database is displayed.



8 Using the hardware keyboard, enter the target folder name in each field from “Index” to “Settings” in which the database is to be created.

Name the folders according to the table below.



Entry field	Folder name
Index	...\Index
Data	...\Data
Backup Index	...\BackupIndex
Backup Data	...\BackupData
Calibration	...\Cal
Import/Export	...\Outside
Web Data	...\Web
Settings	...\Settings

* With the device, the “C:” folder cannot be selected.

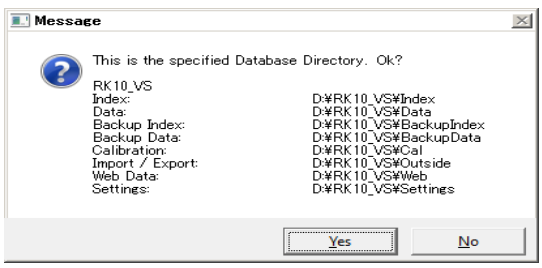
9 Press the OK button.

If any folders entered in Step 8 do not exist, a message is displayed for each folder asking whether to create the folder. Press the Yes button for each message.

The Select Database window is displayed.

10 Press the OK button.

The Message dialog box is displayed.



11 Press the Yes button.

12 Press the button.

The screen returns to the OPD Database Manager screen.

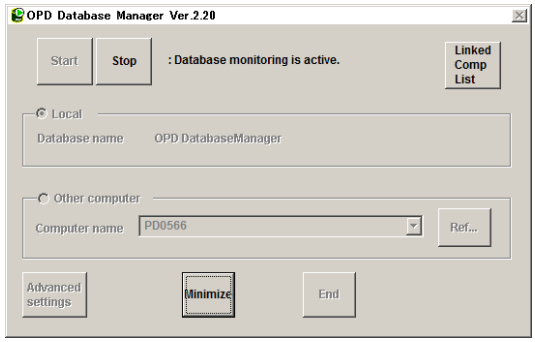
13 Press the Start button to start the connection to the newly created database.

14 Press the Minimize button to minimize the OPD Database Manager screen to the taskbar.

4.9.2 Switching database (Local database)

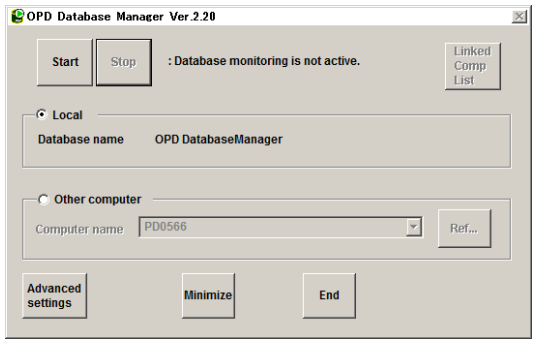
The desired database can be selected from multiple databases.
To use a database on another OPD Database Manager-installed computer on the network, see “4.9.3 Using database in another computer on network” (page 203).

1 Press the Database button on the Maintenance screen to display the OPD Database Manager screen.

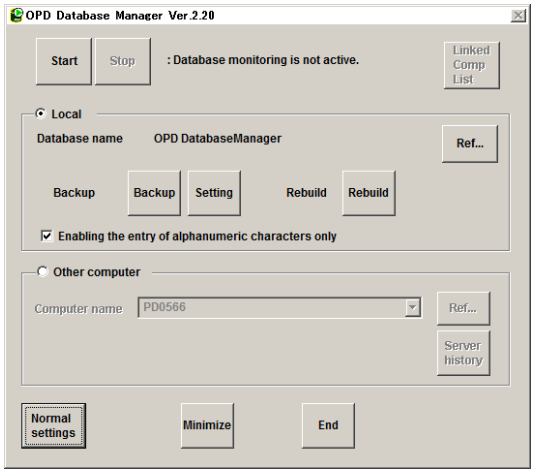


2 Press the Stop button to stop connection to the database.

If other network-connected OPD-Scan IIIs are using the database on the device, stop connection to the database with all the OPD-Scan IIIs in advance. (Press the Stop button on the OPD Database Manager screen with each device.)

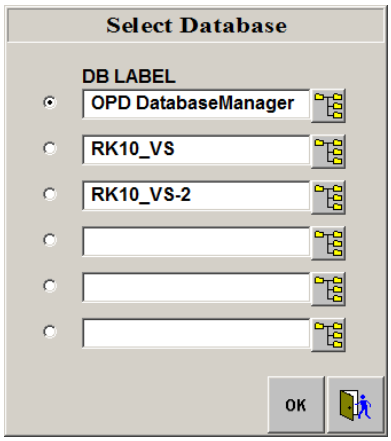


3 Press the Advanced settings button to display the screen in advanced settings mode.



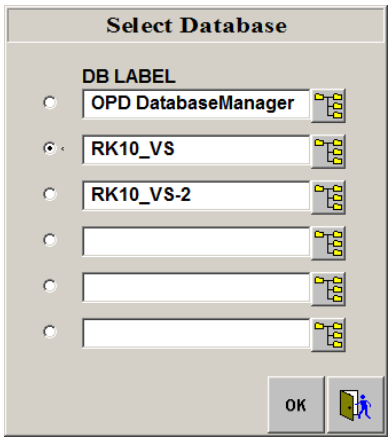
4 Press the Ref... button.

The Select Database window is displayed.



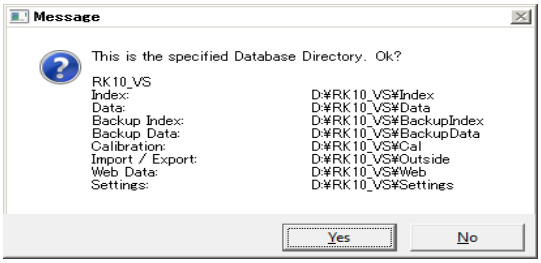
5 Select the radio button of the database to be used.

Press the  to the right of the database field to confirm or edit the folder in which the database is stored.



6 Press the OK button.

The Message dialog box is displayed.



7 Press the Yes button.

8 Press the  button.

The screen returns to the OPD Database Manager screen.

9 Press the Start button.

The device is connected to the database selected in Step 5.

10 Press the Minimize button to minimize the OPD Database Manager screen to the taskbar.

4.9.3 Using database in another computer on network

To use a database in another computer on the network, select “Other Computer” on the OPD Database Manager screen.
In such a case, back up the database with OPD Database Manager-installed computer on which the database to be used is stored.

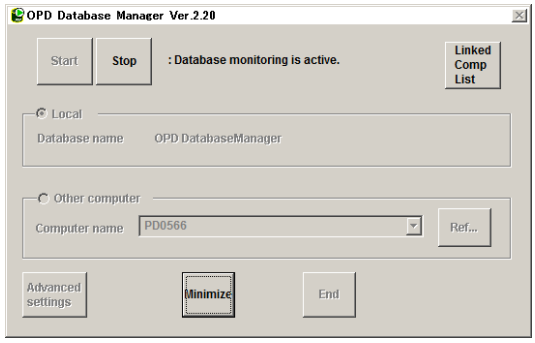
⚠ CAUTION • **When the device is connected to a database in any other computer available on the network, OPD Web Viewer System becomes unusable.**

Note

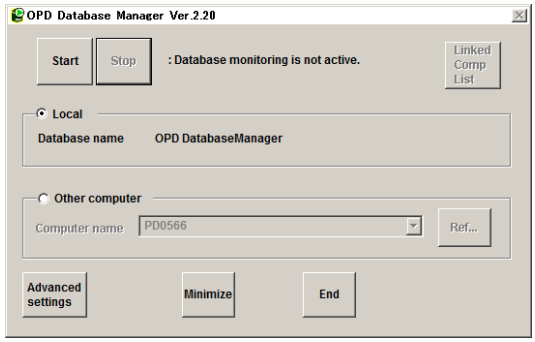
- OPD Database Manager (Ver. 2.20 or later) needs to be installed on the computer to be connected.

  Computers with OPD Database Manager of earlier versions cannot be connected. Update OPD Database Manager to the latest version. (The OPD-Scan III software does not need to be updated.)

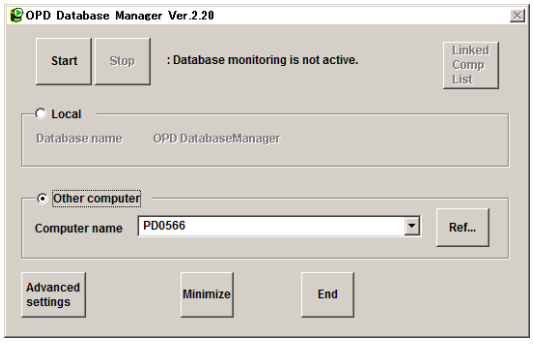
1 Press the Database button on the Maintenance screen to display the OPD Database Manager screen.



2 Press the Stop button to stop connection to the database.



3 Select “Other computer”.



4 Press the “Ref...” button to display the Network screen for browsing computers, select the name of the computer on which the database to be used is stored, then press the OK button.

If the computer name cannot be found, enter the computer name in the Computer name field using the hardware keyboard.

5 Press the Start button to start connection to the specified database.

6 Press the Minimize button to minimize the OPD Database Manager screen to the task-bar.

4.9.4 Database backup

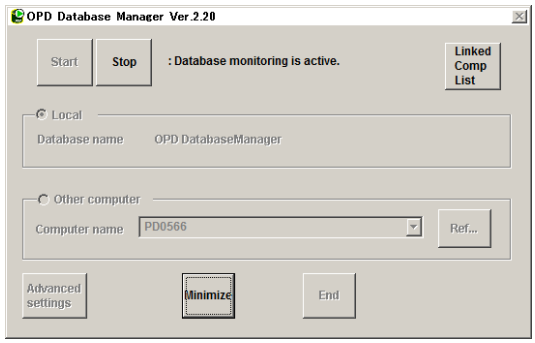
It is recommended to regularly back up the database in case of a database crash.
The database is backed up in the directory specified in the Backup Data field in the Select Database window.
Database backup cannot be performed on the computers selected for “Other computer” on the OPD Database Manager screen. Back up the database with the OPD Database Manager-installed computer on which the database is stored.

Note

- If the SSD (C drive) in the device is specified as the location to store the database, the database cannot be backed up with the procedure described below.

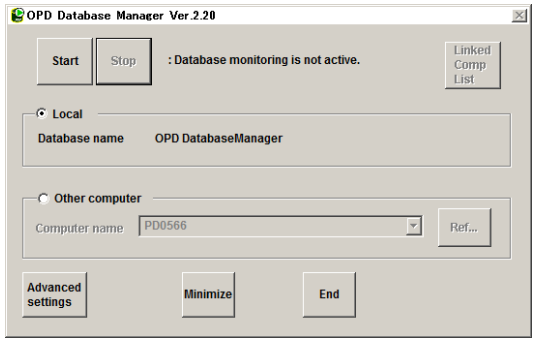
  The database can be backed up by specifying an external storage device (such as an external HDD) as the location to store the database.

1 Press the Database button on the Maintenance screen to display the OPD Database Manager screen.

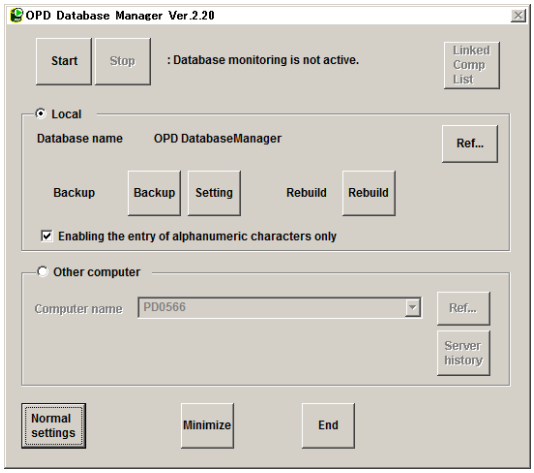


2 Press the Stop button to stop connection to the database.

If other network-connected OPD-Scan IIIs are using the database on the device, stop connection to the database with all the OPD-Scan IIIs in advance. (Press the Stop button on the OPD Database Manager screen with each device.)

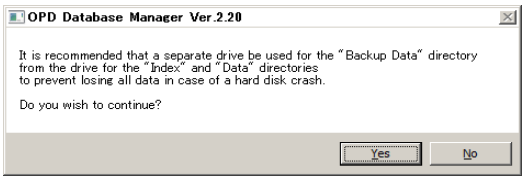


3 Press the Advanced settings button to display the screen in advanced settings mode.



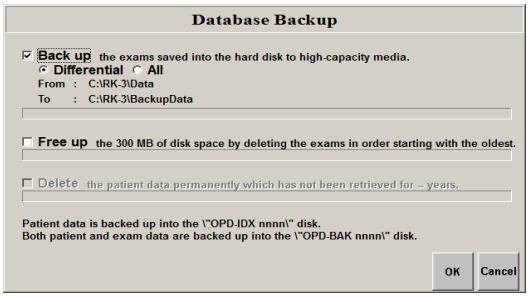
4 Press the Backup button.

If the message, 'It is recommended that a separate drive be used for the "Backup Data" directory from the drive for the "Index" and "Data" directories to prevent losing all data in case of a hard disk crash. Do you want to continue?' is displayed, read the message and press the Yes button to continue.



The Database Backup window is displayed.

If both, the backup destination and the database are located in the same drive, a message recommending the operator to select the backup destination in another drive is displayed.



OK	Backs up the data in the same drive.
Cancel	Cancels the backup process.

5 Check the desired backup type.

Back up: Backs up data.

The backed-up data is saved and can be used for rebuilding the database.

There are two optional methods for backup as follows:

Differential	Backs up only the data added or modified after the last backup. Usually, select this option (◉).
All	Backs up the whole database including the existing backup data. Select this option when changing the location to store the backup data in such cases as a corrupted storage media.

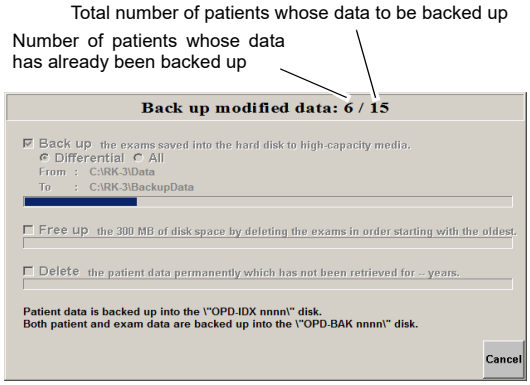
Free up	Deletes data to free up the hard disk space by the specified amount after data backup. For the method to specify the space to free up, see “4.9.7 Setting data deletion criteria” (page 213). The data set that has not been used for the longest time is deleted first.
Delete	Deletes patients whose data has not been used for the specified years. This option allows deletion of data after the specified retention period. For the method to specify the retention period, see “4.9.7 Setting data deletion criteria” (page 213).

Note

- When data is backed up with “All” selected, the previous backup data is no longer available even if it is backed up in another media (such as a DVD-RAM).

6 Press the OK button.

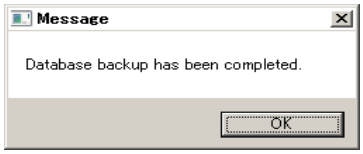
The backup progress bar is displayed.



Backup may take a long time to complete.

The backup process can be stopped by pressing the Cancel button. When backup is canceled, the backup file contains the data backed up until the Cancel button was pressed.

When backup is complete, the message, “Database backup has been completed.” is displayed.



7 Press the OK button.

The screen returns to the OPD Database Manager screen.

8 Press the Start button to restart connection to the database.

9 Press the Minimize button to minimize the OPD Database Manager screen to the task-bar.

CAUTION

- **Be sure to back up data on an external storage device such as a DVD-RAM.**
  If the internal SSD is corrupted, the stored data becomes unreadable.
  Storage media such as CD-R, CD-RW, or DVD-R that need writing software cannot be used for backup.
- **Operators are responsible for managing obtained data.**
  NIDEK does not assume any responsibility for any loss of data.

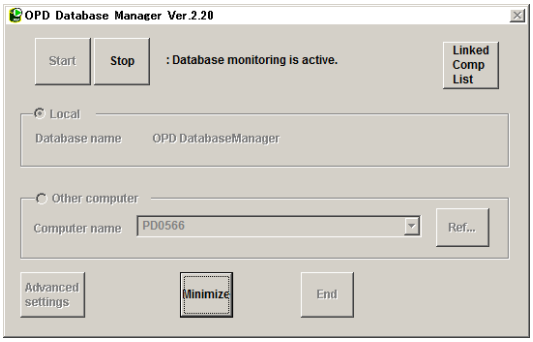
4.9.5 Rebuilding database

If the database crashes, rebuild the database from backup data or data remaining in the data folders. Database cannot be rebuilt on the computers selected for “Other Computer” on the OPD Database Manager screen. Rebuild the database with the device or OPD Database Manager-installed computer on which the database is stored.

Note

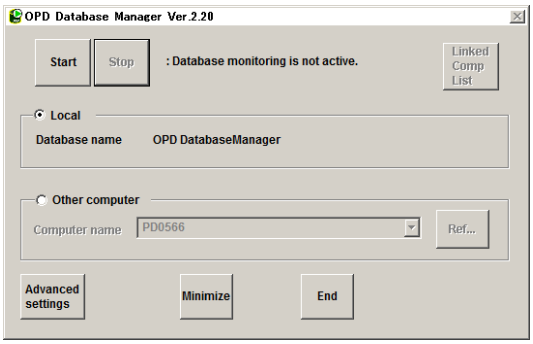
- If the SDD (C drive) in the device is specified as the location to store the database, the database cannot be backed up with the procedure described below.

1 Press the Database button on the Maintenance screen to display the OPD Database Manager screen.

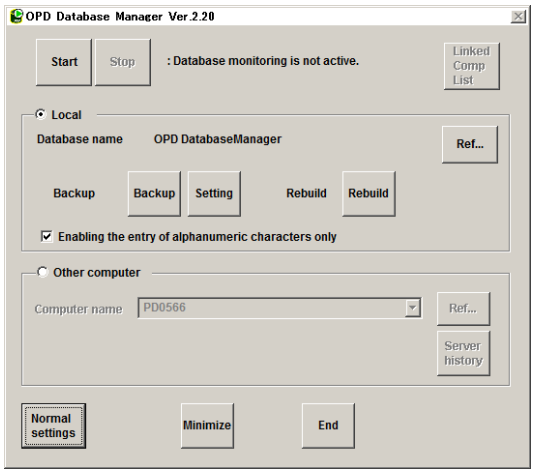


2 Press the Stop button to stop connection to the database.

If other network-connected OPD-Scan IIIs are using the database on the device, stop connection to the database with all the OPD-Scan IIIs in advance. (Press the Stop button on the OPD Database Manager screen with each device.)

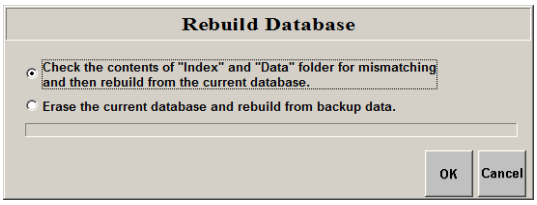


3 Press the Advanced settings button to display the screen in advanced settings mode.



4 Press the Rebuild button.

The Rebuild Database window is displayed.



5 Check the desired rebuild type.

Check the contents…	Rebuilds the database using the currently used data folders.
Erase the current…	Restores backed-up data after replacing the whole device or the internal SSD due to malfunction or other causes.

⚠ CAUTION

- **Rebuilding the database with "Erase the current..." selected completely erases the currently used database. Use precaution when selecting this option.**
  To retain the currently used database, back it up in advance.
- **If data in the database is deleted after backing up the data on an external storage media, the deleted data cannot be restored even by rebuilding the database with "Check the contents..." selected.**

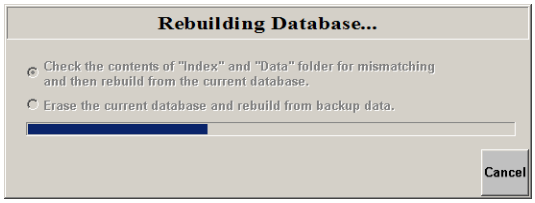
6 Press the OK button.

When "Check the contents…" is selected:

The rebuilding of the database is started and progress bar is displayed.

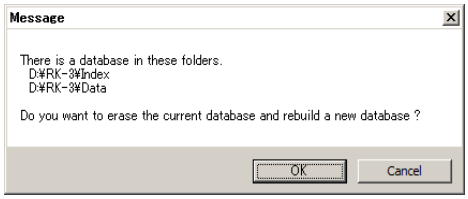
Rebuilding may take a long time.

Go to Step 8.



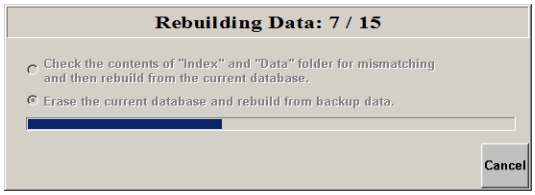
When "Erase the current…" is selected:

The Message dialog box as shown to the right is displayed. Go to Step 7.

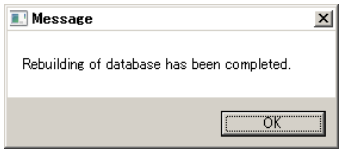


7 Press the OK button.

Rebuilding of the database is executed.



8 When the rebuilding of the database is complete, the message, "Rebuilding of database has been completed." is displayed.



9 Press the OK button.

The screen returns to the OPD Database Manager screen.

10 Press the Start button to restart connection to the database.

11 Press the Minimize button to minimize the OPD Database Manager screen to the taskbar.

4.9.6 Setting destination of data backup, import, and export

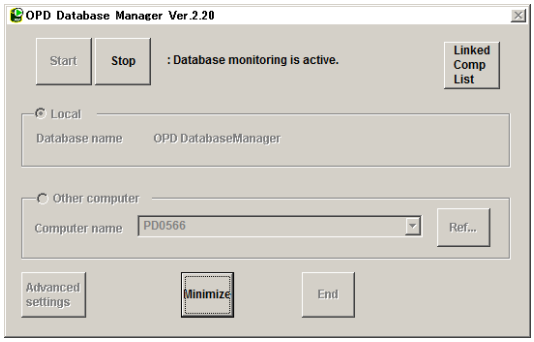
The destination for data backup, import, and export can be changed.

⚠ **CAUTION**

- **After changing the target location in the Backup Data field in the Select Database window, be sure to perform the initial backup with "All" selected.**
- **If any improper storage location is entered in any field among the Index, Data, Backup Index, and Backup Data fields, examination data may be lost.**

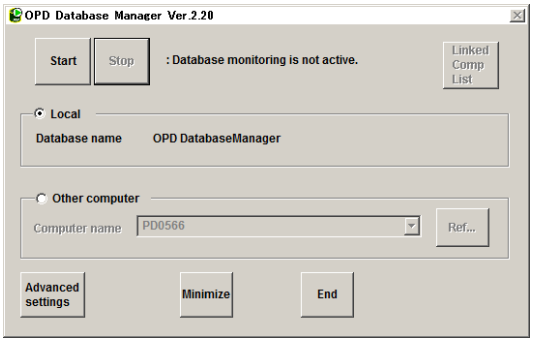
  When changing the initial storage locations, consult NIDEK or your authorized distributor.

1 Press the Database button on the Maintenance screen to display the OPD Database Manager screen.

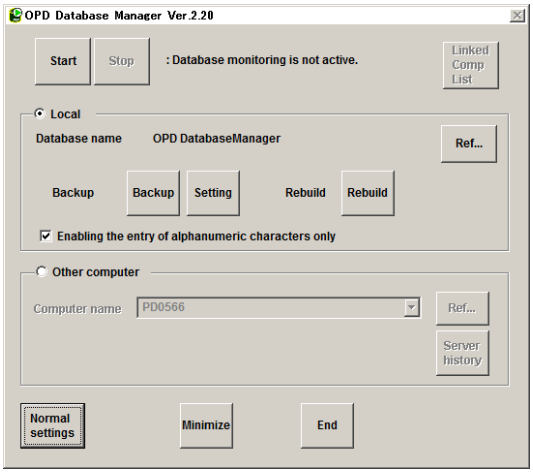


2 Press the Stop button to stop connection to the database.

If other network-connected OPD-Scan IIIs are using the database on the device, stop connection to the database with all the OPD-Scan IIIs in advance. (Press the Stop button on the OPD Database Manager screen with each device.)

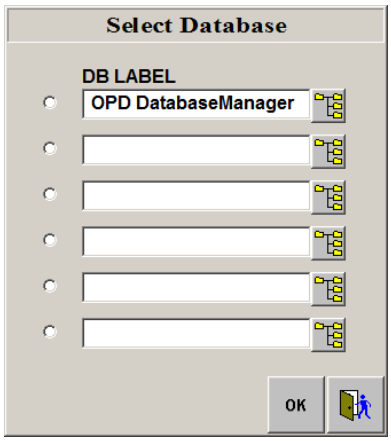


3 Press the Advanced settings button to display the screen in advanced settings mode.



4 Press the Ref... button.

The Select Database window is displayed.



5 The database being selected with the radio button is being used. Press the button to the right of the database field.

The folders in which the database is stored are displayed.

6 Change the desired items.

Select the desired drive or directory. The destination can also be selected from the folders browsing window that appears by pressing the button.

Entry field	Description
Index	Storage location of the database index An external storage device or the internal SSD cannot be specified in this field.

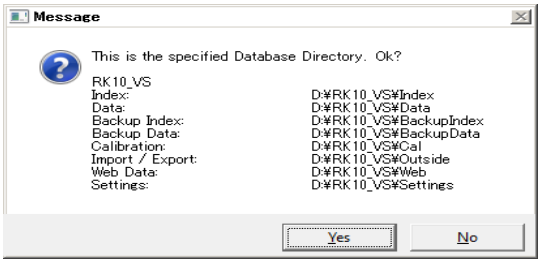
Entry field	Description
Data	Storage location of the examination (analysis) data An external storage device or the internal SSD cannot be specified in this field. The same folder selected for the Backup Data or Import/Export field cannot be selected.
Backup Index	Storage location of a copy of the index file created when the system is shut down. The copy is used when rebuilding the database. An external storage device or the internal SSD cannot be specified in this field.
Backup Data	Database backup destination The same folder selected for the Data or Import/Export field cannot be selected. After changing the backup destination, be sure to perform the initial backup with “All” selected. The internal SSD cannot be specified in this field.
Calibration	Storage location of the calibration and nomogram files The internal SSD cannot be specified in this field.
Import/Export	Data import or export destination The internal SSD cannot be specified in this field.
Web Data	Storage location of reference data in OPD Web Viewer
Settings	Storage location of necessary setting files to be shared with clients

7 Press the OK button.

The Select Database window is displayed.

8 Press the OK button.

The Message dialog box is displayed.



9 Press the Yes button.

10 Press the  button.

The screen returns to the OPD Database Manager screen.

11 Press the Start button to restart connection to the database.

12 Press the Minimize button to minimize the OPD Database Manager screen to the taskbar.

○ Backing up to external storage device

Data can be backed up to an external storage device (such as USB hard disk) connected to the USB connector.

USB external storage device → Connect it to the USB connector.

For the connection method of each external storage device, refer to the manual of the device.

To back up data to an external storage device, specify the target directory in the Backup Data field.

To manage storage media (such as a DVD-RAM), be sure to assign a volume label to each media.

Note

- The USB connector is designed for hot-plugging. As long as data is not being read or written, the external storage device can be removed without a removal procedure.

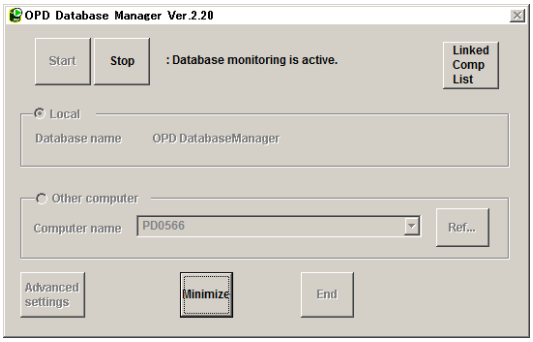
4.9.7 Setting data deletion criteria

The criteria for deletion of data at the time of backup can be specified.

Note

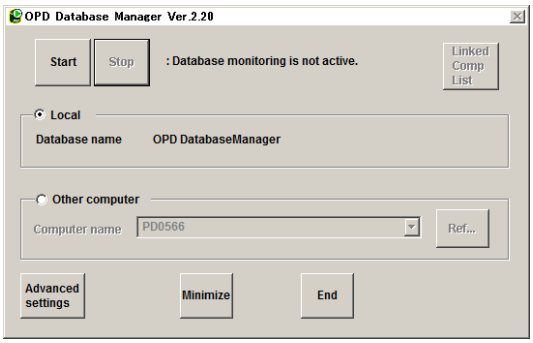
- If the SDD (C drive) in the device is specified as the location to store the database, the database cannot be backed up with the procedure described below.

1 Press the Database button on the Maintenance screen to display the OPD Database Manager screen.

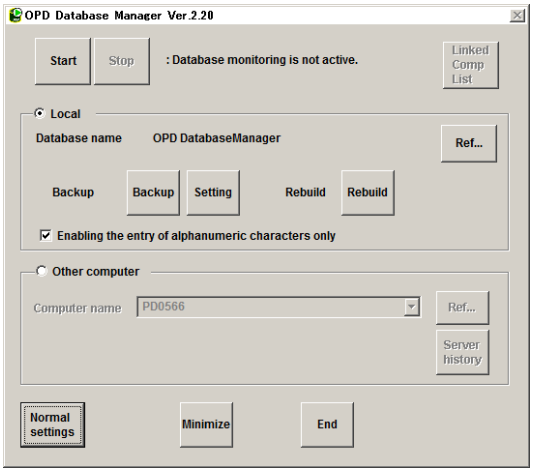


2 Press the Stop button to stop connection to the database.

If other network-connected OPD-Scan IIIs are using the database on the device, stop connection to the database with all the OPD-Scan IIIs in advance. (Press the Stop button on the OPD Database Manager screen with each device.)

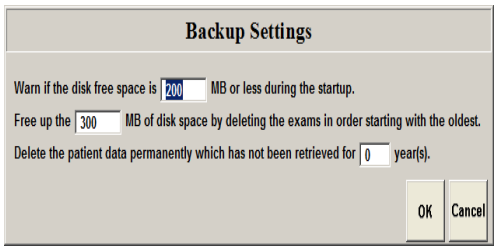


3 Press the Advanced settings button to display the screen in advanced settings mode.



4 Press the Setting button.

The Backup Settings window is displayed.



5 Set the desired data deletion criteria.

Warn if the disk free…	If free space of the internal SDD is less than the capacity specified in this field (unit: MB), the message recommending the operator to free up backup space is displayed at device start-up.
Free up…	This value is the target space to free up for the internal SDD (unit: MB). When backup is executed with “Free up” selected, data is deleted so that the free space specified in this field is created. To use data deleted by this back up method, retrieve the data from an external storage media.
Delete the patient data permanently…	Patients whose data has not been used for the years specified in this field are deleted when backup is performed with “Delete” selected. If this field is “0” (zero), The check box for “Delete” cannot be selected. To select “Delete”, enter the desired value in this field (in increments of 1 year).

6 Press the OK button.

The screen returns to the OPD Database Manager screen.

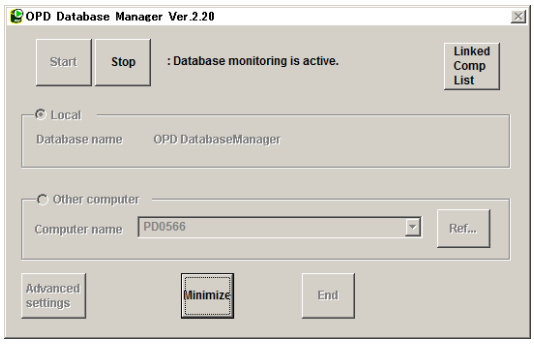
7 Press the Start button to restart connection to the database.

8 Press the Minimize button to minimize the OPD Database Manager screen to the task-bar.

4.9.8 List of connected computers

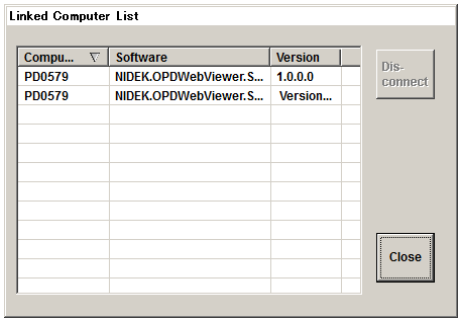
A list of computers being connected to the local database can be viewed.

1 Press the Database button on the Maintenance screen to display the OPD Database Manager screen.



2 Press the Linked Comp List button.

The Linked Computer List screen is displayed.



Note

- Connection with computers can be terminated by selecting the computers to be disconnected and pressing the Disconnect button.

  Be sure to check the status of the computers to be disconnected in advance.

3 Press the Close button.

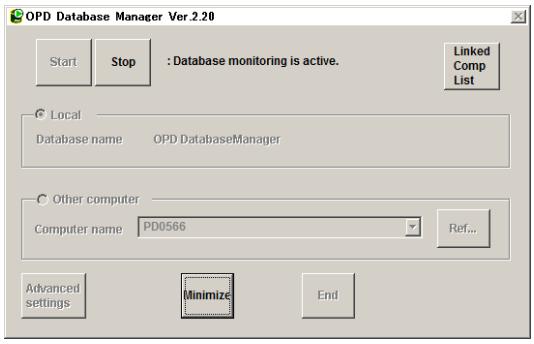
The screen returns to the OPD Database Manager screen.

4 Press the Minimize button to minimize the OPD Database Manager screen to the taskbar.

4.9.9 List of computers that have been connected before

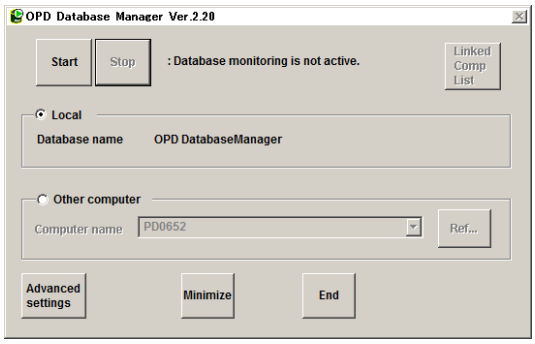
A list of computers that have been connected before can be viewed.

1 Press the Database button on the Maintenance screen to display the OPD Database Manager screen.

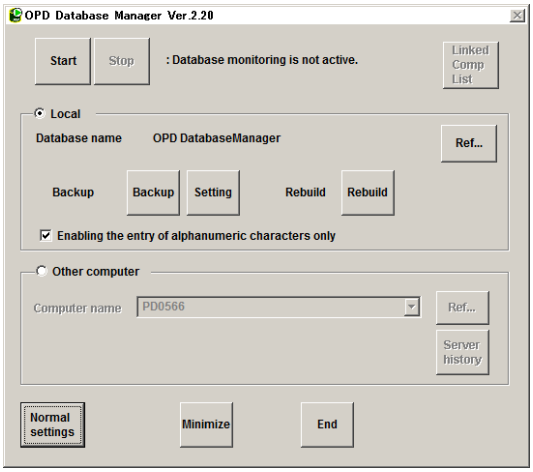


2 Press the Stop button to stop connection to the database.

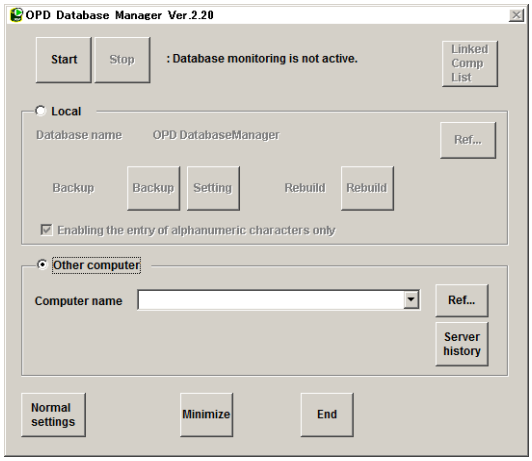
If other network-connected OPD-Scan IIIs are using the database on the device, stop connection to the database with all the OPD-Scan IIIs in advance. (Press the Stop button on the OPD Database Manager screen with each device.)



3 Press the Advanced settings button to display the screen in advanced settings mode.

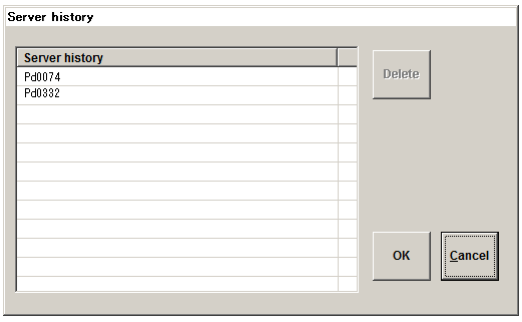


4 Select “Other computer”.



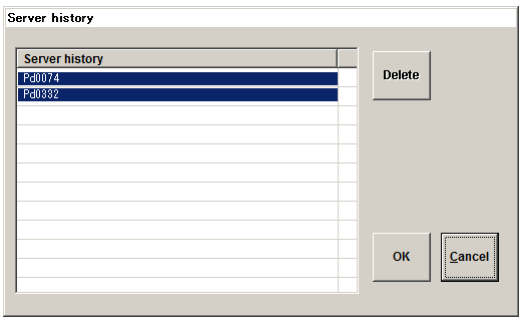
5 Press the Server history button to display the Server history window.

The list of computers that have been connected before can be viewed.



6 If necessary, delete the computers.

Select the name of the computer to be deleted from the list and press the Delete button.



7 Press the OK button.

The screen returns to the OPD Database Manager screen.

If the Cancel button is pressed, the screen returns to the OPD Database Manager screen without deleting any computer.

8 Restore the original setting of “Local” or “Other computer”, then press the Start button to restart connection to the database.

9 Press the Minimize button to minimize the OPD Database Manager screen to the taskbar.

4.10 OPD Web Viewer System Setting

OPD Web Viewer System can be installed on an OPD-Scan III or a computer server with OPD Database Manager installed. The software configuration of OPD Web Viewer System is performed in the management window.

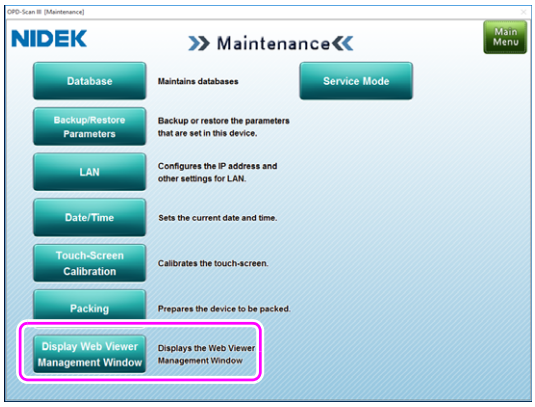
4.10.1 Displaying OPD Web Viewer System management window

Note

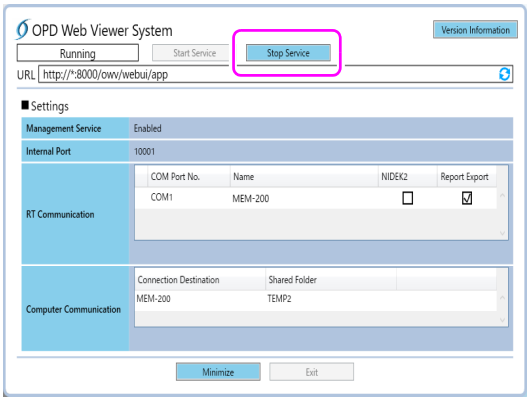
- A hardware keyboard is necessary for entering the connection destination in "RT Communication" or "Computer Communication".

1 To display the management window from the device, press the Display Web Viewer Management Window button on the Maintenance screen.
To display it from a computer server, double click the icon on the taskbar.

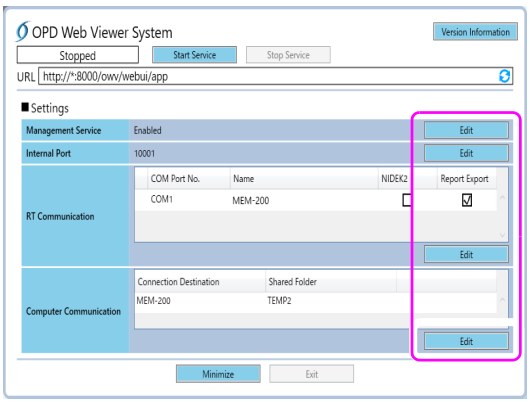
The OPD Web Viewer System management window is displayed.



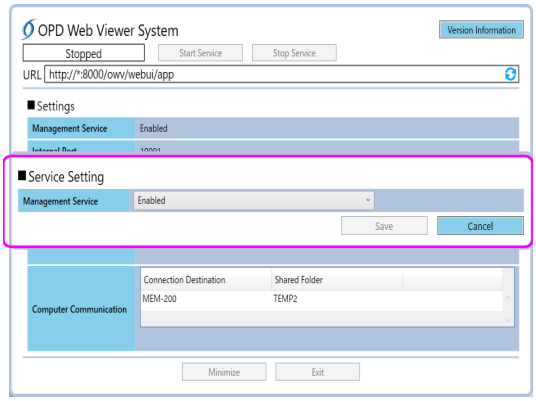
2 Press the Stop Service button to stop the management service.



3 Press the Edit button to display the edit mode window.



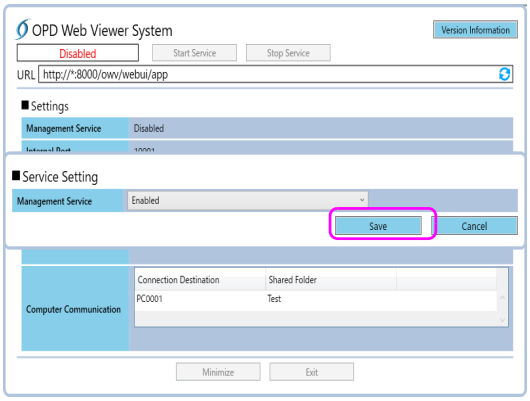
4 Change the set value in the edit mode window.



Note

- If the URL of Web UI is not displayed correctly, press the refresh button ( ). The URL is reloaded.

5 After changing the settings, press the Save button and close the edit mode window.



6 If necessary, change the settings of Management Service, Internal Port, RT Communication, and Computer Communication.

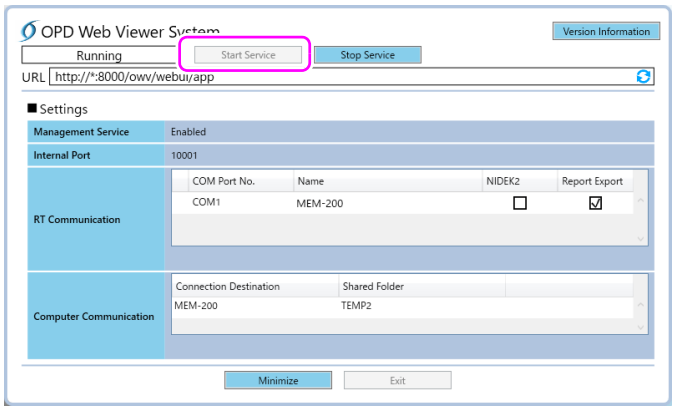
4.10.2 Closing OPD Web Viewer System management window

When the software configuration is complete, resume the management service and minimize the OPD Web Viewer System management window.

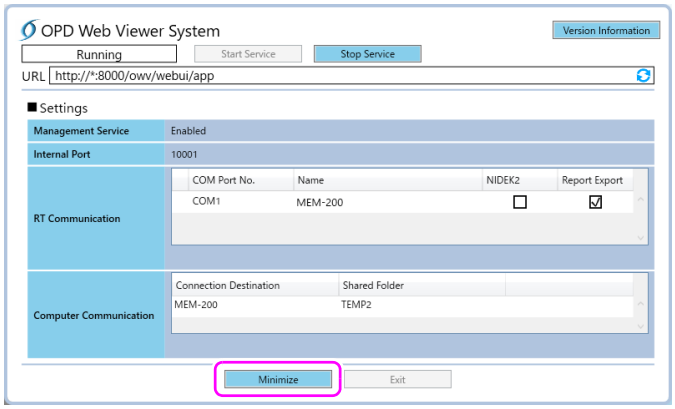
Note

- While the management service of OPD Web Viewer System is running, the OPD Web Viewer System management window cannot be closed.

1 Press the Start Service button to start the management service.

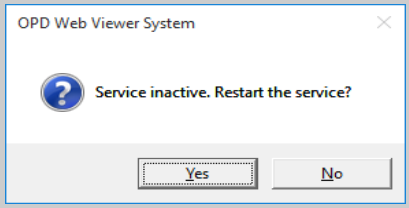


2 After the service status changes to “Running”, press the Minimize button to hide the OPD Web Viewer System management window.



Note

- When the Minimize button is pressed with the service status of “Stopped” displayed, the cautionary message appears.
  Pressing the Yes button reactivates the service.



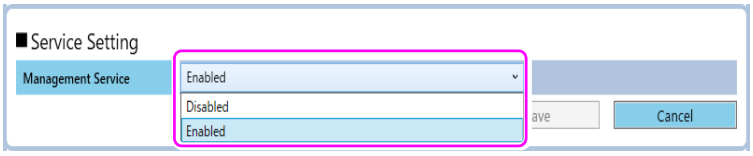
4.10.3 Editing settings in OPD Web Viewer System management window

Change the set value in the edit mode window that is displayed by pressing the Edit button.

Management Service

Used to enable or disable OPD Web Viewer System by selecting it from the drop-down list.

Default: Enabled



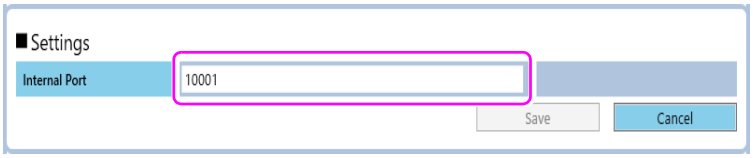
In devices or computers with OPD Web Viewer System installed, disable the system if it is unnecessary.

Internal Port

Sets the port number used for the OPD Web Viewer System internal communication.

Enter the port number in the range from 0 to 65535 in the Internal Port field using the hardware keyboard. Be sure to enter the port number that is not being used by any other system.

Default: 10001



Note

- When an error icon ( ) is displayed, hovering the cursor over the icon displays the error message.

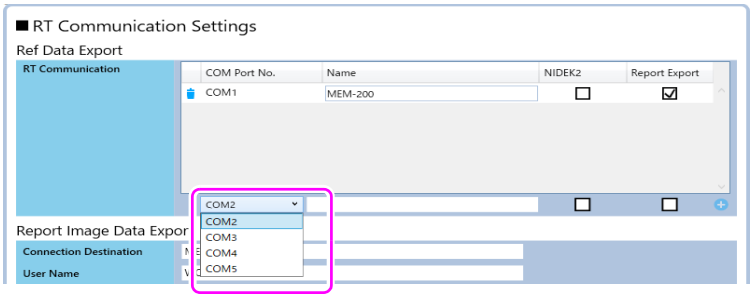
RT communication (Ref value output)

Sets the COM port used for RT communication.

COM Port No.	Used to select the COM port to be used. The COM ports available for use are displayed on the drop-down list.
Name	Used to enter the name for identifying the RT to be connected to the COM port. Name the RT as desired. When connecting two or more RTs, select the RT to be used for transferring data by its name.
NIDEK2	Sets whether to use NIDEK2 protocol. When the check box is selected: NIDEK2 protocol is in use. This setting option is recommended for wireless communication. When the check box is not selected: NIDEK2 protocol is not in use. This setting option is recommended for wire communication.
Report Export	Sets whether to export the report image data as default. The export of the report can be canceled while it is in progress.

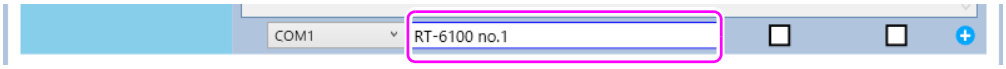
Adding COM port

1) Select the desired COM port from the drop-down list.

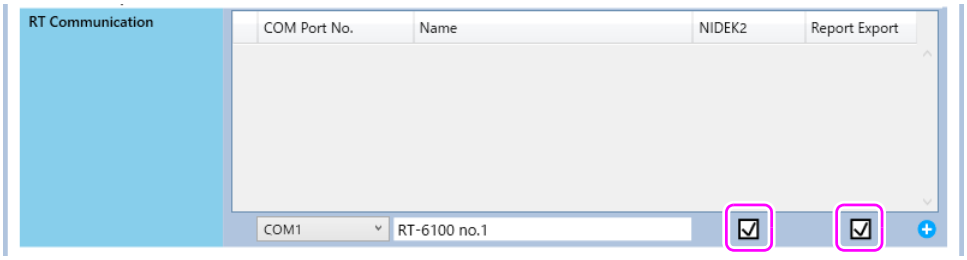


If the COM port to be added is not detected, the entry field is grayed out.

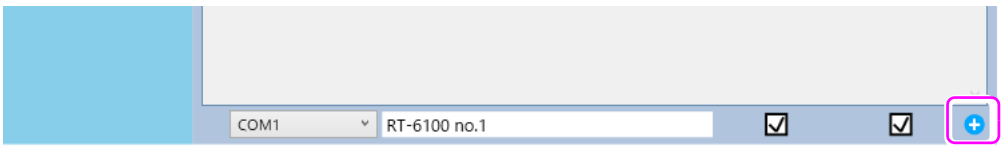
2) Enter the name of the RT using the hardware keyboard.



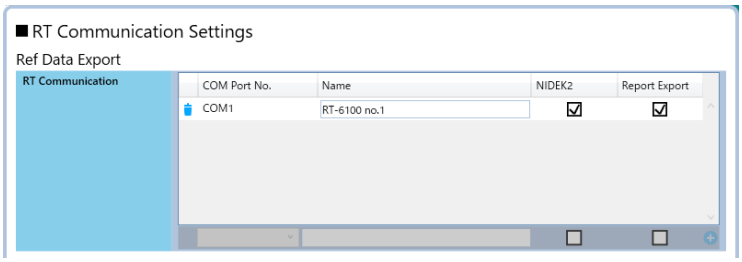
3) Select the check box to use “NIDEK 2” protocol or set “Report Export”.



4) Press the adding button ( ) to add the port to the RT Communication list.



The port is added to the list.

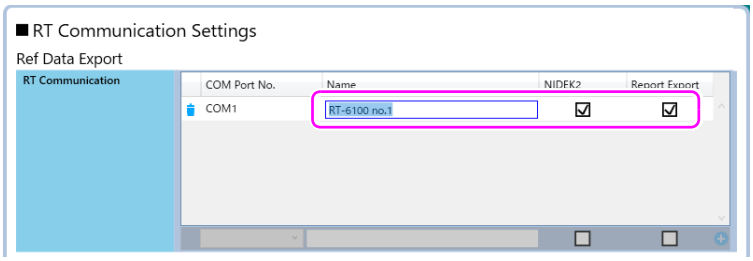


Note

- When an error icon ( ) is displayed, hovering the cursor over the icon displays the error message.

Editing COM port

To edit any COM port that has been added to the RT Communication list, edit it directly from the list.



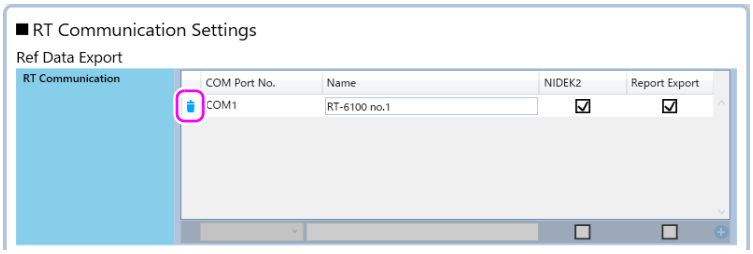
A COM port cannot be edited. To change a COM port on the list, delete the COM port to be changed, then add the desired one to the list.

Note

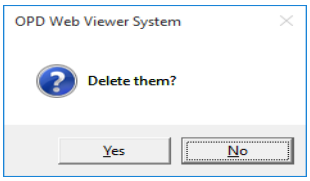
- The RT name fields cannot be left blank. Enter a name that has not been used.

Deleting COM port

1) Press the delete button ( ) next to the COM port selected to be deleted from the RT Communication list.



2) The confirmation message is displayed. Confirm the list, then press the Yes button.



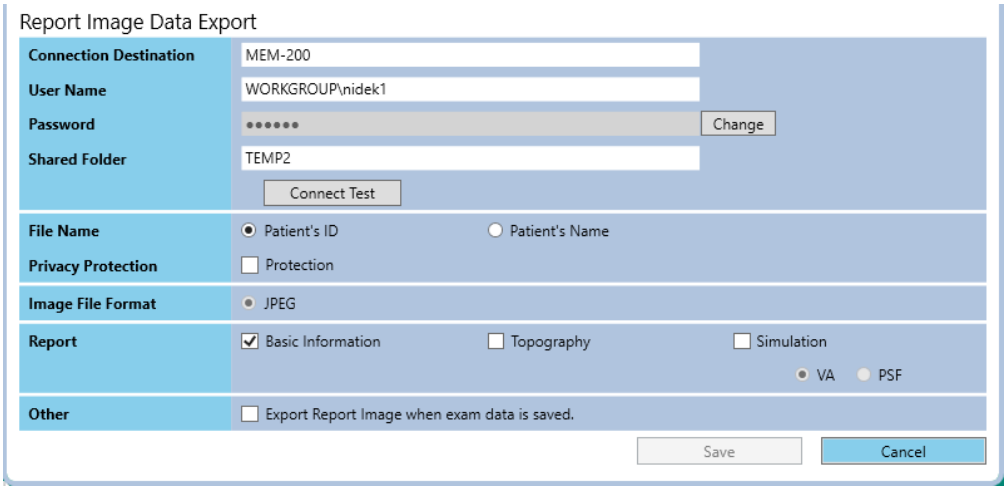
The selected COM port is deleted from the RT Communication list.

RT Communication Settings (Report Image Data Export)

Set the export destination, file name, or such to display the report image in the RT-6100.

Connection Destination	Used to enter the computer name that identifies the connection destination. Default: MEM-200
User Name	Used to enter the user name of the computer where the shared folder is stored. Default: WORKGROUP\nidek1

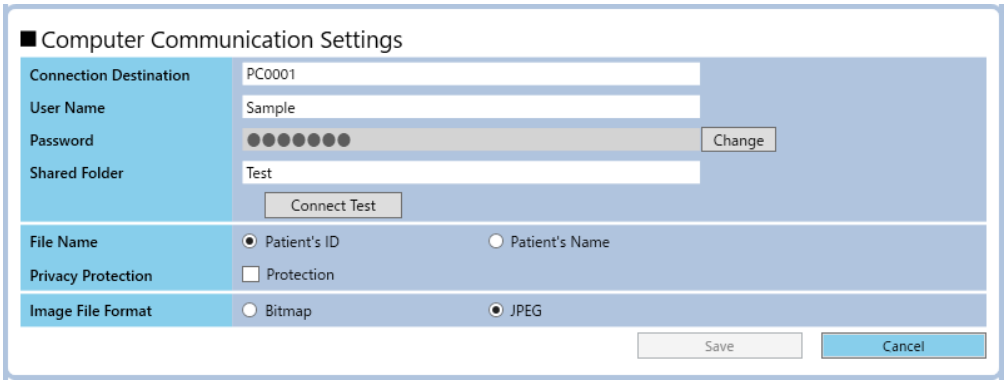
Password	Used to enter the login password for the user name of the computer where the shared folder is stored. The password is hidden behind the bullets. Default: nidek1
Display button (Change button)	During initial password setting, the Display button is displayed. Pressing the button reveals the password that is hidden behind the bullets. Pressing the Save button closes the edit window and displays the Change button to be used for changing the password. Pressing the Change button clears the Password field and returns the display on the button to “Display”. As with the initial password setting, enter the password.
Shared Folder	Used to enter the shared folder name. Default: TEMP2
Connect Test button	After setting the connection, perform the connection test. The test result is displayed next to the button. 
File Name	Selects whether to use a patient’s ID or patient name for the character string that identifies the patient in the file. Default: Patient’s ID
Privacy Protection	Select the check box to encrypt and protect personal information. The check box is not selected by default.
Image File Format	Displays the file format (JPEG) of report image.
Report	Selects the report to be exported. For Simulation Report, select the report contents between VA map and PSF map. Default: The check box for Basic Information is selected. The check box for Topography is not selected. The check box for Simulation is not selected. VA is selected.
Other	When saving the examination data after the measurement, select this check box to export a report image to the shared folder. The check box is not selected by default. Note: When the check box is selected, the notification that indicates the export of report image has been completed is not displayed.



Computer Communication Settings

Set the export destination, file name, or such to export the enlarged map as the image to the computer.

Connection Destination	Used to enter the computer name that identifies the connection destination.
User Name	Used to enter the user name of the computer where the shared folder is stored.
Password	Used to enter the login password for the user name of the computer where the shared folder is stored. The password is hidden behind the bullets.
Display button (Change button)	During initial password setting, the Display button is displayed. Pressing the button reveals the password that is hidden behind the bullets. Pressing the Save button closes the edit window and displays the Change button to be used for changing the password. Pressing the Change button clears the Password field and returns the display on the button to “Display”. As with the initial password setting, enter the password.
Shared Folder	Used to enter the shared folder name.
Connect Test button	After setting the connection, perform the connection test. The test result is displayed next to the button. 
File Name	Selects whether to use a patient’s ID or patient name for the character string that identifies the patient in the file. Default: Patient’s ID
Privacy Protection	Select the check box to encrypt and protect personal information. The check box is not selected by default.
Image File Format	Selects the file format (Bitmap/JPEG) of enlarged map image. Default: JPEG



4.11 Cleaning

When the cover or panel of the device becomes dirty, clean it with a soft, dry cloth. For persistent stains, soak the cloth in a neutral detergent, wiring well, and wipe. Finally dry with a soft, dry cloth.

⚠ **CAUTION**

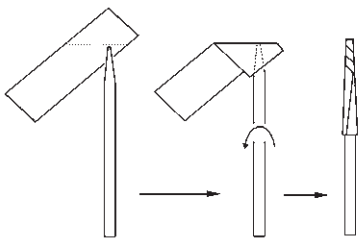
- **Never use an organic solvent such as paint thinner.**
  This could damage the surface of the device.
- **Lightly wipe the exterior of the LCD. Do not press the LCD using an object with a hard tip and keep magnetic objects away from the LCD.**
  It may damage the surface of the LCD. Device malfunction may also result.
- **Never use a sponge or cloth soaked in water.**
  Water may leak into the interior of the device resulting in malfunction.

4.11.1 Cleaning the measuring window

When the measuring window gets fingerprints or dust on it, the reliability of the measured value is impaired substantially. Check for smudge on the measuring window before use, and then clean it if it is soiled.
The measuring window lens does not usually get soiled through normal use because it is recessed.

1 Blow the dust off the measuring window with a blower.

2 Wrap lens cleaning paper around a thin stick (or use a cotton swab), moisten it with alcohol, and wipe the lens of the measuring window.



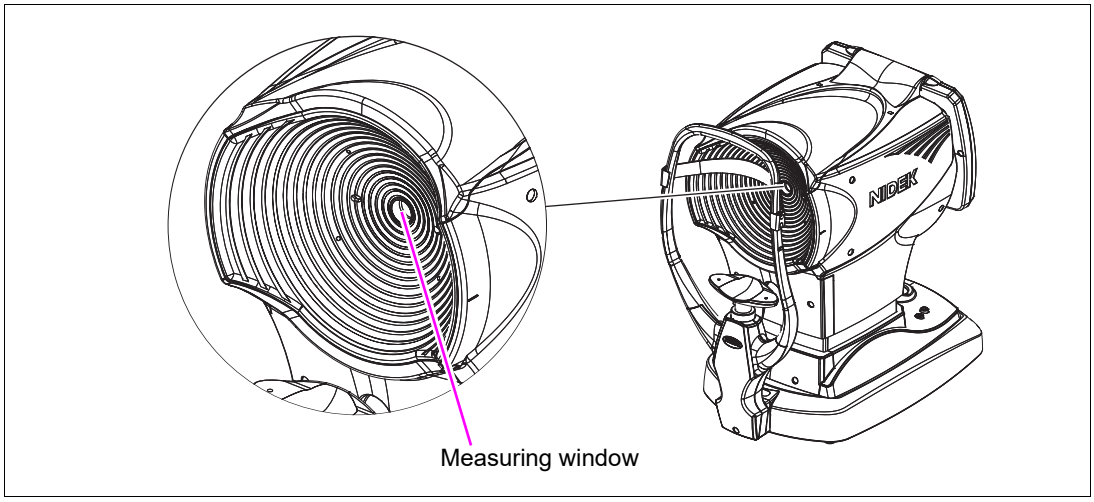
Wrap cleaning paper around the tip.

Note

- Do not use a stick made of metal or other hard material which may damage glass.
- Gently wipe the lens of the measuring window circularly from the center to periphery.

3 Check if the window is clean using a penlight. If it is not, clean it again with new cleaning paper.

Shine a penlight and view from different angles to check the window cleanliness.



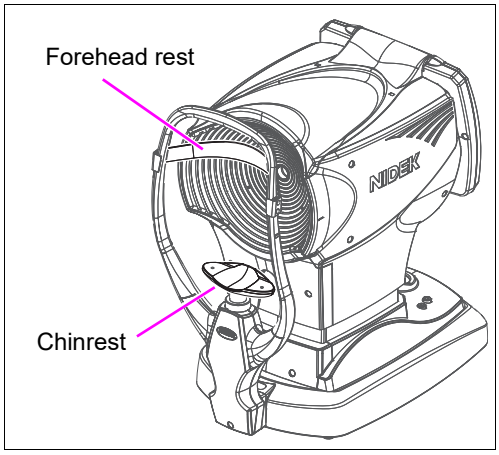
4.11.2 Cleaning the forehead rest and chinrest

Before measurement, clean the area that comes into contact with the patient (chinrest and forehead rest).

Gently wipe the surface of the device with clean gauze or absorbent cotton dampened with rubbing alcohol.

If a stack of chinrest paper is on the chinrest, remove one sheet.

If residue is found or dirt cannot be removed, repeatedly wipe the surface with new gauze or absorbent cotton.



4.11.3 Cleaning the printer

After repeated usage, the paper slot of the auto cutter of the printer may become soiled with powdery paper residue. If the residue settles, malfunction of the auto cutter may result. Check the auto cutter before using the device. Clean it if it is soiled.

1 Open the printer cover and remove the printer paper roll.

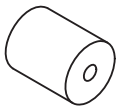
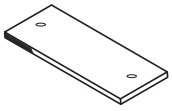
See “4.3 Printer Paper Replacement” (page 147).

2 Apply the nozzle of a vacuum cleaner to the auto cutter to remove paper residue.

Never blow off paper residue with a blower. If residue settles on the internal working structure, malfunction may result.

3 Load the printer paper as before.

4.12 Consumable List

Part name	Part number	Note
Printer paper	80620-00001	Width 58 mm, Length 25 m 
Chinrest paper	32903-M047	1 pack 

* After replacing consumables, restock them.

5. SPECIFICATIONS AND ACCESSORIES

5.1 Classifications

Protection against electrical shock: Class I ME equipment, Type B applied part

Protection against harmful ingress of water or particulate matter: IPX0

Method(s) of sterilization: If necessary, clean the forehead rest and chinrest of the OPD-Scan III with a clean cloth dampened with rubbing alcohol.

Suitability for use in an oxygen rich environment: ME system that is not intended for use in an oxygen rich environment.

Mode of operation: Continuous operation

5.2 Specifications

○ Objective refractive error measurement (AR measurement)

- Spherical refractive error (S)
  Measurement range: -20.00 to +22.00 D (VD = 12 mm)
  Indication increments: 0.01/0.12/0.25 D increments
- Cylindrical refractive error (C)
  Measurement range: 0 to ±12.00 D
  Indication increments: 0.01/0.12/0.25 D increments
- Cylinder axis (A)
  Measurement range: 0 to 180°
  Indication increments: 1°/ 5° increments
- Vertex distance
  0/10.5/12/13.75/15/16.5 mm
- Minimum measurable pupil diameter
  2.6 mm in diameter
- Measurable range on the eye
  2.0 to 9.5 mm in diameter
- Relaxation of accommodating eye
  Auto fogging system
- Chart
  Scenery chart
- Accuracy
  The accuracy specifications are based on the results of eye model testing performed in accordance with ISO 10342, Ophthalmic Instruments - Eye Refractometers.

Criterion	Measurement range	Test device[a]	Tolerance
Spherical vertex power	-15 to +15 D (Maximum meridional vertex power)	0 D, ±5 D, ±10 D	±0.25 D
		±15 D	±0.50 D
Cylindrical vertex power	0 to 6 D	Sph: approx. 0 D Cyl: -3 D Axis: 0°, 90°	±0.25 D
Cylinder axis[b] for cylinder power	0 to 180°		±5°

a The refractive error of the test device shall not differ by more than 1.0 D from the nominal value above.
b Cylinder axis shall be indicated as specified in ISO 8429.

○ Corneal curvature radius measurement (KM measurement)

- Corneal curvature radius (R1, R2, AVG)
  Measurement range: 5.00 to 10.00 mm
  Indication increments: 0.01 mm increments
- Corneal refractive power (R1, R2, AVG)
  Measurement range: 33.75 to 67.50 D (n = 1.3375)
  Indication increments: 0.01/0.12/0.25 D increments
- Corneal cylindrical power (C)
  Measurement range: 0 to ±12.00 D
  Indication increments: 0.01/ 0.12/0.25 D increments
- Cylinder axis (A)
  Measurement range: 0 to 180°
  Indication increments: 1°/ 5° increments
- KM measurable area
  3.3 mm in diameter (when the corneal curvature radius is 7.7 mm)

The measuring range is in accordance with Code A, ISO 10343 and the measuring accuracy in accordance with Code 2, ISO 10343.

○ Corneal shape measurement (CT measurement)

- Corneal refractive power
  Measurement range: 33.75 to 67.50 D (n = 1.3375)
  * Indication range: 10 to 100 D (n = 1.3375)
  Indication increments: 0.01 D increments
- Corneal diameter to be measured
  Maximum diameter of 11 mm (Corneal curvature radius, r = 7.9 mm)
  Minimum diameter of 0.5 mm (Corneal curvature radius, r = 7.9 mm)
- Number of placido rings (edges)
  33 edges (16 rings × 2 and center circle) or more
- Measurement point
  11,880 (33 × 360) points or more
- Accuracy
  The accuracy specifications are based on the results of eye model testing performed in accordance with ISO 19980.

Corneal curvature radius	Corneal refractive power	Measurement range	Tolerance/ mean deviation	Tolerance/ standard deviation
5.00 mm	67.50 D	Diameter ≤ 6 mm	±0.25 D	0.30 D
6.50 mm	51.92 D	Diameter ≤ 6 mm Diameter ≤ 3 mm 3 mm < Diameter ≤ 6 mm Diameter > 6 mm	±0.16 D	0.25 D
8.00 mm	42.19 D	Diameter ≤ 6 mm Diameter ≤ 3 mm 3 mm < Diameter ≤ 6 mm Diameter > 6 mm	±0.11 D	0.13 D
9.40 mm	35.90 D	Diameter ≤ 6 mm Diameter ≤ 3 mm 3 mm < Diameter ≤ 6 mm Diameter > 6 mm	±0.10 D	0.14 D
10.00 mm	33.75 D	Diameter ≤ 6 mm Diameter ≤ 3 mm 3 mm < Diameter ≤ 6 mm Diameter > 6 mm	±0.09 D	0.15 D

○ Other measurements

- Pupillary distance measurement (PD measurement)
  Measurement range: 30 to 85 mm
  Indication increments: 1 mm increments
- Corneal diameter measurement (WTW measurement)
  Measurement range: 13.0 mm or less
  Indication increments: 0.02 mm increments
- Pupil diameter measurement (PS measurement)
  Measurement range: 1.0 to 10.0 mm
  Indication increments: 0.02 mm increments

○ Working range of auto tracking

- Up and down
  32 mm or more
- Right and left
  ±5 mm
- Forward and backward
  ±2 mm

○ Movable range

- Measuring unit
  Forward and backward: 33 mm
  Right and left: 85 mm
- Motorized chin rest
  Up and down: 62 mm or more

○ Other functions

- Display
  10.4-inch color LCD (XGA)
- Printer
  Thermal line printer with auto cutter
- Storage
  Solid State Drive (Built into the main body)
- Interface connectors
  RS-232C (Output)
  USB (USB 2.0)
  LAN (Ethernet)

○ Power supply

- Voltage AC 100 to 240 V ±10%
- Frequency 50/60 Hz
- Power consumption 110 VA

○ Dimensions and mass

- Dimensions 284 (W) × 525 (D) × 533 (H) mm
- Mass 23 kg

○ Environmental conditions (during use)

- Temperature 10 to 35ºC (50 to 95ºF)
- Humidity 30 to 90%
- Atmospheric pressure 800 to 1,060 hPa
- Others Indoor, no harmful dust or smoke

○ Environmental conditions (during transport and storage, packed condition)

- Temperature -10 to 55ºC (14 to 131ºF)
- Humidity 10 to 95%
- Atmospheric pressure 700 to 1,060 hPa

○ Others

- Expected service life (defined by manufacturer)
  8 years from the date of initial operation
  * Proper maintenance is necessary.
- Packing unit 1 unit

5.3 Standard Configuration

5.3.1 Standard accessories

• Printer paper	3 rolls
• Power cord	1 unit
• Dust cover	1 unit
• Chinrest paper	1 pack
• Fixing pins for chinrest paper	2 unit
• Spherical model eye	1 unit
• Operator’s manual	1 volume
• Touch pen	1 unit
• Touch pen stand	1 unit
• Ferrite core	1 unit
• Installation CD for OPD Web Viewer System	1 unit
• Installation manual for OPD Web Viewer System	1 volume

5.3.2 Optional accessories

- Interface cable
- Eye Care card system
- Barcode reader (USB)
- Magnetic card reader (USB)

6. APPENDIX

6.1 Glossary

●AR typical value

The typical value of the first 3 usable values taken during AR-measured values and put in order in a computer.

●AR values

One of the measured values (SPH, CYL, AXIS) obtained during OPD measurement which is equal to values obtained by an auto refractometer. These values represent the refractive status of an approximate center of the eye.

●Auto shot

A function with which the device automatically starts a serial measurement as soon as the optimum alignment and focus conditions are achieved.

●Auto tracking

A function with which the device automatically controls the up, down, right, and left movements and focusing of the measuring unit.

●Chart

The picture of a balloon that can be seen by looking into the measuring window.

●Contact lens conversion value

The value that the AR typical value (or the latest value when the typical value has not been obtained) are converted into CL values, letting the vertex distance (VD) be 0mm.

●CT measurement

The projected placido rings on the cornea are captured. The captured image is analyzed to obtain a map which shows the corneal curvature radius and distribution of refractive powers.

●Limit indicator

When the main body moves beyond the working range of auto tracking, the limit indicator (arrows) is displayed on the screen.

●OPD measurement

Fundus is scanned with slit-shaped ray bundles and measured in increments of 1º in the 2 to 9.5 mm-diameter area to obtain the AR values and OPD maps.

●PD

Abbreviation of “Pupil Distance” which is the width between the right and left pupils.

●Power saving mode

If there is no operation for more than a set number of minutes of latent operation, a dimmed title screen is automatically displayed, which is the power-saving status of the device. Touch the touch screen or press any key on the keyboard to exit the power saving mode and return to normal mode.

●PSF

Abbreviation of “Point Spread Function”. This function simulates what kind of image is formed on the retina when the patient looks at a point source light like a star.

●Trial Lens Data

The value that automatically converts the CYL value based on the AR typical value (or the latest value if there is no typical value) so that the trial lens sphere value becomes smaller.

●Vertex Distance

The distance between a corneal vertex to the inner surface of a spectacle lens.

●Web UI

Abbreviation of “Web User Interface” which is used to display the measurement results using a browser. Web UI of OPD Web Viewer System displays the Patient List screen and report screens.

6.2 List of Abbreviations

The following abbreviations are used in the device and operator's manual.

General

OPD	Optical Path Difference
CT	Corneal Topography
DNS	Domain Name System
PSF	Point Spread Function
RMS	Root Mean Squared fit error
MTF	Modulation Transfer Function
SimK S	Simulated keratometry Steep
SimK F	Simulated keratometry Flat
HO	High Order
EMR	Electronic Medical Record
Web UI	Web User Interface

Color scale

Norm	Relative scale in color scale display (Normalize)
Adj	Adjustable scale in color scale display (Adjustable)
Abs26	26-color fixed color scale (Absolute [26])
Indv	Scale applied to each map data (Individual)
Com	Scale applied to each map type (Common)
S-K 1.5	Smolek Klyce scale in 1.5 D increments (Smolek-Klyce [1.5D])

6.3 EMC (ELECTROMAGNETIC COMPATIBILITY)

The device is suitable for use in stores and hospitals except for near active HF surgical equipment and RF shielded rooms with an ME system for magnetic resonance imaging, where the intensity of electromagnetic disturbances is high, electrophysiology laboratories, or areas where short-wave therapy equipment is used.

⚠ WARNING

- **Do not use the device near, on, or under other electronic equipment or electromagnetic disturbance sources. Otherwise, it could result in improper operation. If such use is necessary, the device and the other equipment should be observed to verify that they are operating normally.**
- **Use of accessories, cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and cause improper operation.**
- **Portable RF communications equipment (including peripherals such as antenna cables and external antennas) or electromagnetic disturbance sources as shown below should be used no closer than 30 cm (12 inches) to any part of the device, including the specified or provided cables. Otherwise, degradation of the performance of this equipment could result.**

  The following are examples of electromagnetic disturbance sources:
  - Induction cooking appliance and ovens
  - RFID readers
  - Electronic article surveillance (EAS) systems
  - Sponge detection systems
  - Equipment used for position detection (e.g. in catheter labs)
  - Wireless power transfer charging systems for electrical vehicles

O Specified cable

Part name	Cable shielded	Ferrite core	Length (m)
Power cord	No	No	2.5

O Essential performance

Refractive error measurement function

Corneal topography function

◆ Compliance for Emission Standard

Phenomenon	Product family standard	Compliance
Conducted and radiated RF emissions	CISPR 11	Group 1 Class B
Harmonic distortion	IEC 61000-3-2	*1
Voltage fluctuations and flicker	IEC 61000-3-3	*2

* 1 For the regions where the rated voltage is 220 V to 240 V, this device complies with this standard.
* 2 For the regions where the rated voltage (line to neutral) is 220 V to 250 V, this device complies with this standard.

◆ Test specifications for enclosure port immunity to RF wireless communications equipment

Test frequency (MHz)	Band (MHz)	Service	Modulation	Immunity test level (V/m)
385	380 to 390	TETRA 400	Pulse modulation 18 Hz	27
450	430 to 470	GMRS 460, FRS 460	FM ±5 kHz deviation 1 kHz sine	28
710	704 to 787	LTE Band 13, 17	Pulse modulation 217 Hz	9
745				
780				
810	800 to 960	GSM 800/900, TETRA 800, iDEN 820, CDMA 850, LTE Band 5	Pulse modulation 18 Hz	28
870				
930				
1720	1700 to 1990	GSM 1800; CDMA 1900; GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS	Pulse modulation 217 Hz	28
1845				
1970				
2450	2400 to 2570	Bluetooth WLAN 802.11 b/g/n RFID 2450 LTE Band 7	Pulse modulation 217 Hz	28
5240	5100 to 5800	WLAN 802.11 a/n	Pulse modulation 217 Hz	9
5500				
5785				

◆ Compliance for Immunity Standard

Phenomenon	Basic EMC standard	Immunity test levels
Electrostatic discharge	IEC 61000-4-2	±8 kV contact ±2 kV, ±4 kV, ±8 kV, ±15 kV air
Radiated RF electromagnetic field	IEC 61000-4-3	10 V/m 80 MHz - 2.7 GHz 80% AM at 1 kHz
Proximity fields from RF wireless communications equipment	IEC 61000-4-3	See “Test specifications for enclosure port immunity to RF wireless communications equipment”.
Electrical fast transients / bursts	IEC 61000-4-4	Input power port ±2 kV 100 kHz repetition frequency
		Signal input/output parts port ±1 kV 100 kHz repetition frequency
Surges Line-to-line	IEC 61000-4-5	Input power port ±0.5 kV, ±1 kV
Surges Line-to-ground		Input power port ±0.5 kV, ±1 kV, ±2 kV Signal input/output parts port ±2 kV
Conducted disturbances induced by RF fields	IEC 61000-4-6	3 V 0.15 MHz – 80 MHz 6 V in ISM and amateur radio bands between 0.15 MHz and 80 MHz 80% AM at 1 kHz
Rated power frequency magnetic fields	IEC 61000-4-8	30 A/m 50 Hz or 60 Hz
Voltage dips	IEC 61000-4-11	0% U_T; 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270°, and 315°
		0% U_T; 1 cycle and 70% U_T; 25/30 cycles Single phase: at 0°
Voltage interruptions	IEC 61000-4-11	0% U_T; 250/300 cycles