ALM 800

ESSILOR INSTRUMENTS

USER MANUAL

Contents

I. Introduction

The complete user manual is available on a web space.

To access other available languages, please scan the QR code at the end of this user manual > Chapter QR code *(p.72)*.

This devise is possible to measure the spherical power / cylindrical power / cylindrical axis / prism / PD / UV cut percentage / blue light cut (transmittance) percentage of glass lens and contact lens.

1. About this manual

Please read this manual thoroughly so that safe and effective operation is ensured.

1. The information contained in this manual is subject to change without notice.
2. While reasonable efforts have been made in the preparation of this document to ensure its accuracy, you should contact your local distributor immediately if any quarries arise due to editorial errors or omissions etc.
3. If you find any imperfect collating or missing pages, contact your local distributor for replacement.

This manual contains important contents to prevent users or others from harms and to use this device safely.

Read this manual after understanding the symbols below and follow the instructions in use.

	This manual contains the information about basic operation, inspection and maintenance etc. of ALM800

II. SAFETY CONSIDERATION

1. Symbols in this manual

⚠ Warning	This symbol indicates that mishandling as a result of failure to comply with the indications can result in "personal death" or "serious injury".
	Denotes general ban or prohibition
	General mandatory action
	Additional information which is important to the text or useful/ convenient to know
	Number on the left is the lower limit and the one on the right is the upper limit of the temperature
	Number on the left is the lower limit and the one on the right is the upper limit of the humidity
	Avoid direct sunlight
	Manufacturer
	Symbol for Compliant with CE marking i.e. with applicable European directives
	Special collection for this type of electrical and electronic device

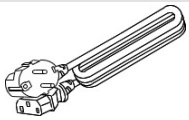
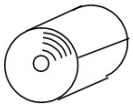
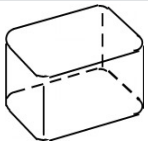
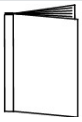
2. General cautions

- It affects its measurement accuracy if fingerprints or dust etc. are on the optical parts, such as glass parts under the lens stand. Do not touch them with hands and avoid dust.
- If fingerprints or dust are adhered on the optical parts, such as lens, wipe it gently with a soft cloth.
- The device is not intended to be used in conjonction with oxygen rich environment.
- Never attempt to modify or disassemble this product yourself. It can result in malfunction or fire.
- In case of disposal, comply with the regulations and recycle plan of the local government. Inappropriate disposal causes a negative effect on environment.

	No dew condensation

- Avoid installation near TV or radio. The reception can be disturbed by electrical noise.
- If liquid is spilled on this device or a foreign substance is entered in it, unplug the power cord and contact your local distributor.
- Cut the power immediately and contact your local distributor if malfunction (noise, smoke etc.) occurs. It can result in fire or injury if you keep using it.
- If malfunction occurs, do not touch the inside of this device. Unplug the power cord and contact your local distributor.
- No contraindication.

III. ACCESSORIES

	Power cord: 1 (2.5m)
	Printer paper: 1 (Width: 58mm)
	Contact lens: 1
	Dust cover: 1
	Operation manual: 1

	Use only the accessories specified by us.

	Avoid direct sunlight, high-temperature and humidity when storing the printer paper because it is a thermal paper.

IV. Device

1. General description of product

This device aims to take the measurements of SPH, CYL, AXIS, prism refractive power and optical axis coordinate of unprocessed lens, processed eyeglass lens and contact lens, and to put dots on them to find its axis.

It also performs automatic discrimination of progressive lens, pupillary distance (PD) measurement of glass lens, UV cut percentage measurement, blue light which harmful to eyes cut percentage measurement, blue light transmittance measurement which necessary to adjust the circadian rhythm.

Refer to [Instructions for use] about the operating precautions of this device.

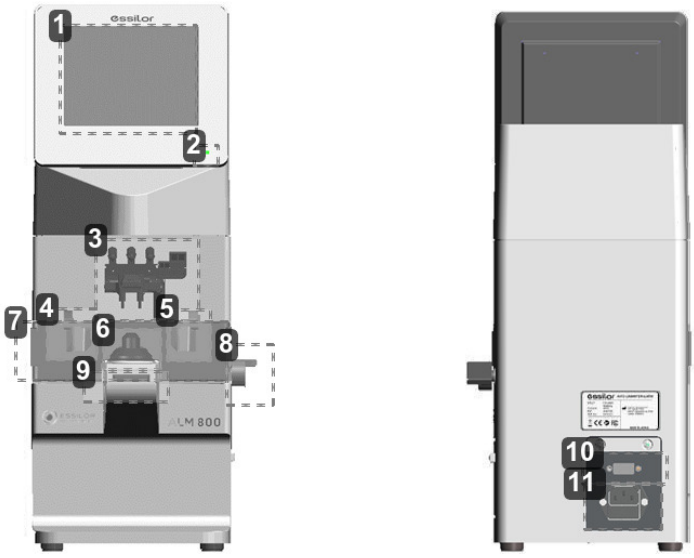
The interval from -5D to + 4D covers 97% of the glasses used.

Performance is optimized for use in a room lit between 300 to 1000 Lux.

The performances of the BV (Blue Violet) and CB (Circadian Blue) measurements are:

- Repeatability: <1% (for -5D to + 4D, or 97% of the lenses)
- Reproducibility: <3% (for -5D to + 4D, or 97% of the lenses)
- Precision: < 5% (flat lenses)
- Precision: <7% (for -5D to + 4D, i.e. 97% of lenses)

2. Parts identification



1. *LCD (with touch panel)*
   - Color LCD with 640 X 480 dots.
   - User-friendly LCD which is adjustable vertically within operating range (60°).
   - Touch panel is adopted.
2. *Pilot lamp*

   Lamp to indicate ON (light on)/ OFF (light off) and power saving mode (blink).
3. *Marking lever & Lens holder*

   The marking lever and lens holder are integrated.
   - Marking lever: puts the dots by pressing the lever down.
   - Lens holder: fixes the eyeglass glass on the lens stand by moving the lever up and down.
4. *Nose pad (x2)*

   Used for measuring PD of the eyeglass lens.

   Set the eyeglass lens so as that the nose pad is placed on it. The judgment of right and left and PD measurement are performed based on the position of the nose pad.

5. *Nose pad*
6. *Lens stand*

   Take a measurement by placing the eyeglass lens on the lens stand.
7. *Lens plate*

   The plate to be reference of the cylindrical axis and specified direction of the prism.

   For the eyeglass lens, take a measurement so as that the lens frame contacts with the lens plate.
8. *Lens plate lever*

   Moves the lens plate back and forth.
9. *Memory/Add switch*

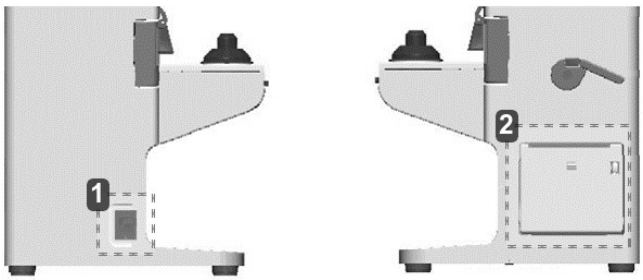
   The switch to store the measurement values on the measurement screen of single focus lens, multifocal lens and contact lens.

   Freezes the display of the measurement values and store them.

   The switch to execute the near and far points in case of manual measurement on the progressive lens measurement screen
10. *Communication connector*

    The communication connector to transfer the measurement data to the other devices and computers.
11. *Power inlet*

    The inlet to connect the power cord supplied to supply power.



1. *Power supply switch*

   The switch to turn on/ off the power of the device.
2. *Printer*

   Prints out the measurement values.

V. Instructions for use

1. Installation

1. Do not expose the device to sunlight or bright light from lighting equipments.

NOTE	Take extra caution to avoid strong light because it may cause the failure of measurement.

2. Do not install the device in places where either dust or rubbish may accumulate.

Also, the environments with extremes in heat and humidity should be avoided.

In case of using the device, ensure to comply with the environmental conditions of unpacking and usage before starting a measurement.

	Temperature	Humidity	Atmospheric pressure
Use	[5°C ; 40°C]	[30% ; 95%]	[50 kPa ; 106 kPa]
Storage	[-10°C ; 55°C]	[10% ; 95%]	[50 kPa ; 106 kPa]
Transport	[-40°C ; 70°C]	[10% ; 95%]	[50 kPa ; 106 kPa]

3. Keep away from inflammable or explosive gases as well as storage area of the medical supplies and chemicals.

4. Keep away from the sites that experience strong vibrations or sudden shocks.

5. The device might be broken if it falls down. Also, it might cause injury if dropping it. Therefore, do not store it at an unstable place or in high, 'out of reach' place.

6. Keep this device away from water (liquid).

Degree of protection: IP20

2. Connection / Wiring

1. The earth cable of the power code should be connected to the earth terminal.
2. Avoid damaging the power cord (such as bending it in an extremely small size, pulling, placing a heavy object on it etc.). Also, do not fabricate the cord.
3. When the power cord is damaged, (breaks, damage of cover etc.), replace it to the new one. Fire or electric shock may occur if you keep using it.
4. Insert the power cord firmly into the outlet and device. If not, fire or electric shock may occur.
5. Keep the power cord clean without any dust or oil etc. on it. The dirty terminal may cause malfunction or fire.
6. When the power cord gets hot after use, check for the dirt of the terminal unit. If you find no dirt, replace the power cord to the new one. Fire or electric shock may occur if you keep using it.
7. Use it with the correct power-supply voltage. Fire or electric shock may occur if using it with more than the rated supply voltage.
8. Always hold the plug when plugging or unplugging the power cord.
9. Do not touch the plug with wet hands. You may get an electric shock.
10. If the device is not used for a long time, unplug the power cord from the outlet.

3. Maintenance / Inspection

1. This is the precision optical device. Make sure not to mishandle or drop it.

2. Do not touch or allow dust to adhere on the optical parts (i.e. lenses), as the measurement accuracy could be adversely affected by fingerprints and dust etc.

	When fingerprints or dust are adhered onto the optical parts, gently wipe them with the accompanying dust cloth or a soft cloth. In this instance, make sure not to scratch them.

3. If the main unit cover or operation panel is dirty, gently wipe it with a dry cloth. For hard to remove stains, a damp cloth or neutral cleanser is recommended.

	Avoid using organic solvent such as thinner which may damage the water based paint finish or device.

4. If the device is not used for any length of time, unplug the power cord.

5. When the device is not in use, protect it with the accompanying dustproof cover. The measurement accuracy could be affected by dust.

6. Never attempt to fix or remodel the device. When the device fails to function properly, do not touch the inside. Contact us or your local distributor.

4. Disposal

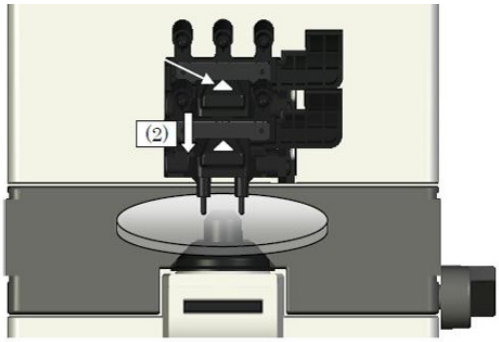
In case of disposal, comply with the regulations and recycle plan of the local government.

Inappropriate disposal causes a negative effect on environment.

VI. Operating instructions of device

1. Lens holder

1. Raise the lever to the operational direction until it is unlocked.
2. Lower the lens holder slowly and fix the lens.

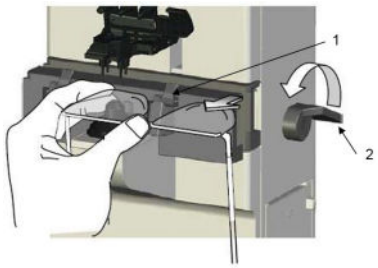


	Do not give strong impact to a lens when lowering the lens holder. When rising the lens holder, make sure to move to the top.

2. Lens plate

The lens plate is the reference of the cylindrical axis.

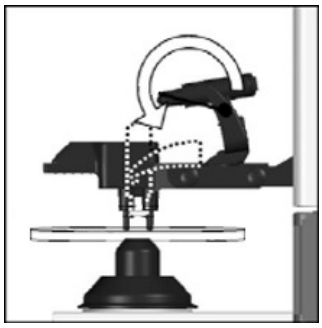
Place the eyeglass lens and rotate the lens plate lever to the direction of the arrow so that the bottom of the lens touches the lens plate. After that, lower the lens holder and fix the lens.



1. Lens plate
2. Lens plate lever

3. Marking lever

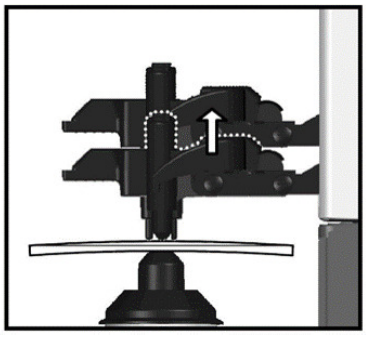
1. Turn and lower the marking lever.



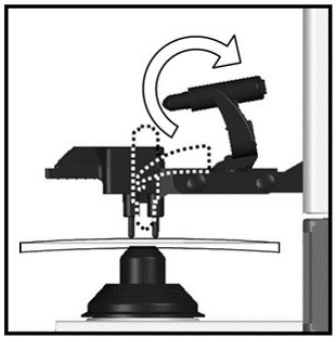
2 Place the tips of the marking pens on the lens surface softly.

⃠	Do not mark several times at the same point. The marking pen may be worn out quickly.

3 Release the finger after marking.



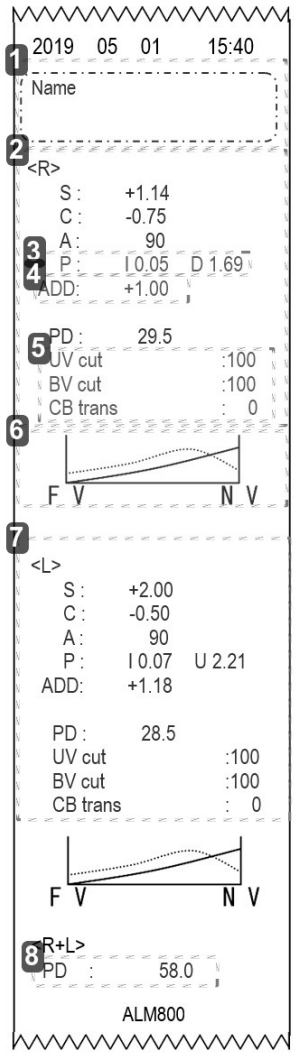
4 The marking lever returns to the initial position.



⃠	Avoid the followings since they may damage the tips of the marking pens. ◦ Perform marking roughly ◦ Operate the marking lever without a lens set ◦ Touch a tip of the marking pen during cleaning

4. Printer

The measurement values can be printed out by touching  after taking a measurements.



1. *Name*

   Distributor's name, comment etc. (printed out only when ID is set)

   Number of characters input: 44 characters (22 characters X 2 lines)

2. *<R>*

   Measurement value of right lens

3. *[P]*

   The unit of the prism value is different according to the setting.

4. *[Add]*

   Add measurement values are displayed only at the time of measurements of multifocal lens and progressive lens.

   (Left: ADD1, Right: ADD2)

5. *[UV] & [BV] cut & [CB] trans*
   - [UV] cut percentage
   - [BV] cut percentage
   - [CB] transmittance

6. *Graph*

   When the assessment graph is printed.

   [Graph Print] is set as [On] at the time of progressive lens measurement

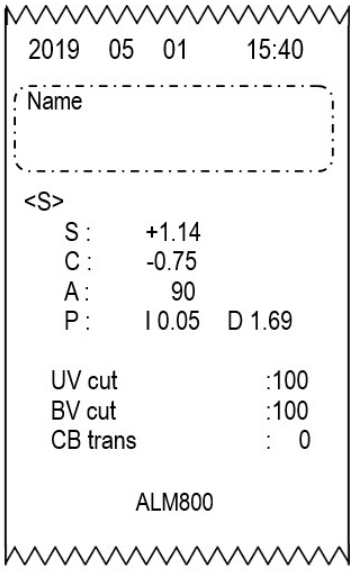
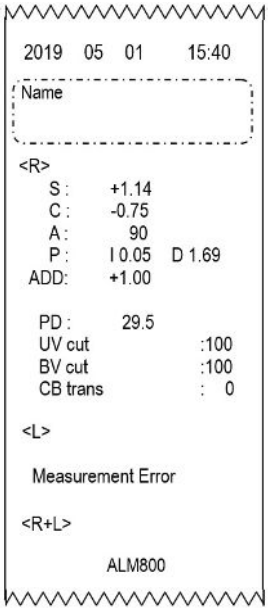
7. *<L>*

   Shown the measurement value of the left lens

(Same as that for a right lens)

8. *PD*

PD of right eye and left eye

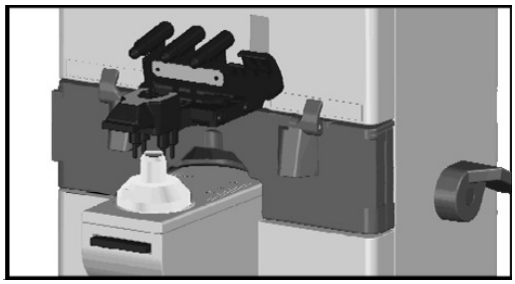
Printout sample when unprocessed lens is measured	Printout sample in case of measurement error
	 [Measurement error]. Other error can be displayed: • SPH Over • CYL Over • Prism Over

VII. BEFORE MEASUREMENT

1. Check up before measurement

1 Verify that:
- The lens holder is set properly.
- The lens under the lens stand is clean.

> In case that the lens is dirty, clean it with a soft cloth.



2 Plug the power cord to the outlet.

❗	Always connect the earth terminal to a ground.

3 Set the printer paper in the printer.

4 Confirm that the lens is not placed on the lens stand.

5 Turn on the power switch.

> The following screen appears:

1. *S*
   Spherical degree
2. *C*
   Cylindrical degree
3. *A*
   Cylindrical axis
4. *P*
   Prism value
5. *B*
   Basal angle
6. *Cross cursor*

7. *Measurement value display area*

2. Description of measurement screen

The display of the measurement screen reflects the setting and condition of the device. The touch panel is adopted. They are corresponding to the icons on the monitor.

1. *Type of lens*
   - Left
   - Right
   - Single
2. *Measurement setting*
3. *AXIS mark*
4. *Cross cursor*
5. *Display of alignment condition or error message*
6. *Clear*

   Deletes measurement values stored in memory.
7. *Unprocessed lens/ eyeglass lens selection switch*
8. *Switch of measurement*
9. *Device setting*

   Switch to the [Setup] (device setting) screen.
10. *Measurement value output*

Explanation about switches - Upper of monitor:

Name of icon	Icon	Description of function
Lens switching		It is display the left or right lens to be measured.
Astigmatism sign switching		It is switching the sign of astigmatism (-, +, ±).
Step of measurement value display switching		It is switching the step of measurement value display (0.25, 0.12, 0.01).
UV /BV /CB /Hard contact lens /Soft contact lens /measurement		It is display the [UV/BV] cut percentage measurement mode, [CB] transmittance measurement mode and Hard/Soft contact lens measurement mode. The details of [UV/BV] cut percentage and [CB] transmittance measurement are

		mentioned [Measurement of ultraviolet (UV) and blue light cut percentage /transmittance]. The details of Hard/Soft contact lens measurement mode are mentioned [Measurement of contact lens].

Explanation about switches - Bottom of monitor:

Name of icon	Icon		Description of function
Clear			Deletes measurement values stored in memory.
Unprocessed lens/ eyeglass lens selection switch	Lab mode	ECP mode	
			Switch the left or right lens of unprocessed or eyeglass lens. Details of this function, refer to [Lab/ECP mode].
Switch of measurement			Switches to multifocal lens measurement from single focus lens.
Device setting			Switch to the [Setup] (device setting) screen.
Measurement value output			Prints out measurement result, outputs data from RS232C or both.
Lens stand unit: 1			
Memory/Add switch	No icon		Stores measurement values in memory and take a measurement of ADD.

3. Preparation for measurement

a. Device setting

This device is ready for use with the standard mode but the setting can be changed easily as needed.
Switch to the [Setup] (setup of device) screen by touching  at the bottom of screen.

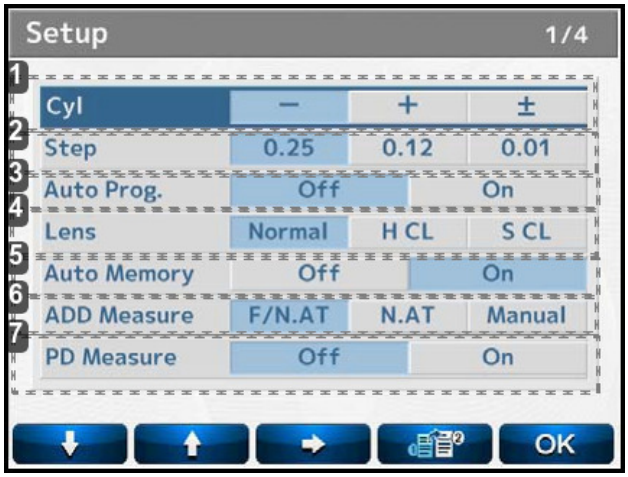
Change of switch function

The functions of each switch are changed on the menu screen.
The icons are displayed on the screen. Touch the icon in accordance with the display.

Icon	Action
	Moves the cursor downward at each setting item
	Moves the cursor upward at each setting item
	Goes to a further page of [Setup] 
	Selects the item of each setting item. The selection cursor moves vertically.
	Switches back to the measurement screen.

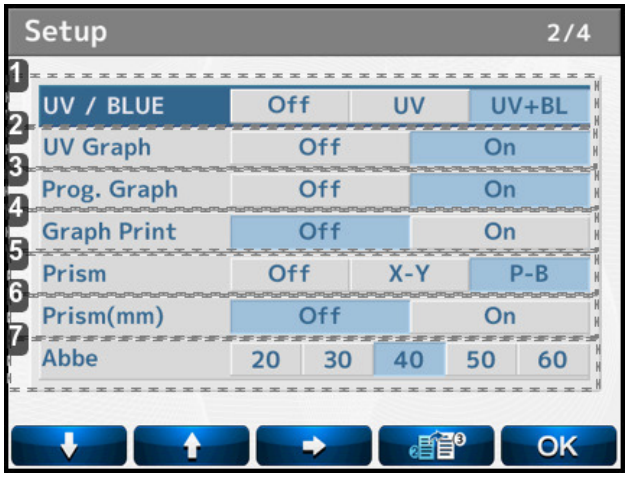
b. [Setup] screen

[Setup] screen - Page 1/4



1. *[Cyl]*
   Selects sign for Cyl:
   - -
   - +
   - ±
2. *[Step]*
   Selects step to display measurement value:
   - 0.25
   - 0.12
   - 0.01
3. *[Auto Prog.]*
   Sets auto detection of progressive lens:
   - [Off]
   - [On]
4. *[Lens]*
   Selects lens to be measured:
   - [Normal]: Eyeglass lens
   - [H CL]: Hard contact lens
   - [S CL]: Soft contact lens
5. *[Auto Memory]*
   Sets auto memory at the time of [Marking OK]:
   - [Off]
   - [On]
6. *[Add Measure]*
   Selects auto/ manual memory of far and near points:
   - [F/N.AT]: Stores both near and far points automatically
   - [N.AT]: Stores only near point automatically
   - [Manual]: Stores data manually
7. *[PD Measure]*
   Selects if performing PD measurement or not:
   - [Off]: Not perform
   - [On]: Perform

[Setup] screen - Page 2/4



1. *[UV / Blue]*

   Selects [UV] cut percentage or [BV] cut percentage and [CB] transmittance measurement
   - [Off]: No measurement
   - [UV]: Only [UV] cut measurement
   - [UV+BL]: [UV] and [BV] cut percentage, [CB] transmittance measurement.
2. *[UV Graph]*

   Selects if displaying [UV] transmission graph or not (displayed only on the progressive lens measurement screen):
   - [Off]: Not perform
   - [On]: Perform
3. *[Prog. Graph]*

   Selects if displaying the assessment graph or not:
   - [Off]: Not display
   - [On]: Display
4. *[Graph Print]*

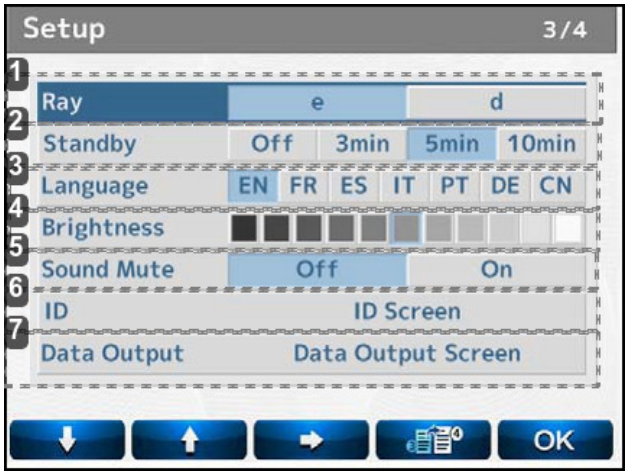
   Selects if printing out the assessment graph after measuring progressive lens:
   - [Off]: Not print out
   - [On]: Print out
5. *[Prism]*

   Selects if displaying prism or not, and selects the unit to be displayed:
   - [Off]: Not display
   - [X-Y], [X-Y] display
   - [P-B]: Prism value – base direction
6. *[Prism (mm)]*

   Select if displaying prism value of X-Y direction in mm:
   - [Off]: Not display
   - [On]: Display
7. *[Abbe]*

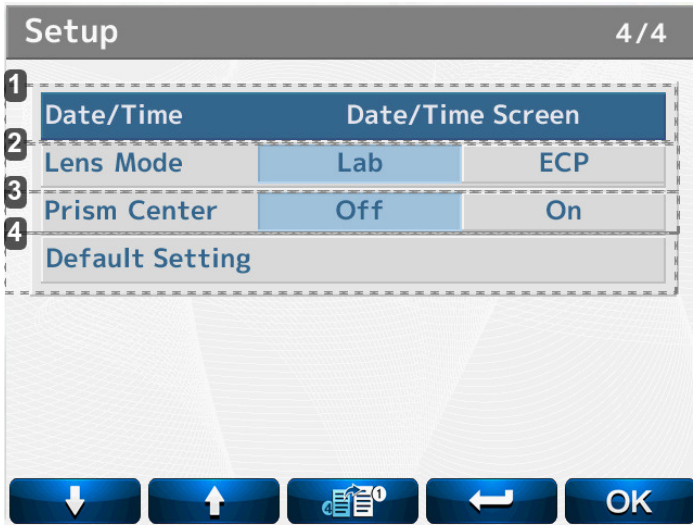
   Selects [Abbe] number:
   - 20
   - 30
   - 40
   - 50
   - 60

[Setup] screen - Page 3/4



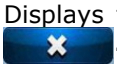
1. *[Ray]*
   Selects measurement wavelength:
   - e-line
   - d-line
2. *[Stanby]*
   Selects time to activate standby mode:
   - Off
   - 3 min
   - 5 min
   - 10 min
3. *[Language]*
   Selects language displayed on screen:
   - English
   - French
   - Spanish
   - Italian
   - Portuguese
   - German
   - Chinese
4. *[Brightness]*
   Sets brightness of screen (50% to 100%)
5. *[Sound Mute]*
   Sets [On/ Off] of buzzer at the time of operating switches
6. *[ID]*
   Switches to [ID] screen
7. *[Data Output]*
   Switches to [Data Output screen]

[Setup] screen - Page 4/4



1. *[Date/Time]*
   Switches to [Date/Time] screen
2. *[Lens mode]*
   Selects the lens measurement mode:
   - [Lab]: Switching the lens which is selected single lens→ eyeglass right lens→ eyeglass left lens
   - [ECP]: Switching the lens which is selected eyeglass right lens → eyeglass left lens

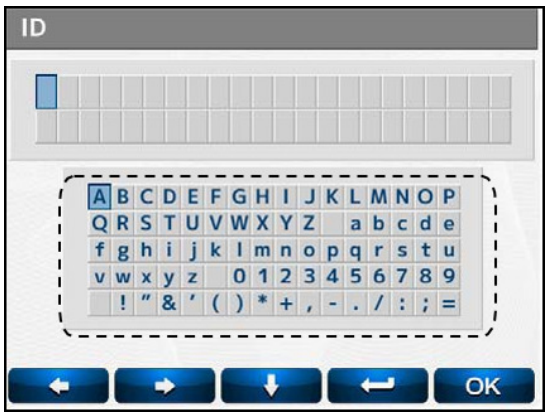
   Refer to [Lab/ECP mode].
3. *[Prism center]*
   Selects the Prism center measurement:
   - [Off]
   - [On]

   Refer to [Prism center screen].
4. *[Default Setting]*
   Displays thesetup items changed from default and changes the setting back to the default by pressing  .

c. [ID] screen

This screen is to create the data for printing out the distributor's name or message on the printout.

1 Select [ID] screen.



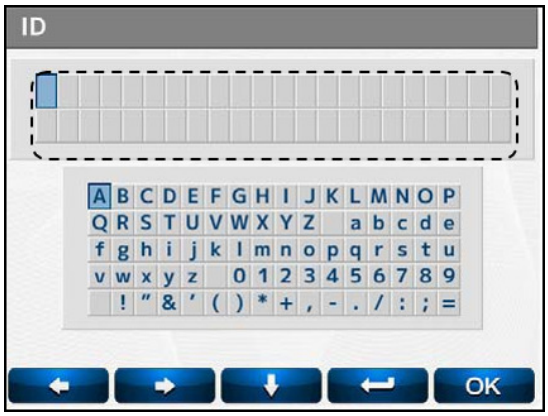
2 Select the characters with [←] [→] [↓] and enter them with [↵].

> Any changes made will overwrite the original characters.

> The cursor in [ ] moves by pressing the arrows.

> The maximum number of characters is 44 (22 characters X 2 lines).

3 In case of changing the characters, move the cursor to the one changed by pressing [←] [→] [↓] with holding the Memory/Add switch.



4 Return to [ID] screen and select the character to be input with [←] [→] [↓] and enter them with [↵].

> The cursor in [ ] moves while the Memory/ADD switch is held

How to delete

1 In case of deleting the characters, move the cursor to the one deleted with [←] [→] [↓].

2 Then, press [✖].

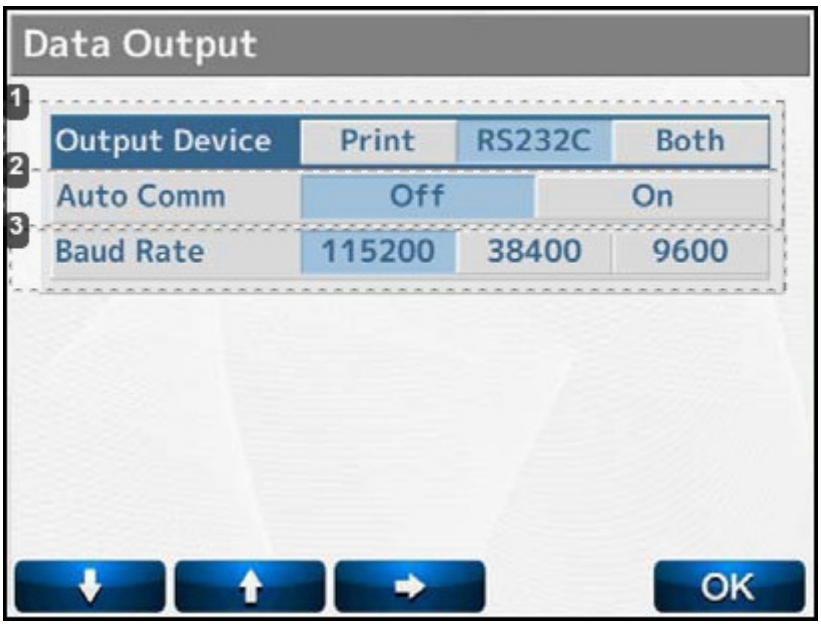
It is possible to select and enter the characters with touching directly.

d. [Data Output] screen

This screen is to set the communication parameter for outputting the measurement values to the externally connected PC etc.

The measurement values and data created on the [ID] screen are output by selecting [RS232C] or [Both] of [Data Output] on the [Setup] screen.

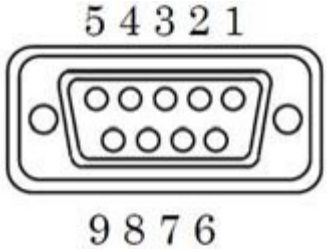
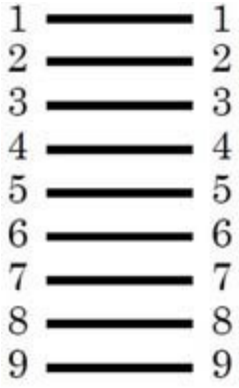
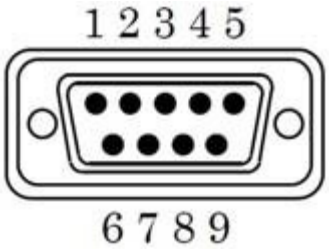
NOTE	The output content is same with the one of the printout. However, the graph at the time of progressive lens measurement is not output.



1. *[Output Device]*
   - [Print]: Device printer
   - [RS232C]: RS232C terminal
   - [Both]: Both
2. *[Auto Comm]*
   - [Off]: Output by touching the measurement screen output icon
   - [On]: Measurement values are output continuously
3. *[Baud Rate]*

   Communication speed, select from:
   - 115200
   - 38400
   - 9600

NOTE	In case of output from RS232C, the data is output only in english regardless of language setting.

D-Sub: 9Pin (male) - Lensmeter	Connection	D-Sub: 9Pin (female) - PC
		

Use the straight cable (D-sub 9 pin: male/ D-sub 9: female) as the connection cable at the time of outputting the measurement values by using the RS232C.

Contact your local distributor if you have anything unclear or any questions regarding operation and connection.

NOTE	Use a shield wire for a connecting cable to protect the output data from noise.

e. [Date/Time] screen

The screen to set the date and time for printout and communication output.

Select the item to be changed with  and set the detail with  :

- [YMD]: Year, Month, Day
- [DMY]: Day, Month, Year
- [MDY]: Month, Day, Year

The setting can be also changed by touching the screen.

Change of date

Select [Date] with  .

Move the cursor to the item to be changed with  .

While the Memory/Add switch is held, the screen above is displayed. Make changes with  and 
.

Change of time

Select [Time] with  .

Move the cursor to the item to be changed with  .

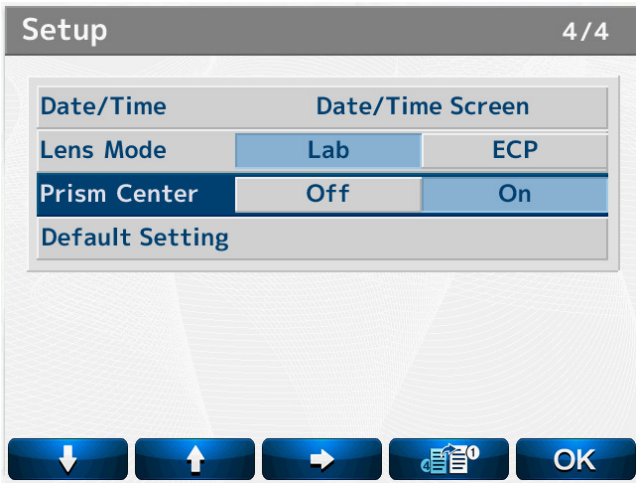
While the Memory/Add switch is held, the screen above is displayed. Make changes with  and 

.

f. [Prism center] screen

This function performs the prism center measurement setting.

- If set the [On], the prism center measurement is performed.
- If set the [Off], the prism center measurement is not performed.



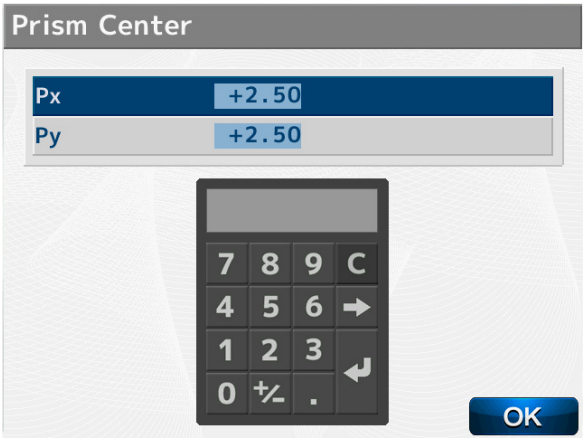
NOTE	When you select [On] at the [Prism center], the following measurement screens are displayed.

When entering X-Y coordinate	When entering polar coordinate
When [X-Y] is selected for [Prism] on the [Setup] screen	When [P-B] is selected for [Prism]" on the [Setup] screen
	

It is displayed the screen for entering the prism prescription value by touch the [ ] area.

Prism prescription value input screen (XY coordinate)

First, touch the axis for entering at the prism input value screen.

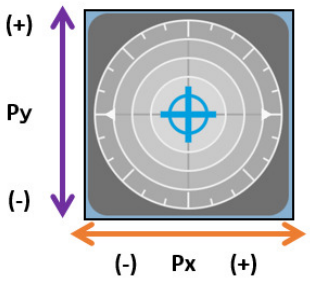


Next, enter the prism value to ten-key which is displayed and touch the enter key ↵.

After entering the value, touch OK to return to measurement screen.

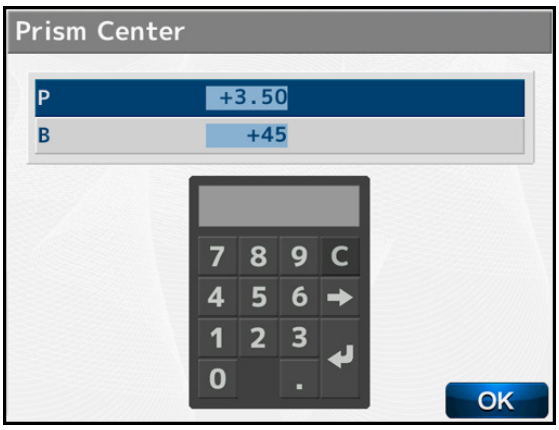
> The cross cursor is displayed at the entered prism prescription value.

> The crosshair cursor moves as follows according to the entered prism value.



Prism prescription value input screen (Polar coordinate)

First, touch the axis for entering at the prism input value screen.



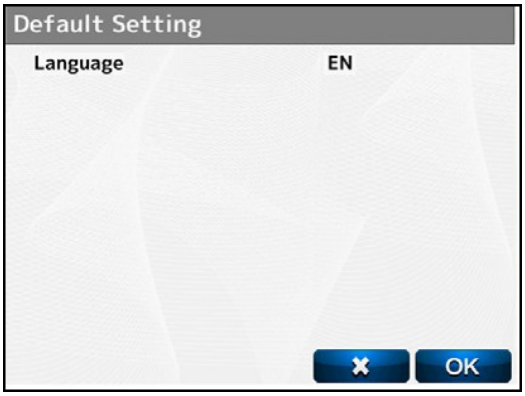
Next, enter the prism value to ten-key which is displayed and touch the enter key .

After entering the value, touch OK to return to measurement screen.

> The cross cursor is displayed at the entered prism prescription value.

g. [Default Setting] screen

The screen to change the setting of the device back to the default.



Press:

-  if you want to change the setting back to the default.
-  if you do not want to change the setting back to the default.

  It goes back to the measurement screen by selecting it.

VIII. Measurement

1. Measurement of single lens

NOTE	Make sure that the [Lens Mode] setting on the [Setup] screen is set to [Lab].

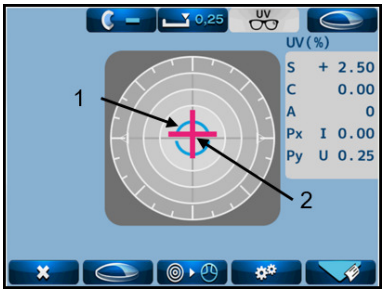
1 Place the lens on the lens stand.

Lower the lens holder softly on the lens.

> The following screen appears:

	Do not give strong impact to a lens when lowering the lens holder. When rising the lens holder, make sure that it is moved to the top and locked.

2 Bring the cross cursor to the alignment mark by moving the lens. The message [Alignment OK] appears on the screen when alignment completes. If the lens is the cylindrical one, rotate the lens to fit the axis direction.



1. Alignment mark
2. Cross cursor

NOTE	The alignment mark represents the optical center of the lensmeter and the cross cursor represents the optical center of the lens.

3 Move the lens until the alignment mark and cross cursor overlap. When they overlap, the message [Marking OK] appears to indicate that the marking is ready to be carried out.

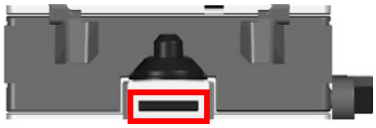
S, C, A and prism value are stored by pressing the Memory/Add switch.

> The color of the measurement value area is reversed, and the values are fixed.

In case of setting [Auto Memory] on the Setup screen as [On], the measurement values are stored in memory automatically after the message [Marking OK] appears.

In case of deleting the data stored in memory, touch  .

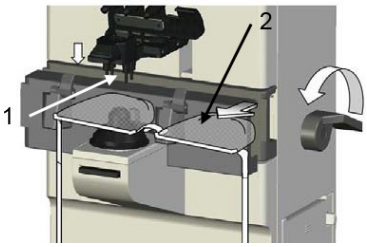
In case of printing it out, touch  .

	Memory /Add switch

2. Measurement of eyeglass lens

1 Place the eyeglass lens on the lens stand and lower the lens holder softly on the lens.

Move the lens plate to the near side with the lens plate lever so that the bottom of the lens touches the lens plate.



1. Lens holder
2. Lens plate

2 Specify the right or left of the eyeglass lens by touching  .

> The icon in the upper right corner of the screen switches to  .

3 Perform alignment so as that the bottom of the eyeglass lens always touches the lens plate in a manner similar to the single lens.

4 Save the measurement values in memory by pressing the Memory/Add switch after measurement.

> The color of the measurement value area is changed, and the measurement values are fixed.

NOTE	In case of setting [Auto Memory] on the [Setup] screen as [On], the measurement values are automatically stored in memory after the message [Marking OK] appears.

5 Switch the lens from right to left and place the lens in a manner similar to (1).

Switch the measurement to the left lens by touching 

> At this time, the measurement values of the right lens remain on the screen.

In case of measuring PD with the setting of PD Measure [On], the right eye and left eye are switched automatically.

NOTE	The measurement of the lens can be started from either right or left. In case that the measurement values of both right and left are stored, the values on the selected side are deleted by touching  .

3. Pupillary distance [PD] measurement

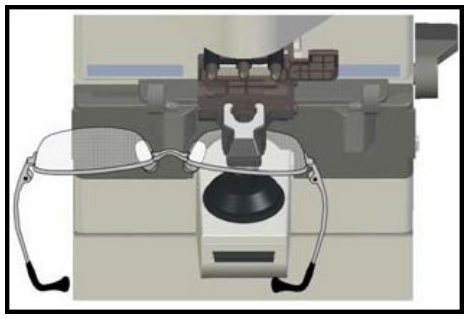
a. Device setting

On the [Setup] screen, confirm that [PD Measure] is set as [On], and the lens measurement is set for both of right and left lens.

In case that [PD Measure] is [Off], the PD measurement value and measurement area are not displayed.

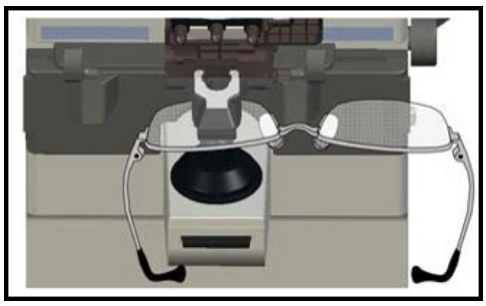
b. Measurement procedure (Right lens > Left lens)

1. Pull the lens plate toward the examiner.
2. Place the eyeglass lens so as that the bottom of the frame contacts with the lens plate with the frame contacting with the left nose pad.
3. Place the right lens on the lens stand and hold it with the lens holder softly.



4. Achieve an alignment by moving the right lens back and forth, and right and left with the frame always contacting with the lens plate.

   Store the measurement values and PD measurement values of the right lens by pressing the Memory/ Add switch after completing alignment.
5. After the measurement of right lens, place the left lens on the lens stand with the frame contacting with the right nose pad, and hold the lens with the lens holder softly.



   At this time, it is switched from right lens to left lens automatically based on the position of the nose pad.
6. In a manner similar to (4), achieve an alignment of the left lens. After completing alignment, store the measurement value of the right lens and PD measurement values by pressing the Memory/ Add switch.

NOTE	In case that [Auto Memory] on the [Setup] screen is set as [On], the measurement values are stored automatically after the message [Marking OK] is displayed.

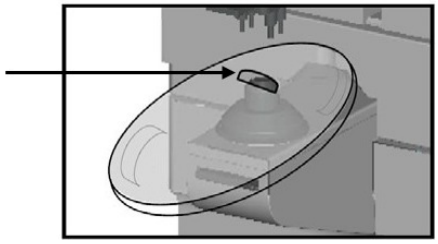
1. Left PD measurement value
2. Right and left PD measurement values
3. Right PD measurement value

4. Measurement of multifocal lens

1 Place the lens on the lens stand and hold it with the lens holder softly.

2 Take a measurement of far point, and press the Memory/ Add switch.
SPH, CYL, AX and prism values are stored.
> The measurement result stored is fixed, and color of the measurement value display area changes.
[Ad1] is added by pressing the Memory/ Add switch one more time.

3 Perform the measurement of near point after confirming that "Ad1" is displayed.
Move the lens so as that the near point (near-sight segment) comes to the center of the lens stand.



NOTE	A measurement can be taken even if the messages of [Alignment OK] and [Marking OK] are not displayed.

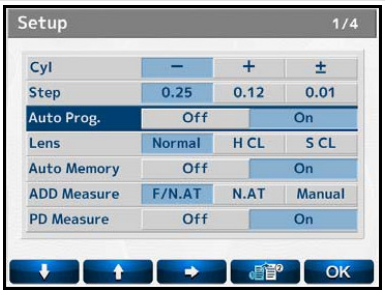
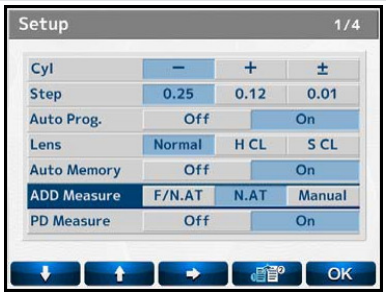
4 Store the ADD value of the near point (near-sight segment) in memory by pressing the Memory/Add switch. The color of the Add value is reversed after storing it.

In case of trifocal lens, display "Ad2" by pressing the Memory/Add switch one more time. After that, repeat (3) and (4) after bringing the second near point (near-sight segment) to the center of the lens stand.

5. Measurement of progressive lens

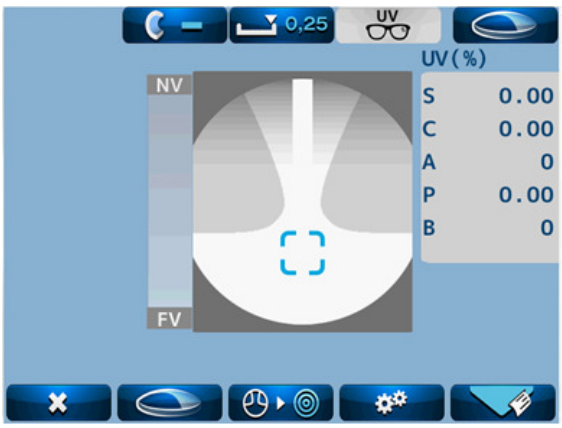
1 Take a measurement of progressive lens.

2 Set [Auto Prog.] and [ADD Measure].

[Auto Prog.]	[ADD Measure]
	
◦ [Off]: No auto judgment for a progressive lens ◦ [On]: Auto judgment for a progressive lens	◦ [F/N.AT]: Auto memory of far and near points ◦ [N.AT]: Auto memory of near point ◦ [Manual]: Manual memory of far and near points

3 Switching to progressive lens measurement screen.

> The icon is changed to  , and the progressive lens measurement screen is displayed by pressing  (single/ progressive lens selection switch).



NOTE	In case that [Auto Prog] is set as [On], the lens is automatically judged whether the lens is a progressive lens or not. Set the lens in the center region of the progressive zone. It starts the auto judgment of the progressive lens. When the lens is identified as a progressive lens, the screen is switched to the progressive lens measurement screen. If not, the measurement screen remains as the single focus lens measurement screen. When the ADD value is small (less than 1D), the auto detection may not be performed. Also, if the progressive zone cannot be found at where the lens is set, the auto detection may not be performed. In these cases, move the lens back and forth, and right and left slowly. When the ADD value is small (less than 1D), the eyeglass lens is small, or the lens is dirty or has some flaws, the far point and near point may not be detected automatically. In such case, take a measurement manually.

4 Measuring procedure of progressive lens (when N.AT is selected for ADD Measure).

Detection of progressive zone.

First, find the progressive zone by moving the lens back and forth, and right and left slowly.

The cross cursor (screen shown below) appears when the progressive zone is found.

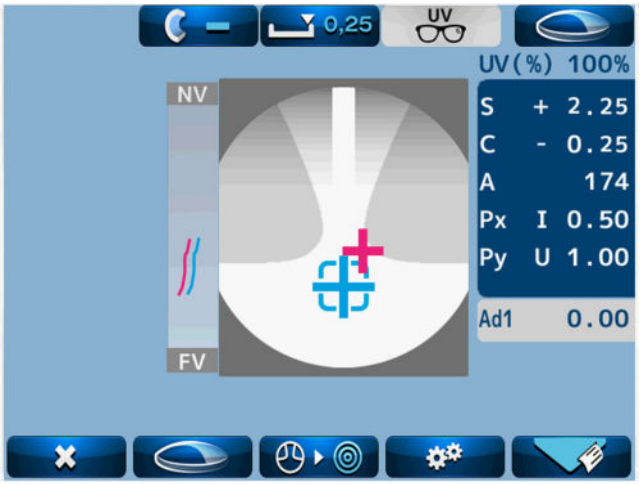
NOTE	Press the Memory/Add switch in case that the progressive zone cannot be detected because ADD value is small etc. It switches to the measurement screen of the far point.

5 Measurement of far point.

Take a measurement of far point. Move the lens toward the device so as that the center of the alignment mark overlaps with the cross cursor.

The color of the cross cursor is changed to blue by pressing the Memory/Add switch after they overlaps.

At this time, the measurement values of the far point are stored.

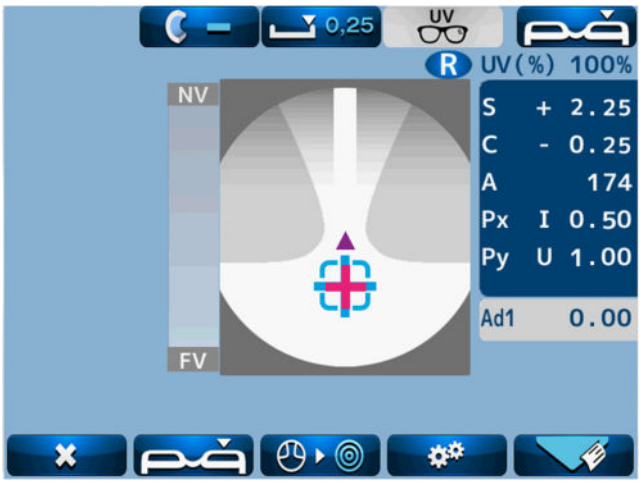


NOTE	When (ADD Measure] on the [Setup] screen is set as [F/N.AT], it is detected automatically and the measurement values are stored in memory.

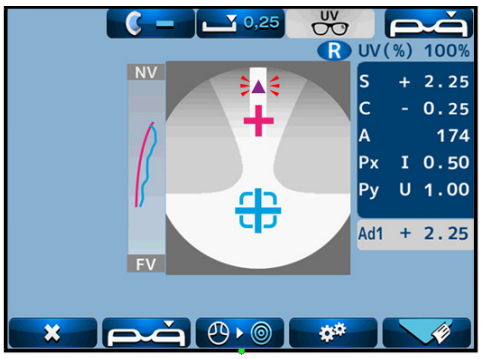
6 Measurement of near point.

Take a measurement of near point. As shown on the right, move the lens slowly to move the cross cursor (red) according to ▲.

If it goes out of the progressive zone, the cross cursor moves right or left. If it goes out of the progressive zone, bring it back to the zone and move the lens toward near point.



NOTE	The cross cursor on the screen indicates the actual measurement position on the lens. For example, if it goes to the right side of the lens which is out of the progressive zone at the time of moving from far point to near point, the cross cursor is displayed on the right deviated from the progressive zone.



7 Perform the alignment carefully when it comes closer to the near point and ▲ starts blinking.

Once the near point is detected, it blips. The cross cursor is fixed at the near point and its color changes to blue. When the near point is attained, the ADD value is stored in memory automatically.

NOTE	Measurement can be started from either right or left lens.

8 Display of ADD value and assessment graph, and manual operation (when [Manual] of [ADD Measure] is selected).

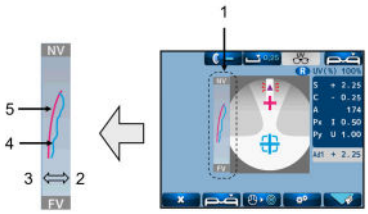
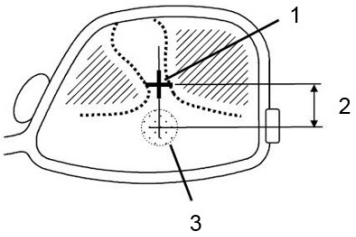
When setting [Prog. Graph] as [On] on the [Setup] screen, the graph is displayed on the progress lens measurement screen.

Depending on the type of lens, it may be difficult to detect each point automatically even though normally the near and far points are detected automatically. In such case, take a measurement manually by reference to the ADD value and assessment graph.

To take a measurement of far point manually, carry out the alignment in the same manner as the auto measurement.

For the measurement of near point, press the Memory/Add switch where the ADD value is the highest while the alignment cursor stays in the progressive area.

The near point is where the assessment line moves closer to the Y coordinate. Therefore, carry out alignment by reference to the shape of the graph and blinking of ▲.

	1. Graph 2. High 3. Low 4. Assessment graph (blue line) 5. ADD value transition graph (red line)
	1. Near the center of lens 2. Approx. 5 to 10 mm 3. Far point

6. Measurement of ultraviolet [UV] transmission and blue light cut percentage /transmittance

It is possible to measure the [UV] cut and blue light cut percentage /transmittance of lens and possible to check the [UV] and blue light function.

Measuring beam of [UV] cut percentage measurement is 375 nm, blue light cut percentage measurement is 425 nm, blue light transmittance is 470 nm.

It does not measure the cut percentage / transmittance of the entire UV and blue light.

a. Device setting

Before [UV] cut percentage measurement, please make sure what [UV / BLUE] is set to [UV] in the [Setup] screen.

- If [UV / BLUE] is set to [Off], [UV] cut percentage and [UV] cut percentage display area are not displayed.
- If you want to display the [UV] cut percentage graph, set [UV Graph] to [On].

The graph display shows only the progressive lens measurement mode.

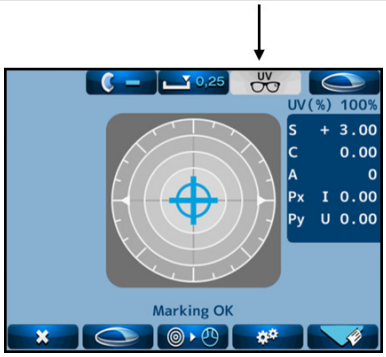
b. [UV] cut measurement after measuring degree

The [UV] cut percentage measurement is performed after achieving an alignment of the lens and pressing the [Memory/Add switch] to store the measurement values.

NOTE	At the time of progressive lens measurement, the [UV] cut percentage measurement is performed after taking a measurement of far point.

In case of taking a measurement again, clear the measurement values first by touching  .

The values are cleared in order of degree of lens and [UV] cut percentage.

[UV] display	[UV] cut percentage / Measurement value	[UV] cut percentage graph
		

c. UV and BV cut percentage and CB transmittance measurement

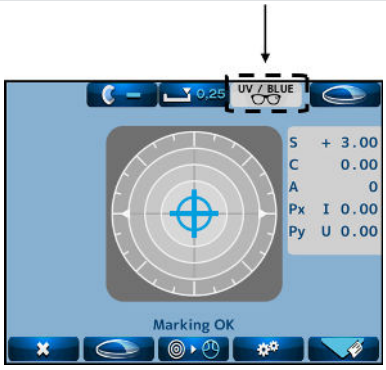
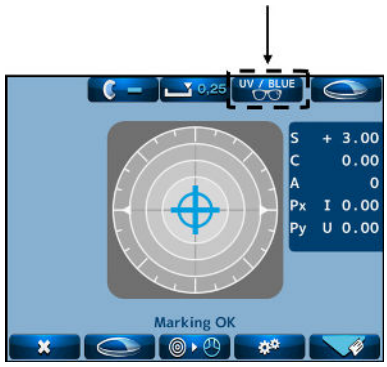
Please make sure that [UV / BLUE] is set to [UV+BL] in the [Setup] screen before perform the [UV] and [BV] cut percentage and [CB] transmittance measurement.

Press the [Memory/Add] switch to store the measured values after align the lens.

And then measure [UV] and [BV] cut percentage and [CB] transmittance.

NOTE	In the case of progressive lens measurement, [UV] cut rate, [BV] cut rate, and [CB] transmittance measurement are performed after taking a measurement of far point.

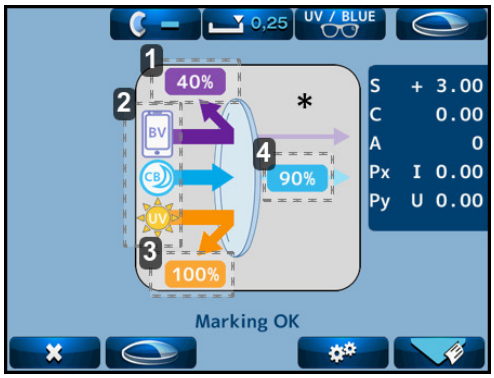
If you want to measure again, please perform the measurement after delete measurement value by pressing  icon.

[UV / BLUE] icon (before storing measured values	[UV / BLUE] icon (after storing measured values)
	

UV / BLUE button will be changed to UV / BLUE button after measurement. Then it is possible to touch.

By touching UV / BLUE, [UV/BLUE] screen is displayed and it is possible to check the [UV] and [BV] cut percentage and [CB] transmittance.

[UV / BLUE] screen



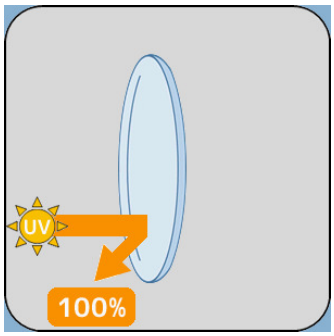
1. *Measurement result [BV]*
2. *Measurement icon*
3. *Measurement result [UV]*
4. *Measurement result [CB]*

Measurement icon	Description of icon		
BV	[BV] cut percentage measurement (Blue Violet) Measure the cut percentage of blue light which harmful to the eyes. The measurement result [BV] are displayed and by the size and color of the arrow (*)		
	nothing	→	→
	R ≦ 15%	16% ≦ R ≦20%	0% ≦ R
CB	[CB] transmittance measurement (Circadian Blue) Measure the transmittance of blue light which need for the circadian rhythm to adjust. The measurement result are displayed [CV] and by the size and color of the arrow (*)		
	→	→	→
	T = 100%	91% ≦ T ≦ 99%	T ≦ 90%

	[UV] transmittance measurement （Ultra Violet） Measure the cut percentage of UV which harmful to the eyes. The measurement result are displayed [UV] and by the size and color of the arrow (*)			
	→	→	→	nothing
	R = 0%	1% ≦ R ≦ 9%	10% ≦ R	R = 100%

NOTE

It is possible to determine whether the measured lens has blue cut function.
When measuring a lens with a low [BV] cut percentage or a lens that does not include the [BV] cut function, the [UV / BLUE] screen displays only the UV transmittance measurement results.
Condition: When [BV] cut percentage is 15% or less, [BV] cut percentage and [CB] transmittance percentage are not displayed.

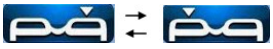


7. [Lab / ECP] Mode

In [Lens Mode] on the [Setup] screen, It is possible to select [Lab] mode or[ECP] mode.

Touching the lens selection switch at the bottom of the measurement screen changes the icon as shown below and the screen changes.

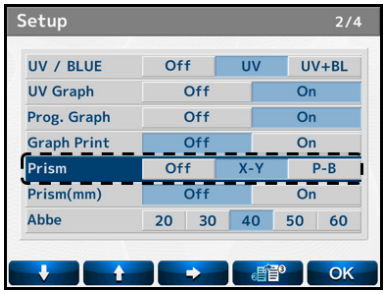
- [Lab] mode: (single lens)  (Eyeglass lens right and left).

  Touch  to return from eyeglass lens measurement mode to single lens measurement mode.
- [ECP] mode:  (Eyeglass lens right and left).

However, when [PD Measure] on the Setup screen is [On], the left and right sides of the single lens depend on the position of the PD plate.

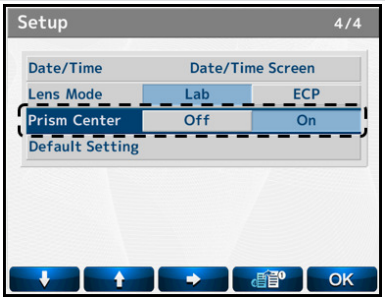
8. Prism measurement

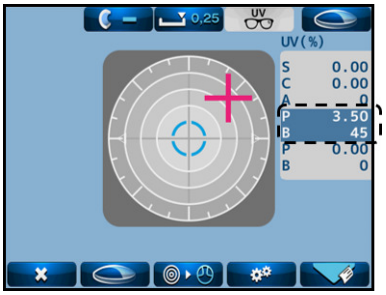
When [Prism] on the [Setup] screen is set to [X-Y] or [P-B], the prism value can be measured on the following screen.

[Prism]	
	

Furthermore, [Prism Center] on the Setup screen set to [On], It is possible to enter any prism center value on the following screen.

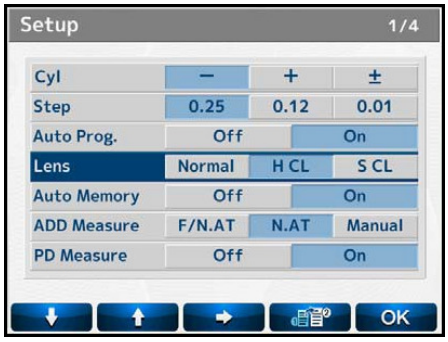
[Prism Center]





9. Measurement of contact lens

a. Preparation



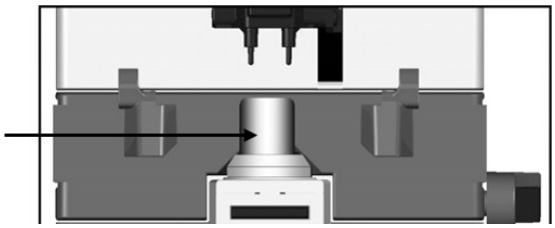
1. Select:
   - [H CL]: in case of taking a measurement of hard contact lens
   - [S CL]: in case of taking a measurement of soft contact lens
2. Change the lens stand to the accompanying contact lens stand.

b. Procedure

1. Set the contact lens on the contact lens stand.

NOTE	Remove the water or moisture from the lens, and set it on the stand with paying attention not to distort it. Then, take a measurement quickly.

2 Replace the standard lens stand with the contact lens stand.



3 Lower the lens holder, and hold the contact lens stand which the contact lens is already placed.

IX. MARKING

1. Lens without astigmatism

1. Overlap the cross cursor with the alignment mark on the screen by moving the lens.
   > You are ready for marking when the message [Marking OK] is displayed.
2. Lower the marking lever to mark on the lens.

2. Lens with astigmatism

Marking according to the axis in the prescription

1. Move the lens so as that the axis mark aligned with the angle in the prescription approximately.
2. To be more precise, align it according to the axis value indicated.

Marking on the cylindrical axis

1. Move the lens so as that the axis mark aligned with 0° approximately.
2. To be more precise, align it so as that the axis value indicated becomes 0°.

3. Prism lens

In case that prescription is expressed in [X-Y]

1. Select [X-Y] from [Prism] on the [Setup] screen.
2. Move the lens so that the prism values displayed on the screen match with the ones on the prescription.

The meanings of the prism values displayed are as shown below.

Px	I	Base In	Base inward
Px	O	Base Out	Base outward
Py	U	Base Up	Base upward
Py	D	Base Down	Base downward

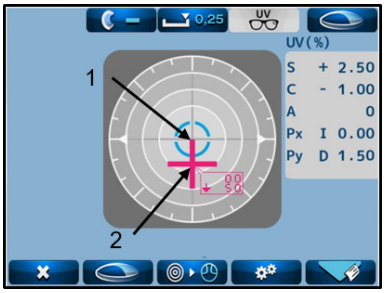
In case that prescription is expressed in [P-B]

1. Select [P-B] from [Prism] on the [Setup] screen.
2. Move the lens so that the prism values displayed on the screen match with the ones in the prescription.

P	Prism value
B	Base direction

In case that prescription is expressed in [mm]

1. Set [Prism (mm)] as [On] on the [Setup] screen.
2. Move the lens so that the prism values displayed on the screen match with the ones in the prescription.



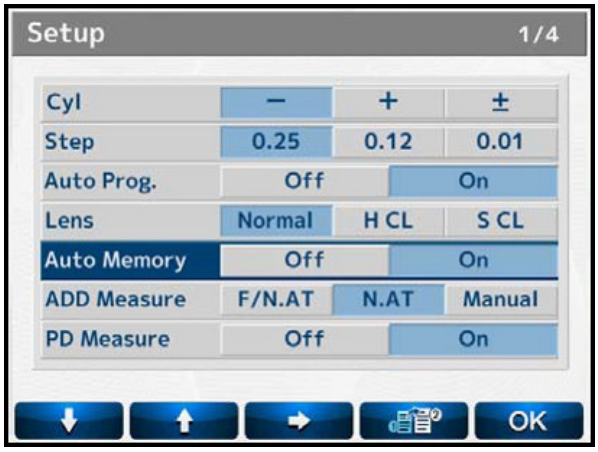
1. Optical center
2. Measurement position

The arrows (↑ ↓ ← →) indicate the direction of the measuring position on the lens from its optical center.

X. Other functions

1. Auto memory

This device has the function to store the measurement values in memory automatically when the alignment is achieved, and the message [Marking OK] is displayed at the time of the measurements of single focal lens, multifocal lens and contact lens.



1. Move the cursor to [Auto Memory] with ↓ or ↑.
2. Select [On] with →.
3. Return to the measurement switch with OK after the settings or changes are completed.

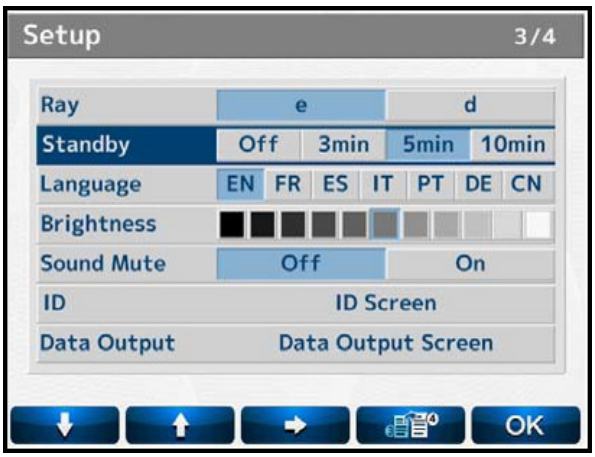
> The measurement values are stored in memory automatically when the message [Marking OK] appears after the alignment mark and cross cursor overlap as shown on the right.

1. Alignement mark
2. Cross cursor

2. Power saving

The power saving function is activated if no switches are operated or no measurement values are updated with the power on. The switching time to the power saving mode can be set on [Standby] of the [Setup] screen.

!	While this function is activated, the power to the measurement light and LCD monitor is turned off. It returns to the measurement mode by pressing any switch.



Measurement mode power indicator (PW) light on
⬇ (No operation for a set time)
Power saving Power indicator (PW) blinking
⬇(Press any switch)
Return to measurement mode power indicator (PW) light on

XI. Error display

1. Type of errors

An error message appears when the measurement condition or measurement result is judged as unreasonable. Also, an error message appears when the performance of the device is abnormal.

Message	Cause	Corrective action
Initial error	Abnormality of device	Any of the measurement values is more than ±0.25 Lens is set on the lens stand Abnormal measurement because of dust or unnecessary light
Paper empty		No printer paper
Printer cover opened		Printer is opened
Printer overheated		Printer head is overheated
EEPROM failure		Abnormality of memory
Sensor error		Abnormality of CMOS sensor
Error *** (160-16)[1]		Abnormality of electronic parts
SPH over	Measurement abnormality	SPH measurement value is more than the upper limit of the measurement range
CYL over		CYL measurement value is more than the upper limit of the measurement range
Prism over		The prism measurement value is more than the upper limit of the measurement range
ADD over		ADD measurement value is more than the upper limit of the measurement range
Measurement error	Abnormality of image processing	Measurement light LED does not light on
Center error		Unexpected light receiving image because of unnecessary light

[1] Display with a three-digit code (number)

2. Error handling procedure

⚠	Do not disassemble, remodel or repair the device, it may cause electric shock.

Initial error	• This message appears if the lens is placed on the lens stand when the power is turned on or the lens under the lens stand is dirty. • Remove the lens. When the lens under the lens stand is dirty, gently wipe it with a soft cloth. • After that, turn the power back on. > Refer to checkup before measurement
Paper empty	• This message appears if no papers are set or papers are not set appropriately. • Set the paper appropriately. > Refer to Installation and replacement of printer paper.
Printer cover opened	• This message appears when the printer cover is opened. • Check the cover and close it properly

SPH/CYL/Prism/ADD over	• This message appears in case of measuring the lens which exceeds the upper limit of the measurement range of the device. • Take a measurement of the lens within the measurement range > Refer to specification
Measurement error or center error	• This message appears when the direct sunlight or strong glare is on the device, or the lens under the lens stand is extremely dirty or has scratches. • If the lens under the lens stand is extremely dirty, gently wipe it with a soft cloth. • Then, turn the power back on.

	If an error message other than shown above is displayed or an error message is still displayed even after performing the procedure above, turn off the power, disconnect the power cord and contact your local distributor.

XII. Storage and maintenance

1. Storage

1. Points to check for long-term storage
   - Turn the power switch OFF
   - Remove the power cord from the outlet
   - Put the dust proof cover on the main unit
2. Notes on storage environment

   Avoid storage under the following conditions:
   - Dusty place
   - Where water may get on the device
   - High-temperature and humidity
   - Where sunlight directly contacts
   - Unstable and high place

	If an error message other than shown above is displayed or an error message is still displayed even after performing the procedure above, turn off the power, disconnect the power cord and contact your local distributor.

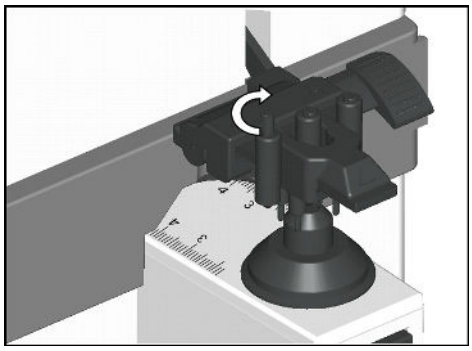
2. Maintenance

a. Replacement of marking pen

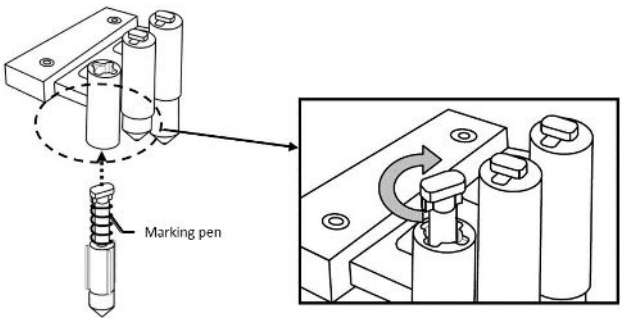
The marking pen is the consumable item.

Replace it if the imprint becomes thin or the pen tip is worn.

1 Remove the marking pen by pressing and rotating it 90 degrees as shown below.



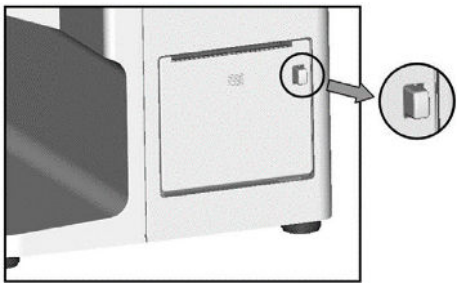
2 Insert the new pen back to the initial position as shown below.



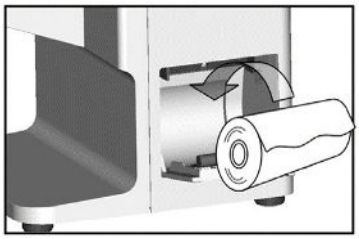
	• Ensure to use the marking pen specified for ALM800. • Do not touch the pen tip at the time of replacement.

b. Reloading printer paper

1 Open the printer cover by pressing the printer cover button.



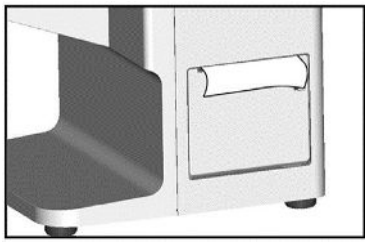
2 Insert the printer paper with attention to the winding direction.



	Insert the printer paper so as that the printer paper comes out from the upside.

3 Close the printer cover with the end of the paper taken out a little.
At this time, close it completely until hearing the clicking noise.

	The error is displayed and the data is not printed out if the cover is opened.



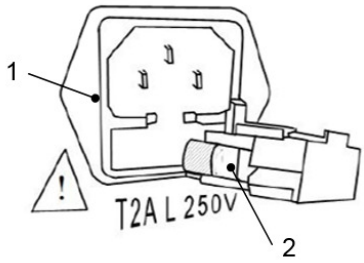
	Use the printer paper specified for ALM800.

c. Fuse replacement

⚠	When replacing a fuse, unplug the power cord from the unit before removing the fuse holder. You may be in danger of electric shock if you remove the fuse holder without unplugging the power cord.

When the fuse is brown out, replace it after removing the fuse holder of the power inlet. The fuse holder is removed from the main unit by pulling it out.

	Always use the specified fuse (T2A L 250V).



1. Power inlet (with fuse holder)
2. Fuse

XIII. SPECIFICATIONS

Measurement range	Sphere (S)	-25D to +25D	Step: 0.01/0.12/0.25D
	Cylinder (C)	0 to ±10D	Step: 0.01/0.12/0.25D
	Axis angle (A)	0 to 180°	Step: 1°
	Addition (Add)	0 to +10D	Step: 0.01/0.12/0.25D
	Prism	0 to 10Δ	Step: 0.01/0.12/0.25D
Measurement lens	Unprocessed lens (diameter: 100mm) Eyeglass processed lens	Single lens, multifocal lens, progressive lens	
	Hard contact lens Soft contact lens	Accompanying lens stand is required	
Measurement wavelenght	525 nm		
UV cut percentage measurement wavelength	375 nm (UV-A)		
UV cut percentage	0～100%		
BV cut percentage measurement wavelength	425nm		
BV cut percentage	16～100%		
CB transmittance measurement wavelength	470nm		
CB transmittance	0～100%		
UV transmission	0 to 100% (-25D to +25D)		
UV transmission measurement wavelenght	375 nm (UV-A)		
PD measurement	45 to 85 mm (0.5 mm step)		
Power rating	100 to 240V 50/60 Hz		
Power consumption	40 VA		
Printer	Thermal printer (paper width: 58mm)		
Monitor	Color LCD monitor (5.7 inches)		
Size / Weight Environmental condition of use	(W) 170 mm (D) 205 mm (H) 438 mm 400 mm when the monitor is stored Approx. 4.3 kg		
Environmental condition of use	Temperature range: 5°C to 40°C		
	Humidity range: 30 to 95% HR (No dew condensation allowed)		

XIV. GUIDANCE AND MANUFACTURER'S DECLARATION

1. Electromagnetic emission

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

2. Electromagnetic immunity

Guidance and manufacturer's declaration – electromagnetic immunity			
This device is intended for use in the electromagnetic environment specified below. The customer or the end user of the ALM800 should assure that it is used in such an environment.			
Immunity test	**IEC 60601 Test level**	**Compliance level**	**Electromagnetic environment - guidance**
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Transient/sequence of rapid electrical pulses IEC 61000-4-4	±2 kV for power supply lines ±1 kV for I/O lines	±2 kV for power supply lines ±1 kV for I/O lines	The quality of the network voltage should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV differential mode ±2 kV common mode	±1 kV differential mode ±2 kV common mode	
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5 % U_T (>95% dip in U_T) for 0.5cycle 40 % U_T (60% dip in U_T) for 5 cycles 70 % U_T (30% dip in U_T) for 25 cycles <5 % U_T (>95% dip in U_T) for 5s	<5 % U_T (>95% dip in U_T) for 0.5cycle 40 % U_T (60% dip in U_T) for 5 cycles 70 % U_T (30% dip in U_T) for 25 cycles <5 % U_T (>95% dip in U_T) for 5s	The quality of the mains voltage should be that of a typical commercial or hospital environment. If the use of the device requires continued operation during mains power outages, it is recommended to use the device with an uninterruptible power supply or batteries.
High frequency (50/60Hz) magnetic field IEC 61000-4-8	3 A/m	0.3A/m	If image distortion occurs, it may be necessary to position the device further from sources of power frequency magnetic fields or to install magnetic shielding. The power frequency magnetic field should be measured in the intended installation location to assure that it is sufficiently low.
Note: U_T s the mains voltage in AC before applying the test level.			

Guidance and manufacturer's declaration – electromagnetic immunity			
The device is intended for use in the electromagnetic environment specified below. The customer or the user of the device should assure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment – guidance**
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	Portable and mobile RF communications equipment should be used no closer to any part of the device, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance d= 1.167*√P d= 1.167*√P 80 MHz to 800 MHz d= 2.333*√P 800 MHz to 2.5 GHz
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and (d) is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey[a], should be less than the compliance level in each frequency range[b]. Interference may occur in the vicinity of equipment marked with the following symbol:
NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies. NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			
[a]: Field strengths from fixe transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which this device is used exceeds the applicable RF compliance level above, this device should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating this device. [b]: Over the frequency range 150kHz to 80MHz, field strengths should be less than 3 V/m.			

Recommended separation distance between portable and mobile RF communication equipment and the pupillometer			
This device is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or user can help prevent electromagnetic interference by keeping a minimum distance between the RF portable and mobile communication device (transmitters) and the device, as recommended below, depending on the maximum transmission power of the communication device.			
Rated maximum output power of transmitter (W)	**Separation distance according to frequency of transmitter (m)**		
	150kHz to 80MHz d= 1.2 √P	80MHz to 800MHz d= 1.2 √P	800MHz to 2.5GHz d= 2.3 √P
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance (d) in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where (P) is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.
NOTE 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.
NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

XV. QR Code

The complete user manual is available on a web space. To access it, please scan the QR code below using a dedicated application.

Le manuel utilisateur complet est disponible sur un espace web. Pour y accéder veuillez scanner le QR code ci-dessous à l'aide d'une application dédiée.

Die vollständige Bedienungsanleitung ist auf einem Speicherplatz verfügbar: Für den Zugriff darauf scannen Sie bitte untenstehenden QR-Code mittels einer dafür vorgesehenen Anwendung.

العربية الأدبية

إن الدليل الكامل للمستخدم متاح على استضافة ويب. لتتمكن من الوصول إليه، يُرجى مسح رمز الاستجابة السريعة أدناه باستخدام تطبيق مخصص لذلك.

O manual do usuário completo está disponível na área web do cliente. Para acessar, escaneie o código QR abaixo usando o aplicativo respectivo.

Пълното ръководство за потребителя е достъпно на уеб пространство. За достъп, моля, сканирайте QR кода по-долу с помощта на специално предназначено приложение.

可通过网络空间访问操作手册全文。如需访问该空间，请使用专用应用程序扫描 QR 码。

완전한 사용자 매뉴얼이 웹사이트에 있습니다. 전용 앱을 사용해 아래의 QR 코드를 스캔하면 접근할 수 있습니다.

Potpuni korisnički priručnik dostupan je na webu. Da biste mu pristupili, skenirajte QR-kod u nastavku namjenskom aplikacijom.

Den komplette brugermanual findes på et websted. Du får adgang til den ved at scanne QR-koden nedenfor ved hjælp af en dertil beregnet applikation.

El manual de uso completo está disponible en la web. Para acceder, escanee el código QR que se encuentra a continuación con la ayuda de una aplicación.

Täielik kasutusjuhend on saadaval veebis. Juurdepääsuks palun skannige allolevat QR-koodi, kasutades selleks spetsiaalset rakendust.

Täydellinen käyttöohje on käytettävissä verkossa. Avaa käyttöohje skannaamalla QR-koodi asianmukaisella sovelluksella.

Το πλήρες εγχειρίδιο χρήσης διατίθεται σε έναν ιστοχώρο. Για να μεταβείτε σε αυτόν, σαρώστε τον παρακάτω κωδικό QR μέσω μιας ειδικής εφαρμογής.

A teljes használati útmutató megtalálható a webes felületen. A hozzáféréshez, kérjük, olvassa le a lenti QR-kódot a megfelelő alkalmazás használatával.

Panduan pengguna yang lengkap tersedia di halaman web. Untuk mengaksesnya, silakan pindai kode QR berikut menggunakan aplikasi khusus.

Il manuale utente completo è disponibile su uno spazio Web. Per accedervi, scansionare il codice QR seguente mediante un'applicazione dedicata.

ユーザーマニュアル完全版はウェブサイト内で閲覧いただけます。そちらにアクセスするには、専用アプリケーションを使用して以下のQRコードをスキャンしてください。

Pilnā lietotāja instrukcija ir pieejama tīmeklī. Lai tai piekļūtu, lūdzu, noskenējiet tālāk redzamo QR kodu, izmantojot tam paredzētu lietojumprogrammu.

Išsamaus naudotojo vadovo ieškokite interneto svetainėje. Kad jį atvertumėte, specialia programėle nuskaitykite toliau pateiktą QR kodą.

Manual pengguna yang lengkap boleh didapati di ruangan web. Untuk akses, sila imbas kod QR di bawah menggunakan aplikasi yang berkenaan.

Den komplette brukerhåndboken er tilgjengelig på et webområde. For å få tilgang, må du skanne QR-koden nedenfor ved hjelp av en dedikert applikasjon.

De volledige gebruikershandleiding is beschikbaar op een website. U kunt de handleiding bereiken door de QR-code hiernaast te scannen met een geschikte applicatie.

Kompletna instrukcja użytkownika jest dostępna na stronie internetowej. Aby uzyskać do niej dostęp, zeskanuj poniższy kod QR przy użyciu dedykowanej aplikacji.

O manual do utilizador completo está disponível num espaço web. Para aceder, queira digitalizar o QR code seguinte com a ajuda de uma aplicação dedicada.

Celá uživatelská příručka je k dispozici na webu. Pro přístup k ní oskenujte níže uvedený QR kód pomocí specializované aplikace.

Versiunea integrală a manualului de utilizare este disponibilă pe un site web. Pentru a-l accesa, scanaţi codul QR de mai jos cu ajutorul unei aplicaţii dedicate.

Полное руководство пользователя доступно в Интернете. Для доступа просканируйте приведенный ниже QR-код с помощью специального приложения.

Potpuno korisničko uputstvo je dostupno na vebu. Da biste mu pristupili, skenirajte QR kôd u nastavku pomoću namenske aplikacije.

Celý používateľský manuál je dostupný na internete. Aby ste sa k nemu dostali, naskenujte QR kód nižšie pomocou na to určenej aplikácie.

Celoten uporabniški priročnik je na voljo na spletnem mestu. Za dostop do njega skenirajte spodnjo kodo QR z uporabo namenske aplikacije.

Den fullständiga handboken finns på en plats på Internet. Skanna QR-koden nedan med en lämplig app för att få åtkomst till den.

มีคู่มือผู้ใช้ฉบับสมบูรณ์อยู่ในพื้นที่เว็บ เพื่อเข้าถึงข้อมูล กรุณาสแกนรหัส QR ด้านล่างนี้โดยใช้แอปพลิเคชั่นเฉพาะงาน

Kullanma kılavuzunun tamamı internette bulunmaktadır. Kılavuza erişmek için, QR kodunu uygun bir uygulama kullanarak taratınız.

Повне керівництво користувача доступно в Інтернеті. Для доступу проскануйте наведений нижче QR-код за допомогою спеціального додатку.

Câm nang hương dân s dung hoan chinh hiên có trên không gian web. Đ truy câp, vui long quet m, QR bên dươi bằng ưng dung chuyên dung.

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