NIDEK

Fully Assisted Refraction System

OPERATOR'S MANUAL

Original instructions

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Before Use

Be sure to read the SOFTWARE LICENSE AGREEMENT (page 2) before using this product.

This operator's manual includes information such as the operating procedure and safety precautions. Be sure to read this operator's manual before using this product. Keep this manual handy for reference.

If you encounter any problems or have questions about this product, please contact Nidek or your authorized distributor.

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RTP15-P902-A6

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

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

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

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Indications in This Manual

The following indications are used in this operator's manual.

- Repeatedly used descriptions are expressed with the following indications.

Indication	Meaning	Example
[XXX]	A term enclosed in brackets indicates a button, setting, and such.	[OK], [Next]
	For details, see the following page.	 *" Indications in This Manual" (page 5)*

- Information related to operations is indicated by the icon display.

Check

Indicates items to be checked.

Help

Indicates workarounds for when intended operation or intended results cannot be obtained.

Tip

Indicates tips useful for product operation.

Setting

Indicates information on settings.

Knowledge

Indicates detailed information on the product.

Table of Contents

1 SAFETY PRECAUTIONS

1.1 For Safe Use

In this manual, signal words are used to designate the degree or level of safety alerting. The definitions are as follows.
⚠ WARNING Indicates a potentially hazardous situation which, if not avoided, may result in death or serious injury.
⚠ CAUTION Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damage accident.
Even situations indicated by ⚠ CAUTION may result in serious injury under certain conditions. Safety precautions must be strictly followed at all times.

1.2 Usage Precautions

Before use

⚠ WARNING

- If any serious device-related incident occurs, report it to NIDEK and the competent authority in the country where the user or patient, or both reside.

⚠ CAUTION

- Do not use the device for other than the intended purpose.

  Nidek is not responsible for accidents or malfunctions caused by misuse.

- Be sure to read this operator's manual and the RT-6100 and SSC-100 Operator's Manuals before using the device to understand the safety precautions and operating procedures thoroughly.

  Using the device for purposes other than those specified in the operator's manual may cause unanticipated adverse events or adverse device effects.

- When connecting the device to peripheral equipment such as a computer through a LAN port via a medical facility network, insert an isolation transformer between the medical electrical equipment and network devices such as a network switch, and between the network devices and other electrical equipment.

  Electric shock may result. For installation of the network isolation transformer, consult Nidek or your authorized distributor.

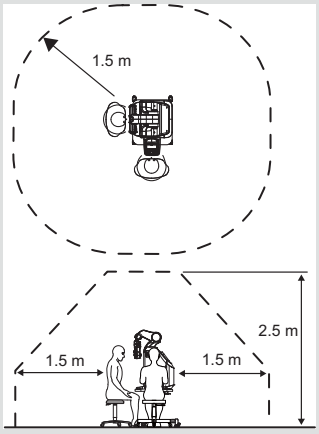
- Do not use the device beyond its service life.

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

- Equipment connected to the analog or digital interfaces must be certified according to the applicable international standards for safety such as IEC 60601-1: Medical electrical equipment.

  Furthermore, all configurations must comply with the system standard IEC 60601-1. Anyone who connects additional equipment to the signal input part or signal comes configures a medical system, and is therefore responsible that the system complies with the requirements of the system standard IEC 60601-1. If you have any questions, contact Nidek or your authorized distributor.

- The patient environment is the volume of space in which contact can occur between the patient and any part of the device (including connected devices) or between the patient and any other person(s) touching the device (including connected devices).
  IEC 60601-1 compliant products need to be used when the computer and AC adapter are placed in the patient environment.
  If the adapter that meets the Class II requirements of IEC 60950-1 or IEC 62368-1 is used, place the computer and AC adapter outside the patient environment, or place and monitor them so that the patient will not touch them.
  The operator should not touch the patient while operating the computer.



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

  Electric shock may result. For installation of the network isolation transformer, consult Nidek or your authorized distributor.

⚠ CAUTION

- Wipe any part of the Joystick Controller where the patient may touch, using a cloth dampened with rubbing alcohol before using the Joystick Controller.
- Do not connect the USB cable of the Joystick Controller to any computer other than the one to be used.
- For the location where the system application is installed, follow the operating environmental conditions (temperature, humidity, and atmospheric pressure) of the computer on which the system application is installed.

  In addition, use the device under the following conditions:
  - Free from harmful dust or smoke
  - Free from vibration or impact
  - Free from condensation
- Install, uninstall, or partially configure the system application by user accounts with Windows OS Administrator privileges.
- Connect the Joystick Controller before starting the system application.

  The system application may not function properly.
- Use a wired LAN to connect the computer to the RT-6100.
- It is recommended to use anti-virus software to prevent unauthorized access to the computer.
- When connecting the connector, note the following points:
  - Connect the cables correctly according to the indications.
  - Connect the cables securely without excess force.

During use

⚠ CAUTION

- Read the operator's manual for the computer and Windows, and always follow the operating precautions.
- Set the Windows settings "Display resolution" and "Change the size of text, apps, and other items" so that the computer display can be shown vertically at Full HD (1920 × 1080 pixels) or higher.

  The screen display may not be shown correctly.
- Set the computer power option to not enter sleep mode.

  The computer may not operate properly when recovered from sleep mode.
- Incorrect network settings may cause network failures partly or throughout the network.

  Confirm that settings are proper with the network administrator.
- Do not change Windows Themes while the system application is in use.
- If the RT-6100 is disconnected while the system application is used, restart both the RT-6100 and the system application.
- The operator needs to adjust the refraction position, vertex distance, and pupillary distance.
- Be careful not to pinch the patient's nose when adjusting the pupillary distance of the refractor.
- Instruct the patient to follow the instructions when the voice guide tells the patient to move their face away from the device.

After use

⚠ CAUTION

- Do not turn off the computer before exiting Windows.

  Programs or data on the computer may be corrupted.

Disposal

⚠ CAUTION

- When disposing of the Joystick Controller and accessories, observe the local ordinances concerning disposal and recycling, and local recycling plans. Especially when disposing of the printed circuit board used internally and plastic parts containing brominated flame retardant, observe the instructions of local governments.

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

- When disposing of packaging materials, sort them by material and dispose of them according to the local ordinances and recycling plans.

  Inappropriate disposal may contaminate the environment.

1.3 Symbols

The following symbols are provided on the product.

	Type B applied part		Direct current
	Manufacturer		Date of manufacture
	Follow the operator's manual. *"1.2 Usage Precautions" (page 10)* Background color: Blue		Refer to the operator's manual. *"6.5 Specifications (Joystick Controller)" (page 66)*
SN	Serial number	REF	Catalog number
UDI	Unique Device Identifier		

2 INTRODUCTION

2.1 Outline

The Fully Assisted Refraction System consists of the Joystick Controller and a dedicated system application.

The product can be used by connecting the Joystick Controller and the RT-6100 to a computer with the system application installed.

◆ Intended use

In the conventional refraction, the patient responds to the operator's questions. According to their answers, the operator performs subjective refraction such as refining refractive errors (sphere, cylinder, prism, and such) and proceeding to the next test. In this system, the patient responds to refraction questions by themselves using the Joystick Controller in response to the voice guide from the computer. The system application enables subjective refraction according to patient operation to determine the full correction.

◆ Intended patient population

The patients are assumed to meet the following general requirements.

Age	10 years and older
Health condition	• Able to sit on a chair for measurements • Able to understand voice-guided questions and answer them with the Joystick Controller
Conditions	• One or both eyes are normal or diseased (eyes that have lost the visual function are not targeted) • Those who want to wear glasses or contact lenses • Able to understand Japanese, English, German, French, Spanish, Italian, Portuguese, Korean, or Chinese.

◆ Intended user profile

The product is intended for users with the following qualifications or skills.

- Operator
  - Any qualified personnel such as ophthalmologists, nurses, orthoptists, opticians, or optometrists (irrespective of nationality, culture, or style of dress)
  - Those who understand the display language of the operator's manual and the system application
- Patient (respondent using Joystick Controller)

  Those who fall under the intended patient population

◆ Intended use environment

In accordance with the RT-6100 Operator's Manual

◆ Operating environment

The product operates under the following system requirements.

● System requirements

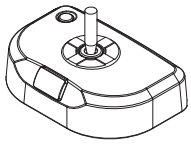
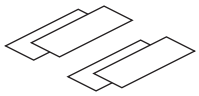
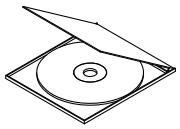
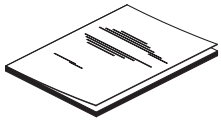
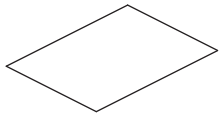
Computer	• English Windows 10 (32-bit/64-bit) or Windows 11 • Windows Media Player installed • USB 2.0 port ×1 or more • LAN port (100BASE-T or higher) x1 or more • Audio output terminal (recommended)
Display	Full HD (1920 × 1080) or higher
Disk device	CD-ROM drive (only for installation)

Check

- Windows 10 versions are 1809 and 1909 or later.
- Windows 11 versions are 21H2 and later.
- Operation on other than the specified Windows version is not guaranteed.
- Speakers or such for voice output that can be connected to a computer are required.
- This manual explains touch panel operations as an example, but mouse operation is also possible.

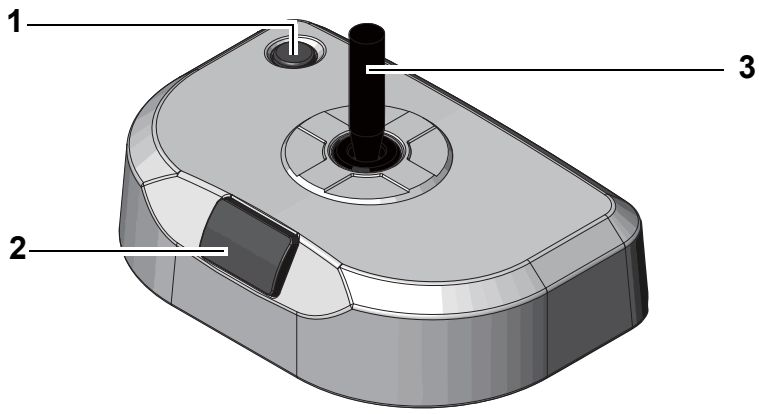
2.2 Packed Contents

The following accessories are included in the standard configuration. Check the contents before use.
A computer and a LAN cable (commercially available category 5 or higher) are required separately.

Part name		Quantity	Appearance
☐	Joystick Controller	1	
☐	Velcro tape	2 sets	
☐	Installation CD	1	
☐	Operator’s manual	1	
☐	Quick reference guide	1	

2.3 Joystick Controller Configuration and Functions

The patient operates this controller.



1 Help button

Pressed when the patient has trouble with operations.

Pressing this button changes the system application screen to the help screen.

"♦ *Help screen" (page 22)*

2 Answer button

Used to respond to questions during measurement.

If the patient cannot read the presented chart or the answer is almost the same, they press this button.

3 Answer lever

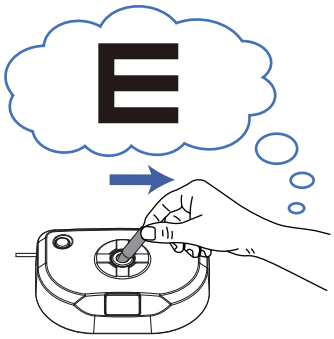
Used to respond to questions during measurement.

The direction in which the patient tilts the lever is the answer.

Tip

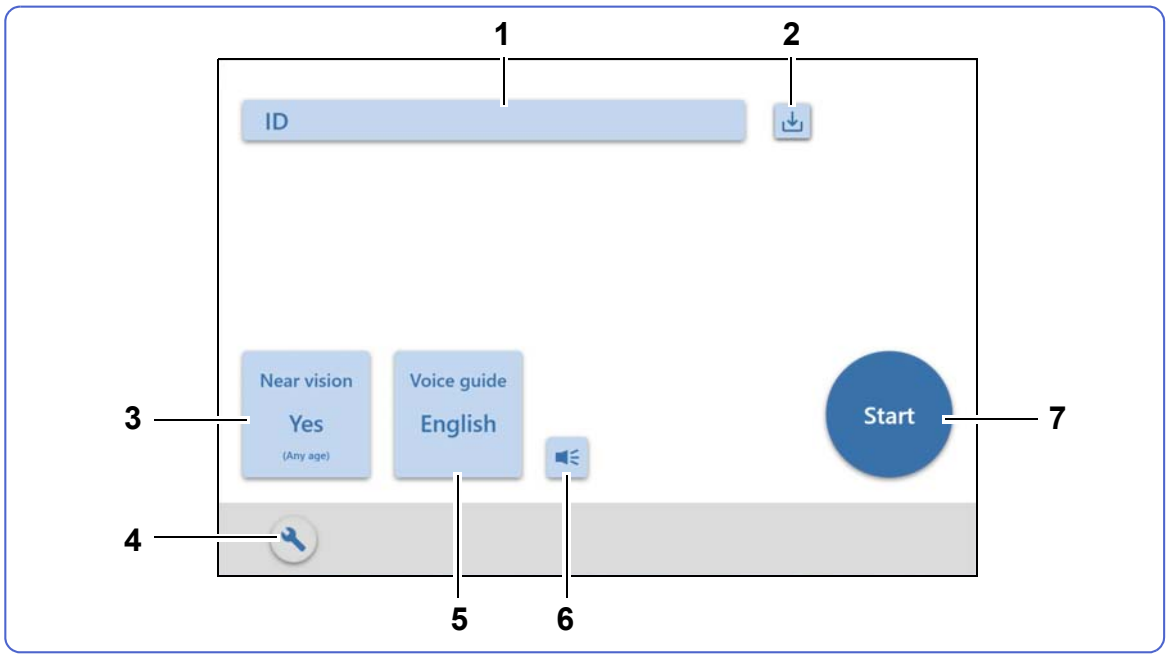
- How to use the answer lever

  Tilt the answer lever in the direction that the letter E is facing or the direction indicated by the voice guide.



2.4 Screen Configuration and Functions

2.4.1 Home screen



1 ID input button ID

Used to enter the patient ID.

2 Import button

Imports AR or LM data of the entered patient ID.

3 Near vision test button

Sets whether to perform the near vision test and/or the age of the patient.

4 Setting button

Displays parameter settings.

"2.4.4 Parameter setting screen" (page 25)

5 Voice guide button

Selects the language of the voice guide. *"♦ Selecting voice guide language" (page 48)*

6 Volume test button

Plays a test voice to check the volume of the voice guide.

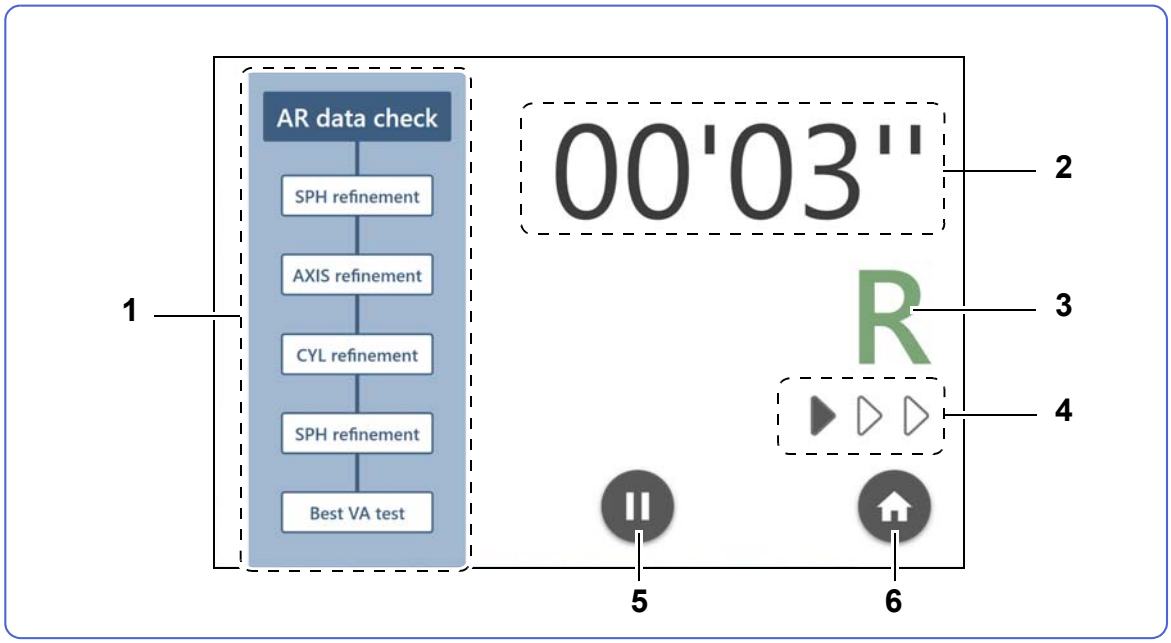
7 Start button Start

Displays the measurement screen and starts measurement.

"2.4.2 Measurement screen" (page 20)

2.4.2 Measurement screen

This is the screen displayed during measurement. Once measurement starts, input from the RT-6100 control box is disabled until measurement is paused or complete.



1 Measurement items

Up to 6 measurement items are displayed. The item being measured is displayed in a darker color.

2 Elapsed time

Displays the elapsed time since Start was pressed on the home screen.

When the time set by the “Alert time 1” parameter has passed, the indication turns orange.

When the time set by the “Alert time 2” parameter has passed, the indication blinks in orange.

3 Eye being measured

“R” is shown while the right eye is measured. For the left eye, “L” is shown. For both eyes, “BIN” is shown.

4 Progress indicator

Shows the progress of measurement. The number of ▶ increases as measurement progresses.

5 Pause button

Pauses measurement and displays the pause screen.

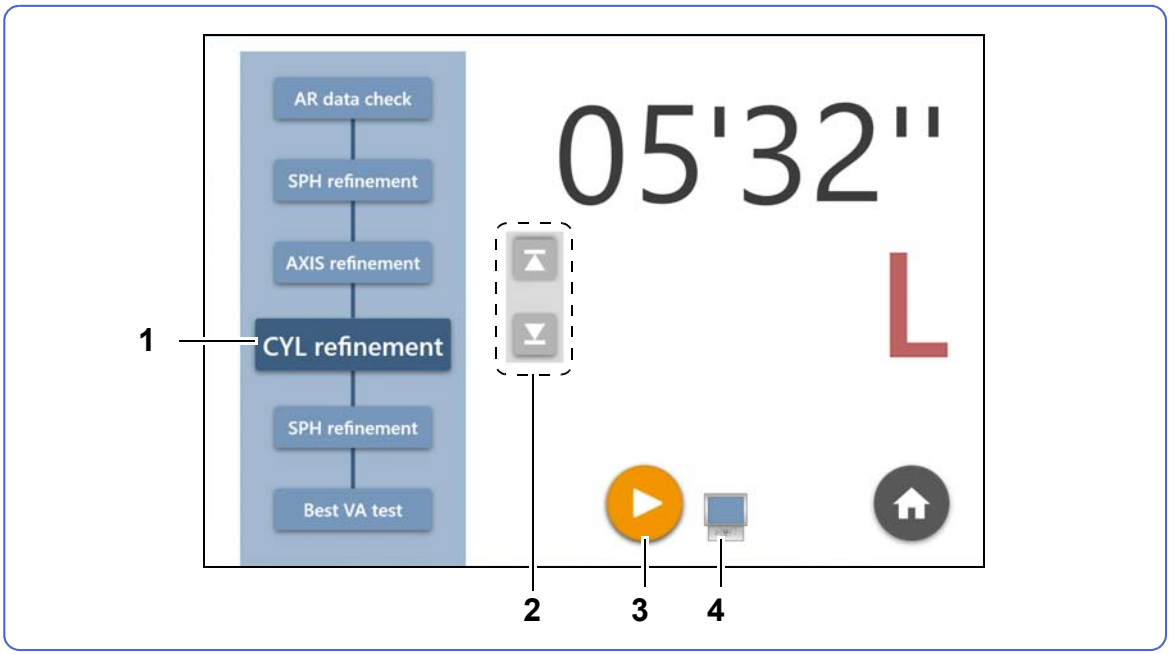
“♦ *Pause screen” (page 21)*

6 Home button

Completes measurement and displays the home screen.

Displaying the home screen resets the measurement conditions and measurement results.

◆ Pause screen



1 Measurement item button

The measurement item that was running before the pause is displayed in a darker color.

Pressing a measurement item button resumes measurement from that item.

Pressing the measurement item button that was running before the pause resumes measurement with the pre-pause answers reset.

2 Measurement item select buttons

returns to the previous measurement item and proceeds to the next measurement item.

3 Resume button

Resumes measurement from where the measurement was paused in the measurement item that was running before the pause.

Check

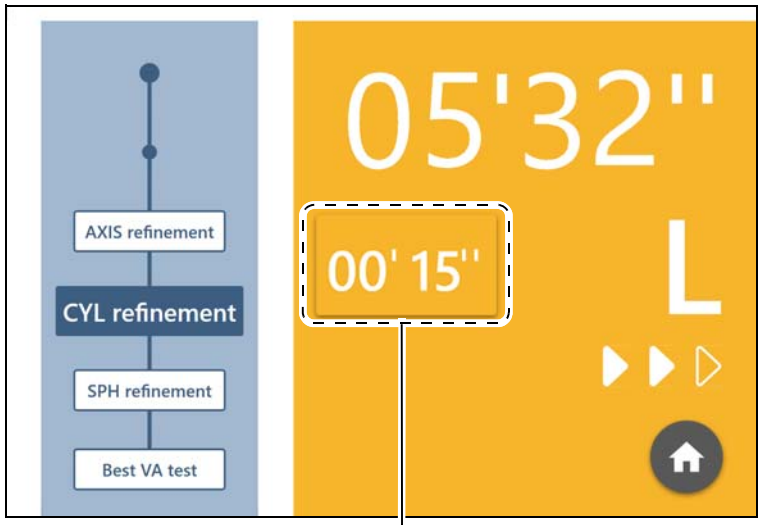
- If the refractive power is changed while the visual acuity test is paused, the measurement may not be correctly resumed with .
  In this case, reattempt the measurement with the measurement item button.

4 Control box indicator

The control box of the RT-6100 is operable while this icon is displayed.

◆ Help screen

This is the screen displayed when the patient presses the help button on the Joystick Controller.
It is also displayed when there is no operation from the Joystick Controller for a certain period of time.



1 Response button 00'00"

Cancels the help screen and displays the pause screen.

“♦ *Pause screen” (page 21)*

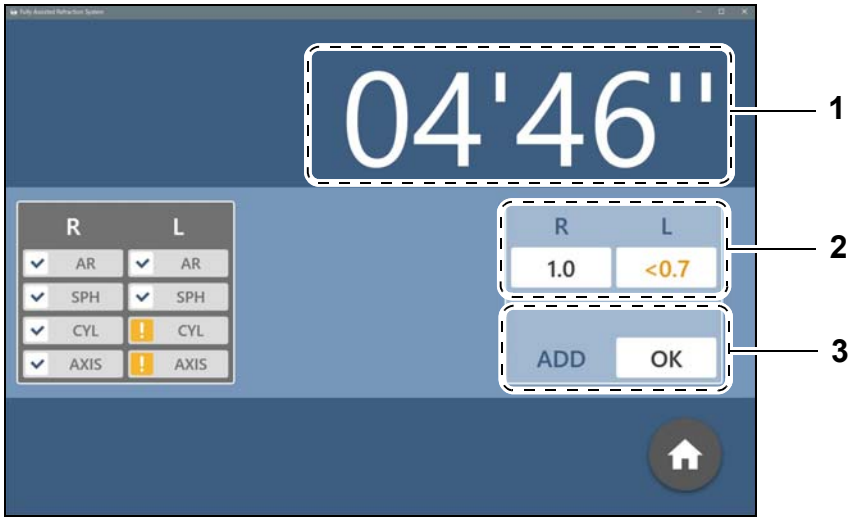
The number of seconds is the elapsed time since the help screen was displayed.

Knowledge

- Operation from the Joystick Controller is disabled while the help screen is displayed.
- While the help screen is displayed, the voice guide repeats “Our staff is coming. Please wait.” every 15 seconds.

2.4.3 Complete screen

This screen displays measurement results after measurement is complete.



1 Measurement implementation results

AR: AR data check

☑: In the visual acuity test with AR values, the visual acuity chart set by parameter could be recognized.

❗: In the visual acuity test with AR values, the visual acuity chart set by parameter could not be recognized.

SPH: Spherical power refinement (red-green test)

☑: Implemented

Blank: Not implemented

CYL: Cylindrical power refinement (cross cylinder test)

☑: Implemented

Blank: Not implemented

❗: The cylindrical power refinement exceeded the range set by the “Std: AXIS refinement range” parameter.

AXIS: Cylinder axis refinement (cross cylinder test)

☑: Implemented

Blank: Not implemented.

❗: The cylinder axis refinement exceeded the range set by the “Std: AXIS refinement range” parameter.

2 Measuring time

The time taken for measurement.

3 Best-corrected visual acuity results

These are the measurement results of the best-corrected visual acuity.

If the value is lower than the minimum visual acuity value set by parameter, the numeric value is shown in orange with “<” added.

If the measurement of the best-corrected visual acuity is skipped, the field is blank.

4 Addition test result

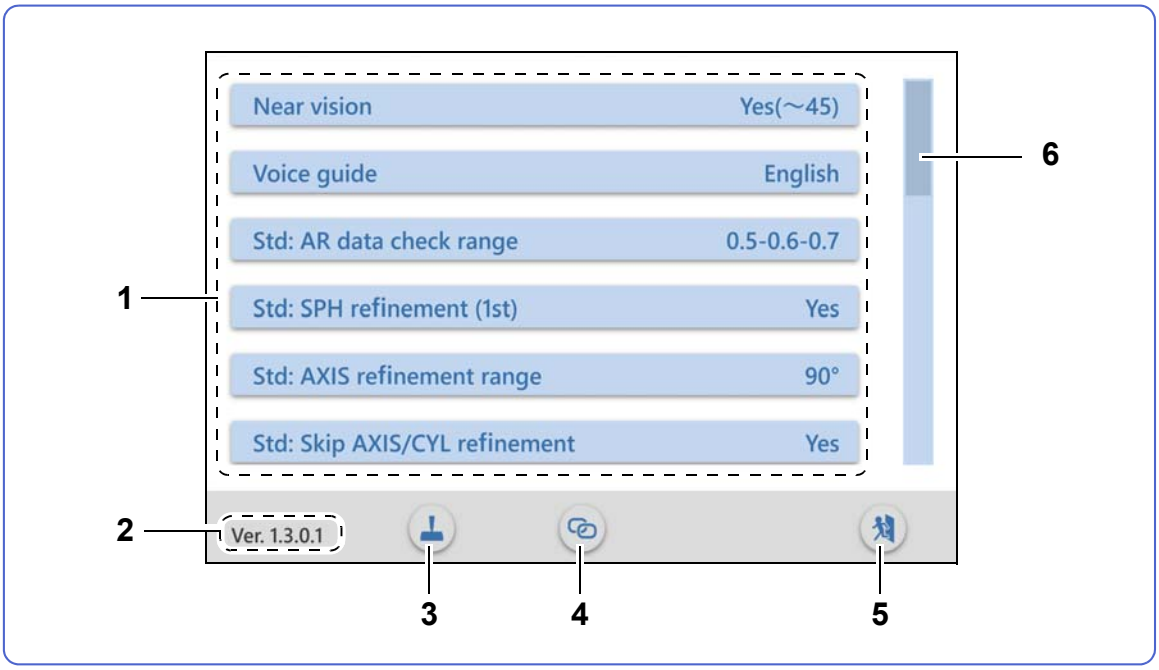
This is the result of the addition test.

If the patient can read the letters in the visual acuity test with addition, “OK” is shown. If the patient cannot read the letters or the visual acuity test with addition is skipped, the field is blank.

When the near vision test button is set to [No], this indication is not shown.

2.4.4 Parameter setting screen

This is the screen displayed by pressing on the home screen. This screen allows parameter settings to be changed.



1 Parameter setting buttons

Set each parameter setting option.

"5.2 Parameter Table" (page 57)

2 Version information

Shows the version of the system application.

3 Operation test button

Runs the operation test for the Joystick Controller.

"6.2 Operation Test" (page 63)

4 Connection test button

Runs the network connection test.

"6.3 Connection Test" (page 64)

5 Setting complete button

Saves the changed parameter settings and displays the home screen.

6 Scroll bar

Scrolls the screen.

3 INITIAL SETTINGS AND INSTALLATION

3.1 Connection between RT-6100 and Computer

1 Confirm that the RT-6100, SSC-100, and computer are turned off.

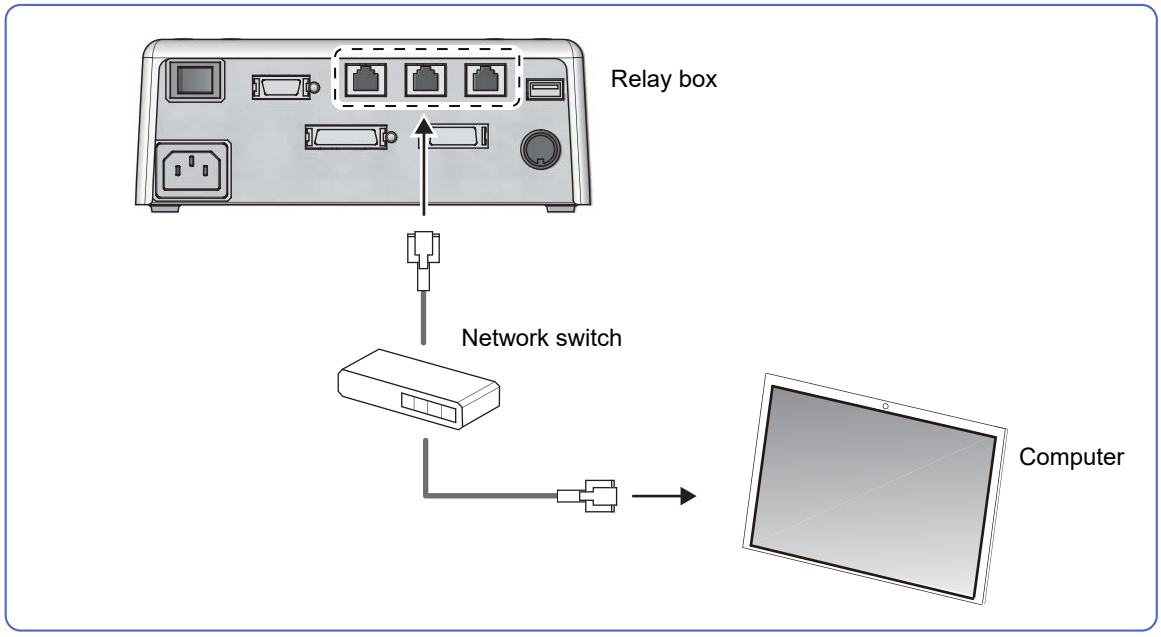
2 Connect a LAN cable (commercially available category 5 or higher) to the LAN connector (one of the three connectors) on the RT-6100 relay box.

For detailed operations, refer to the RT-6100 and SSC-100 Operator's Manuals.

A network switch that is already used is also available for connection.

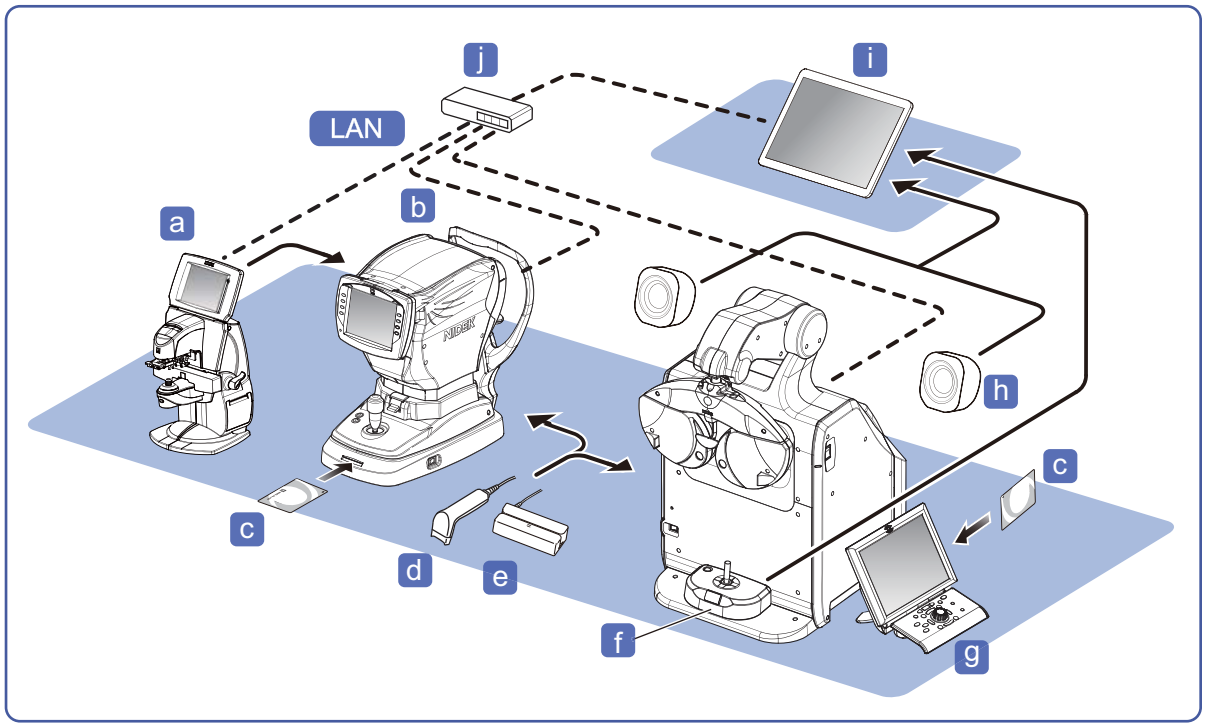
3 Connect a LAN cable to the computer.

- When connecting the RT-6100 and computer via network switch



◆ Example of connection with peripheral equipment

This is an example of connecting the product to the RT-6100. The auto refractometer and lensmeter are also connected via a LAN cable.

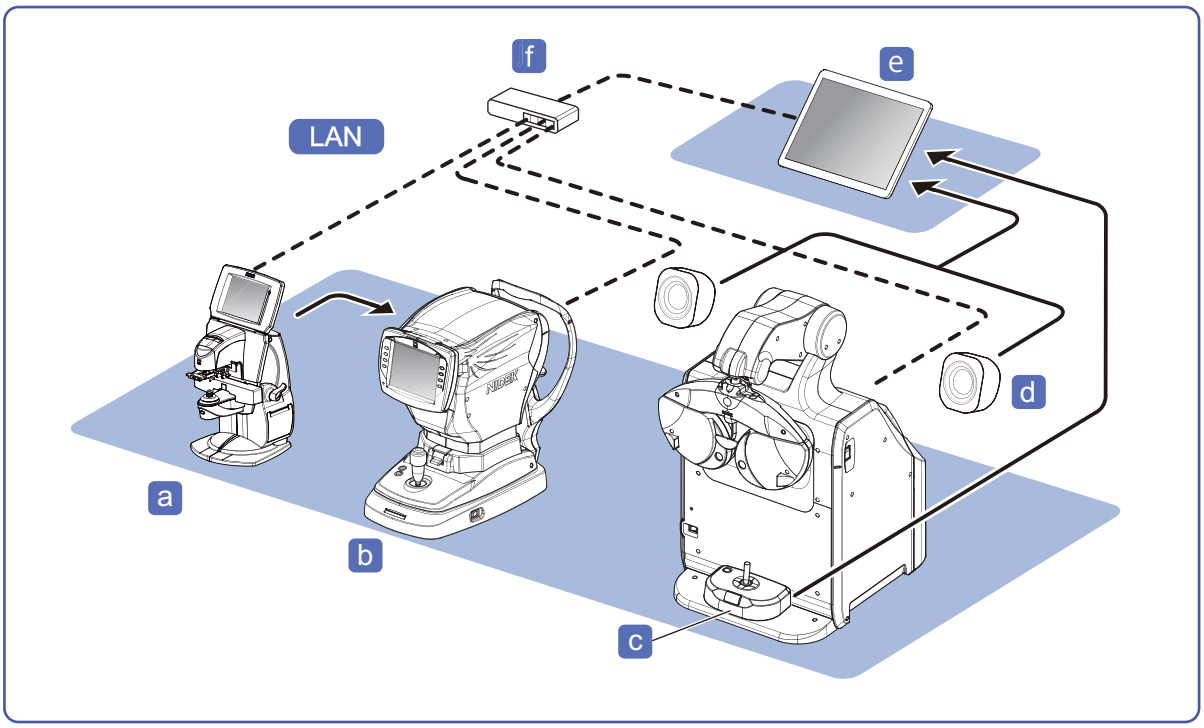


a	Lensmeter
b	Auto refractometer
c	Eye Care card
d	Barcode scanner
e	Magnetic card reader
f	Joystick Controller
g	Control box
h	Speaker
i	Computer with system application installed
j	Network switch

◆ Example with RT-6100 CB for Windows installed

This is an example of connecting a computer installed with RT-6100 CB for Windows instead of the control box.

In this case, RT-6100 CB for Windows and the system application can be used on the same computer or on a different computer.

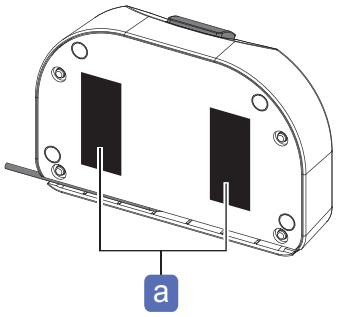


a	Lensmeter
b	Auto refractometer
c	Joystick Controller
d	Speaker
e	Computer with system application and RT-6100 CB for Windows installed
f	Network switch

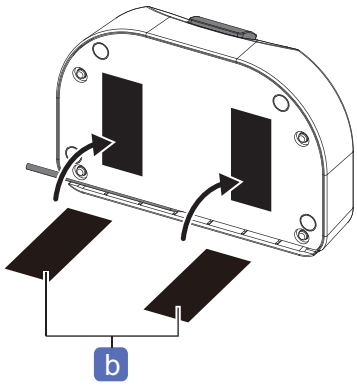
3.2 Joystick Controller Installation

1 Remove the backing paper from the hook (hard surface) a of each Velcro tape and attach it to the underside of the Joystick Controller.

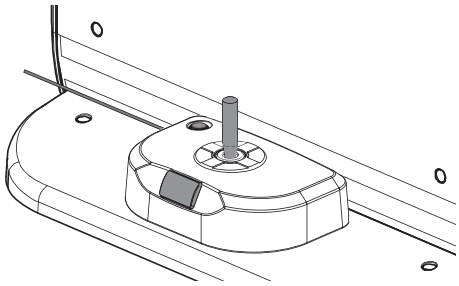
If necessary, secure the cable to the groove on the underside of the Joystick Controller.



2 Attach the loops (soft surface) b to the hooks attached in *Step 1*.



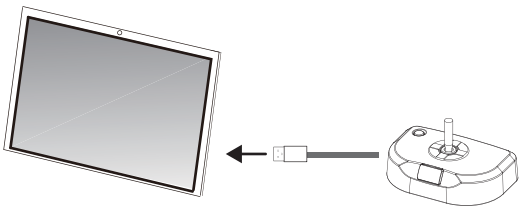
3 Remove the backing paper from the loops and attach the Joystick Controller to the SSC-100 body.



Check

- Install the Joystick Controller so that the answer button is on the patient side.
- Run and secure the USB cable so that it will not be pulled when using the Joystick Controller.

4 Connect the Joystick Controller to the USB port on the computer.



Check

- The Joystick Controller cannot be used by connecting it to the USB connector of the RT-6100 relay box or control box.
- Do not operate the system application with any device other than the designated Joystick Controller.
  Malfunctions may result.
- Do not connect more than one Joystick Controller.
  It may not be recognized properly.

3.3 Enabling SMB 1.0 on Windows

When auto refractometer or lensmeter data is acquired from the shared folder of the MEM-200, SMB 1.0 needs to be enabled.

If data in the shared folder is not to be used, or if SMB 1.0 is already enabled, proceed to *"3.4 System Application Installation" (page 33)*.

Check

- When using the RT-6100 overall version 1.6.0 or earlier, enable SMB 1.0.
- Activate the system application with Windows Administrator privileges.
  If necessary, enter the password of the administrator account.
- Confirm that settings are proper with the network administrator.

1 Turn on the computer to start Windows.

Close all running applications.

2 Open [Control Panel].

Tip

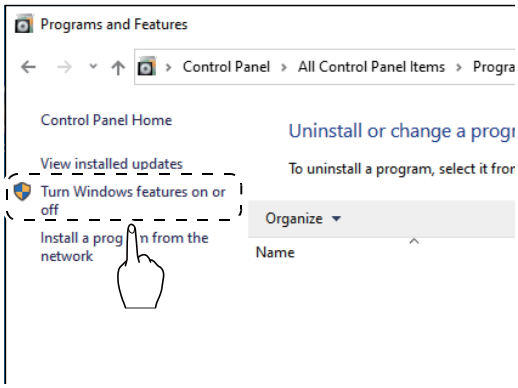
- Typing "con" in the search box on the task bar displays [Control Panel].

3 Press [Programs and Features].

Tip

- When [Programs and Features] is not displayed, select [Large icons] or [Small icons] for [View by].

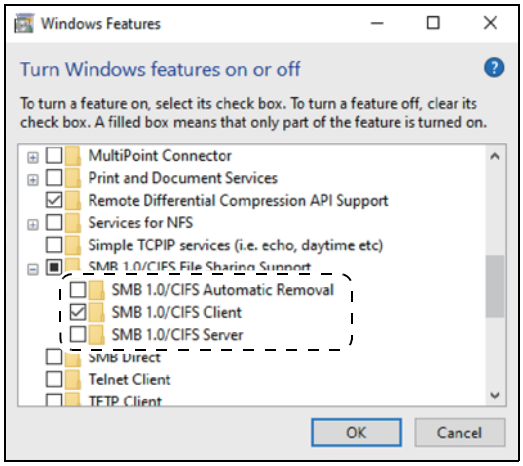
4 Press [Turn Windows features on or off].



5 Check [SMB 1.0/CIFS File Sharing Support].

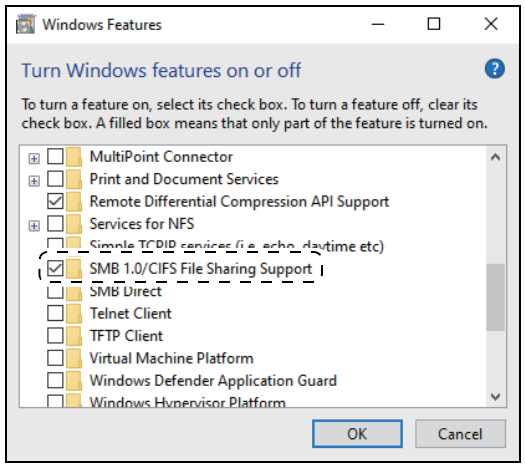
- For items with 

  1) Press  , then check [SMB 1.0/CIFS Client].
  2) Clear [SMB 1.0/CIFS Automatic Removal] and [SMB 1.0/CIFS Server].
  3) Press [OK].



- For items without 

  1) Check [SMB 1.0/CIFS File Sharing Support].
  2) Press [OK].



6 Restart the computer.

3.4 System Application Installation

Check

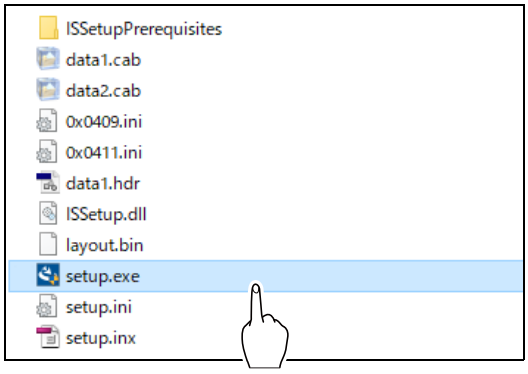
- Activate the system application under a user account with Windows Administrator privileges. If necessary, enter the password of the administrator account.
- If [Settings] > [Apps] > [Apps & features] > [Choose where to get apps] is set to “The Microsoft Store only”, the system application cannot be installed. Change the setting to an option other than “The Microsoft Store only”.
- Do not launch other applications during installation.
- Do not remove the installation CD during installation.
- The installation CD is required for uninstalling or reinstalling the system application. Keep the CD in a safe place.

1 Insert the installation CD into the CD-ROM drive, then open it via File Explorer.

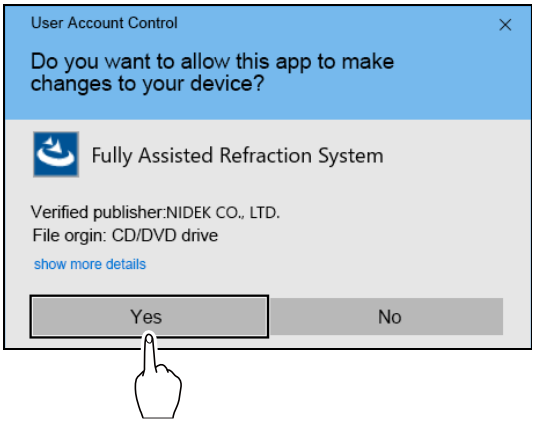
Help

- For the computer that is not equipped with a CD-ROM drive, open the USB flash drive or such that contains the entire contents of the installation CD copied in advance using File Explorer.

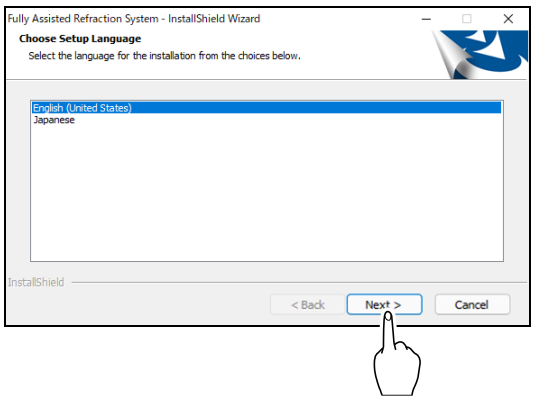
2 Run [setup.exe].



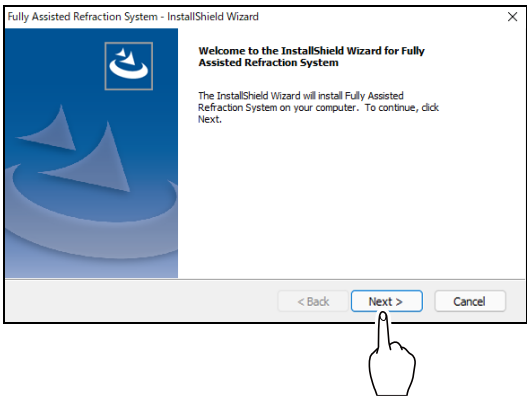
3 Press [Yes].



4 Select the desired language, then press [Next].

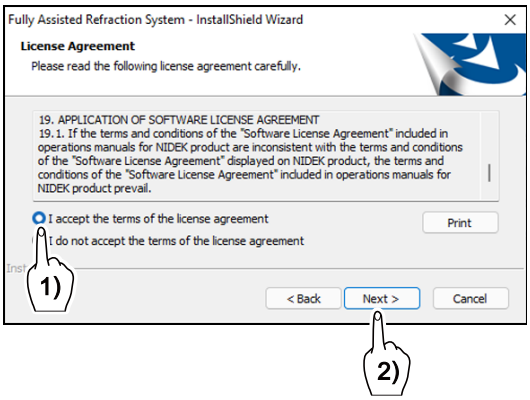


5 Press [Next].



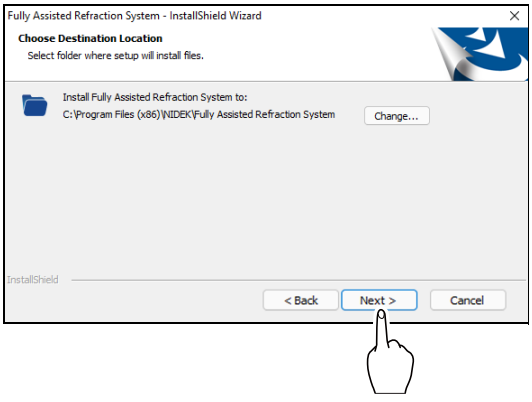
6 Read the license agreement.

1) Read the contents to the end, and if you agree, select [I accept the terms of the license agreement].
2) Press [Next].



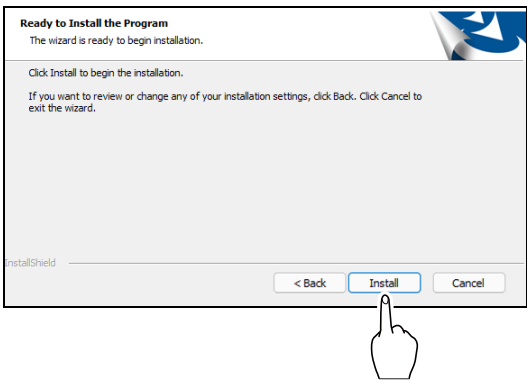
7 Press [Next].

If the installation destination needs to be changed, press [Change] to specify the installation destination.

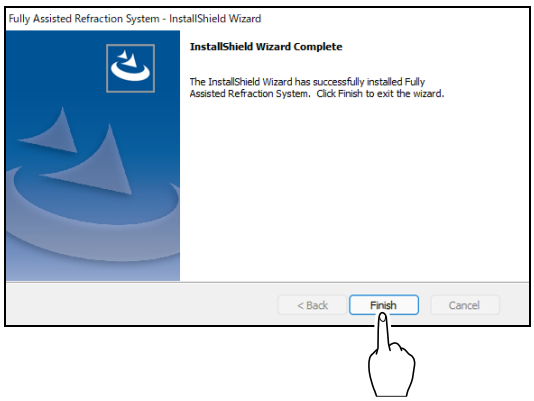


8 Press [Install].

The software installation starts.



9 When the installation is complete, press [Finish].



10 Remove the installation CD from the CD-ROM drive.

3.5 Network Configuration

This is the procedure for setting up a computer with the system application installed so that it can communicate with the RT-6100.

This section describes the case where a computer is connected to the RT-6100 at the factory.

Check

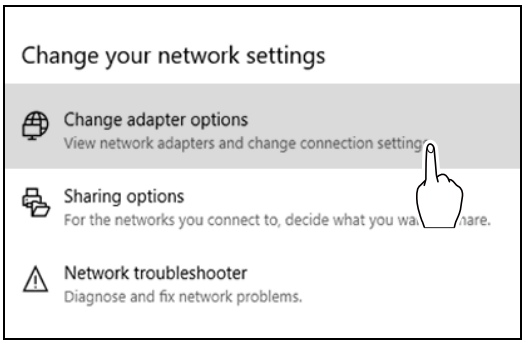
- Activate the system application with Windows Administrator privileges.
  If necessary, enter the password of the administrator account.
- Confirm that settings are proper with the network administrator.
- This procedure is explained based on the operation on Windows 10.

1 Press [Start menu] > [SETTING] > [Network & Internet].

2 Press [Change adapter options].

Help

- For Windows 11, press [Advanced network settings] > [More network adapter options].



3 Select the LAN adapter to be connected to the RT-6100 to open the menu.

Help

- Press and hold for tap operation or right-click for mouse operation.

4 Press [Properties].

5 Press [Internet Protocol Version 4 (TCP/IPv4)].

6 Press [Properties].

7 Press [Use the following IP address].

8 Enter the following values in [IP address], [Subnet mask], and [Default gateway].

IP address	192.168.0.150 (Set this value so that it does not overlap with the IP address of the connected device.)
Subnet mask	255.255.255.0
Default gateway	Blank

Check

- The values listed above are for reference only.
  If the values of the RT-6100 are different from the factory default values, enter the corresponding values.

9 Press [OK].

10 Shutdown Windows to turn off the computer.

3.6 Parameter Setting for RT-6100

To use the product, set the RT-6100 as follows.

For parameter settings of the RT-6100, refer to the RT-6100 Operator's Manual.

◆ Parameter settings

S/C/A	
SPH step	0.25 D
CYL mode	–
Cross cylinder / Prism	
Cross cylinder(XC) test	Auto
XC mode S.E fix	Yes
CYL mode S.E fix	No
XC mode AXIS 90° auto change	No
Near measurement	
Preset ADD When the RT-6100 overall version 1.8.0 or later is used, this setting is not required.	No
Print	
Print format	All data

◆ Network settings

Other: External output	
External control	To be used

3.7 Operation Check

Follow the steps below to check whether there are any problems with startup or connection.

1 Check whether the system application starts.

"4.1.1 Starting the system application" (page 41)

2 Check the connection between the computer and the Joystick Controller.

"6.2 Operation Test" (page 63)

3 Check the connection with the RT-6100 and the shared folder.

"6.3 Connection Test" (page 64)

4 As necessary, set the display language, voice language, and connected chart by parameters.

The setting of the connected chart for the system application needs to match that for the RT-6100.

"5.1 Parameter Setting" (page 55)

5 Check whether voice guide is played correctly.

"♦ Checking volume" (page 48)

4 OPERATING PROCEDURE

4.1 Startup and Shutdown

4.1.1 Starting the system application

1 Turn on the SSC-100 to start the RT-6100 and SSC-100.

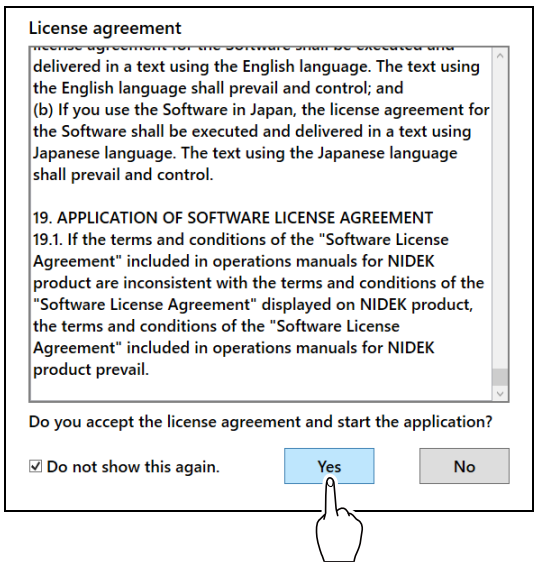
For detailed operations, refer to the RT-6100 and SSC-100 Operator's Manuals.

2 Turn on the computer to start Windows.

3 After the startup of the RT-6100 and SSC-100 is complete, start [Fully Assisted Refraction System] .

4 Read the license agreement to the end, and if you agree, press [Yes].

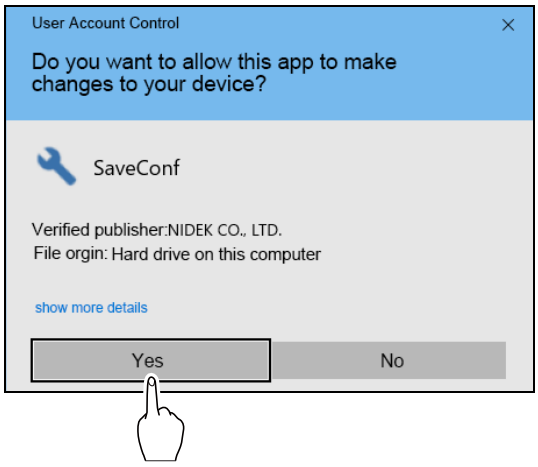
Checking "Do not show this again." omits the confirmation of the license agreement from the next time.



Check

- If no Joystick Controller is connected to the USB connector, an error message appears.
- When restarting the RT-6100, also restart the system application.

5 Checking "Do not show this again." in Step 4 may display the dialog box on the right. In this case, press [Yes].



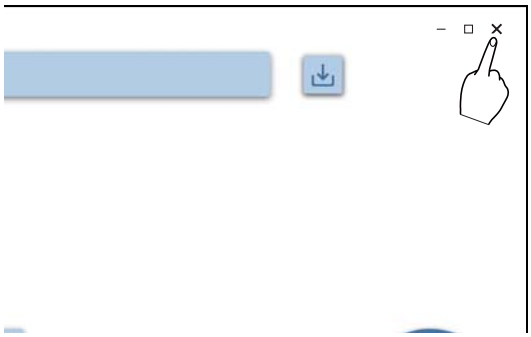
After a moment, the startup screen of the system application is displayed.

4.1.2 Pre-use check

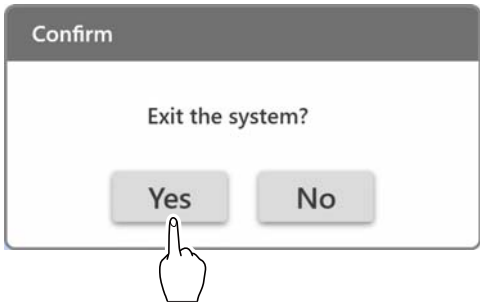
1. Visually check the Joystick Controller for damage or abnormalities.
2. Check that the Joystick Controller is stably installed.
3. Check the operation of the Joystick Controller in the operation test.
   “6.2 Operation Test” (page 63)
4. Check the network connection in the connection test.
   “6.3 Connection Test” (page 64)
5. Check that the speaker functions properly in the volume test.
   “♦ Checking volume” (page 48)

4.1.3 Exiting the system application

1 Press [×] in the upper right corner.



2 Press [Yes].



3 Shutdown Windows to turn off the computer.

4 Turn off the SSC-100 (RT-6100).

For detailed operations, refer to the RT-6100 and SSC-100 Operator's Manuals.

4.1.4 After-use check

1 Visually check the Joystick Controller for damage or abnormalities.

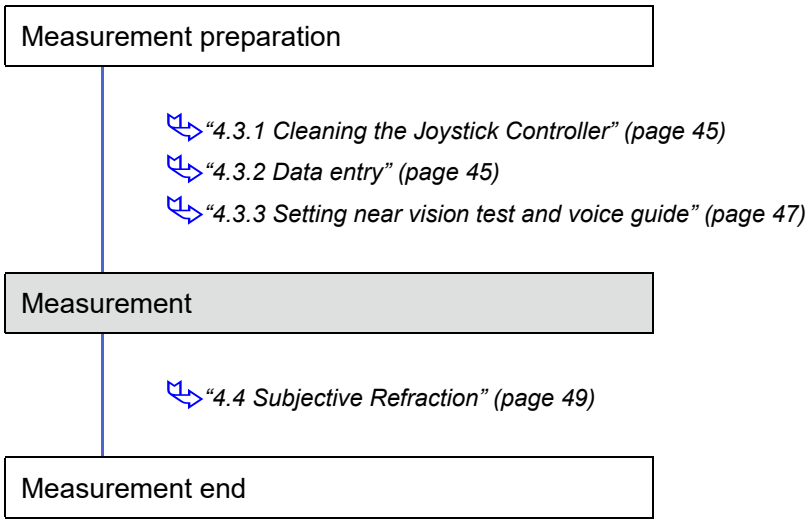
2 Clean the Joystick Controller.

"4.3.1 Cleaning the Joystick Controller" (page 45)

3 Store the Joystick Controller.

Store the Joystick Controller with the Velcro tape attached, or store it in a stable place. Also, keep it away from dust.

4.2 Measurement Flow



4.3 Measurement Preparation

4.3.1 Cleaning the Joystick Controller

1. Soak a cloth in rubbing alcohol.
2. Wipe the buttons, answer lever, Joystick Controller, and other areas that the patient may touch.

Check

- Be careful not to allow rubbing alcohol to enter the interior of the Joystick Controller.

4.3.2 Data entry

This is the procedure for entering the objective data measured with an auto refractometer or glasses data measured with a lensmeter.

The following methods are available for data entry.

- Entering patient ID

"♦ *Entering data using patient ID" (page 46)*

- Entering AR/LM data with the RT-6100 control box
  - Import data from the connected auto refractometer or lensmeter.
    Refer to the procedure for importing data from the auto refractometer or lensmeter in the RT-6100 Operator's Manual.
  - Enter data manually.
    Refer to the procedure for entering data manually in the RT-6100 Operator's Manual.
  - Read data from the Eye Care card.
    Refer to the procedure for reading data from the Eye Care card in the RT-6100 Operator's Manual.

Check

- Be sure to set the sphere or cylinder increments of the auto refractometer or lensmeter data to 0.25 D.

◆ Entering data using patient ID

This is the procedure for obtaining auto refractometer or lensmeter data using patient ID to import subjective starting values.

In this case, the data with patient ID need to be written to the shared folder with an auto refractometer or lensmeter in advance.

Check

- Depending on the security software settings, acquisition of AR/LM data may fail.
  In this case, acquire AR/LM data with the control box. For security software settings, contact your system administrator.

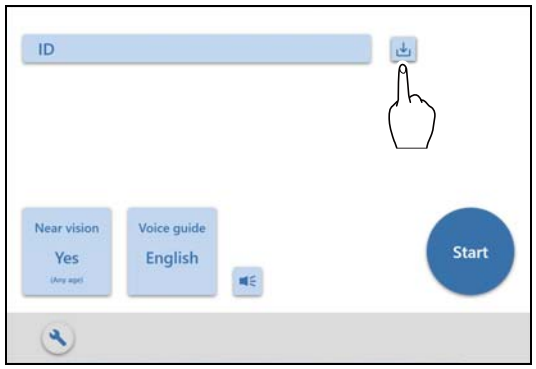
● Entering patient ID with barcode scanner

1) Read the patient ID with a barcode scanner.

2) Press [↓].

Setting

- When the “AR/LM data import with ID” parameter is set to “Yes”, reading the patient ID in *Step 1)* automatically imports the subjective starting values.

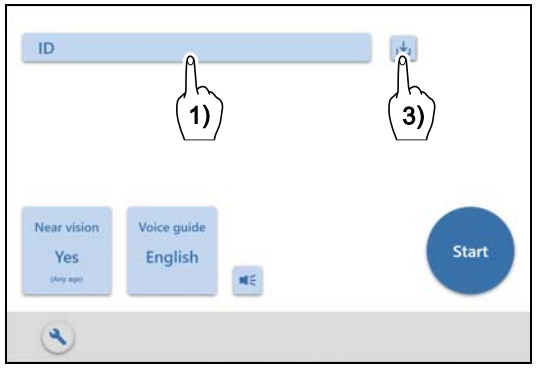


● Entering patient ID manually

1) Press [ID].

2) Enter the patient ID with the keyboard.
   For a tablet computer, a keyboard is displayed on the screen.

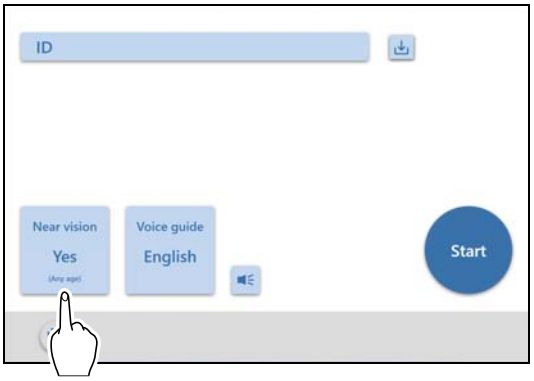
3) Press [↓].



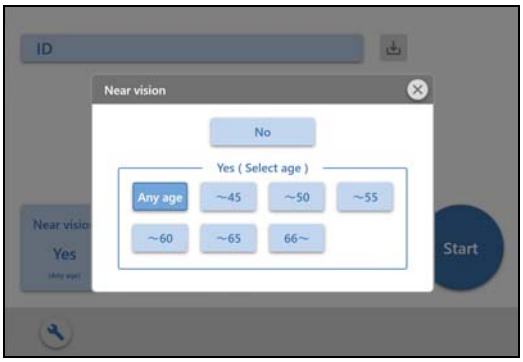
4.3.3 Setting near vision test and voice guide

◆ Setting near vision test

1 Press the near vision test button.



2 For the near vision test, select the age according to the patient. To skip the near vision test, press [No].

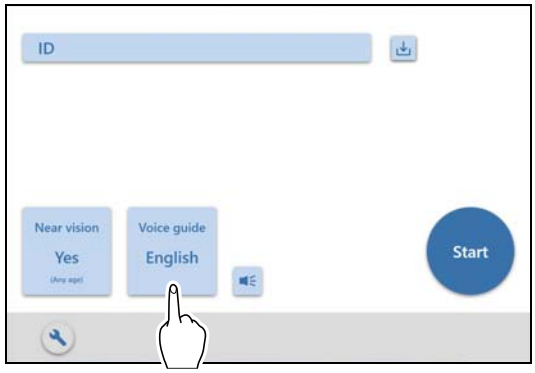


Knowledge

- If the near vision test is performed for young people, selecting [Any age] is recommended. As a general guide, selecting [Any age] is recommended for patients under 40 years old.

◆ Selecting voice guide language

1 Press the voice guide button.



2 Select the voice guide language used in measurements.

The first to third rows are for standard languages.

The fourth row is for additional languages. When a language is added, the language name is shown on the button.

Check

- If the additional language is not installed properly, ⚠ is shown on the corresponding button along with the writing folder name (Other1-3). In this case, contact Nidek or your authorized distributor.

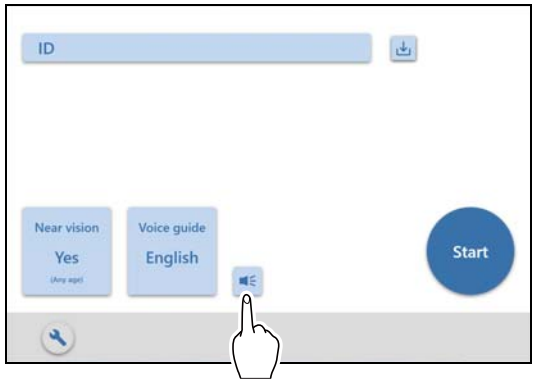
  Example: Other2 ⚠

◆ Checking volume

1 Press 🔊.

A test voice guide is played.

Pressing 🔊 again while voice guide is played stops the voice guide.



2 Adjust the volume as necessary.

Adjust the volume with a computer or speaker.

4.4 Subjective Refraction

1 Prepare the refractor.

For detailed operations, refer to the RT-6100 and SSC-100 Operator's Manuals.

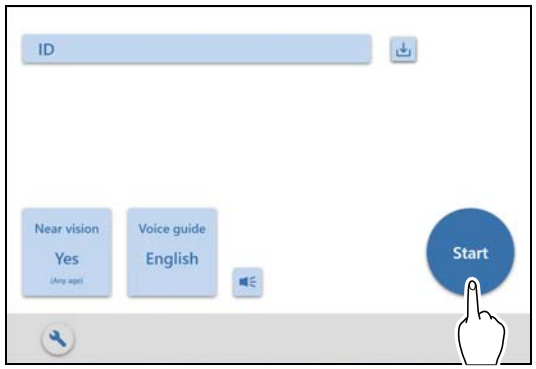
If necessary, instruct the patient how to operate the Joystick Controller.

2 Press Start.

The measurement screen is displayed and measurement starts.

At this time, the entered patient ID is reflected in the RT-6100.

However, if the patient ID has already been set in the RT-6100, it is not reflected.



3 The patient responds to questions using the Joystick Controller according to the voice guide.

The operator needs to note the following points.

- The operator does not need to accompany the patient all the time. Occasionally check the measurement status on the screen.
- The operation voice guide for each measurement item is played twice at intervals.
- If the orientation of the visual acuity chart is continuously incorrect twice in "AR data check", the measurement of that eye is skipped.
- For both eyes, if the orientation of the visual acuity chart is continuously incorrect twice in "AR data check", the measurement is complete.

4 After all measurements are complete, check the measurement results.

Perform measurement again if necessary. For details on how to check the measurement results, see *"2.4.3 Complete screen" (page 23)*.

Check

- Measurement results are reflected in the RT-6100.

  However, when the RT-6100 overall version is 1.7.0 or earlier, the visual acuity value is not entered. Enter it manually, if necessary.

5 Make a final prescription with a trial frame.

Raise the refractor head to test the final prescription through a trial frame.

If necessary, reflect the measurement results on the RT-6100, and output and print data.

For detailed operations, refer to the RT-6100 and SSC-100 Operator's Manuals.

Check

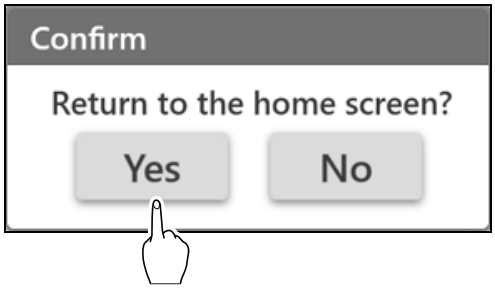
- The Fully Assisted Refraction System determines subjective refraction based on the answers given by the patients. Therefore, the operator needs to make a final prescription of the vision with a trial frame.

6 Press .

7 Press [Yes] to return to the home screen.

Check

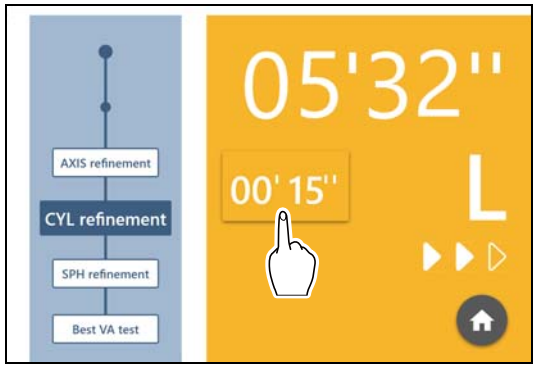
- Returning to the home screen erases the measurement data.



4.5 Help Screen

This is the procedure to be taken when the help screen is displayed.

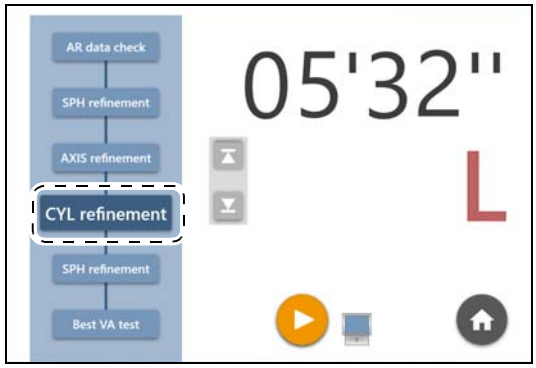
1 When the help screen is displayed, press 00'00'' to display the pause screen.



2 Check which item is in progress in the measurement item indication.

Tip

- The item being measured is displayed in a darker color.
- The control box is operable while the pause screen is displayed.



3 Solve the issue of the patient.

4 Resume measurement.

- To resume from where the measurement was paused, press ▶.

  However, if correct measurement may not be resumed with ▶, such as when the refractive power was changed while the visual acuity test was paused, reattempt the measurement with the measurement item button.
- To resume from another item, press the desired measurement item button.
- To reset the answers given before the pause and resume from the same item, press the measurement item button in a darker color.

4.6 Refraction Programs

The standard refraction programs for the product are as follows.

Charts and visual acuity values presented vary depending on the chart type.

Knowledge

- The measurement range is according to the RT-6100. However, cylinder axis refinement and cylindrical power refinement need to meet the following conditions:
  - The range of sphere including addition is -19.00 to +16.50 D.
  - No prism power entry

  If the above conditions are not met, correct measurement may not be possible.
- If the measurement range is exceeded, the measurement completes and proceeds to the next measurement item.
- Only four-way visual acuity charts are used in the visual acuity test.
- Measurement may be performed again with the same power and same visual acuity value in the final overcorrection check of the best-corrected visual acuity determination.
- For low-power astigmatism (0.50 D or less) and when the “Std: Skip AXIS/CYL refinement” parameter is set to “Yes”, the first spherical power refinement, cylinder axis refinement, and cylindrical power refinement are skipped. However, if the cylindrical power is 0 D, the step is skipped regardless of the parameter setting.
- If the refinement exceeds the range set by the “Std: AXIS refinement range” parameter in the cylinder axis refinement, the axis is reset to the one at the start of the measurement and the step proceeds to the cylindrical power refinement.

Eye being measured	Order	Measurements	
Right eye	1	AR data check	Check of whether the VA chart set by the “Std: AR data check range” parameter can be read with AR data *“5.2 Parameter Table” (page 57)*
	2	SPH refinement	Spherical power refinement using the Red-green chart (+0.5 D fogging) Refine until the letters on the red and green sides appear equally or the letters on the green side appear slightly clearer.
	3	AXIS refinement	Cylinder axis refinement using the Dots chart or such Place the auto cross cylinder lens to refine the cylinder axis.
	4	CYL refinement	Cylindrical power refinement using the Dots chart or such Place the auto cross cylinder lens to refine the cylindrical power.
	5	SPH refinement	Spherical power refinement using the Red-green chart (+0.5 D fogging) Refine until the letters on the red and green sides appear equally or the letters on the red side appear slightly clearer.
	6	Best VA test	Determination of best-corrected visual acuity with the most plus power using the VA chart Determine the visual acuity while checking overcorrection or undercorrection by changing the sphere based on the patient’s can-see or cannot-see determination.

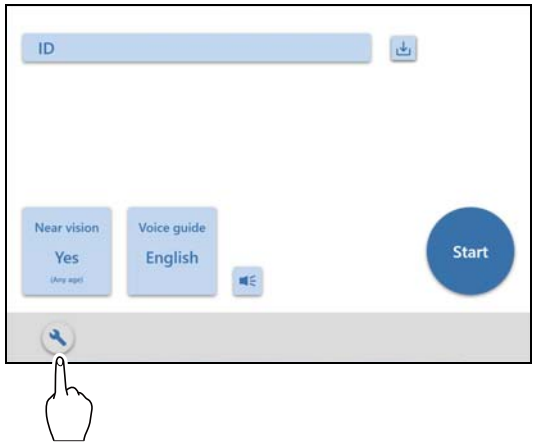
Eye being measured	Order	Measurements	
Left eye	7	AR data check	Check of whether the VA chart set by the “Std: AR data check range” parameter can be read with AR data
	8	SPH refinement	Spherical power refinement using the Red-green chart (+0.5 D fogging) Refine until the letters on the red and green sides appear equally or the letters on the green side appear slightly clearer.
	9	AXIS refinement	Cylinder axis refinement using the Dots chart or such Place the auto cross cylinder lens to refine the cylinder axis.
	10	CYL refinement	Cylindrical power refinement using the Dots chart or such Place the auto cross cylinder lens to refine the cylindrical power.
	11	SPH refinement	Spherical power refinement using the Red-green chart (+0.5 D fogging) Refine until the letters on the red and green sides appear equally or the letters on the red side appear slightly clearer.
	12	Best VA test	Determination of best-corrected visual acuity with the most plus power using the VA chart Determine the visual acuity while checking overcorrection or undercorrection by changing the sphere based on the patient’s can-see or cannot-see determination.
Both eyes	13	ADD test	Addition test using the Cross grid chart for near vision Performed only when the near vision test button is set to “Yes”.
	14	ADD VA test	Visual acuity test with addition using the near point chart Performed only when the near vision test button is set to “Yes”.

5 PARAMETER SETTING

5.1 Parameter Setting

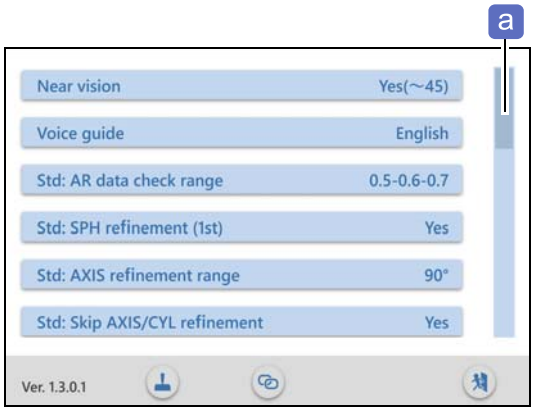
1 Press  .

The parameter setting screen is displayed.



2 Scroll the screen with the scroll bar a to display the parameter setting to be changed.

3 Press the parameter setting button of a parameter to be changed.



- For 2 options

  Pressing a parameter setting button toggles its options.

- For 3 options

  1) Select the parameter setting to be changed.
  2) A dialog box is displayed.
  3) Select the desired option button.

- For entering values or characters

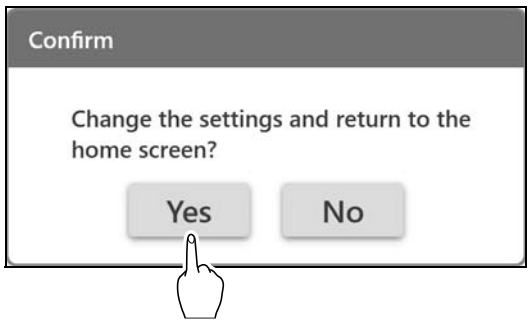
  1) Select the parameter setting to be changed.
  2) Enter values or characters using the keyboard.
     For a tablet computer, a keyboard is displayed on the screen.
  3) After setting, press the [Enter] key.

4 After setting, press .

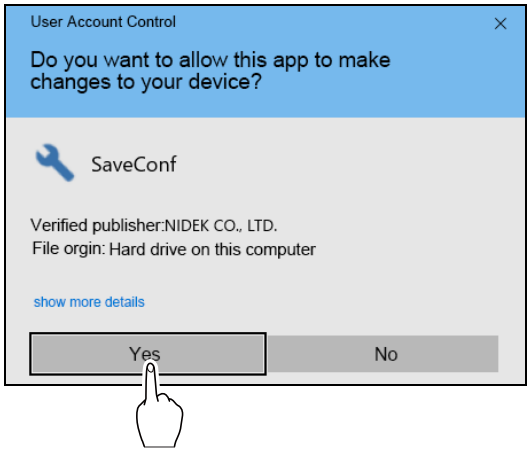
Knowledge

• Changing a parameter setting displays “!” in the setting complete button .

5 Press [Yes] to save the settings.



6 If the dialog box on the right is displayed, press [Yes].



5.2 Parameter Table

The underlined setting options in bold indicate the factory default settings.

Parameter	Setting options
Near vision	**Yes** (**Any age**, ~45, ~50, ~55, ~60, ~65, 66~), No
	Sets whether to perform the near vision test. Selects the age when the near vision test is set to “Yes”.
Voice guide	Japanese, **English**, German, French, Spanish, Italian, Portuguese, Korean, Chinese
	Selects the language of the voice guide. In addition to the standard languages listed above, three additional languages can be added to the voice guide. For more information on the languages that can be added, contact Nidek or your authorized distributor.
Std: AR data check range	**0.5-0.6-0.7**, 0.5-0.6, 0.5
	Selects the visual acuity chart to be presented during AR data check. For example, for “0.5-0.6-0.7”, the chart is presented in the order of 0.5, 0.6, and 0.7. Selecting a lower visual acuity may make it easier to pass the AR data check, however, may make the subsequent measurements more difficult to determine.
Std: SPH refinement (1st)	**Yes**, No
	Sets whether to perform the first spherical power refinement.
Std: AXIS refinement range	15°, 30°, 45°, 60°, 75°, **90°**
	If the refinement exceeds the range set by this parameter in the cylinder axis refinement, the axis is reset to the one at the start of the measurement and the step proceeds to the next measurement item.
Std: Skip AXIS/CYL refinement	**Yes**, No
	Sets whether to skip the first spherical power refinement, cylinder axis refinement, and cylindrical power refinement for low-power astigmatism (0.50 D or less) However, if the cylindrical power is 0 D, the step is skipped regardless of this setting.
Std: SPH refinement (2nd)	**Yes**, No
	Sets whether to perform the second spherical power refinement.
VA test: Criteria	**1/2**, 2/3, 3/4, 3/5
	Selects the pass/fail criteria when the best-corrected visual acuity is determined. A visual acuity chart is presented by the number of times in the denominator of a set fraction, and if the patient responds correctly by the number of numerator times, it is determined the patient has that visual acuity. Only 1/2 can be set for Type A.
VA test: Max VA	0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.2, **1.5**
	Selects the maximum visual acuity value when the best-corrected visual acuity is determined. A value smaller than the minimum acuity value cannot be selected. The value varies with the chart used.

VA test: Min VA	0.5, 0.6, 0.7, **0.8**, 0.9, 1.0, 1.2, 1.5
	Selects the minimum visual acuity value when the best-corrected visual acuity is determined. A value greater than the maximum acuity value cannot be selected. The value varies with the chart used.
AR/LM data import with ID	Yes, **No**
	Sets whether to automatically import AR or LM data of the patient when the patient ID is read by a barcode scanner.
Alert time 1	No, 6 min, **8 min**, 10 min, 12 min, 14 min, 16 min, 18 min, 20 min
	Selects the elapsed time for the indication to change from the normal state to an abnormal state. After the elapsed time, the indication turns orange. A value greater than “Alert time 2” cannot be selected.
Alert time 2	No, 6 min, 8 min, **10 min**, 12 min, 14 min, 16 min, 18 min, 20 min
	Selects the elapsed time for the indication to change from the abnormal state to an elevated abnormal state. After the elapsed time, the orange indication starts blinking. A value smaller than “Alert time 1” cannot be selected.
Home return confirmation	**Yes**, No
	Sets whether to display a confirmation message when  is pressed during measurement.
Connected RT setting	*“5.2.1 Connected RT settings” (page 58)*
Shared folder setting	*“5.2.2 Shared folder settings” (page 59)*
Display language	Japanese, **English**, French, Spanish, German, Chinese
	Selects the display language of the system application.
Connected chart	SSC-100 Type A, Type D, Type C-C, Type C-E, Type M, Type P, **Type T**, Type UK
	Selects the chart type of the connected SSC-100. • Select Type C-C when the Landolt ring is used for the visual acuity test in Type C. • Select Type C-E when tumbling E is used for the visual acuity test in Type C.
License agreement	**Yes**, No
	Sets whether to display the license agreement screen when the system application starts.

5.2.1 Connected RT settings

Parameter	Setting options
IP address	RT015_CB (keyboard input)
	Sets the computer name (NetBIOS name) or IP address (IPv4) of the connected RT-6100.
Port No.	62929 (keyboard input)
	Sets the port number of the connected RT-6100.

5.2.2 Shared folder settings

Parameter	Setting options
User name	NIDEK (keyboard input)
	Sets the user name to access the shared folder.
Password	***** (keyboard input)
	Sets the user password to access the shared folder.
Share name	DATA (keyboard input)
	Sets the name of the shared folder.
Domain	WORKGROUP (keyboard input)
	Sets the domain name to access the shared folder.
Shared folder location	RT015_RB (keyboard input)
	Sets the device containing the shared folder with a computer name or IP address.
Input folder type	**RT**, MEM-200
	Sets whether the shared folder for import is in the RT-6100 or MEM-200.

6 MAINTENANCE AND SPECIFICATIONS

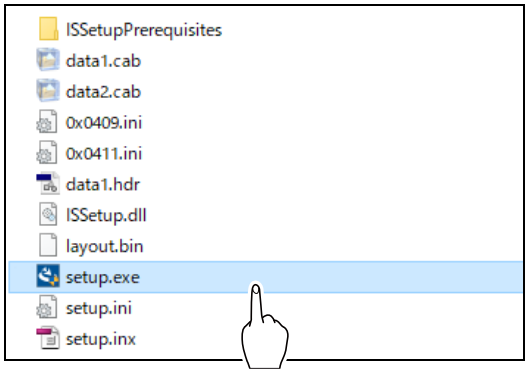
6.1 System Application Uninstallation

Check

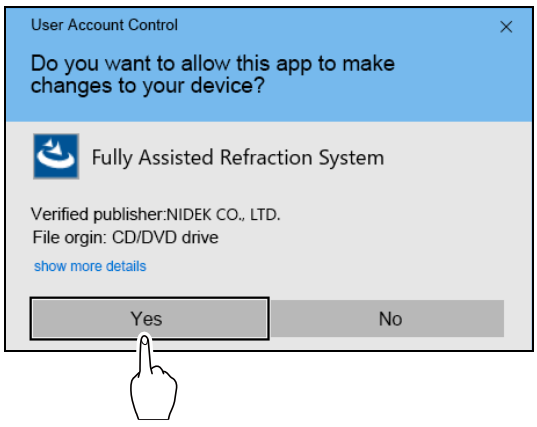
- Activate the system application under a user account with Windows Administrator privileges. If necessary, enter the password of the administrator account.
- Be sure to exit the system application before uninstallation.
- Do not launch other applications during uninstallation.
- Do not remove the installation CD during uninstallation.

1 Insert the installation CD into the CD-ROM drive, then open it via File Explorer.

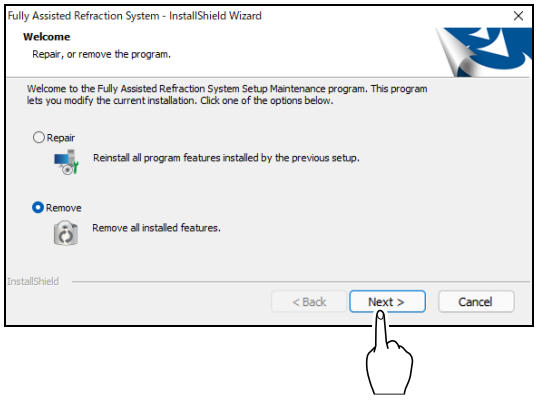
2 Run [setup.exe].



3 Press [Yes].



4 Select [Remove], then press [Next].

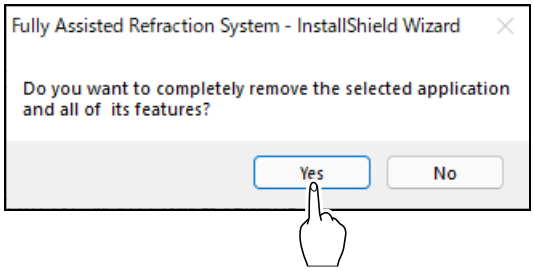


Knowledge

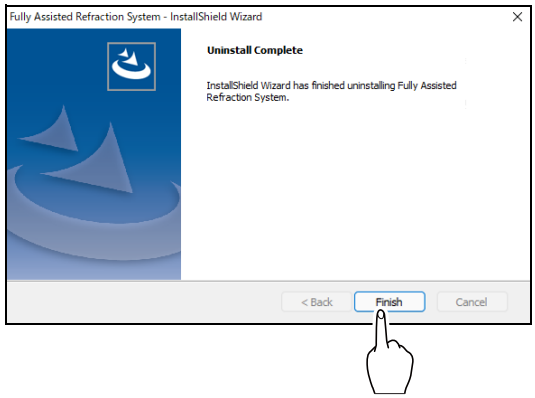
- Selecting [Repair] enables reinstallation. Select this option when the system application does not start normally.

5 Press [Yes].

The software uninstallation starts.



6 When the uninstallation is complete, press [Finish].

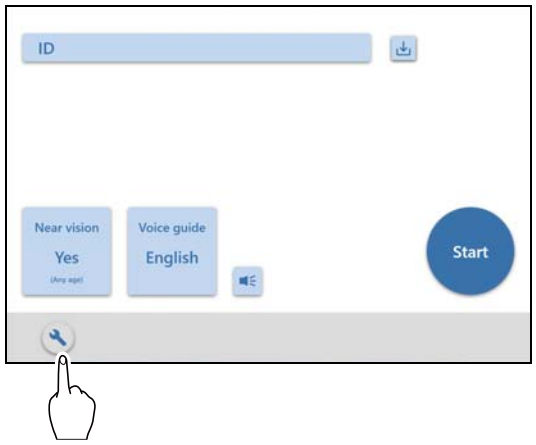


7 Remove the installation CD from the CD-ROM drive.

6.2 Operation Test

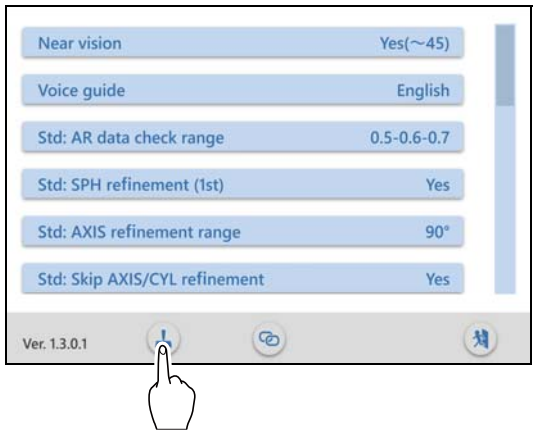
This is the procedure for checking the operation of the Joystick Controller.

1 Press .

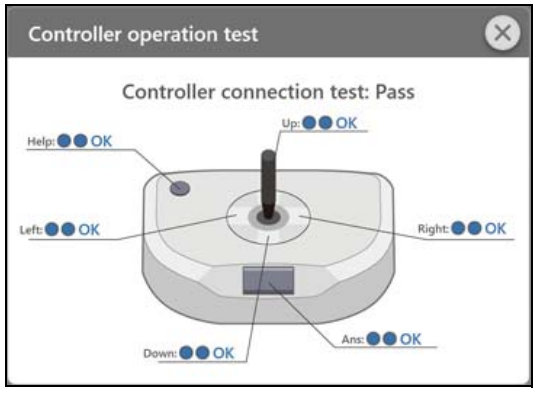


2 Press .

The operation test screen is displayed.



3 Operate the buttons and the answer lever twice each.



Check

- To prevent malfunctions, continuous operation in a short time is not recognized. Leave an interval of about 1 second between operations.

Tip

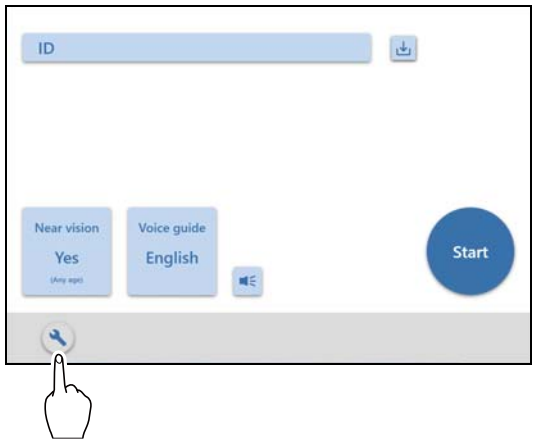
- If the operation is successful, a blue circle appears.
- If the operation is successful twice, “OK” also appears.
- If “OK” is displayed for all items, “Controller connection test: Pass” also appears.

4 Press [×] in the upper right corner to exit the test.

6.3 Connection Test

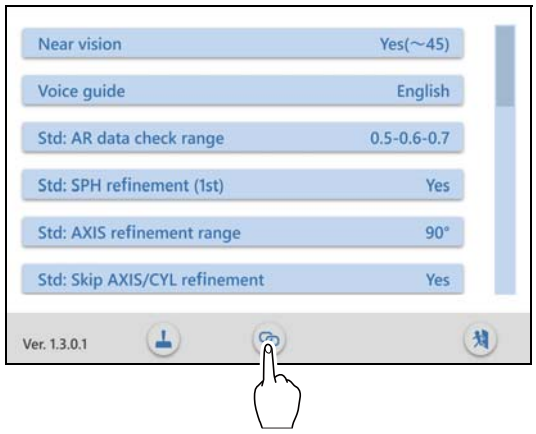
This is the procedure for checking the network connection of the product.

1 Press .



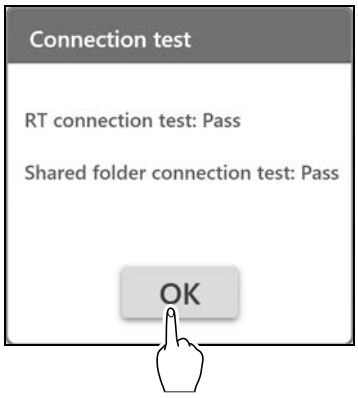
2 Press .

The icon is indicated in blue while the connection test is performed.
When the test is complete, the results are displayed.



3 Check the results.

4 Press [OK] to exit the test.



Help

- If the connection test fails, an error message appears.
  "6.4 Error Messages" (page 65)

6.4 Error Messages

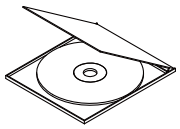
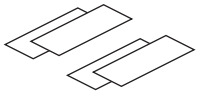
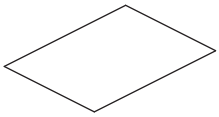
One of the following messages is displayed on the screen when an error occurs. Take actions according to the displayed message.

If the issue persists even after the suggested actions are taken, contact Nidek or your authorized distributor.

Error message
The controller is not connected. Check the connection of the controller.
RT is not connected. Check the connection of RT.
An unexpected error occurred. Contact your system administrator.
Because the configuration file values could not be obtained, the settings were initialized. Start the software, then check the values on the setting screen.
Could not read the configuration file. Contact your system administrator.
Could not write the configuration file. Contact your system administrator.
The number of characters read by the barcode exceeds 255. Use the barcode with the allowable number of characters.
The barcode contains invalid characters. Use the barcode with valid characters.
Voice guide could not be played. Contact your system administrator.
Could not load files correctly. Check the following folders.
The AR data does not exist. Check the ID you entered.
The AR data could not be read. Check the file content.
The LM data does not exist. Check the ID you entered.
The LM data could not be read. Check the file content.
No AR or LM data found.
Cannot connect to RT. Check the connected RT settings.
RT cannot be operated. Check the RT settings.
Cannot connect to the shared folder. Check the shared folder settings.
One or more invalid characters were entered in {Items}. You cannot enter the following symbols: \/ "[]:|<>+=;,?*%@ in {Items}.
One or more invalid characters were entered in {Items}. You cannot enter the following symbols: \/:*?"<>| in {Items}.
The port number value is outside the permitted range. Only 0 to 65535 can be entered.
The option is blank. Set the value at the time of installation.

6.5 Specifications (Joystick Controller)

Dimensions and mass	
Dimensions	150 mm (W) x 100 mm (D) x 84 mm (H) (including answer lever (upright)) (with USB cable)
Mass	300 g
Power supply	
Input voltage	5 V DC
Input current	100 mA
Environmental conditions	
Follow the RT-6100.	
Other	
Expected service life	8 years from the date of initial operation (Proper maintenance is necessary.)

Standard accessories					
Part name	Quantity	Appearance	Part name	Quantity	Appearance
Operator's manual	1		Installation CD	1	
Velcro tape	2 sets		Quick reference guide	1	

If you need information to ensure cybersecurity, contact Nidek or your authorized distributor.

6.6 License Information of Software Library

The following is license information for Silicon Labs USBXpress Host SDK for USB bridge products for Windows, ReactiveProperty, and BlowFish used in the Fully Assisted Refraction System.

◆ Silicon Labs USBXpress Host SDK for USB bridge products for Windows:

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6.7 Glossary and Abbreviations

■ The following terms and abbreviations are used in this operator's manual.

Terms and abbreviations	
AR	Abbreviation for the Nidek auto refractometer such as AR-1
CB	Abbreviation for the control box
Eye Care card	Dedicated IC card for Nidek
Full correction	Refractive error correction with the most plus power
Joystick Controller	The controller used to respond to questions during refraction with this product
LM	Abbreviation for the Nidek lensmeter such as LM-1800
Maximum visual acuity value	The visual acuity value with the smallest optotype in the visual acuity test
Minimum visual acuity value	The visual acuity value with the largest optotype in the visual acuity test
RB	Relay box of the RT-6100
System application	The software application for refraction with this product

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