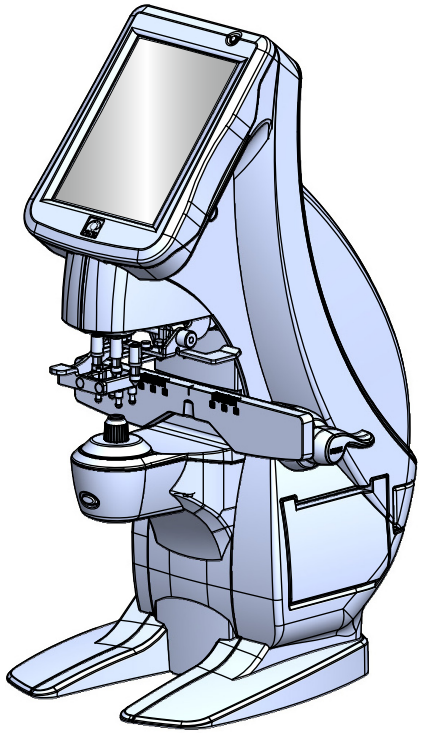
NIDEK

AUTO LENSMETER

LM-7/LM-7P

OPERATOR'S MANUAL



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

Original instructions

NIDEK CO., LTD.

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Before Use

This operator's manual includes operating procedures, safety precautions, and specifications for the NIDEK AUTO LENSMETER, LM-7/LM-7P.

Be sure to read the operator's manual prior to use of the device to understand the safety precautions and operating procedures thoroughly.

Keep this manual handy for reference.

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

31035-P902-B1

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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.

12. SURVIVAL

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

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

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

14. ENTIRE AGREEMENT

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

15. NO WAIVER

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

16. NO THIRD PARTY RIGHTS

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

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

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Table of Contents

1 SAFETY PRECAUTIONS

1.1 Before Use, Read this Manual

⚠ BEFORE USE, READ THIS MANUAL.
Be sure to read the operator's manual prior to operation of the device to understand the safety precautions and operating procedures thoroughly. Keep this manual handy for reference.

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

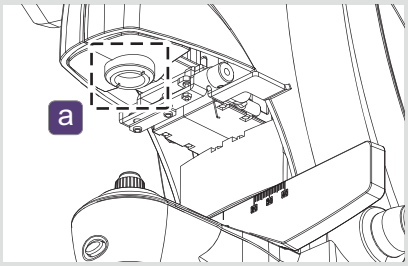
⚠ CAUTION

- Do not use the device for other than the intended purpose.
  NIDEK does not assume any responsibility for accidents or malfunctions caused by misuse.
- Never modify the device or touch the internal structure of the device.
  Electric shock or malfunction may result.
- Install the device in an environment that meets the specifications.
  "6.1 Specifications" (page 103)
- Install the device in an environment where no contaminants such as corrosive gas, acid, or salt particles are present.
  Corrosion or malfunction of the device may result.
- Avoid installing the device where it is exposed to direct air flow from an air conditioner.
  Changes in temperature may result in condensation or adversely affect functions of the device.
- Do not use the device in places exposed to direct sunlight or near incandescent lighting. Do not install the device directly on a showcase or glossy table surface.
  Malfunction may occur or an error message may appear.
- When handling power supply or electrical components, follow the precautions described below.
  Malfunction, electric shock, or fire may result.
  - Be sure to use a power outlet that meets the specified power requirements.
    "6.1 Specifications" (page 103)
  - Be sure to connect the power plug to an outlet equipped with a grounding terminal. Or, connect the grounding wire to the earth.
  - Insert the power plug fully into the power outlet.
  - Never use power strips or extension cables for the power supply of the device.
  - Do not use any power cord other than the one provided. Do not use the provided power cord for any other equipment.
  - Before connecting any cable to the device, be sure to turn off power to the device and unplug the power cord.
  - Never crush or pinch the power cord with heavy objects.
- Install the device in an area where the outlet that the power plug is inserted into is easily accessible during use. In addition, ensure that the power plug can be disconnected without the use of a tool.
  Otherwise, it may interfere with disconnecting of the power from the input power source in case of abnormality.

During use

⚠ CAUTION

- Immediately replace the power cord if the internal wires are exposed, the power turns on or off when the power cord is moved, or the cord or plug is too hot.
  Should the device fail, disconnect the power cord from the power outlet and contact NIDEK or your authorized distributor without touching the interior of the device.
- There may be a few bright or dark dead pixels on the LCD monitor which are a characteristic of the LCD monitor manufacturing process.
  This does not represent a failure of the LCD monitor, and the monitor can be used without any problem.
- Ultraviolet rays are irradiated from the LED light opening a during transmittance measurement. Do not look into it.



- The wireless LAN module incorporated in this device conforms to the regional regulations of Japan, the USA, and Canada, and the RE Directive. When using the wireless LAN, follow the radio laws of the respective countries.
- Even in the countries or regions where the wireless LAN module incorporated in this device is approved by the governing bodies, depending on the installation location or use environment (especially in a location where other medical devices are present such as an operating room or ICU), the wireless function may be impaired. Follow the guidelines determined by medical institutions or optician facilities where the device is to be used.
- Data handled via the wireless LAN is controlled by patient numbers and IDs. Information that would personally identify an individual is not included. For security, follow the guideline determined by each facility where the device is to be used.

After use

⚠ CAUTION

- When the device is not in use, turn off power to the device and place the dust cover over the device.
- This device uses heat-sensitive printer paper.
  - The paper degrades over time and the printed characters may become illegible.
  - If adhesive tape or an adhesive containing organic solvent is applied to the printer paper, the printed data may disappear and become illegible.
    To keep the printed data for a long period of time, make copies of the printouts or write the measured results down.
- Always hold the power plug, not the cord, when disconnecting it from the power outlet.
  Cord breakage may result.
- Occasionally clean the prongs of the power plug with a dry cloth.
  If dust settles between the prongs, short circuit or fire may occur.
- If the device will not be used for an extended period of time, disconnect the power cord from the power outlet.
- Maintain the following environmental conditions when transporting or storing the device in packed condition.
  "6.1 Specifications" (page 103)
- When transporting the device, use the packaging materials dedicated to the product and be careful not to expose the device to excessive shocks such as dropping it.
  When holding and transporting the device by hand, use both hands so as not to drop it. Malfunction may result.

Maintenance

⚠ CAUTION

- Only service personnel trained by NIDEK are allowed to repair and service the device.
  NIDEK assumes no responsibility for any adverse events resulting from improper servicing.
- When performing maintenance work, secure a sufficient maintenance space.
- Take special care not to scratch the protective glass under the nosepiece.
  Flaws on the glass substantially lower the reliability of measurement.
- Clean the protective glass under the nosepiece occasionally with a blower brush.
  If dust settles on the protective glass, it may affect the measurement accuracy.
- If you have doubts about the accuracy of measured values, measure a lens whose values are known (such as a trial lens).
  If the measured results are substantially different from the known values of the lens, contact NIDEK or your authorized distributor for calibration.

Disposal

⚠ CAUTION

- Follow local governing ordinances and recycling plans regarding disposal or recycling of device components.
  It is recommended to entrust the disposal to a designated industrial waste disposal contractor.
  Inappropriate disposal may contaminate the environment.
- When disposing of packing materials, sort them by material and follow local ordinances and recycling regulations.
  Inappropriate disposal may contaminate the environment.

Connection to Network

⚠ CAUTION

- If the medical system is to be configured using an IT network, implement IT security measures with the network administrator, and check that the system operates properly.
  Virus infection, unauthorized access, or data tampering may result.

1.3 Labels and Symbols

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

	Power is turned on.
	Power is turned off.
	Indicates that the operator is required to refer to the operator's manual. *"6.1 Specifications" (page 103)*
	Alternating current
	Date of manufacture
	Manufacturer
	Indicates that this product must be disposed of in a separate collection of electrical and electronic equipment in "EU".
	Medical device
	EU Authorized Representative
	Serial number
	Swiss authorized representative
	Indicates that this medical device incorporates a wireless communication module (applicable to the models that incorporate the wireless LAN module only). It indicates that interference may occur in the vicinity of equipment marked with this symbol.

2 BEFORE USE

2.1 Device Outline

The NIDEK AUTO LENSMETER LM-7/LM-7P measures the optical performance of spectacle lenses such as single vision, bifocal (trifocal), and progressive power lenses or contact lenses.

Product name	Type
LM-7	Not equipped with a printer
LM-7P	Equipped with a printer In this manual, figures of the LM-7P are used for explanation.

◆ Intended use

This device is designed to measure vertex powers and prismatic effects of spectacle and contact lenses, to orientate and mark uncut lenses, and to verify the correct mounting of lenses in spectacle frames.

◆ Intended user profile

Any qualified personnel such as ophthalmologists, nurses, or optometrists (irrespective of nationality, culture, or style of dress)

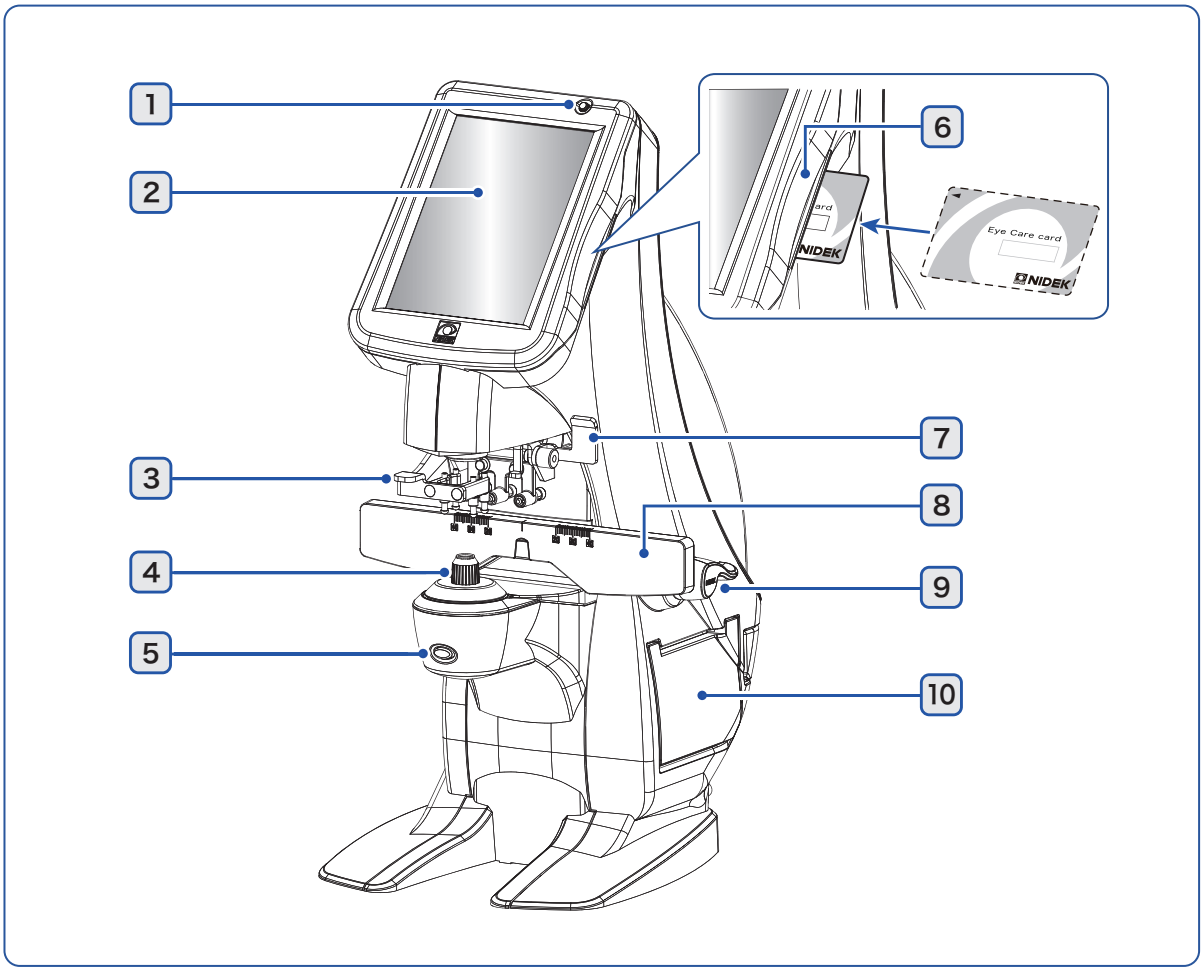
◆ Intended use environment

Medical facility, optical store, or optical lens laboratory

⚠ CAUTION

- If the device is used outside the specified use location, intended performance and security level cannot be maintained.

2.2 Device Configuration



1 Pilot lamp

Indicates whether the device is turned on or off.

Illuminated	Power is turned on.
Not illuminated	Power is turned off.
Fast blinking (twice/second)	Indicates that extended pressing of a button is recognized by the device.
Slow blinking (once/second)	Display auto off function

- Display auto off function

  When the device is idle for the time set with the Auto off parameter, the display auto off function works and the display turns off automatically. The measurement light source also turns off.

  To recover from auto off mode, touch the display. During lens measurement, the display auto off function does not work.

2 Touch screen

640 × 480 dots color touch LCD. The device can be operated by pressing the screen display.

3 Lens holder lever

Operates the lens holder.

4 Nosepiece

A lens to be measured is placed on the nosepiece. This is the base point for measurements.

When measuring contact lenses, replace the standard nosepiece with the provided one for contact lenses.

"3.3 Lens Setting" (page 34)

5 Read button

Reads measured data. Measured data is locked in.

When a measurement error occurs, the read button becomes disabled.

Extended pressing of the button on the measurement screen starts the UV transmittance measurement.

6 Eye Care card slot

Slot for the Eye Care card to which measured data is saved.

7 Marking lever

To mark a lens, push down this lever.

"3.11 Marking" (page 60)

8 Lens table

- Align the markings on the lenses to the scales on the lens table to confirm PD.

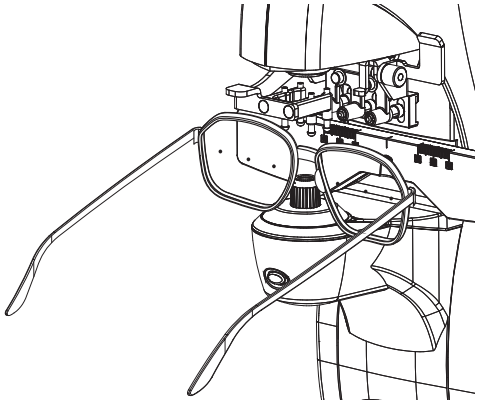
  Mount the nose pads of the frames on the nosepiece and align the center of the frames to that of the lens table. Move the lens table close to the lenses and read the monocular PD.

  PD can be checked with the scale mode function.

  "3.10 Measurement Using Scale Mode Function" (page 58)

- To measure a mounted lens, touch the bottoms of the frames to the lens table.

  "3.3 Lens Setting" (page 34)



9 Lens table lever

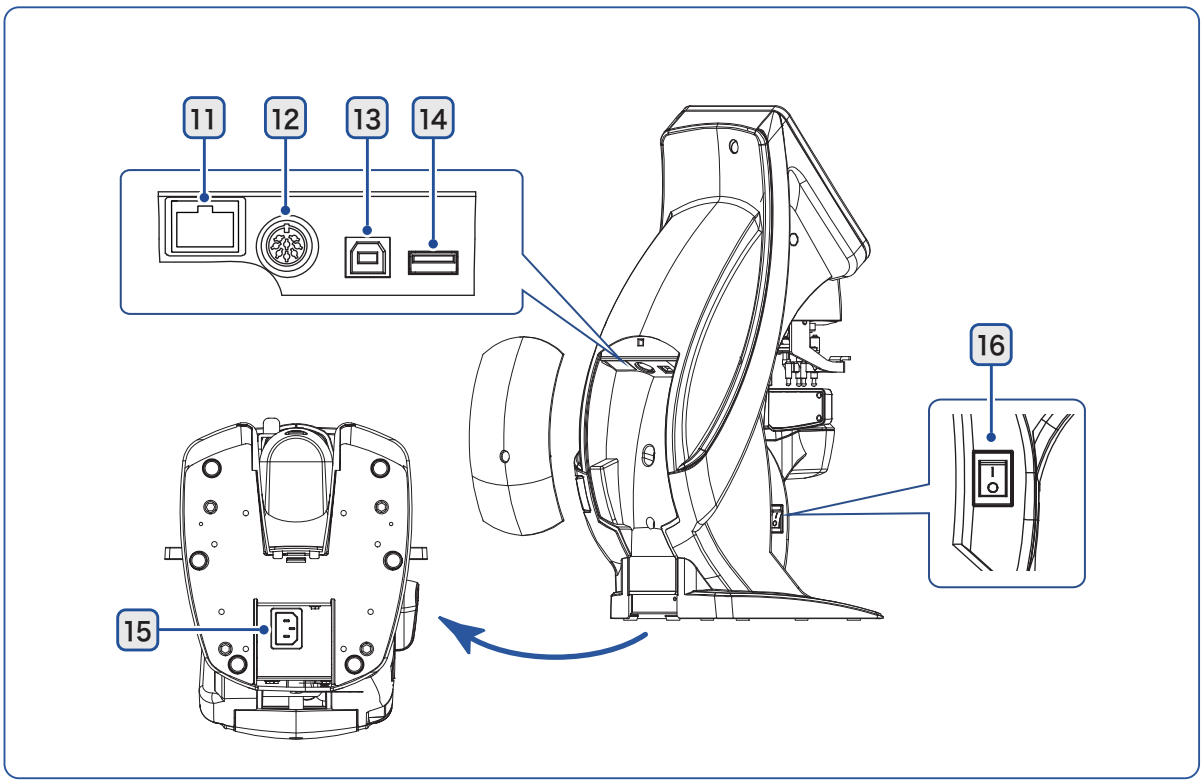
Moves the lens table forward and backward.

Forward movement	Pull the lens table lever forward.
Backward movement	Push the lens table lever backward.

10 Printer cover (LM-7P)

When replacing the printer paper, open this cover by pressing the button on the rear.

"5.4 Printer Paper Replacement" (page 97)



11 LAN cable port (optional)

Port for Ethernet LAN.

12 Communication port

RS-232C compatible port used for communication. The AR, ARK, RT, computer, or such is connected here.

13 USB port (device)

USB port for transferring measured data to a computer.

This port is in compliance with USB 2.0. Connect a computer using the optional USB cable.

14 USB port (host)

Port for a USB flash drive, barcode scanner, or magnetic card reader.

For the USB port, select either “Device” or “Host” by the USB parameter.

“4.2 Parameter Settings” (page 80)

15 Power inlet

A detachable power cord is connected here.

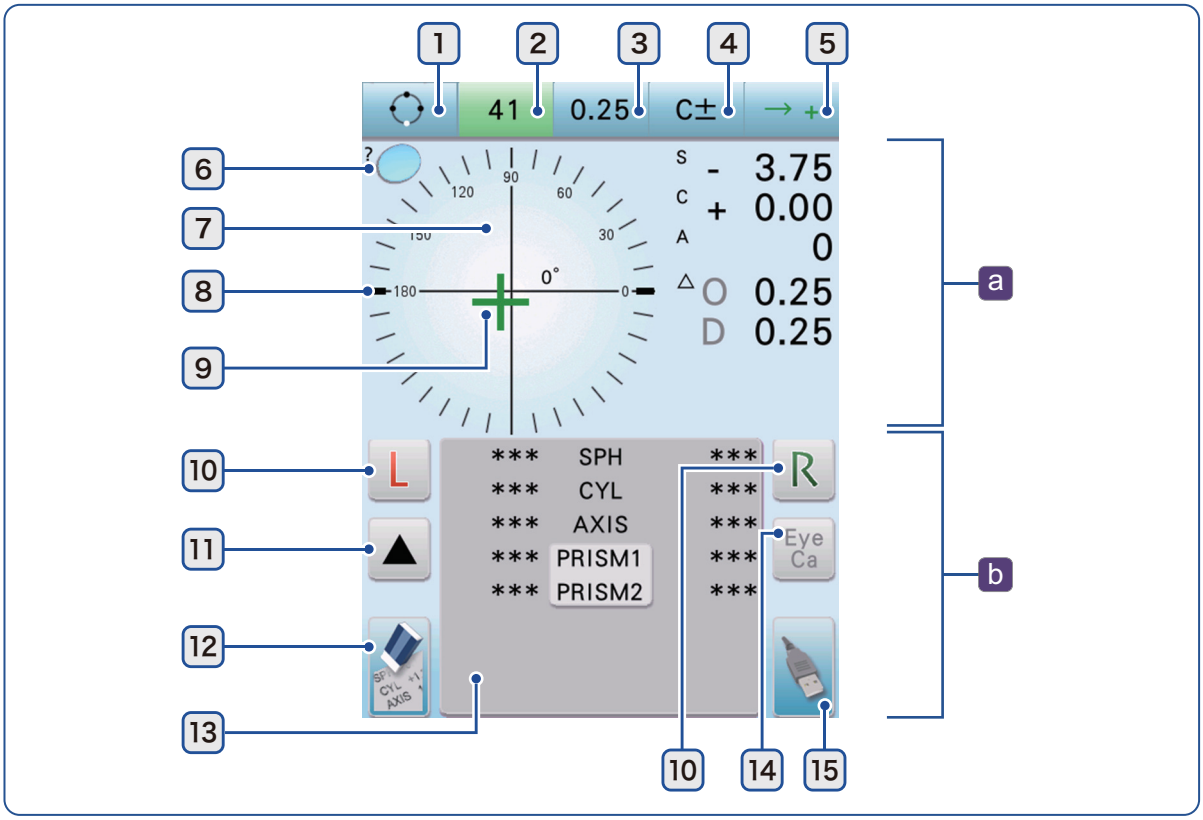
16 Power switch

Turns on or off power to the device.

2.3 Screen Configuration

2.3.1 Measurement screen

■ The following measurement screens are available: auto measurement screen, normal measurement screen, progressive power lens measurement screen, and contact lens measurement screen. The figure below shows the auto measurement screen that automatically measures lenses. Each measurement screen consists of the measurement area a and measured results display area b.



1 Parameter button 

Pressing the button switches to the parameter screen for setting parameters.

2 Abbe number button 41

Displays the Abbe number of the lens material that is set in the range of 20 to 60. Extended pressing of the button toggles the set numbers A → B → C in that order.

The numbers for A, B, and C are set on the parameter screen. After any number is changed, measured data is cleared.

"4.2 Parameter Settings" (page 80)

3 Increment button 0.25

Toggles the display increments for measured data in the order of 0.25 → 0.12 → 0.06 → 0.01.

Extended pressing of the button returns to the increment set by the parameter.

4 CYL +/- switching button C±

Switches the cylinder reading between positive (+) and negative (-).

Pressing the button again returns to the reading set by the parameter.

Pressing any button other than the increment button, auto read button, parameter button, and read button also returns to the reading set by the parameter.

Button	Description
Off (default)	Data is displayed in the cylinder reading set by the parameter.
On	The color of the button changes, and the sphere, cylinder, and axis values are displayed with the cylinder reading sign inverted from that set by the parameter.

When the Prism parameter is set to “P-B” or “BU/D BI/O (X-Y)”, this button is used to change the prism display setting.

Extended pressing of the button displays the setting of the Prism parameter. The setting is changed after the button is released.

- When the Prism parameter is set to “P-B” P-B

Button	Description
Off (default)	Prism prescriptions are displayed in polar coordinates.
On (extended pressing)	The color of the button is inverted and prism prescriptions are displayed in rectangular coordinates.

- When the Prism parameter is set to “BU/D BI/O (X-Y)” X-Y

Button	Description
Off (default)	Prism prescriptions are displayed in rectangular coordinates.
On (extended pressing)	The color of the button is inverted and prism prescriptions are displayed in polar coordinates.

5 Auto read button →+

Changes the auto read setting temporarily.

Extended pressing of the button returns to the setting by the parameter.

Display	Description
(Not set)	The contents set by the parameter are displayed. Single state: The contents set by the Auto read S parameter are displayed. R/L state: The contents set by the Auto read R/L parameter are displayed. *“4.2 Parameter Settings” (page 80)*
→+ ( )	
→+ ( )	

◆ Measurement area a

Operations are explained using mainly the measurement area of the screen.

6 Measurement screen display

Indicates which measurement is being taken.

Display	Description
	Normal measurement Measurement of single vision lenses or bifocal (trifocal) lenses
	Progressive power lens measurement
	Contact lens measurement
	Auto measurement When a lens on the nosepiece is detected as a progressive power lens, the normal measurement screen changes to the progressive power lens measurement screen automatically. If the distance portion of a progressive power lens is placed on the nosepiece, it may not be detected as a progressive power lens. In such a case, put the intermediate portion (progressive zone) or near portion area on the nosepiece.

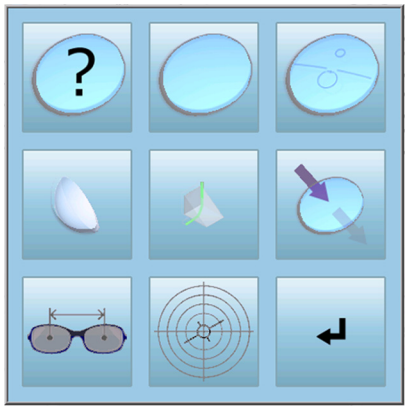
7 Alignment circle

The target is displayed on this circle. The center indicates the optical center position.

- Measurement select window

Extended pressing of the periphery of the alignment circle displays the measurement select window.

Press the button to display the desired measurement screen.



1		Switches to the auto measurement screen.
2		*“ Normal measurement screen” (page 23)*
3		*“ Progressive power lens measurement screen” (page 23)*
4		*“ Contact lens measurement screen” (page 23)*
5		*“ Prism layout screen” (page 23)*
6		*“ UV transmittance screen” (page 24)*
7		*“ Scale mode screen” (page 24)* Displayed only when right or left for the lens is specified.
8		Toggles the target display. *“9 Target” (page 20)*
9		Returns to the measurement screen.

8 Axis bar

The thick line displayed on the protractor of the alignment circle indicates the axis.

9 Target

Indicates the optical center of a lens to be measured.

The target shape changes depending on the Target parameter setting and alignment level.

Display		Description
Normal target	Prism target	
○		Misaligned
＋ (cross)		Placed within approximately 0.5Δ. Measured data can be read. When auto read ＋ (cross) is set, the measured data is locked in.
＋ (large cross)		Aligned (marking point) When auto read ＋ (large cross) is set, the measured data is locked in. When auto read ＋ (cross) is set, the measured data is automatically read again and locked in.

◆ Measured results display area b

10 R/L measurement select button

Indicates the single measurement or right/left measurement L, R. Pressing the button switches from the single state to the R/L state L, R.

Display	Description
, L (white)	Measurement is not performed yet.
, L (green)	While measurement is being performed, the corresponding button blinks in green.
, L (blue)	Measurement is complete.

11 Area replacement button ▲ ▼

Replaces the measurement area and measured results display area up and down.

12 Clear button

Clears the measured data that has been saved.

The locked data is released and the R/L measurement select button returns to (white).

13 Measured results display

Displays the measured data that has been locked in.

- Prism ON/OFF button PRISM1 PRISM2

Toggles whether to output measured prism data through printing, communication, or such. When the button is turned off, the button and measured data turn gray and measured prism data is not output.

Depending on the parameter setting, the button display when measured data is cleared differs.

Parameter		Button
Prism	Prism Tx	
Off	Off	Cleared
	On	Selected
	Display	Cleared
P-B BU/D BI/O	Off	Cleared
	On	Selected
	Display	Selected

14 Eye Care card button 

Indicates the Eye Care card state.

Extended pressing of this button clears the data on the card.

Display	Description
 (white)	The Eye Care card is not inserted.
 (blue)	The Eye Care card is inserted.
 (green)	The Eye Care card is being accessed. Never touch the card.
 (red)	An error has occurred while the Eye Care card is being accessed.

15 Print button 

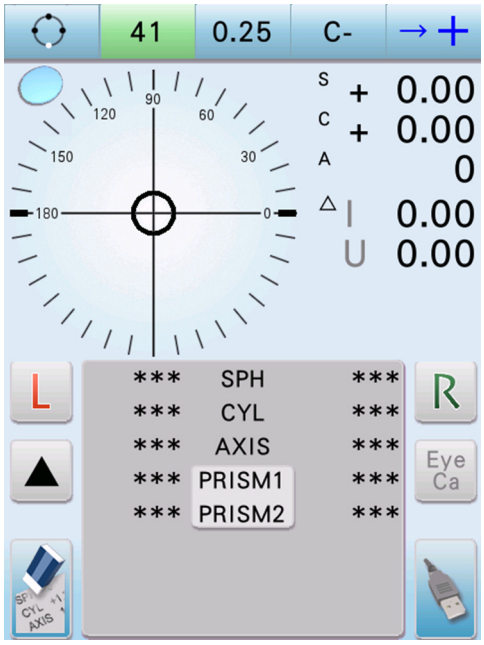
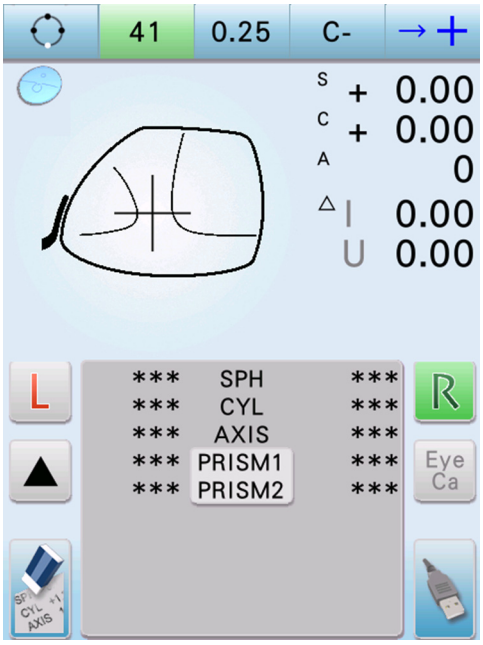
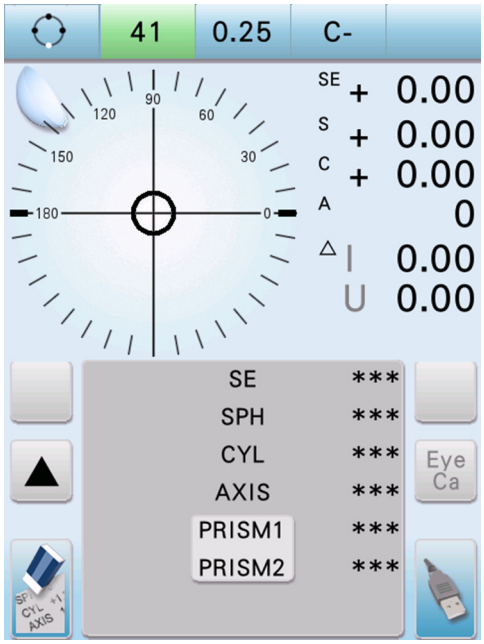
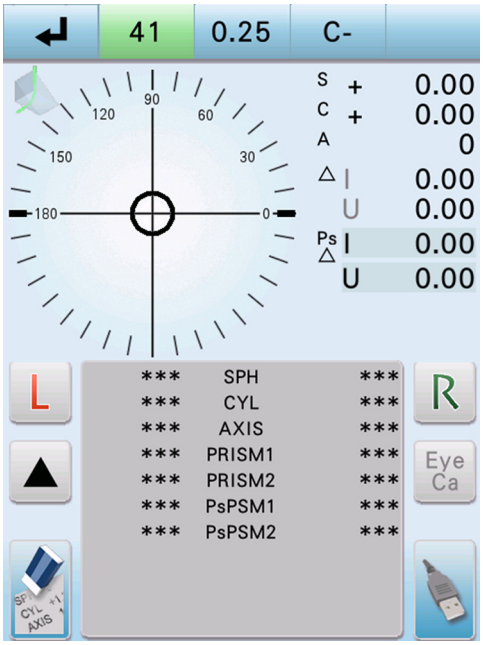
Performs printing of locked measured data, data transmission, and writing to the Eye Care card.

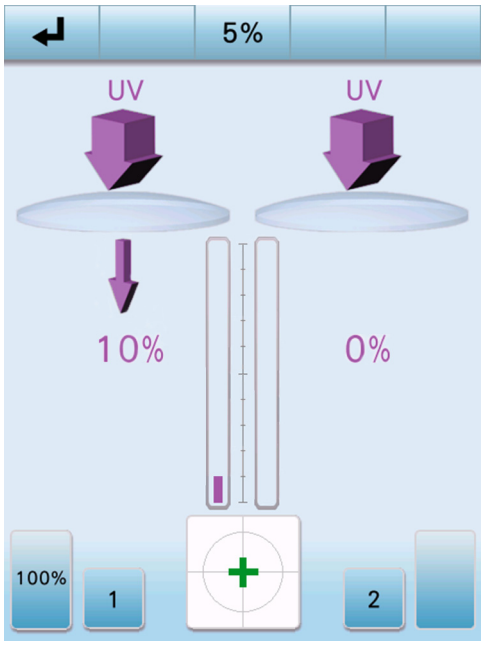
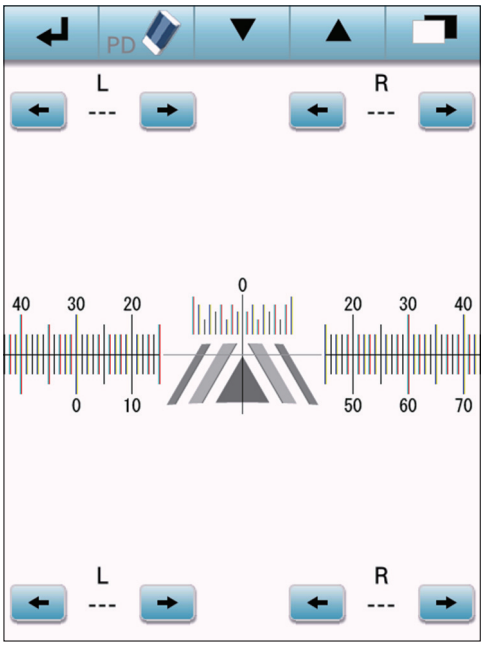
The function and display of the button changes depending on the parameter setting.

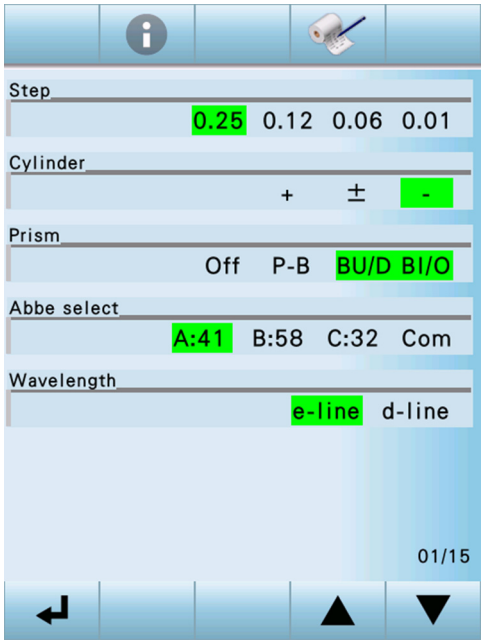
When the button is pressed while measured data is not locked in, the data is automatically locked in and printed.

Display	Function	Parameter	
		Printer	Com mode
	Prints measured data. Extended pressing of the button feeds the paper. When the device is connected to external equipment, measured data is printed and transmitted at the same time (except when the Com mode parameter is set to “Off”). When the Eye Care card is inserted, data is written to the card.	On	-
	Prints measured data with the printer of the connected AR, ARK, or RKT. *“4.1.2 Connecting AR/ARK/RKT” (page 74)* When the Eye Care card is inserted, data is written to the card.	AR print	NIDEK NIDEK2
	Outputs measured data to the connected external equipment. Printing is not performed. When the Eye Care card is inserted, data is written to the card.	Off	NIDEK NIDEK2 PC NCP10 NCP20

2.3.2 Other screens

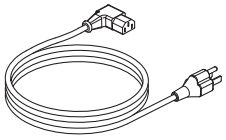
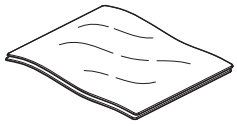
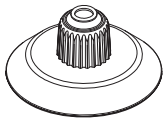
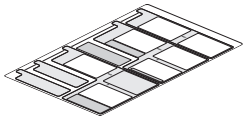
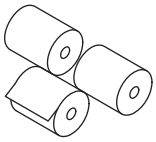
Normal measurement screen	Progressive power lens measurement screen
	
Screen for measuring single vision lenses or bifocal (trifocal) lenses *"3.4 Single Vision Lens Measurement" (page 37)*,*"3.5 Bifocal and Trifocal Lens Measurement" (page 40)*	Screen for measuring progressive lenses *"3.6 Progressive Power Lens Measurement" (page 44)*
Contact lens measurement screen	**Prism layout screen**
	
Screen for measuring contact lenses The SE value (spherical equivalent refractive power) is displayed in addition to lens measurement values. *"3.8 Contact Lens Measurement" (page 53)*	Screen for marking lenses for strabismus and phoria prescriptions using the prism layout function *"3.7 Prism Power Measurement of Lenses for Strabismus and Phoria" (page 51)*

UV transmittance screen	Scale mode screen
	
Screen on which UV transmittance measured data is displayed *"3.9 UV Transmittance Measurement" (page 55)*	Screen for easily measuring the PD and LPD/RPD values by aligning the marked lenses to the scale displayed on the screen *"3.10 Measurement Using Scale Mode Function" (page 58)*

Parameter screen

Screen for setting the parameters of the device *"4.2 Parameter Settings" (page 80)*

2.4 Packed Contents

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

	Part name	Quantity	Appearance
☐	Main body	1 unit	
☐	Power cord	1 unit	
☐	Dust cover	1 unit	
☐	Nosepiece for contact lenses	1 unit	
☐	Operator’s manual	1 volume	
☐	Measuring Progressive Power Lenses explanation guide	1 page	
☐	Printer paper (LM-7P)	3 rolls	

2.5 Before First Use

2.5.1 Cable connection and startup

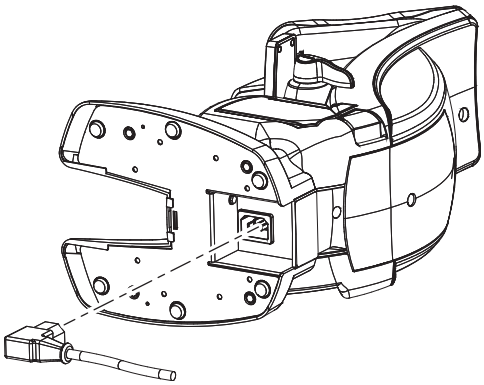
1 Place the device on a stable table.

2 Lay the device on its side gently.

3 Connect the power cord to the power inlet.

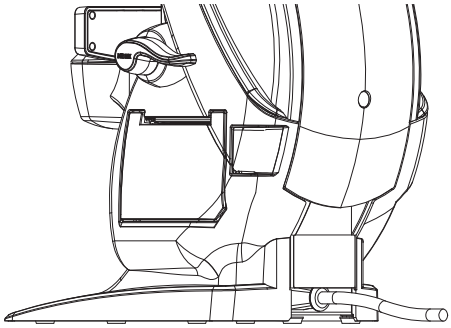
Connect peripheral equipment as necessary.

"4.1 Operation when Peripheral Devices are Connected" (page 71)



4 Stand the device upright.

Draw the power cord through the indentation on the rear of the device to keep the cord free.



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

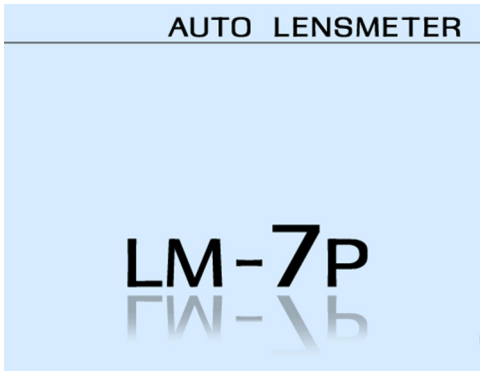
⚠ CAUTION

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

6 Turn on (|) the power switch.

The initial screen is displayed and the device is initialized.

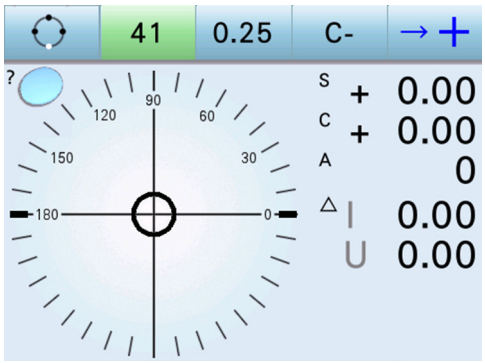
Wait until the screen changes.



7 Confirm that the measurement screen is displayed.

The measurement screen displayed when power is turned on can be set with the Initial screen parameter.

"4.2 Parameter Settings" (page 80)

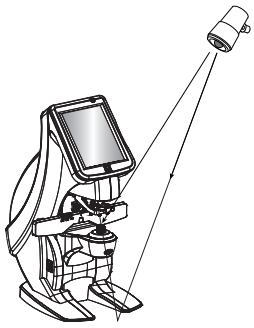


Note

- If any error appears, interference light may be the cause. Do not install the device in places exposed to direct sunlight or near lighting. In particular, ensure that the device is not illuminated by a spot light from the upper front.

  Measured data of lenses of 10Δ or more is prone to be affected adversely by interference light.

  In that case, change the position or orientation of the device.



- If you place the device on a showcase or glossy table, lay a cloth or such on it.

  Reflected light of illumination may adversely affect measurements.

8 Load the supplied printer paper. (LM-7P)

For the procedure, see *"5.4 Printer Paper Replacement" (page 97)*.

❖ This completes the setup procedure.

Note

- Set the parameters as necessary or desired.

  "4.2 Parameter Settings" (page 80)

- For the device of the ink pad type, ink is not contained in the ink pad at shipment. Fill the ink before using the device.

  "5.5.2 Ink pad (optional)" (page 98)

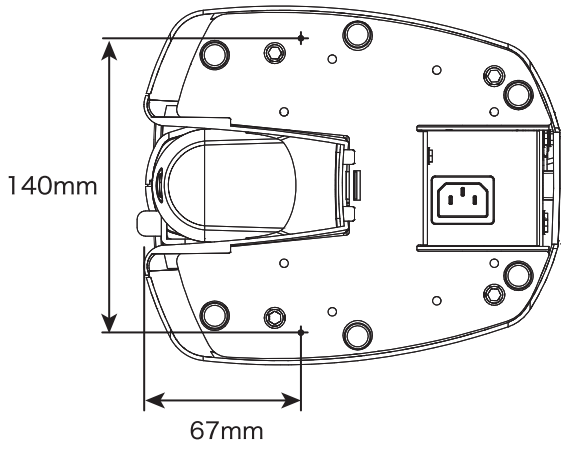
◆ When fastening the device to a table

- To use the device safer, fasten the device using the screw holes on the bottom.

  It is necessary to drill the table at two positions suitable for the screw holes as shown in the right figure.

- Prepare two commercially available screws with a diameter of 3 mm.

  The screw length depends on the table thickness. For a table thickness of 20 mm, a screw length of 30 mm is appropriate. If the screw is too long, adjust it with a washer or such.



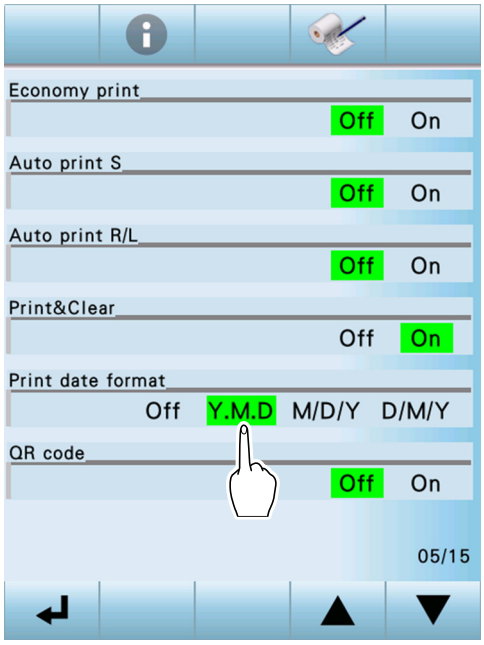
2.5.2 Date and time setting

■ On the parameter screen, set the date and time, and the order of display for them to be printed.

1 Press the parameter button [⚙].

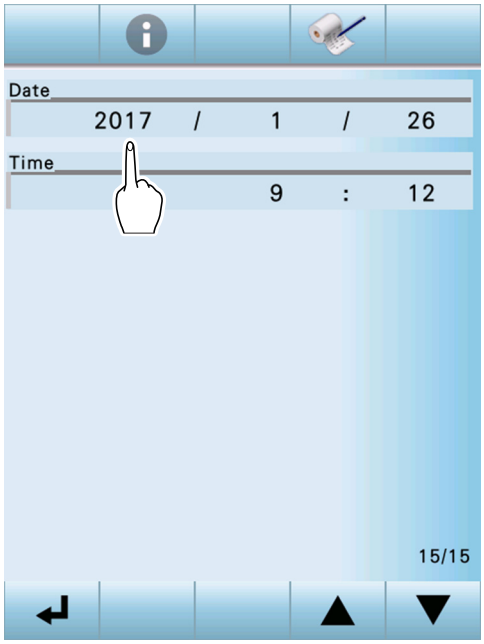
2 Select the order of year, month, and day to be printed.

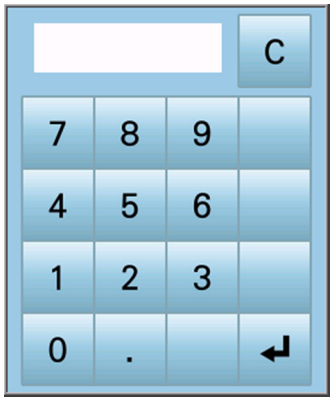
Using the page change button [▼] [▲], display the Print date format parameter and select the desired order.



3 Set the date and time.

1) Using the page change button [▼] [▲], display the Date parameter and Time parameter.
2) Press the parameter to be changed.
   The numeric keypad appears.
3) Enter the desired numbers and press the exit button [↵].





3 OPERATING PROCEDURE

3.1 Operation Flow

Turning on the device

"3.2 Preparation for Measurement" (page 30)
Turn on power to the device and change the parameter settings as necessary.

Measurement

"3.3 Lens Setting" (page 34)
"3.4 Single Vision Lens Measurement" (page 37)
For entering the operator ID / patient ID, see *"4.1.5 Connecting the barcode scanner / magnetic card reader" (page 77)*.
"3.5 Bifocal and Trifocal Lens Measurement" (page 40)
"3.6 Progressive Power Lens Measurement" (page 44)
"3.7 Prism Power Measurement of Lenses for Strabismus and Phoria" (page 51)
"3.8 Contact Lens Measurement" (page 53)
"3.9 UV Transmittance Measurement" (page 55)
"3.10 Measurement Using Scale Mode Function" (page 58)

Marking

"3.11 Marking" (page 60)
"3.11.1 Marking at optical center" (page 60)
"3.11.2 Marking for prism prescription" (page 61)

Printing, Data saving

"3.12 Printing" (page 65)
"3.13 Saving Data to Eye Care Card" (page 67)

Turning off the device

"3.14 After Use" (page 69)

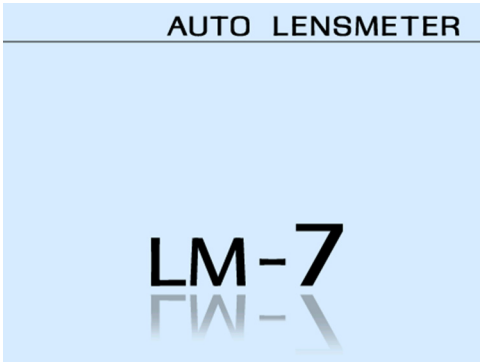
3.2 Preparation for Measurement

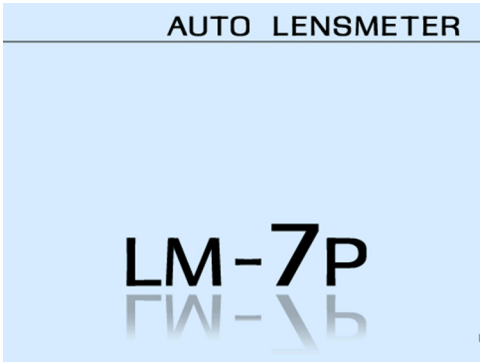
1 Perform checks before use.

“♦ *Checklist before use” (page 31)*

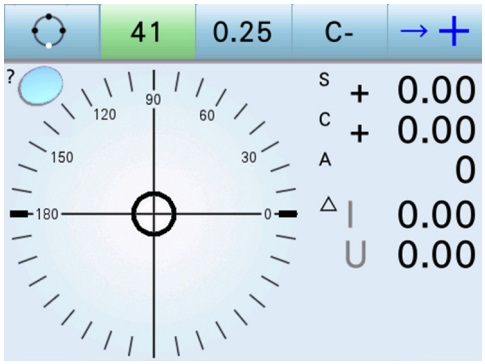
2 Turn on (|) the power switch.

The title screen is displayed. Wait until the screen changes.





After initialization, the measurement screen is displayed.



Note

- The measurement screen displayed when power is turned on can be set with the Initial screen parameter.
- Do not turn on power while a lens is set in the device.
  If there is a lens on the nosepiece before the measurement screen is displayed, the error message “0D initialization error” appears. In such a case, remove the lens and turn on power again.

◆ Checklist before use

	Items (before turning on power)
☐	The power cord is connected to the power inlet and outlet securely.
☐	The cables of the connected equipment are connected securely.
☐	The main body is clean.
☐	The protective glass is clean.
☐	No dust or debris is adhered to the tip of the nosepiece or lens holder.
☐	The printer paper is loaded and sufficient.
☐	The connected equipment is turned on.
	Items (after turning on power)
☐	When power is turned on, no error message appears.
☐	The screen is displayed properly and its brightness is uniform.
☐	The touch screen and each button function properly.
☐	The measurement screens and measured values are displayed properly.
Note	

◆ Measurement screen when power is turned on

Depending on the settings of the Initial screen and Contact measurement parameters and the type of the attached nosepiece, the measurement screen displayed after initialization differs.

- Initial screen parameter setting

Setting	Initial screen
Auto	Auto measurement screen
Normal	Normal measurement screen
Progressive	Progressive power lens measurement screen
Contact	Contact lens measurement screen

- Contact measurement parameter setting

  - When the parameter is set to “On” or “Off”

    Except for the following cases, the measurement screen set by the Initial screen parameter is displayed.

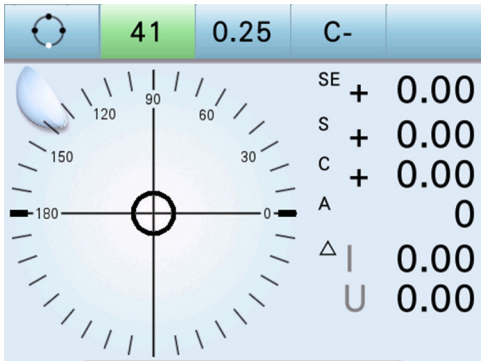
    - When the Contact measurement parameter is set to “Off” and the Initial screen parameter is set to “Contact”, the auto measurement screen is displayed.
    - When the Initial screen parameter is set to any other than “Contact”, and power is turned on (|) with the nosepiece for contact lenses mounted, the error message appears on the initial screen.

To measure spectacle lenses	Replace the nosepiece with the standard one, then press the restart button  . The measurement screen set by the Initial screen parameter is displayed.
To measure contact lenses only	Press the execute button  to display the contact lens measurement screen. In this case, the contact lens measurement screen cannot be changed to the other measurement screens unless the nosepiece is replaced and power is turned off and on.

  - When the parameter is set to “Only”

    Regardless of the Initial screen parameter setting, the contact lens measurement screen is displayed.

    Confirm that the nosepiece is for contact lenses.

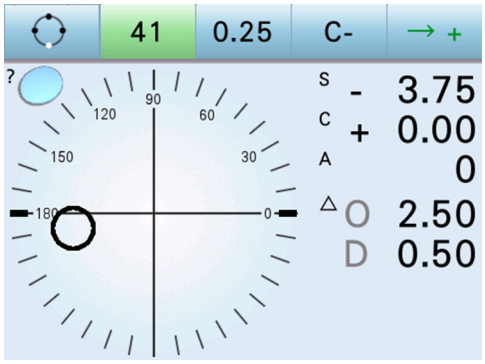


◆ Details of target

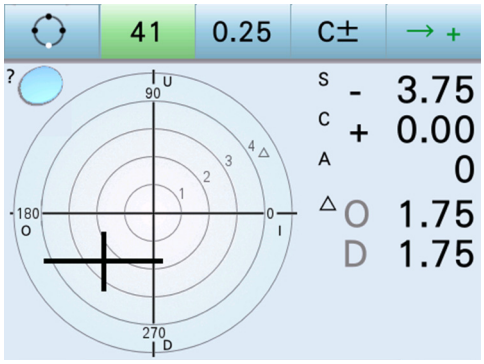
The target form displayed on the measurement screen can be selected by the Target parameter.

● Target parameter setting

Setting	Details of target
○ (Normal)	The target indicates the distance and direction from the nosepiece center. The direction and movement distance are constant regardless of lens refractive power. As the target approaches the center, its shape changes from ○ → + (within 0.5Δ) → + (within ø0.8 mm).
× (Prism)	The target moves based on prism amount as with the eyepiece-type or projection-type lensmeter. Also, the target turns to indicate the axis. As the target approaches the center, its shape changes from × → ⊗ (within 0.5Δ) → ⊗ (within ø0.8 mm).



○ (Normal)



× (Prism)

Note

• This operator's manual provides explanations with the Target parameter set to ○ (Normal).

3.3 Lens Setting

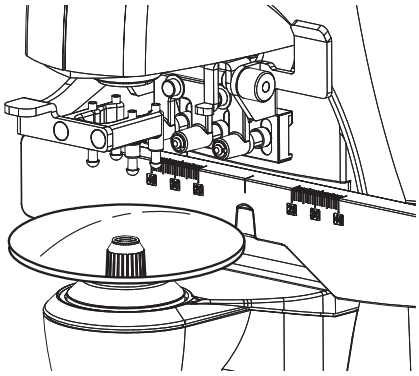
Note

- Before setting a lens, confirm that no dust or debris is adhered to the tip of the nosepiece or lens holder.
  The lens may be damaged.

◆ Uncut lenses

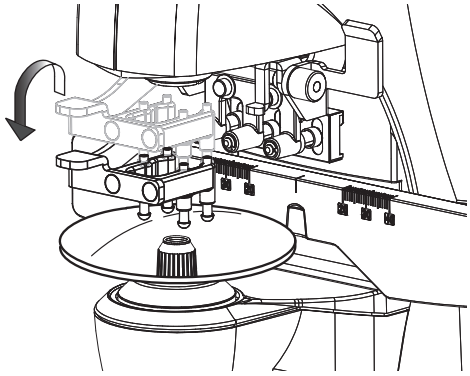
1 Set a lens on the nosepiece.

Place the lens center on the nosepiece with the convex side facing up.



2 Secure the lens with the lens holder.

Lift the lens holder lever to unlock, then lower it slowly to secure the lens.



Note

- When an uncut lens is set, it is not necessary to use the lens table.
- Set the lens with the top oriented forward.
  In this device, the 0° direction of the prism base is to the left as viewed from the front. This is opposite to the orientation when setting a lens with a manual lensmeter or blocker.

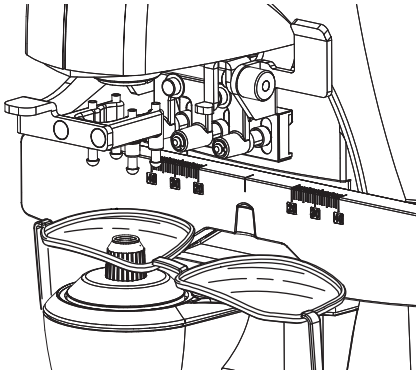
◆ Mounted lenses

Note

- When measuring glasses or processed lenses, remove any dust or processing waste adhered to the lens before measuring
  Foreign matters are adhered to the nosepiece or lens holder resulting in lens damage.

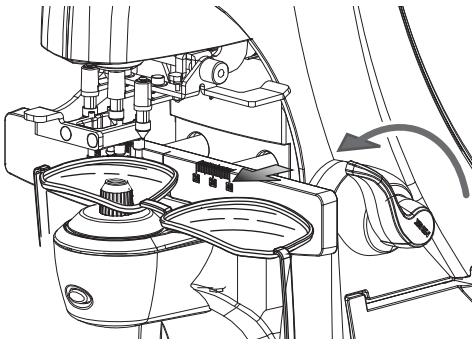
1 Set mounted lenses on the nosepiece.

Place the frames on the nosepiece with the front surface facing up.



2 Set the lens table.

Pull the lens table lever forward until the lens table comes into contact with the bottoms of the frames.

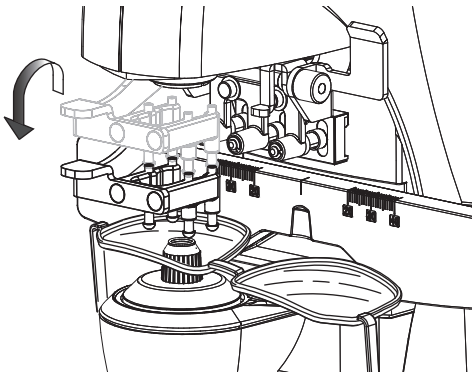


Note

- Make sure that the bottoms of both frames are in contact with the lens table.
  If the frames are off the lens table, an error may occur in the axis value.

3 Secure the lens with the lens holder.

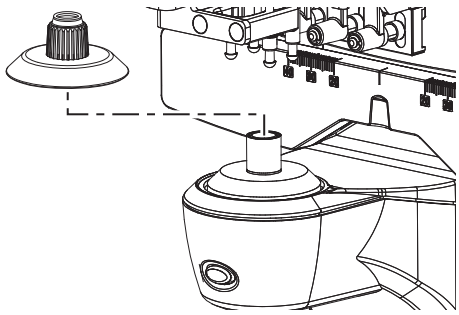
Lift the lens holder lever to unlock. Lower the lens lever gently to secure the lens.



◆ Contact lenses

1 Replace the nosepiece with the one for contact lenses.

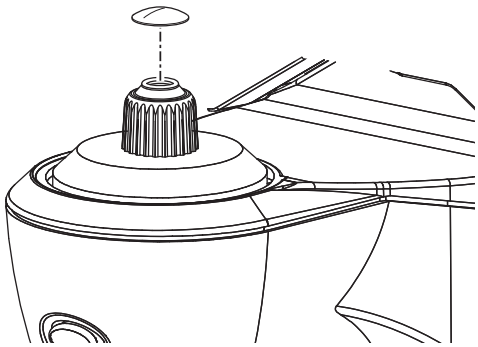
The top of the nosepiece for contact lenses is smaller than the standard one.



2 Set a contact lens.

Place a contact lens on the nosepiece with the convex side facing up.

For soft contact lenses, remove moisture from the surface with soft paper or such before setting them.



⚠ CAUTION

- Handle contact lenses with tweezers or fingers being careful not to scratch them.
  Only use tweezers with rounded tips.
- Do not secure contact lenses with the lens holder.
  They may be damaged.

3.4 Single Vision Lens Measurement

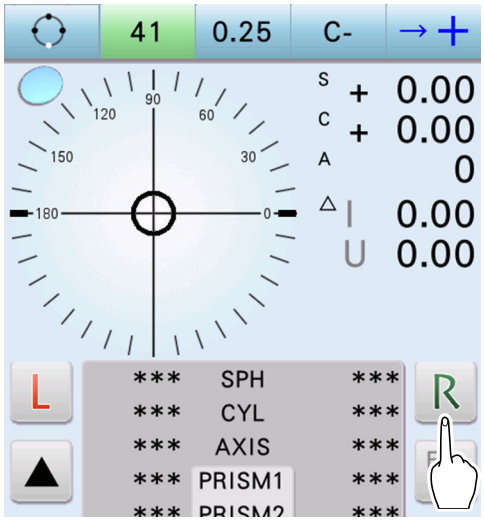
Single vision lenses are measured on the auto measurement screen or normal measurement screen.

For entering the operator ID / patient ID, see *"4.1.5 Connecting the barcode scanner / magnetic card reader" (page 77)*.

1 Specify the lens side if necessary.

Press the R/L measurement select button ▢ to switch to L or R.

The selected button blinks in green to indicate that the corresponding lens is being measured.



Note

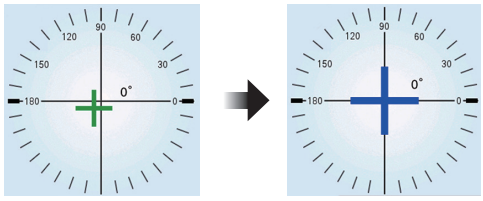
- If the lens side is specified after measurement in the single state is complete, the measured data is cleared.

  Specify the lens side before measurement.

2 Perform alignment of the lens.

Move the lens to bring the target close to the center of the alignment circle.

For mounted lenses, move the lens table along with the frames. When alignment is complete, make sure that the bottoms of the frames are in contact with the lens table.



Note

- When the target changes from ◯ to ＋ (cross), correct measurement can be performed in normal measurement.

  When marking a lens, perform more accurate alignment until ＋ (large cross) appears.

3 Press the read button.

The measured data is locked in.

- The R/L measurement select button turns blue.
- The target is not locked in. To retry measurement, align the target and press the read button again.
- Cylinder mode can be changed with the CYL +/- switching button C± even after data is locked in.

- Locking in measured data with the auto read function

When the Auto read S or Auto read R/L parameter is set to " + (cross)" or " + (large cross)", measured data is automatically locked in after the target is aligned as well as when the read button is pressed.

Parameter	Auto read function
Auto read S	Single state
Auto read R/L	R/L state

To retry measurement, align the target and press the read button again.

Note

- When the Auto read S or Auto read R/L parameter is set to " + (cross)", auto read is performed after the target changes to + (cross). If alignment is performed until the target changes to + (large cross), auto read is performed again.

4 Measure the other lens if necessary (in the R/L state).

Switch the R/L measurement select button to L or R.

Follow the same steps as the first lens.

Note

- When the Auto R/L parameter is set to "On", R and L are changed automatically after the measured lens is removed.

5 Press the print button  to print the measured results (or perform data transmission or writing to the Eye Care card).

For details of printing, see *"3.12 Printing" (page 65)*.

Note

- When the Auto print S or Auto print R/L parameter is set to "On", the measured results are printed automatically after the measured lens is removed.

◆ Selecting the prism indication

To display the prism value, set the Prism parameter to “P-B” or “BU/D BI/O”.

When the Prism parameter is set to “Off”, the prism value is not displayed.

When marking with the prism prescription, follow the prescription.

Parameter	Description
P-B	The measured prism value is displayed in polar coordinates. Absolute value of prism (Δ) Direction of base (°)
BU/D BI/O	The measured prism value is displayed in rectangular coordinates. BASE IN BASE OUT BASE UP BASE DOWN
Off	The measured prism value is not displayed.

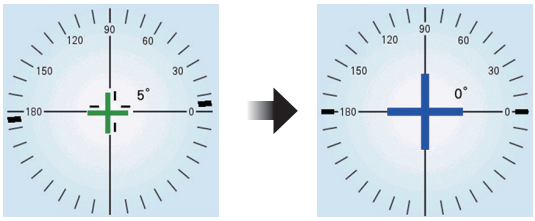
◆ Guide

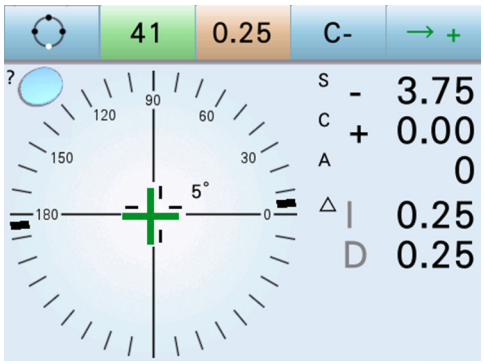
To align the target precisely, the guide (- ¦ -) can be displayed in the alignment circle.

It is displayed when the Guide parameter is set to “On”.

The discrepancy between the guide and target makes it easier to recognize the target position relative to the center of the alignment circle.

When the target is precisely aligned, the guide disappears.

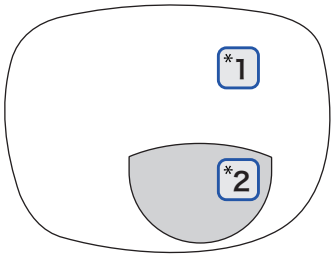
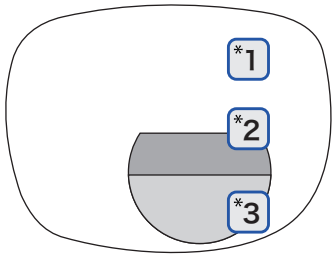




3.5 Bifocal and Trifocal Lens Measurement

Bifocal lenses (or trifocal lenses) can be measured successively in the order of distance portion*1 → near portion*2 (for trifocal lenses, distance portion*1 → intermediate portion*2 → near portion*3).

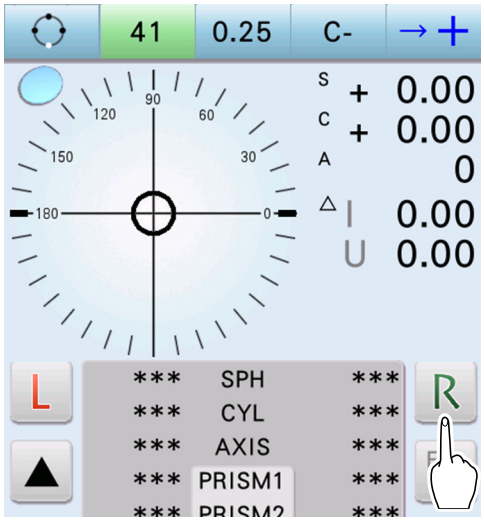
Above lenses are measured on the auto measurement screen or normal measurement screen.

Bifocal lens	Trifocal lens
	

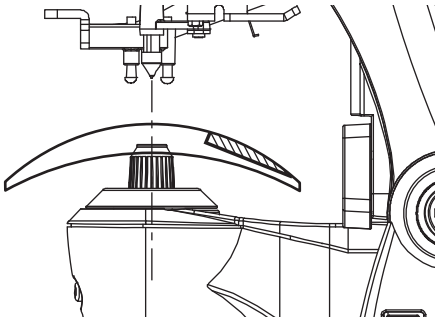
1 Specify the lens side if necessary.

Press the R/L measurement select button ▭ to switch to L or R.

The selected button blinks in green to indicate that the corresponding lens is being measured.

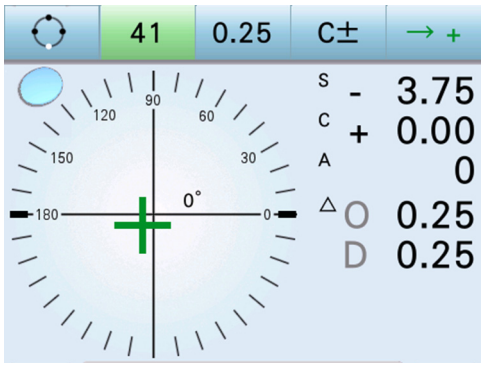


2 Bring the distance portion of the lens onto the nosepiece with the concave side facing down.



3 When the target changes from ◯ to ＋ (cross), press the read button.

The distance power is locked in.



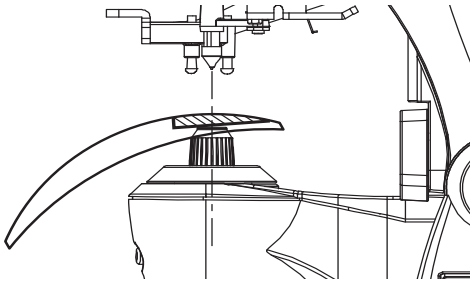
Note

- In measurement of the distance portion, auto read works depending on the setting of the Auto read S or Auto read R/L parameter.

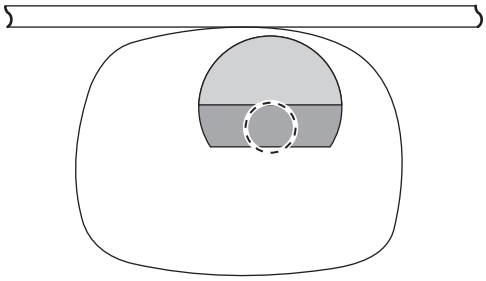
4 Measure the near add power (Add: 1st add power).

Pull the lens forward to bring the near portion onto the nosepiece.

When the add power is detected, the auto add measurement function places the device into add power measurement.



For trifocal lenses, bring the intermediate portion onto the nosepiece.



Note

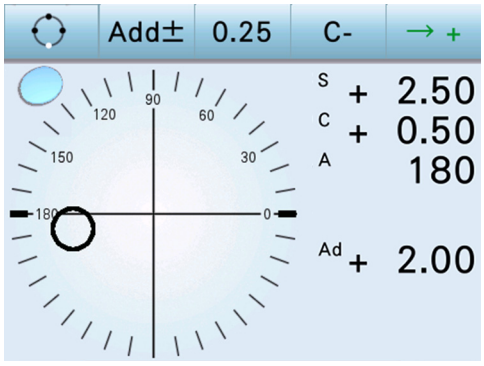
- It is not necessary to align the target.
- Measure the near add power without removing the lens from the nosepiece.
  Once the lens is removed, it is necessary to restart from the distance power measurement.
- For trifocal lenses, when the vertical length of the intermediate portion is narrow, the measuring beam may interrupt the boundary and correct measurement may not be performed.

5 Press the read button.

The measured data of the near add power (Add) is locked in.

Because auto read does not function, press the read button to lock in the measured data.

When the measured prism value is not displayed, “Ad” is displayed.



Add power +/– value switching button [Add±] : This button is displayed after add power measurement.

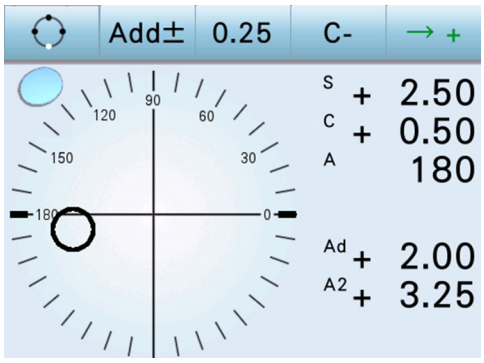
Each pressing of the button toggles the +/– value of add power. For example, the display toggles between SPH-2.50 Add +2.00 and SPH -0.50 Add -2.00.

❖ Only for trifocal lenses, perform Steps 6 and 7 to measure the near add power (2nd add power).

6 Bring the near portion onto the center of the nosepiece.

The near add power (Add2: 2nd add power) is displayed.

When the measured prism value is not displayed, “A2” is displayed.



Note

- It is not necessary to align the target.

7 Press the read button.

The near add power (Add2) is locked in.

Auto read does not function. Press the read button to lock in the measured data.

8 Measure the other lens if necessary (in the R/L state).

Switch the R/L measurement select button to [L] or [R].

Follow the same steps as the first lens.

9 Press the print button  to print the measured results (or perform data transmission or writing to the Eye Care card).

For details of printing, see *“3.12 Printing” (page 65)*.

Note

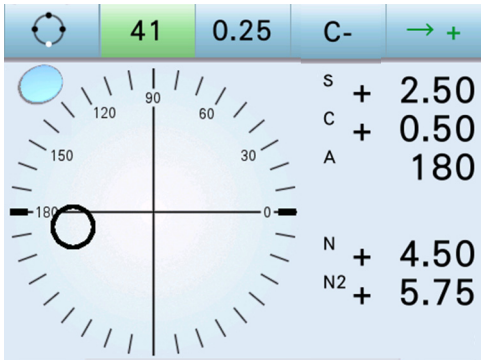
- Auto R/L selection and auto print work in the same manner as the single vision lens measurement.

◆ Sphere indication for near portion

By setting the Near parameter to “Near Sph”, the measured data of the near portion is displayed by sphere value instead of near add power (Add).

N: 1st near power (distance power + 1st add power)

N2: 2nd near power (distance power + 2nd add power)

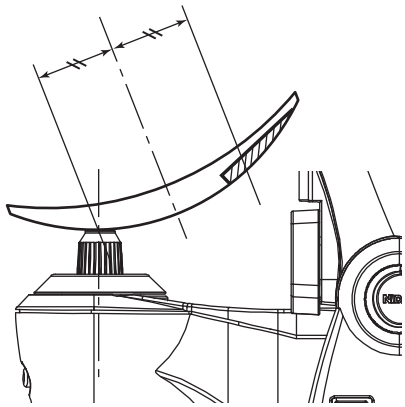


◆ Measuring add power more accurately

Measurement error occurs due to the lens thickness between the segment and nosepiece. Measure the add power in the way to correct the error. It is especially effective when the base lens is thick.

1 Set the distance portion of the lens with the concave side facing up.

Bring the position opposite to the segment that is the same distance away from the lens center onto the nosepiece.



2 Press the read button.

The distance power is locked in.

Note

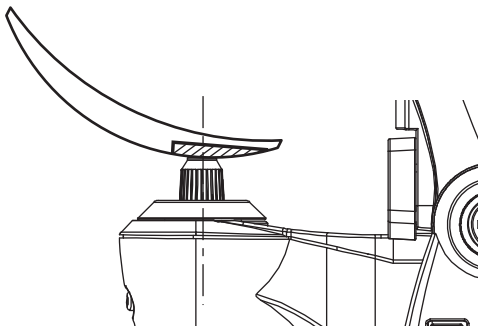
- It is not necessary to align the target.
- The measured value is a reference value of distance power for obtaining addition. It is not the actual distance power.

  For distance power, perform normal measurement with the convex side of the lens facing up and record it.

3 Set the near portion.

Pull the lens forward to bring the near portion onto the center of the nosepiece.

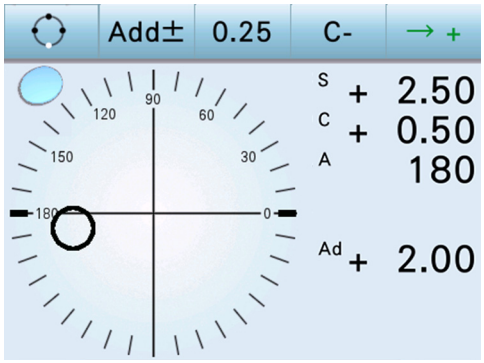
The near add power (Add) is displayed.



4 Press the read button.

The measured data of the near add power (Add) is locked in.

Auto read does not function. Press the read button to lock in the measured data.

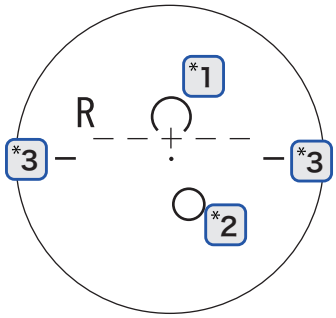


3.6 Progressive Power Lens Measurement

3.6.1 Uncut lens measurement

Measure a lens at the marks of the distance portion and near portion printed on the lens.

Perform measurement in the same manner as *"3.5 Bifocal and Trifocal Lens Measurement" (page 40)*.



1	Distance power measuring position
2	Near power measuring position
3	Horizontal reference line

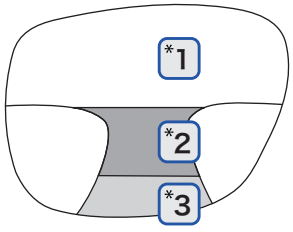
Note

- A lens must be placed with its horizontal reference line parallel to the lens table.
- If the marks printed on the lens interrupt the measuring beam, the target may wiggle.
  Move the position of the lens slightly and measure it with the target stabilized.

3.6.2 Mounted lens measurement

Measure a lens on the progressive power lens measurement screen or auto measurement screen.

After the distance and near portions are detected according to power changes in the progressive power lens, the guides (target and arrow) for aligning the lens position appear on the screen.



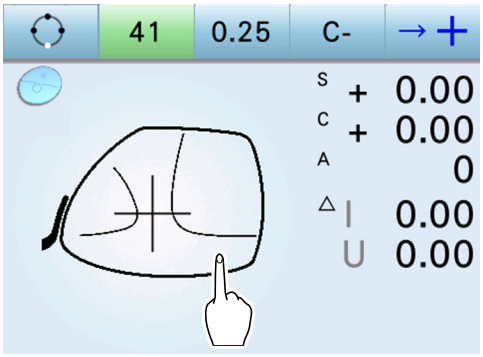
1	Distance portion
2	Intermediate portion (progressive zone) Power changes progressively.
3	Near portion

1 Press the periphery of the alignment circle to display the progressive power lens measurement screen.

For the screen change on the auto measurement screen, see *"♦ Screen change in auto measurement" (page 48)*.

Specify the lens side if necessary.

Press the R/L measurement select button ▢ to switch to L or R.

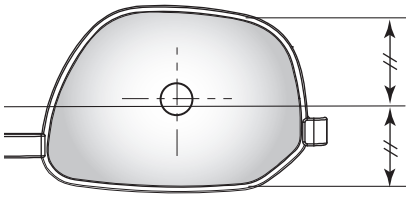


2 Set a lens.

"3.3 Lens Setting" (page 34)

❖ The following is the procedure for measuring the right-eye lens.

3 Measure the distance power.

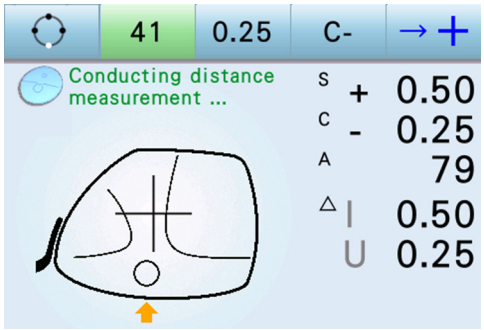


1) Bring the intermediate portion (progressive zone) onto the nosepiece.

   Place a portion that is slightly lower than the center of the lens on the nosepiece.

   The target ◯ indicating the distance portion is displayed.

   The arrow shows the direction in which the lens should be moved.



Note

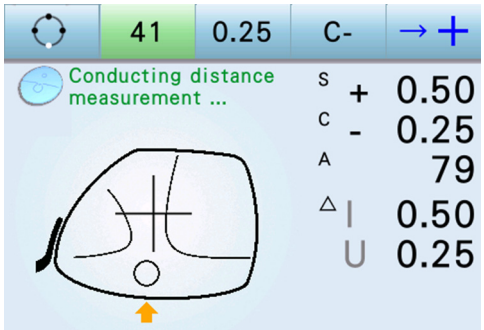
- To correctly measure the progressive power lens, note the following.
  - First align the lens horizontally, then vertically.
  - Move the lens while the frames are constantly in contact with the lens table.
  - Ensure that the lens back surface is constantly in contact with the nosepiece.

2) Move the lens horizontally to align the target to the vertical line of the crossline.

3) Slowly move the lens backward (upward on the screen) to align the target to the crossline.

   If the target is shifted to the right or left from the vertical line of the crossline while the lens is moved, move the lens horizontally.

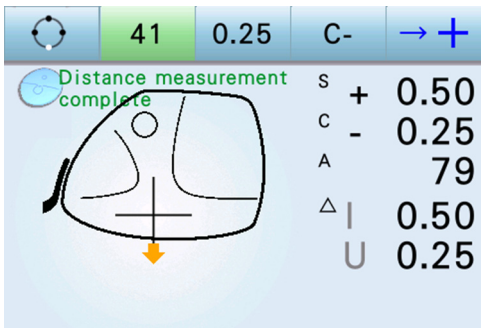
   When the vertical position is roughly aligned, the arrow ▲ disappears.



4) Precisely adjust the lens vertically and horizontally to align the target to the crossline.

   When the target changes to ┼ (cross) and the measured data stabilizes, the measured data is automatically locked in.

   The screen automatically changes to add power measurement for the near portion.

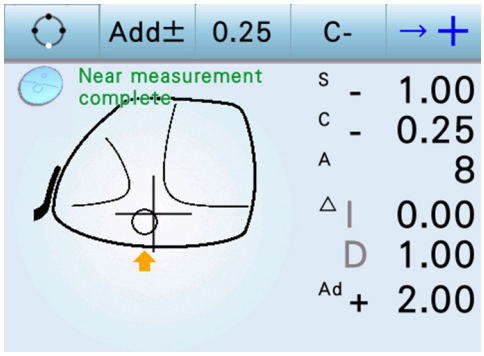


Note

- When the Distance auto read parameter is set to “Off”, press the read button when the target changes to ┼ (cross) and the measured data stabilizes.
- For a lens whose distance portion cannot be detected correctly, bring the distance portion onto the center of the nosepiece, then press the read button.
- For progressive power lenses corrected with the horizontal prism, the position 3 mm upper from the pupil for the distance vision with glasses is marked as distance portion. Bring the marked position onto the nosepiece and manually press the read button.
  The near portion can be measured in the normal procedure.

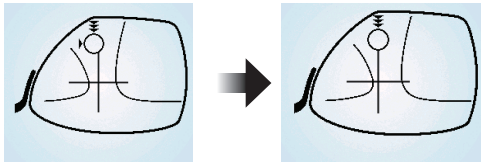
4 Measure the near add power.

1) The target indicating the near portion is displayed.
   The arrow shows the direction in which the lens should be moved.
2) Slowly move the lens in the direction of the arrow (toward the operator).
   When the intermediate portion (progressive zone) is detected, the message appears and the current add power (Ad) appears.



Indicators for near portion ▼ appear above, below, to the right, and left of the target, indicating the direction and distance for which the lens is to be moved. Move the lens in the direction of indicators.
The greater the number of indicators (up to three), the farther the lens is to be moved.

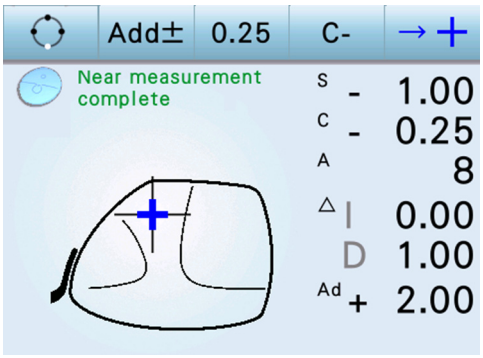
3) Align the lens horizontally.
   Move the lens horizontally until indicators for near portion to the right or left of the target disappear.
4) Align the lens vertically.
   Move the lens vertically until indicators for near portion above or below the target disappear.



Note

- If indicators for near portion appear to the right or left of the target again while the lens is vertically aligned, align the lens horizontally again.
  Always align the lens vertically while indicators are not displayed to the right or left of the target.
- Indicators for near portion above the target may not disappear.
  For vertically narrow frames, indicators for near portion may not disappear due to steep variation in lens power even if the lens is moved toward the operator.
  “♦ *Progressive power lenses for vertically narrow frames” (page 49)*
- Whether to display indicators for near portion can be set by the Indicator parameter.
  When the Indicator parameter is set to “Off”, align the lens referring to the target.
  When the vertical position is aligned, the arrow disappears.

5) When the target changes from ◯ to ┼ (cross) and the measured data is automatically locked in.



Add power +/– value switching button [Add±] : This button is displayed after add power measurement.

Each pressing of the button toggles the +/– value of add power. For example, the display toggles between SPH-2.50 Add +2.00 and SPH -0.50 Add -2.00.

Note

- When the Near auto read parameter is set to “Off”, press the read button when the target changes to ┼ (cross) and the measured data stabilizes.
- For a lens whose near portion cannot be detected correctly, bring the near portion onto the center of the nosepiece, then press the read button.

5 Measure the other lens if necessary (in the R/L state).

Switch the R/L measurement select button to [L] or [R].

Follow the same steps as the first lens.

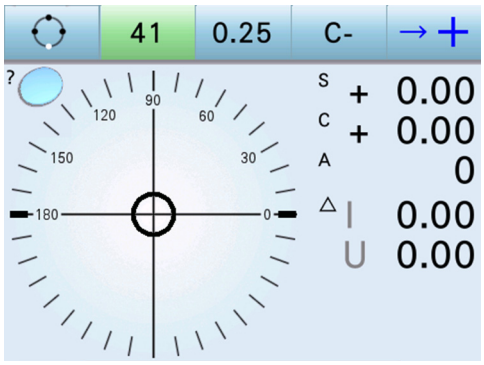
6 Press the print button to print the measured results (or perform data transfer or writing to the Eye Care card).

For details of printing, see *“3.12 Printing” (page 65)*.

Note

- Auto R/L selection and auto print work after add power measurement.

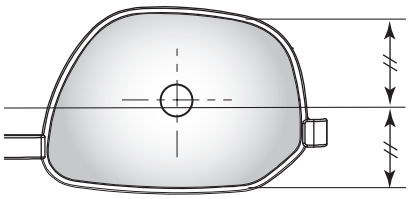
◆ Screen change in auto measurement



When the lens on the nosepiece is detected as a progressive power lens on the auto measurement screen (normal measurement), the screen changes to the progressive power lens measurement screen (auto measurement) automatically.

1) Set a progressive power lens onto the nosepiece with the auto measurement screen displayed.

   Place the intermediate portion (progressive zone) that is slightly lower than the center of the lens or near portion area on the nosepiece.

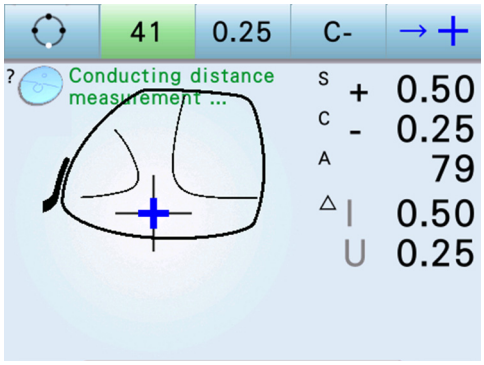


Note

- If the distance portion is placed on the nosepiece, the lens may not be detected as a progressive power lens.
- The progressive power lens detection is continuously performed while the lens is set on the nosepiece in auto measurement.

2) The screen changes to the progressive power lens measurement screen automatically.

   After lens measurement, pressing the print button  or clear button  returns to the auto measurement screen (normal measurement).



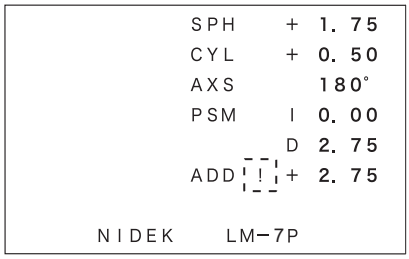
◆ Progressive power lenses for vertically narrow frames

When the height of the processed lens is small and near portion is not intact, the display changes to alert that the correct near power has not been measured.

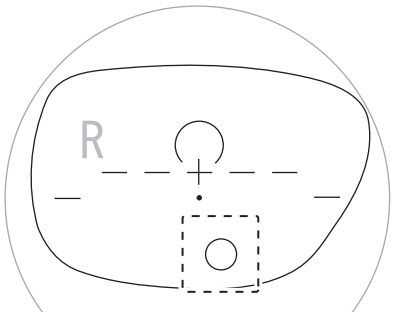
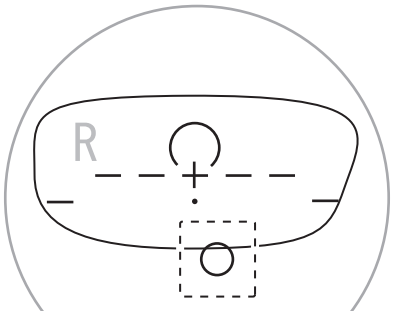
When the edge of the lens is reached before the near portion is detected, a small lens image is displayed on the screen. At this time, the lens image and measured value of add power are displayed in orange.

The near add power is locked in by auto read function, and measurement completes.

An exclamation mark is added to the add power on the printout.



When the height of the processed lens is short and near portion is not intact, add power cannot be measured with usual auto read function.

Lens height is sufficient	Lens height is short
	
Normal	Near portion is not intact.

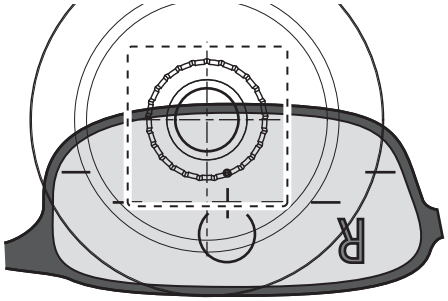
● When auto read does not function properly

Measure the point that is closest to the near portion and perform auto read.

1) Measure the distance portion of the lens with the auto read function until the target changes from ◯ to ＋ (cross).

2) After the measurement, leave the lens table as it is and move the frames toward the operator. At this time, make sure that indicators for near portion ▶ are not displayed to the right or left of the target.

When the near portion cannot be detected and the bottom of the frame begins to contact the nosepiece, moving the frame so that the nosepiece is positioned about one third back (measurement point) allows near portion auto read to function.



Maximum addition power is automatically detected from a part of near portion on the nosepiece.

❖ For the measured data obtained here, the near portion is not intact. It is the power remaining in the lens being measured and not an estimation of the near power that the lens originally had.

Note

- Even when the Near auto read parameter is set to “Off”, auto read functions if the near portion is not intact.
- The measuring method is the same as normal lenses, however, note the following.
  - When moving down the lens, make sure that indicators for near portion are not displayed to the right or left of the target.
  - If auto read is performed while the lens is shifted to the right or left, addition power is underestimated.
  - Perform alignment with the lens covering more than half of the nosepiece.
  - If the lens comes off a large portion of the nosepiece, the error message “Measurement error” appears.
  - It is not possible to determine to what extent the addition power is not intact from that originally designed.
    Consider that the addition power obtained with this function is lower than actual.

3.7 Prism Power Measurement of Lenses for Strabismus and Phoria

This section describes the method to measure prism power of mounted lenses for strabismus and phoria.

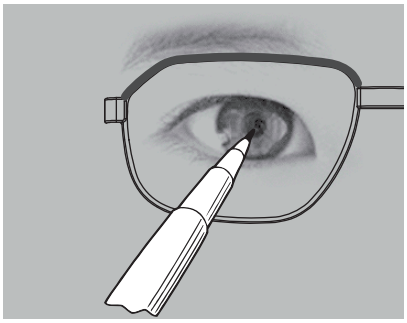
Select the method for displaying measured prism values by the Prism parameter in advance.

"4.2 Parameter Settings" (page 80)

Setting	Description
P-B	The measured prism value is displayed in polar coordinates.
BU/D BI/O	The measured prism value is displayed in rectangular coordinates.
Off	The measured prism value is not displayed.

1 Mark the pupil center (eyepoint).

Instruct the customer to wear glasses and look straight. Mark the pupil center on each lens.



Note

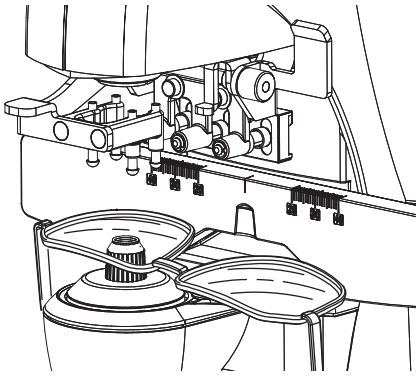
- The mark should be as small as possible (ø1 mm in diameter).
  If the mark is too large, it may interfere with the measurement.

2 Set a mounted lens.

Place the lens on the nosepiece with the convex side facing up.

Press the R/L measurement select button ▢ to switch to L or R.

The selected button blinks in green to indicate that the corresponding lens is being measured.

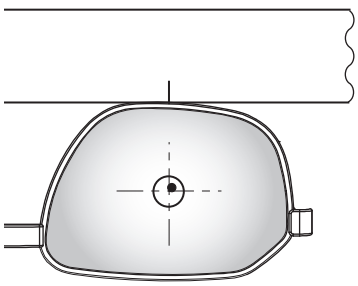


3 Secure the lens with the lens holder.

4 Bring the eyepoint marked in Step 1 to the center of the nosepiece.

Note

- It is not necessary to align the target.



5 Press the read button.

The measured data is locked in.

Note

- If “Measurement error” appears, the mark may obstruct the measuring beam. Move the lens slightly.

6 Measure the other lens if necessary (in the R/L state).

Switch the R/L measurement select button to L or R.

Follow the same steps as the first lens.

7 Press the print button  to print the measured results (or perform data transfer or writing to the Eye Care card).

For details of printing, see *“3.12 Printing” (page 65)*.

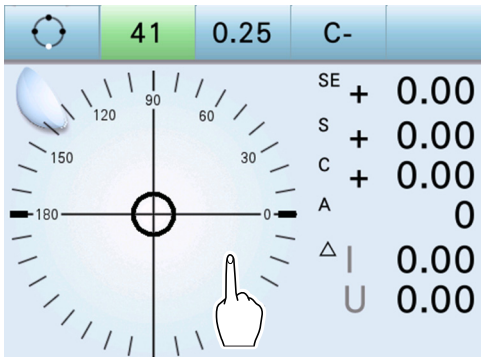
3.8 Contact Lens Measurement

1 Press the periphery of the alignment circle to display the contact lens measurement screen.

Specify the lens side if necessary.

Press the R/L measurement select button ▢ to switch to L or R.

The selected button blinks in green to indicate that the corresponding lens is being measured.



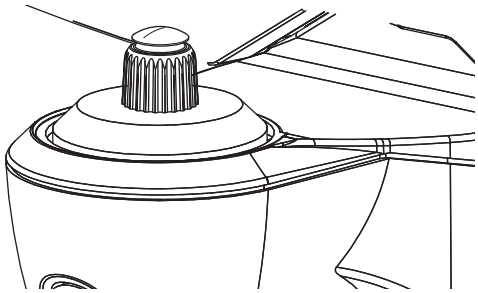
Note

- When the Contact measurement parameter is set to “Only”, the measurement screen cannot be changed.
- When the Contact measurement parameter is set to “Off”, the screen cannot be changed to the contact lens measurement screen.
  Set the Contact measurement parameter to “On” or “Only”.

2 Set a contact lens and align it.

“3.3 Lens Setting” (page 34)

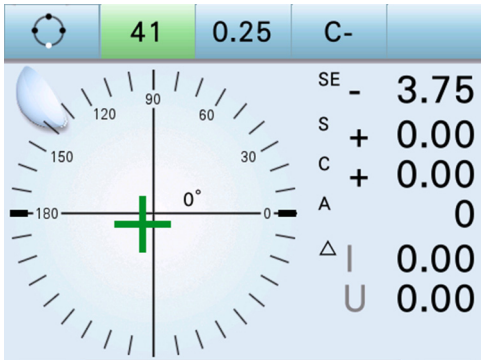
Perform alignment by pushing the lens edge with tweezers tips.



3 Press the read button.

In contact lens measurement, a SE value is displayed along with the S, C and A measured data.

- SE (Spherical Equivalent) value
  This is a value obtained by adding half of a cylinder value to a sphere value. If a cylinder value is measured in a lens that should not have that value, the SE value is more reliable than the SPH value to know the total sphere value.
  Measurement error caused by an unintended cylinder value is reduced.



Note

- On the contact lens measurement screen, the auto read function is disabled regardless of the parameter setting.
  Press the read button to perform measurement.

4 Remove the contact lens from the nosepiece.

5 Measure the other lens if necessary (in the R/L state).

Switch the R/L measurement select button to L or R.

Follow the same steps as the first lens.

6 Press the print button  to print the measured results (or perform data transfer or writing to the Eye Care card).

For details of printing, see *"3.12 Printing" (page 65)*.

Note

- The auto print function is disabled during contact lens measurement.
- Measure a soft contact lens quickly so that the lens surface does not dry.
  Due to drying of the lens or its soft material, the lens surface may be distorted resulting in incorrect measured data.

3.9 UV Transmittance Measurement

For UV (ultraviolet) transmittance, the transmittance at the center wavelength of 365 nm (UV-A) is measured in percentage. UV transmittance can be measured on all measurement screens.

To measure UV transmittance, set the Transmittance, Transmittance step, and Auto correct parameters. In addition, set the Transmittance display parameter to “Compare” or “Simple” for the method of the measured result display.

“4.2 Parameter Settings” (page 80)

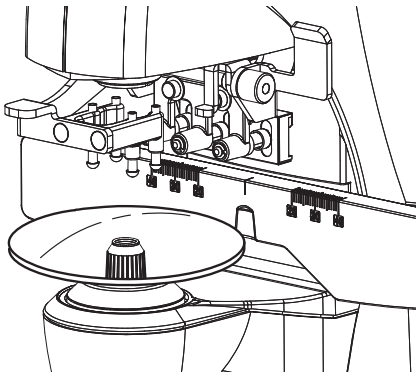
1 Set a lens.

“3.3 Lens Setting” (page 34)

2 Align the distance portion of the lens.

Move the lens until the target changes from ◯ to ＋ (cross).

To maintain the measurement accuracy of UV transmittance, it is recommended to measure a position within 4Δ from the optical center.

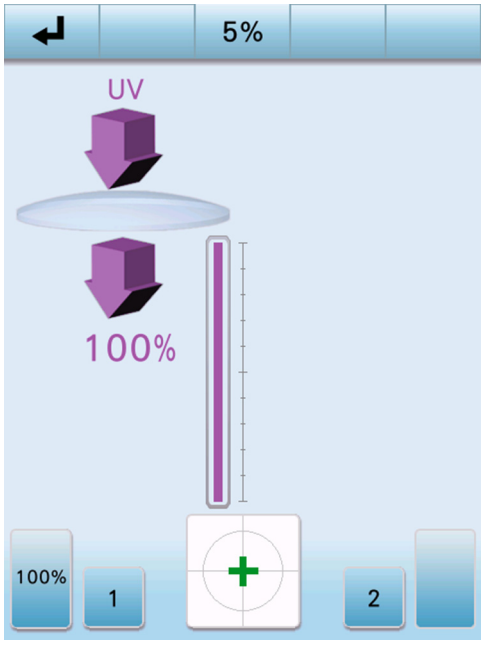


3 Press and hold the read button.

The UV transmittance is measured and the measured result is displayed.

Note

- Measure UV transmittance just after measuring the distance portion.
  The UV transmittance measurement is not performed after measurement for the near portion (intermediate portion) even if the read button is pressed and held.
- In the UV transmittance measurement, measure UV transmittance only.

Simple	Compare
	
The UV transmittance measured result (%) is displayed.	The screen changes to the UV transmittance screen and the measured result is displayed.

- Buttons on the UV transmittance screen

Button	Operation
UV 100% correction 100%	Corrects UV transmittance to 100%. This button is used if “100%” is not displayed when no lens is placed on the nosepiece. Press and hold the button with no lens set. When UV 100% correction is complete properly, a beep sounds.
Retry 1	Measures UV transmittance of the same lens again.
Compare measurement 2	Measures UV transmittance of another lens and displays the measured result on the UV comparison screen.
Exit ↵	Returns to the measurement screen.

Note

- When UV transmittance is unstable, it is recommended to perform UV 100% correction before transmittance measurement.
- When the Auto correct parameter is set to “On” or “Silent”, UV transmittance is automatically corrected to 100%. During the auto correction, the message appears to indicate the measurement is being performed.
  - When the message disappears, the 100% correction is renewed. However, the 100% correction is not renewed if any lens was set when the message appeared.
  - Even if the message appears during the lens measurement, it does not affect the measured data of the lens.
  - The UV100% correction is performed automatically at 5 to 60 minute intervals depending on the change in camera sensitivity of UV transmittance measurement.

● Comparative measurement of UV transmittance

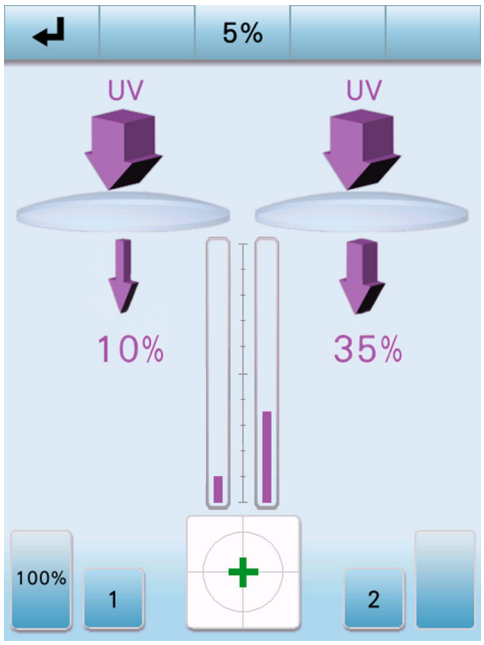
By measuring another lens, UV transmittance can be compared.

1) After replacing the lens and bringing the optical center onto the nosepiece, press the compare measurement button [2].

The measured results of the two lenses are displayed on the UV comparison screen simultaneously.

- The left side of the screen shows the measured result of the first lens, and the right side shows that of the succeeding lens.
- Perform measurement while checking the target in the circle at the bottom of the screen. When the target becomes + (within 4Δ), measurement can be performed more precisely.

2) Press the exit button [↵] to return to the measurement screen.



Note

- Pressing the retry button [1] or compare measurement button [2] repeatedly renews each measured result.

◆ Harmful effects of ultraviolet rays on eyes

Ultraviolet rays included in sunlight are roughly classified into three types.

Classification	Effect
UV-C 280 nm or less	• Absorbed by the ozone layer and hardly reaches the ground.
UV-B 280 to 320 nm	• Absorbed in cornea causing corneal injury such as keratitis. • Causes sunburn and skin becomes red. • Causes skin irritation and skin damage such as stains, freckles, and wrinkles.
UV-A 320 to 380 nm	• Accumulated in the crystalline lens resulting in cataract. • Skin becomes dark after sunburn.

This device measures UV-A transmittance.

UV cut-off blocks ultraviolet rays with wavelengths shorter than a certain wavelength. Measurement of UV-A transmittance is effective to assess protection.

3.10 Measurement Using Scale Mode Function

The values of the LPD/RPD, PD, and such can be measured easily by aligning the marked glasses to the scale displayed on the screen.

⚠ CAUTION

- When aligning the markings on glasses to the scale, sliding the glasses with the frames in contact with the screen may make buttons inoperative. Also, lenses may be damaged.

Note

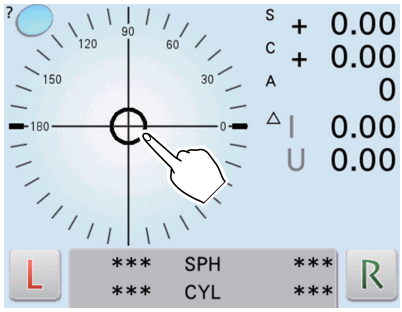
- Read the scale while facing the screen squarely.
- The values taken from the reading should only be used as a guide because they may be affected by the lens they are read through.
- The accuracy of the scale in the scale mode screen is within 0.5 mm.

1 Display the scale mode screen.

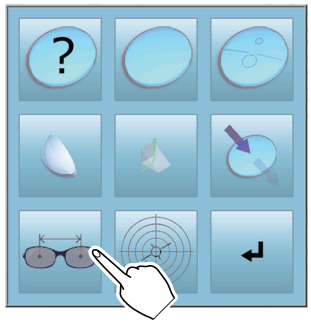
Press and hold around the center of the target and select scale mode  .

The screen is displayed only when right or left for the lens is specified.

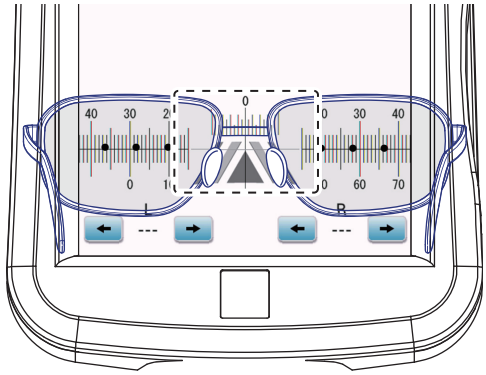
1-1



1-2

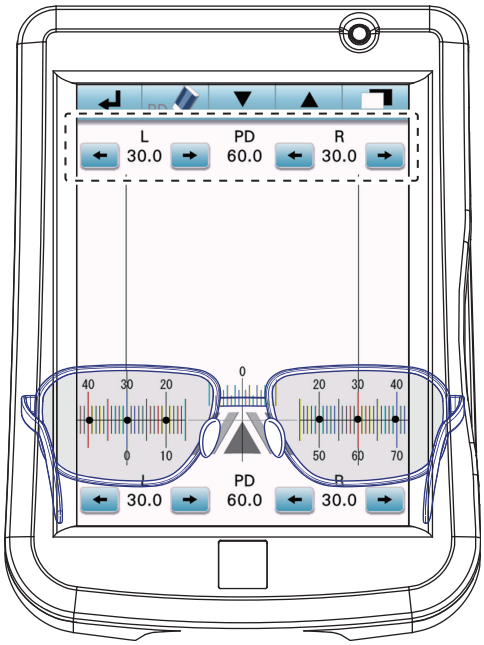


2 Align the center of the frames to the scale.



- When measuring PD and LPD/RPD

  Change the background color with the background switching button  if necessary.



  1) Using the up button  and down button  , align the scale to the markings.

  2) Using the left button  and right button  , align the vertical lines to the center markings on the right and left lenses.

     The buttons on the top and bottom are the same in operation.

     Movement range: 15 to 42.5 mm, 0.5 mm increments

  3) Read the PD value, the distance from the origin to the center marking on the left lens (L value), and the distance from the origin to the center marking on the right lens (R value).

  4) Press the exit button  to return to the measurement screen.

     To reset the values, press the clear button  .

3.11 Marking

3.11.1 Marking at optical center

Marking is performed to indicate the optical center position and axis direction.

Note

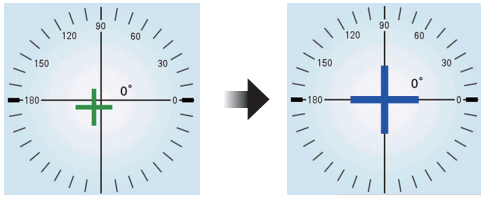
- To measure PD of the mounted lenses, mark the right and left lenses at the optical center, and measure the distance between the center markings.
  "3.10 Measurement Using Scale Mode Function" (page 58)
- For simple astigmatism lenses such as S 0.00 D and C -1.00 D or equivalent lenses, the target cannot be moved in the bus direction.
  Mark a lens at the geometric center in the correct axis direction.

1 Set a lens.

"3.3 Lens Setting" (page 34)

2 Perform alignment of the lens.

Move the lens to align the target to the center of the alignment circle until the target changes from ┼ (cross) to ╋ (large cross).

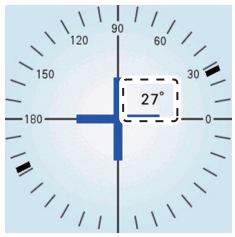


● For lenses having cylindrical power

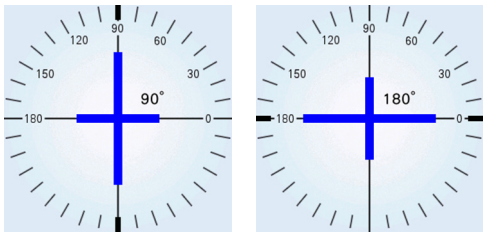
While seeing the axis value, rotate the lens until the prescribed axis value is displayed.

When auto read is set to any other than "Off", the measured data is automatically locked in after the target is aligned.

See the axis value displayed to the upper right of the target.



For the axis of 90º or 180º, the shape of the target changes.



Note

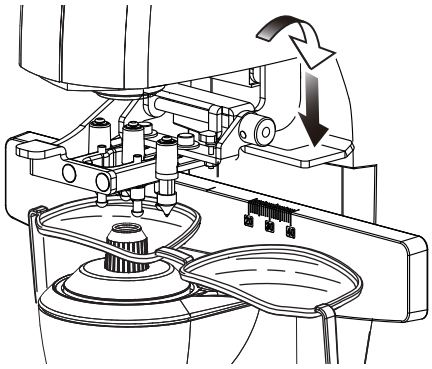
- When marking a cylinder lens in the bus direction, adjust the axis to 180º.

3 Mark the lens.

1) Push down the marking lever to be level.

2) Lower the marking lever to mark the lens.

Three points are marked in a line parallel to the lens table.

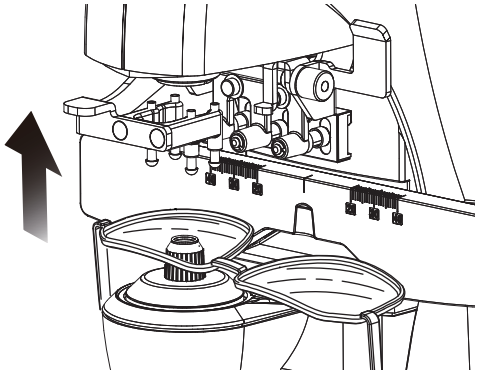


Note

- Lower the marking lever slowly and lightly.
  The tips of the ink cartridge may be damaged.

4 Remove the lens.

Lift the lens holder lever until it clicks and remove the lens.



3.11.2 Marking for prism prescription

This is the procedure to mark lenses for strabismus and phoria prescriptions.

The prism layout function allows the operator to easily determine marking points on a lens.

Note

- Do not touch the marked points.
  Smudged ink makes the cylinder axis difficult to identify.
- After marking uncut lenses, it is recommended to put marks with a marker pen so that the right side or left side of the lens or nasal side can be identified.
- After marking repellent or super repellent lenses, pull up the marking lever slowly so that the tips of the ink cartridge gradually separate from the lens.
  This prevents the ink from dispersing, making the markings easy to see.

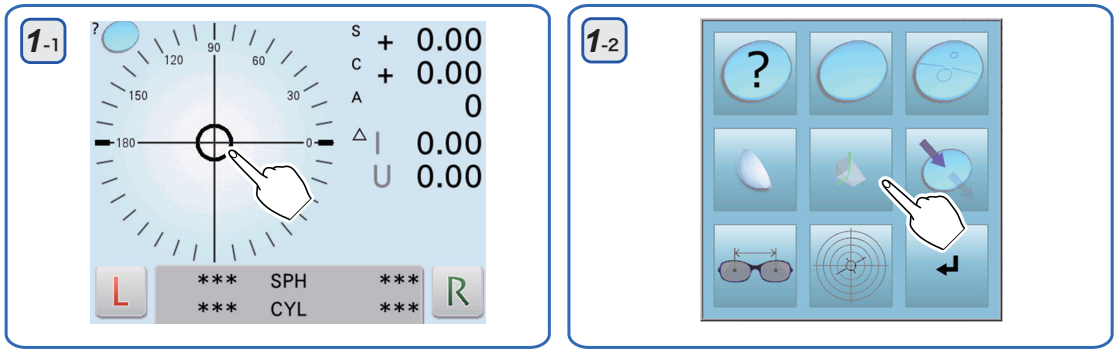
● Prism layout function

- Prior entry of prism prescription makes the on-screen target to move in the opposite direction by the amount of the prism data.
- Align a lens so that the target is aligned to the center of the alignment circle and then mark the lens.

◆ When only marking lenses

1 Display the prism entry screen.

Press and hold around the center of the target and press the prism icon.



2 Enter prism prescription.

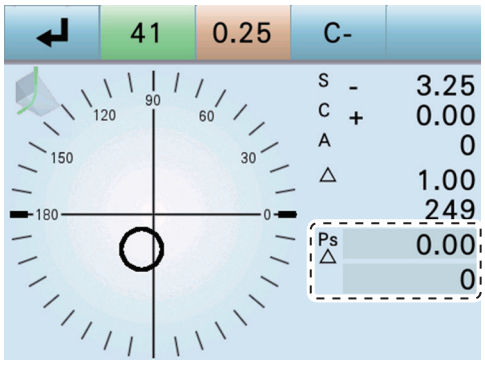
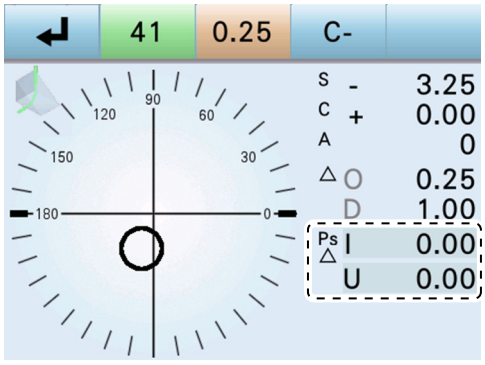
1) Specify the lens side if necessary.

Press the R/L measurement select button ▢ to switch to L or R.

The selected button blinks in green to indicate that the corresponding lens is being measured.

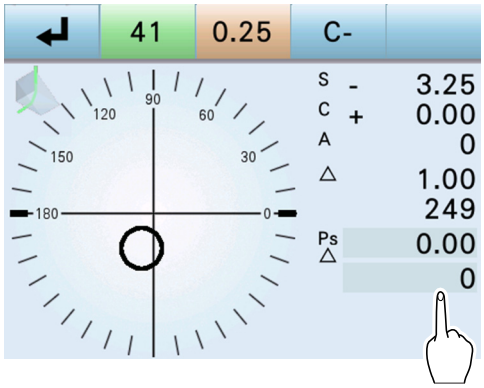
2) Select coordinates mode according to the prescription.

Each extended pressing of C± switches coordinates mode.

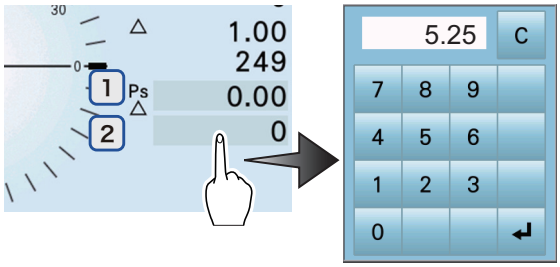
Polar coordinates mode	Rectangular coordinates mode
	

3) Press and hold the numeric field and enter the prism prescription.

The numeric keypad appears. The target moves in the opposite direction by the entered prism value.



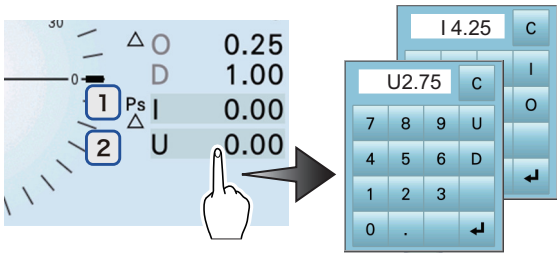
- Polar coordinates display (Δθ)



1	Absolute prism value Enter prism prescription by absolute prism value (Δ: Prism).
2	Base direction Enter prism prescription by prism base direction (°: Base).

- Rectangular coordinates display (XY)

  Before entering a value, enter a letter from “U/D” (base up/down) and “I/O” (base in/out) first.



1	I/O Enter prism prescription in the base in/out direction.
2	U/D Enter prism prescription in the base up/down direction.

Note

- Up to 20Δ of prism prescriptions expressed in polar coordinates can be entered. The entry of values less than 20Δ may be rejected when the prism prescription is displayed in rectangular coordinates, or the other side of the value may be modified to confine the absolute prism value expressed in polar coordinates to 20Δ.

  When the prism value in the base in/out direction is modified, the prism value in the base up/down direction may be modified automatically.

3 Set the lens on the nosepiece with its top facing to the front.

⚠ CAUTION

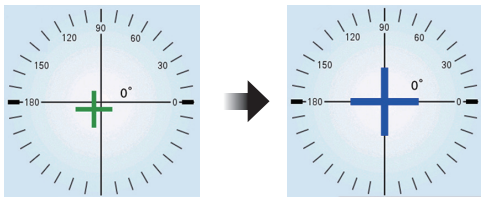
- When marking a lens for prism prescription, be sure to set the lens with its top facing to the front.

  If the orientation is incorrect, marking cannot be performed according to the prescription.

  In this device, the 0° direction of the prism base is to the left as viewed from the front. This is opposite to the orientation when setting a lens with a manual lensmeter or blocker.

4 Perform alignment of the lens.

Move the lens to align the target to the center of the alignment circle until the target changes from ┼ (cross) to ╋ (large cross).

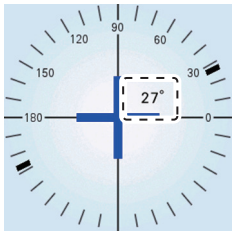


● For lenses having cylindrical power

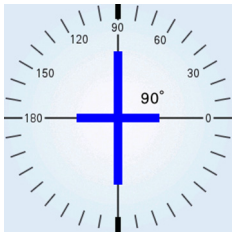
While seeing the axis value, rotate the lens until the prescribed axis value is displayed.

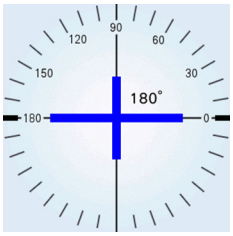
When auto read is set to any other than “Off”, the measured data is automatically locked in after the target is aligned.

See the axis value displayed to the upper right of the target.



For the axis of 90º or 180º, the shape of the target changes.





Note

• When marking a cylinder lens in the bus direction, adjust the axis to 180º.

5 Mark the lens.

Press down the marking lever to mark the lens.

Note

• Pressing the read button at this time locks in the measured data.
The saved measured data can be printed from the measurement screen.

6 If necessary, enter the prism prescription of the other lens and mark it.

Switch the R/L measurement select button to L or R.

Mark the lens in the same manner as the first lens.

Note

• To mark both lenses successively, be sure to enter prism prescription for each lens before marking.

7 Press the exit button ↵ to return to the measurement screen.

3.12 Printing

Press the print button to print measured data.

Note

- Print the data after confirming that the measured data is locked in.

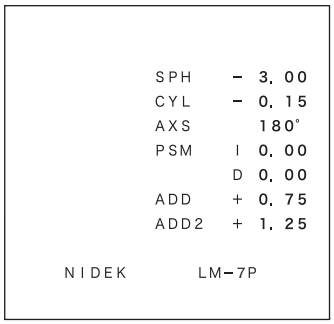
  If the print button is pressed while the measured data is not locked in, the data when the button is pressed is locked in and printed.

- When the device is connected to external equipment, measured data is printed and transmitted at the same time.

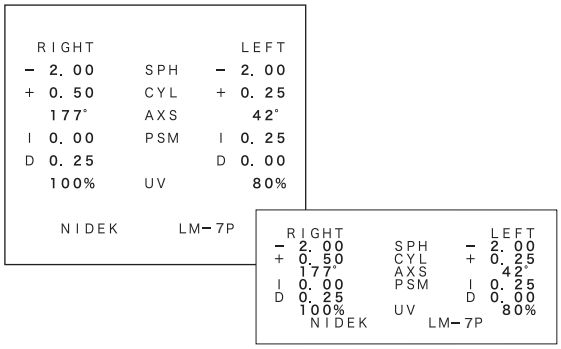
  When the Printer parameter is set to “Off”, pressing the print button performs data transmission only.

  “4.1 Operation when Peripheral Devices are Connected” (page 71)

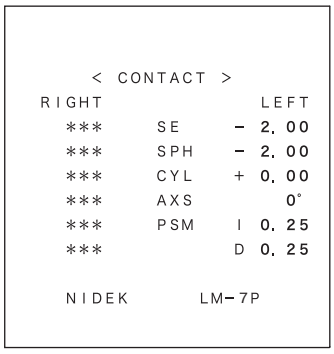
Sample printout



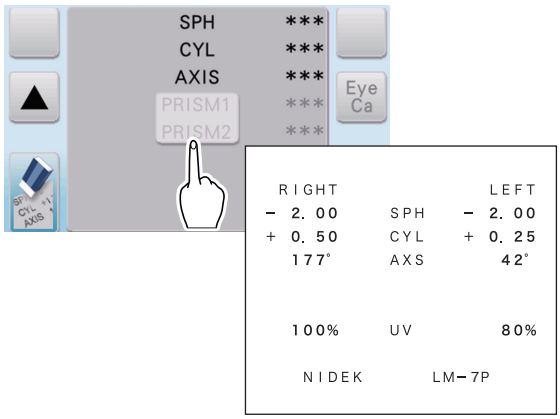
- Single state measurement



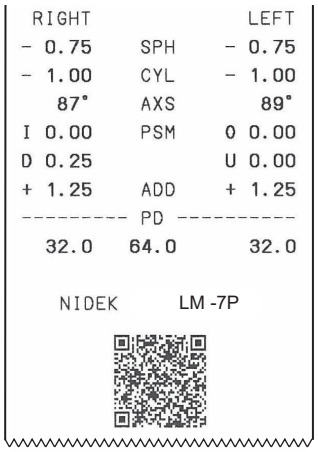
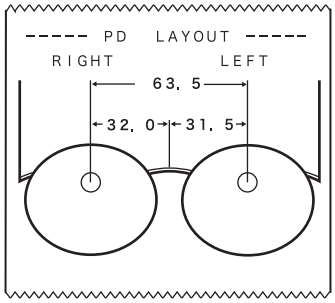
- R/L state measurement
  By setting the Economy print parameter, spacing between lines can be reduced.



- Contact lens measurement
  When printing is performed after only one side of lens is measured in R/L state, “***” is printed in the numeric fields.



- Hiding measured prism values
  When the prism ON/OFF button is turned off, the measured value turns gray. The measured value is not printed.

Sample printout	
	
• When the QR code parameter is set to “On”	• When the PD layout parameter is set to “On”

3.13 Saving Data to Eye Care Card

The measured data is saved to the Eye Care card to transfer the LM data to the connected equipment.

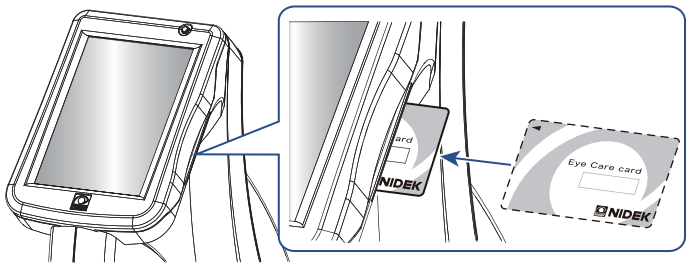
- Each data of sphere, cylinder, axis, add, and prism for right and left lenses is saved.
- If data has the 2nd add power, it is saved.
- Prism data is saved in the format set by the Prism parameter.

Note

- When the lens side is not specified (single state), data is not written to the Eye Care card.
  Even if the procedure for writing data is taken, data is not written.
- Only one item of LM data (a pair of frames) can be saved to the Eye Care card.
- Never remove an Eye Care card while it is being accessed.
  - The Eye Care card icon is displayed as Eye Ca (green) while it is being accessed.
  - The display of Eye Ca (red) indicates an error. The card may be removed.
    If the card is removed while it is being accessed, data cannot be written properly. The Eye Care card may be irreparably damaged.
- The data is written to the Eye Care card when the Auto print S or Auto print R/L parameter is set to “On”.
- When the Eye Care card is inserted after measurement with measured data locked in, the data is automatically written.

1 Inset the Eye Care card while no measured data is locked in.

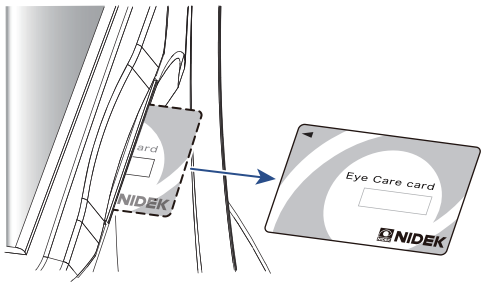
The Eye Care card icon changes from Eye Ca (white) to Eye Ca (blue).



2 After measurement, press the print button  .

The Eye Care card icon changes to Eye Ca (green). When the data is written to the card successfully, the icon changes to Eye Ca (blue).

3 When the Eye Care card icon changes to Eye Ca (blue), pull out the card straight.



◆ Erasing data on Eye Care card

This is the method to erase all the data on the Eye Care card.

1) After inserting the Eye Care card, press and hold the Eye Care card button 

.

A beep sounds and the pilot lamp blinks. Releasing the button erases all the data on the Eye Care card.

While the data is being erased, the Eye Care card icon is displayed as 

(green).

2) When the Eye Care card icon changes from 

(green) to 

(blue), pull out the card straight.

3.14 After Use

1 Turn the device off (◯).

Turn off (◯) the power switch while any of the measurement screens is displayed.

Note

- Turning off (◯) power while parameter settings are being changed on the parameter screen, the settings may not be saved.

  Parameter settings are saved when the exit button ↵ or page change button ▲ ▼ is pressed.

2 Place the provided dust cover over the device.

⚠ CAUTION

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

  If dust settles between the prongs, the dust could collect moisture, and short circuit or fire may occur.
- When the device is not in use, turn off power to the device and place the dust cover over the device.

  Dust may affect the measurement accuracy.

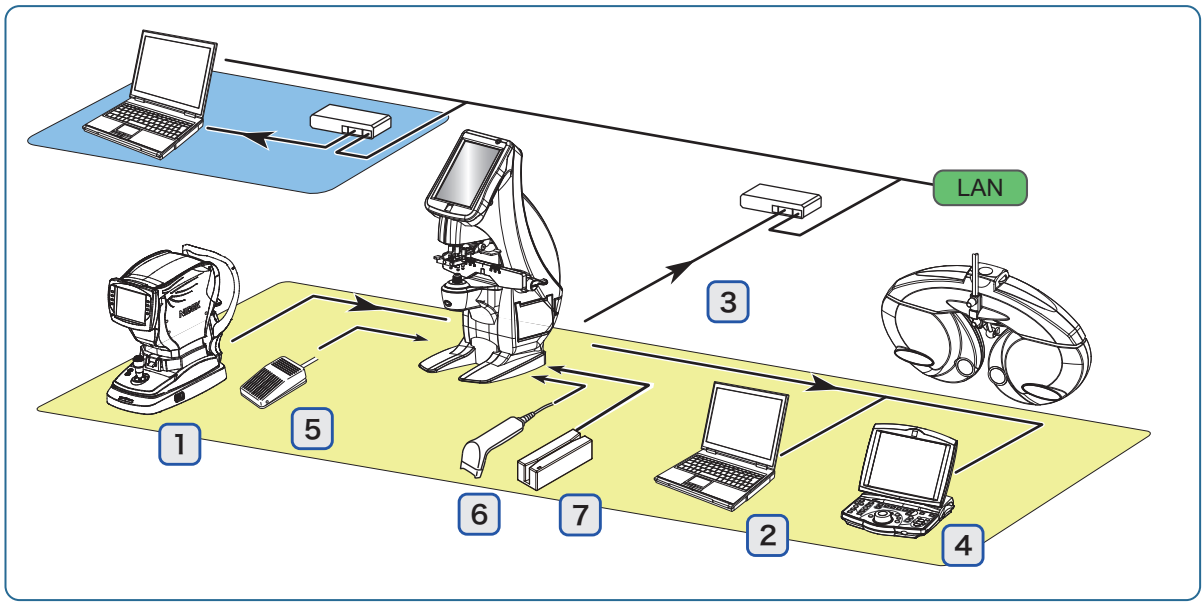
4 CONNECTION AND SETTINGS

4.1 Operation when Peripheral Devices are Connected

■ The LM-7/LM-7P can transmit data to the peripheral devices. In addition, measured results can be printed with the printer of the peripheral devices. Connect the peripheral devices to the communication ports of the LM-7/LM-7P and set the parameters.

⚠ CAUTION

• Be sure to turn off each device before connecting the communication cable.
Connecting the cable with power on may cause malfunction.



	Connecting device	Connection	Function
1	AR/ARK/RKT	RS-232C port	AR print *"4.1.2 Connecting AR/ARK/RKT" (page 74)*
2	Computer	RS-232C port USB port LAN/WLAN (optional)	LM data transmission Measured data is managed with database software. *"4.1.3 Connecting RT (refractor) or computer" (page 75)*
3	LAN	LAN/WLAN (optional)	
4	NIDEK motorized refractor	RS-232C port	LM data transmission Data is used as former LM data in subjective test with the RT. *"4.1.3 Connecting RT (refractor) or computer" (page 75)*

	Connecting device	Connection	Function
5	Foot switch (optional)	RS-232C port	Used in place of the read button *"4.1.4 Connecting the foot switch" (page 76)*
6	Barcode scanner (optional)	USB port	Entry of patient ID *"4.1.5 Connecting the barcode scanner / magnetic card reader" (page 77)*
7	Magnetic card reader (optional)	USB port	

Note

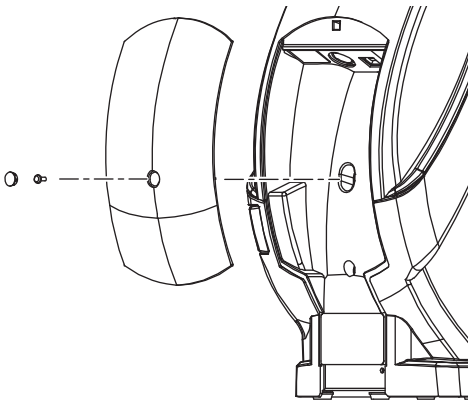
- After connecting each device, press and hold the network test button  on the parameter screen and confirm the connection.
  When performing a network test using the wireless LAN, it may take some time for the test results to be displayed (about 20 seconds).

4.1.1 Connecting optional cables

Only service personnel trained by NIDEK are allowed to connect the cables.

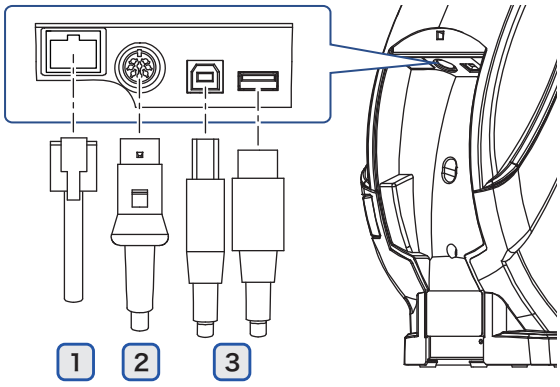
1 Remove the rear cover.

1) Remove the screw hole cap.
2) Remove the screw with a Phillips screwdriver.
3) Remove the rear cover.



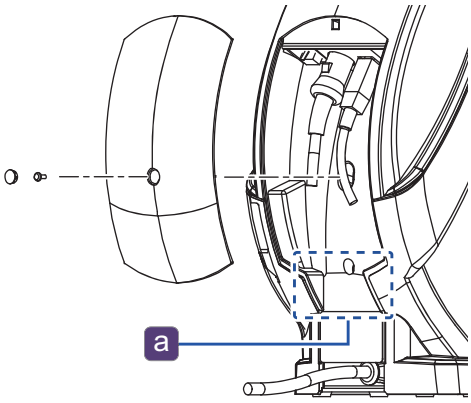
2 Connect each cable.

	Connection
1	LAN cable
2	RS-232C cable
3	USB cable



3 Attach the rear cover.

Attach the rear cover in the reverse order of removal. Draw each cable through the indentation a at the bottom of the cover.



4.1.2 Connecting AR/ARK/RKT

Measured data of the LM-7/LM-7P can be printed with the printer of the connected AR, ARK, or RKT.

Connect the NIDEK AR, ARK, or RKT to the communication port of the LM-7/LM-7P and set the parameters.

Connectable equipment	AR-600/330A series, ARK-700/530A series, AR-1/ARK-1 series, RKT-7700/ TONOREF II/TONOREF III

- Parameter setting procedure

1) Set the communication related parameters of the LM-7/LM-7P.

For the setting procedure, see *"4.2 Parameter Settings" (page 80)*.

Parameter	Setting contents
Printer	AR print
Com mode	NIDEK
Baud rate	9600
Parity	Odd
Data bits	8bit
Stop bits	1bit

2) Set the parameters of the connected device.

Connecting device	Parameter	Setting contents
AR/ARK series	IN port (LM)	NIDEK
	LM Data Prt.	YES
	Baud-Rate	9600
	Bit Length	8
RKT-7700/TONOREF II/TON-OREF III	BAUD-RATE	9600
	BIT LENGTH	8
	LM DATA PRINT	YES

Note

- For the setting procedure, refer to the operator's manual for the connected device.
- When printing with the AR, ARK, or RKT, the font is different from that printed with the LM-7/LM-7P.
- The Print density, Paper cut, Auto cutter, Economy print, QR code, and PD layout parameters are not supported.
  For PD, only a value is printed, and spacing between lines is unchanged.

4.1.3 Connecting RT (refractor) or computer

Data to be printed is transmitted to the NIDEK motorized refractor (hereafter referred to as the RT) or a computer.

LM data transmitted to the RT is used as LM data in subjective test.

LM data transmitted to a computer is managed with various database software.

Connectable equipment	RT-2100 / RT-5100

1 Connect the RT (or a computer) and the LM-7/LM-7P with the communication cable (optional).

- Connecting to a computer using USB

  Connect the optional USB cable between the USB port of the LM-7/LM-7P and that of a computer.

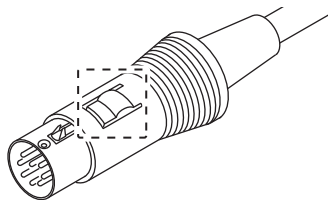
  Install the USB driver included with the optional USB cable to the computer.

  "4.1.1 Connecting optional cables" (page 72)

Note

- LM data is transmitted through RS-232C compliant interface.
- Data can be transmitted to a computer through USB.
- The USB interface is in compliant with USB2.0.
- Do not use the commercially available USB cable since the EMC performance may deteriorate (electromagnetic interference may occur).
- Disconnect the communication cable while pressing the button on the connector.

  When the cable is connected, the button is located on the upside of the connector.



2 After measurement, press the print button  .

The LM-7/LM-7P transmits the measured data to the RT (or a computer). Then the data is printed.

- When the LM is connected to the RT, it receives a data No. (ID No.) from the RT.
- When the LM is connected to a computer, it does not receive a data No. (ID No.)
- When the LM is connected to the RT, the data No. (ID No.) is also printed.

◆ LAN communication

1) Connect a computer and the LM-7/LM-7P with the LAN cable.

"4.1.1 Connecting optional cables" (page 72)

2) Set the LAN parameter to "LAN".

"4.2 Parameter Settings" (page 80)

3) Consult the network administrator regarding parameter setting of the LM-7/LM-7P and computer.

Note

- For LAN communication settings and connection, consult NIDEK or your communication system personnel.

◆ WLAN (wireless) communication

Communication between the LM-7/LM-7P and connected device is performed over the wireless LAN.

1) Confirm the access point (wireless router or such).

2) Set the LAN parameter to "WLAN".

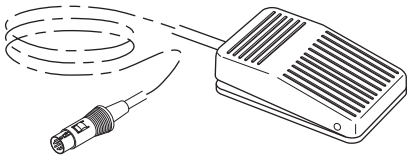
"4.2 Parameter Settings" (page 80)

Note

- For wireless LAN communication settings, consult NIDEK or your communication system personnel.

4.1.4 Connecting the foot switch

The optional foot switch can be used instead of the read button when reading data. In such cases when a number of lenses are measured in the Lab system, the foot switch allows for measurement while holding frames with both hands.



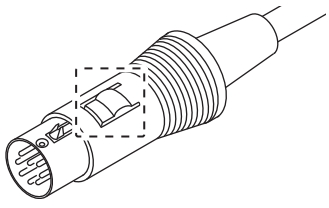
Connect the cable of the foot switch to the communication port.

"4.1.1 Connecting optional cables" (page 72)

Note

- Even when the foot switch is connected, the read button can be used.
- UV transmittance measurement can be performed by depressing and holding the foot switch.
- Disconnect the communication cable while pressing the button on the connector.

  When the cable is connected, the button is located on the upside of the connector.



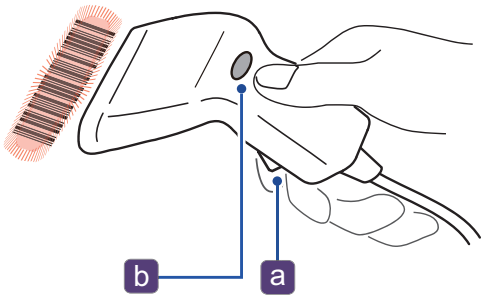
4.1.5 Connecting the barcode scanner / magnetic card reader

- Barcode scanner operation

  Hold the barcode scanner window over a barcode and press the trigger button a.

  The scanner window lights up in red and reads the barcode.

  When the barcode has been read successfully, the confirmation LED b lights up and the scanner emits a beep.

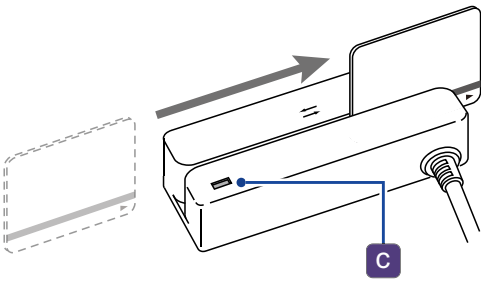


- Magnetic card reader operation

  Swipe the card through the magnetic card reader.

  A beep sounds and the confirmation LED c turns off.

  When the card has been read successfully, the confirmation LED lights up in green.



Note

- Only the dedicated barcode scanner and magnetic card reader can be connected.
- A beep sounds when the device is turned on with the barcode scanner or magnetic card reader connected.
  This beep is to confirm the connection. It is not an error.

1 Change the parameter settings.

"4.2 Parameter Settings" (page 80)

1) Set the USB parameter to "Host".

   Also check the settings of the Read beginning of reader and the Read length of reader parameters.

2) Set the ID mode parameter to other than "Off".

Note

- When the ID mode parameter is set to "Off", keep the following in mind:
  - The barcode button  is not displayed on the measurement screen.
  - When the USB parameter is set to "Host", connecting the barcode scanner or magnetic card reader changes the ID mode parameter to "PAT".
    It allows the barcode scanner or magnetic card reader to be used. Change the setting of the ID mode parameter if necessary.

2 Connect the barcode scanner or magnetic card reader.

"4.1.1 Connecting optional cables" (page 72)

The barcode button  is displayed on the measurement screen. The indication on the barcode button changes depending on the ID mode parameter setting.

3 Read the ID with the barcode scanner or magnetic card reader.

A maximum of 16 characters can be read.

The procedure changes depending on the ID mode parameter setting.

⚠ CAUTION

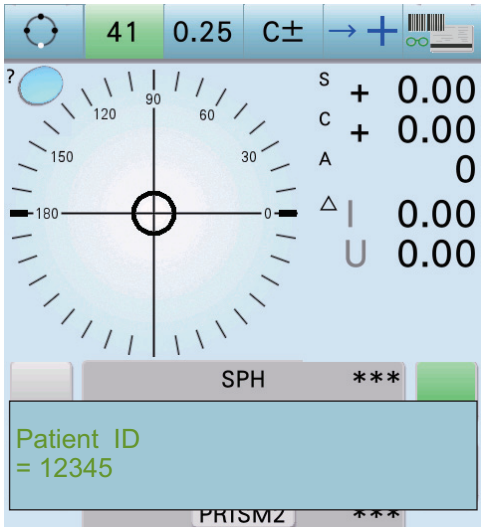
- After the ID is read, the screen cannot be operated for 3 seconds. After 3 seconds or more, press the outside of the window where the ID is displayed to return to the measurement screen.
  - If the screen is not operated, the ID window remains displayed.
  - Return to the measurement screen before measuring the lens.

Note

- Use a CODE39 barcode.
- Use magnetic cards utilizing a magnetic stripe format compliant with ISO 7811, AAMVA, and CA DMV.
- When there is no data after the reading start position set by the Read beginning of reader parameter, ID is not displayed.
- For the ID, alphanumeric characters and symbols can be used.
  Other control codes are not recognized by the LM-7/LM-7P. All unrecognized symbols are converted to "~".
- IDs can be manually entered (see *Step 4*).
- Pressing the clear button  clears the read ID or patient ID.
  The operator ID is not cleared. To clear the operator ID, press the clear button CLR on the ID edit window (see *Step 4*).

● When the ID mode parameter is set to "PAT"

- Read the ID.
  - The read ID is displayed. Then the glasses icon  is displayed on the barcode button.
  - The ID is updated every time it is read from the barcode scanner or magnetic card reader.



● When the ID mode parameter is set to “OPE/PAT”

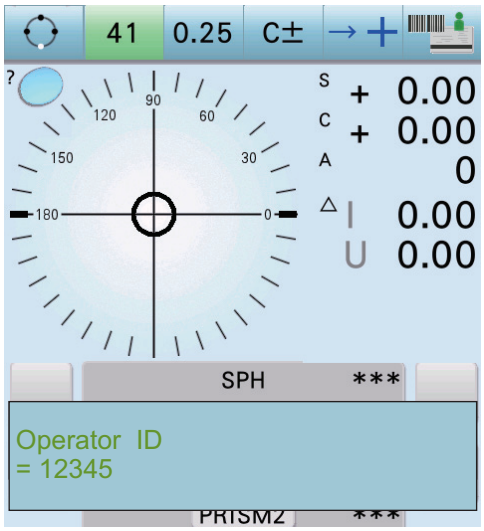
If the ID to be read is an operator, the color of the barcode button changes  .

1) Read the operator ID.

The read operator ID is displayed. Then the human icon  is displayed on the barcode button.

2) Read the patient ID.

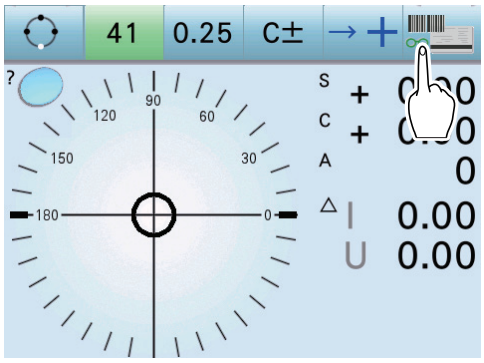
- The read patient ID is displayed. The glasses icon  is displayed on the barcode button.
- The patient ID is updated every time it is read from the barcode scanner or magnetic card reader.



4 Check or edit the read ID (patient ID or operator ID) as necessary.

1) Press the barcode button  .

The ID edit window is displayed.



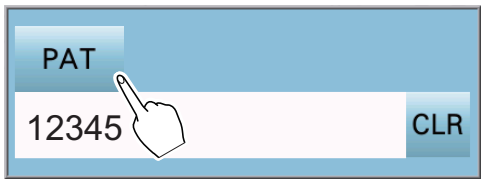
2) Check the read ID.

Pressing the clear button  clears the read ID.

3) Press the edit button of the ID to be edited.

A keyboard is displayed.

The indication on the button changes depending on the ID mode parameter setting.



4) Edit the ID.

“4.2.2 Entering keyboard characters” (page 89)

5) Press an area other than the window to return to the measurement screen.

4.2 Parameter Settings

Parameters include settings related to display, measurement, printing, communication, UV transmittance measurement, and such.

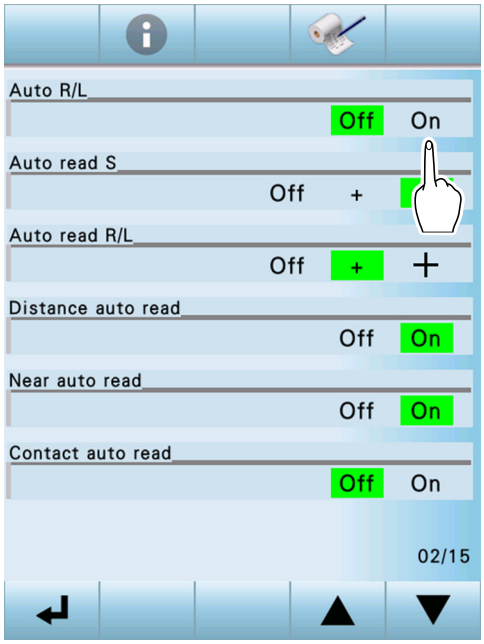
1 Press the parameter button [⌖].

2 Display the page that has the parameter to be set.

1) Using the page change button [▼] [▲], display the page that has the parameter to be changed.

2) Select the desired parameter item.

The background of the selected parameter item turns green.



3 Press the exit button [↵] to return to the measurement screen.

The changed parameter setting is saved.

4.2.1 Parameter setting table

Note

- Underlined options indicate factory settings.

	Parameter	Setting contents
1	Step	**0.25**, **0.12**, **0.06**, **0.01** (D)
		Display increments for measured data (D) (Axis and prism θ are always displayed in 1° increments.)
2	Cylinder	**+**, **±**, **-**
		Cylinder display mode +, -: The cylinder value is displayed in positive or negative reading. ±: When the refractive power at all axis angles is positive, the cylinder value is displayed in positive reading. Otherwise, the cylinder value is displayed in negative reading.
3	Prism	Off, **P-B**, **BU/D BI/O**
		Selects the method for displaying measured prism values. Off: Not displayed P-B: Displayed in polar coordinates BU/D BI/O: Displayed in rectangular coordinates

	Parameter	Setting contents
4	Abbe select	**A: , B: , C: , Com**

Using Abbe number for lens material, measurement value error that occurs during high-refractive lens measurement is corrected. Abbe number used for correction is selected from A, B, C or Com.

Factory setting: A: 41, B: 58, C: 32

- Abbe numbers can be entered for A, B, and C individually in the range of 20 to 60 according to the lens material. Extended pressing of the item displays the numeric keypad.
- "Com" can be selected only when Abbe number is transmitted from the connected computer. When "Com" is selected, Abbe number entered through communication is set and displayed in the setting field of the measurement screen. (In this case, the number is displayed in black with a yellow background.)

When power is turned on, A is automatically selected. Enter Abbe number of commonly used lens material for A.

5	Wavelength	**e-line, d-line**

Measurement reference wavelength, e-line (546.07 nm), d-line (587.56 nm)

6	Auto R/L	**Off, On**

Selects the method for specifying the right eye lens or left eye lens when changing lenses.
Off: Lens side is specified with the R/L measurement select button.
On: Removing the lens after measured data is locked in specifies the opposite side lens.
However, when measured data for both side lenses are locked in, removing the lens does not work as above.
This function is not available in single state measurement.

7	Auto read S	**Off,** ┼ , ┼

Enables or disables the auto read function in the single state (lens side is not specified).
Off: The measured data is locked in by pressing the read button.

┼ : When alignment is performed until the target changes to ┼ (cross), the measured data is automatically locked in.

After auto read, when further alignment is performed until the target changes to ┼ (large cross), auto read is performed again.

┼ : When alignment is performed until the target changes to ┼ (large cross), the measured data is automatically locked in.

This function is not available in contact lens measurement.

8	Auto read R/L	**Off,** ┼ , ┼

Enables or disables the auto read function in the R/L state.
The settings are the same as the Auto read S parameter.
This function is not available in contact lens measurement.

9	Distance auto read	Off, **On**

Distance auto read function on the progressive power lens measurement screen

For "On", when alignment is performed until the target changes to ┼ (cross), the measured data is automatically locked in without pressing the read button.

10	Near auto read	Off, **On**

Near auto read function on the progressive power lens measurement screen

For "On", when alignment is performed until the target changes to ┼ (cross), the measured data is automatically locked in without pressing the read button.

	Parameter	Setting contents
11	Contact auto read	**Off, On**

Auto read function on the contact lens measurement screen.
For “On”, when the conditions for auto read are met, the measured data is automatically locked in.

12	Indicator	Off, **On**

Selects whether to display indicators for near portion ▼ when alignment for the near portion is performed on the progressive power lens measurement screen.
For “On”, indicators for near portion ▼ appear above, below, to the right, and left of the target, indicating the direction and distance for which the lens is to be moved.

13	Single state	Off, **On**

Selects whether to set the single state (lens side is not specified).
For “On”, pressing the clear button  sets the single state. For “Off”, “R” is set.

14	Near	Near Sph, **Add**

Selects the indication method for the measured near portion data.

15	Contact measurement	**Off, On, Only**

Enables or disables cataract lens measurement.
Off: Contact lens measurement is not performed.
Pressing the periphery of the alignment circle displays the screen in the order of auto measurement screen → normal measurement screen → progressive power lens measurement screen → ...
On: Contact lens measurement is performed.
Pressing the periphery of the alignment circle displays the screen in the order of auto measurement screen → normal measurement screen → progressive power lens measurement screen → contact lens measurement screen → ...
Only: Contact lens measurement only
Only the contact lens measurement screen is displayed. It is not possible to switch to any other measurement screen.

16	Printer	**Off, On, AR print** (“**On**” for the LM-7P)

Selects the function when the print button  is pressed.
Off: Printing is not performed. Only transmission of measured data to the external equipment is performed.
On: Printing is performed. Transmission of measured data to the external equipment is performed at the same time.
AR print: Measured data of the LM-7/LM-7P is printed with the printer of the connected AR, ARK, or RKT. Transmission of measured data to the external equipment is performed at the same time.
When “AR print” is selected, the Print density, Paper cut, Auto cutter, Economy print, QR code, and PD layout parameters are disabled.

17	Print format	**Right & Left, Left & Right**

Selects the printing arrangement of measured data for right side and left side lenses.
Measured data is always printed to the right in the single state.

18	Print density	**60, 80, 100, 120, 140 (%)**

Selects print density.

	Parameter	Setting contents
19	Print number	**Off, On: (0001)**
	Selects whether to print the print number. Extended pressing of the value of “On” displays the numeric keypad. Enter a value (1 to 9999). Each pressing of the clear button  on the measurement screen increases the number by 1. After 9999, the number returns to 0001. The number is maintained even after the device is turned off. When a data No. of the RT exists, it is prioritized and printed.	
20	Paper cut	**Partial, Full**
	Selects the cutting method of the printer paper. Partial: Printer paper is cut with a center part left. Full: Printer paper is cut off.	
21	Auto cutter	**Off, On** (LM-7P)
	Selects whether to cut the paper automatically after printing.	
22	Economy print	**Off, On**
	Selects whether to reduce spacing between lines. For “On”, spacing between lines is reduced to one fourth of the normal one.	
23	Auto print S	**Off, On**
	Selects whether removing the lens after measured data is locked in prints the data automatically in the single state (lens side is not specified). This function is not available in contact lens measurement.	
24	Auto print R/L	**Off, On**
	Selects whether removing the lens after measured data for both side lenses is locked in prints the data automatically in the R/L state. This function is not available in contact lens measurement.	
25	Print&Clear	Off, **On**
	Selects whether to clear measured data from the memory after printing, data transmission, or writing to the Eye Care card. This function is available when the print button is pressed.	
26	Print date format	**Off, Y.M.D, M/D/Y, D/M/Y**
	Selects print date format. For “Off”, date is not printed.	
27	QR code	**Off, On** (LM-7P)
	Selects whether to print measured data with QR code.	
28	PD layout	**Off, On** (LM-7P)
	Selects whether to print measured PD data along with glasses illustration. When the Economy print parameter is set to “On”, only measured PD data is printed.	
29	Initial screen	**Auto, Normal, Progressive, Contact**
	Selects the measurement screen to be displayed when the device is turned on.	
30	Target	◯, +
	Selects the target shape displayed on the measurement screen. ◯ (Normal target): Indicates the distance and direction from the nosepiece center. The direction and movement distance are constant regardless of lens refractive power. + (Prism target): Moves based on prism amount as with the eyepiece-type or projection-type lensmeter. Also, the target turns to indicate the axis.	

	Parameter	Setting contents
31	Guide	**<u>Off</u>, On**
	Selects whether to display the guide - ¦ - for precise alignment of the target.	
32	Beep	**Off, <u>Low</u>, Middle, High**
	Selects tones of beeps that sound when a button is pressed or auto read is performed.	
33	Auto off	**Off, 1, 3, 5, 10, 15, <u>30</u>, 60(minute)**
	Enables or disables the display auto off function. Idle time for the device to enter auto off mode can be selected.	
34	Contrast	**Low, <u>Middle</u>, High**
	Contrast of LCD screen	
35	Color	**<u>Standard</u>, Change:300**
	Colors of LCD screen • With “Standard”, set blue colors. With “Change:”, set colors as desired. • Extended pressing of the value of “Change:” displays the numeric keypad. The standard value is 199, the monochrome value is -360 to -1, the color value is 0 to 359, 0 (red), 120 (green), 240 (blue).	
36	Transmittance	**Off, <u>On</u>, With**
	Selects whether to perform the UV transmittance measurement. Off: UV transmittance measurement is not performed. On: Extended pressing of the read button performs UV transmittance measurement. If the other values are not measured, it is not possible to print or transfer the UV transmittance measured value only. With: Extended pressing of the read button performs lens power reading and UV transmittance measurement. When addition power is measured, only lens power reading is performed.	
37	Transmittance step	**1, <u>5</u> (%)**
	Selects display increments of UV transmittance.	
38	Transmittance display	**<u>Compare</u>, Simple**
	Selects the screen for UV transmittance measurement. Compare: The screen changes to the UV transmittance screen and the measured results are displayed. By comparative measurement, UV transmittances of two lenses are displayed for comparison on the UV comparison screen. Simple: The measured result is displayed on the measurement screen.	
39	Auto correct	Off**, On, <u>Silent</u>**
	Selects whether to perform auto UV 100% correction. Off: Auto UV 100% correction is not performed. On: Auto UV 100% correction is performed. When UV 100% correction is renewed, a beep sounds. Silent: Auto UV 100% correction is performed. Even when UV 100% correction is renewed, no beep sounds. Even if a measurement error occurs during correction measurement, the correction amount is measured to the end. When the correction measurement message is displayed, the touch screen becomes difficult to operate for several seconds.	
40	USB	Host**, <u>Device</u>**
	Selects the USB port depending on the equipment to be connected. Host: Barcode scanner, magnetic card reader Device: Computer	

	Parameter	Setting contents
41	Read beginning of reader	Operator:**1**, **Patient:1**

Sets the position to start reading of ID transferred from a reader.
Settings for the operator ID and patient ID are available.
Pressing the item displays the numeric keypad. Enter a value (1 to 255).
Enter a value so that the total of “Read length of reader” and “Read beginning of reader” is 256 or less.
For example, when “Read length of reader” is set to 16, “Read beginning of reader” can be set up to 240.

42	Read length of reader	Operator:**16**, **Patient:16**

Sets the reading length of ID transferred from a reader.
Settings for the operator ID and patient ID are available.
Pressing the item displays the numeric keypad. Enter a value (1 to 16).
Enter a value so that the total of “Read length of reader” and “Read beginning of reader” is 256 or less.
For example, when “Read length of reader” is set to 16, “Read beginning of reader” can be set up to 240.

43	ID mode	**Off**, **PAT**, **OPE/PAT**

Selects the reading setting of the reader.
The number of reading IDs and the reading order can be specified.
Off: No ID is read from the reader. The barcode button  is not displayed on the measurement screen.
PAT: One ID can be entered. The ID is updated every time it is read from the reader.
OPE/PAT: Two IDs can be entered. The operator ID is stored until it is cleared and the patient ID is updated every time it is read from the reader.
“4.1.5 Connecting the barcode scanner / magnetic card reader” (page 77)

44	Com mode	**Off**, **NIDEK**, **NIDEK2**, **PC**, **NCP10**, **NCP20**

Off: Data transmission and AR print are not performed.
NIDEK: Communication with a NIDEK device
NIDEK2: Communication with a NIDEK device (time-out period is extended)
PC: Communication with a computer
NCP10: Communication with a NCP10-compliant NIDEK device
NCP20: Communication with a NCP20-compliant NIDEK device
When the Printer parameter is set to “AR print”, only “NIDEK” or “NIDEK2” can be selected.
“NIDEK2” offers the same settings as “NIDEK” with a longer time-out limit. If time-out occurs with the factory setting “NIDEK” due to the communication environment, select “NIDEK2”.

45	Baud rate	**1200**, **2400**, **4800**, **9600**, **19200(bps)**

Selects the bit transmission speed for communication.
When the Com mode parameter is set to “NIDEK” or “NIDEK2”, “Baud rate” is fixed to the dedicated setting inside the device regardless of its indication.

46	Parity	**Off**, **Odd**, **Even**

Selects whether parity checking is performed in odd parity mode or even parity mode, or either is not performed.
When the Com mode parameter is set to “NIDEK” or “NIDEK2”, “Parity” is fixed to the dedicated setting inside the device regardless of its indication.

47	Data bits	7bit, **8bit**

Selects the bit number for a single character used in communication.
When the Com mode parameter is set to “NIDEK” or “NIDEK2”, “Data bits” is fixed to the dedicated setting inside the device regardless of its indication.

	Parameter	Setting contents
48	Stop bits	**1bit, 2bit**
	Selects the stopping bit in communication. When the Com mode parameter is set to “NIDEK” or “NIDEK2”, “Stop bits” is fixed to the dedicated setting inside the device regardless of its indication.	
49	CR code	**Off, On**
	Selects whether to add a CR code to the end of data to be transmitted.	
50	Prism Tx	Off**, On, Display**
	Turns on or off the prism ON/OFF button. Off: The prism ON/OFF button is normally turned off and measured prism data is not transmitted. On: The prism ON/OFF button is normally turned on and measured prism data is transmitted. Display: When measured prism data is displayed on the screen, it is transmitted. When data is not displayed, it is not transmitted. Display of measured prism data is toggled with the prism ON/OFF button in the measured results display area. Even when the setting is “On” or “Off”, whether or not to transmit measured prism data can be toggled with the prism ON/OFF button.	
51	Source	**1**
	Sets the port number for the source (LM-7/LM-7P). Pressing the item displays the numeric keypad. Enter a value (0 to 255). Enter different numbers for “Source” and “Destination”.	
52	Destination	**0**
	Sets the port number for the destination (receiving device). Pressing the item displays the numeric keypad. Enter a value (0 to 255). Enter different numbers for “Source” and “Destination”.	
53	Request	**2.0(second)**
	Sets the response waiting time (time-out) for command requests. Pressing the item displays the numeric keypad. Enter a value (0.1 to 10.0).	
54	Reception	**10(second)**
	Sets the waiting time (time-out) for receiving commands. Pressing the item displays the numeric keypad. Enter a value (1 to 100).	
55	Response	**2.0(second)**
	Sets the waiting time (time-out) for responding commands. Pressing the item displays the numeric keypad. Enter a value (0.1 to 10.0).	
56	Re-request	**2.0(second)**
	Sets the response waiting time (time-out) for command requests. Pressing the item displays the numeric keypad. Enter a value (0.1 to 10.0).	
57	Retry	**3**
	Sets the number of retries when communication cannot be established. Pressing the item displays the numeric keypad. Enter a value (0 to 5).	
58	LAN	**Off, LAN, WLAN**
	Selects from the detected LAN communication function (undetected function is not displayed). For the LAN communication, the optional LAN board or WLAN module needs to be mounted.	

❖ The following parameters are displayed only when “LAN” or “WLAN” is selected.

	Parameter	Setting contents
59	MAC address	ex.) **FF-FF-FF-FF-FF-FF**
	Displays the MAC address. The setting cannot be changed on the parameter screen.	
60	Network	**Off**, **On**
	Selects whether to use the network. Off: The device does not use the network. On: The device always opens the ports and stands by to send and receive data.	
61	File format	**NIDEK_V1.00**, **NIDEK_V1.01**
	Selects the file format.	
62	DHCP	**Off**, **On**
	Selects whether to obtain the IP address and subnet mask from the DHCP server. Off: The IP address and subnet mask are not obtained. On: The IP address and subnet mask are obtained. The IP address and Subnet mask parameters become unchangeable. The values obtained from the DHCP are displayed.	
63	IP address	ex.) **192. 168. 0. 90**
	Sets the IP address. Pressing the item displays the numeric keypad. Enter a value (0 to 255).	
64	Subnet mask	ex.) **255. 255. 255. 0**
	Sets the network subnet mask. Pressing the item displays the numeric keypad. Enter a value (0 to 255).	
65	Default Gateway	ex.) **0. 0. 0. 0**
	Sets the default gateway. Pressing the item displays the numeric keypad. Enter a value (0 to 255).	
66	User name	ex.) **GUEST**
	Sets the user name of the connected computer. Pressing the item displays the keyboard. Enter alphanumeric characters (up to 20 characters).	
67	Password	*****
	Sets the login password associated with the user name of the connected computer. Pressing the item displays the keyboard. Enter alphanumeric characters (up to 20 characters).	
68	Domain	ex.) **WORKGROUP**
	Sets the domain name of the connected computer. Pressing the item displays the keyboard. Enter alphanumeric characters (up to 48 characters).	
69	PC name	ex.) **LM**
	Sets the PC name of the connected computer. Pressing the item displays the keyboard. Enter alphanumeric characters (up to 20 characters).	
70	Folder	ex.) **DATA**
	Sets the name of the shared folder on the connected computer. Pressing the item displays the keyboard. Enter alphanumeric characters (up to 20 characters).	
71	Network timeout	Off, **On:5**
	Sets the time to wait for files saved in the shared folder on the connected computer to be deleted. Off: Deletion of files is not confirmed. On: If any file remains after the specified time elapses after saving, a network time-out error occurs. Extended pressing of the item displays the numeric keypad. Enter a value (1 to 60).	

❖ The following parameters are displayed only when “WLAN” is selected.

	Parameter	Setting contents
72	SSID	ex.) **123456**
	Sets the access point identification name for WLAN. Pressing the item displays the keyboard. Enter alphanumeric characters (up to 32 characters).	
73	Security Mode	**Open, WEP(128bit:ASCII), WEP(128bit:HEX), WEP(64bit:ASCII), WEP(64bit:HEX), WPA, WPA2, WPA/WPA2**
	Selects security mode.	
74	Security Key	ex.) **00000**
	Sets security key. Pressing the item displays the keyboard. Enter the security key of the communication destination. WEP(128bit:ASCII): Alphanumeric characters or symbols, 13 characters WEP(128bit:HEX): HEX, 26 characters WEP(64bit:ASCII): Alphanumeric characters or symbols, 5 characters WEP(64bit:HEX): HEX, 10 characters WPA, WPA2, WPA/WPA2: Alphanumeric characters or symbols, 63 characters Enter the security key left aligned. If the number of characters is insufficient, “0” will be entered after the entered security key.	

4.2.2 Entering keyboard characters

Enter characters in the keyboard when the ID read by the reader or a parameter setting needs to be edited.

The following is an example when a parameter setting is changed.

1 Press the parameter to be changed.

2 Enter alphanumeric characters.

1) Press a character to be changed in the overall entry field.

   The characters preceding and following the pressed character (8 characters) are displayed in green and enlarged.

2) Press the alphabet, number, or symbol button as necessary.

Button	Description
↵	Returns to the parameter screen.
ABC	Alphabet (upper case)
abc	Alphabet (lower case)
12!	Number
:;<	Symbol

3) Select and enter the desired alphabetic letters, numbers, and symbols.

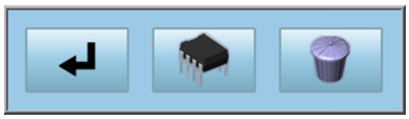
   Characters that are currently being entered are displayed in green.

Note

- For the space entry, the button indication (□ , INS ,) changes depending on the entry screen.
- Depending on the connected device, printed characters may differ from those displayed on the screen. This is prone to occur in symbols such as “#”, “$”, “@”, “[” and “]”. Perform printing to check.

3 Press the exit button .

The confirmation dialog box appears.



Button	Description
	Returns to the entry screen.
	Saves the entered setting and returns to the parameter screen.
	Discards the entered setting and returns to the parameter screen.

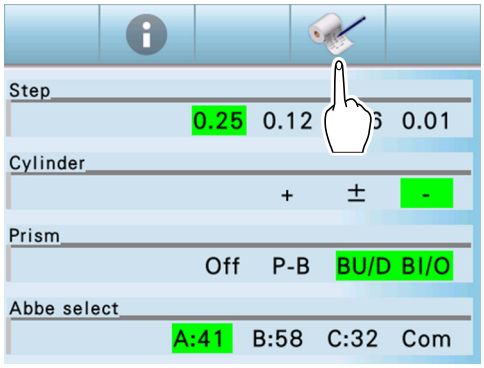
4.2.3 Entering shop name for printing

Change the comment to be printed (the default setting is “NIDEK LM-7(P)”).

The comment can be entered in two lines with 24 characters per line.

1 Press the parameter button .

2 Press the shop name print button .

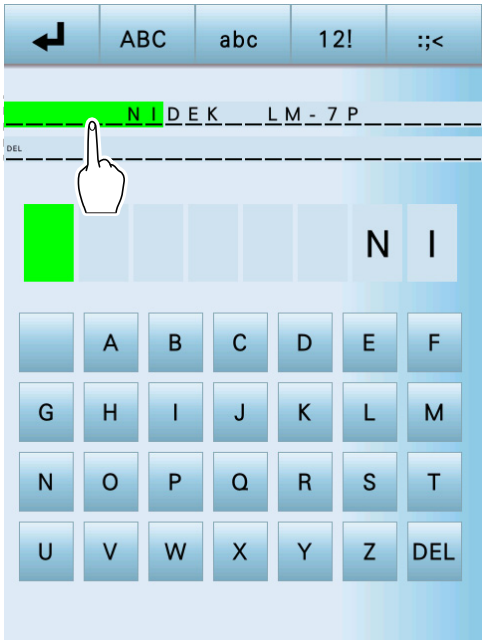


3 Enter a shop name or such.

1) Press a character to be changed in the overall entry field.

   The characters preceding and following the pressed character (8 characters) are displayed in green and enlarged.

2) Press the alphabet, number, or symbol button as necessary.

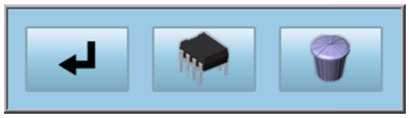


Button	Description
	Returns to the parameter screen.
ABC	Alphabet (upper case)
abc	Alphabet (lower case)
12!	Number
:;<	Symbol

3) Select and enter the desired alphabetic letters, numbers, and symbols.
Characters that are currently being entered are displayed in green.

4 Press the exit button  .

The confirmation dialog box appears.



Button	Description
	Returns to the entry screen.
	Saves the entered setting and returns to the parameter screen.
	Discards the entered setting and returns to the parameter screen.

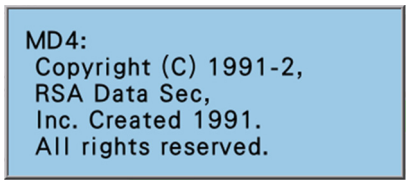
Note

- Depending on the connected device, printed characters may differ from those displayed on the screen.
  This is prone to occur in symbols such as “#”, “$”, “@”, “[” and “]”. Perform printing to check.

4.2.4 License information

Pressing the information button  on the parameter screen displays the license information of MD4.

Pressing the MD4 license information window returns to the original screen.



5 MAINTENANCE

5.1 Troubleshooting

■ In the event that the device does not work correctly, attempt to correct the problem according to the following table before contacting NIDEK or your authorized distributor.

Symptom	Remedy
The LCD does not turn on.	• The power cord may not be connected properly. Reconnect it securely. • The power switch may not be turned on. Check the power switch.
The LCD does not turn on (or is unclear) even though the power is on.	• The display auto off function may be activated. Press the touch screen to exit from auto off mode. • The brightness may be set to the low level. Check the setting of the Contrast parameter.
The display of the LCD suddenly disappears.	• The display auto off function may be activated. Press the touch screen to exit from auto off mode.
The position touched on the screen and the response position do not match.	• Perform calibration for the touch screen. *"5.3 Touch Screen Calibration" (page 96)*
Data is not printed.	• Check the printer paper. If the paper has run out, load the new printer paper. • The Printer parameter may be set to "Off". Reset the parameter.
The printer does operate, however, printed results cannot be obtained.	• The printer paper may be loaded with the wrong side up. Load the printer paper with the correct side up.
Data cannot be written even though the Eye Care card is inserted.	• The contacts in the Eye Care card slot may be soiled. Clean them. *"5.7.4 Eye Care card slot" (page 101)* • When an error occurs while data is read in the other device such as a refractor, clean its card reader.
Communication with a computer is not possible.	• The User name, Domain, PC name, or Folder parameter may be set incorrectly. Check whether any unnecessary character, space, or symbol is entered.

❖ If the symptom cannot be corrected by the above remedies, contact NIDEK or your authorized distributor.

5.2 Error Messages and Remedies

■ If any error message in the following table appears on the screen, follow the instructions below.
If the problem persists, contact NIDEK or your authorized distributor.

Symptom	Remedy
0D initialization error	• The measuring beam is obstructed during initialization. Check the nosepiece. Press the restart button ↵ to restart the device.
Please remove lens from nosepiece	• A lens was set on the nosepiece at start-up. After removing the lens, press the restart button ↵ to restart the device.
Dust detected. Please clean lens.	• There is something that obstructs the measuring beam on the nosepiece when power is turned on. Check the nosepiece. If the protective glass is soiled, clean it. Press the restart button ↵ to restart the device.
Use contact nosepiece?	• The nosepiece for contact lenses is mounted at start-up. • Replace the nosepiece with the standard one, press the restart button ↵ to restart the device. • To measure a contact lens, press the execute button ▶.
Transmittance initialization error	• The measuring beam is obstructed during initialization. • Check the nosepiece. • Press the restart button ↵ to restart the device.
Measurement error	• The measuring beam is obstructed during initialization. • Check the nosepiece. • Press the restart button ↵ to restart the device. • The LED is not lit. Failure in the interior of the device. Contact NIDEK or your authorized distributor.
Transmittance measurement error	• Significant change such as interference light occurred during measurement. Make the lens stable and perform measurement again.
SPH overflow error	• The sphere value exceeds ±27 D. Check the lens.
CYL overflow error	• The cylinder value exceeds ±11 D. Check the lens.
ADD overflow error	• The add value exceeds 11 D. Check the lens.
Center overflow error	• The lens with the prism value exceeding 21Δ is on the nosepiece. Perform alignment of the lens. Or remove the lens.
CCD error	• The CCD signal is not correct. Failure in the interior of the device. Contact NIDEK or your authorized distributor.
Printer error	• The print button was pressed with the printer paper run out. Load the new printer paper.

Symptom	Remedy
Printer paper error	• The printer ran out of paper while printing. Load the new printer paper.
Communication error	• Communication with external equipment is not performed properly. • Check the communication cable. • Confirm that the connected device is turned on. • Confirm that the parameters related to communication are correctly set.
AR print error	• A request for data transmission is not sent from the AR, ARK or RKT before printing. • Check the communication cable. • Check the parameter settings in the AR, ARK or RKT.
Eye Care card error	• Communication with the Eye Care card is not performed properly. Replace the Eye Care card and check whether communication is possible.
Network error	• Network communication has failed. To confirm details, perform network communication check.
Network timeout error	• Files were not deleted from the shared folder within a specified time.
DHCP error	• There is no response from the DHCP server. Check the DHCP server, or manually set the IP address, subnet mask, and default gateway.
Shared file access error	• The shared folder on the computer is not found. Check whether the shared folder names match.
Network access error	• It is not possible to connect to the network. Check the connection of the network cable and the settings of the IP address, subnet mask, and default gateway.
File save error	• Files cannot be saved to the shared folder. Check whether the shared folder is write protected.
Network configuration error	• The domain or user name is incorrect. Check the domain and user name.
Connection limit error	• The number of the shared folder connections is exceeding. Check the number of the shared folder connections.
Password error	• The password is incorrect. • Check whether the user name is correct. • Reenter the password.
Disk full	• There is no free space on the drive. Check the free space on the drive.
WLAN error	• Connection to the WLAN access point has failed. Check the WLAN connection.

Note

- If printing is performed at the time of overflow error, erroneous measured values are displayed with "*".
  The "*" marks indicate that the measured values are erroneous.
- The measured value with an overflow error is displayed in orange and the orange indication remains even after data reading. Also, auto read is disabled at the time of error.

RIGHT		LEFT
+ 1. 50	SPH	+ 1. 25
+11. 00	* CYL *	+11. 00
137°	AXS	0°
1. 50	PSM	3. 25
268°	BAS	266°
+ 2. 75	ADD	+ 0. 75
***	ADD *	+ 2. 25

5.3 Touch Screen Calibration

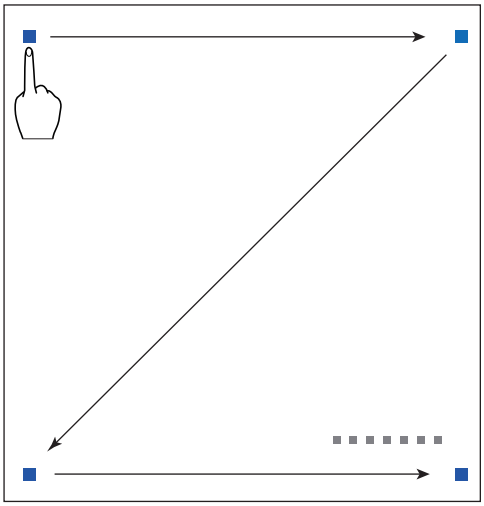
If the position touched on the screen and the response position do not match, perform the touch screen calibration.

1 While pressing the read button, turn on (|) the power switch.

Continue pressing the read button until the calibration screen is displayed.

2 Press the blue squares that appear on the screen in order.

When the squares in all four corners are pressed, the calibration is complete.



Note

- Pressing with a rod with a narrow, rounded tip such as a touch pen allows more accurate calibration.

5.4 Printer Paper Replacement

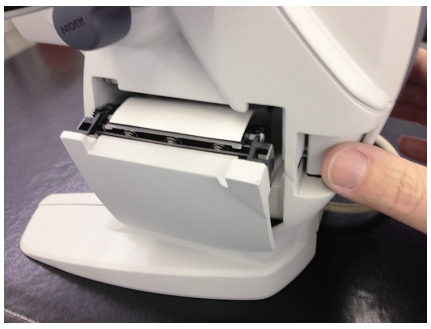
When a red line appears on the edge of the printer paper, it means that the paper is running short. Replace it with the new printer paper.

Note

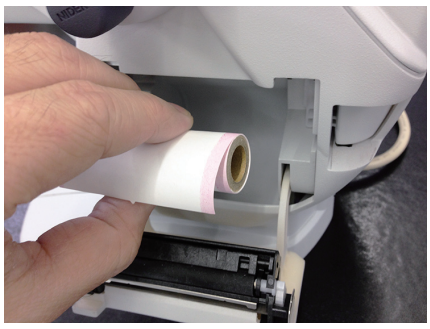
- Do not run the printer while the printer paper is not loaded.
- Do not pull the paper from the printer forcefully.
- Confirm that the printer paper is not reversed or tilted. In addition, confirm that the tube of the printer paper roll is not off-center.
  The printer paper may not be printed correctly or fed properly.
- Confirm that the cover is securely closed.
  If the cover is not closed securely, the auto cutter may not operate properly.

1 Push the button on the rear of the device to open the printer cover and remove the printer paper.

1-1



1-2



⚠ CAUTION

- When replacing the printer paper, be careful not to touch the printer head at the top inside the printer cover.
  As the printer head immediately after printing is extremely hot, injury may occur.

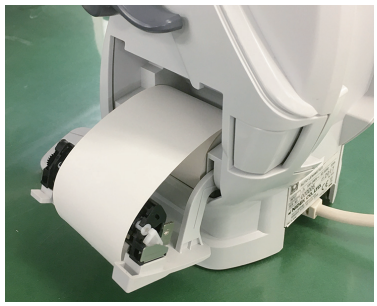
2 Load the new printer paper.

Make sure that the end of the printer paper comes out slightly from the cover.

3 Close the printer cover.

Push the right and left sides of the printer cover to close it securely.

2



3

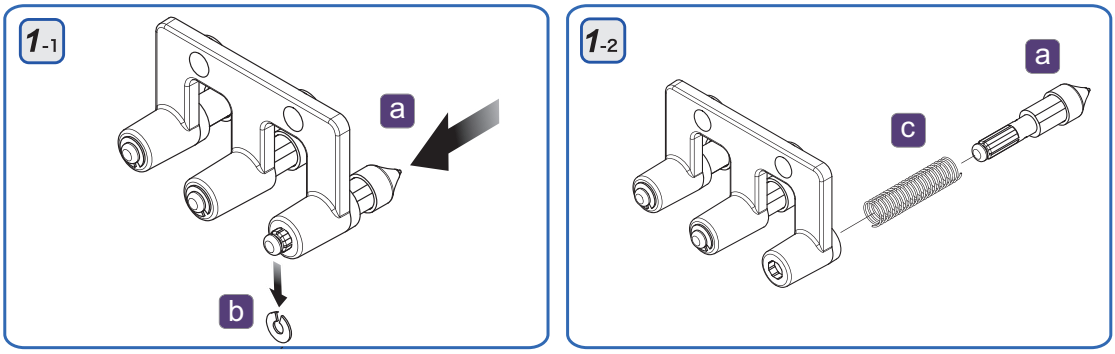
5.5 Ink Refilling

5.5.1 Ink cartridge

When markings become faint, replace the ink cartridge.

1 While pressing the tip of the ink cartridge a with a finger, remove the C-ring b.

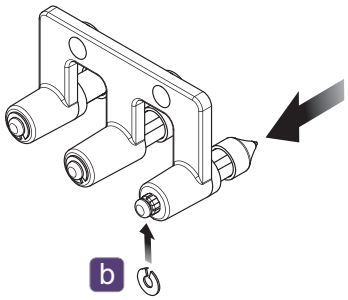
It is recommended to remove the C-ring with tweezers so as not to lose it. When the C-ring is removed, the spring c and cartridge a come off. Be careful not to lose them.



2 Insert the spring and new cartridge into the marker holder, and set the C-ring b in the groove at the end of the ink cartridge.

Match the shaft of the cartridge to the hole of the marker holder by rotating until the cartridge can be inserted smoothly.

For the C-ring, use either the one removed in Step 1 or the one attached to the cartridge as a replacement part.



5.5.2 Ink pad (optional)

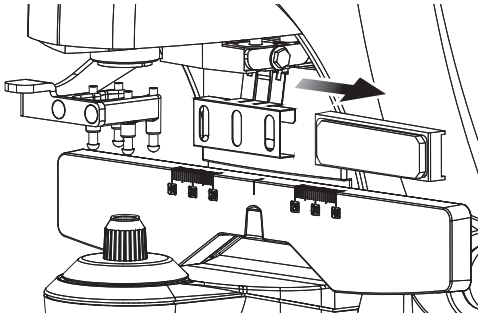
When markings become faint, supply the ink to the ink pad.

1 Remove the ink pad.

Push the left side of the pad and pull it out of the holder.

2 Supply the ink.

Supply an appropriate amount of the ink to the pad.



Note

- If the ink is supplied too much, the periphery of the lens marker may be soiled.

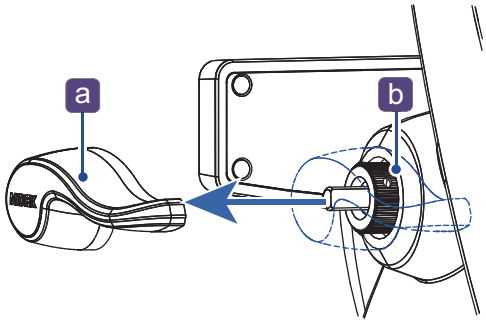
5.6 Lens Table Adjustment

Adjust the feel of the lens table lever movement. If the lever feels too heavy or too light during use, perform the following adjustment.

1 Remove the lens table lever a.

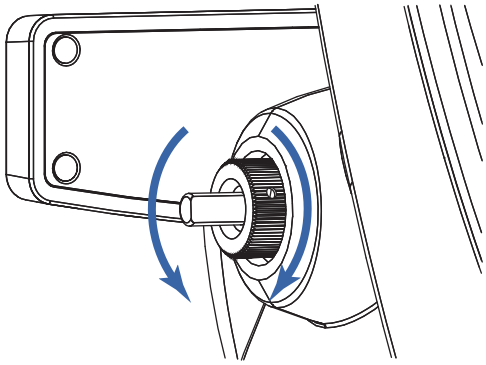
Pull it out straight.

2 Loosen the setscrew b on the adjustable screw with a flatblade screwdriver.



3 Rotate the adjustable screw to adjust the feel of the lens table lever movement.

Rotate the screw without rotating the center shaft.



Clockwise rotation	The lens table lever feels heavier.
Counterclockwise rotation	The lens table lever feels lighter.

Note

- The rotation range of the adjustable screw is up to one rotation in either clockwise or counterclockwise direction from the factory setting.
  Even if the adjustable screw is rotated counterclockwise by more than one rotation, the lever no longer feels lighter.
  Moreover, if the screw is continuously rotated counterclockwise (about five rotations or more), it comes off and malfunction may result.

4 Tighten the setscrew on the adjustable screw.

5 Attach the lens table lever and check the lever movement.

5.7 Cleaning

5.7.1 Device exterior

When the cover or panel of the device becomes soiled, clean it with a soft cloth. For persistent stains, wipe them away with a cloth soaked in a neutral detergent and wrung well. Finally wipe them with a dry and soft cloth.

⚠ CAUTION

- Never use an organic solvent such as paint thinner.
  This could damage the surface of the device.
- Lightly wipe the touch screen with a soft cloth.
  The surface of the LCD may be damaged. Device malfunction may also result.
- Never use a sponge or cloth soaked in water.
  Water may leak into the interior of the device resulting in malfunction.

5.7.2 Protective glass

If dust settles on the protective glass, it may affect the measurement accuracy.

⚠ CAUTION

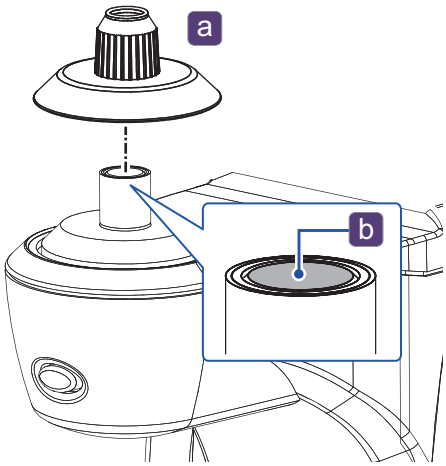
- Clean the protective glass under the nosepiece with a blower brush.
  Dust may include sharp particles. Wiping the protective glass without blowing dust damages the lens coating. Be sure to remove any dust on the protective glass with a blower brush.

1 Remove the nosepiece a.

2 Clean the protective glass b.

Remove any dust on the glass with a blower brush.

If the glass is still soiled, wipe it gently with a lens cleaning cloth.



Note

- Take special care not to scratch the protective glass.
  Flaws on the glass substantially lower the reliability of measurement.

5.7.3 Printer

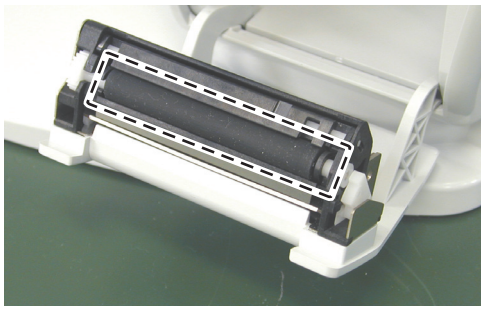
After repeated usage, the paper slot of the auto cutter of the printer may become soiled with paper residue. If the residue settles, malfunction of the auto cutter may result.

1 Open the printer cover and remove the printer paper.

"5.4 Printer Paper Replacement" (page 97)

2 Apply the nozzle of a vacuum cleaner to the auto cutter to remove paper residue.

Never blow off paper residue with a blower. If residue settles on the internal working structure, malfunction may result.

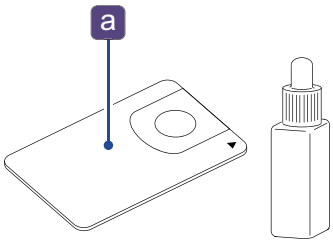


3 Load the printer paper as before.

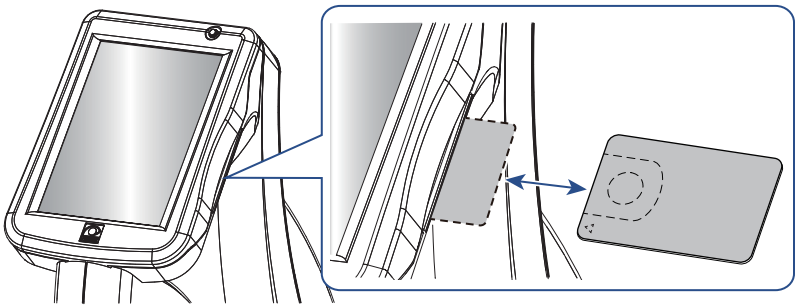
5.7.4 Eye Care card slot

With an extended period of use, the contacts in the Eye Care card slot may become soiled resulting in contact failure. Data may not be read or written properly.

In such a case, clean the contacts with a contact cleaner a for contact-type IC card reader/writer.



Use a commercially available contact cleaner or the optional one (part No.: 8060500023).

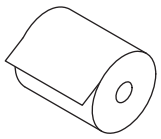
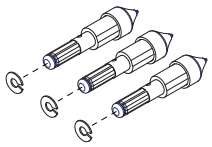
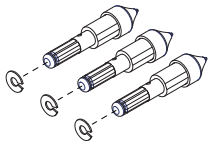
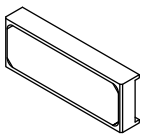
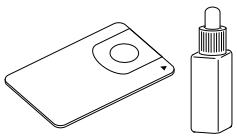


When the contacts of the Eye Care card are soiled, wipe them with a soft cloth. For persistent stains, wipe them away with a cloth soaked in a neutral detergent and wrung well. Finally wipe them with a dry and soft cloth.

Note

- Be sure to turn off the device before cleaning with a contact cleaner.
- For use of the contact cleaner, refer to the instructions provided with the cleaner.
- The Eye Care card reader contacts are on the back side. Insert and remove the contact cleaner with the wiper part (cloth-attached surface) facing back several times to clean the reader contacts.

5.8 List of Consumables and Replacement Parts

Part name (part No.)	Appearance	Note
Printer paper (8062000001)		Width 58 mm, Length 25 m
Ink cartridge / red (31001-3371)		Red ink, 3 units, with C-ring
Ink cartridge / blue (31001-3372)		Blue ink, 3 units, with C-ring
Supplement ink / red (31001-M231)		Ink pad type, 20 ml
Supplement ink / blue (31001-M232)		Ink pad type, 20 ml
Ink pad (30282-M3332)		Ink pad type
Contact cleaner (8060500023)		For cleaning the contacts of the Eye Care card slot

❖ After replacing consumables, restock them.

Note

• When storing the ink cartridge, keep the marker pen upright with the pen tip pointing down.
Otherwise, the ink inside separates from the pen tip worsening marking condition.

6 SPECIFICATIONS AND TECHNICAL INFORMATION

6.1 Specifications

Measurement items	
• Spherical power (spectacle lenses)	-25.00 to +25.00 D, 0.01/ 0.06/ 0.12/ 0.25 D increments

Measurement range (D)		Accuracy (D)
< 0 ≥ -5	> 0 ≤ +5	±0.06
< -5 ≥ -10	> +5 ≤ +10	±0.09
< -10 ≥ -15	> +10 ≤ +15	±0.12
< -15 ≥ -20	> +15 ≤ +20	±0.18
< -20	> +20	±0.25

• Spherical power (contact lenses)	-25.00 to +25.00 D (BC = 6.00 to 9.00), 0.01/ 0.06/ 0.12/ 0.25 D increments
• Cylindrical power	0.00 to ±10.00 D (-, +/-, +), 0.01/ 0.06/ 0.12/ 0.25 D increments
• Cylinder axis	0° to 180°, 1° increments
• Addition power	+0.4 to +10.00 D (first add, second add), 0.01/ 0.06/ 0.12/ 0.25 D increments
• Prism power	0.00 to 20.00Δ, 0.01/ 0.06/ 0.12/ 0.25Δ increments

Measurement range (Δ)	Accuracy (Δ)
> 0 ≤ 5	0.1
> 5 ≤ 10	0.2
> 10 ≤ 15	0.3
> 15 ≤ 20	0.4

• Prism measurement	Polar coordinates (Δ, θ), Rectangular coordinates (Base in/out, Base up/down)
• UV transmittance	0 to 100%: Transmittance of central wavelength 365 nm (UV-A). 1%/ 5% increments
• Light source wavelength	528 ±15 nm (green), 365 ±5 nm (during UV transmittance measurement)

• Measurement time	Display update 0.1 second ±10% (minimum time)
• Measurement method	IOA method (Infinity On Axis)
• Measurement	Continuous measurement of sphere, cylinder, axis, add, prism, and SE (contact lens mode) Measured data is saved to the memory and locked on the screen with the read button. The data is automatically unlocked by placing a new lens on the nosepiece.

Applicable Lenses	
• Lens diameter	Spectacle lenses: 20 to 120 mm in diameter Contact lenses: Larger than the inner diameter of the nosepiece (5 mm in diameter)
• Transmittance	10% or more (0.00 to ±15.00 D), 20% or more (±15.00 to ±25.00 D)
• Compensation function of high index lenses	The Abbe number is changeable in the range of 20 to 60.

Other functions	
• Lens marker	Ink cartridge type, Ink pad type
• Display	5.7 inch color full graphic TFT LCD, 640 × 480 dots (VGA), Equipped with a LED backlight
• Printer (LM-7P)	Line printer with auto cutter Paper: 58 mm in width × 25 m
• Interface ports	RS-232C: 1 port USB2.0 HOST: 1 port USB2.0 FUNC: 1 port 10/100BASE-T Ethernet: 1 port (optional) Wireless LAN (optional)

Wireless LAN (optional)	
• Standard	IEEE 802.11a/b/g/n
• Center frequency	2.4 GHz: 2412 to 2472 MHz (varies depending on the region or country) 5 GHz: 5180 to 5320 MHz, 5500 to 5700 MHz, 5745 to 5825 MHz (varies depending on the region or country)
• Effective radiated power	8.24 mW
• Modulation	OFDM with BPSK, QPSK, 16-QAM, and 64-QAM 802.11b with CCK and DSSS
• Data rates	IEEE 802.11n: 6.5 to 150 Mbps IEEE 802.11a/g: 6 to 54 Mbps IEEE 802.11b: 1 to 11 Mbps
• Access method	Infrastructure mode (client)
• Security	WPA, WPA2, WEP (64/128 bits)

Wireless LAN (optional)	
• Certification	The wireless LAN module incorporated in this device is certified in accordance with the requirements stipulated by the following regulations and organizations. Radio law (Japan), FCC (U.S.A.), Industry Canada (Canada), 2014/53/EU Radio Equipment Directive (EU) IMDA Standards (Singapore) The following labels indicate the Dealer's individual license in Singapore. 

Dimensions and mass	
• Dimensions	200 (W) × 240 (D) × 410 (H) mm
• Mass	3.7 kg (LM-7) / 4 kg (LM-7P)
• Power source	AC 100 to 240 V (±10%), 50/60 Hz Universal power supply cord is equipped (transformer is not necessary). Built-in fuse (non-replaceable)
• Power consumption	50 VA

Environmental conditions	
• Environmental conditions (during use)	Temperature: 10 to 35ºC (50 to 95ºF) Humidity: 30 to 85% Atmospheric pressure: 800 to 1,060 hPa Altitude: Up to 1,000 m above sea level Installation location: Indoors Minimal exposure to interference light, No harmful dust or smoke, No exposure to water, Free from vibration and shock
• Environmental conditions (during storage, packed condition)	Temperature: -10 to 55ºC (14 to 131°F) Humidity: 10 to 85% (non-condensing) Atmospheric pressure: 700 to 1,060 hPa
• Environmental conditions (during transport, packed condition)	Temperature: -30 to +60ºC (14 to 131°F) Humidity: 10 to 85% (non-condensing) Atmospheric pressure: 500 to 1,060 hPa
• Installation category	II (OVERVOLTAGE CATEGORY)
• Pollution degree	2 (IEC 60664)
• Expected service life (defined by manufacturer)	8 years from the date of initial operation * Proper maintenance is necessary.
• Classifications	Protection against electrical shock: Class I ME equipment Protection against harmful ingress of water or particulate matter: IPX0 Method(s) of sterilization: ME equipment that does not contain any part that needs sterilization Suitability for use in an oxygen rich environment: ME equipment that is not intended for use in an oxygen rich environment Mode of operation: Continuous operation

Standard configuration	
• Standard accessories	Power cord, dust cover, nosepiece for contact lenses, Operator's Manual, Measuring Progressive Power Lenses explanation guide, printer paper (3 rolls for LM-7P)
• Optional accessories	Ink cartridge (red) Ink cartridge (blue) Ink pad type marking unit Ink pad (red) Ink pad (blue) RS-232C communication cable (OPIF-6) USB communication cable (equipped with the dedicated USB driver) LAN board LAN communication cable WLAN module Foot switch Barcode scanner Magnetic card reader Eye Care card (1 set of 5 units)

6.2 List of Terms and Abbreviations

The following terms and abbreviations are used in reference to the device and in the Operator's Manual.

Terms	
SE	Spherical equivalent refractive power
SPH (S)	Spherical power
CYL (C)	Cylindrical power
AXIS (A)	Cylinder axis
ADD	Addition power
PRISM	Prism power (indicated with BI/O, BU/D, or Δθ)
UV	Ultraviolet
UV-A	Ultraviolet A (wavelength: 315 to 380 nm)
Reference wavelength	Mercury e-line 546.07 nm and helium d-line 587.56 nm
Abbe number	Measure for chromatic dispersion of optical glasses
Progressive power lens	Multifocal lens with addition power for near vision added to its lower portion based on distance vision dioptric power Because the dioptric power gradually changes from distance to near portions of the lens, intermediate vision correction is also available.
Eye Care card	Memory card to which data is saved Measured data is transmitted between NIDEK devices through this card.
Extended pressing	Pressing of the touch screen or read button for 1 second or more Different functions from the case of brief pressing are assigned.
Lock in	Operation of fixing measured data on the screen and saving it to the memory of the device
Auto read	When the target is aligned, measured data is automatically locked in.
Power strip	Equipment that allows multiple plugs to be connected to one receptacle

Abbreviations	
CCD	Charge Coupled Device
EMC	Electromagnetic Compatibility
IC	Integrated Circuit
LAN	Local Area Network
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LM	Lensmeter

Abbreviations	
RF	Radio Frequency
USB	Universal Serial Bus
WLAN	Wireless Local Area Network

6.3 EMC (Electromagnetic Compatibility)

The device is suitable for use in stores and hospitals except for near active HF surgical equipment and RF shielded rooms with an ME system for magnetic resonance imaging, where the intensity of electromagnetic disturbances is high, electrophysiology laboratories, or areas where short-wave therapy equipment is used.

⚠ WARNING

- Do not use the device near, on, or under other electronic equipment or electromagnetic disturbance sources. Otherwise, it could result in improper operation. If such use is necessary, the device and the other equipment should be observed to verify that they are operating normally.
- Use of accessories, cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and cause improper operation.
- Portable RF communications equipment (including peripherals such as antenna cables and external antennas) or electromagnetic disturbance sources as shown below should be used no closer than 30 cm (12 inches) to any part of the device, including the specified or provided cables. Otherwise, degradation of the performance of this equipment could result.
  The following are examples of electromagnetic disturbance sources:
  - Induction cooking appliance and ovens
  - RFID readers
  - Electronic article surveillance (EAS) systems
  - Sponge detection systems
  - Equipment used for position detection (e.g. in catheter labs)
  - Wireless power transfer charging systems for electrical vehicles

◆ Specified cable

Part name	Cable shielded	Ferrite core	Length (m)
Power cord	No	No	2.5

◆ Essential performance

- Lens power measurement function

◆ Compliance for Emission Standard

Phenomenon	Product family standard	Compliance
Conducted and radiated RF emissions	CISPR 11	Group 1 Class B
Harmonic distortion	IEC 61000-3-2	*1
Voltage fluctuations and flicker	IEC 61000-3-3	*2

* 1 For the regions where the rated voltage is 220 V to 240 V, this device complies with this standard.
* 2 For the regions where the rated voltage (line to neutral) is 220 V to 250 V, this device complies with this standard.

◆ Test specifications for enclosure port immunity to RF wireless communications equipment

Test frequency (MHz)	Band (MHz)	Service	Modulation	Immunity test level (V/m)
385	380 to 390	TETRA 400	Pulse modulation 18 Hz	27
450	430 to 470	GMRS 460, FRS 460	FM ±5 kHz deviation 1 kHz sine	28
710	704 to 787	LTE Band 13, 17	Pulse modulation 217 Hz	9
745				
780				
810	800 to 960	GSM 800/900, TETRA 800, iDEN 820, CDMA 850, LTE Band 5	Pulse modulation 18 Hz	28
870				
930				
1720	1700 to 1990	GSM 1800; CDMA 1900; GSM 1900; DECT; LTE Band 1, 3, 4, 25; UMTS	Pulse modulation 217 Hz	28
1845				
1970				
2450	2400 to 2570	Bluetooth WLAN 802.11 b/g/n RFID 2450 LTE Band 7	Pulse modulation 217 Hz	28
5240	5100 to 5800	WLAN 802.11 a/n	Pulse modulation 217 Hz	9
5500				
5785				

◆ Compliance for Immunity Standard

Phenomenon	Basic EMC standard	Immunity test levels
Electrostatic discharge	IEC 61000-4-2	±8 kV contact ±2 kV, ±4 kV, ±8 kV, ±15 kV air
Radiated RF electromagnetic field	IEC 61000-4-3	10 V/m 80 MHz - 2.7 GHz 80% AM at 1 kHz
Proximity fields from RF wireless communications equipment	IEC 61000-4-3	See “Test specifications for enclosure port immunity to RF wireless communications equipment”.
Electrical fast transients / bursts	IEC 61000-4-4	Input power port ±2 kV 100 kHz repetition frequency
		Signal input/output parts port ±1 kV 100 kHz repetition frequency
Surges Line-to-line	IEC 61000-4-5	Input power port ±0.5 kV, ±1 kV
Surges Line-to-ground		Input power port ±0.5 kV, ±1 kV, ±2 kV Signal input/output parts port ±2 kV
Conducted disturbances induced by RF fields	IEC 61000-4-6	3 V 0.15 MHz – 80 MHz 6 V in ISM and amateur radio bands between 0.15 MHz and 80 MHz 80% AM at 1 kHz
Rated power frequency magnetic fields	IEC 61000-4-8	30 A/m 50 Hz or 60 Hz
Voltage dips	IEC 61000-4-11	0% U_T; 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270°, and 315°
		0% U_T; 1 cycle and 70% U_T; 25/30 cycles Single phase: at 0°
Voltage interruptions	IEC 61000-4-11	0% U_T; 250/300 cycles