Auto-Lensometer

AXIS 900/900P

Instruction Manual

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1.INTRODUCTION

Thank you for purchasing this product.
The AXIS series Auto-Lensometer has been designed for measuring vertex powers and prismatic effects of eyeglasses and contact lenses, to orient and mark lens blanks, and for verifying the correct mounting of lenses in spectacle frames. It is composed of a built-in optical system, an electronic processing system and a mechanical system. Please read this manual carefully before using this device for safe and proper operation.
For future reference, please keep this booklet in a safe and handy place.

2.PRECAUTIONS

To avoid an incorrect usage of this device, please pay attention to the precautionary statements described below.

⚠Warning	Identifies conditions and actions that are a potentially hazardous situation which, if not avoided, could result in serious injury or death.
⚠Caution	Identifies conditions and actions that, if not avoided, could result in minor or moderate personal injury.
Notice	Identifies conditions and actions that, if not avoided, could result in equipment damage or, cause it not to work properly afterwards.

Explanation of graphic symbols used in this manual.

Prohibited	Indicates an action that is not allowed.	Instruction	Indicates an action that must be done.

⚠Warning	
Prohibited	Keep liquids away from the unit. Any spill over the equipment might start a fire, cause an electrical shock or irreparable damage to the product.
	Do not disassemble, repair, or modify this equipment by yourself or any unauthorized third-party personnel. Doing so might start a fire, cause an electric shock or injury. Contact your dealer or nearest service center for repairs.
	Do not operate this product with wet hands. Doing so might cause an electric shock, burn injury or product malfunction.
	Do not use aerosol sprays, abrasives or solvents like alcohol, benzine or thinner, for cleaning the device. The usage of that kind of products might cause damage/deformities to the device components, an electric shock or start a fire.
Instruction	Make sure that power cable's plug is fully and firmly inserted into the power outlet. Do not use a damaged or loose power outlets. Incomplete insertion of the power plug might result in electric shock or fire caused by overheating.
	Always disconnect power cable from the outlet by holding the connector. Never pull on the cable itself. Not doing so might damage the power cord and could cause fire or an electric shock.
	Loose the strap from power cable before connecting. Using the device when the cables are tightly bundled might cause overheat and could start a fire.
	Stop using the device if you notice any abnormality such as smoke, odor or noise. Using the device in this condition might result in a fire or injury.
	If any liquid or debris gets inside the device, immediately turn it off and unplug power cable from the outlet. Stop equipment usage and contact your dealer or nearest service center. Continuing usage of the device might cause overheat and could start a fire.

⚠Caution	
Prohibited	Place the device on a firm, flat, level surface. Failure to do so might result in a poor product performance or represent a possible safety hazard if the unit falls down.
	Never place heavy objects over the power cable. Doing so might damage the power cord, exposing the wiring and this could result in an electric shock.
Instruction	Be sure to use a wall outlet that meets the power specification requirements. If the line voltage is too high or too low, the device may not operate at its full performance. Also, malfunction might occur or could start a fire.
	Provided power cable is for using exclusively with this equipment. Do not use this cable for other purposes than intended nor with any other product. Failure to do so could start a fire.
	Replace the power cable with a new one if any of the following conditions is met. If internal wiring is exposed, if the cable was unplugged when the equipment's power switch was on or if the cable becomes so hot that cannot be held with hands. If a damaged cord is not replaced, there is a potential risk of fire or an electric shock. In case of a failure, immediately unplug the power cord from the wall outlet. Do not try to open the equipment and contact your dealer or nearest service center for repairs.
	Be sure to connect your equipment to a properly grounded outlet. This will diminish the risk of an electric shock in case of a failure.
	Clean the metal prongs from the power plug periodically. If dust accumulates there, moisture could be absorbed, increasing the risk of a short circuit or fire.
	Disconnect the equipment from the wall outlet if not going to be used for a long time. If kept connected, an electric leakage might occur.

PRECAUTIONS BEFORE USE

Use the equipment in a place that meets the following conditions :
- Minimal dust presence.
- Minimal or low exposure to ambient light.
- Free from shock and vibration.
- On a firm, flat, level surface.

Do not use or store the device in locations exposed to rapid changes in temperature or humidity.
Drastic changes in temperature or humidity can provoke condensation to form inside the equipment and affect measurements.

Do not use or store the device in an environment where corrosive gases, acids, salinity or other contaminants are present.
Doing so may cause corrosion and failure.

Avoid using the equipment in a place exposed to direct sunlight or near incandescent lights.
A light-reflecting surface, such as a glass showcase or a shiny table, is also not appropriate.
In such places, the equipment may work irregularly, under poor performance or continuously showing error messages.

Do not power the equipment using a power strip or an extension cable.
Electrical safety might be lowered if using this kind of adapters.

Make sure that the power switch is in OFF position and the power cord is unplugged from the wall outlet before connecting the equipment.
A malfunction might occur if this instruction is not followed.

Use special packing materials for transporting the device. They will protect it in case of dropping or impact.
Excessive vibration or impact to the device might cause a malfunction.

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

OptiSource shall not be liable for any loss or damage, direct or indirectly, caused by not following the instructions described in this manual.

PRECAUTIONS DURING USE

It is recommended to wait a proper amount of time after turning on the equipment.
It will perform more accurate measurements.

Do not shake nor abruptly move the unit.
Doing so may cause failure or injury.

Do not apply excessive pressure to the unit. (Do not press the unit from the top.)
Doing so may cause inaccuracy on measurement.

While using the device, there may be constantly lit, missing or dead pixels on the LCD screen.
Since this is a normal characteristic of a LCD, do not represent a malfunction. Please use as is.

This device has been tested and found to comply with the limits of the standard IEC 60601-1-2: 2007.
These limits are designed to provide reasonable protection against harmful interference in a typical medical installation.
This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to other devices in the vicinity.
If this equipment causes interference with other devices, which may be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures :

- Reorient or relocate the device receiving the interference.
- Increase the separation between the equipment.
- Connect the equipment into an outlet on a different circuit from that which the other device(s) are connected.
- Contact your dealer for additional help.

Never use portable and mobile radio frequency (RF) devices in the vicinity of the equipment.
These devices might adversely affect medical electrical equipment resulting in malfunctioning.

Do not apply excessive pressure when using the touch panel.
Screen might get broken or internal damage to the panel might occur.

Do not operate the touch panel with a hard or pointed object such as a mechanical pencil or pen.
Screen might get broken or internal damage to the panel might occur.

Never scratch, bend, twist nor deform the power cord.
Using a damaged cable might result in malfunctioning and increases the risk of an electric shock or a fire.

Never use the equipment with generic cables or accessories.
ElectroMagnetic Compatibility (EMC) performance might deteriorate affecting the operation of the equipment.

Do not place any strange object onto the nosepiece or the contact lens holder.
Placing an object different than eyeglasses, lens blanks or contact lenses might cause damage to this accessory.

Avoid using a nosepiece or contact lens holder if it is damaged (pointy edge).
If used, can damage (scratch) the surface of any lens placed over it.

Do not touch any optical component in the equipment.
It may cause a malfunction or to work under poor performance.

Do not move single vision lens too fast, tilt, or swing when you are in auto progressive mode.
The unit might switch automatically into progressive measurement mode.

Some small size frame spectacles might show different result from specification, due to limited setting angle of the object.

A malfunction might occur if you measure progressive lenses with printed marks.

Please switch lens mode into progressive lens, when you measure lenses with ADD below +1.00D.

Some progressive lenses with flat power gradient for near, might show higher diopter than manufacturer's specification.

Some spectacles with near point cut, might show lower diopter than manufacturer’s specification.

Some progressive lenses for middle/near vision, or some progressive additional lenses, might show different results from manufacturers specification.

PRECAUTIONS DURING USE

Make sure the opening of nosepiece is clear when you attach lens protection sheet to the nosepiece.

Some progressive lenses can not be detected as such due to their own design.
Also some progressive lenses might be detected as single vision lens and the cursor might be seen in alignment with the hold point. In such cases, switch into progressive lens measurement mode.

PRECAUTIONS AFTER USE

Turn off the equipment when not in use.

Only authorized service technicians can repair this equipment.
OptiSource shall not be liable for any loss or damage as a result from an improper repair work.

Unplug the equipment before cleaning it.
If the unit remains connected, there is a risk of an electric shock or short circuit.

Make sure to secure enough space before giving maintenance to the equipment.
To avoid the possibility of any injury.

When replacing a lens marker pen, hold the cartridge securely before tighten the screw.
Make sure to use the appropriate screwdriver described on this manual.
The risk of an injury might increase if using a different screwdriver, also the spring might pop out and get lost.

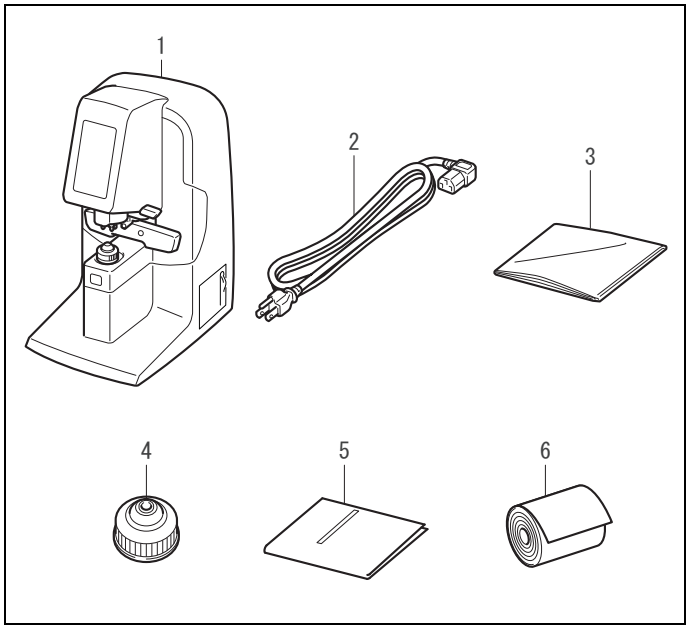
Avoid to do any scratches on the surface of the cover glass under the nosepiece.
If the cover is scratched, the reliability of the measurements will be compromised.

Periodically clean the cover glass under the nosepiece with a blower brush.
If dust accumulates over the cover glass surface, accurate measurements might not be obtained.
After cleaning the cover glass, initialize the optical system by pressing the RESET button at Settings screen 3.

Follow the local government regulations when disposing or recycling this equipment.
We recommend you to hand it over to a designated industrial waste disposal contractor.

When disposing packing materials, follow local recycling guidelines.
An inappropriate disposal might cause environmental effects.

3.CHECKING BOX CONTENTS

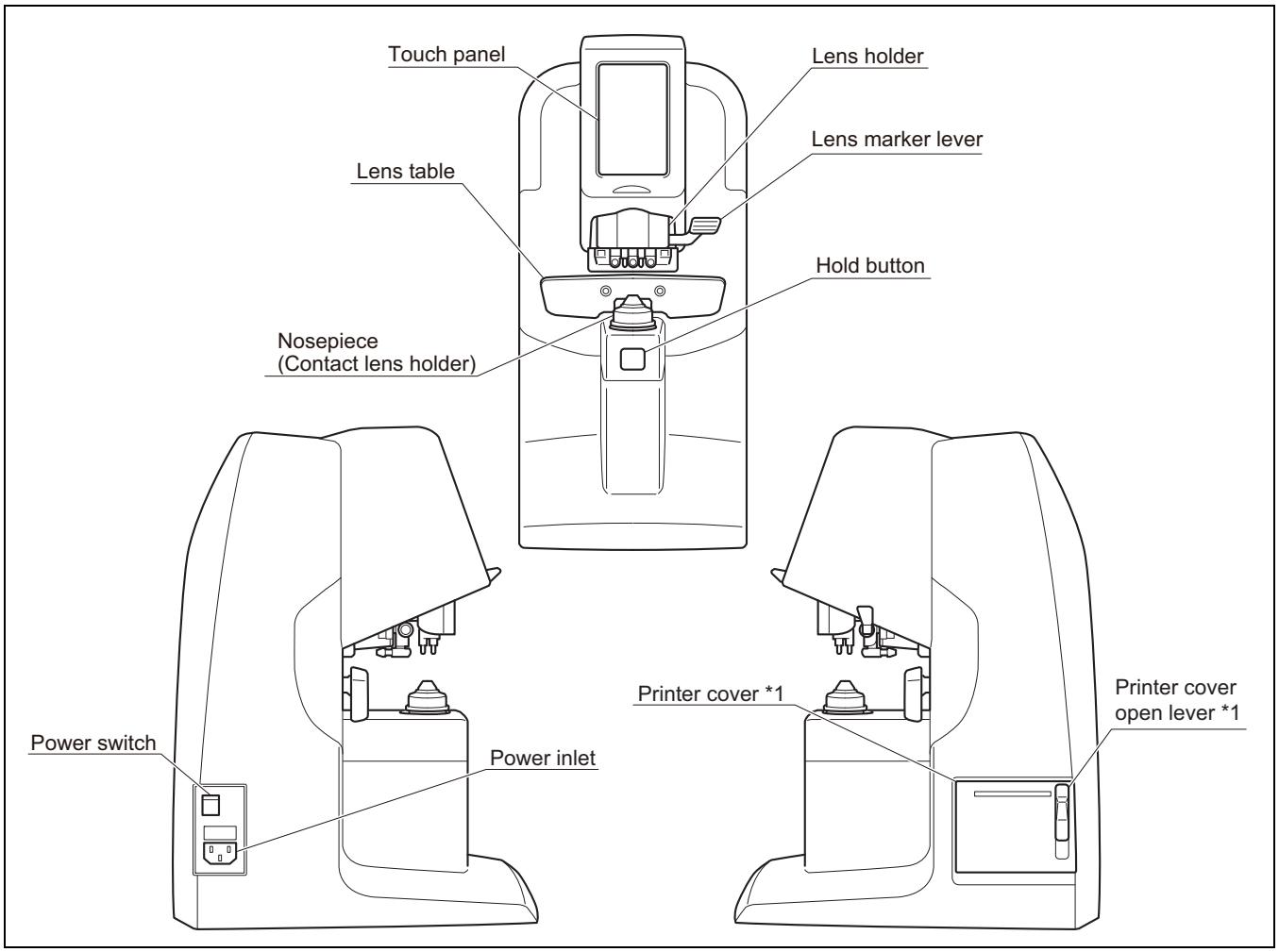


No.	Part Name	Quantity
1	Lensometer Main Unit	1
2	Power Cable	1
3	Dust Cover	1
4	Contact Lens Holder	1
5	This Booklet	1
6	Printer Paper	1

* AXIS 900 does NOT include Printer Paper.

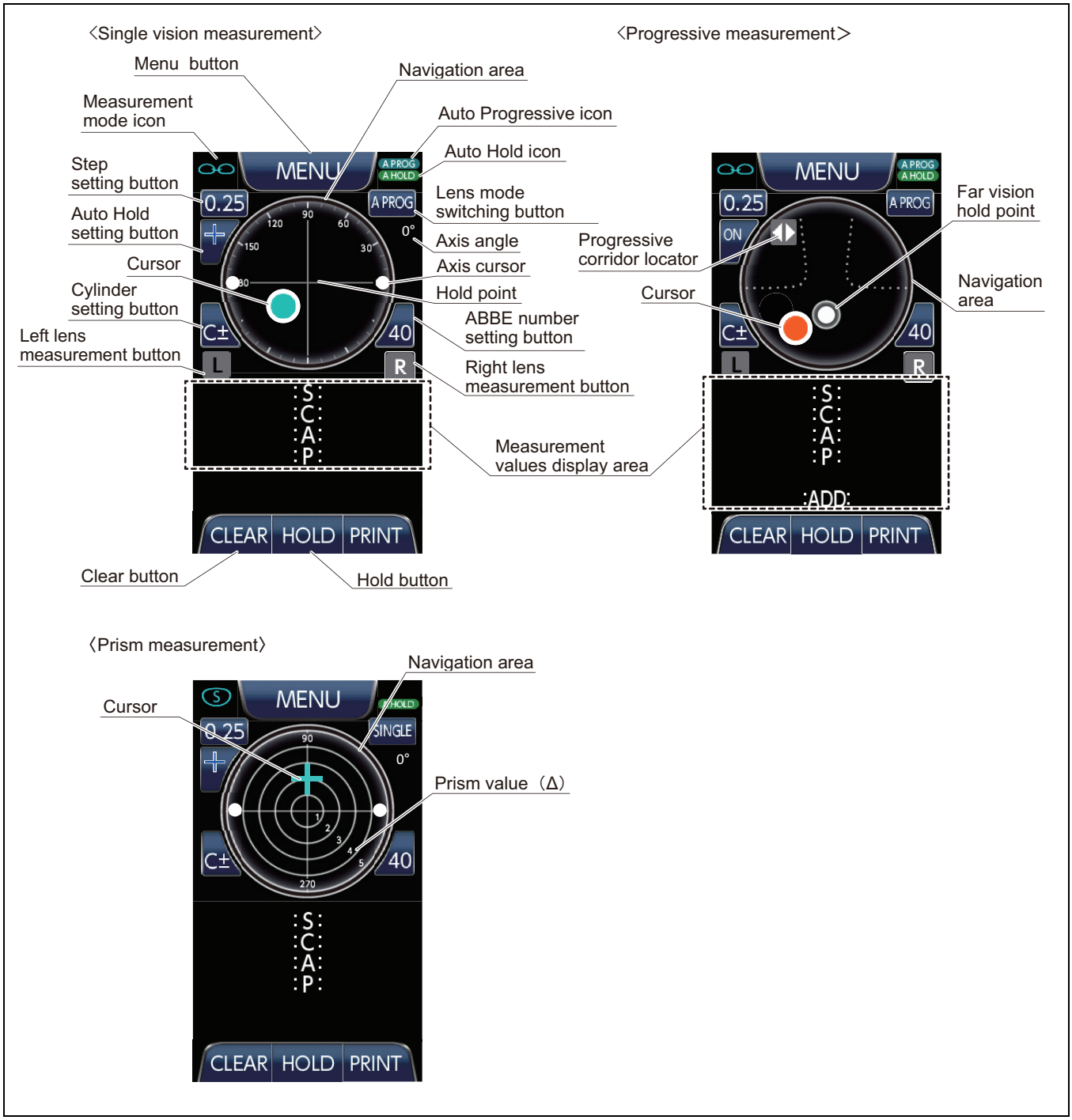
4.COMPONENT NAMES

<Main Unit>



*1 Printer is NOT available on AXIS 900.

<Measurement screen>



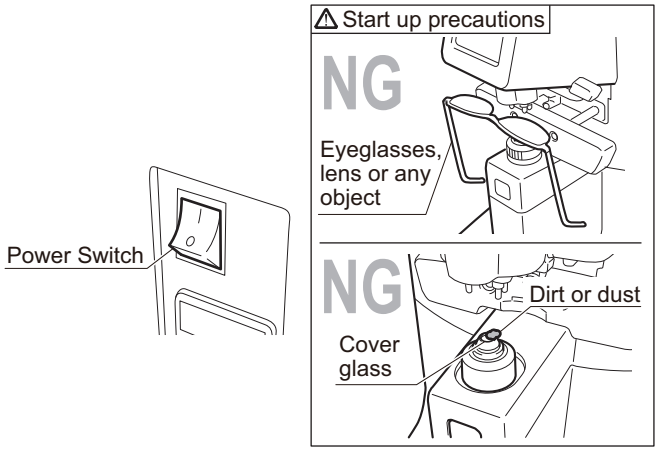
An icon representing the direction of lens movement appears in the upper-left area of the Navigation Area when performing progressive measurements.

- : Progressive corridor locator ····· Move the lens horizontally (left or right).
- : Far point locator ····· Move the lens towards the equipment.
- : Near point locator ····· Move the lens towards the user (yourself).

5.GETTING ACQUAINTED WITH YOUR DEVICE

5-1. TURNING YOUR AUTO LENSOMETER ON AND OFF

5-1-1. Start up procedure

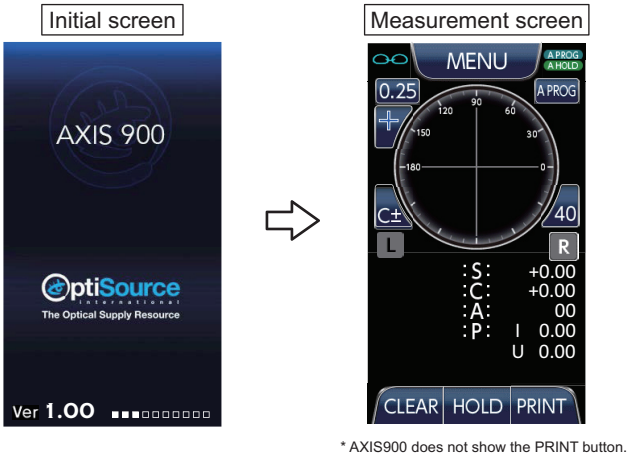


Use the following procedure to start the device.

(1)Insert one end of the power cord to the power inlet and connect the other side to a wall outlet.

(2)Push the power switch for setting it into "I" position.

> ⚠ Before starting the device, make sure that the cover glass under the nosepiece is clean and that no object is set onto the equipment that could block the light from the LED.



* AXIS900 does not show the PRINT button.

(3)The initial screen appears for a short time. After initialization, the screen changes to the Measurement screen.
(The settings made on the Measurement screen will be saved while the unit is on. If you turn off the equipment, then the initial settings on your Measurement screen will be cleared and restored to your default settings.
The default settings can be changed by accessing the Main Menu)
Basic settings in Menu screen.
-Held after Power off.
Basic settings in Measurement screen.
-Erased after Power off.*1

*1 If you made any changes in the Measurement screen settings while measuring a lens, they will be lost if you access the Main Menu.

5-1-2. Shutdown Procedure

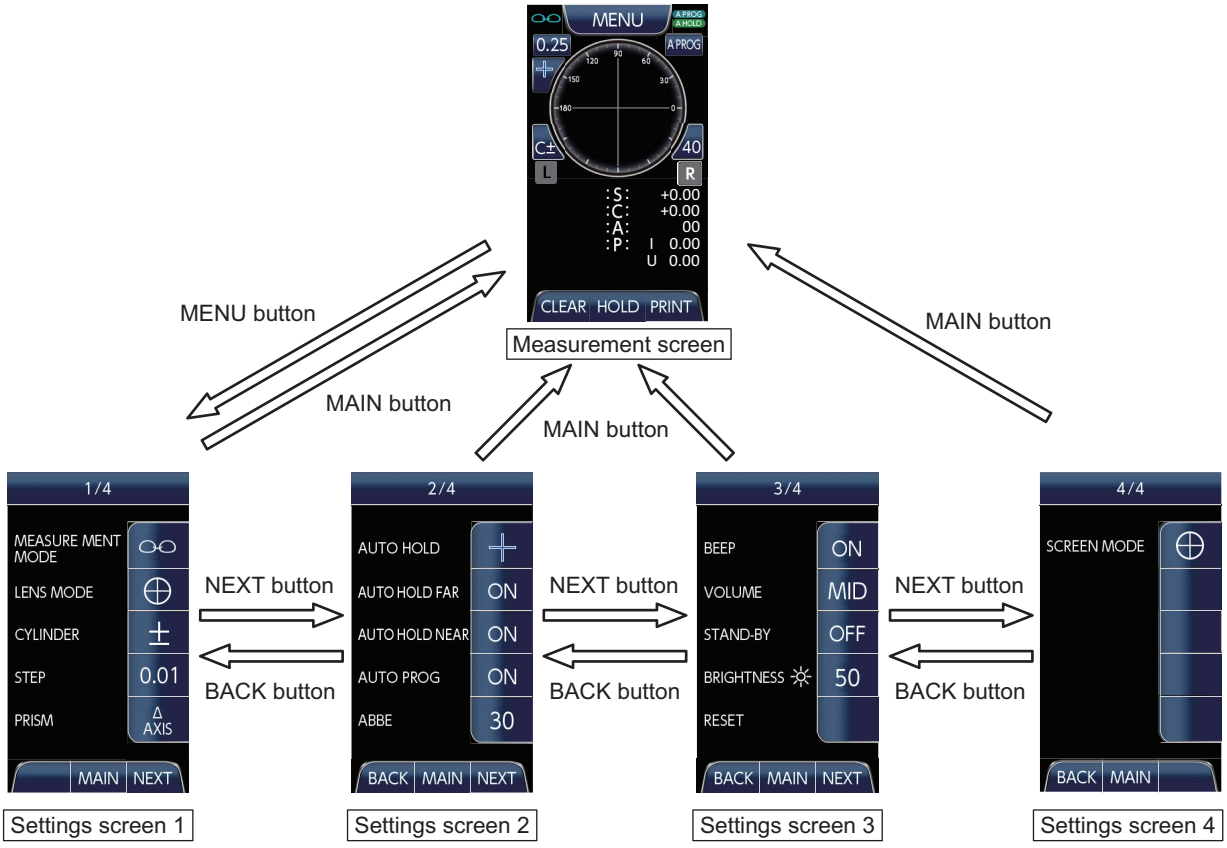
Use the following procedure to shutdown the device.

(1)When Measurement screen is displayed, push the power switch for setting it into "O" position.

(2)Place the dust cover over the equipment when not in use.

5-2. SETTINGS

5-2-1. Navigating between screens

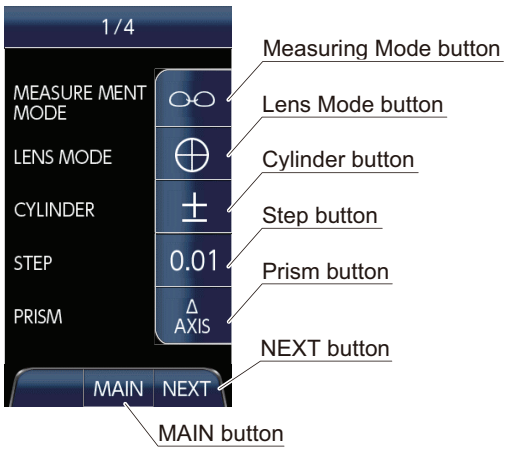


(1)Press the MENU button on the Measurement screen to display Settings screen 1.
(2)Press the NEXT button on the Setting screen to display next Setting screen.
(3)Press the BACK button on the Setting screen to display previous Setting screen.
(4)Press the MAIN button on the Setting screen for returning to the Measurement screen.

When changing the settings, use [BACK] / [NEXT] buttons to navigate between screens.
After you finished making changes, press [MAIN] button for returning to the Measurement screen.

5-2-2. Settings screen 1

Settings Screen 1



Press MENU button on the Measurement screen for displaying Settings Screen 1.

◆MEASUREMENT MODE

Measuring mode	Button image in Menu screen
Eyeglass	
Single lens (Lens blank)	
Contact lens	

This setting determines the measuring mode. Measuring mode options include eyeglasses, single lens, and contact lenses. Use the mode that better fits the lens being measured.

Press the button to change the selection.

◆LENS MODE

This setting determines the type of lens to be measured and will depend on the selected measuring mode. Single Vision and Progressive options are available for Eyeglass and Lens blank (Uncut lens) measuring modes. In the case of Contact lens, it is fixed in Single vision lens mode.
If "Auto Progressive mode" is set to ON (refer to P. 14), then the "Lens Mode" will change automatically.

Press the button to change the selection.

Measuring mode	Button image in Menu screen	Lens mode	Button image in Menu screen	Description	Button image in Measurement screen
Eyeglass		Single vision lens		Eyeglass/Single vision lens	SINGLE
		Progressive lens		Eyeglass/Progressive lens	PROG
Single lens		Single vision lens		Single lens/Single vision lens	SINGLE
		Progressive lens		Single lens/Progressive lens	PROG
Contact lens		Contact lens		Contact lens (Fixed)	SINGLE

◆CYLINDER

Cylinder	Button image in Menu screen	Button image in Measurement screen
Plus		
Minus		
Plus-minus		

This setting determines the cylinder option.
Cylinder options include plus (+), minus (-), and plus-minus (±).
*Cylinder can also be selected from Measurement screen.

Press the button to change the selection.

◆STEP

Step	Button image in Menu screen	Button image in Measurement screen
0.25		
0.12		
0.01		

This setting determines the step of measurement value.
Step options include 0.25, 0.12, and 0.01.
*Step can be temporarily selected from Measurement screen.

Press the button to change the selection.

◆PRISM

Prism	Button image in Menu screen	Example display
BUBO(*1)		O 5.00 U 3.00
ΔAXIS(*2)		5.00 150
N/A		Value is not displayed

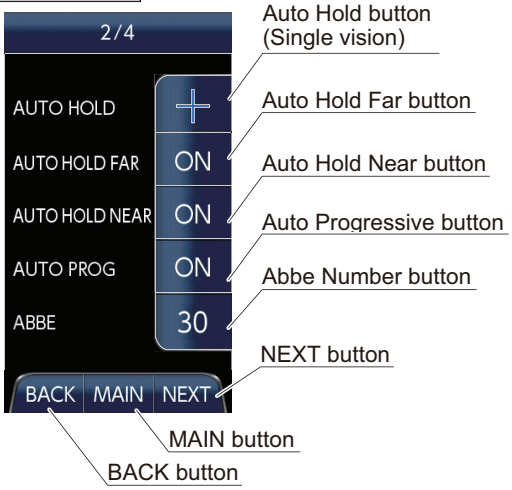
This setting determines the display method for the measured prism value. Available display methods are BUBO(*1), AXIS(*2), and N/A.

Press the button to change the selection.

(*1):Orthogonal coordinate display BI: Base In, BO: Base Out, BU: Base Up, BD: Base Down
(*2):ISO 8598-1:2014 Optics and Optical Instruments - Focimeters - Part 1 : General purpose instruments Paragraph 3.10
Non-symmetric prism error of a focimeter.
Difference in the prismatic power readings when a plano-prism is measured first with its base setting in one direction and then in the opposite direction, for example, base settings of 180° and 360°, or 90° and 270°.

5-2-3. Settings screen 2

Settings Screen 2



Press NEXT button on Settings Screen 1 to display Settings Screen 2.

◆AUTO HOLD

AUTO HOLD	Button image in Menu screen	Button image in Measurement screen
Measuring hold		
Lens marker hold (precision hold)		
OFF (disabled)	OFF	OFF

Press the button to change the selection.

This setting enables or disables the Auto Hold function for Single Vision and Contact Lens measurements.

Measuring hold ····· For measurements
(Lens is within an area of 2mm diameter from optical center)

Lens Marker hold···· For lens marking
(Lens is within an area of 0.3 mm diameter from optical center)

Precision hold ····· For contact lenses only
Auto Hold indication will appear in Measurement screen.
*Auto Hold Mode can be temporarily changed in Measurement screen.

◆AUTO HOLD FAR

When measuring a progressive lens, you can activate the Far Point Auto Hold. This setting enables (ON) and disables (OFF) the Auto Hold Far function for Progressive lens measurement.
* Far Point Auto Hold Setting can be temporarily changed in Measurement screen.

Press the button to change the selection.

◆AUTO HOLD NEAR

When measuring a progressive lens, you can activate the Near Point Auto Hold. This setting enables (ON) and disables (OFF) the Auto Hold Near function for Progressive lens measurement.
* Near Point Auto Hold Setting can be temporarily changed in Measurement screen.

Press the button to change the selection.

◆AUTO PROG

This setting enables (ON) or disables (OFF) the Progressive Lens Auto Detection function.
(Please see table below for operation reference)

Press the button to change the selection.

Measuring mode	Button image in Menu screen	AUTO PROG	Button image in Menu screen	Description	Button image in Measurement screen
Eyeglass		ON (enabled)		Progressive Lens Auto Detection Enabled	
		OFF (disabled)		Progressive Lens Auto Detection Disabled	
Single lens		ON (enabled)		Progressive Lens Auto Detection Enabled	
		OFF (disabled)		Progressive Lens Auto Detection Disabled	
Contact lens		OFF (disabled)		Progressive Lens Auto Detection is fixed to disabled	

The Auto Progressive icon will always appear on the Measurement screen when this function is enabled, with exception of Contact lens measuring mode.

◆ABBE

Abbe number	Button image in Menu screen	Button image in Measurement screen
30		
35		
40		
45		
50		
55		
60		

This setting determines the Abbe number.
Options between 30 and 60 (in increments of 5) are available.

Abbe number can also be selected from Measurement screen.

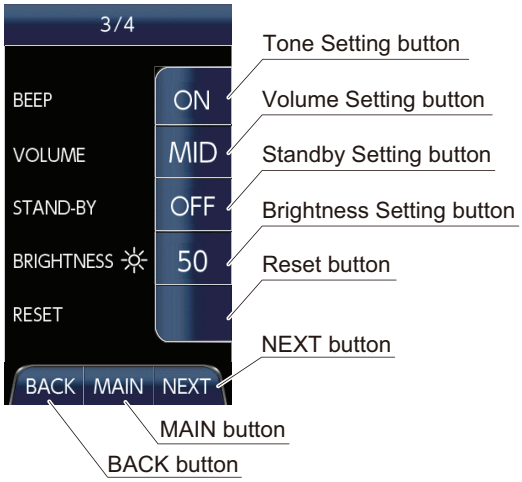
Abbe number:
When white light passes through the prism, colors are separated to produce a rainbow spectrum. The width of this color band is referred to as chromatic dispersion. The Abbe number represents the size of chromatic dispersion. The chromatic dispersion decreases as the Abbe number increases. The periphery appears to have more color for lenses with low Abbe numbers.

Press the button to change the selection.

5-2-4. Settings screen 3

Press NEXT button on Settings Screen 2 to display Settings Screen 3.

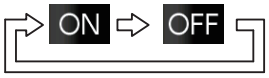
Settings Screen 3



◆BEEP

This setting enables (ON) or disables (OFF) the tone function.

Press the button to change the selection.



◆VOLUME

This setting determines the tone volume. Volume options include MIN (minimum), MID (medium), and MAX (maximum).

Press the button to change the selection.

◆STAND-BY

This setting determines the standby function. Standby options include OFF (disabled), 3 minutes, 5 minutes, and 10 minutes. The LCD screen backlight dims after the set standby time elapses without any touch panel or device hold button operation. The screen backlight does not dim if the standby setting is disabled.
Tap over the LCD screen or push the built-in HOLD button to make the screen brighten again.

Press the button to change the selection.

◆BRIGHTNESS

This setting determines the LCD brightness. Brightness options include 10 levels from 10 (dark) to 100 (bright).

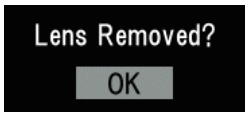
Press the button to change the selection.

◆RESET

This setting is used to initialize the optical system.
Remove any lenses, dirt, or other objects from the nosepiece before pressing the Reset button.

> The reset process will not be performed correctly if lenses, dirt, or other objects are present on the nosepiece area.

After pressing the Reset button, the following message will appear.
Confirm that there are no lenses, dirt, or other objects on the nosepiece and then press OK



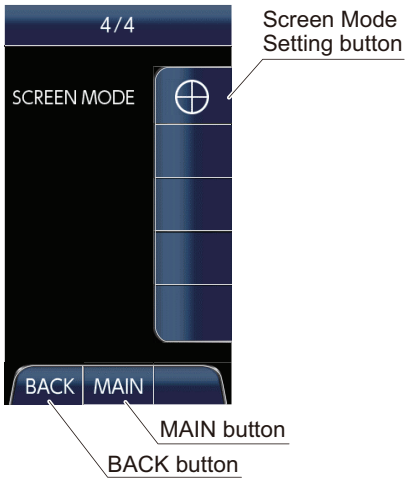
A process start confirmation message will appear, press OK again.
Then, the optical system will reset. Please be patient, this process may take some time.

The message will disappear after reset process is completed.

> ⚠ If you run the process without removing the lens, the measurement accuracy will decrease significantly. In this case, remove the lens and reset again.

5-2-5. Settings screen 4

Settings Screen 4



Press NEXT button on Settings Screen 3 to display Settings Screen 4.

◆SCREEN MODE

To select screen setting. Choose Main Measurement screen or Prism Measurement screen.

Press the button to change the selection.

Cursor changes as below, according to the selected screen.

	Hold point ←				Fringe of the lens
Main Measurement screen *1					
Prism Measurement screen *2					
Color of the Cursor	Blue/White	Blue	Yellow-green	Yellow	Red
Position of the Cursor	Lens Marker Hold area	Measuring Hold area	Near Measuring Hold area	Slightly away from Hold area	Away from Hold area

Screen changes as below.

*1 Main measurement screen

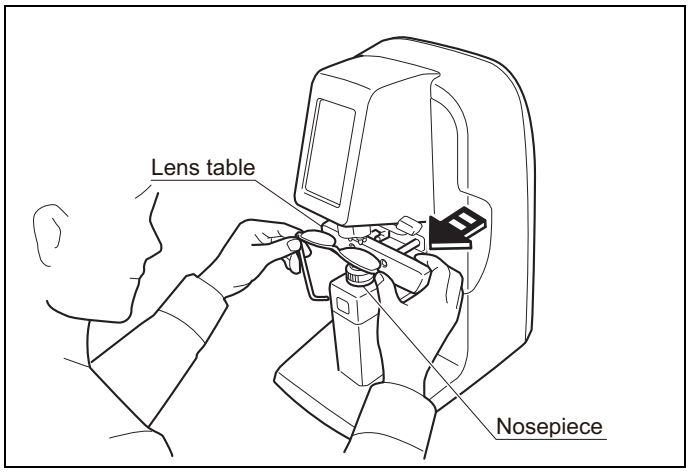
*2 Prism measurement screen

*1 Indicates the distance and direction from optical center.

*2 Indicates prism value and angle.

5-3. OPERATING PROCEDURES

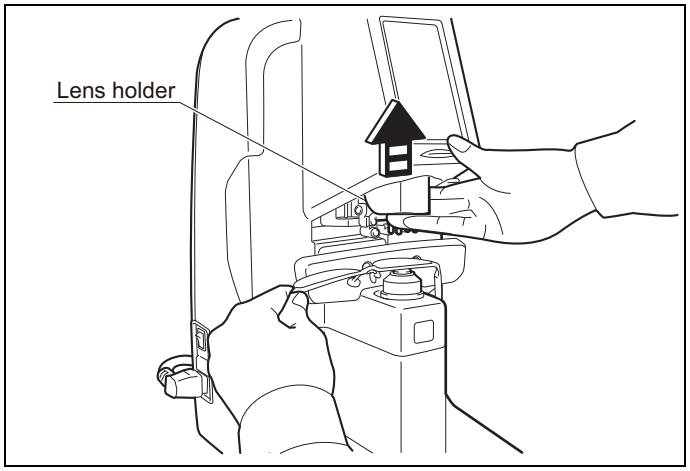
5-3-1. Eyeglasses and Lens blanks (Uncut lenses)



(1)Place a previously cleaned lens onto the nosepiece with the front surface up.
(2)Pull the lens table towards yourself until it touches the bottom of the frame.

> ⚠ Correct measurements cannot be taken if the frame is off the lens table (Axis value may be incorrect).

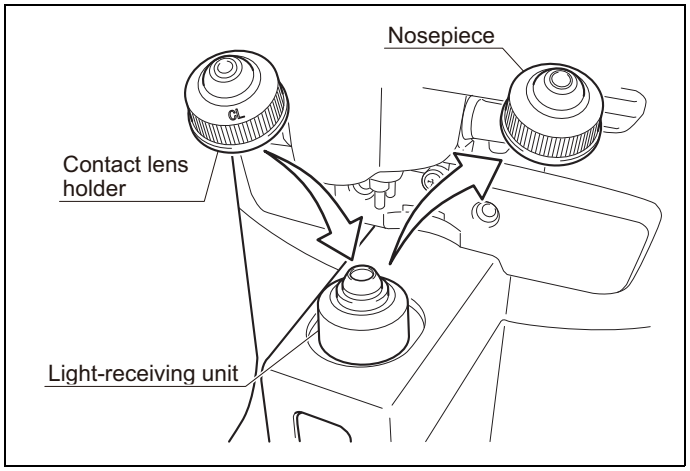
- The lens table does not need to be used when placing a single lens (lens blank).
- Be sure that the lens surface is constantly in contact with the nosepiece when performing a measurement.



(3)Lift the lens holder up to unlock.
(4)Lower the lens holder onto the lens to secure it in place.

> ⚠ Be careful when lowering the lens holder. It may damage the lens if moved abruptly.

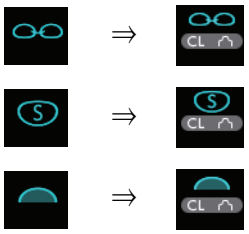
5-3-2. Contact lenses



(1)Remove the nosepiece from the light-receiving unit and attach the contact lens holder.

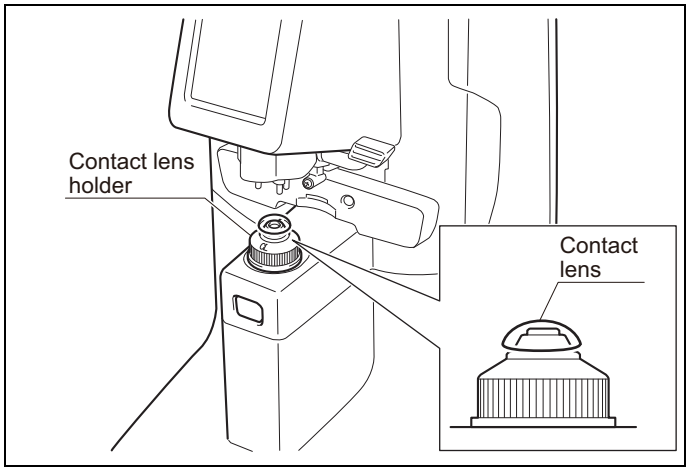
> POINT Check for the "CL" mark as a reference.

* When you install the contact lens holder, the CL icon will be displayed in the Measurement screen.



⇒ If you see any of these icons displayed, please change to the appropriate measurement mode.

⇒ Correct setting for CL measurement.

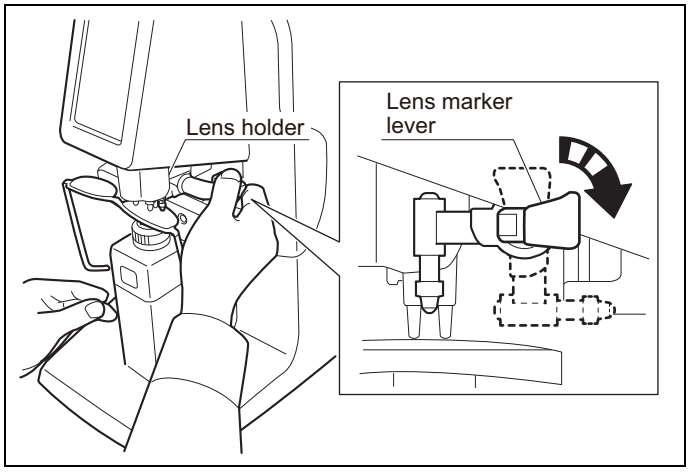


(2)Set the contact lens onto the contact lens holder.

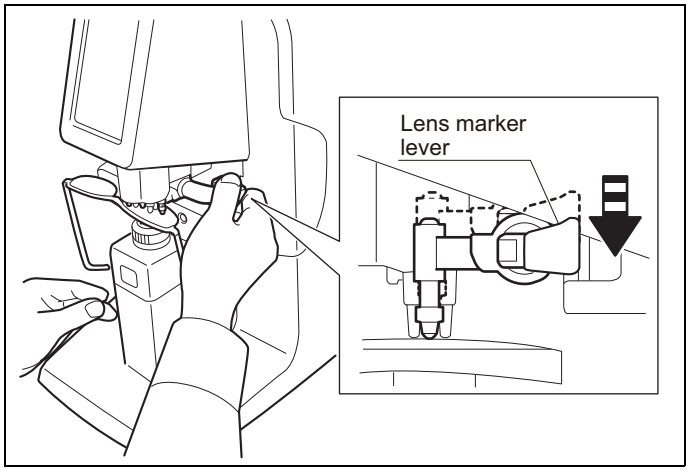
> Set the contact lens so that its surface side faces up.

5-3-3. Using the lens marker

◆Marking a lens



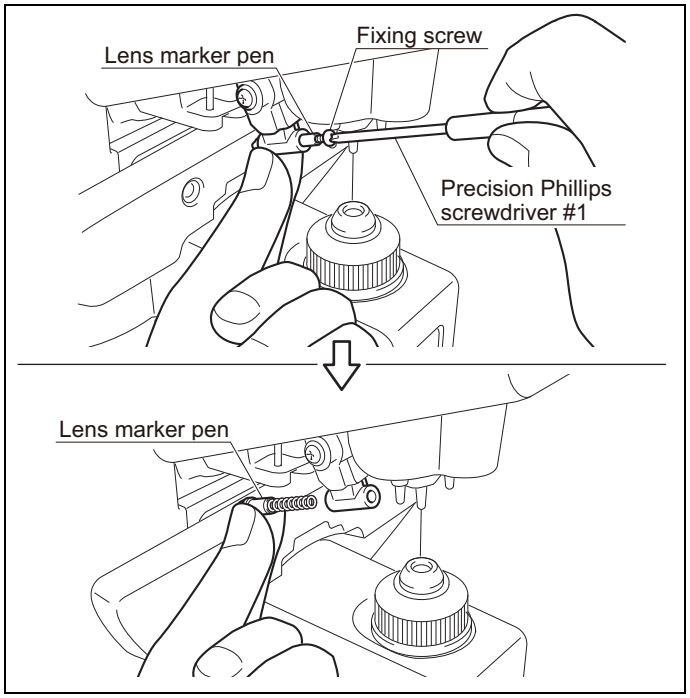
(1)Set the Auto Hold setting on Settings Screen 2 to [Lens Marker Hold (Precision Hold)].
(2)Lower the lens holder to secure the eyeglass or single lens.
(3)Align the cursor on the hold point until displaying the lens marker hold cursor.
(4)Rotate the lens marker lever in the direction of the arrow.



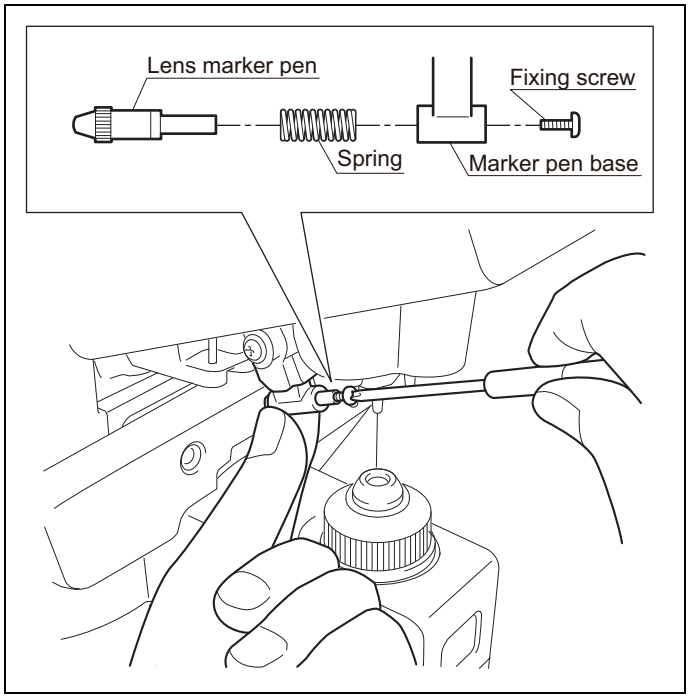
(5)Lower the lens marker lever after rotating it.

> Observe the following precautions to prevent damage to the pen tip.
> - Make sure rotate lens marker lever first then push downwards.
> (Otherwise may damage the marker pens by hitting the lens table.)
> - ⚠ Do not apply excessive force when lowering the lens marker lever.
> (Doing so may damage the lens.)
> - Do not operate the lens marker lever if a lens is not set onto the device.
> - Do not touch the pen tip when cleaning the device.

◆Replacing the lens marker pen



(1)Remove the screw securing the lens marker pen before removing it from the base.



(2)Mount the spring to the pen first, then insert them together into the base. Finally, secure the pen with the screw.

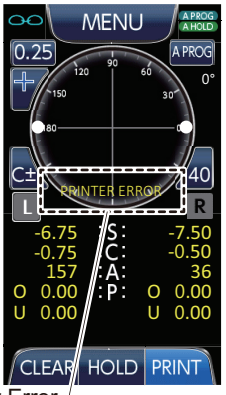
When replacing a lens marker:
- Use original spare part from OptiSource.
- Do not touch the pen tip.
- Do not overtight the fixing screw. (Doing so may damage the lens marker.)
- Do not lose the screw or the spring.

Suggested tightening torque for lens marker pen screw.
3 inch-pounds (± 10%)

5-4. Built In Printer (only on AXIS 900P)

◆Printing out results

PRINT button



Printer Error Indication

(1)Complete measurements.
(2)Press PRINT button to print out.

> ⚠
> • Printing will not start until you complete all measurements.
> • If "PRINTER ERROR" message appears, please refer to Page 45.

◆Print out samples

〈Eyeglass/Single Vision〉

```
        OptiSource
<L>      Single      <R>
 - 7.01     S     + 5.23
 + 0.00     C     + 0.00
    0°      A        0°
   0.07    PSM      0.04
   351°    BAS      56°
```

Prism Δaxis

〈Eyeglass/Progressive〉*

```
        OptiSource
<L>    Progressive   <R>
 - 1.62     S     + 2.00
 + 0.00     C     + 0.19
    0°      A        33°
 I 0.07    PSM    I 0.31
 U 1.89           D 5.44
 + 3.16    ADD    + 2.98
```

Prism BUBO

〈Single Lens/Single Vision〉

```
        OptiSource
          Single
             S     + 5.25
             C     + 0.00
             A        0°
```

No Prism Indication set

〈Single Lens/Progressive〉

```
        OptiSource
         Progressive
             S     + 1.94
             C     + 0.18
             A        52°
           ADD     + 1.74
```

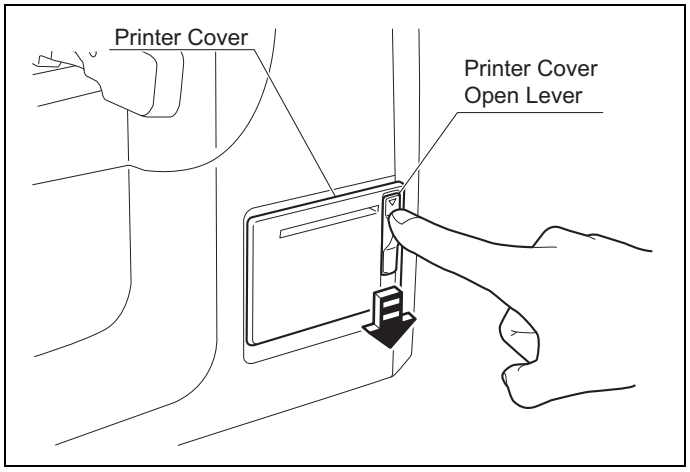
〈Contact Lens〉

```
        OptiSource
          Contact
             S     + 4.99
             C     + 0.00
             A        0°
           PSM     C 0.04
                   D 0.01
```

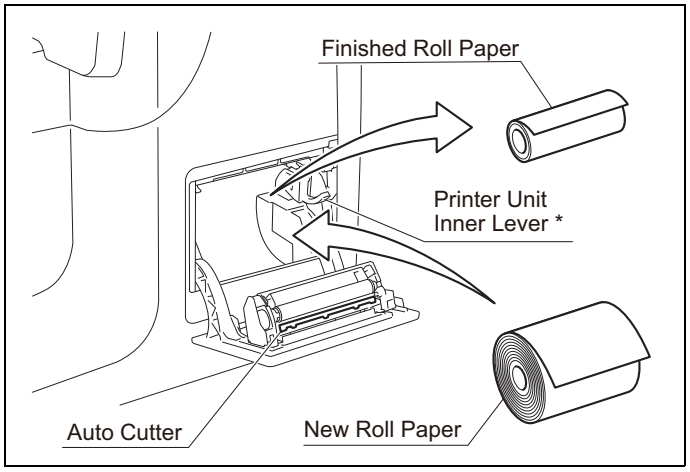
*When the near point is located on the lens edge (results displayed in orange numbers), the ADD value will be printed inside parenthesis.

```
        OptiSource
<L>    Progressive   <R>
 - 1.62     S     + 2.00
 + 0.00     C     + 0.19
    0°      A        33°
 I 0.07    PSM    I 0.31
 U 1.89           D 5.44
 (+ 3.16)  ADD   (+ 2.98)
```

◆Changing Roll Paper

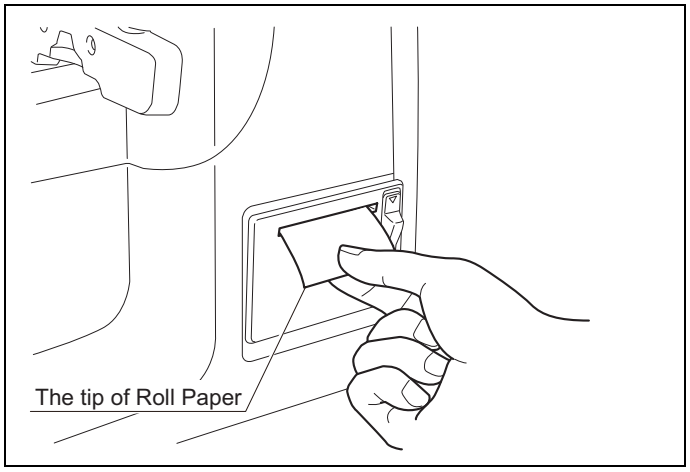


(1)Press down the Printer Cover Open Lever.
(2)Open the printer cover.



(3)Take out finished roll paper, then insert a new roll.

- Do not touch auto cutter.
  (Blade in the auto cutter might cause injury.)
- Make sure the roll paper is set in the right direction.
  (If paper is set upside down, printer will not operate properly.)
- Use genuine roll paper from OptiSource.



(4)Close printer cover and leave the tip of roll paper outside.

* If the Inner Lever interferes with the Printer Cover when closing, push forward the Inner Lever till it is locked, then close the Printer Cover.

- Do not touch upper part of printer unit.
  (It gets hot right after printing, and might cause a skin burn.)
- Store Printer Paper in a cool place. It can be deteriorated if stored in a high temperature environment.

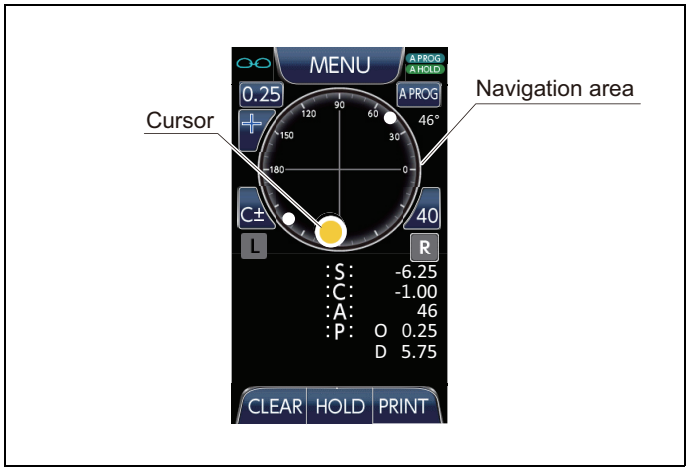
6.MEASURING PROCEDURES

6-1. SINGLE VISION LENSES (SCA, SCAP)

6-1-1. Eyeglasses (AUTO HOLD Enabled)

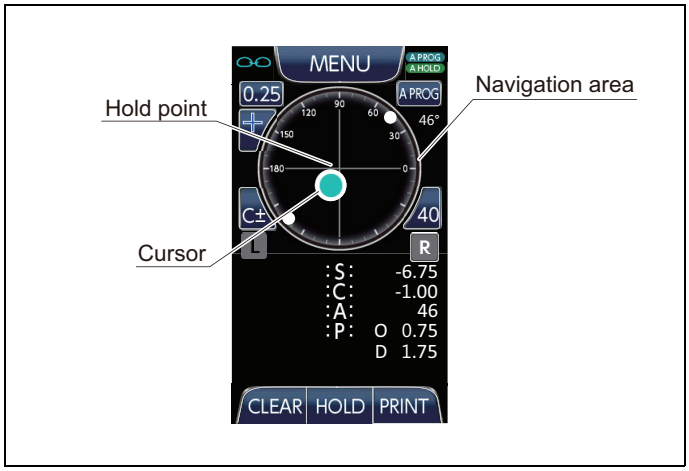
This procedure starts from Right side lens. If you want to begin from the Left side, please tap on the "Left measurement button".

This procedure defines device operation when "AUTO HOLD" is enabled (refer to P. 13).



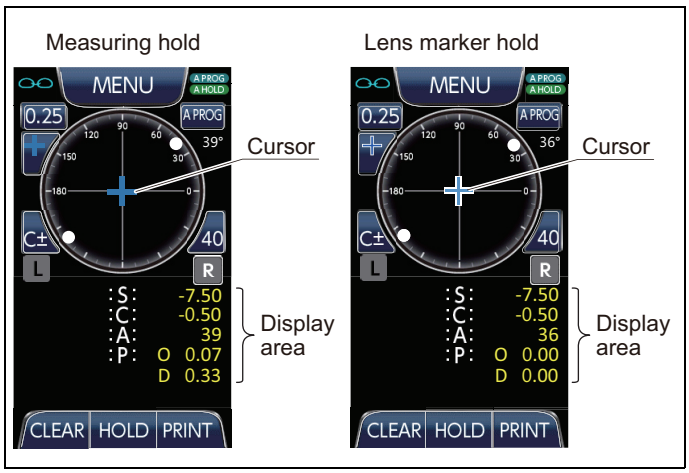
(1)Place the right-eye lens onto the nosepiece.

<Screen display>
The cursor will appear in the navigation area when a lens is set onto the nosepiece.



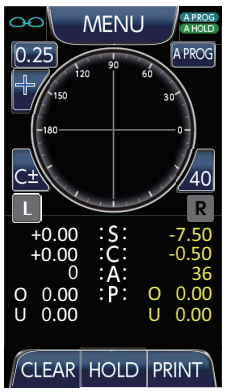
(2)Move the lens for bringing the cursor into the hold point located in the center of the navigation area.

<Screen display>
The on-screen cursor will move accordingly with lens movement.
The color of the cursor changes from red to yellow and then to yellow-green as it moves closer to the hold point.



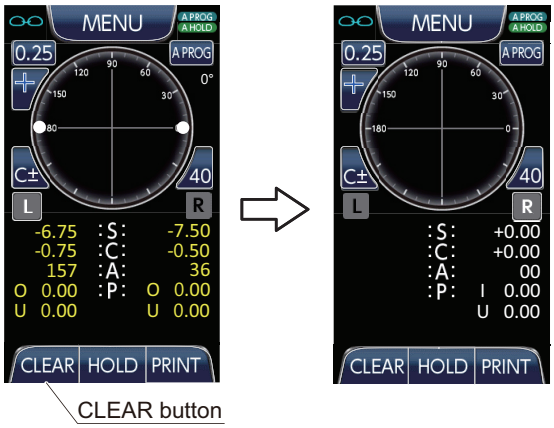
(3)The optical center will be automatically determined once the cursor is in alignment with the hold point.

<Screen display>
The cursor will turn blue once it is in alignment with the hold point.
The HOLD button will turn momentarily blue when the center is determined.
The S, C, A, and P values will appear in yellow on the right side display area once the measurements have been calculated.
Press the CLEAR button if you need to retake measurements.



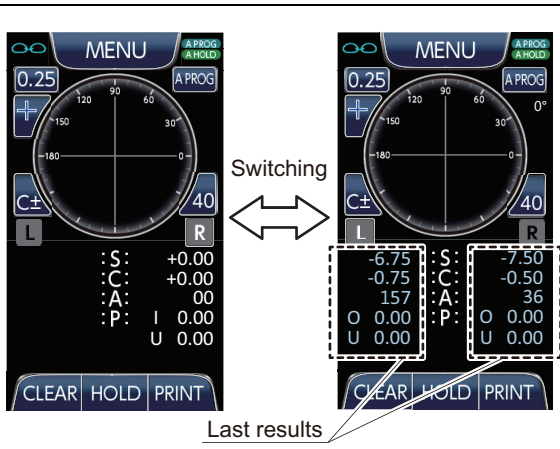
(4)Remove the right-eye lens from the nosepiece.

<Screen display>
The cursor will disappear from the screen.
The system will change to the left-eye lens measurement mode once the right-eye lens is removed.



(5)After measurements are completed, remove the eyeglasses and then press the CLEAR button to erase the results and reset the Measurement screen.
At this time, pressing the CLEAR button will store the erased measurement result as the previous value.
(If only one side has been measured, only one side is memorized)
If you do not press the CLEAR button and set a new lens, you can overwrite the measurement result on the screen. Please press the (L) or (R) button for selecting the side you want to measure.

* If you want to store the last measurement results, please make sure to press the CLEAR button. If you insert a new lens without pressing the CLEAR button, last measurement data will be lost.



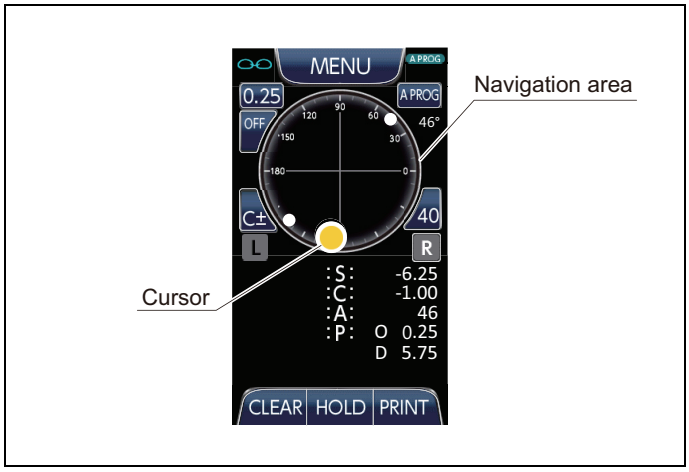
(6)When you press the measurement value display area without setting a lens, the previous value will be displayed in light blue.
(7)If you press the measurement value display area again, the screen will show the last results (yellow numbers). If you keep pressing in the measurement value display area, the last and previous results will be showed alternately.
(8)After the measurement is completed (yellow numbers are displayed), remove the lens and press the CLEAR button to store the last values in memory.
(9)The values stored in memory will be erased after doing one of the following.

- Change one of the following settings in the Main Menu
  - Measurement mode
  - Lens mode
  - Auto Progressive
- Mode change with measurement mode switching button on measurement screen
- Power OFF

6-1-2. Eyeglasses (AUTO HOLD Disabled)

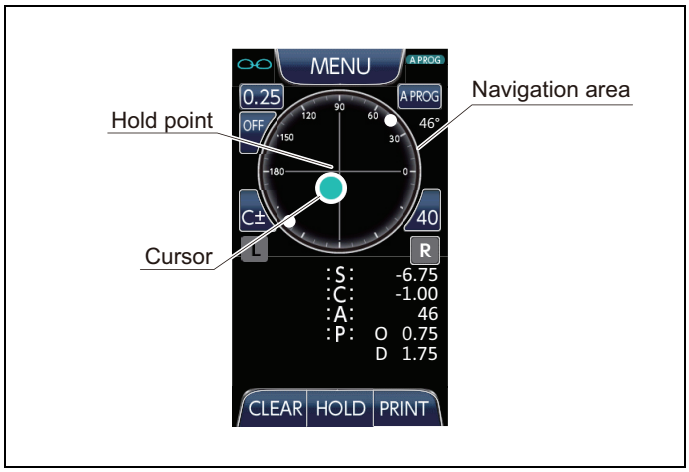
This procedure starts from Right side lens. If you want to begin from the Left side, please tap on the "Left measurement button".

This procedure defines device operation when "AUTO HOLD" is disabled (refer to P. 13).



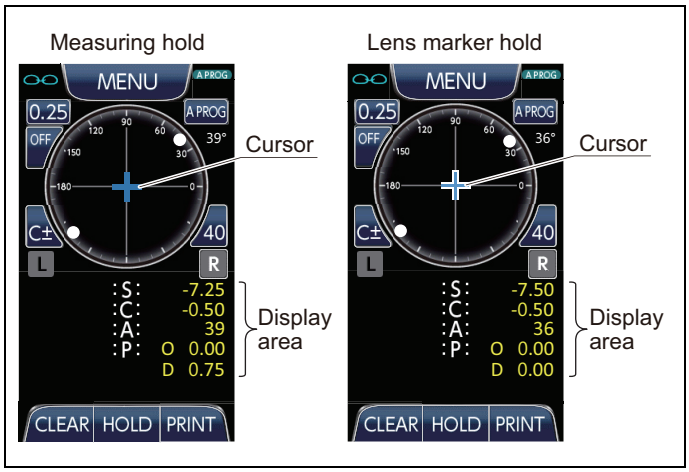
(1)Place the right-eye lens onto the nosepiece.

<Screen display>
The cursor will appear in the navigation area when a lens is set onto the nosepiece.



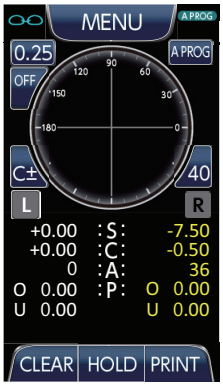
(2)Move the lens for bringing the cursor into the hold point located in the center of the navigation area.

<Screen display>
The on-screen cursor will move accordingly with lens movement.
The color of the cursor changes from red to yellow and then to yellow-green as it moves closer to the hold point.



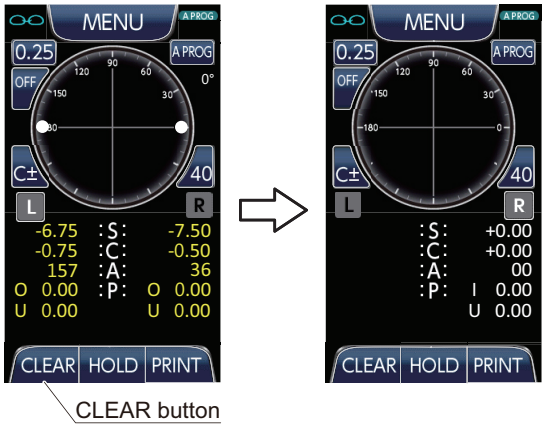
(3)Press the HOLD button (either on-screen or built-in) once the cursor has been aligned to the hold point.

<Screen display>
The cursor will turn blue once it is in alignment with the hold point.
After the HOLD button (either on-screen or built-in) has been pressed, the S, C, A, and P values will appear in yellow on the right side display area once the measurements have been calculated.
Press the CLEAR button if you need to retake measurements.



(4)Remove the right-eye lens from the nosepiece.

<Screen display>
The cursor will disappear from the screen.
The system will change to the left-eye lens measurement mode once the right-eye lens is removed.



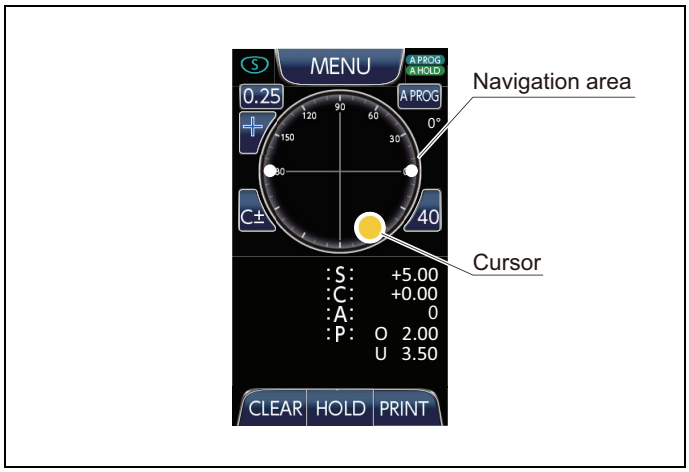
(5)After measurements are completed, remove the eyeglasses and then press the CLEAR button to erase the results and reset the Measurement screen.
At this time, pressing the CLEAR button will store the erased measurement result as the previous value.
(If only one side has been measured, only one side is memorized)
If you do not press the CLEAR button and set a new lens, you can overwrite the measurement result on the screen. Please press the (L) or (R) button for selecting the side you want to measure.

* If you want to store the last measurement results, please make sure to press the CLEAR button. If you insert a new lens without pressing the CLEAR button, last measurement data will be lost.

(6)About the display of previous results, please refer to steps "6-1-1. (6) ~ (9)" (P.24)

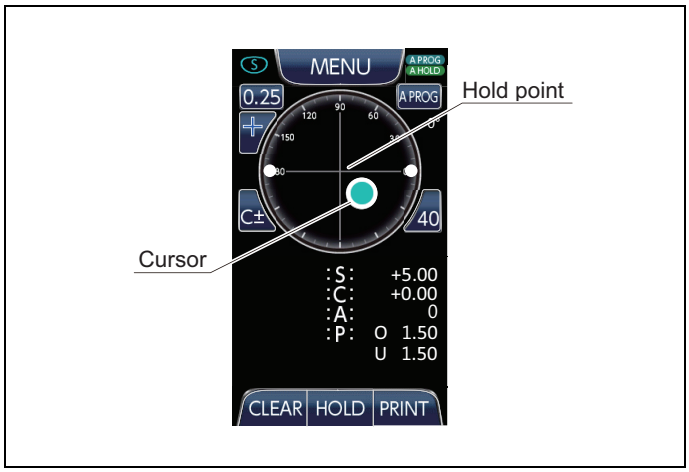
6-1-3. Lens Blanks (Uncut Lenses)

This procedure defines device operation when "AUTO HOLD" is enabled. (refer to P. 13).
For the procedure when "AUTO HOLD" is disabled, please follow the steps described in page 25.



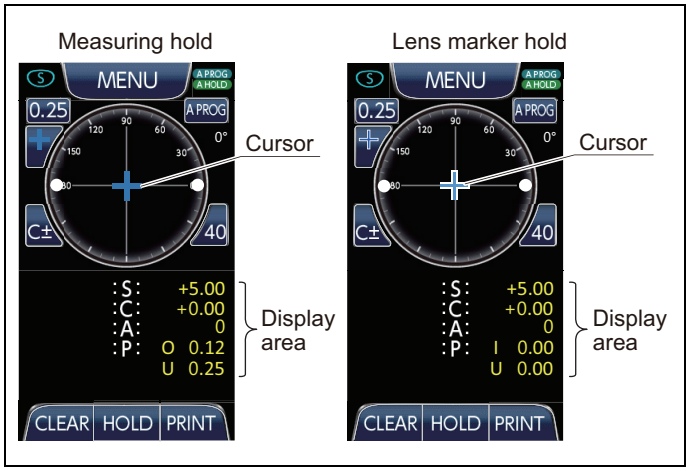
(1)Place a lens blank (uncut lens) onto the nosepiece.

<Screen display>
The cursor will appear in the navigation area when a lens is set onto the nosepiece.



(2)Move the lens for bringing the cursor into the hold point located in the center of the navigation area.

<Screen display>
The on-screen cursor will move accordingly with lens movement.
The color of the cursor changes from red to yellow and then to yellow-green as it moves closer to the hold point.

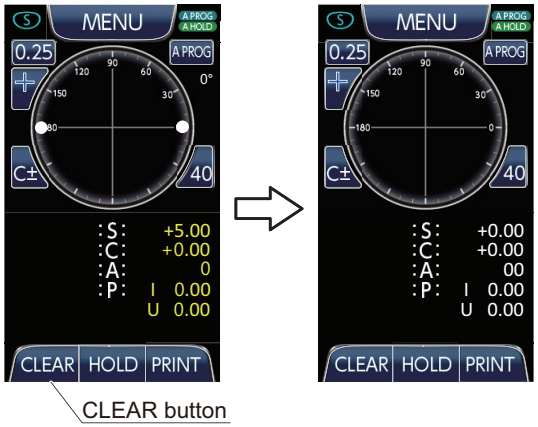


(3)The optical center will be automatically determined once the cursor is in alignment with the hold point.

<Screen display>
The cursor will turn blue once it is in alignment with the hold point.
The HOLD button will turn momentarily blue when the center is determined.
The S, C, A, and P values will appear in yellow on the right side display area once the measurements have been calculated.
Press the CLEAR button if you need to retake measurements.

(4)Remove the lens blank (uncut lens) from the nosepiece.

<Screen display>
The cursor will disappear from the screen.



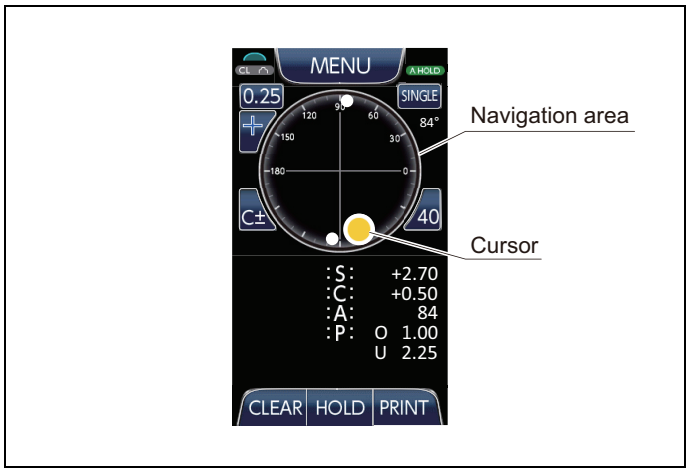
(5)Press the CLEAR button to erase the results and reset the Measurement screen.
At this time, pressing the CLEAR button will store the erased measurement result as the previous value.
If you do not press the CLEAR button and set a new lens, you can overwrite the measurement result on the screen.

* If you want to store the last measurement results, please make sure to press the CLEAR button. If you insert a new lens without pressing the CLEAR button, last measurement data will be lost.

(6)About the display of previous results, please refer to steps "6-1-1. (6) ~ (9)" (P.24)

6-1-4. Contact Lenses

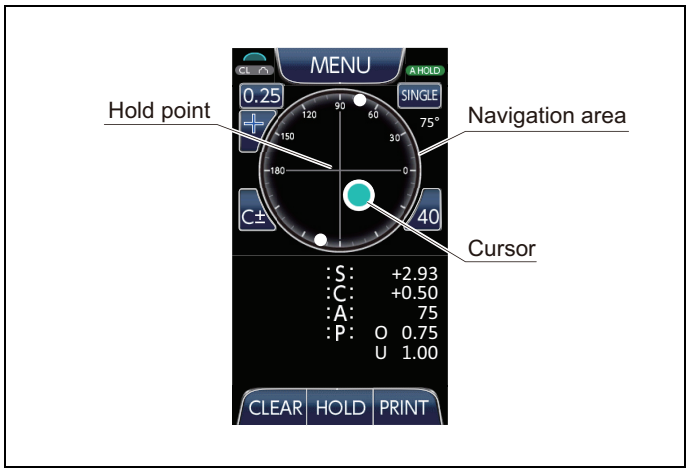
This procedure defines device operation when "AUTO HOLD" is enabled. (refer to P. 13).
For the procedure when "AUTO HOLD" is disabled, please follow the steps described in page 25.



(1)Place a contact lens onto the contact lens holder.

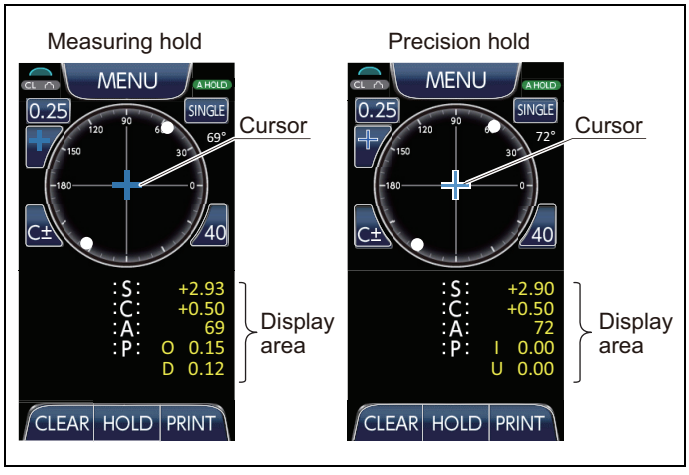
<Screen display>
The cursor will appear in the navigation area when a contact lens is set onto the contact lens holder.

⚠ Make sure you have set the contact lens holder before measuring a lens.



(2)Move the contact lens for bringing the cursor into the hold point located in the center of the navigation area.

<Screen display>
The on-screen cursor will move accordingly with contact lens movement.
The color of the cursor changes from red to yellow and then to yellow-green as it moves closer to the hold point.

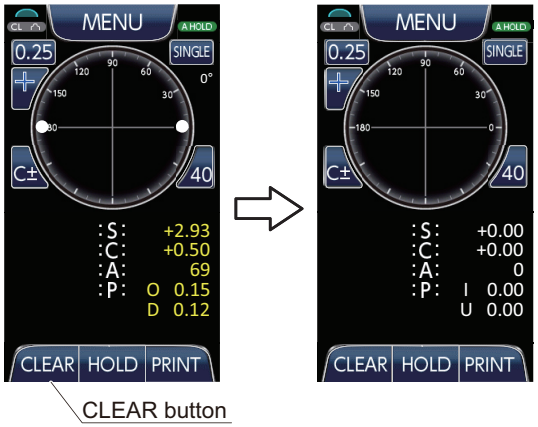


(3)The optical center will be automatically determined once the cursor is in alignment with the hold point.

<Screen display>
The cursor will turn blue once it is in alignment with the hold point.
The HOLD button will turn momentarily blue when the center is determined.
The S, C, A, and P values will appear in yellow on the right side display area once the measurements have been calculated.
Press the CLEAR button if you need to retake measurements.

(4)Remove the contact lens from the contact lens holder.

<Screen display>
The cursor will disappear from the screen.



(5)Press the CLEAR button to erase the results and reset the Measurement screen.
At this time, pressing the CLEAR button will store the erased measurement result as the previous value.
If you do not press the CLEAR button and set a new lens, you can overwrite the measurement result on the screen.

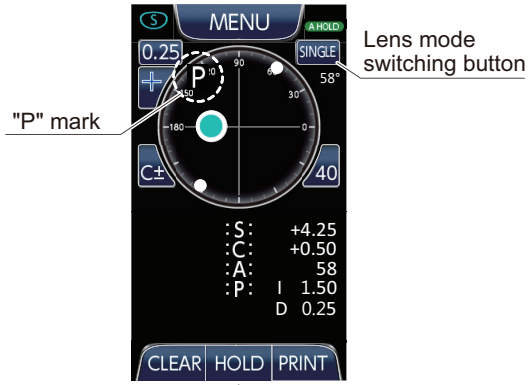
* If you want to store the last measurement results, please make sure to press the CLEAR button. If you insert a new lens without pressing the CLEAR button, last measurement data will be lost.

(6)About the display of previous results, please refer to steps "6-1-1. (6) ~ (9)" (P.24)

6-1-5. When measuring a lens different than the configured type

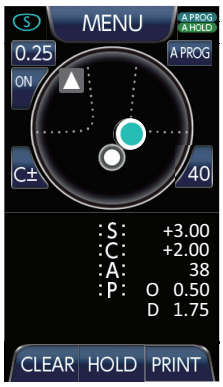
When a lens different from the "Lens Mode" setting (P.11) is placed into the nosepiece, the following display will appear.

Single vision lens mode



Progressive lens mode

Switching



<Measurement condition>
Lens mode: Single vision lens
Measured lens: Progressive lens

A "P" mark is displayed at the upper left section of the navigation area, notifying that lens under measure is a progressive lens.

For this case, set Lens mode to PROG by tapping on the "Lens mode switching button" on screen and measure again.

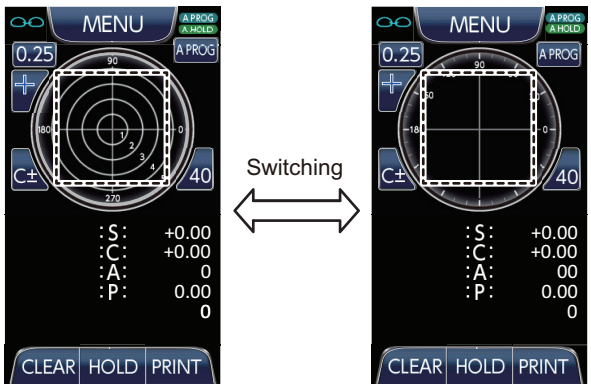
<Measurement condition>
Lens mode: progressive lens
Measuring lens: single vision lens

Measurement can not be done.

For this case, set Lens mode to SINGLE or A PROG by tapping on the "Lens mode switching button" on screen and measure again.

6-1-6. Prism Measurement Screen

When Prism Measurement Screen is selected (refer to P.17), Prism scale screen with + cursor will appear. The cursor moves according to Prism Δ axis. As the cursor approaches to hold point, color of the cursor changes.



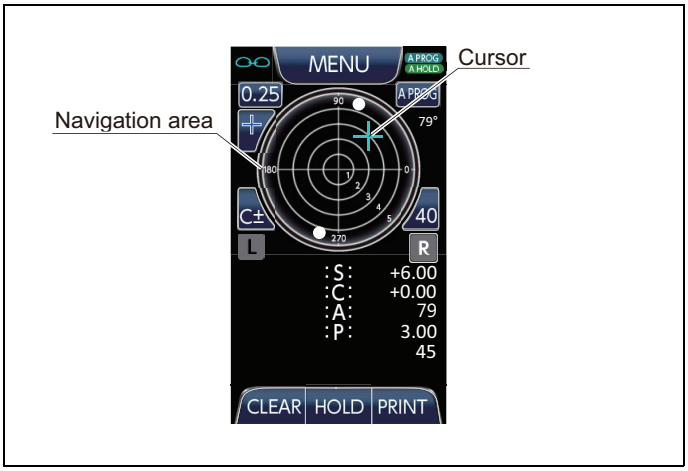
The measurement screen temporally changes by pressing the area indicated in left picture.

Example: When you measure 2.00 Δ/90° prescribed prism lens, set the cursor over the circle scale of 2 Δ at 90° then check vertex power.

Example: When you measure 4.00 Δ/135° prescribed prism lens, set the cursor over the circle scale of 4 Δ at 135° then check vertex power.

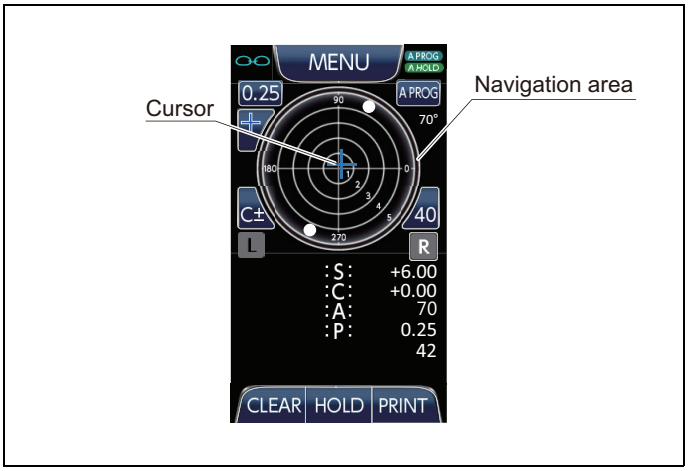
This procedure starts from Right side lens. If you want to begin from the Left side, please tap on the "Left measurement button".

Operation shown below is in AUTO HOLD ON (Refer to P13) and Prism SCREEN MODE (Refer to P17).



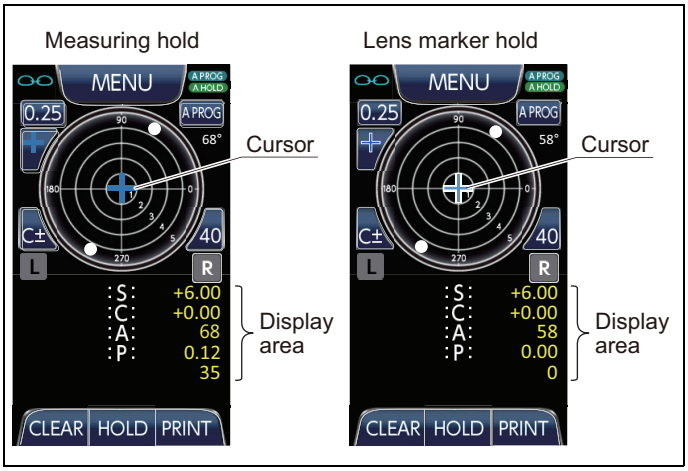
(1)Place the right-eye lens onto the nosepiece.

<Screen display>
The cursor will appear in the navigation area when a lens is set onto the nosepiece.



(2)Move the lens for bringing the cursor into the hold point located in the center of the navigation area.

<Screen display>
The on-screen cursor will move accordingly with lens movement.
As prism value comes smaller, The color of the cursor changes from red to yellow and then yellow-green as it moves closer to the hold point.

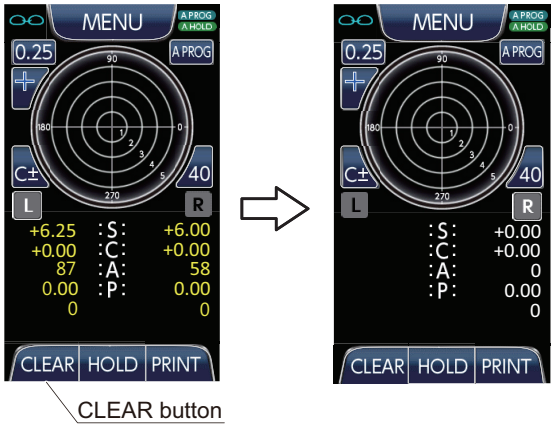


(3)The optical center will be automatically determined once the cursor is in alignment with the hold point.

<Screen display>
The cursor will turn blue once it is in alignment with the hold point.
The HOLD button will turn momentarily blue when the center is determined.
The S, C, A, and P values will appear in yellow on the right side display area once the measurements have been calculated.
Press the CLEAR button if you need to retake measurements.

(4)Remove the right-eye lens from the nosepiece.

<Screen display>
The cursor will disappear from the screen.
The system will change to the left-eye lens measurement mode once the right-eye lens is removed.



(5)After measurements are completed, remove the eyeglasses and then press the CLEAR button to erase the results and reset the Measurement screen.
At this time, pressing the CLEAR button will store the erased measurement result as the previous value.
(If only one side has been measured, only one side is memorized)
If you do not press the CLEAR button and set a new lens, you can overwrite the measurement result on the screen. Please press the (L) or (R) button for selecting the side you want to measure.

* If you want to store the last measurement results, please make sure to press the CLEAR button. If you insert a new lens without pressing the CLEAR button, last measurement data will be lost.

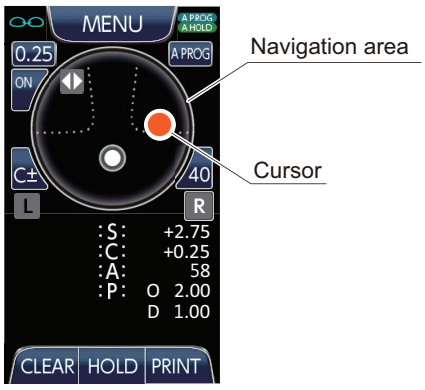
(6)About the display of previous results, please refer to steps "6-1-1. (6) ~ (9)" (P.24)

6-2. PROGRESSIVE LENSES (SCA/ADD, SCAP/ADD)

6-2-1. Eyeglasses

This procedure starts from Right side lens. If you want to begin from the Left side, please tap on the "Left measurement button".

The following procedure describes operation under the conditions described below :
Enabled functions : "AUTO HOLD FAR" & "AUTO HOLD NEAR" (refer to P. 13), "AUTO PROG" (refer to P. 14) and "PRISM" (refer to P. 12)



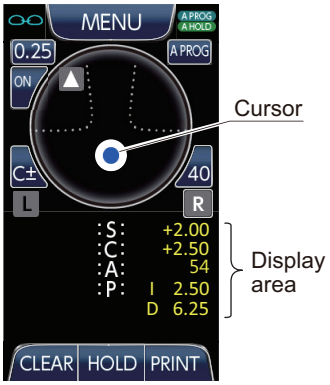
(1)Place the right-eye lens onto the nosepiece.

<Screen display>
The cursor will appear in the navigation area when a lens is set onto the nosepiece.

Tip for measuring progressive lenses.
- Place the center of the lens on the nosepiece, then move forward and backwards slowly. The Screen will change into Progressive measurement mode. Once the device is into Progressive measurement mode, move slowly from center towards far point.
- If progressive corridor locator appears, start moving the lens left and right until Far point locator appears again.
- Make sure that surface of the lens is in contact with the nosepiece.

(2)Move the lens for bringing the cursor into the hold point located in the lower part of the navigation area.

<Screen display>
The on-screen cursor will move accordingly with lens movement.
The color of the cursor changes from red to yellow and then to yellow-green as it moves closer to the hold point.

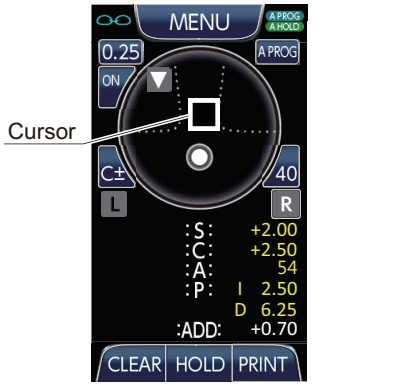


(3)The far point will be automatically determined once the cursor is in alignment with the hold point.

<Screen display>
The cursor will turn blue once it is in alignment with the hold point.
The HOLD button will turn momentarily blue when the center is determined.
The S, C, A, and P values will appear in yellow on the right side display area once the measurements have been calculated.
Press the CLEAR button if you need to retake measurements.

(4)After the far point is determined, the system will switch automatically to the near point calculation.

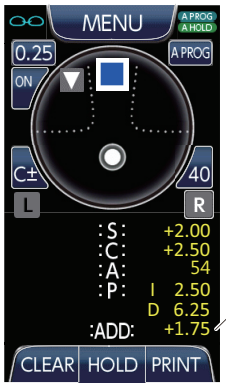
<Screen display>
The color and shape of the cursor will change, as well as the ADD value calculation will start.
The S, C, A, and P measurements are fixed to the far-point values.



(5)Move the lens for bringing the cursor into the upper part of the navigation area.

<Screen display>
The on-screen cursor will move accordingly with lens movement.
The color and shape of the cursor changes from a white cross to a white outline square when it is close to the near point.

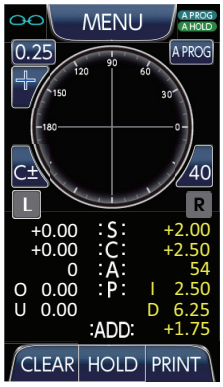
Tip for measuring progressive lenses.
If the cursor does not change from a white cross or a white outline square into a blue square, move the cursor back to the center, and try again.



(6)The near point is automatically determined.

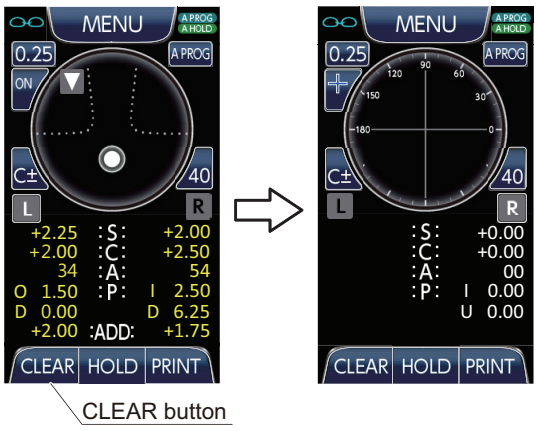
<Screen display>
The cursor will turn blue once it has found the near point.
The HOLD button will turn momentarily blue when the near point is determined.
The ADD measurement will appear in yellow in the right side display area once the measurement has been calculated.
Press the CLEAR button if you need to retake measurements.

* If the near point is located on the lens edge, measurements will be displayed in orange. These measurements should be considered as a reference.



(7)Remove the right-eye lens from the nosepiece.

<Screen display>
The cursor will disappear from the screen.
The system will change to the left-eye lens measurement mode once the right-eye lens is removed.



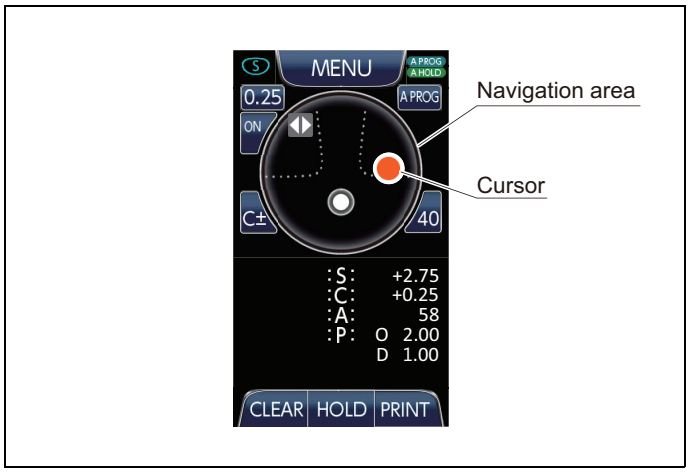
(8)After measurements are completed, remove the eyeglasses and then press the CLEAR button to erase the results and reset the Measurement screen.
At this time, pressing the CLEAR button will store the erased measurement result as the previous value.
(If only one side has been measured, only one side is memorized)
If you do not press the CLEAR button and set a new lens, you can overwrite the measurement result on the screen. Please press the (L) or (R) button for selecting the side you want to measure.

* If you want to store the last measurement results, please make sure to press the CLEAR button. If you insert a new lens without pressing the CLEAR button, last measurement data will be lost.

(9)About the display of previous results, please refer to steps "6-1-1. (6) ~ (9)" (P.24)

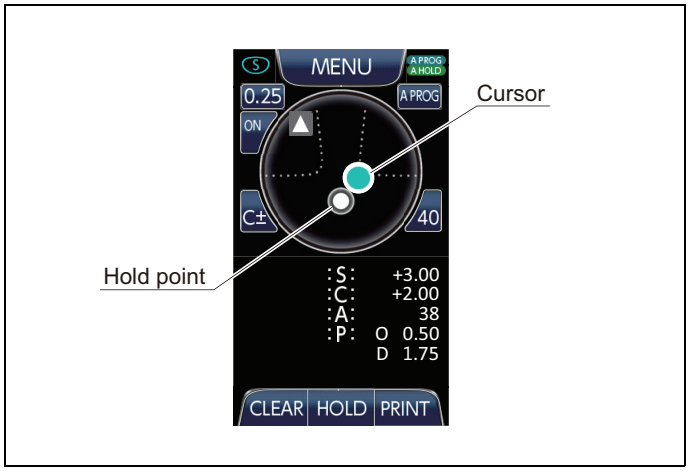
6-2-2. Lens blanks (Uncut lenses)

The following procedure describes operation under the conditions described below :
Enabled functions : "AUTO HOLD FAR" & "AUTO HOLD NEAR" (refer to P. 13), "AUTO PROG" (refer to P. 14) and "PRISM" (refer to P. 12)



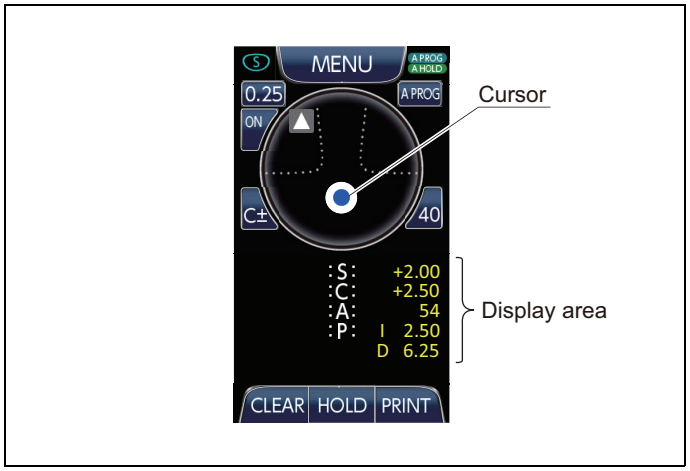
(1)Place a lens blank (uncut lens) onto the nosepiece.

<Screen display>
The cursor will appear in the navigation area when a lens is set onto the nosepiece.



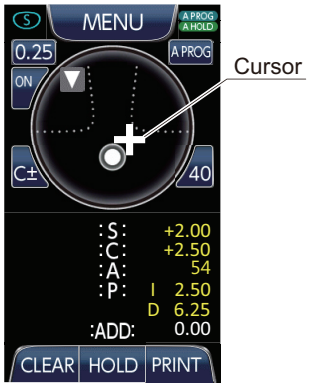
(2)Move the lens for bringing the cursor into the hold point located in the lower part of the navigation area.

<Screen display>
The on-screen cursor will move accordingly with lens movement.
The color of the cursor changes from red to yellow and then to yellow-green as it moves closer to the hold point.



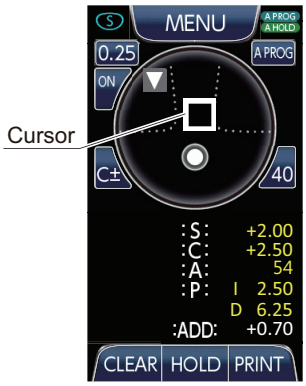
(3)The far point will be automatically determined once the cursor is in alignment with the hold point.

<Screen display>
The cursor will turn blue once it is in alignment with the hold point.
The HOLD button will turn momentarily blue when the center is determined.
The S, C, A, and P values will appear in yellow on the right side display area once the measurements have been calculated.
Press the CLEAR button if you need to retake measurements.



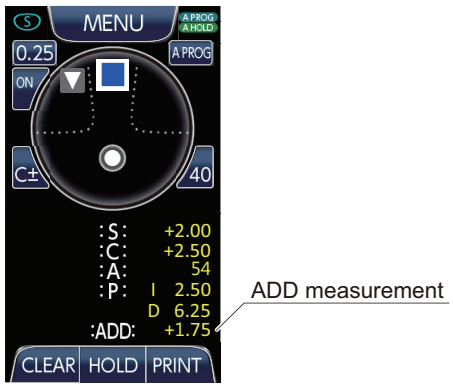
(4)After the far point is determined, the system will switch automatically to the near point calculation.

<Screen display>
The color and shape of the cursor will change, as well as the ADD value calculation will start.
The S, C, A, and P measurements are fixed to the far-point values.



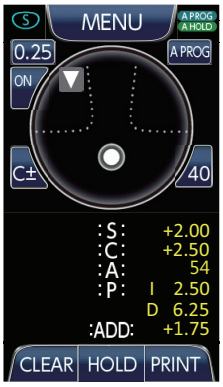
(5)Move the lens for bringing the cursor into the upper part of the navigation area.

<Screen display>
The on-screen cursor will move accordingly with lens movement.
The color and shape of the cursor changes from a white cross to a white outline square when it is close to the near point.



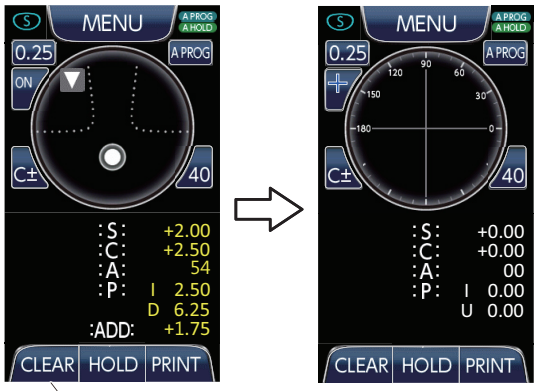
(6)The near point is automatically determined.

<Screen display>
The cursor will turn blue once it has found the near point.
The HOLD button will turn momentarily blue when the near point is determined.
The ADD measurement will appear in yellow in the right side display area once the measurement has been calculated.
Press the CLEAR button if you need to retake measurements.



(7)Remove the lens from the nosepiece.

<Screen display>
The cursor will disappear from the screen.



(8)After measurements are completed, remove the lens and then press the CLEAR button to erase the results and reset the Measurement screen.
At this time, pressing the CLEAR button will store the erased measurement result as the previous value.
If you do not press the CLEAR button and set a new lens, you can overwrite the measurement result on the screen.

* If you want to store the last measurement results, please make sure to press the CLEAR button.
If you insert a new lens without pressing the CLEAR button, last measurement data will be lost.

(9)About the display of previous results, please refer to steps "6-1-1. (6) ~ (9)" (P.24)

7.CLEANING

<Auto-lensometer Main Unit>

Wipe the surface with a soft cloth.

Do not use aerosol sprays, solvents or abrasives.

<Cover glass>

Use lens cleaning products to clean the cover glass whenever dirty.

<LCD Screen>

Use a dry or slightly damp, soft cloth to clean the screen whenever dirty.

Using excessive force to wipe the screen with a dry cloth may cause damage to it.

Do not use aerosol sprays, solvents or abrasives.

<Printer>

Clean up the slot of auto cutter.

Do not use a blower. It might blow dust into the unit.

8.SPECIFICATIONS

Measurement range	Spherical power	-25 D to +25 D	(0.01/0.12/0.25 step)
	Cylindrical power	-10 D to +10 D	(0.01/0.12/0.25 step)
	Axis	0 to 180°	(1° step)
	ADD power	0 to +10 D	(0.01/0.12/0.25 step)
	Prism power	0 to 12 Δ	(0.01/0.12/0.25 step)
	Measurable lens diameter	Max 100 mm	
	LED wavelength	528 nm	
User interface	4.3 inch TFT LCD Touch Panel Screen Built-in HOLD button		
Power supply	Power supply voltage: 100 to 240 V AC (50/60 Hz)		
	Power consumption	AXIS 900	Max 13 VA
		AXIS 900P	Max 38 VA
	Sleep Mode	Off, 3, 5, and 10 minutes (selectable)	
Dimensions/ Weight	AXIS 900	222 (W) x 301 (D) x 414 (H) mm 8.7 (W) x 11.9 (D) x 16.3 (H) inches 3.6 kg (8.0 pounds)	
	AXIS 900P	233 (W) x 301 (D) x 414 (H) mm 9.2 (W) x 11.9 (D) x 16.3 (H) inches 4.0 kg (8.8 pounds)	
Environmental conditions	During use		
	Temperature	+10 to +35°C (+50 to +95°F)	
	Humidity	30 to 85%	
	Pressure	800 to 1060 hPa	
	Installation site	Indoors	
	Storage		
	Temperature	-10 to +55°C (+14 to +131°F)	
	Humidity	10 to 85%	
	Pressure	700 to 1060 hPa	
	Transport		
	Temperature	-20 to +60°C (-4 to +140°F)	
	Humidity	10 to 85%	
	Pressure	500 to 1060 hPa	
Printer	AXIS 900P	Built in thermal printer with auto paper cutter	
	Roll Paper Size	W 58 mm x 25 m	
	*Built In Printer is ONLY available in AXIS 900P.		
Other specifications	Installation category	II (Over-voltage categories)	
	Pollution degree	2 (IEC60664)	

9.TROUBLESHOOTING

Problem	Possible cause	Countermeasure
Device does not start.	Power cable is not connected to an electrical outlet.	Connect the power cable to an electrical outlet.
	Power cable is not completely connected to the device.	Connect the power cable to the device.
	Power switch is in OFF position.	Turn ON the power switch.
	Fuse is blown.	**Contact your dealer or nearest service center.**
Device beeps during startup, but nothing appears on the screen.	LCD malfunction.	**Contact your dealer or nearest service center.**
LCD screen suddenly becomes black.	Standby function is ON.	Tap over the LCD screen or push the built-in HOLD button.
Screen does not respond to touch during operation.	Touch panel malfunction.	**Contact your dealer or nearest service center.**
Lens marking is blurry.	Lens marker has run out of ink.	Replace the lens marker pen.
	Ink has dried.	
The cursor is displayed on the navigation screen as if making measurements, but there is no lens placed onto the device.	Environmental conditions (such as temperature) has significantly changed from when starting up the device.	Reinitialize the optical system using the "RESET" function from Settings Screen 3. (refer to P16)
"Lens Removed?" message is displayed and not starting.	The unit is turned on when a lens is left on the nosepiece.	Remove Lens.
	Other cases besides from above, if the unit was reset manually from Settings Screen 3 with a lens left on the nosepiece.	Press OK button. Then after "Press Start OK?" message is displayed, press OK button again.
Hold Button does not work.	Hold Button malfunction.	Turn the power OFF and ON. **Contact your dealer or nearest service center** if the equipment does not start after a few rebooting attempts.

10.ON SCREEN NOTIFICATION

Error displayed	Possible cause	Countermeasure
Remove LENS	Measurement can be continued even if the message appears.	If measurement is completed, remove the lens and wait until the process is over. (the on screen message will disappear)
Please wait	The device is performing its automatic optical system reset.	Do NOT place lens until the indication is turned off.

11.OVERFLOW

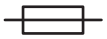
Error displayed	Possible cause	Points to be checked.
OVER FLOW	The device is attempting to measure an unsupported lens. *An error will occur if the S, C, A & Prism values are outside the following ranges. -25 < S < +25 -10 < C < +10 0 < ADD < +10 0 < Δ < 12 These values can be measured only when the prism option ΔAxis has been selected.	Check that the lens is compatible. Alternatively, take measurements of lenses supported and within the specified range.

12.ERROR MESSAGE

Error displayed	Possible cause	Countermeasure
Initializing ERROR	Fail to initialize hardware.	**Contact your dealer or nearest service center.**
System ERROR	An fatal error may have occurred.	Turn the power OFF and ON. **Contact your dealer or nearest service center** if the equipment does not start after a few rebooting attempts.
	PCB malfunction.	
ERROR or Clean COVER GLASS	An object is blocking the measuring light beam.	Remove the object.
	Ambient light is causing interference.	Do not use the device in locations over exposed to ambient light. E.g. , near windows or directly under bright lighting.
	Lens under measure is dirty.	Clean the lens.
	Dirt or dust on the Cover Glass.	Clean the Cover Glass with a soft cloth.
	The nosepiece is not placed correctly.	Remove and reattach the nosepiece.
	The nosepiece is missing.	Attach the nosepiece or the contact lens holder.
	An inappropriate nosepiece is attached.	Attach the appropriate accessory for the lens under measure.
	Another cause not listed.	Contact your dealer or nearest service center after completing this troubleshooting guide.

Error displayed	Possible cause	Countermeasure
ERROR	User is trying to measure the lens edge.	Measure the center, far point, or near point of the lens.
	The lens is positioned at an angle over the nosepiece.	Use the lens holder and/or lens table to measure the lens at a horizontal position.
	The lens is moved too quickly.	Take measurements while moving the lens slowly.
	The user is attempting to measure an unsupported lens.	Check that the lens is compatible. Alternatively, take measurements of lenses supported and within the specified range.
	Optical system malfunction.	Reinitialize the optical system using the "RESET" function from Settings Screen 3. (refer to P16)
	Another cause not listed.	Contact your dealer or nearest service center after completing this troubleshooting guide.
PRINTER ERROR (AXIS 900P only)	Out of roll paper.	Install new roll paper according to section 5-4. The unit will start printing after new roll has been installed.
	Printer cover is not closed completely.	Push the printer cover to close completely.
	Paper jammed.	Open the printer cover and remove jammed paper.
	Others.	If countermeasures above do not work, contact your dealer or nearest service center.

13.LABELS & INDICATIONS

	Indicates the state of the power switch. When this mark side of the switch is pressed, power will not be supplied to the device.
	Indicates the state of the power switch. When this mark side of the switch is pressed, power will be supplied to the device.
	Indicates that the power supplied to the device must be as an alternating current.
	Indicates that the instructions described in the manual must be followed during operation.
	Indicates the date of manufacture.
	Indicates that this equipment should be disposed by following state and municipal E-waste guidelines.
	Indicates the place where the fuse can be replaced. Fuse replacement specifications: Rating: 4A AC250V Fuse notation [T4AL 250V]

14.CLASSIFICATION & TECHNICAL SPECS

14-1. DEVICE CLASSIFICATION

◆[Form of protection against electrical shock]

The AXIS 900/900P are classified as Class I device.
A Class I is a device in which the protection against electrical shock does not rely on basic insulation only, but which includes an additional an additional safety precaution in such a way that means are provided for the connection of the device to the protective (ground) conductor in the fixed wiring of the installation in such a way that accessible metal parts cannot become live in the event of a failure in the basic insulation.

◆[Compliance with electromagnetic compatibility specifications]

The AXIS 900/900P comply with EMC standard IEC 60601-1-2: 2007.

◆[Degree of protection against ingress of liquids]

The AXIS 900/900P are classified as IPX0.
An IPX0 is an enclosed system without protection against ingress of liquids.
Be careful not to get any liquid inside the device.

◆[Classification according to the degree of safety of use in the presence of flammable anesthetics and/or flammable cleaning agents]

The AXIS 900/900P are not suitable for use in an environment where flammable anesthetics and/or flammable cleaning agents are present.
Please do not use the device in places where this kind of materials are present.

◆[Methods of sterilization or disinfection recommended by the manufacturer]

The AXIS 900/900P do not contain any parts that require sterilization or disinfection.

◆[Mode of operation]

The AXIS 900/900P are continuous operating devices.

◆[Mode of transport]

The AXIS 900/900P are stationary equipments.

14-2. MEASUREMENT ACCURACY

◆Spherical power (spectacle lens)

[Accuracy]

Measurable range (D)	Accuracy (D)
$-5 \leq D \leq +5$	±0.06
$+5 < D \leq +10$	±0.09
$-5 > D \geq -10$	
$+10 < D \leq +15$	±0.12
$-10 > D \geq -15$	
$+15 < D \leq +20$	±0.18
$-15 > D \geq -20$	
$+20 < D$	±0.25
$-20 > D$	

The accuracy specifications are based on the result of test lens measured in accordance with ISO 8598 (Focimeters)

◆Prism refractive power (spectacle lens)

[Accuracy]

Measurable range (Δ)	Accuracy (Δ)
$0 < \Delta \leq 5$	±0.1
$5 < \Delta \leq 10$	±0.2
$10 < \Delta \leq 12$	±0.3

The accuracy specifications are based on the result of test lens measured in accordance with ISO 8598 (Focimeters)

14-3. EMC (ELECTROMAGNETIC COMPATIBILITY)

The AXIS 900/900P comply with the requirements of the EMC (electromagnetic compatibility) standard described in the following table.
When using the equipment under an electromagnetic environment, please refer to this guidance.

This technical information provides "the requirements about the EMC environment for safely use electronic devices" according to the EMC (Electromagnetic Compatibility) standard.
The EMC standard regulates the influence of noise generated from equipment to the level that does not affect other electronic equipment (emission), as well as noise generated by other electronic equipment (portable type, mobile type radio communication equipment, etc.) so as to keep it functioning normally (immunity).

◆EMC (IEC60601-1-2 : 2007)

<table>
<tr><th colspan="3">Guidance and manufacturer’s declaration – electromagnetic emissions</th></tr>
<tr><td colspan="3">The AXIS 900/900P are intended for use in the electromagnetic environment specified below.
The customer or the user of AXIS 900/900P should assure that it is used in such environment.</td></tr>
<tr><th>Emissions test</th><th>Compliance</th><th>Electromagnetic environment - guidance</th></tr>
<tr><td>RF Emissions
CISPR 11</td><td>Group 1</td><td>The AXIS 900/900P use RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.</td></tr>
<tr><td>RF Emissions
CISPR 11</td><td>Class 8</td><td rowspan="3">The AXIS 900/900P are suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.</td></tr>
<tr><td>Harmonic Emissions
IEC 61000-3-2</td><td>*1</td></tr>
<tr><td>Voltage fluctuations / flicker emissions
IEC 61000-3-3</td><td>*2</td></tr>
</table>

*1 : For the regions where the rated voltage is 220V or greater, this equipment complies with class A. For the regions where the rated voltage is less than 220V, this standard is not applicable.

*2 : For the regions where the rated voltage is 220V or greater, this equipment complies with this standard. For the regions where the rated voltage is less than 220V, this standard is not applicable.

Guidance and manufacturer's declaration - electromagnetic immunity			
The AXIS 900/900P are intended for use in the electromagnetic environment specified below. The customer or the user of AXIS 900/900P should assure that it is used in such environment.			
Immunity test	IEC 60601 Test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) IEC 61000-4-2	± 6kV contact ± 8kV air	± 6kV contact ± 8kV air	Floor should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	± 2kV for power supply lines ± 1kV for power supply lines	± 2kV for power supply lines ± 1kV for power supply lines	Main power quality should be that of a typical commercial and/or hospital environment.
Surge IEC 61000-4-5	± 1k line to line ± 2k line to ground	± 1k line to line ± 2k line to ground	
Voltage dips, short interruptions and voltage variations on power supply IEC 61000-4-11	<5% U_T (>95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (95% dip in U_T) for 5 sec	<5% U_T (>95% dip in U_T) for 0.5 cycle 40% U_T (60% dip in U_T) for 5 cycles 70% U_T (30% dip in U_T) for 25 cycles <5% U_T (95% dip in U_T) for 5 sec	Main power quality should be that of a typical commercial and/or hospital environment. If the user of the AXIS 900/900P require continued operation during main power interruption, it is recommended that the lensometer be powered from an uninterruptible power supply or battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
Note: U_T is the AC main voltage prior to application of the test level.			

Guidance and manufacturer's declaration - electromagnetic immunity			
The AXIS 900/900P are intended for use in the electromagnetic environment specified below. The customer or the user of AXIS 900/900P should assure that it is used in such environment			
Immunity test	IEC 60601 Test level	Compliance level	Electromagnetic environment - guidance
Conducted RF IEC 61000-4-6 Radiated RF IEC 61000-4-3	3Vrms 150kHz~80MHz 3V/m 80MHz~2.5GHz	3Vrms (V_1=3) 3Vrms (E_1=3)	Portable and mobile RF communications equipment should be used no closer to any part of the AXIS 900/900P including cables, than the recommended separation distance calculated from the equation appropriate to the frequency of the transmitter. Recommend separation distance $d = 1.2\sqrt{P}$ 150kHz to 80MHz $d = 1.2\sqrt{P}$ 80MHz to 800MHz $d = 2.3\sqrt{P}$ 800MHz to 2.5GHz 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 fixed transmitters, such as base stations for radio (cellular/ cordless) telephones and land mobile radio, AM and FM radio broadcast, and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the AXIS 900/900P are used exceeds the applicable RF compliance level above, the lensometer should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the lensometer.

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

Recommended separation distance between portable and mobile RF communications equipment and the AXIS 900/900P

The AXIS 900/900P are intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customers or the users of these lensometers can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the AXIS 900/900P as recommended below, according to the maximum output power of the communications equipment.

Output Power of Transmitter (W)	Separation distance according to frequency of transmitter (m)		
	150kHz ~ 80MHz $d = 1.2 \sqrt{P}$	80MHz ~ 800MHz $d = 1.2 \sqrt{P}$	800MHz ~ 2.5GHz $d = 2.3 \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

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

Note 1: At 80MHz and 800MHz, 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.

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