

**USER MANUAL
NON-MYDRIATIC RETINAL CAMERA**

TRC-NW400

INTRODUCTION

Thank you for purchasing the TOPCON TRC-NW400 NON-MYDRIATIC RETINAL CAMERA.

INTENDED USE / INDICATIONS FOR USE

The TRC-NW400 intended for use in capturing images of the retina and the anterior segment of the eye and presenting the data to the eye care professional, without the use of a mydriatic.

FEATURES

This instrument is a special photographic device used to observe, photograph and record the image of the fundus and anterior segment and present an electronic image for diagnosis.

The built-in digital camera will take a picture of the fundus and anterior segment.

After photographing, the images of the fundus and anterior segment can be recorded on the following device:

- The commercial personal computer connected to this instrument.

The observed/photographed images are displayed on the built-in control panel with touch panel.

PURPOSE OF THIS MANUAL

This manual outlines the TRC-NW400 NON-MYDRIATIC RETINAL CAMERA, including operating procedures, troubleshooting, maintenance and cleaning.

Before using the instrument, carefully read the "GENERAL SAFETY INFORMATION" to familiarize yourself with the features of the TOPCON TRC-NW400 NON-MYDRIATIC RETINAL CAMERA and to ensure that you operate it efficiently and safely.

Always keep this Instruction Manual at hand.

CAUTION : Federal law restricts this device to the sale by or on the order of a physician.



- This User Manual is made on an assumption that the user already has knowledge of the personal computer (PC) and Microsoft Windows operating systems. This User Manual does not describe details on how to handle common operation procedures of the PC and Microsoft Windows operating systems.
- For handling a computer and operating Microsoft Windows, refer to the user manual attached to each of them.
- If you have made a mistake in handling a computer or operating Microsoft Windows and this software, the files contained by the computer and Microsoft Windows or this software may be destroyed.

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1. No part of this manual may be copied or reprinted, in whole or in part, without prior written permission.
 2. The contents of this manual are subject to change without prior notice and without legal obligation.
 3. The contents of this manual are correct to the best of our knowledge. Please inform us of any ambiguous or erroneous descriptions, missing information, etc.
 4. Original Instructions
This instruction manual was originally written in English.
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GENERAL SAFETY INFORMATION



CONTRAINDICATIONS

This instrument must not be used for the following patients:

- Patients who are hypersensitive to light.
- Patients who recently underwent photodynamic therapy (PDT).
- Patients taking medication that causes photosensitivity.



WARNINGS

Ensuring the Safety of Patients and Operators

Be careful not to hit the patient's eyes or nose with the instrument during operation.
The patient may be injured.

Handling the cord on this product or cords associated with accessories sold with this product, will expose you to lead, a chemical known to the State of California to cause birth defects or other reproductive harm.

Wash hands after handling.

CAUTIONS

Important Cautions

Use this instrument carefully on the following patients.

- Patients who have epidemic keratitis, conjunctivitis or any other infectious disease.
- Patients who are taking medications that cause light hypersensitivity.

This instrument is a photography device to observe, photograph/record the eyeballs and their adnexa and give the electronic image information for diagnosis. Doctors must be responsible for diagnoses.

Basic Cautions

When operating the chinrest up/down button, be careful not to pinch the patient's hand to avoid possible injury.

To avoid electric shock, do not open the instrument.
Request service from an authorized Topcon distributor.

Preventing Electric Shock and Burn

To avoid fire and electric shock, install the instrument in a place free of water and other liquids.

To avoid fire and electric shock, do not put cups or vessels containing liquids near the instrument.

To avoid electric shock, do not insert metal objects into any vents and/or slots.

To avoid fire in the event of an instrument malfunction, immediately turn OFF (○) the Power switch and unplug the cable if you see smoke coming from the instrument or if you detect other problems. Don't install the instrument where it is difficult to unplug the cable from the instrument body. Ask your dealer for repairs.

Do not put any substance over the vent on the top surface of the main unit. If the vent is covered, the temperature of the power supply unit may rise abnormally and cause a malfunction. To prevent the instrument from malfunctioning, do not drop any liquid into the vent.

Electromagnetic Compatibility (EMC)

This instrument has been tested (with 100V/120V/230V) and found to comply with IEC60601-1-2:2007.

This instrument radiates radio frequency energy within standard and may affect other devices in the vicinity.

If you have discovered that turning on/off the instrument affects other devices, we recommend you change its position, keep a proper distance from other devices, or plug it into a different outlet.

Please consult the dealer from whom you purchased the instrument if you have any additional questions.

HOW TO USE THIS MANUAL

- Read the instructions on pages 1 to 9 before using the machine.
- Regarding connection to various devices, see "CONNECTING THE EXTERNAL I/O TERMINALS" on page 33.
- If you would like an overview of the system, begin by reading "BASIC OPERATIONS" (page 37).

GENERAL MAINTENANCE INFORMATION

USER MAINTENANCE

To ensure the safety and performance of the instrument, all maintenance work should be conducted by trained service engineers.

The following maintenance task may be done by the user.

For details, see the relevant part of this manual.

Cleaning the objective lens:

The objective lens may be cleaned by the user. For details, see "Cleaning the objective lens" on page 95.

DISCLAIMERS





- TOPCON shall not take any responsibility for damage due to fire, earthquakes, actions by third persons and other accidents, or damage due to negligence and misuse by the user and any use under unusual conditions.
- TOPCON shall not take any responsibility for damage derived from inability to properly use this instrument, such as loss of business profit and suspension of business.
- TOPCON shall not take any responsibility for damage caused from using this instrument in a manner other than that described in this Instruction Manual.
- Diagnoses made shall be the responsibility of pertaining doctors and TOPCON shall not take any responsibility for the results of such diagnoses.
- The customer shall take the responsibility to save data and perform backup in case data should be lost.

When the customer has obtained data through this software and has saved or backed up the data in a server or personal computer, TOPCON shall not take any responsibility for the loss of the data, loss of profit or other damages on the customer.












DISPLAYS AND SYMBOLS FOR SAFE USE

To encourage safe and proper use and to prevent injury to the operator and others or potential damage to property, important messages are put on the instrument body and inserted in the instruction manual. We suggest that everyone understand the meaning of the following displays, icons and text before reading the "GENERAL SAFETY INFORMATION" and observe all listed instructions.

DISPLAYS

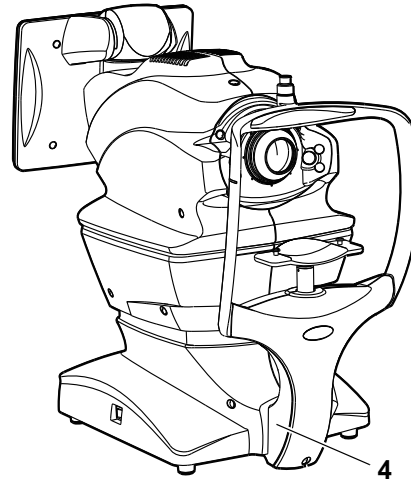
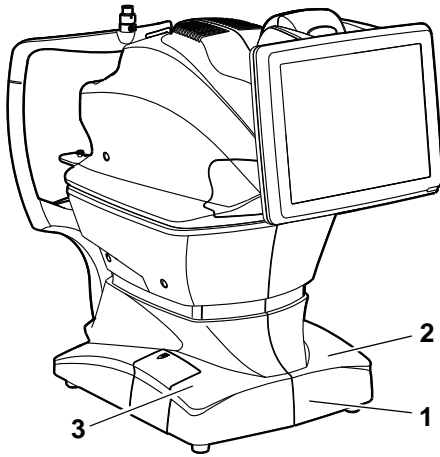
Display	Meaning
 CONTRAINDICATIONS	Situations in which the device should not be used because the risk of use clearly outweighs any possible benefit.
 WARNINGS	Incorrect handling by ignoring this display may lead to a risk of death or serious injury.
 CAUTIONS	Incorrect handling by ignoring this display may lead to personal injury or physical damage.
 NOTES	Useful functions to know. Paying attention to these will prevent the noted problems.






SYMBOL

Symbol	IEC/ISO Publication	Description	Description (French)
	IEC 60417-5032	Alternating Current	Courant alternatif
	IEC 60417-5008	Off (power: disconnection from the main power supply)	Éteint (courant: coupure avec le secteur)
	IEC 60417-5007	On (power: connection to the main power supply)	Allumé (courant: raccordement sur le secteur)
	IEC 60878-02-02	Type B applied part	Partie appliquée du Type B
	ISO 7010-W001	General warning sign	Symbole d'avertissement général
	ISO 7010-M002	Refer to instruction manual/ booklet	Voir le manuel/la brochure
	ISO 7000-2497	Date of manufacture	Date de fabrication
	ISO 7000-2498	Serial number	Numéro de série
	IEC60417-5021	Equipotentiality	Equipotentialité
	ISO 7000-3082	Manufacturer	Fabricant
	ISO 15223-1	Authorised Representative in the European Community	Représentant autorité pour l'Union européenne

POSITIONS OF WARNING AND CAUTION INDICATIONS

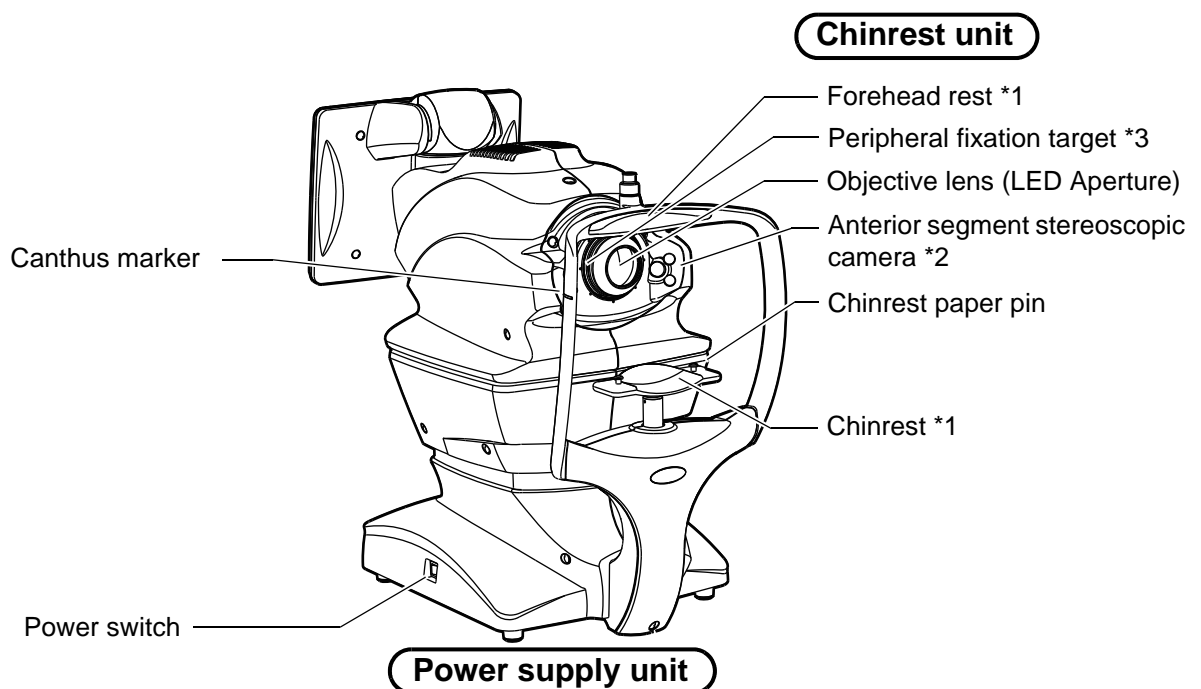
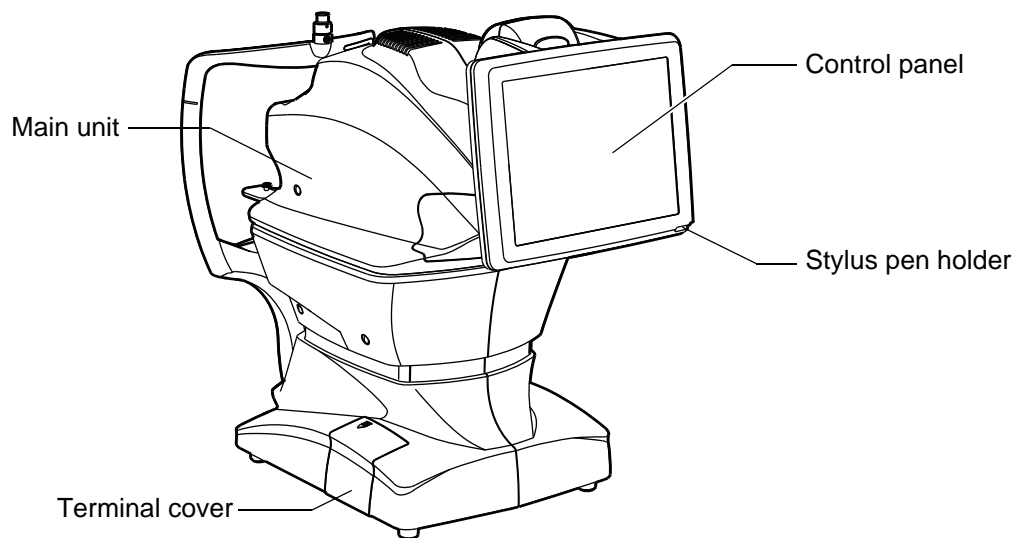
To ensure safety, this machine provides warning displays. Use the instrument correctly by observing the display instructions. If any of the following display labels are missing, contact your TOPCON dealer at the address listed on the back cover.



No.	Label	Meaning	Signification
1		WARNING To avoid injury caused by electric shock, do not open the cover. Ask your dealer for service.	MISE EN GARDE Ne pas ouvrir le couvercle pour éviter les blessures causées par un choc électrique. Demander au revendeur d'effectuer le service.
2		CAUTION When operating the chinrest up/down switch, be careful not to pinch the patient's hand. The patient may be injured.	PRÉCAUTION Prendre garde de ne pas pincer la main du patient en opérant le commutateur haut/bas du support de jugulaire. Le patient pourrait être blessé.
3		CAUTION Be careful not to hit the patient's eyes or nose with the instrument during operation.	PRÉCAUTION Prendre garde de ne pas frapper les yeux ou le nez du patient avec l'instrument pendant l'opération.
4		Degree of protection against electric shock : TYPE B APPLIED PART	Degré de protection contre les chocs électriques : TYPE B PARTIE D'APPLICATION
-		CLASS 1 LED PRODUCT (IEC60825-1:2001)	APPAREIL À DEL DE CLASSE 1 (IEC60825-1:2001)

SYSTEM DIAGRAM

COMPONENT NAMES



*1: Contacting part (class B)

*2: This unit is placed at the right and left sides of objective lens.

*3: There are eight targets around the objective lens.

COMPOSITION OF PARTS THAT COME IN CONTACT WITH THE PATIENT

Forehead rest : Silicone rubber

Chinrest : Acrylonitrile butadiene styrene resin

Chinrest paper pin : Polyamide resin

OPERATION METHOD OF CONTROL PANEL



NOTES

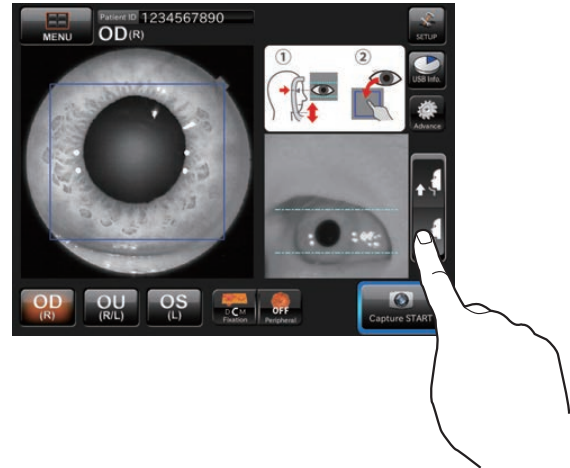
Operate the control panel by your fingers or the accessory stylus pen. Don't use any sharp tool such as a ball point pen.
The touch panel may be damaged to cause an incorrect operation.

Tap → To select any relevant item.



Touch the screen softly with a finger.

Continue to press → Used for continuous moving.
(Moving of chinrest and main unit)



Continue to touch the screen softly with a finger.

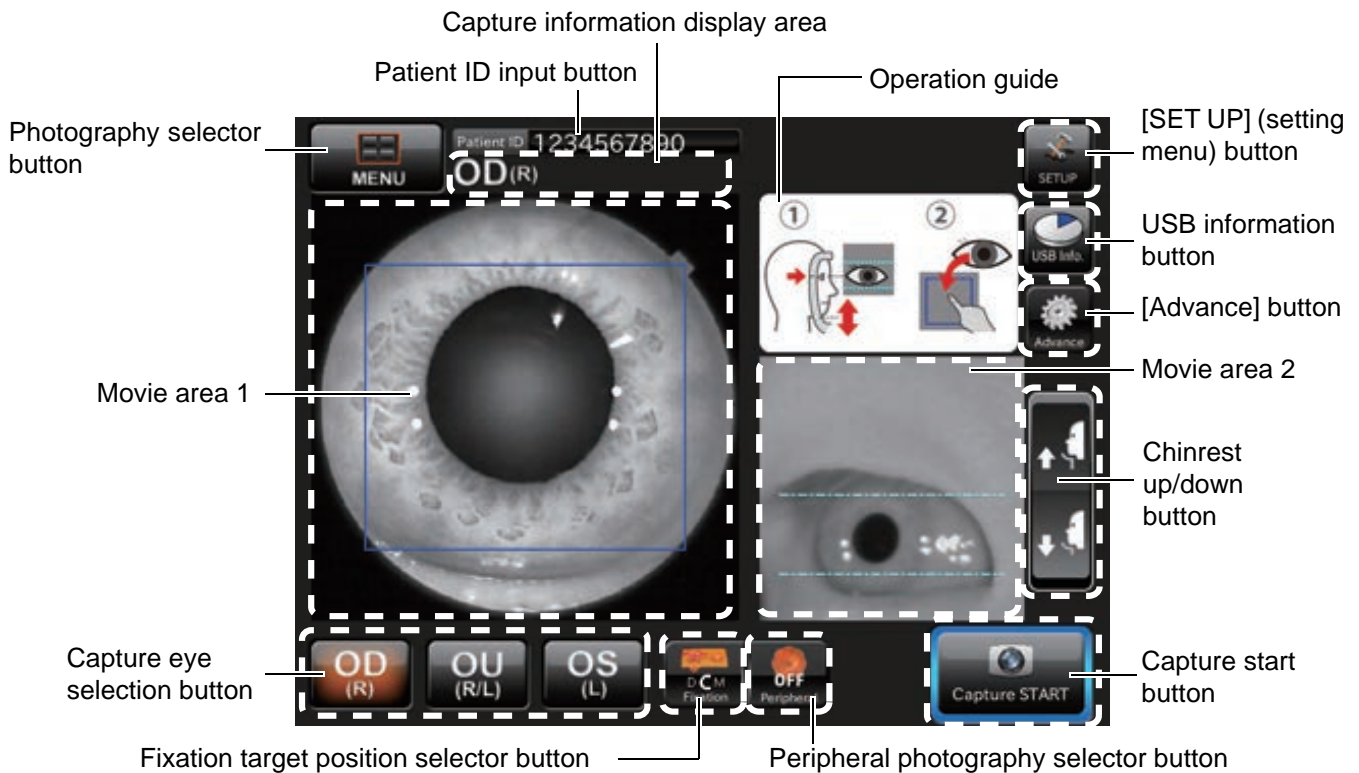
NAMES ON THE CONTROL PANEL

■ Display areas and functions on the control panel

The control panel is designed as a touch panel. Information is displayed on the control panel and you can perform a variety of operations by touching the screen.


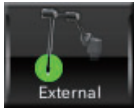
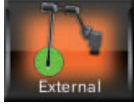
■ Photography screen (Chinrest adjustment)


As watching the anterior segment observation image and the image of the anterior segment stereoscopic camera, adjust the chinrest.



- [SET UP] (setting menu) button : Shifts to the setting menu screen.
- Photography selector button : Shifts to the photography selection screen.
- Patient ID input button : Displays the software keyboard. Enter the ID.
- Capture information display area : Displays the captured eye and picture angle.
- USB information button : Displays the remaining capacity of USB when the USB memory is connected. Tap this, and the information of USB memory is displayed.
- [Advance] button : Tap this button, and the "Advance" mode is accessed. In the "Advance" mode, you can change the diopter compensation lens and perform other operations.
- Operation guide : Displays how to operate this screen.
- Movie area 1 : Displays the anterior segment observation image. Touch the pupil to be within the frame.
- Movie area 2 : Displays the image of the anterior segment stereoscopic camera, which is nearer to the captured eye than the other. Align the eye height to the canthus marker of the chinrest unit with the lines on the screen as standard.
- Chinrest up/down button : Moves the chinrest up and down.
Tap the upper part of the button, and the chinrest moves up. Tap the lower part of the button, and the chinrest moves down.

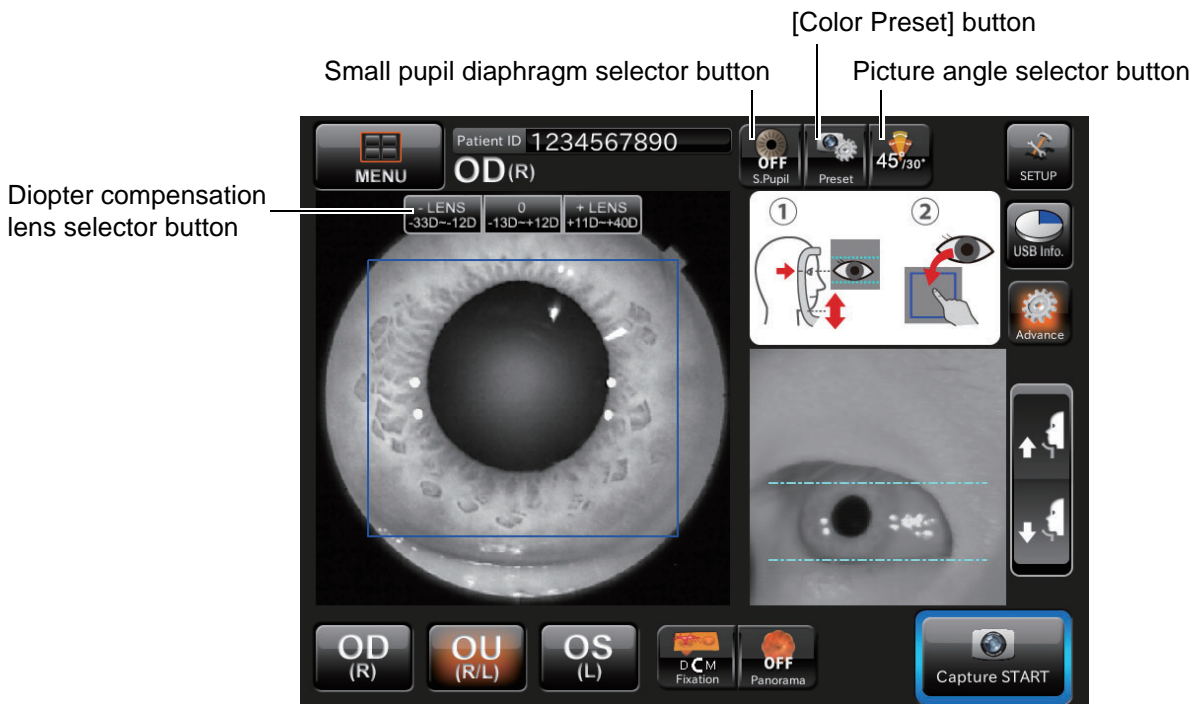
- Capture eye selection button : Select an eye to be captured.
- Fixation target position selector button : The fixation target position is changed.
- Peripheral photography selector button : This is changed to the FIXATION TARGET POSITION SELECTOR button for peripheral photography.
- Capture start button : Starts photographing.

 NOTES	<p>External fixation target button The external fixation target is an optional accessory. So, this button is displayed only when it is set to "valid". Displays the status (ON/OFF) of the external fixation target. You can change ON/OFF of the external fixation target with this button.</p> <div style="display: flex; align-items: flex-start;"> <div style="margin-right: 10px;">  </div> <div> <p>Displays the status of the internal fixation target. (Background is gray.)</p> </div> </div> <div style="display: flex; align-items: flex-start; margin-top: 10px;"> <div style="margin-right: 10px;">  </div> <div> <p>Displays the status of the external fixation target. (Background is orange.)</p> </div> </div> <p>When using the external fixation target, guide the fixation of patient's eye by operating the arm.</p>
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 NOTES	<ul style="list-style-type: none"> Enter the patient ID on the chinrest adjustment screen. This entry cannot be performed on other screens. When connected to IMAGEnet, the software keyboard is not displayed even if you tap the patient ID input button. When you tap the CAPTURE START button and "Check connection" is displayed, check the connection with the saving destination. Images cannot be saved to the destination that cannot be connected to the instrument. When two or more destinations for saving are set and one of them can be connected, it is possible to start photography.
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■ Photography screen (Chinrest adjustment): Advance mode

When you set "ON" for the "Advance" mode on the screen where you adjust the chinrest as watching the anterior segment observation image and the image of the anterior segment stereoscopic camera, this screen appears.



Small pupil diaphragm selector button

: Displays the small pupil diaphragm status (ON/OFF). You can change the ON/OFF status of the small pupil diaphragm. When the pupil diameter of the patient is small (when it is smaller than the pupil detection mark), set it to ON and take a picture.

The automatic small pupil (diaphragm) function can be set. While this function is set, the small pupil diaphragm is automatically set to ON and the instrument takes a color picture of fundus if the pupil diameter is small (when it is smaller than the pupil detection mark). After taking a picture, it is set to OFF. When you set this function, in the fundus photography, it is not necessary to set the small pupil diaphragm to ON with this button even if the pupil diameter is small.

[Color Preset] button

: The camera setting (white balance and light intensity) is changed.

Picture angle selector button

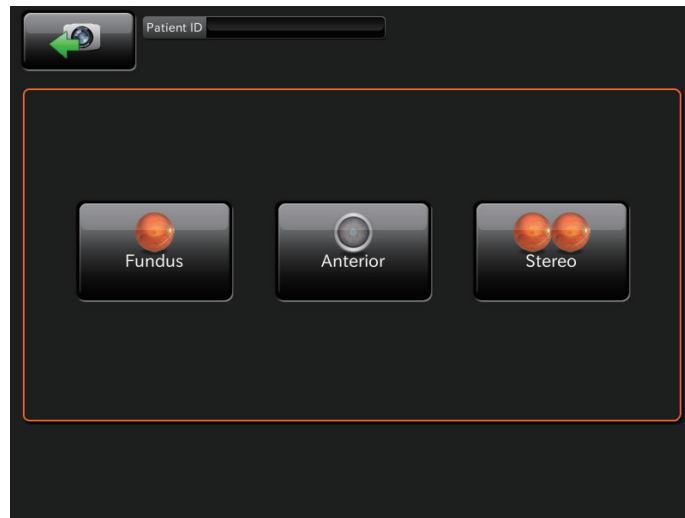
: Select "30°". "30°" is displayed on the capture information display area. The system sets the fundus or anterior segment image to be equal to the picture angle 30° and takes a picture.

Diopter compensation lens selector button

: Tap [+LENS] to increase the power. Tap [-LENS] to decrease the power. The center displays "No compensation lens".

■ Photography selection screen

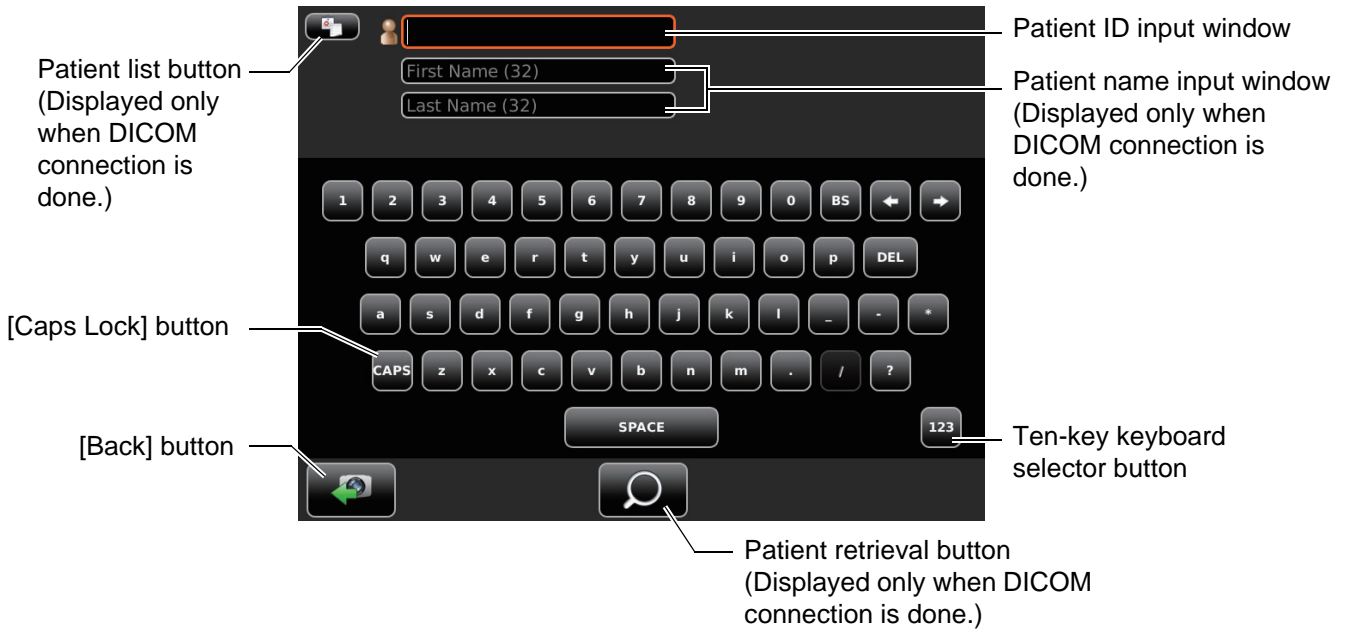
Tap the **PHOTOGRAPHY SELECTOR** button on the chinrest adjustment screen, and this screen appears to select a photography.








- [Fundus] button : Accesses the fundus photography mode.
- [Anterior] (Anterior segment photography) button : Accesses the anterior segment photography mode.
- [Stereo] (Stereoscopic photography) button : Accesses the stereoscopic photography mode.

■ Patient ID input screen

Tap the **PATIENT ID INPUT** button to enter the patient ID on this screen.




-  Patient list button : Displays the patient selection screen (DICOM work list).
-  [Caps Lock] button : Changes the capital and small letters on the software keyboard.
-  Ten-key keyboard selector button : Changes the software keyboard, from QWERTY arrangement to ten-key arrangement.
-  Patient retrieval button : Searches for the patient input through the DICOM server.
-  [Back] button : Returns to the chinrest adjustment screen.



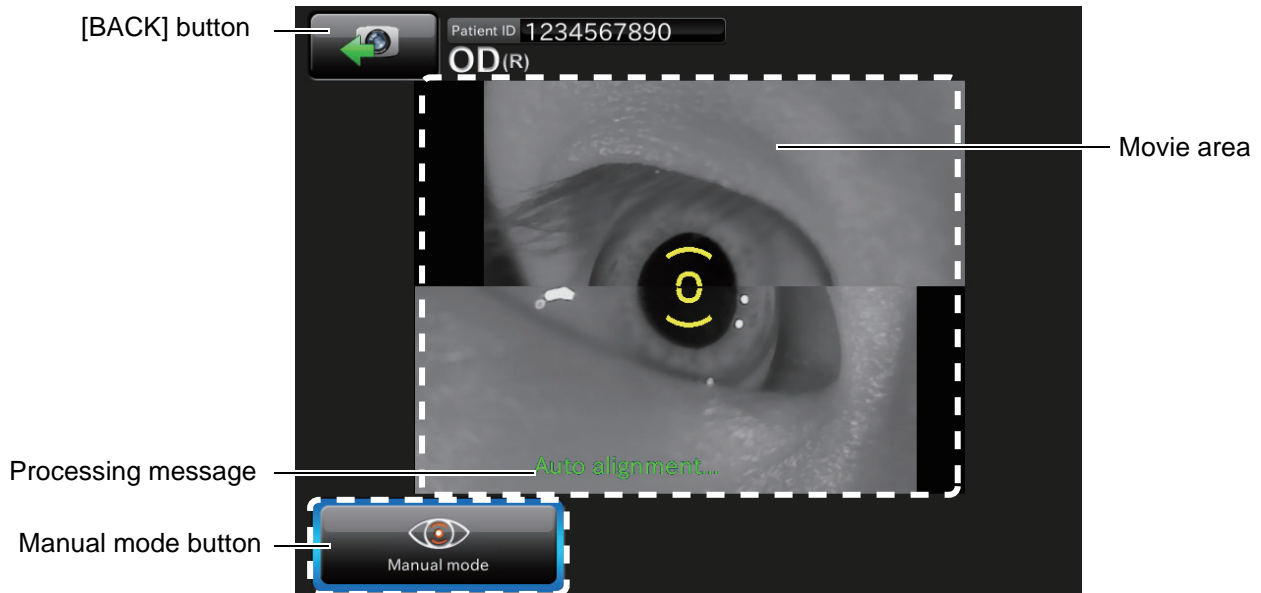
NOTES

The patient list button, patient retrieval button and patient name input window are displayed only when DICOM connection is done. For details, contact your dealer or the offices listed on the back cover.


■ Photography screen (Automatic alignment to pupil)

 CAUTIONS	To avoid injury of the patient, be careful not to hit the patient with the instrument during automatic alignment.
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This screen is used to perform automatic alignment to pupil. Alignment is performed by the image of the right and left anterior segment stereoscopic cameras.

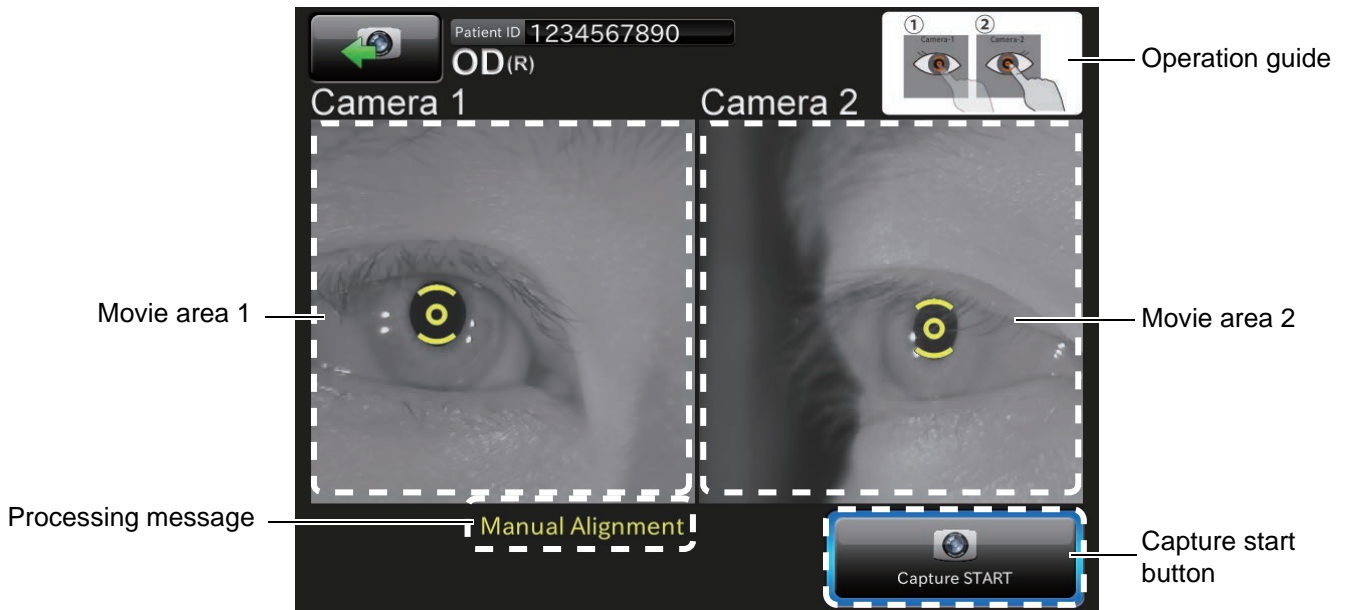


- Movie area : Displays the image of the right/left anterior segment stereoscopic camera.
- Manual mode button : Tap the **MANUAL MODE** button. The system stops automatic adjustment of the captured eye and shifts to the "Manual adjustment mode" screen where you can adjust the captured eye manually.
- Processing message : Displays the current processing status.
- [BACK] button : Returns to the chinrest adjustment screen.

 NOTES	When opening the eyelid (opening the eyelid by hand), be careful not to touch the anterior segment stereoscopic camera by hand. If your hand touches it, automatic alignment is not performed normally from time to time.
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■ **Photography screen (Manual alignment to pupil)**

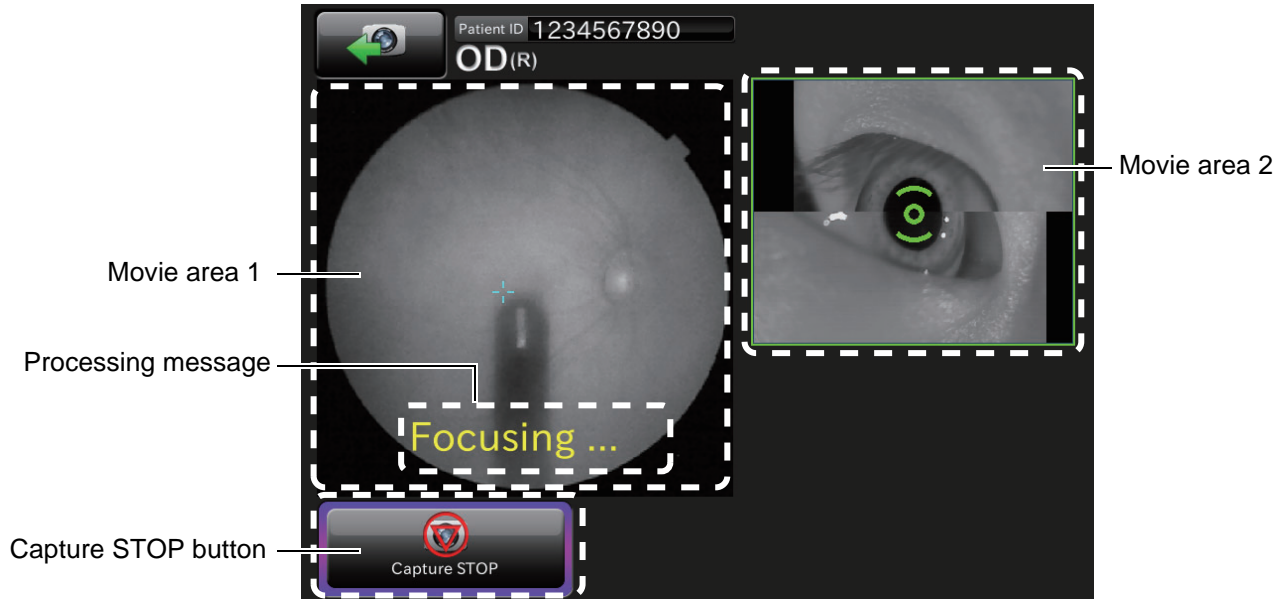
This screen is used to perform manual alignment to pupil. Tap the pupil displayed on Camera 1 and Camera 2.



- Operation guide : Displays how to operate this screen.
- Movie area 1 : Displays the image of the anterior segment stereoscopic camera 1.
- Movie area 2 : Displays the image of the anterior segment stereoscopic camera 2.
- Processing message : Displays the current processing status.
- Capture start button : Starts photographing. Tap the screen of Camera 1/Camera 2, and it is active.

■ Photography screen (Automatic focus)

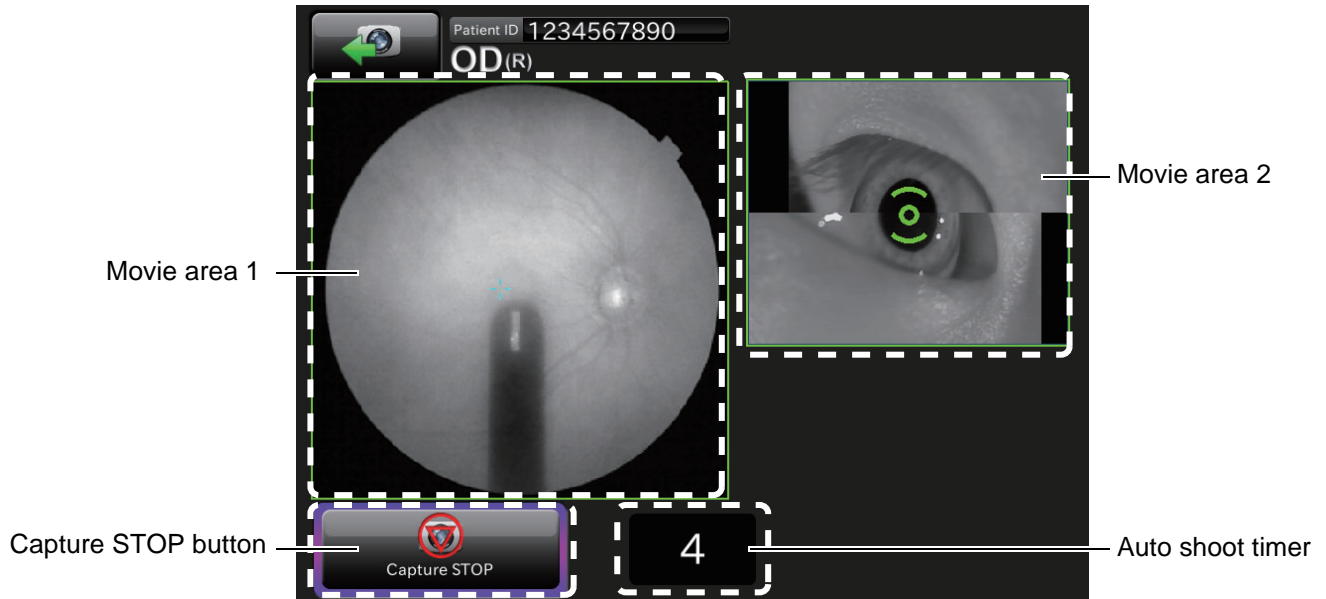
This screen is used to perform automatic focus to fundus.



- Movie area 1 : Displays the fundus image. When auto focus is successful, the area is encircled with a green frame.
- Movie area 2 : Displays the image of the anterior segment stereoscopic camera. When alignment is successful, the pupil mark is green and the area is encircled with a green frame.
- Processing message : Displays the current processing status.
- Capture STOP button : Tap the **CAPTURE STOP** button. The system stops automatic adjustment and shifts to the "Manual adjustment mode" screen where you can perform adjustment manually.

■ **Photography screen (waiting for fundus capture to start)**

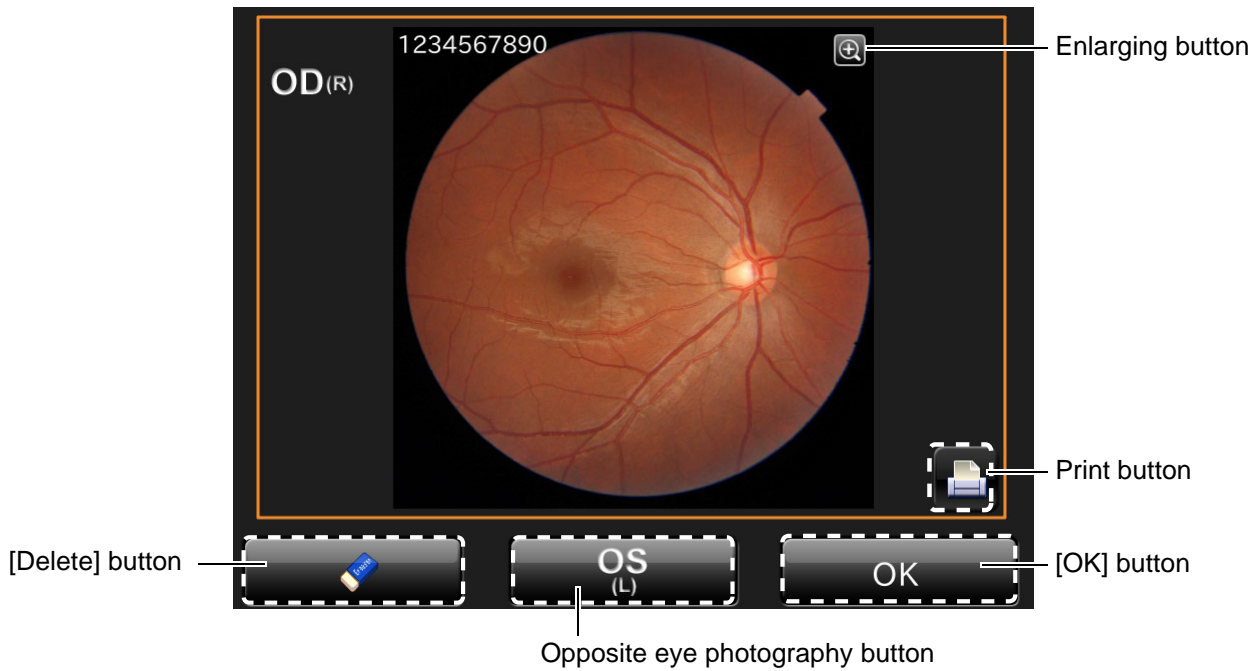
This screen shows the status while for the fundus capture to start. Make sure that all areas are encircled with green frames. When the green frame is not displayed, tap the **CAPTURE STOP** button to stop photographing.



- Movie area 1 : Displays the fundus image.
- Movie area 2 : Displays the image of the anterior segment stereoscopic camera. When alignment is not correct, the green frame is not displayed for the area.
- Capture STOP button : Tap the **CAPTURE STOP** button. The system stops automatic adjustment and shifts to the "Manual adjustment mode" screen where you can perform adjustment manually.
- Auto shoot timer : This is the countdown timer until photographing starts. When this timer shows "0", the system takes a picture automatically.

■ Preview screen

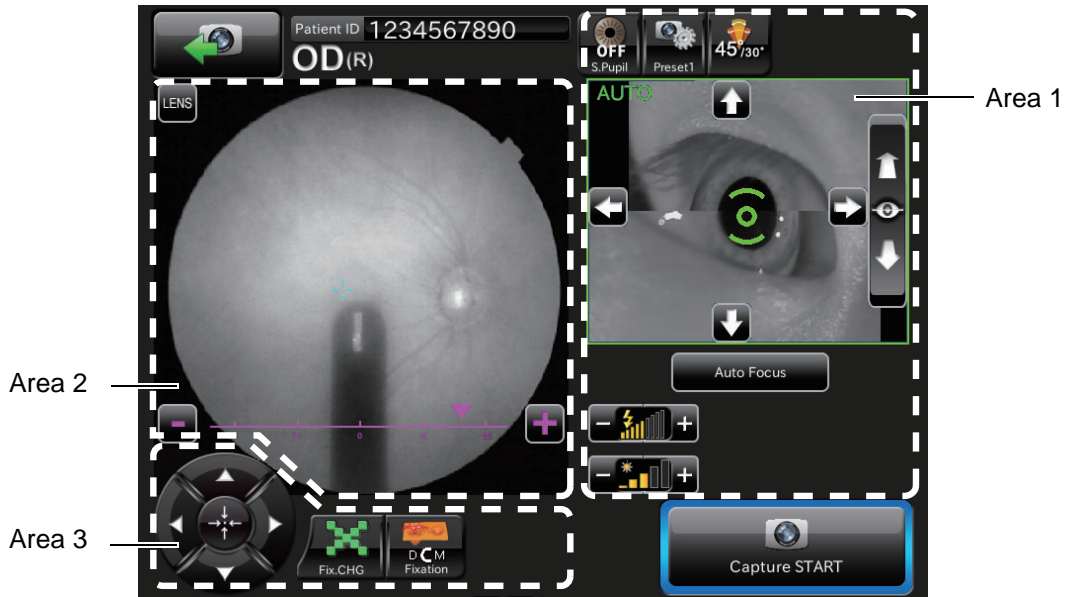
Preview is displayed per shooting. In the case of both eyes, the system shifts to the next photographic capture session by tapping the [OK] button.



- Print button : Prints the displayed image when the printer is connected.
- [Delete] button : Deletes the data being displayed on the screen.
- Opposite eye photography button : Shifts to the photography session of another eye. This button is displayed only when selecting "Auto photography" on the setting menu and then setting the binocular photography to "OFF".
- [OK] button : Saves the data being displayed on the screen and shifts to the next photography session.
- Enlarging button : Enlarges and displays the image. Each time you tap this button, the image is displayed in the status of "2x", "4x" and "Not enlarged" alternately.

■ **Photography screen (Manual adjustment mode)**

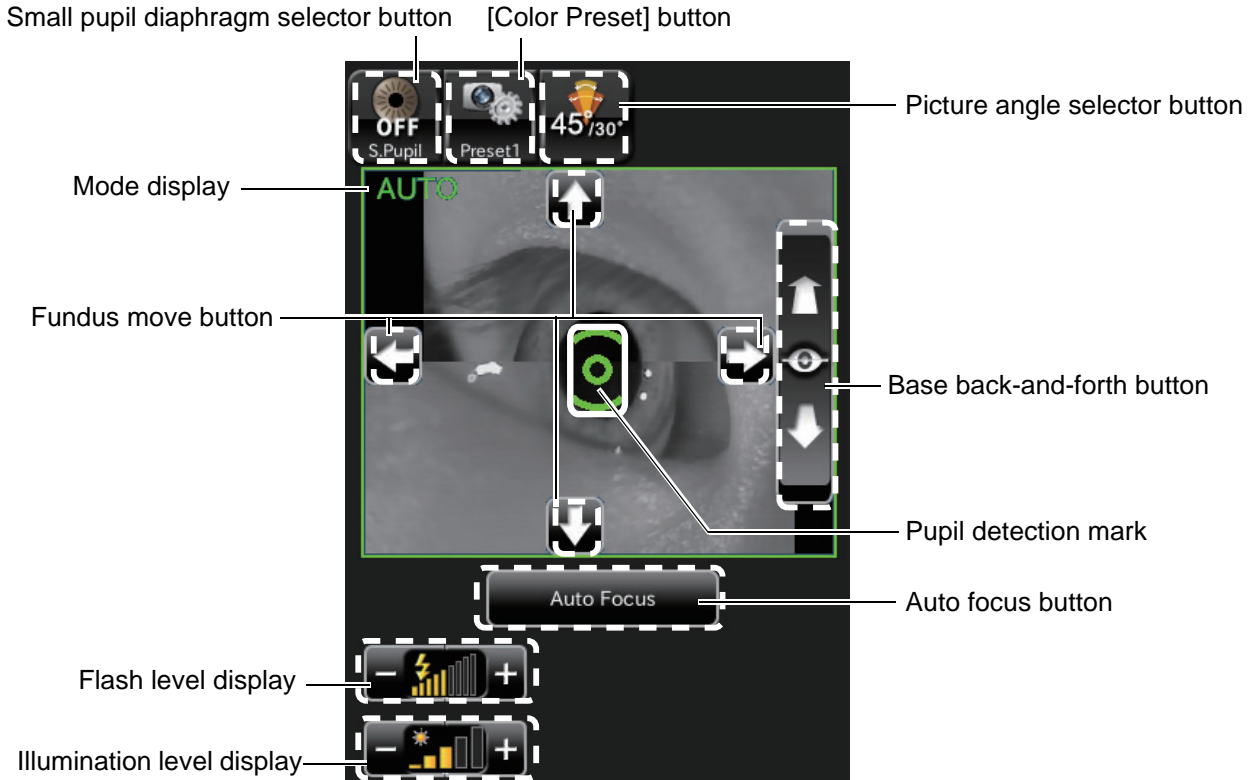
This screen is used to perform adjustment manually.



- Area 1 : Displays the image of the anterior segment stereoscopic camera. You can perform alignment and change the setting.
- Area 2 : Displays the fundus or anterior segment live image. You can adjust focus and perform other operations.
- Area 3 : Changes the fixation target.

Area 1

Area 1 displays the image of the anterior segment stereoscopic camera. It is possible to set the data for alignment and photography with the **[FUNDUS MOVE]** button and **[BASE BACK-AND-FORTH]** button. Right after this screen is displayed, auto alignment is always performed. Tap the screen of the anterior segment stereoscopic camera, the **[FUNDUS MOVE]** button and **[BASE BACK-AND-FORTH]** button. "Auto" is changed to "Manual". When alignment is correct, the area is encircled with a green frame.



- **Small pupil diaphragm selector button:**
Displays the small pupil diaphragm status (ON/OFF). You can change the ON/OFF status of the small pupil diaphragm. When the pupil diameter of the patient is small (when it is smaller than the pupil detection mark), set it to ON and take a picture. The automatic small pupil (diaphragm) function can be set. While this function is set, the small pupil diaphragm is automatically set to ON and the instrument takes a color picture of fundus if the pupil diameter is small (when it is smaller than the pupil detection mark). After taking a picture, it is set to OFF. When you set this function, in the color fundus photography, it is not necessary to set the small pupil diaphragm to ON with this button even if the pupil diameter is small.
- **[Color Preset] button:**
The camera setting (white balance and light intensity) is changed.
- **Picture angle selector button:**
Select "30° ". "30° " is displayed in the capture information display area. The system sets the fundus or anterior segment image to be equal to the picture angle 30° and takes a picture.
- **Base back-and-forth button:**
Tap the upper part of the button, and the base comes near the patient. Tap the lower part of the button, and the base moves away from the patient. Keep pressing the button, and the moving speed is higher.

- Fundus move button:
Tap the upper, lower, right and left buttons on the fundus image to adjust the whole fundus position finely. Tap the upper button, and the base moves up and the displayed fundus moves down. Tap the right button, and the base moves right and the displayed fundus moves left. Keep pressing the button, and the moving speed is higher.
- Pupil detection mark:
This is displayed when the pupil is detected. When alignment is correct, this mark is green. When alignment is not correct, this mark is orange.
- Auto focus button:
Executes automatic focus.
- Flash level display:
Displays the flash level in nine steps (value range: -4 - +4). You can adjust the flash level by tapping the screen. (Refer to page 61.)
While the xenon lamp power supply is being charged, the icon blinks. When charging is finished, the icon is lit.



NOTES

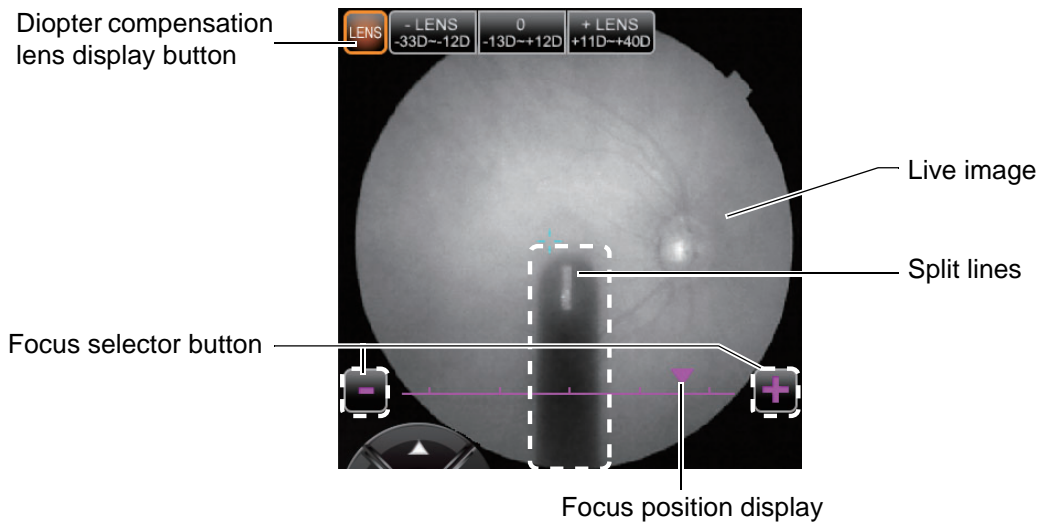
- The flash level can be set in nine steps (-4 to +4).
When the instrument is first turned on, the flash level is set to "level 0".
- When the flash level is raised by 1 step, the flash level is increased by about 20%.

- Illumination level display
Displays the illumination level by five steps (value: 1 - 5). You can adjust the illumination level by tapping the screen. (Refer to page 61.)

Area 2

Area 2 displays the fundus or anterior segment live image.

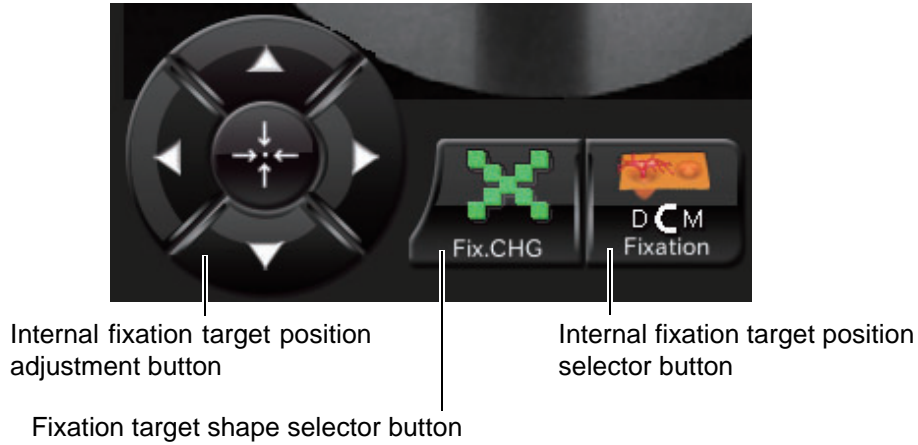
Area 2 displays the fundus or anterior segment live image, illumination level and flash level. You can adjust the focus, diopter compensation lens, small pupil diaphragm, picture angle, illumination level and flash level by the control panel.




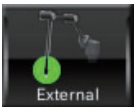

- Live image:
Displays the live image of the fundus or anterior segment.
- Diopter compensation lens display button:
Tap the **LENS** button, and the **DIOPTER COMPENSATION LENS SELECTOR** button is displayed. Tap the **LENS** button again, and the **DIOPTER COMPENSATION LENS SELECTOR** button disappears.
- Diopter compensation lens selector button:
Tap [+LENS] to increase the power. Tap [-LENS] to decrease the power. The center displays "No compensation lens".
- Split lines:
Split lines are displayed. This display is changed according to the **FOCUS SELECTOR** button.
- Focus selector button:
Changes focus.
- Focus position display:
Displays the current focus. Tap [+] of the **FOCUS SELECTOR** button, and focus moves in the plus direction. Tap [-], and focus moves in the minus direction.

Area 3



In Area 3, set and change the fixation target with the buttons.

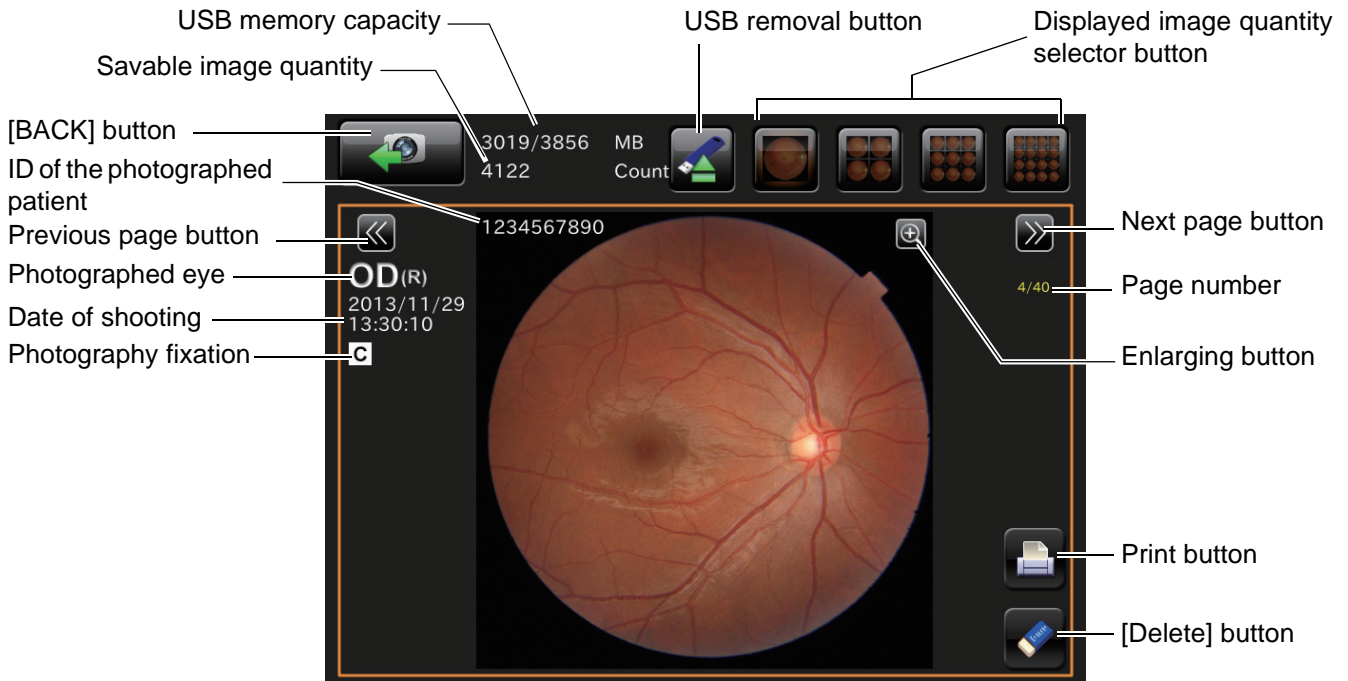


- Internal fixation target position adjustment button
Tap one of the buttons, and the fixation target is displayed. Tap it again, and you can change the fixation target position. Tap the center button, and the fixation target is returned to the initial position.
- Fixation target shape selector button
Tap this button, and two types ("point" and "cross") of the shape the patient sees are changed to each other. The display on the screen is not changed.
- Internal fixation target position selector button
Set the fixation position of the patient. By this button, "Disc", "Center" and "Macula" are changed in turn.


 <p>NOTES</p>	<p>External fixation target button The external fixation target is an accessory. So, this button is displayed only when it is set to "valid" by setting. Displays the status (ON/OFF) of the external fixation target. You can change ON/OFF of the external fixation target with this button.</p> <div style="display: flex; flex-direction: column; gap: 10px;"> <div>  </div> <div> <p>Displays the status of the internal fixation target. (Background is gray.)</p> </div> <div>  </div> <div> <p>Displays the status of the external fixation target. (Background is orange.)</p> </div> </div>
---	--

■ USB reproduction screen (One image display)

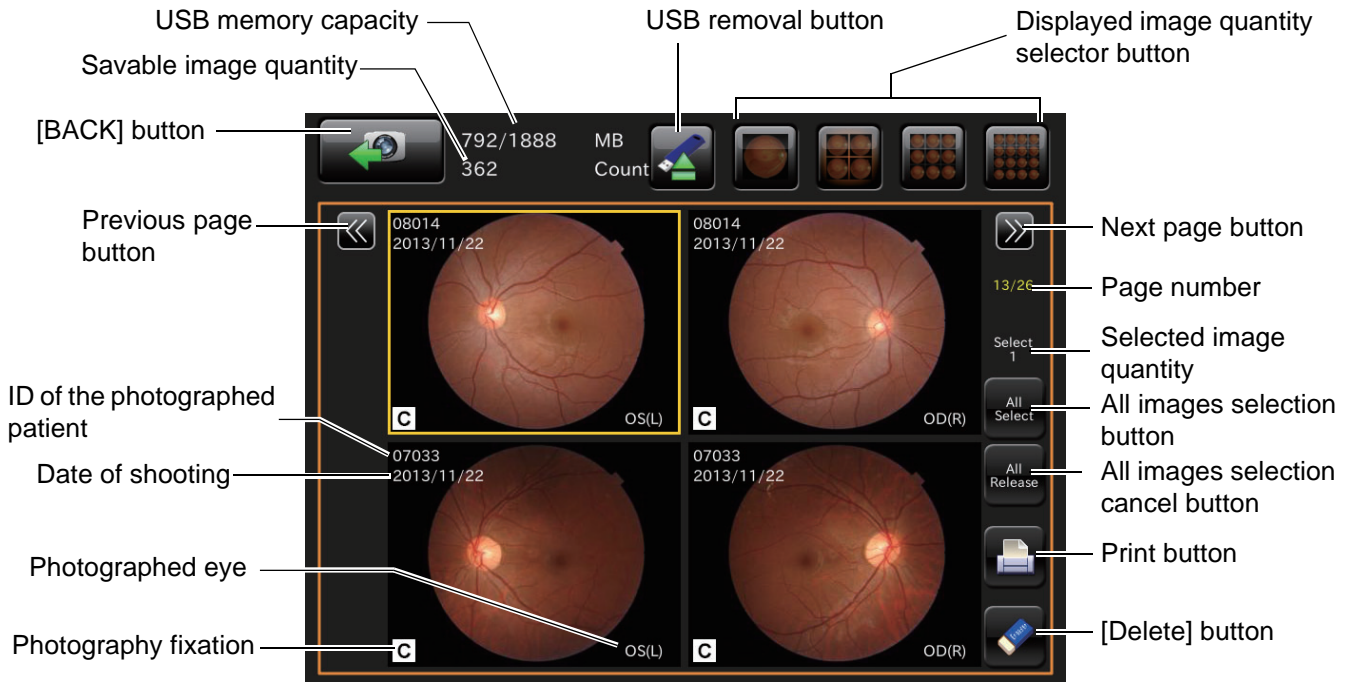
 CAUTIONS	<p>To take out the USB memory, tap the USB REMOVAL button . If you remove the USB memory without tapping this button, the data is not saved from time to time. When the chinrest adjustment screen appears, remove the USB memory.</p>
---	--



- [BACK] button : Return to the chinrest adjustment screen.
- USB memory capacity : Displays the used area and capacity of USB memory.
- Savable image quantity : Displays the savable image quantity when calculating with the set image size.
- USB removal button : This is used to remove the USB memory safely. Tap this button. The chinrest adjustment screen appears and it is possible to remove the USB memory.
- Displayed image quantity selector button : Change the quantity of the images displayed on one screen with this button.
- Previous page button : Displays the preceding page.
- Next page button : Displays the next page.
- Page number : Displays the numbers of the current page and all the pages.
- Enlarging button : Enlarges and displays the image. Each time you tap this button, the image is displayed in the status of "2x", "4x" and "Not enlarged" alternately.
- ID of the photographed patient : Shows the ID of the patient for the displayed image.
- Photographed eye : Shows the eye on the displayed image.
- Date of shooting : Shows the date of shooting for the displayed image.
- Photography fixation : Shows the fixation position when capturing the displayed image.
- Print button : Prints the displayed image.
- [Delete] button : Deletes the displayed image.

 NOTES	<p>Only the photographed image can be deleted by the DELETE button. Do not save any other data into the USB memory.</p>
--	--

■ USB reproduction screen (Two or more images display)



- [BACK] button : Return to the chinrest adjustment screen.
- USB memory capacity : Displays the used area and capacity of USB memory.
- Savable image quantity : Displays the savable image quantity when calculating with the set image size.
- USB removal button : This is used to remove the USB memory safely. Tap this button. The chinrest adjustment screen appears and it is possible to remove the USB memory.
- Displayed image quantity selector button : Change the quantity of the images displayed on one screen with this button.
- Previous page button : Displays the preceding page.
- Next page button : Displays the next page.
- Page number : Displays the numbers of the current page and all the pages.
- ID of the photographed patient : Shows the ID of the patient for the displayed image.
- Photographed eye : Shows the eye on the displayed image.
- Date of shooting : Shows the date of shooting for the displayed image.
- Photography fixation : Shows the fixation position when capturing the displayed image.
- Selected image quantity : Shows the quantity of the selected images.
- All images selection button : Selects all the images.
- All images selection cancel button : Cancels the selection of all the images.
- Print button : Prints the displayed image.
- [Delete] button : Deletes the displayed image.



NOTES

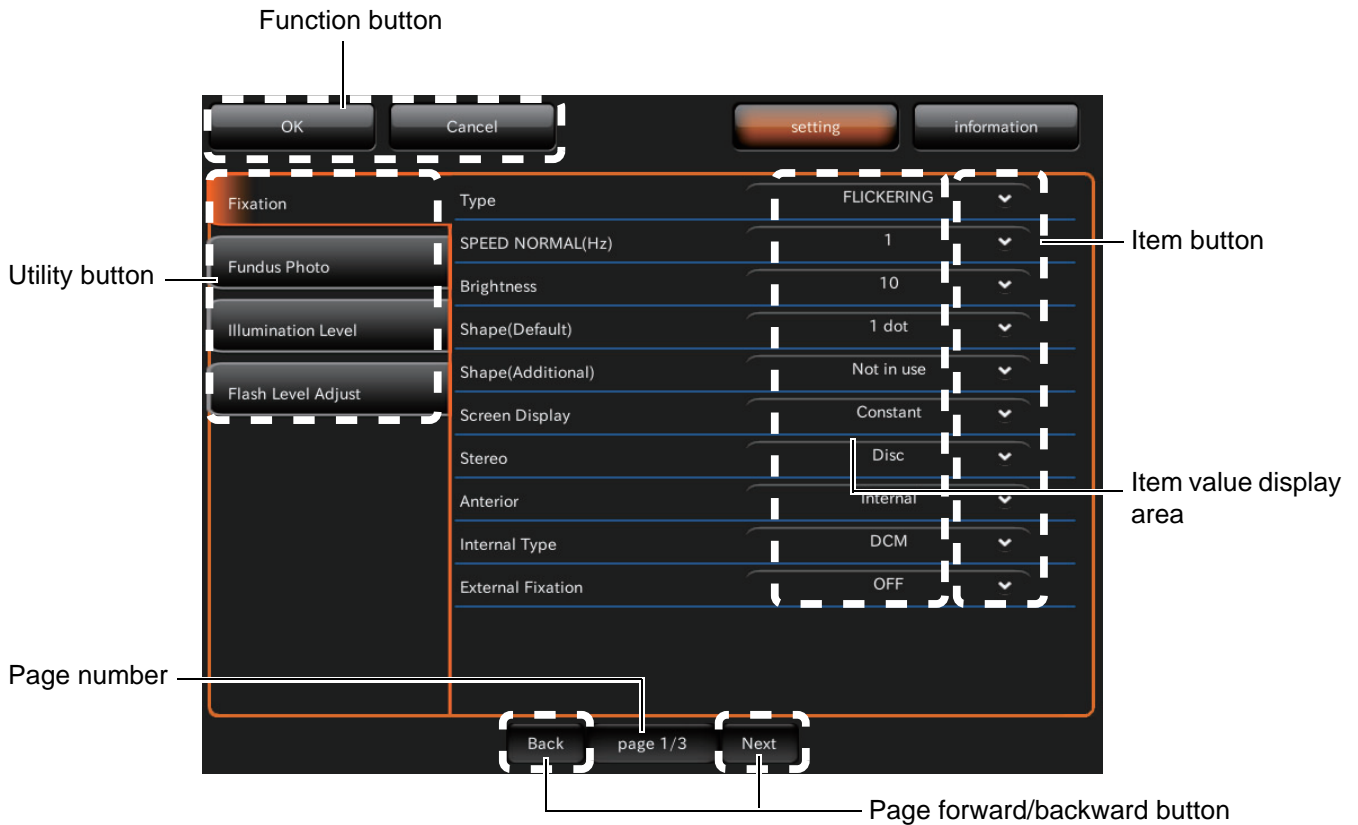
Only the photographed image can be deleted by the **DELETE** button. Do not save any other data into the USB memory.

■ Setting menu screen

You can set many kinds of data for this instrument on this screen.

Press the **SET UP** button on the photography screen (chinrest adjustment), which is the initial screen, and this screen appears.

- Photography setting screen • Auto operation setting screen • System setting screen
- You can set data about photography and system.


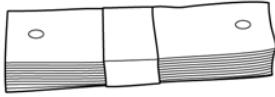

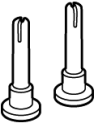

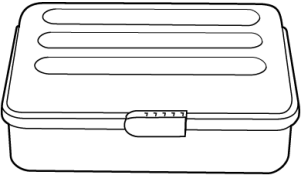
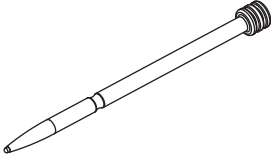

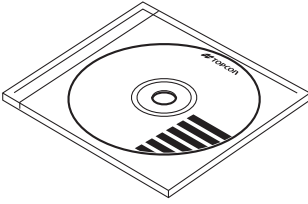
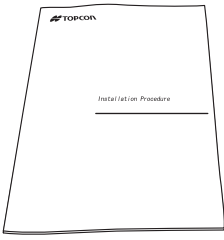


- Function button : Saves and cancels the setting.
- Page number : Displays the current setting menu page's number in page order.
- Utility button : Displays the objective items on the current setting menu page. Select the desired item.
- Page forward/backward button : Shifts to other pages in the setting menu.
- Item button : Changes the set status of the selected item.
- Item value display area : Displays the current set status of each item.

STANDARD ACCESSORIES

Upon unpacking, make sure that all the following standard accessories are included.

Figures in () are the quantities.

<p>Power cord (1)</p> 	<p>Chinrest paper (1)</p> 	<p>Monitor cleaner (1)</p> 
<p>Chinrest paper pins (2)</p> 	<p>Dust cover (1)</p> 	<p>Accessory case (1)</p> 
<p>Stylus pen (1)</p> 	<p>User manual (1)</p> 	<p>Capturing software (Ez Capture for TRC-NW400) (1)</p> 
<p>Capturing software (Ez Capture for TRC-NW400) Installation procedure (1)</p> 		

PREPARATIONS

INSTALLATION

CAUTIONS

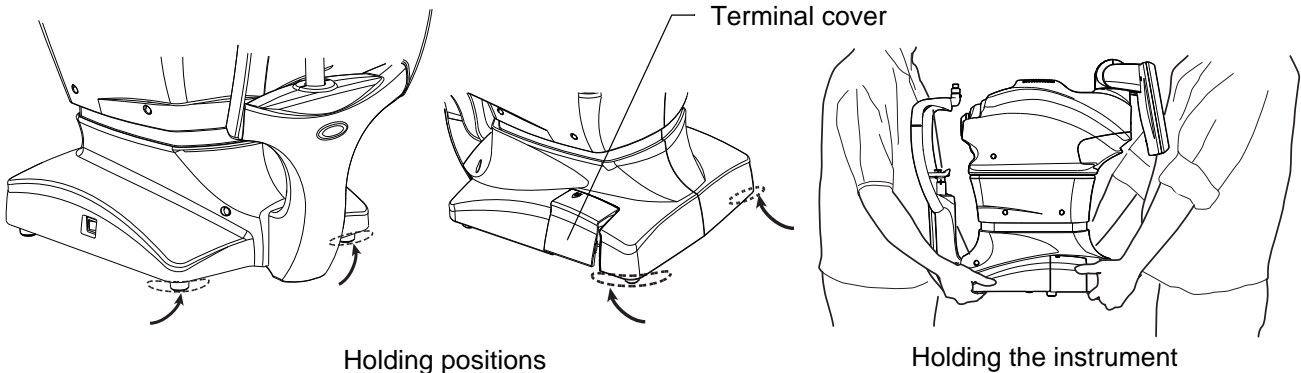
- The instrument should be moved by two people holding the bottom of the device. Be sure to hold the bottom with two people. To avoid injury, be aware of projections at the bottom. Carrying by one person may cause harm to his/her back or injury by falling parts. Also, holding areas other than the bottom and holding the terminal cover may cause injury, as well as damage to the instrument.
- To prevent damage and injuries, do not install the instrument on an uneven, unsteady or sloped surface.
- When setting an instrument on an instrument table, pay attention not to catch the patient's fingers between the instrument and the table.



NOTES

Do not place the instrument in an area where it will be exposed to direct sunlight.
Automatic alignment may not be performed correctly.

- 1** Firmly hold the instrument at the position shown below and place it on the automatic instrument table.



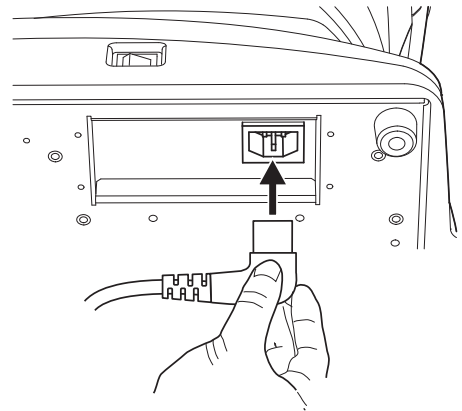
CONNECTING THE POWER CORD



CAUTIONS

- Be sure to connect the power plug to an AC 3-pin receptacle equipped with grounding. Connection to a receptacle without grounding may cause fire and electric shock in the case of shortcircuiting.
- To avoid electric shocks, do not handle the power plug with wet fingers.

- 1** Make sure the POWER switch of the instrument is turned OFF.
- 2** Tilt the body slowly so that the POWER switch is on top and the power inlet at the bottom can be seen.
- 3** Connect the power cable to the Power inlet.
- 4** Insert the power cable plug into the 3-pin AC grounding receptacle.



CONNECTING THE EXTERNAL I/O TERMINALS



CAUTIONS

To avoid electric shock, do not touch the external connection terminal and the patient at the same time.



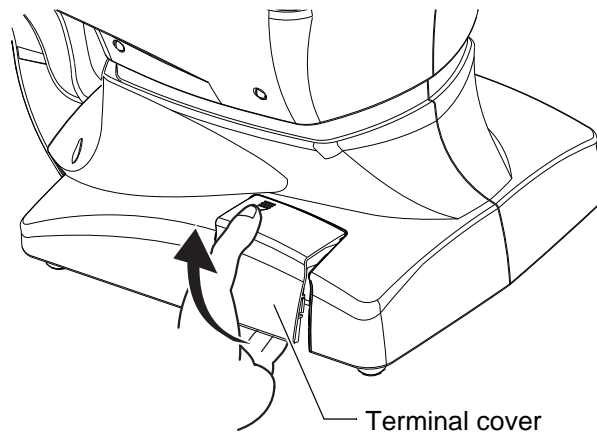
NOTES

Use the external device conforming to IEC60950/IEC60950-1.
For connecting to an external device, contact your TOPCON dealer or the offices listed on the back cover.

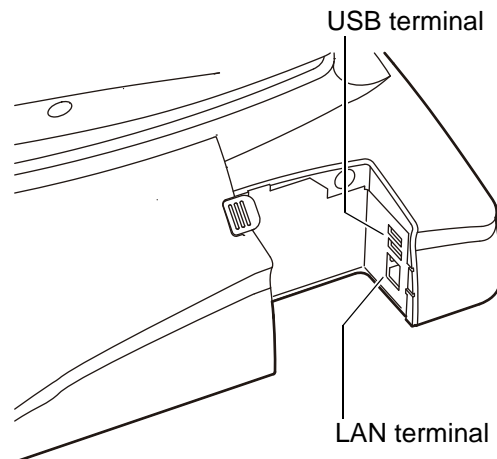
DATA OUTPUT

This product can be connected to a personal computer (PC) and other external devices via LAN.

- 1** Remove the terminal cover by pulling up as follows.



- 2** Insert the connection cable (LAN cable) into the terminal of the instrument.



- 3** Connect the other end of the connection cable (LAN cable) to the PC, etc.

4 Replace the terminal cover.





NOTES

- If an external device infected with a computer virus is connected to the instrument, the instrument may be infected with the virus. Before connecting external devices, make sure that they are not infected with any computer virus.
- When you want to change the date recorded in the memory device, contact your dealer or the offices listed on the back cover.
- For using an image filing system such as IMAGEnet, refer to the instruction manual attached to each device.
- For the usable printer, contact your dealer or the offices listed on the back cover.
- When connecting the instrument to a filing system or data server, contact your dealer or the offices listed on the back cover.
- When you use an external input device through USB connection, contact your dealer or the offices listed on the back cover.

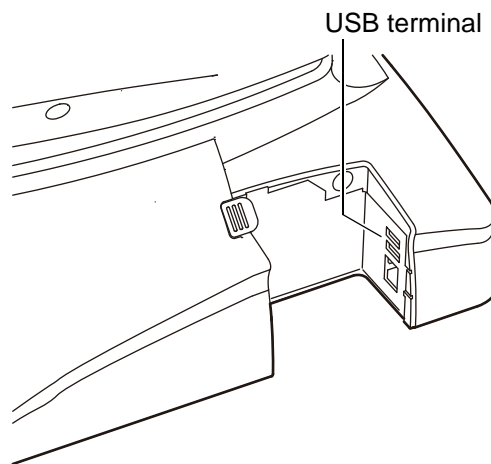
CONNECTING THE USB MEMORY


CAUTIONS

- To take out the USB memory, tap the **USB INFORMATION** button . Then, tap the **USB REMOVAL** button  on the displayed screen or the **EJECT** button on the message. If you remove the USB memory without tapping the above-mentioned buttons, data is not saved from time to time.
- Use the USB memory formatted with "FAT32". If you use the USB memory that is not formatted yet, the instrument cannot be connected to it from time to time.


When you use the USB memory, connect it to the instrument according to the following procedure. The USB memory can also be connected while the power is ON.

- 1** Connect the USB memory to the terminal in the correct direction.



- 2** To take out the USB memory, tap the button. Then, tap the **USB REMOVAL** button  on the displayed screen or the **EJECT** button on the message.

NOTES

- Before connecting the USB memory, make sure that it is not infected with any computer virus.
- Before photographing, check if the **USB INFORMATION** button  is displayed on the monitor screen. Unless this button is displayed, the USB memory is not connected and the captured image is not saved. Right after the USB memory is connected, it takes a while to recognize the USB memory. Wait until the **USB INFORMATION** button is displayed.
- If the **USB INFORMATION** button is not displayed after waiting for a while, remove the USB memory and connect it again.
- When you want to save data into the DICOM server, be sure to connect the USB memory. If not, photographing cannot start.
- The USB memory may be destroyed. Back up data diligently not to lose it.

RECOVERY FROM POWER SAVE STATUS

This instrument adopts the power save system for saving electric power. When the machine is not operated for a set time, the control panel becomes a screensaver.

1 Tap the control panel.

In a few seconds, the measurement screen will be displayed and measurement is enabled.

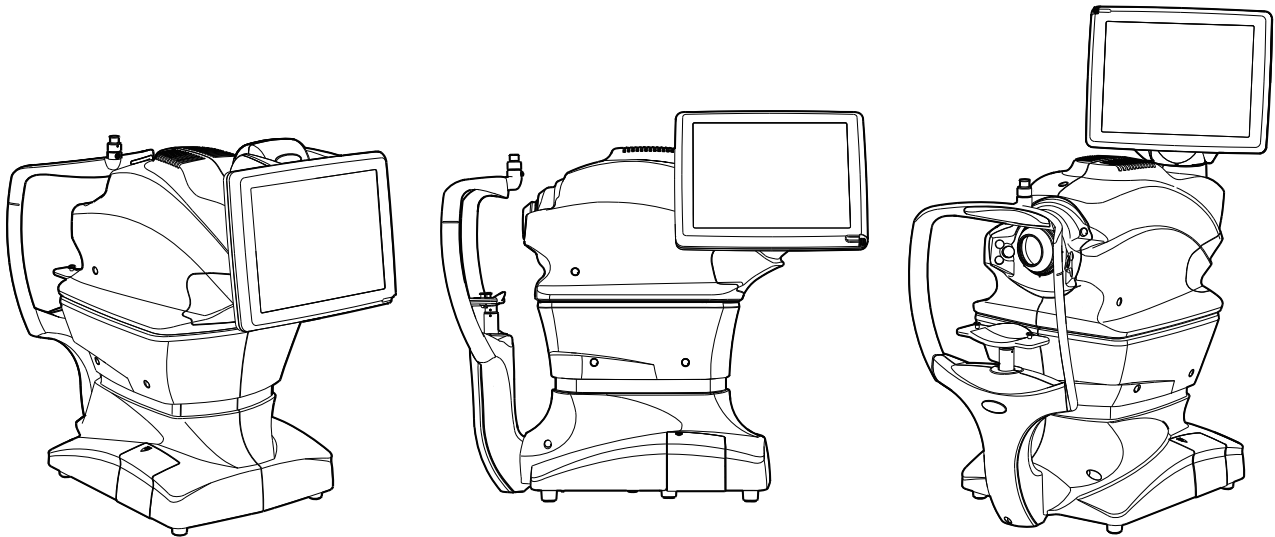


NOTES

The time to start the power save status can be changed by changing "POWER SAVE TIMER (Min.)" on "System Setting" of "Setting menu".


ADJUSTING THE CONTROL PANEL POSITION


Tapping the control panel controls operations including chinrest up-and-down movements, alignment and measurement. It is possible to change the control panel position in the up-and-down and right-and-left directions. Adjust the control panel position optionally.




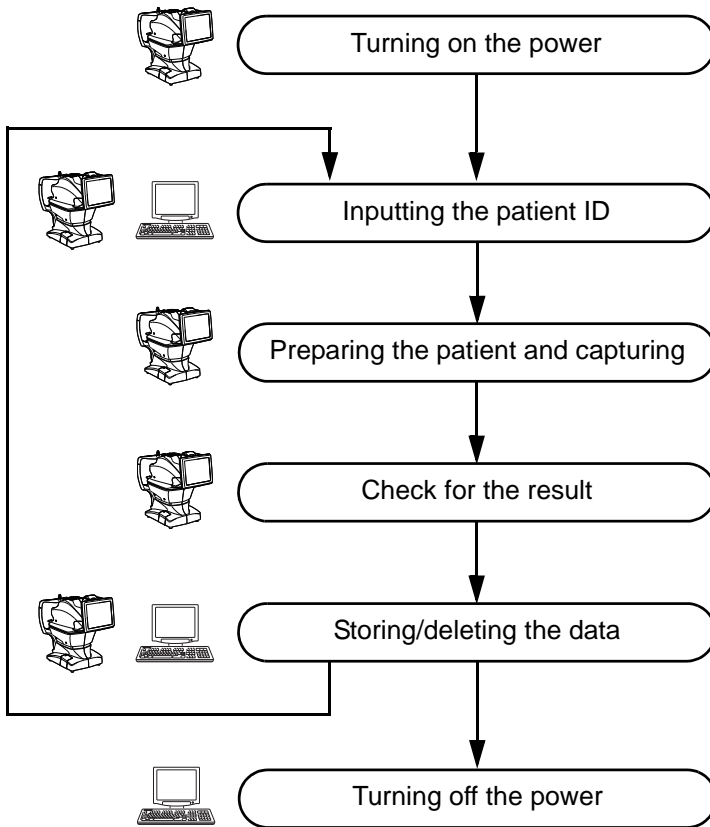
BASIC OPERATIONS


FLOW OF OPERATION

 CAUTIONS	Before starting photography, check the patient information, the captured eye, the picture angle and other photography conditions. If not, the image may be saved with incorrect photography information.
---	--

 :Operations of instrument body

 :Operations of PC



 NOTES	When connecting to a personal computer, contact your dealer or the offices listed on the back cover.
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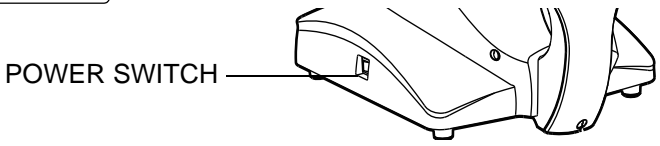
PREPARATION FOR PHOTOGRAPHY

Turn ON the power


1 Check the power cord connection.

For details, see "CONNECTING THE POWER CORD" on page 32.

2 Turn ON the **POWER SWITCH** of the instrument.



3 Confirm that the Title screen is displayed and then, in several tens of seconds, the capture screen should be displayed.

 NOTES	After the Title screen is displayed, the screen is blank for about 10 seconds because the built-in graphics are initialized. This is not a trouble.
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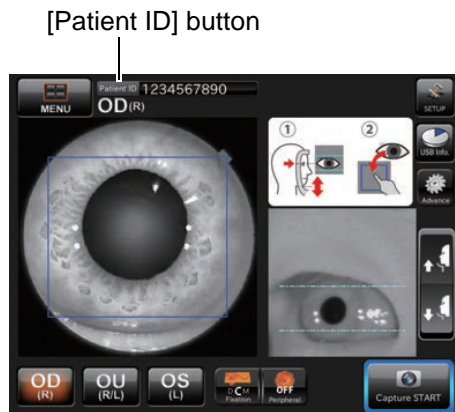
SETTING THE PATIENT

CAUTIONS

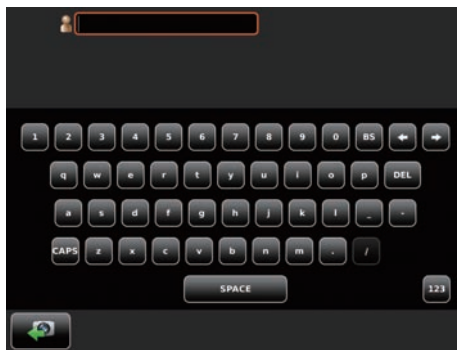
There is a mode which starts under the condition that the patient ID is input. If you want to take a picture with other patient ID, input the ID again. If not, the photographed image is registered as the data of a different patient.

Inputting the Patient ID

- 1 Tap the **[PATIENT ID]** button.



The patient ID input screen appears.



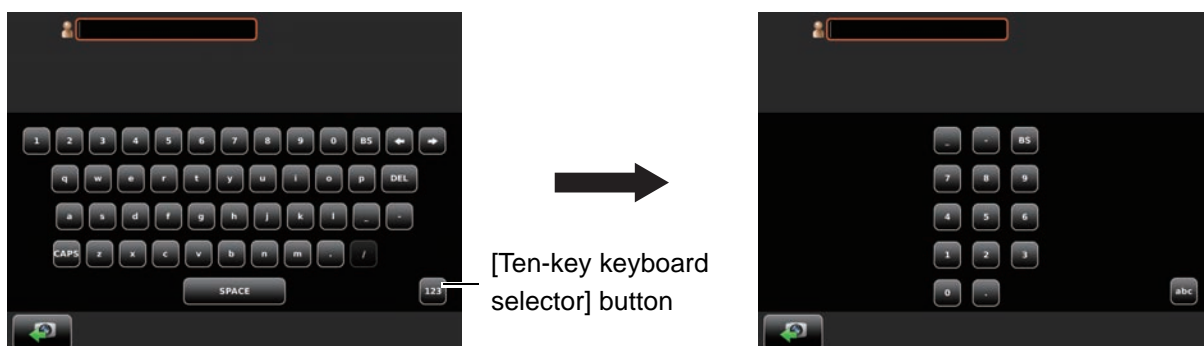
- 2 Tap the patient ID input item window to make the frame orange.



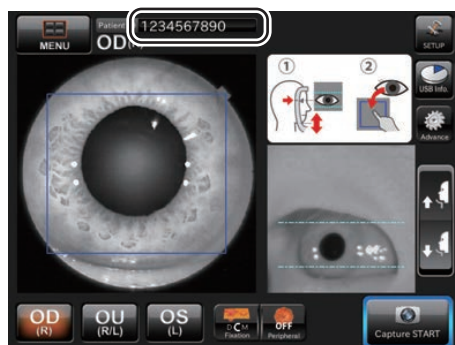
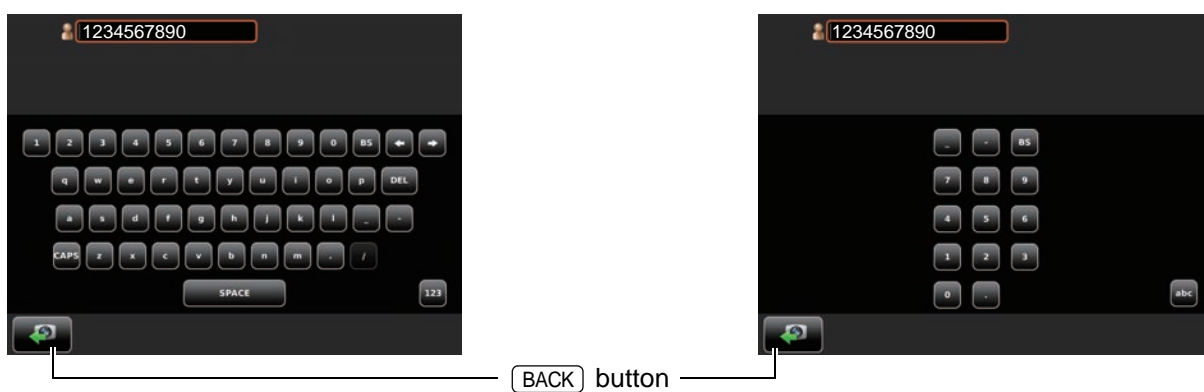
- 3** Tap the **[INPUT]** button to enter the patient ID.




- 4** When you want to input numerals with ten keys, tap the **[TEN-KEY KEYBOARD SELECTOR]** button to access the ten-key input screen.
Input numerals by the same procedure as the above Step 2 - 3.




- 5** Tap the **[BACK]** button to return to the chinrest adjustment screen. Make sure that the patient ID is updated.





FUNDUS PHOTOGRAPHY

 CAUTIONS	<ul style="list-style-type: none"> • When selecting a patient, the base is initialized. To avoid injury of the patient, instruct the patient to move away his/her chin from the chinrest. • Caution in photography Under the following photography conditions, there is a bright spot on the center of the picture. <ul style="list-style-type: none"> • The patient's pupil is small. (This condition includes the case of "When the small pupil diaphragm is set to ON".) • The flash level is high. • Alignment is not adjusted properly. <p>To improve these conditions, carry out the following operations.</p> <ul style="list-style-type: none"> • Darken the room to enhance dilation. When using mydriatic, follow the judgment of a doctor and the instruction manual about medicine. • Adjust alignment for the position where the flare is the least visible on the monitor screen. • Set the flash level to the lowest setting the environment will allow. <p>Then, take a picture.</p> <ul style="list-style-type: none"> • To avoid injury of the patient, be careful not to bump the patient's eye or nose with the instrument and external fixation target when operating the control panel.
---	---

 NOTES	<p>To ensure correct imaging, adjust the table height so the patient can relax with his/her chin placed centrally on the chinrest.</p>
--	--

Preparing the patient and capturing

 CAUTIONS	<ul style="list-style-type: none"> • To avoid electric shock, do not touch the external connection terminal and the patient at the same time. • When moving the chinrest up and down, be careful not to pinch the patient's hand to avoid possible injury. • When moving the main unit by auto/manual alignment, the external fixation target will be pushed by the measuring head. Be careful to prevent the external fixation target from hitting the patient.
---	---

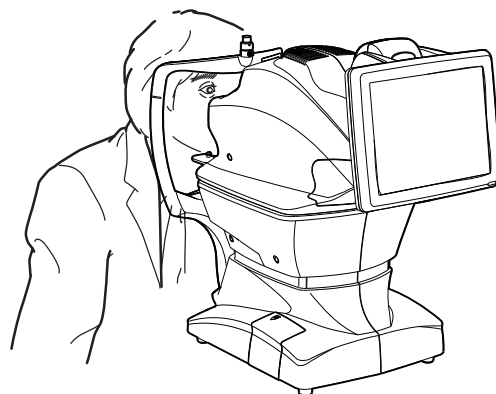
 NOTES	<ul style="list-style-type: none"> • If the patient wears glasses or contact lenses, have him/her remove them first. • When automatic photography is not good, it is possible to perform adjustment manually.
--	---

1 Peel off one chinrest paper. If there is not chinrest paper, supply it. (Refer to P.93.)

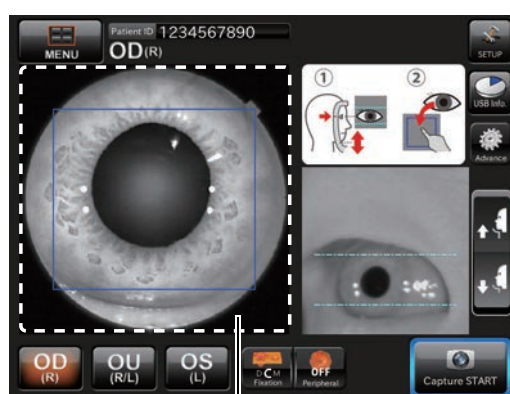
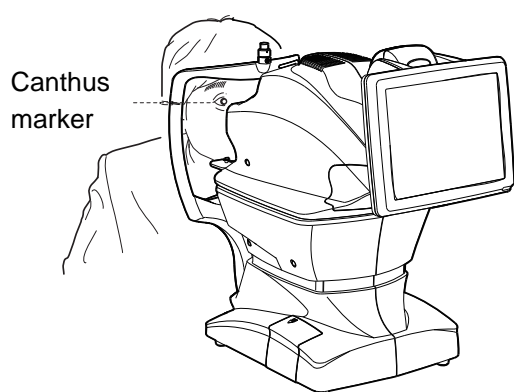
2 Wipe off dust on the forehead rest.

3 Seat the patient comfortably on an exam stool or chair in front of the instrument.

4 Adjust the table height or chair height so the patient can relax with his/her chin placed centrally on the chinrest.
Let the patient rest his/her chin on the chinrest.



5 Adjust the chinrest height by adjusting the **CHINREST UP/DOWN** button so the outside corner of the patient's eye is level with the Canthus marker on the chinrest post.
Let the patient rest his/her forehead on the forehead rest.
Tap Movie area 1 on the screen to place the pupil within the blue frame.



Movie area 1

Chinrest up/down button



NOTES

In the photography with "optic disc" as the fixation target, the peripheral fixation targets around the objective lens are lit to guide the patient's eye to the correct position easily when taking a picture.

6 Instruct the patient to look at the green light (internal fixation target).

7 After the preparation has been completed, tap the **CAPTURE START** button. Automatic alignment starts.

8 After automatic alignment, automatic focus starts.



NOTES

- When automatic operation is not possible for certain reasons, the manual adjustment screen is automatically accessed. You can also access the manual adjustment screen by tapping the **CAPTURE STOP** button. For operation on the manual screen, refer to "■ OPERATION ON THE MANUAL ADJUSTMENT SCREEN" on P.58.

9 After the preparation for photography has been completed, Auto Shoot Timer begins to count. Then, after the given time has passed, photography is executed.

10 The result of photography is displayed.



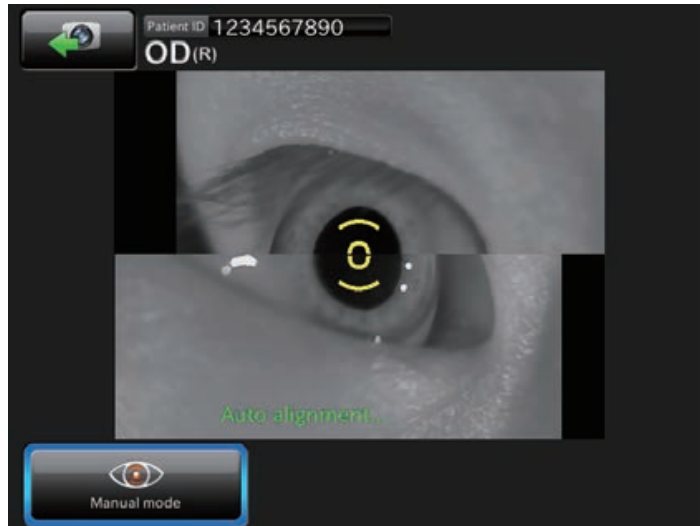
NOTES

- The following modes are also provided:
 - Mode not to display the photography result;
 - Mode to display the results after all the specified pictures have been taken;
 - Mode to cancel the preview function after the given time has passed.

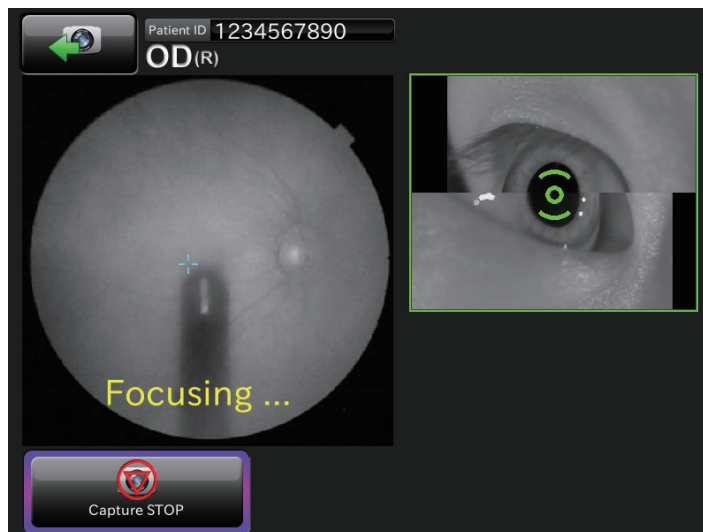
■ **Photography screen (Automatic photography)**

After adjusting the chin position with the **CHINREST UP/DOWN** button, tap the **CAPTURE START** button. Automatic photography starts. The following steps are automatically executed in the order listed below.

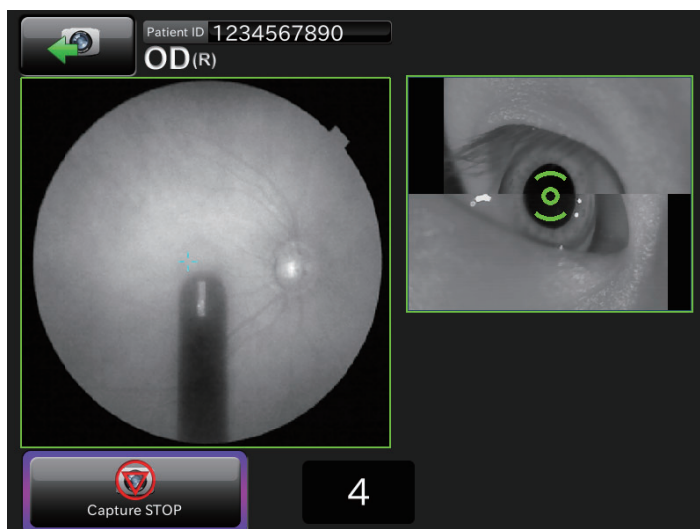
1 Alignment to pupil is performed automatically.



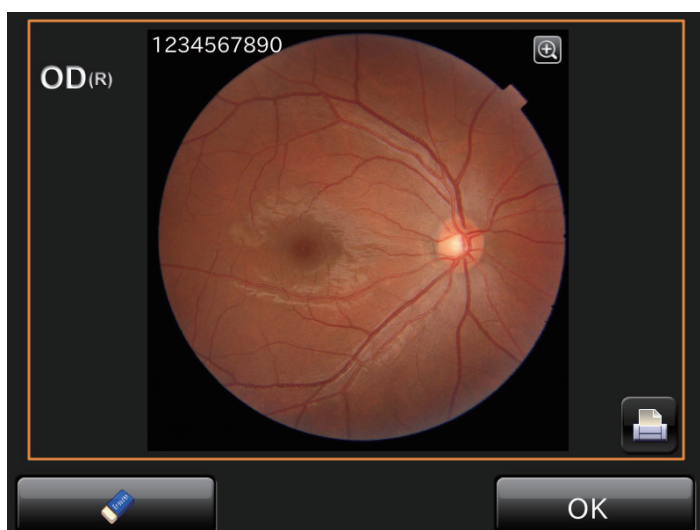
2 Automatic focus to fundus is performed automatically.



- 3** The system shifts to the waiting status for the capture start and the capture timer starts. After the given time has passed on the capture timer, photography starts automatically.



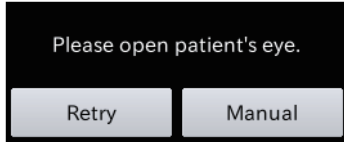
- 4** After the photograph is taken, the result is automatically displayed.



■ Photography screen (when automatic photography has failed)

If an error message is displayed during automatic photography, perform adjustment by manual photography. Then, tap the **CAPTURE START** button to continue the photography.

- If an error has occurred during automatic alignment to pupil:
If the patient's face or eye cannot be detected or the pupil center is not tracked, the following messages are displayed.



When the eyelid is not opened fully

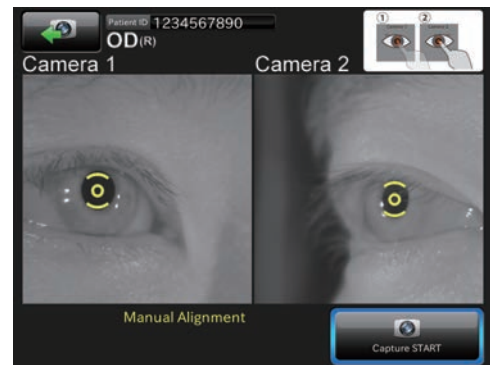
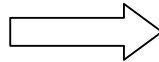
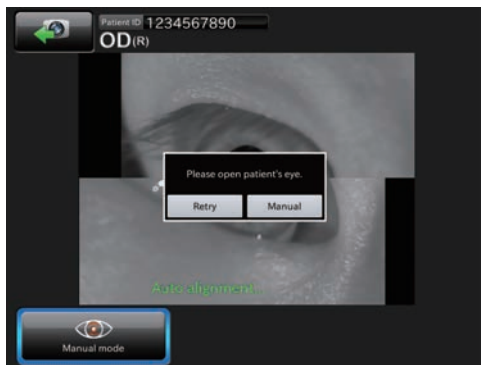


When the eye fixation is not stabilized

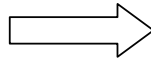
Perform one of the following operations.

- Set the patient properly, press the **RETRY** button and perform automatic alignment again according to the message.
- Press the **MANUAL** button to shift to the manual adjustment mode.

After tapping the pupil in the movie area, tap the **CAPTURE START** button to continue the photography.

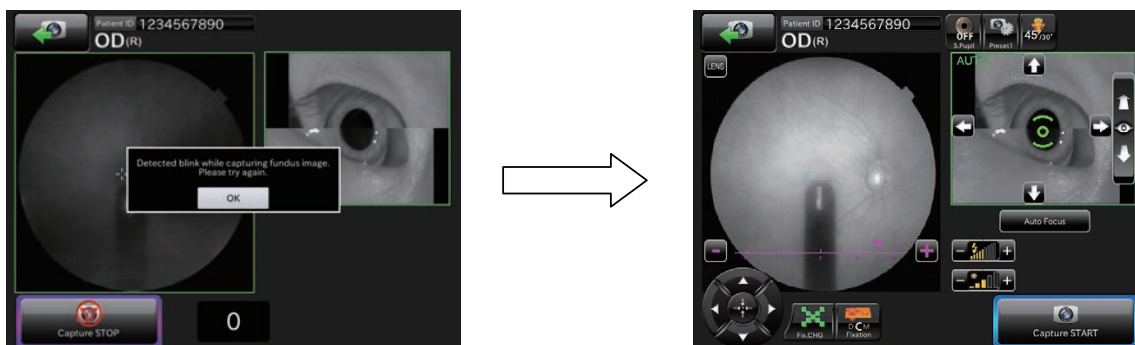


- If an error has occurred during automatic focus:
If automatic photography has failed, shift to the manual adjustment mode. After adjusting, press the **CAPTURE START** button to continue the photography.

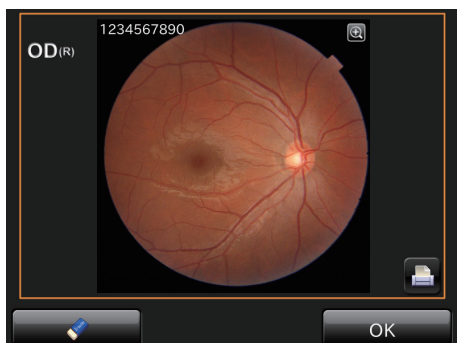


- If an error has occurred during the following process: The system shifts to the waiting status for the capture start and the capture timer starts. After the given time has passed on the capture timer, photography starts automatically.

If any trouble such as blink is detected right before photography, shift to the manual adjustment mode. After adjusting, tap the **CAPTURE START** button to continue the photography.



- After the photograph is taken, the result is automatically displayed.

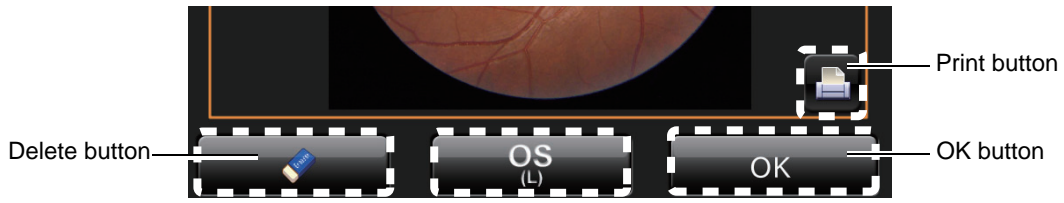


Check for photography result

1 When the photography result is OK. : Tap the **OK** button.

Where OU photography is selected, shift to the photography for the other eye. To photograph the other eye, operate as indicated in step **4** and below on page 42.

When the photography result is not OK. : Tap the **DELETE** button to delete photographic data.



2 After the necessary photograph is taken, let the patient move away from the instrument body.

HOW TO SHUT DOWN

Shutting down the instrument

1 Turn OFF (○) the **POWER SWITCH** of the instrument.



NOTES

- When the instrument is not in use for a long time, unplug the power cords of the instrument, external recording device and others from the outlet and remove the cords from each device.
- This instrument adopts a "Power save method" (P.36). If you use the instrument continually all day, it is recommended that you use it without turning off the **POWER SWITCH**.

ANTERIOR SEGMENT PHOTOGRAPHY

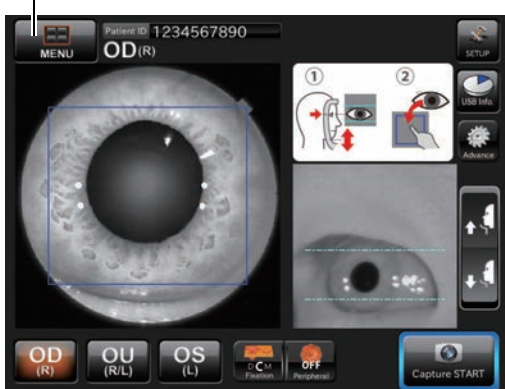
CAUTIONS

- To avoid injury of the patient, be careful not to bump the patient's eye or nose with the instrument and external fixation target when operating the control panel.
- When selecting a patient, the base is initialized. To avoid injury of the patient, instruct the patient to move away his/her chin from the chinrest.

Selecting the photography button

On the photography screen (chinrest adjustment), which is the initial screen, tap the **PHOTOGRAPHY SELECTOR** button to select the **ANTERIOR SEGMENT PHOTOGRAPHY** button.

Photography selector button



Anterior segment photography button



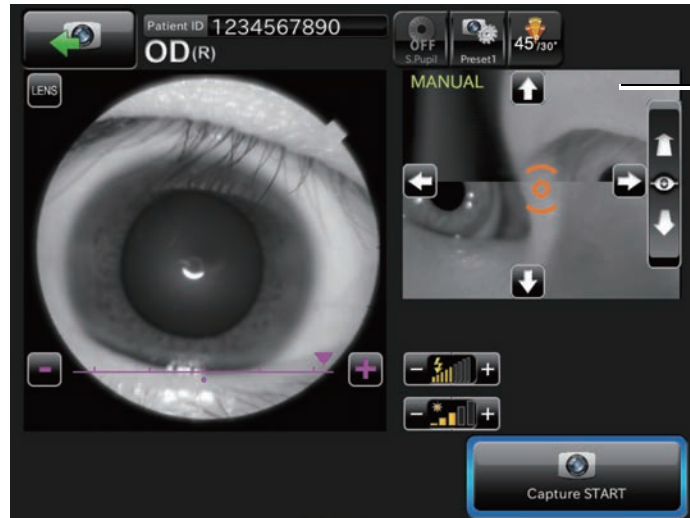
Setting up the patient

Refer to "Preparing the patient and capturing" on page 41.

■ Anterior segment photography

After adjusting the chin position with the **CHINREST UP/DOWN** button, tap the **CAPTURE START** button. The system shifts to the manual adjustment screen.

- 1 Perform adjustment so that the anterior segment image can be seen clearly. Then, tap the **CAPTURE START** button to start the photography.




Even if the image on the movie area 2 is not fit, there is no problem.

- 2 After the photograph is taken, the result is automatically displayed.



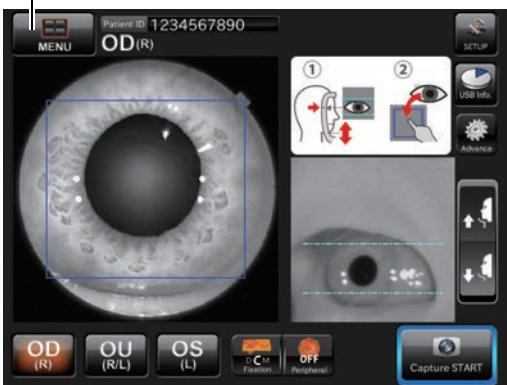
STEREOSCOPIC PHOTOGRAPHY

 CAUTIONS	<ul style="list-style-type: none">• When selecting a patient, the base is initialized. To avoid injury of the patient, instruct the patient to move away his/her chin from the chinrest. <p>Caution in photography</p> <p>Under the following photography conditions, there is a bright spot on the center of the picture.</p> <ul style="list-style-type: none">• The patient's pupil is small. (This condition includes the case of "When the small pupil diaphragm is set to "ON")• The flash level is high.• Alignment is not adjusted properly. <p>To improve these conditions, carry out the following operations.</p> <ul style="list-style-type: none">• Darken the room to enhance dilation. When using mydriatic, follow the judgment of a doctor and the instruction manual about medicine.• Adjust alignment for the position where the flare is the least visible on the monitor screen.• Set the flash level to the lowest setting the environment will allow. <p>Then, take a picture.</p> <ul style="list-style-type: none">• To avoid injury of the patient, be careful not to bump the patient's eye or nose with the instrument and external fixation target when operating the control panel.
---	---

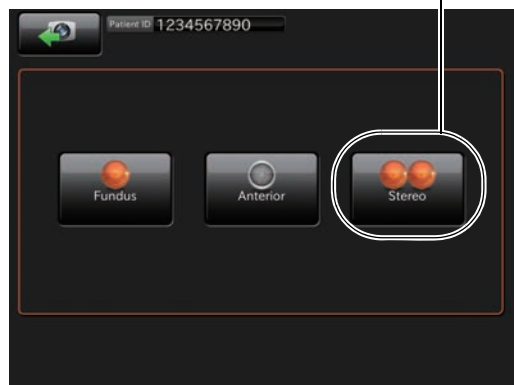
Selecting the photography button

On the photography screen (chinrest adjustment), which is the initial screen, tap the **PHOTOGRAPHY SELECTOR** button to select the **STEREOSCOPIC PHOTOGRAPHY** button.

Photography selector button



Stereoscopic photography button



Setting up the patient

Refer to "Preparing the patient and capturing" on P.41.

■ Stereoscopic photography

After adjusting the chin position with the **CHINREST UP/DOWN** button, tap the **CAPTURE START** button. Automatic photography starts.

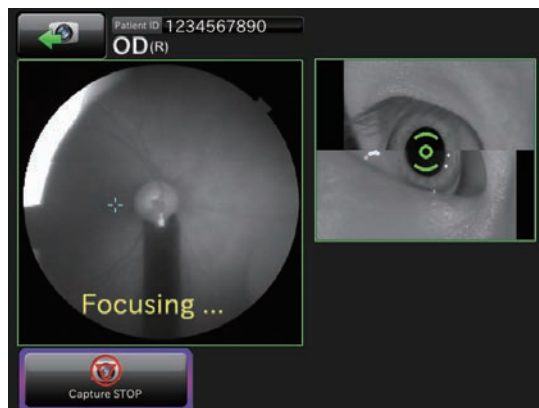


Make sure that the desired fixation target is selected and then start photography. The following steps are automatically executed in the order listed below.

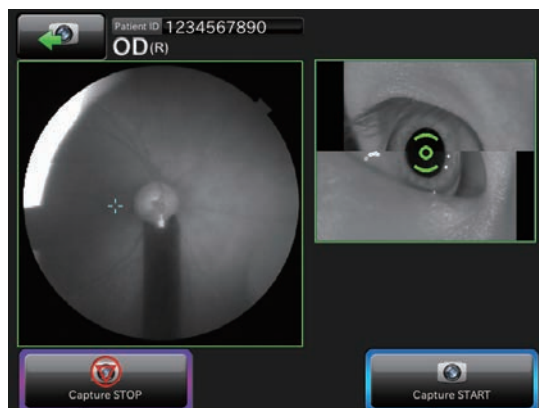
- 1 Alignment to pupil is performed automatically.



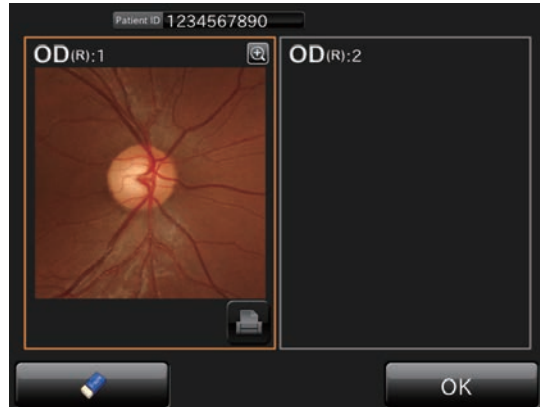
- 2 Automatic focus to fundus is performed automatically.



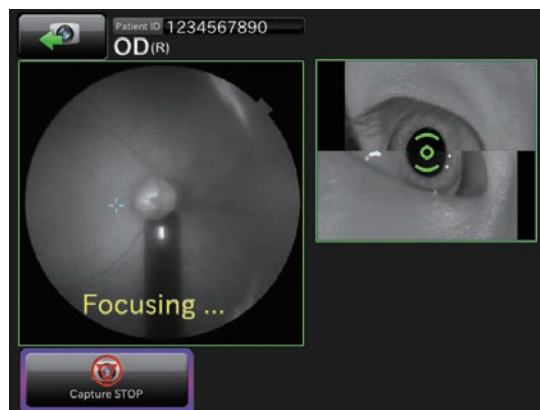
- 3 The system shifts to the waiting status for the capture start and the base moves rightward as viewed from the patient side. Make sure that the pupil is open (it is larger than the pupil detection mark) and then tap the **CAPTURE START** button to take a picture.



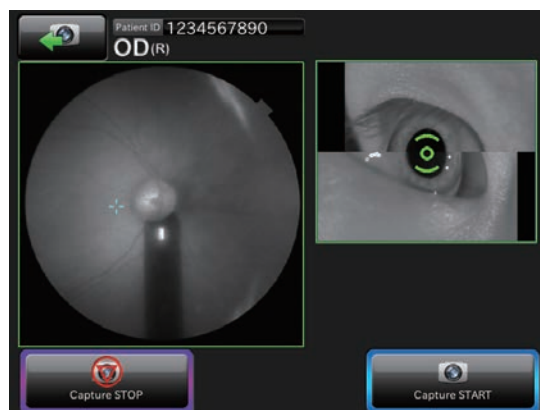
- 4 After the photograph is taken, the result is automatically displayed. Tap the **OK** button, and the second capturing is automatically performed.



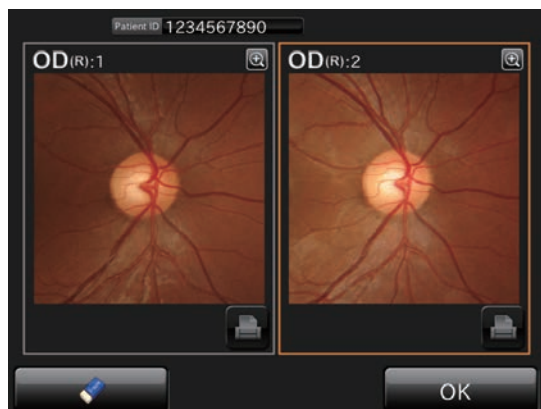
- 5 Automatic focus to fundus is performed automatically.



- 6 The system shifts to the waiting status for the capture start and the base moves leftward as viewed from the patient side. Make sure that the pupil is open (it is larger than the pupil detection mark) and then tap the **CAPTURE START** button to take a picture.



7 After the photograph is taken, the result is automatically displayed.

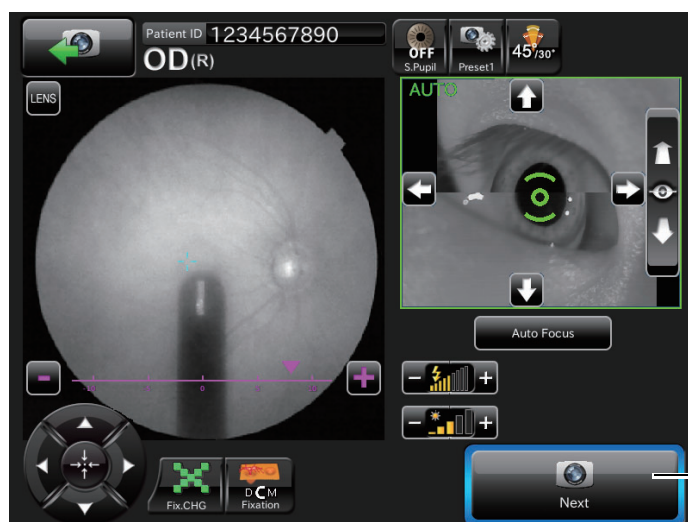


NOTES

- For shifting to the left and right base, the flare might be seen in the image.
- If alignment or focus is not good, perform adjustment by the manual adjustment mode.

Manual adjustment mode in stereoscopic photography


After adjusting alignment or focus, tap the **NEXT** button.



[Next] button

The base moves to the capturing position. Tap the **CAPTURE START** button to start photography.

FUNDUS PERIPHERAL PHOTOGRAPHY

 CAUTIONS	<ul style="list-style-type: none">• When selecting a patient, the base is initialized. To avoid injury of the patient, instruct the patient to move away his/her chin from the chinrest. <p>Caution in photography</p> <p>Under the following photography conditions, there is a bright spot on the center of the picture.</p> <ul style="list-style-type: none">• The patient's pupil is small. (This condition includes the case of "When the small pupil diaphragm is set to "ON")• The flash level is high.• Alignment is not adjusted properly. <p>To improve these conditions, carry out the following operations.</p> <ul style="list-style-type: none">• Darken the room to enhance dilation. When using mydriatic, follow the judgment of a doctor and the instruction manual about medicine.• Adjust alignment for the position where the flare is the least visible on the monitor screen.• Set the flash level to the lowest setting the environment will allow. <p>Then, take a picture.</p> <ul style="list-style-type: none">• To avoid injury of the patient, be careful not to bump the patient's eye or nose with the instrument and external fixation target when operating the control panel.
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Selecting the photography button

On the photography screen (chinrest adjustment) after start, select the PERIPHERAL PHOTOGRAPHY SELECTOR button.



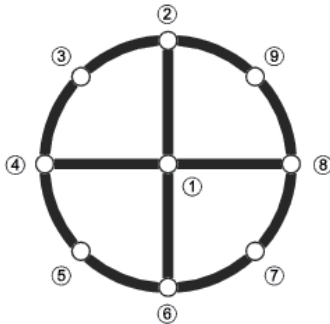
Peripheral photography selector button

Setting the picture position

- The fixation position can be changed in nine directions with the following buttons. On the button, the capture count is displayed at each fixation position. These buttons are displayed on the chinrest adjustment screen and the manual adjustment mode screen.



- You can set the following six fixation patterns on the setting menu. For setting, refer to page 66.



Fixation pattern	Lighting place
4X	③ ⑤ ⑦ ⑨
4+	② ④ ⑥ ⑧
5X	① ③ ⑤ ⑦ ⑨
5+	① ② ④ ⑥ ⑧
8	② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨
9	① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨



NOTES

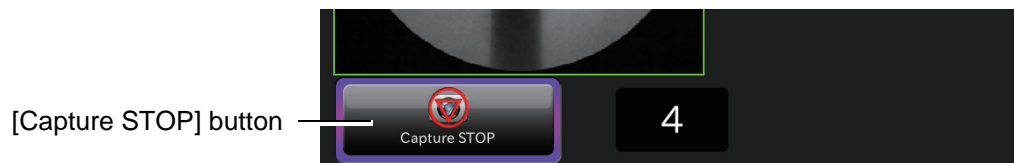
The automatic small pupil function does not work.
When binocular photography is selected, the first eye will be photographed.

Setting up the patient

Refer to "Preparing the patient and capturing" on page 41.

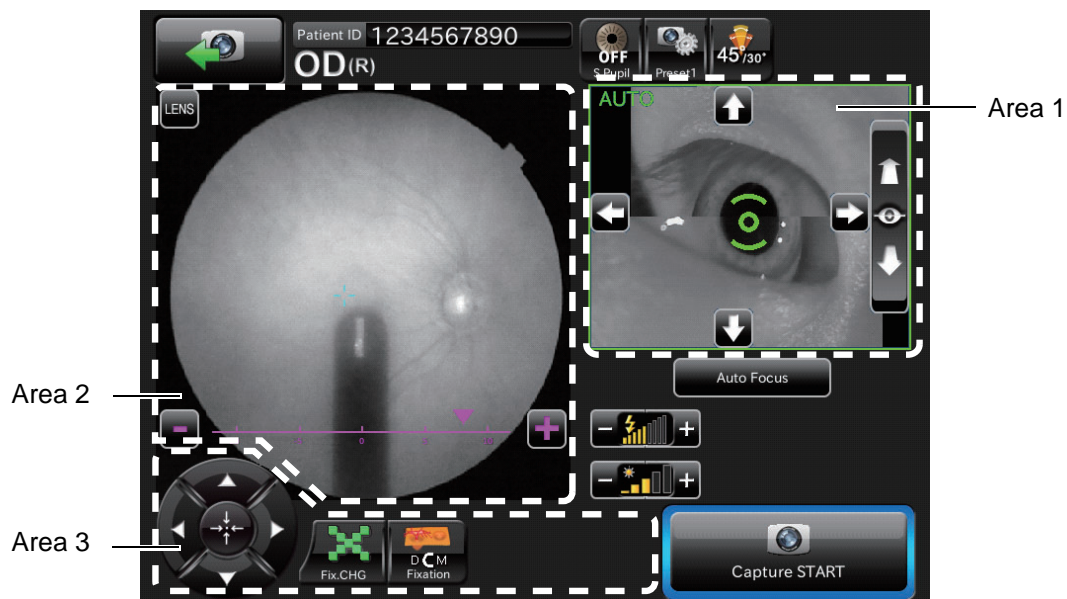
OPERATION ON THE MANUAL ADJUSTMENT SCREEN

Tap the [CAPTURE STOP] button after the alignment for pupil has been finished. It is possible to perform manual adjustment.



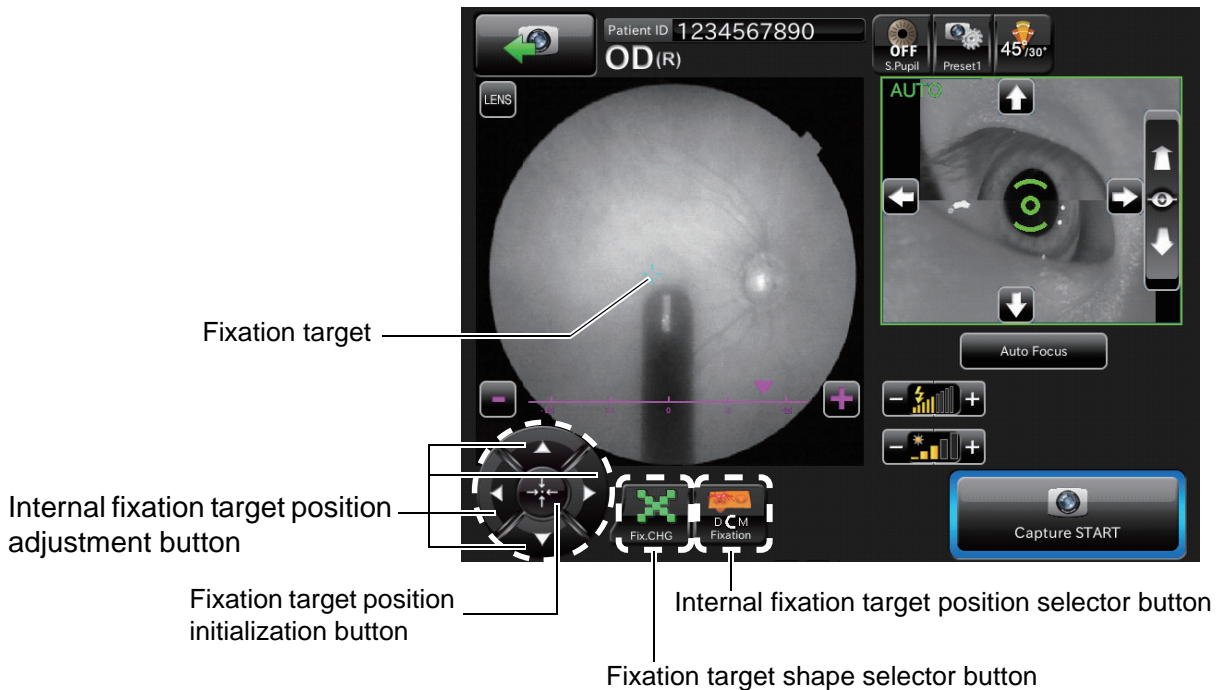
During manual adjustment, the following photography screen is shown.

For the details of the screen, refer to page 22. For the details of operations, refer to the next page and after.



■ Changing the fixation target

Tap the buttons in the following screen to change and adjust the fixation target.



- Fixation target** : Indicates the fixation target position.
- Internal fixation target position adjustment button** : Tap the upper, lower, right and left buttons when the fixation target is displayed. The target position can be moved. After 3 seconds have passed since the last operation, the fixation target disappears on the fundus image. (*)
- Fixation target position initialization button** : If the fixation target is not displayed, it is displayed and its initial position is not changed. Tap this button when the fixation target is displayed. The fixation target is reset to its initial position. After 3 seconds have passed since the last operation, the fixation target disappears on the fundus image. (*) The button color is not changed.
- Fixation target shape selector button** : If the fixation target is not displayed, it is displayed on the fundus and its shape is not changed. Tap the **FIXATION TARGET SHAPE SELECTOR** button when the fixation target is displayed, and the target shape will change to "•" and "x" alternately. After 3 seconds have passed since the last operation, the fixation target disappears on the fundus image. (*) The button color is not changed.
- Internal fixation target position selector button** : Set the fixation position of the patient. By this button, "Disc", "Center" and "Macula" are changed in turn.

* When you select "CONSTANT" after tapping the buttons in the following order "**SET UP**" (setting menu) button" → "PAGE 1: Photography Setting" → "Fixation" → "TYPE", the fixation target does not disappear.

■ Setting the picture position

You can change the default picture position. When the external fixation target, which is the optional accessory, is mounted, you can change the picture position to the external fixation target if necessary. There are the following changing methods. Please change the picture position by your desired method.

- **Changing by using the external fixation target button**

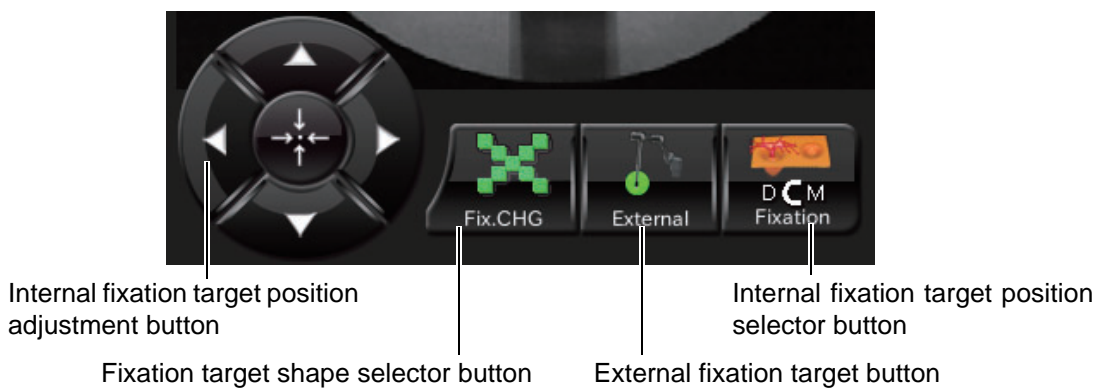
Change the internal fixation target to the external fixation target.



NOTES

The **EXTERNAL FIXATION TARGET** button is displayed only when the external fixation target, which is the optional accessory, is mounted and it is set to "valid".

- 1 Tap the **EXTERNAL FIXATION TARGET** button on Area 3 of photography screen, and the target is changed to the external fixation target. Change to the desired picture position.




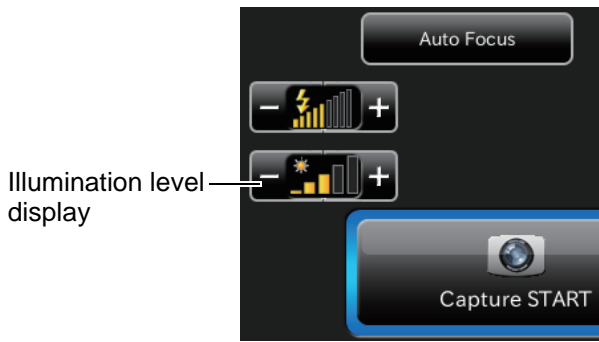
- **Changing by using the internal fixation target position adjustment button (control panel)**

Change the picture position by adjusting the internal fixation target position finely.

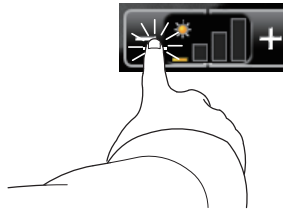
- 1 Tap the **INTERNAL FIXATION TARGET POSITION ADJUSTMENT** button on Area 3 of the photography screen to access the internal fixation target adjustment mode. The internal fixation target is displayed on Area 2. Perform adjustment by tapping the upper, lower, right and left arrow buttons.

■ Setting the illumination level

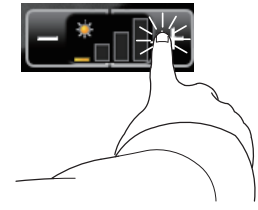
Tap the "+" of the [Illumination level] display  on the photography screen (manual focus), and the illumination level increases. Tap the "-", and the illumination level decreases.



Illumination level decreases.



Illumination level increases.




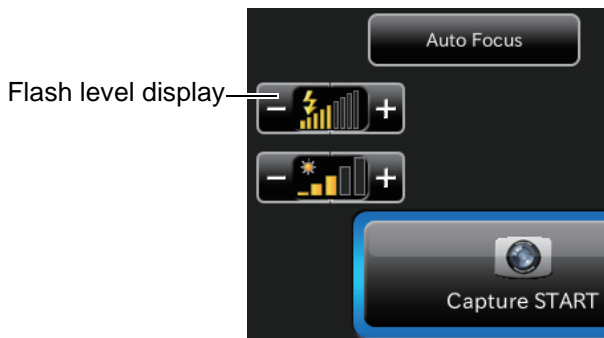
■ Setting the flash level



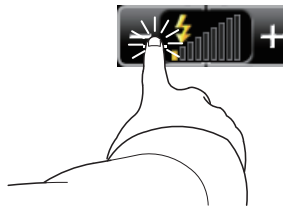
CAUTIONS

To avoid discomfort to the patient, do not brighten the photography light more than necessary.

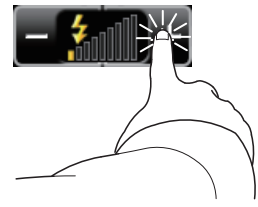
Tap the "+" of the [Flash level] display  on the photography screen (manual focus), and the flash level increases. Tap the "-", and the flash level decreases.



Flash level decreases.

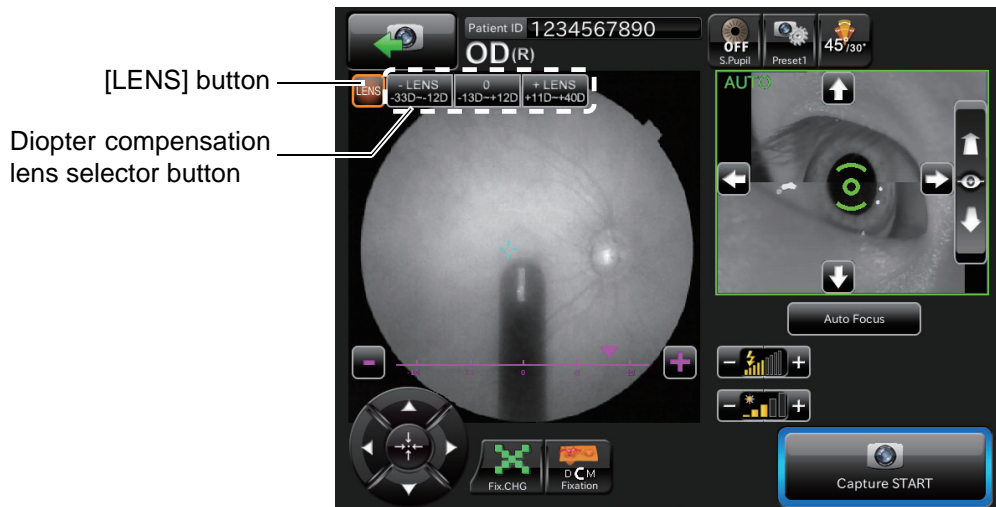


Flash level increases.



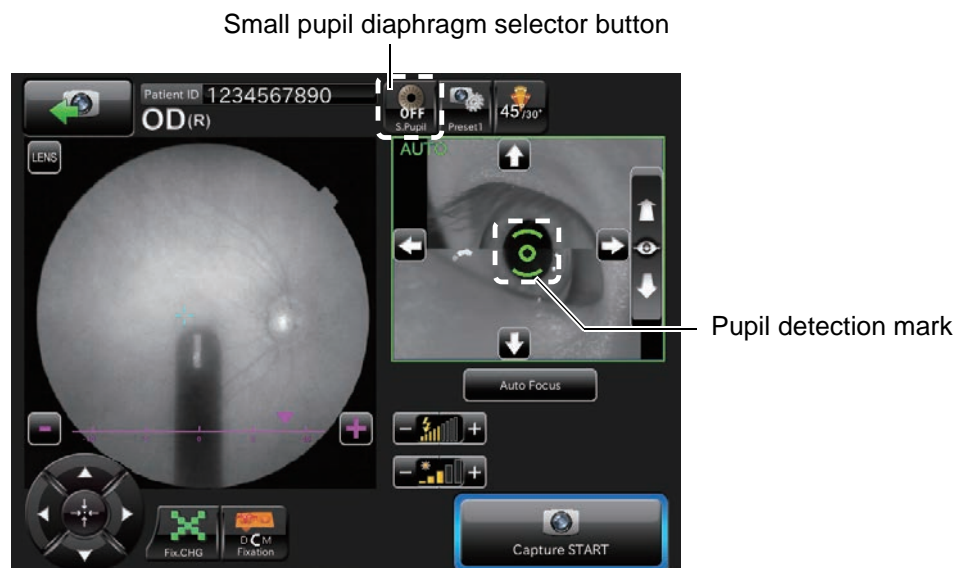
■ Changing the diopter compensation lens

Tap the [LENS] button on the photography screen (manual focus) to display the [DIOPTER COMPENSATION LENS SELECTOR] button. Change the diopter compensation lens according to the patient's eye status.



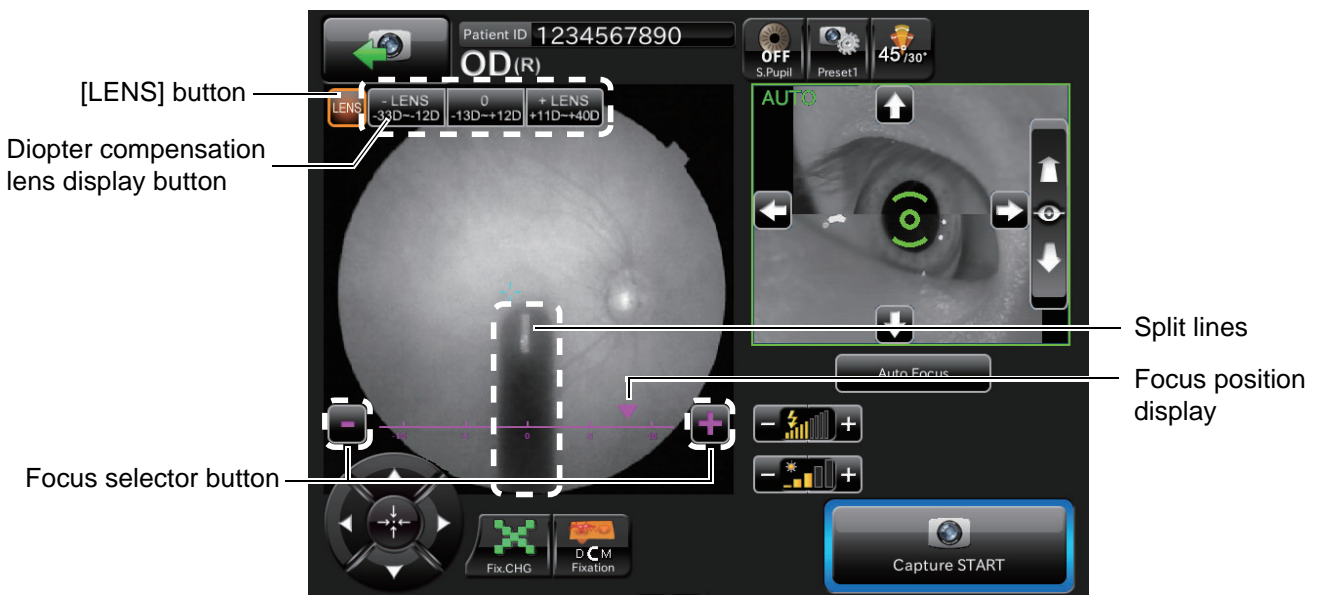
■ Changing the small pupil diaphragm

This button displays the small pupil diaphragm status (ON/OFF). You can change the ON/OFF status of the small pupil diaphragm. When the pupil diameter of the patient is small (when it is smaller than the pupil detection mark), set it to ON and take a picture. The automatic small pupil (diaphragm) function can be set. While this function is set, the small pupil diaphragm is automatically set to ON and the instrument takes a picture of fundus if the pupil diameter is small. After taking a picture, it is set to OFF. When you set this function in fundus photography, it is not necessary to set the small pupil diaphragm to ON with this button even if the pupil diameter is small.



■ Focus adjustment

Tap the buttons shown in the screen below to adjust focus.



- Diopter compensation lens display button : Tap [+LENS] to increase the power. Tap [-LENS] to decrease the power. The center displays "No compensation lens".
- Split lines : Split lines are displayed. This display is changed according to the **FOCUS SELECTOR** button.
- Focus selector button : Changes focus.
- Focus position display : Displays the current focus. Tap [+] of the **FOCUS SELECTOR** button, and the focus moves rightward. Tap [-], and it moves leftward.

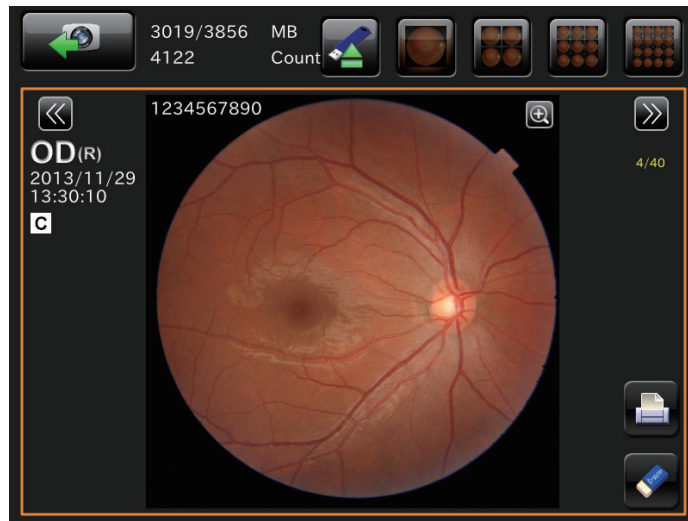


NOTES

- When the patient's eye has a strong myopia, set the **DIOPTRER COMPENSATION LENS SELECTOR** button to (-).
When the patient's eye has a strong hyperopia, set the **DIOPTRER COMPENSATION LENS SELECTOR** button to (+).
Compensation range: 0 : -13 ~ +12D
- : -33 ~ -12D
+ : +11 ~ +40D
- When the diopter compensation lens is set to a value other than "0", the split lines disappear. At the same time, the functions of auto focus, auto shoot and auto small pupil (diaphragm) are invalidated. You can carry out operation manually.

BROWSING DATA

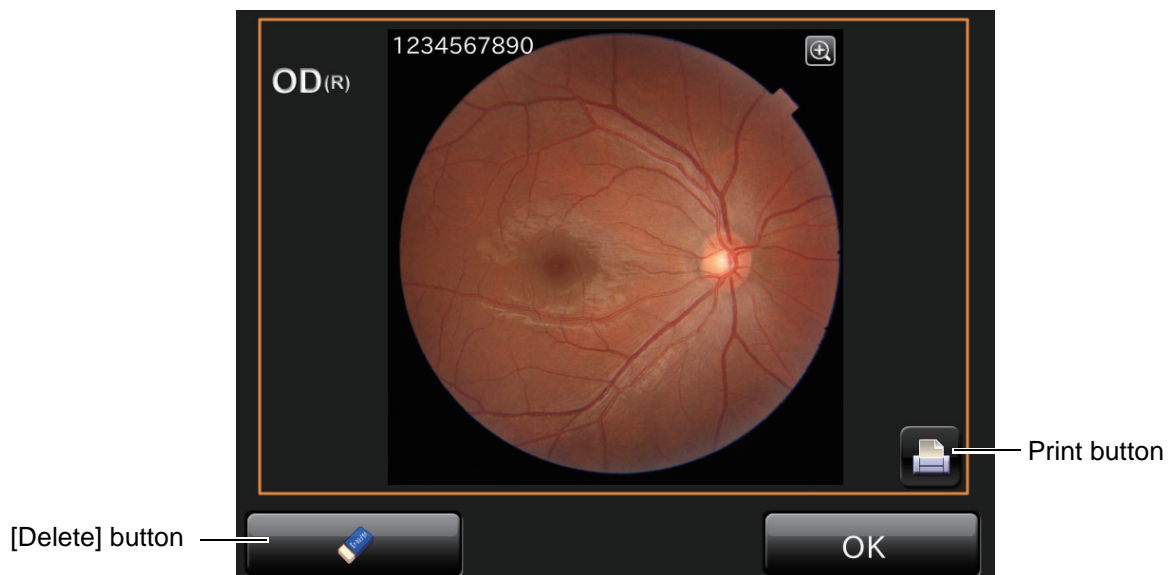
The image saved in the USB memory is displayed. Browse, print and delete the images. When two or more images are displayed and selected, the selected images are processed at a time.



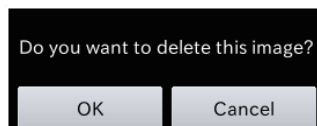
NOTES

When the display status is changed to "only one image display" after selecting the images on the screen where two or more images are displayed, the image of the newest shooting date among the selected images is displayed.


DELETING DATA



Tap the **[DELETE]** button while the preview screen is being displayed. The following check message is displayed. Tap the **[OK]** button, and the data that is displayed on the preview screen is deleted.



SAVING DATA


 CAUTIONS	<ul style="list-style-type: none">• While the message showing that data is being transferred is displayed, do not turn off the instrument. If you turn off the instrument during data transfer, the data may be lost.• Right after "Please wait" is displayed during saving, do not turn off the power. Data may be lost.• The saved data includes private information. Be very careful when setting the external save destination or when handling the USB memory.
---	---

Tap the **OK** button while the preview screen is being displayed. The data that is displayed on the preview screen is saved.

If the preview screen is not displayed, the data is saved automatically.

When tapping the **OK** button in the DICOM connection status, the image is sent to the DICOM server.

When connected to IMAGEnet, the image is sent to IMAGEnet.

 NOTES	<ul style="list-style-type: none">• When the USB memory is connected, data is saved in the USB memory even if the data is not saved into an external save destination successfully.• Before saving data into an external save destination, make sure that the user authority is proper. For the setting method, contact your dealer or the offices listed on the back cover.• If data is being transferred or there is any data that is not transferred in DICOM connection, a message is displayed on the operation guide area.• For connecting the DICOM server, contact your dealer or the offices listed on the back cover.
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PRINTING DATA

Tap the **PRINT** button while the printer is connected. Printing starts.

DETAILS OF THE SETTING MENU

On the setting menu screen, you can set a variety of data.

Preparation for setting

- 1 Check the power cord connection.
For details, see "CONNECTING THE POWER CORD" on page 32.
- 2 Turn ON (I) the **POWER SWITCH** of the instrument.

Displaying the setting menu screen

- 1 Check the photography screen (chinrest adjustment), which is the initial screen.
- 2 Tap the **SET UP** button on the photography screen (chinrest adjustment).



- 3 Check the setting menu screen.



Returning to the photography screen:

- 1 Tap the **CANCEL** button.
- 2 Return to the photography screen.

PAGE 1: Photography Setting

On the "PAGE 1" screen, you can set a variety of data for photography. For the details on each button, refer to page 29.

- PAGE 1: Initial screen



On PAGE 1, the items shown in the following table are assigned to the buttons on each layer.

Utility button	Item button	Item selector button	At shipment
Fixation	Type	CONSTANT (Lighting)	
		FLICKERING (Blinking)	<input type="radio"/>
	SPEED NORMAL (Hz)	1 – 8	1
	Brightness	1 – 10	10
	Shape (Default)	1 dot	
		X	<input type="radio"/>
	Shape (Additional)	No in use	<input type="radio"/>
		4 square dots	
		Cross	
	Screen Display	Constant	<input type="radio"/>
		Given time	
	Stereo	Center	
Macular			
Disc		<input type="radio"/>	
Anterior	Internal	<input type="radio"/>	
	External		
Internal Type	DCM	<input type="radio"/>	
	DCT		

Utility button	Item button	Item selector button	At shipment
Fundus Photo	Blink Detection Level	OFF	
		LOW	○
		Normal	
	Color Mode	Normal ISO	○
		Low ISO	
	Flash Level	1.0 – 15.7W•s	*1
	Gain	0 – 9, BS, AC *2	*1
	Peripheral Photo Sequence	Chinrest screen	○
		Capture screen	
	Peripheral Photo Pattern	4X	
		4+	
		5X	
		5+	
		8	
9		○	
Peripheral Photo Fixation Move	AUTO, MANUAL	AUTO	
Illumination Level	Fundus Photo	1 – 5	3
Flash Level Adjust	Stereoscopic photography	-4 – +4	0
	Peripheral photography	0 – +4	+1
	Anterior segment photography	-4 – +4	-3
	30° photography	-4 – +4	-1

*1: For the flash level and Gain of each image quality at shipment, refer to the table below.

Image quality	Flash level		Gain	
	Settable range	Setting at shipment	Settable range	Setting at shipment
Normal	1.0 – 15.7W•s	4.0W•s	0 – 63	0
Low	1.0 – 15.7W•s	2.0W•s	0 – 63	8

*2: Ten keys are displayed.

PAGE 2: Auto Operation

On the "PAGE 2" screen, set the Auto functions. For details on each button, refer to page 29.

- PAGE 2: Initial screen



On PAGE 2, the items shown in the following table are assigned to the buttons on each layer.

Utility button	Item button	Item selector button	At shipment
Auto Alignment	ON/OFF	OFF	
		ON	<input type="radio"/>
	ACTION	Disconinuous	
		Continuous	<input type="radio"/>
	Timeout (Sec)	OFF, 10, 20, 30	20
Manual Mode	two cameras	<input type="radio"/>	
	one camera		
Focus	ON/OFF	OFF	
		ON	<input type="radio"/>
	Timeout (Sec)	10, 20, 30	10
	One Touch Auto Focus	OFF	
one time sequence		<input type="radio"/>	
Small Pupil	ON/OFF	OFF	<input type="radio"/>
		ON	
	Magnification mode	45° mask	<input type="radio"/>
		30° mask	

- This function is usable only when the color fundus capture icon is selected.
- When the pupil diameter of the patient is small (when it is smaller than the pupil detection mark), the small pupil diaphragm is automatically set and the instrument takes a color picture of the fundus. After taking a picture, the small pupil diaphragm is automatically removed. When you set the small pupil diaphragm selector button to "ON" on Area 1 of the photography screen (color photography), the above automatic setting is not done.

Utility button	Item button	Item selector button	At shipment
Auto Operation	Capture timer value (sec.)	1, 2, 3, 4, 5	3
	Capture order of eyes	Right eye → Left eye	○
		Left eye → Right eye	
		From last captured eye	
	Preview	OFF	
		ON	○
	Preview method *1	Both eyes	
		Each eye (with timer)	
		Each eye	○
	Preview timer (sec.) *2	3, 5, 10	5
	Alignment check	OFF	
		ON	○
	Alignment check time-out *3	3, 5, 10	5
	Auto shoot	OFF	
ON		○	

*1: When "ON" is set for "Preview", it is valid to change setting for this item.

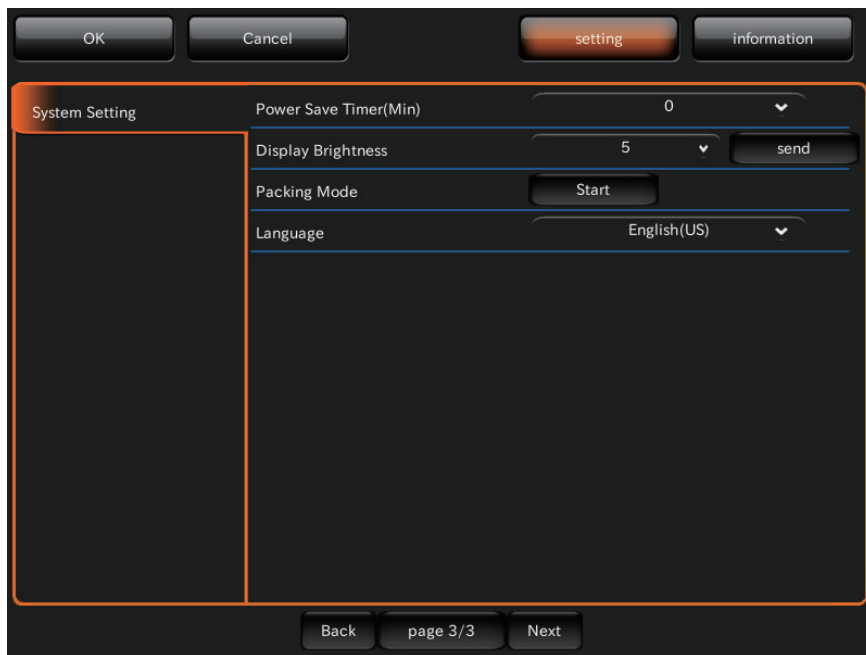
*2: When "ON" is set for "Preview" and "Each eye (with timer)" is set for "Preview method", it is valid to change setting for this item.

*3: When "ON" is set for "Alignment check", setting for this item is valid.

PAGE 3: System Setting

On the "PAGE 3" screen, set the system. For details on each button, refer to page 29.

- PAGE 3: Initial screen



On PAGE 3, the items shown in the following table are assigned to the buttons on each layer.

Utility button	Item button	Item selector button	At shipment
System Setting	Power Save Timer (Min.) Sets the time until the power save function is ON.	0 - 60 (At intervals of 5 minutes)	10
	Display Brightness Sets the brightness of control panel.	1 - 10	5
	Packing Mode Tap the [Start] button, and the head unit and chin-rest move to be in the packaged status.	Start	-
	Language Sets the display language.	Japanease (JP) / English (US)	English (US)

BEFORE REQUESTING SERVICE


TROUBLESHOOTING

Messages during operation

Error message	Contents
Out of memory. Please turn the power switch OFF and try again.	The memory area used by the built-in OS (Operating System) is not sufficient.
Failed to access a micro SD.	An error has occurred while accessing to the built-in micro SD card.
Failed to write a file on micro SD.	An error has occurred while writing to the built-in micro SD card.
Failed to read a file on micro SD.	An error has occurred while reading the built-in micro SD card.
Internal battery may have run out. Please set date and time.	The built-in battery seems to be dead and the date/time has been cleared. Set date/time. Contact the serviceman to replace the battery.
Camera is not connected.	An error has occurred in the communication to the built-in color photography camera. It is probable that the camera is not turned on or that the connecting cable is disconnected.
Failed to initialize a camera.	An initialization error has occurred in the built-in color photography camera.
Failed to capture fundus image.	An error has occurred in the communication to the built-in color photography camera.
Communication error is occurred. Check the connection to the external PC.	An error has occurred in the communication between the instrument and the external personal computer. Check if the LAN cable is connected to the instrument and the external personal computer correctly.
Detected blink while capturing fundus image. Please try again.	Blink is detected during photography.
Failed to charge Xenon flash. Please turn the power switch OFF.	An error has occurred when the power supply for xenon lamp (color fundus photography light source) is being charged.
Overcharged Xenon flash. Please turn the power switch OFF.	Overcharge has occurred in the power supply for xenon lamp (color fundus photography light source).
Lamp house cover is off. Please turn the power switch OFF and close the cover.	It is probable that the lamp house cover comes off or is not attached properly.
Failed to detect the center position of XZ stage.	An error has occurred during the initialization of head unit.
Failed to detect the center position of Y stage.	An error has occurred during the initialization of head unit.
Failed to detect the center position of Y-axis motor.	An error has occurred during the initialization of Y-axis motor.
EEPROM data error.	The EEPROM data of the built-in PCB is not normal.
TRC focus motor initialization error.	An error has occurred during the initialization of TRC focus motor.
Split unit motor initialization error.	An error has occurred during the initialization of split unit.
Diopter scale lens initialization error.	An error has occurred during the initialization of the diopter compensation lens motor.
Small pupil diaphragm motor initialization error.	An error has occurred during the initialization of the small pupil diaphragm motor.
Split initialization error.	An error has occurred during the initialization of split motor.

Error message	Contents
IR Compensation initialization error.	An error has occurred during the initialization of the IR compensation lens motor
Failed in auto focus.Please push [Auto Focus] button and execute auto focus again,or manually adjust focus.	Automatic focusing has failed.
Internal communication error. Please turn the power switch OFF.	An error has occurred in the communication between the built-in PCBs.
Failed to access the save destination. Please check the connection.	Connection to the specified save destination cannot be performed. Check the connection and the status of the save destination.
Failed to save the image. Please check the connection.	Saving the image to the shared folder or USB memory has failed. Check the displayed message and check the connection of the LAN cable or USB memory. Moreover, check the status of the save destination.
Failed to access USB memory. Please check the connection.	Connection to the USB memory cannot be performed. Check the connection of the USB memory.
Failed to save USB memory. Please check the connection.	Saving the data to the USB memory has failed. Check the connection and status of the USB memory.
Failed to save shared folder. Please check the connection.	Saving the data to the shared folder has failed. Check the connection of the LAN cable and the status of the shared folder.
Failed to transmit the image. Please check the connection.	Transferring the image to an external device has failed. Check the connection of the LAN cable and the status of the transfer destination.

Troubleshooting

 CAUTIONS	<ul style="list-style-type: none"> • To avoid electric shock, do not attempt disassembling, rebuilding and/or repairs on your own. Ask your dealer for repairs. • Do not remove the covers from the main unit, chinrest unit or power supply unit except for the lamp house cover. You may receive an electric shock. • Do not remove the covers from the main unit except for the lamp house cover. Your eye or skin may be exposed to the LED radiation.
---	---

When an error is encountered, review the Check List below.

After following the instructions below, if you still have difficulty or if the problem does not fall into any of the categories listed below, contact your dealer or TOPCON (see the back cover).

Check List

Problem	Condition	Check	Page
Control panel does not work.	<ul style="list-style-type: none"> • Power cord is not connected to the outlet or instrument. 	Connect power cord.	32
Control panel is not clear.	<ul style="list-style-type: none"> • Image is dark. 	Adjust brightness ("Display Brightness" in setting menu).	71
		Tap the [Illumination level] display on the control panel to adjust the illumination level.	61
		Darken room and thoroughly dilate patient's pupil.	----
Periphery of captured image is dark.	<ul style="list-style-type: none"> • Alignment is incorrect. 	Adjust alignment.	42
	<ul style="list-style-type: none"> • Patient's pupil is not large enough. 	Darken room and thoroughly dilate patient's pupil.	----
Captured image is flared all over. (The whole image is covered by light.)	<ul style="list-style-type: none"> • Alignment is incorrect. 	Adjust alignment.	42
	<ul style="list-style-type: none"> • Opacity in patient's eye. 	Flare cannot be removed.	----
Captured image is whitened.	<ul style="list-style-type: none"> • Patient blinked at the moment the photograph was taken. 	Take another picture.	----
Captured image has a dim white spot.	<ul style="list-style-type: none"> • Objective lens is stained. 	Clean lens.	95
	<ul style="list-style-type: none"> • Eyelashes were in the patient's eye the moment the photograph was taken. (Dim light was seen at the screen bottom the moment the alignment was done.) 	Let the patient open their eye wider and take the picture again. If not wide enough, open the eyelid (i.e., Take picture holding eyelid open).	----
Photographic image is dark all over.	<ul style="list-style-type: none"> • Flash level is insufficient. 	Tap the [Flash level] display on the control panel to adjust the flash level.	61
	<ul style="list-style-type: none"> • Xenon set screws are loose. 	Consult your dealer.	92
	<ul style="list-style-type: none"> • Xenon lamp has served its life. 	Consult your dealer.	92
Internal fixation target cannot be seen.	<ul style="list-style-type: none"> • Alignment is incorrect. 	Adjust alignment.	42
	<ul style="list-style-type: none"> • Internal fixation target is set to the "D" or "M" side. 	Tap the INTERNAL FIXATION TARGET POSITION SELECTOR button to move it to "C".	26
	<ul style="list-style-type: none"> • External fixation target is set. 	Tap the INTERNAL FIXATION TARGET POSITION SELECTOR button to move it to "D" or "C", "M".	26

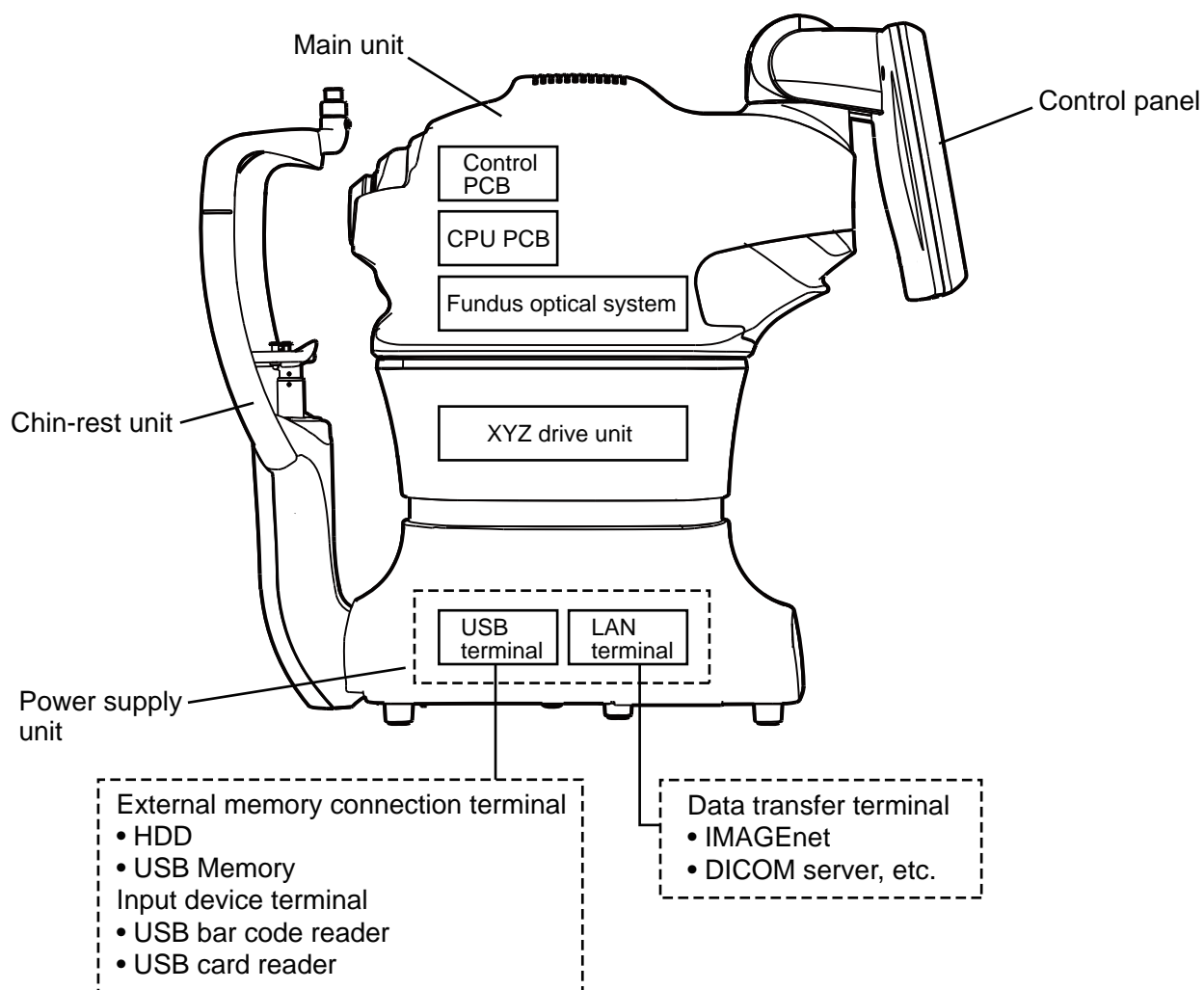
Problem	Condition	Check	Page
Split lines cannot be seen.	<ul style="list-style-type: none"> • Patient's pupil is not large enough. 	Darken room and thoroughly dilate patient's eye.	----
Xenon lamp does not turn on.	<ul style="list-style-type: none"> • Xenon lamp has served its life. 	Consult your dealer.	92
Cannot get patient's pupil center.	<ul style="list-style-type: none"> • Patient's face position is incorrect. (The chin and forehead are not correctly on the rests, or the patient faces sideways.) 	Have patient adjust his/her position accordingly.	41
	<ul style="list-style-type: none"> • Patient's face height is incorrect. 	Adjust face height ((CHINREST UP/DOWN) button on the control panel).	41
Nothing is recorded on the external recording device.	<ul style="list-style-type: none"> • Anomaly in external recording device. 	Check power supply, settings, etc.	----
	<ul style="list-style-type: none"> • Cable connections are incorrect. 	Check and correct cable connections.	33
A black shadow appears at the center of the photographed image.	<ul style="list-style-type: none"> • Does the patient have myopia of -10D or more? 	This shadow always appears because of the optical principle of the product. It does not indicate any trouble.	----
	<ul style="list-style-type: none"> • Is the reflection from the fundus very strong in the patient's eye? 		

SPECIFICATIONS AND PERFORMANCE

SYSTEM DIAGRAM

This instrument is composed of the following three units.

- Main body unit
- Power supply unit
- Chin-rest unit



SPECIFICATIONS

Observation & photographing of the fundus	
• Picture angle	45°/30° or equivalent (digital zoom/digital mask)
• Operating distance	34.8mm
• Photographable diameter of pupil	φ4.0mm or more Small pupil diameter: φ3.3mm or more
• Fundus image resolution (on fundus)	Optical function Center : 60 lines/mm or more Middle (r/2) : 40 lines/mm or more Periphery (r) : 25 lines/mm or more
• Fixation target	Internal fixation target: Dot matrix type organic EL The display position can be changed and adjusted. The displaying method can be changed. Peripheral fixation target: This is displayed according to the internal fixation target displayed position. External fixation target
• Measuring range for the dioptric power of the patient's eye	Without the diopter compensation lens : -13D to +12D When the minus diopter compensation lens is used: -33D to -12D When the plus diopter compensation lens is used : +11D to +40D
• Auxiliary functions for photography	Auto focus function (Usable only in the split line use area) Auto alignment function Auto shoot function Auto small pupil diaphragm function Blink detection function

* The design and the specifications are subject to change without prior notice for product improvement.

SAFETY OF LED PRODUCT



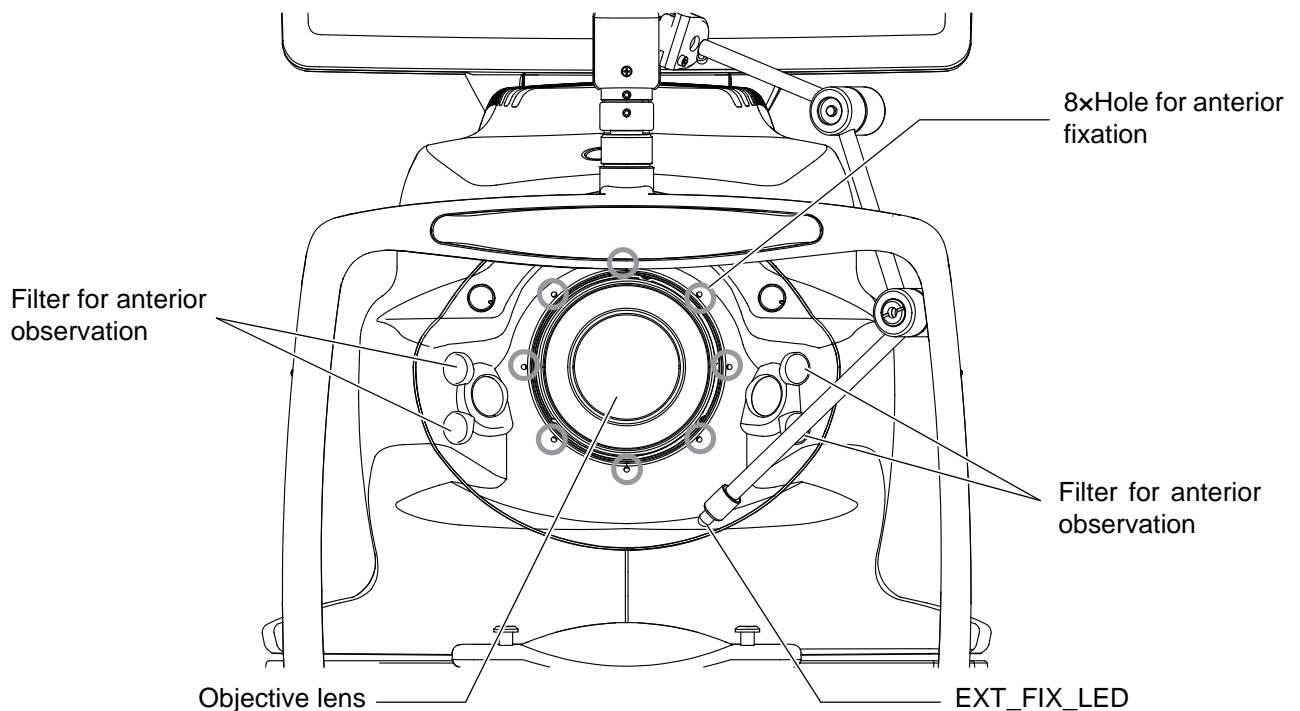
CAUTIONS

- Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
- Do not remove the enclosures. LED high-power is radiated.

Class of LED product	CLASS1 LED PRODUCT(IEC60825-1:1993+A1:1997+A2:2001)	
LED OUTPUT	IR LED	
	Aperture of LED	Objective lens*
	Output of cornea	800 μ W
	Wavelength	850nm
	Half width	30nm
	Beam divergence	0.785rad
	Pulse width	CW
	SPLIT LED	
	Aperture of LED	Objective lens*
	Output of cornea	40 μ W
	Wavelength	870nm
	Half width	35nm
	Beam divergence	0.015rad
	Pulse width	CW
	ANT OBS LED	
	Aperture of LED	Filter for anterior observation*
	Output of cornea	65 μ W
	Wavelength	950nm
	Half width	50nm
	Beam divergence	0.06rad
	Pulse width	CW
	ZEN FIX LED	
	Aperture of LED	Hole for anterior fixation*
	Output of cornea	0.5 μ W
	Wavelength	568nm
	Half width	30nm
	Beam divergence	0.044rad
	Pulse width	CW
	EXT FIX LED	
	Aperture of LED	EXT_FIX_LED*
Output of cornea	120.5 μ W	
Wavelength	565nm	
Half width	30nm	
Beam divergence	0.785rad	
Pulse width	CW	

LED light source	IR LED	
	Output	70mW
	Wavelength	850nm
	Half width	30nm
	Beam divergence	0.52rad
	SPLIT LED	
	Output	3mW
	Wavelength	870nm
	Half width	35nm
	Beam divergence	0.489rad
	ANT OBS LED	
	Output	6mW
	Wavelength	950nm
	Half width	50nm
	Beam divergence	1.4rad
	ZEN FIX LED	
	Output	18mcd
	Wavelength	568nm
	Half width	30nm
	Beam divergence	1.05rad
EXT FIX LED		
Output	10mcd	
Wavelength	563nm	
Half width	30nm	
Beam divergence	0.785rad	

* : LED light is output from Objective lens, Window for anterior observation, Window for anterior fixation and EXT_FIX_LED.



ELECTROMAGNETIC COMPATIBILITY

This product conforms to the EMC standard (IEC 60601-1-2 Ed.3: 2007).

- a) MEDICAL ELECTRICAL EQUIPMENT needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in the ACCOMPANYING DOCUMENTS.
- b) Portable and mobile RF communications equipment can affect MEDICAL ELECTRICAL EQUIPMENT.
- c) The use of ACCESSORIES, transducers and cables other than those specified, with the exception of transducers and cables sold by the manufacturer of the EQUIPMENT or SYSTEM as replacement parts for internal components, may result in increased EMISSIONS or decreased IMMUNITY of the EQUIPMENT or SYSTEM.
- d) The EQUIPMENT or SYSTEM should not be used adjacent to or stacked with other equipment. If adjacent or stacked use is necessary, the EQUIPMENT or SYSTEM should be observed to verify normal operation in the configuration in which it will be used.
- e) The use of the ACCESSORY, transducer or cable with EQUIPMENT and SYSTEMS other than those specified may result in increased EMISSION or decreased IMMUNITY of the EQUIPMENT or SYSTEM.

Item	Article code	Cable Shielded	Ferrite Core	Length (m)
AC power cable (for TRC-NW400)	44804 70150	No	No	1.5
LAN cable	47005 35100	No	Yes	2.0
USB mouse cable (for TRC-NW400)	-	Yes	No	1.8
USB memory	-	-	-	-
Personal computer	47010 77200	-	-	-
USB keyboard cable	-	Yes	Yes	2.0
USB mouse cable	-	Yes	No	1.8
AC power cable (for personal computer)	-	No	No	2.0
Personal computer monitor	47010 77300	-	-	-
AC power cable (for monitor)	-	No	No	1.8
DVI cable	-	Yes	Yes	2.0
Insulation transformer box	47010 77000	-	-	-
AC power cable (for transformer)	44804 70150	No	No	1.5
FG cable	-	No	No	2.0

Guidance and manufacturer's declaration - electromagnetic emissions		
The TRC-NW400 is intended for use in the electromagnetic environment specified below. The customer or the user of the TRC-NW400 should assure that it is used in such an environment.		
Emissions test	Compliance	Electromagnetic environment - guidance
RF emissions CISPR 11	Group 1	The TRC-NW400 uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment. The TRC-NW400 is suitable for use in all establishments including domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
RF emissions CISPR 11	Class B	
Harmonic emissions IEC61000-3-2	Class A	
Voltage fluctuations/ flicker emissions IEC61000-3-3	Complies	

Guidance and manufacturer's declaration - electromagnetic immunity


The TRC-NW400 is intended for use in the electromagnetic environment specified below. The customer or the user of the TRC-NW400 should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) IEC 61000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for input/output lines	± 2 kV for power supply lines ± 1 kV for input/output lines	Main power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	± 1 kV line(s) to line(s) ± 2 kV line(s) to earth	± 1 kV line(s) to line(s) ± 2 kV line(s) to earth	Main power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and Voltage variations on power supply input lines IEC 61000-4-11	<5% U_t (>95% dip in U_t) for 0.5 cycle 40% U_t (60% dip in U_t) for 5 cycles 70% U_t (30% dip in U_t) for 25 cycles <5% U_t (>95% dip in U_t) for 5 sec	<5% U_t (>95% dip in U_t) for 0.5 cycle 40% U_t (60% dip in U_t) for 5 cycles 70% U_t (30% dip in U_t) for 25 cycles <5% U_t (>95% dip in U_t) for 5 sec	Main power quality should be that of a typical commercial or hospital environment. If the user or the TRC-NW400 requires continued operation during main power interruptions, it is recommended that the TRC-NW400 be powered from an uninterruptible power supply or battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

NOTE U_t is the a.c. main voltage prior to application of the test level.

Guidance and manufacturer's declaration - electromagnetic immunity

The TRC-NW400 is intended for use in the electromagnetic environment specified below. The customer or the user of the TRC-NW400 should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Conducted RF IEC 61000-4-6	3 Vrms 150kHz to 80MHz	3 V	<p>Portable and mobile RF communications equipment should be used no closer to any part of the TRC-NW400, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.</p> <p>Recommended separation distance $d = 1.2 \sqrt{P}$</p> <p>$d = 1.2 \sqrt{P}$ 80MHz to 800MHz $d = 2.3 \sqrt{P}$ 800MHz to 2.5GHz</p> <p>where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, ^a should be less than the compliance level in each frequency range. ^b</p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 
Radiated RF IEC 61000-4-3	3 V/m 80MHz to 2.5GHz	3 V/m	

NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the TRC-NW400 is used exceeds the applicable RF compliance level above, the TRC-NW400 should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the TRC-NW400.

b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

**Recommended separation distance between
portable and mobile RF communications equipment and the TRC-NW400**

The TRC-NW400 is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the TRC-NW400 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the TRC-NW400 as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150kHz to 80MHz $d = 1.2 \sqrt{P}$	80MHz to 800MHz $d = 1.2 \sqrt{P}$	800MHz to 2.5GHz $d = 2.3 \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1	At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.
NOTE 2	These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

Requirements for the EXTERNAL DEVICE

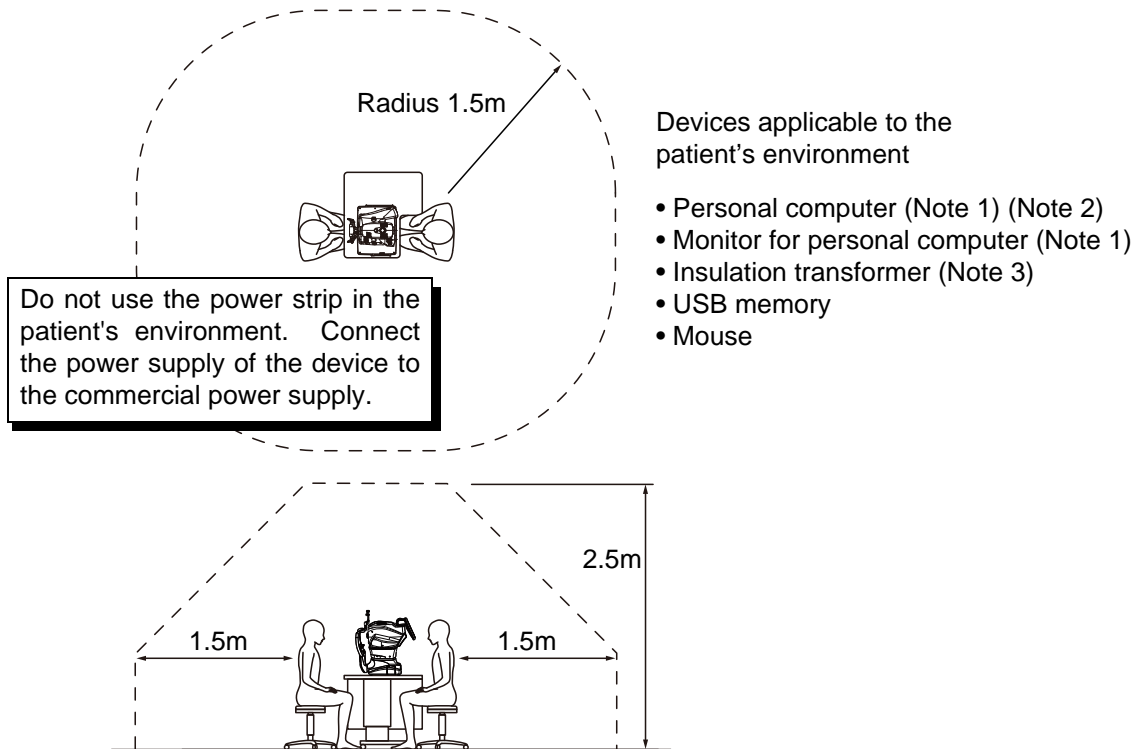
The external device connected to the analog and digital interfaces must comply with the respective IEC or ISO standards (e.g. IEC 60950 for data processing equipment and IEC 60601-1 for medical equipment).

Anybody connecting additional equipment to medical electrical equipment configures a medical system and is therefore responsible that the system complies with the requirements for medical electrical systems. Attention is drawn to the fact that local laws take priority over the above mentioned requirements. If in doubt, contact your dealer or TOPCON(see the back cover).

PATIENT'S ENVIRONMENT

When the patient or inspector comes into contact with the devices (including the connecting devices) or when the patient or inspector is in contact with the person that touches the devices (including the connecting devices), the patient's environment is shown below.

In the patient's environment, use devices conforming to IEC60601-1. If you are compelled to use any device not conforming to IEC60601-1, use an insulation transformer or the common protective earth system.



Devices applicable to the patient's environment

- Personal computer (Note 1) (Note 2)
- Monitor for personal computer (Note 1)
- Insulation transformer (Note 3)
- USB memory
- Mouse

Note 1: Use the personal computer conforming to IEC60950-1.

Note 2: Don't remove the cover from the personal computer.

Note 3: Use the insulation transformer conforming to IEC60601-1.

CAUTION

- Don't connect an additional power strip or an extension cord to the system.
- Don't connect any device which is not recognized as one component of the system.
- The total 1kVA is the maximum allowable load of the auxiliary power supply socket for the insulation transformer, which is provided for the system. Don't connect the device exceeding this capacity.
- Use the auxiliary power supply socket of the insulation transformer to power only a device that will be a component of the system.
- It is dangerous to connect any device which is not used as a component of the system, to the insulation transformer.
- When the insulation transformer is not used, the personal computer and the monitor for the personal computer must be installed out of the patient's environment.

SPECIFICATIONS OF THE PERSONAL COMPUTER (COMMERCIAL PRODUCT) TO BE CONNECTED

Platform	IBM/PC AT compatible (DOS/V) machine
Personal computer	Personal computer in which Microsoft Windows 7 Professional operates
OS	Microsoft Windows 7 Professional 32bit (English) Microsoft Windows 7 Professional 64bit (English) Microsoft Windows 8.1 Professional 64bit (English)
CPU	Intel Core i3-2100 3.10GHz or CPU with higher speed
RAM	4GB or more
Monitor	Monitor that can be used by Microsoft Windows 7 Professional Full-color monitor with resolution 1280×1024 or higher
Display adapter	Applied to DirectX 9.0. Display adapter that conforms to the standard specifications following the operation conditions of Microsoft Windows 7 Professional or higher specifications
Hard disk	Hard disk with higher speed than SATA 3.0Gb/s NCQ HDD (7200 revolutions) Free capacity: 40GB or more
Others	Gigabit Ethernet port: 1 or more The products applied to "Jumbo Frame" are recommended. RAID control (to protect data) IEC60950

SPECIFICATIONS OF THE INSULATION TRANSFORMER (COMMERCIAL PRODUCT) TO BE CONNECTED

Item	Spec.
Input voltage	AC100V/110V/120V (for the 100V system area) AC220V/230V/240V (for the 200V system area)
Frequency	50Hz/60Hz
Phase	Single phase
Secondary capacity	1k VA
Others	IEC60601-1

GENERAL INFORMATION ON USAGE AND MAINTENANCE

INTENDED PATIENT POPULATION

The patient who undergoes an examination by this instrument must maintain concentration for a few minutes and adhere to the following instructions:

- After his/her face to the chinrest, forehead rest.
- Keep the eye open.
- Understand and follow instructions when undergoing an examination.
- If the patient does not conform to these conditions, it is not possible to take a picture correctly.

INTENDED USER PROFILE

The TRC-NW400 Non-Mydriatic Retinal Camera is an electric instrument for medical use. Use this instrument under a doctor's guidance.

ENVIRONMENTAL CONDITIONS FOR USE

Temperature : 10°C to 40°C
Humidity : 30% to 90% (non-condensing)
Air pressure : 700hPa to 1060hPa

STORAGE, USAGE PERIOD

1. Storage (without wrapping (without package))
 - * Temperature : 10°C to 40°C
 - Humidity : 10% to 95% (without dew condensation)
 - Air pressure : 700hPa to 1060hPa
 - * THIS INSTRUMENT DOES NOT MEET THE TEMPERATURE REQUIREMENTS OF ISO 15004-1 FOR STORAGE. DO NOT STORE THIS INSTRUMENT IN CONDITIONS WHERE THE TEMPERATURE MAY RISE ABOVE 40°C OR FALL BELOW 10°C.
2. When storing the instrument, ensure that the following conditions are met:
 - (1) The instrument must not be splashed with water.
 - (2) Do not store the instrument in an environment where air pressure, temperature, humidity, ventilation, sunlight, dust, salty/sulfurous air, etc. could cause damage.
 - (3) Do not store or transport the instrument on a slanted or uneven surface or in an area where it is subject to vibrations or instability.
 - (4) Do not store the instrument where chemicals are stored or gas is generated.
3. Normal life span of the instrument:

8 years from delivery providing regular maintenance is performed (according to the self-certification [TOPCON data])

ENVIRONMENTAL CONDITIONS FOR PACKAGING IN STORAGE

Temperature : -20°C to 50°C

Humidity : 10% to 95%

ENVIRONMENTAL CONDITIONS FOR PACKAGING IN TRANSPORTATION

Temperature : -40°C to 70°C

Humidity : 10% to 95%

ELECTRIC RATING

Source voltage : AC 100 - 240V

Frequency : 50-60Hz

Power input : 120VA

DIMENSIONS AND WEIGHT

Dimensions : 272 - 383mm (W) × 464 - 660mm (D) × 512 - 700mm (H)

Weight : 18kg

SYSTEM CLASSIFICATION

- Types of protection against electric shock:
This instrument is classified as Class I equipment.
Class I equipment does not depend only on basic insulation for protection against electric shock, but also provides a means of connection to a protective earth system so that metal parts that come into contact do not become conductive if the basic insulation fails.
- Grade of protection against electric shock:
This instrument is classified as Type B applied part.
Type B applied part provides a specified grade of protection to prevent electric shock, particularly for reliability against current leaks, measuring current and protective earth current (in case of Class I equipment).
- Degree of protection against harmful ingress of water: IPx0
The TRC-NW400 has no protection against ingress of water. (The degree of protection against harmful ingress of water defined in IEC 60529 is IPx0.)
- Classification according to the method(s) of sterilization or disinfection recommended by the manufacturer: not applicable.
The TRC-NW400 has no part to be sterilized or disinfected.
- Classification according to the degree of safety of application in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide:
 - Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.
 - The TRC-NW400 should be used in environments where no flammable anesthetics and/or flammable gases are present.
- Classification according to the mode of operation: Continuous operation.
Continuous operation is the operation under normal load for an unlimited period, without the specified limits of temperature being exceeded.

Class of insulation transformer

- Types of protection against electric shock:
Class I equipment
- Grade of protection against electric shock:
This device is not equipped with the part applied to this protection grade.

OPERATION PRINCIPLE

The patient's eye is illuminated by infrared light, which is emitted by the illumination optical system (IR LED). The fundus observation/photography optical system forms an image on the fundus observation/photography camera, and the image is observed on the control panel.

The auto alignment function works as follows: the anterior segment of the patient is illuminated by infrared light emitted by the anterior segment observation LED. The auto alignment optical system detects the pupil position with the anterior segment observation camera (master/slave). Then, the instrument is moved to a position applicable to photography.

The auto focus function works as follows: the split lines (infrared light) emitted by the split LED are projected to fundus and the reflected image is detected by the fundus observation/photography camera. Then, arithmetic processing is performed for the reflected image. The lens in the observation/photography optical system is moved to a proper position by the auto focus mechanism (TRC focusing sensor and TRC focusing motor) to adjust focus correctly.

The auto shoot function works as follows: when the capturing position and focus are applicable to photography by the auto alignment/focus mechanisms, the photography light source (xenon lamp) emits light and the fundus observation/photography camera takes a picture.

The captured image can be recorded as electronic data by a personal computer or a commercial memory device connected to the external input/output terminal and can be printed by a printer.

It is possible to set the following functions for the image when the center (equivalent to picture angle 30°) of the captured image is extracted by software:

- Digital mask: The digital mask displays and saves the above-mentioned extracted image.
- Digital zoom: The above-mentioned extracted image is enlarged and the enlarged image is displayed and saved by the digital zoom function.

In fundus stereoscopic photography, the instrument changes the captured positions (temporal side and nasal side of pupil) and takes two pictures of one eye.


In fundus panorama photography, the instrument guides the patient's eye by the peripheral fixation target and takes a picture of the fundus periphery.

CHECKPOINTS FOR MAINTENANCE

1. Regularly maintain and check the instrument and its parts.
2. When using the instrument after a prolonged period of inactivity, confirm normal and safe operation beforehand.
3. To take a good picture, be careful not to stain the objective lens with fingerprints or dust.
4. When this instrument is not in use, cap the objective lens and cover the instrument with the dust cover.
5. When the objective lens is stained, clean it according to "Cleaning the objective lens" in this manual.

DISPOSAL

- When disposing of TRC-NW400 parts, follow the local regulations for disposal and recycling.

 NOTES	<p>This symbol is applicable for EU member countries only. To avoid potential damage to the environment and possibly human health, this instrument should be disposed of (i) for EU member countries - in accordance with WEEE (Directive on Waste Electrical and Electronic Equipment), or (ii) for all other countries, in accordance with local disposal and recycling laws.</p>
	<p>This Product Contains Mercury in the backlighting of the LCD display. Prior to disposal, remove or otherwise ensure that this is disposed of in accordance with Local, State and Federal Laws. This information is applicable in U.S.A only.</p>
	<p>This product contains a CRL Lithium Battery which contains Perchlorate Material-special handling may apply. See http://www.dtsc.ca.gov/hazardouswaste/perchlorate/ Note: This is applicable to California,U.S.A.only</p>

MAINTENANCE



CAUTIONS

To prevent the instrument from falling and to avoid injury, install the instrument on a level surface.



NOTES

Do not contact the attachment for anterior segment with rubber products during storage. The material may deteriorate.

DAILY CHECKUPS

- Dust is a formidable foe to the instrument.
To ensure the production of fine images, care should be taken not to allow fingerprints and/or dirt to get on the objective lens.
- Each time one patient is changed to another, replace the chinrest paper with new one.
- When not in use, be sure to cap the objective lens and cover the instrument with the dust cover.
- Before using the instrument, check if the objective lens is clean. If the objective lens is stained, clean it following the instructions for "Cleaning the objective lens" on page 95.
- When not in use, always turn the **POWER SWITCH** OFF (○).

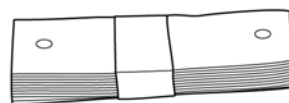
ORDERING CONSUMABLES

- When ordering consumables and spare parts, contact your dealer or TOPCON (see the back cover) and tell them the article name, article code and quantity.

Article name	Article code
Chinrest paper	40310 4082
Dust cover	40496 9011



Dust cover



Chinrest paper

REPLACING THE XENON LAMP

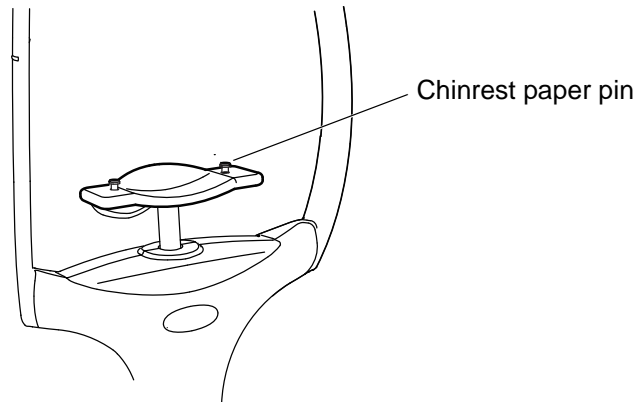


CAUTIONS

To avoid electric shock and burns, do not replace the lamp by yourself.
Ask your dealer for repairs.

REFILLING THE CHINREST PAPER

- When the chinrest paper is used up, pull out the chinrest paper pin and refill the paper.



MAINTENANCE BY THE DEALER

Item	Inspection interval	Details
Cleaning each unit	Within 12 months from the last maintenance	<ul style="list-style-type: none">• Cleaning the external section• Cleaning the optical system• Cleaning the base unit
Checking the operation	Within 12 months from the last maintenance	<ul style="list-style-type: none">• Anterior segment observation function• Internal fixation target• Display on the screen• Adjusting the observation illumination• Fundus observation (by test eye)
Checking the light intensity	Within 12 months from the last maintenance	<ul style="list-style-type: none">• Checking the xenon light intensity (by special tool)

CLEANING

Cleaning the external cover, control panel and other parts



CAUTIONS

To avoid damage to the instrument or injury due to electric shock, turn off the power switch and remove the power cord before cleaning the instrument.



NOTES

- Do not spray liquid on the instrument. The instrument may be damaged or those that come into contact with the instrument may be injured by electric shock.
- Do not spray the cleaner solution directly toward the instrument. If the solution comes into the instrument through a vent or others, the instrument may malfunction.
- When the instrument is not in use, turn off the power switch.
- To prevent the plastic parts of the instrument body from discoloring and deteriorating, do not use volatile solvents for cleaning, such as benzene, thinner, ether, gasoline, etc.
- Do not apply the lubricating oil such as machine oil to the sliding board. It may deteriorate and affect the operability adversely.

- 1** When the external cover and control panel screen become stained, clean them with a dry cloth.
- 2** If the external cover or the control panel is badly stained, prepare a tepid solution of neutral detergent. Moisten a cloth and wring it thoroughly. Then, wipe the cover or panel with the cloth.

Cleaning of the parts which come into contact with the patient

- Before using the instrument, clean the forehead rest unit and chinrest unit.
Mix neutral detergent in tepid water. Moisten a cloth and wring it thoroughly. Then, wipe the forehead rest and chinrest with the cloth.

Cleaning the control panel



NOTES

- The control panel is a touch panel. Before wiping it, turn off the power switch. If not, the touch panel responds to the wiping action and may cause a trouble in operation.
- When the monitor cleaner is dirty, wash and re-use it. Rinse the monitor cleaner until the cleanser does not remain on it any more. If the cleanser remains on the monitor cleaner, the control panel is not wiped uniformly from time to time.

When the control panel is stained by dust or the like

First, remove dust lightly with a soft brush, etc. Then, wipe the screen lightly with the dry monitor cleaner, which is an accessory.

When the monitor screen is stained by fingerprints or the like

Wipe the screen lightly with the dry monitor cleaner, which is an accessory.

If the fingerprints are not removed well, moisten the monitor cleaner with a little water and then wipe the screen with it.

Cleaning the objective lens

- To check if the objective lens is stained, darken the room and illuminate the objective lens with a flashlight, etc. Examine the objective lens diagonally from the front. The lens condition can be seen clearly.

How to wipe the dustproof coated objective lens

The wiping method is different from the conventional coated lens.

The resistance against wiping is very low and the lens is smooth.

- Dust and dirt adhered to the surface

Blow them off using a blower.

Be careful to prevent the blower end from touching the objective lens.

- When the stain is simple such as dust, tears or saliva:

1 Breathe toward the objective lens and wipe it carefully with a piece of lens cleaning paper.

2 If your lens cleaning paper is dirty, replace it with a clean one and repeat step **1**.

3 Repeat steps **1** and **2** until no stain is seen on the lens.

- When the stain is persistent:

1 Moisten a lens cleaning paper with reagent ethanol properly. Wipe the objective lens with the lens cleaning paper by rubbing lightly.

2 If your lens cleaning paper is dirty, replace it with a clean one and repeat step **1**.

3 Repeat steps **1** and **2** until no stain is seen on the lens.

4 Finally, wipe the objective lens with a dry piece of lens cleaning paper (which is not moistened with solvent) until it is clean. It is O.K. to wipe the lens after breathing toward it.



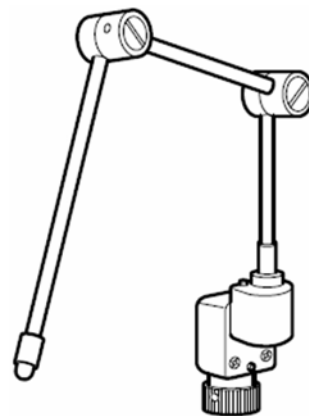
NOTES

- Don't use the following methods because the lens may be damaged.
 - Wiping the lens by grasping with fingernails
 - Using a lens cleaning paper wound around a hard tool (for example, a metallic tool).
- Use a soft lens cleaning paper without fiber.
 - For example, BEMCOT (Asahikasei)
- Don't let any strong-alkaline liquid adhere to the objective lens. If such a liquid adheres to the lens, immediately wipe it off.
- If it is difficult to remove a stain from the objective lens, contact your dealer or TOPCON (see the back cover).

OPTIONAL ACCESSORIES

EXTERNAL FIXATION TARGET EF-2

This is used to guide the patient's fixed sight.



REFERENCE MATERIAL

TYPE OF PLUG

Country	Voltage/frequency	Type of plug
Mexico	110V/50Hz	Type C&E
Argentina	220V/60Hz	Type A
Peru	220V/60Hz	Type A
Venezuela	110V/50Hz	Type C&E
Bolivia & Paraguay	220V/60Hz	Type A (Most common) Type H (Infrequently)
Chile	220V/60Hz	Type A
Colombia	110V/50Hz	Type C
Brazil	220V/60Hz 127V/60Hz	Type A Type C
Ecuador	110V/50Hz	Type C&E
USA	120V/60Hz	Type A (Hospital Grade)
Canada	120V/60Hz	Type A (Hospital Grade)

RELATION BETWEEN THE SETTING OF THE ILLUMINATION/FLASH LEVEL AND MAXIMUM RADIANCE

When the maximum radiance is "1", the ratio of radiance is shown below in the setting of the illumination/flash level.

Illumination level

Display level	Ratio of radiance
1	0.417
2	0.500
3	0.646
4	0.875
5	1.000

Flash level

Display level (High)	Setting of the flash level (W·s)	Ratio of radiance
	15.7	1.000
	13.6	0.867
	11.4	0.729
	9.6	0.613
+4	8.1	0.516
+3	6.8	0.434
+2	5.7	0.365
+1	4.8	0.307
0	4.0	0.258
-1	3.4	0.217
-2	2.9	0.182
-3	2.4	0.153
-4	2.0	0.129
	1.7	0.108
	1.4	0.091
	1.2	0.077
	1.0	0.064

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The following open source softwares are packaged with this product. For each open source software, follow its license terms.

IPA font: <http://ipafont.ipa.go.jp/>

libxml: <http://www.xmlsoft.org/>

Please provide the following information when contacting us regarding questions about this instrument:

- Model name: TRC-NW400
- Serial No.: This is printed on the rating nameplate on the right side of the power supply unit.
- Period of use: Please inform us of the date of purchase.
- Defective condition: Please provide us with as much detail as possible on the problem.

NON-MYDRIATIC RETINAL CAMERA
TRC-NW400

USER MANUAL
The 2014 version (2014.01-100TH[Ⓞ])
Date of issue: January 7, 2014

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TRC-NW400

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