

## Anexa 9 Autorefractometru cu keratomie, Model: RC-900, Potec/ Tomey

Nr. de inregistrare AMDM: DM000663239

Specificarea tehnică deplină solicitată, Standarde de referință	Specificarea tehnică deplină oferită, Standarde de referință																										
<p>Descriere: Autorefractometru este un dispozitiv utilizat în timpul unui examen oftalmologic pentru a oferi o măsurare obiectivă a erorilor și de prescripție de refracție a unei persoane pentru ochelari sau lentile de contact.</p> <table border="0"> <thead> <tr> <th>Parametru</th> <th>Specificație</th> </tr> </thead> <tbody> <tr> <td>Gama măsurilor de refracție:</td> <td></td> </tr> <tr> <td>Putere sferă (SPH)</td> <td>diapazon minim -25 ~ +22D (pasul 0,12/0,25D)</td> </tr> <tr> <td>Putere cilindru(CYL)</td> <td>diapazon minim -10 ~ +10D (pasul 0,12/0,25D)</td> </tr> <tr> <td>Axa</td> <td>diapazon minim 0-180° (pasul 1°)</td> </tr> </tbody> </table> <p>Keratomie:</p> <table border="0"> <tbody> <tr> <td>Rază de curbură</td> <td>5,0–10,0 mm</td> </tr> <tr> <td>Dioptrii corneene</td> <td>33,75–67,50 D</td> </tr> <tr> <td>Axa</td> <td>0–180°</td> </tr> </tbody> </table> <p>Display: LCD color            Imprimantă: Obligatoriu            Memorie: minim 10 rezultate.            Alimentare: 220 V, 50 Hz            Masă electrică pentru lampă cu fantă            Descriere: Masă specială pentru montarea și utilizarea lămpii cu fantă. Furnizorul livrează masa împreună cu lampa montată și fixată pe masă.            Sistemul de reglare Masa trebuie să fie proiectată sau certificată pentru instalarea modelului de lampă cu fantă oferit.            Reglaj înălțime electric, interval minim 650–850 mm.</p> <p>Capacitate de încărcare <math>\geq 50</math> kg.            Siguranță sistem de blocare pentru stabilitate în timpul examinării            Alimentare 220–240 V            Scaun rotativ pentru medic            Descriere: Scaun ergonomic rotativ cu bază pe roți, reglaj pneumatic înălțime, spătar mediu ergonomic, tapițerie rezistentă la dezinfectanți.            Reglaj înălțime pneumatic, interval 450–600 mm            Mobilitate: rotire 360°, deplasare ușoară în jurul mesei            Material: tapițerie rezistentă la dezinfectanți.</p>	Parametru	Specificație	Gama măsurilor de refracție:		Putere sferă (SPH)	diapazon minim -25 ~ +22D (pasul 0,12/0,25D)	Putere cilindru(CYL)	diapazon minim -10 ~ +10D (pasul 0,12/0,25D)	Axa	diapazon minim 0-180° (pasul 1°)	Rază de curbură	5,0–10,0 mm	Dioptrii corneene	33,75–67,50 D	Axa	0–180°	<p>Descriere: Autorefractometru este un dispozitiv utilizat în timpul unui examen oftalmologic pentru a oferi o măsurare obiectivă a erorilor și de prescripție de refracție a unei persoane pentru ochelari sau lentile de contact.</p> <table border="0"> <thead> <tr> <th>Parametru</th> <th>Specificație</th> </tr> </thead> <tbody> <tr> <td>Gama măsurilor de refracție:</td> <td></td> </tr> <tr> <td>Putere sferă (SPH)</td> <td>diapazon minim -30 ~ +22D (pasul 0,12/0,25D)- broșura</td> </tr> <tr> <td>Putere cilindru(CYL)</td> <td>diapazon minim -10 ~ +10D (pasul 0,12/0,25D) - broșura</td> </tr> <tr> <td>Axa</td> <td>diapazon minim 0-180° (pasul 1°)- broșura</td> </tr> </tbody> </table> <p>Keratomie:</p> <p>Rază de curbură: 5,0–13,0 mm - broșura            Dioptrii corneene: 25,96–67,50 D- manual pag. 57            Axa: 0–180° - broșura            Display: LCD color – broșura, manual            Imprimantă incorporată - broșura            Memorie: 10 rezultate – manual pag. 57            Alimentare: 100-240V, 50/60 Hz            Masă electrică pentru autorefractometru: <b>model: TT-4060</b>            Descriere: Masă specială pentru montarea și utilizarea autorefractometrului. Vom livra masa împreună cu autorefractometru și fixa pe masă.            Sistemul de reglare: Masa este destinată pentru utilizarea echipamentului oferit.            Reglaj înălțime electric, interval minim 650–850 mm.</p> <p>Capacitate de încărcare <math>\geq 50</math> kg.            Siguranță sistem de blocare pentru stabilitate în timpul examinării            Alimentare 220–240 V            Scaun rotativ pentru medic            Descriere: Scaun ergonomic rotativ cu bază pe roți, reglaj pneumatic înălțime, spătar mediu ergonomic, tapițerie rezistentă la dezinfectanți.            Reglaj înălțime pneumatic, interval 661–911 mm</p> <p>Mobilitate: rotire 360°- masa este dotată cu roți și poate fi rotită, deplasare ușoară în jurul mesei- broșura            Material: tapițerie rezistentă la dezinfectanți.</p>	Parametru	Specificație	Gama măsurilor de refracție:		Putere sferă (SPH)	diapazon minim -30 ~ +22D (pasul 0,12/0,25D)- broșura	Putere cilindru(CYL)	diapazon minim -10 ~ +10D (pasul 0,12/0,25D) - broșura	Axa	diapazon minim 0-180° (pasul 1°)- broșura
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# Specifications



## SPHERICAL REFRACTIVE POWER (S)

Measurement range	-30.00 D to +25.00 D
Display unit	0.12 D / 0.25 D

## CYLINDRICAL REFRACTIVE POWER (C)

Measurement range	0.00 D to $\pm 10.00$ D
Display unit	0.12 D / 0.25 D

## ASTIGMATISM AXIAL (A)

Measurement range	0° to 180°
Display unit	1°

## CORNEAL CURVATURE MEASUREMENT (K1, K2, AVG)

Measurement range	5.00 mm to 13.00 mm
Display unit	0.01 mm

## CORNEAL ASTIGMATISM AND AXIS (C, A)

Measurement range (C)	0.00 D to -15.0 D
Measurement range (A)	0° to 180°
Measurement area cornea	Central & peripheral
PD range	10 mm to 88 mm
Minimum pupil diameter	2.0 mm
Vertex distance	0.0, 12.0, 13.5, 15.0 mm

## AUXILIARY FUNCTION

Retroillumination	Available
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## MAIN UNIT

Alignment	Semi auto
Built-in printer	Thermal printer
Output	WiFi, RS 232 C, USB, VGA
Display	7" TFT-LCD tilting/swivel

## DIMENSIONS AND ELECTRICAL REQUIREMENTS

Dimensions WDH	260 x 500 x 450 mm
Weight	approx. 20 kg
Voltage	100 VAC to 240 VAC
Frequency	50/60 Hz
Power consumption	40 VA to 60 VA

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2023/08 - subject to change without notice



# RC-900

## Auto Ref-Keratometer

**You + eye.**  
We care.

# RC-900 Auto Ref- Keratometer

The RC-900 delivers rapid and reliable results. In addition to refraction and keratometry, the RC-900 includes other features like Retroillumination to complement your daily refraction routine.



### Convenient operation

The semi-automatic pupil tracking ensures quick adjustment to the ideal measurement height. Thanks to automatic measurement initiation and the user-oriented, tiltable LCD screen, the examination procedure is fast and efficient.



### Connectivity

The results of the refraction measurement can be easily exported to TAP-2000 via WiFi or serial connection. The RC-900's display can be mirrored to a 5:3 screen using the VGA video out. Thanks to these connectivity options, you are optimally supported in your daily workflow and can provide an informative experience for your patients.



"THE RC-900 PERFECTLY COMPLEMENTS OUR AUTO REF-KERATO SERIES. IT IS RELIABLE AND OFFERS TRUE ADDED VALUE."

*Tony Günther*

AREA SALES MANAGER,  
EASTERN EUROPE/EUROPE

### Near vision simulation

By simulating short distances, the RC-900 allows you to assess the patient's need for progressive lenses and to compare vision with and without addition power lenses.

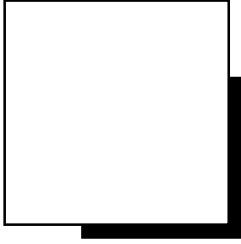
### Extensive measuring range

You can examine almost every eye with peripheral Keratometry and the large dioptric measuring range for refraction.



### Retroillumination

The retroillumination mode is a fantastic tool for visualising opacities in the crystalline lens or for detecting flaws on contact lenses.



# INSTRUCTION FOR USE

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AUTO REF-KERATOMETER

## RC-900



This Instruction For Use (IFU) is available in other languages as electronic IFU. For further information contact your local distributor.

Read this IFU thoroughly before using the instrument to ensure proper and safe operation. Contact your local distributor if you have any questions or you encounter any problems during operation.

**Note** *Always follow the operation procedures described in this manual. Keep this manual in a readily accessible place while operating this instrument.*

*Contact our local distributor if you lose this manual.*

 **TOMEY**

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## IMPORTANT NOTICE

This product may malfunction due to electromagnetic waves caused by portable personal telephones, transceivers, radio-controlled toys, etc. Be sure to avoid having objects such as, which affect this product, brought near the product.

The information in this publication has been carefully checked and is believed to be entirely accurate at the time of publication. TOMEY assumes no responsibility, however, for possible errors or omissions, or for any consequences resulting from the use of the information contained herein.

Upon request, circuit diagrams, component part lists, descriptions, calibration instructions, or other information will be provided to assist service personnel to repair parts of the equipment that are designated by TOMEY as repairable by service personnel.

TOMEY reserves the right to make changes in its products or product specifications at any time and without prior notice, and is not required to update this documentation to reflect such changes.

## SAFETY INFORMATION

Accessory equipment connected to the analog and digital interfaces must be certificated according to the respective IEC standards (e.g. IEC 60950-1 for data processing equipment and IEC 60601-1 for medical equipment). Furthermore all configurations shall comply with the system standard EN 60601-1:2006, Clause 16. Everybody who connects additional equipment to the signal input part or signal output part configures a medical system, and is therefore responsible that the system complies with the requirements of the system standard IEC 60601-1:2005, Clause 16. If in doubt, consult the technical service department or your local representative.

For U.S.A

Do not make any changes or modifications to the equipment unless otherwise specified in the manual.

If such changes or modifications should be made, you could be required to stop operation of the equipment.

For EU Countries

The following mark, the name & address of the EU Representative shows compliance of the instrument with **Directive 93/42/EEC**.



**Authorized Representative:**













**Medical Device Safety Service GmbH**







Schiffgraben 41, 30175 Hanover, Germany



0044

## Symbols marked on the Instrument



Symbol	Description
	TYPE <b>B</b> Applied Part
~	Alternating current
	Protective earth (ground)
	Refer to operating instructions
	Refer to instruction manual/ booklet (ISO 7010-M002)
○	Off (power: disconnect to the mains)
I	On (power: connection to the mains)
	Manufacturer
	Authorized representative in the European Community
	Medical Device
	Year of manufacture
	Do not place your hand or fingers between the stage and base. Also ensure that the examinee does not place his/her hand or fingers there either. Otherwise, hand or fingers may be hurt.
	<p>Disposal of your old appliance</p> <ul style="list-style-type: none"> <li>● When this crossed-out wheeled bin symbol is attached to a product it means the product is covered by the European Directive 2002/96/EC.</li> <li>● All electrical and electronic products should be disposed of separately from the municipal waste stream via designated collection facilities appointed by the government or the local authorities.</li> <li>● The correct disposal of your old appliance will help prevent potential negative consequences for the environment and human health.</li> <li>● For more detailed information about disposal of your old appliance, please contact your city office, waste disposal service or the shop where you purchased the product</li> </ul>
	Keep dry
	This way up





	Fragile
	Do not build up more than 4 boxes
	Do not use hand-hooks
	Temperature between - 40°C ~ 70 °C
	Humidity between 10%RH ~ 95%RH
	Air pressure between 50kPa ~ 106kPa


















## General Safety Information



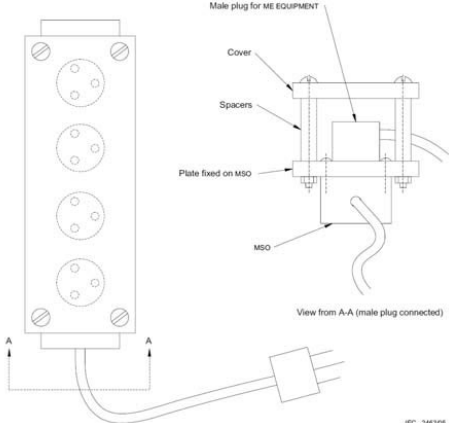
If you see any warnings or cautions printed on the warning labels, follow the safety instructions in this manual. Ignoring such cautions or warnings while handling the product may result in injury or accident. Be sure to read and fully understand the manual before using this product. Keep this manual in easy-to-access place.

## Meaning of Caution Sign

Caution Sign	Description
 <b>WARNING</b>	This indicates a potentially hazardous situation which could result in death or serious injury to you or others.
 <b>CAUTION</b>	This indicates hazardous situations which may result in minor injury to you or others, or may result in machine damage.
<b>NOTE</b>	This is used to emphasize essential information. Be sure to read this information to avoid incorrect operation.

 <b>WARNING</b>	If any serious device-related incident occurs, report it to TOMEY and the competent authority in the country where user or patient, or both reside.
 <b>WARNING</b>	Only operate the instrument with the power supply indicated on the rating plate. Otherwise, it may result in fire or electric shock.
 <b>WARNING</b>	Be sure to turn OFF the power switch before connecting or disconnecting the cables. Also, do not handle them with wet hands. Otherwise, you may get an electric shock that may result in death or serious injury.
 <b>WARNING</b>	Never disassemble or modify this instrument because it may result in fire or electric shock. Also, since this instrument incorporates high-voltage parts and other hazardous parts, touching them may cause death or serious injury.

 <b>WARNING</b>	<p>Should any of the following occur, immediately turn OFF the power switch, unplug the power cable from the AC outlet, and contact the dealer or the agent who/where you purchase this instrument.</p> <ul style="list-style-type: none"> <li>● When there is smoke, strange odor or abnormal sound.</li> <li>● When liquid has been spilled into the instrument or a metal object has entered through an opening.</li> <li>● When the product has been dropped or its housing damaged.</li> </ul>
 <b>WARNING</b>	<p>To avoid the risk of electric shock, this equipment must only be connected to supply mains with protective earth.</p>
 <b>CAUTION</b>	<p>This instrument is shipped with a grounding type power cable. To reduce the risk of electric shock, always plug the cable into a grounded power outlet.</p>
 <b>CAUTION</b>	<p>Ensure that the examinee has not placed his/her hand or fingers under the chin rest. Otherwise, hand or fingers may be hurt.</p>
 <b>CAUTION</b>	<p>Wipe the forehead rest with ethanol or glutaraldehyde solution to disinfect it each time a different examinee uses it, in order to prevent infection.</p>
 <b>CAUTION</b>	<p>Change the chin rest paper each time the examinee changes in order to keep the chin rest clean.</p>
 <b>CAUTION</b>	<p>Do not place your hand or fingers between the stage and base. Also ensure that the examinee does not place his/her hand or fingers there either. Otherwise, hand or fingers may be hurt.</p>
 <b>CAUTION</b>	<p>Do not use the device simultaneously with other electronic equipment to avoid electromagnetic interference with the operation of the device.</p>
 <b>CAUTION</b>	<p>Do not use the device near, on, or under other electronic equipment to avoid electromagnetic interference with the operation of the device.</p>
 <b>CAUTION</b>	<p>Do not use the device in the same room with other equipment such as life-support equipment, other equipment that has major affects on the life of patient an results of treatment , or other measurement or treatment equipment that involve small electric current.</p>
 <b>CAUTION</b>	<p>Do not use the device simultaneously with portable and mobile radio frequency communication systems because it may have an adverse effect on operation of the device.</p>
 <b>CAUTION</b>	<p>Do not use cables and accessories that are not specified for the device because that may increase the emission of electromagnetic waves from the device or the system and decrease the immunity of the device to electromagnetic disturbance.</p>
 <b>CAUTION</b>	<p>Do not position the equipment to make it difficult to operate the disconnection device. (Appliance coupler or separable plug)</p>
 <b>CAUTION</b>	<p>Do not placed the multiple socket-outlet for RC-900 system on the floor in order to prevent liquid penetration and damage to the product.</p>
 <b>CAUTION</b>	<p>RC-900 system shall not be connected with additional multiple socket-outlets or extension cords in addition to a designated single multiple socket-outlet.</p>
 <b>CAUTION</b>	<p>Maximum permissible load of each socket-outlet used for the RC-900 system, shall not be less than 100VA.</p>
 <b>CAUTION</b>	<p>If non-medical electrical equipment (e.g. Video monitor, IT equipment, etc.) that are connected with the RC-900 are, directly connected to the wall socket-outlets, high touch current may flow since the earth continuity is not ensured.</p>

 <b>CAUTION</b>	<p>Multiple socket-outlet should be a grounding-type . and complied with IEC 60884-1.</p>
 <b>CAUTION</b>	<p>Connection of the plug shall be possible only by using the tool. (Refer to the figure below.)</p>  <p style="text-align: right; font-size: small;">IEC 246305</p>

## 1. Features

- (1) **Various Measurements Supported**  
Not only the usual refractometry and keratometry, but also corneal diameter and base curve of contact lens can be measured with this one instrument. Thus, measurements of eye and prescriptions for glasses and contact lenses can be made more efficiently.
- (2) **Wide Dioptric Measurement Range**  
Because the RC-900 covers a wide measurement range, from -30D to +25D, even an examinee with strong myopia can be measured.
- (3) **More Accurate Measurement**  
You can measure more accurately because foggy method of the eye fixation target makes the examinee's eye comfortable.
- (4) **Pupil Distance(PD) can be measured.**
- (5) **Customized Specifications**  
You can change the measurement modes, delete unnecessary modes, and/or change order for printing results. By rotating the monitor, you can see the screen from multiple directions.
- (6) **User-friendly operation features**  
You can easily operate the product with touch screen.
- (7) **Easy Connection with Other Equipments**  
This instrument is designed to connect other equipments using RS-232 or USB communication..
- (8) **External VGA Monitor Display Supported**  
You can connect VGA monitor for the external display
- (9) **Economic printing mode**  
Letter size and arrangement, depending on the mode of printing adjusted to the paper, can be saved.
- (10) **Semi-Auto(Y-axis) Eye Tracking**  
Detect the pupil position of the patient and automatically adjusts the height of the measuring head.



### CAUTION

Do not use RS-232S, USB communication for any other purpose for cybersecurity.

## 2. Notes for Using the Instrument

- (1) Do not hit or drop the instrument. The instrument may be damaged if it receives a strong impact. The impact can damage the function of this instrument. Handle with care.
- (2) Exposure to the direct sunlight or too bright indoor lights can influence on the result of accurate measurement.
- (3) If you want to connect this with other equipment, consult the dealer.
- (4) Sudden heating of the room in cold areas will cause condensation on the protective glass in the measurement window and on optical parts inside the instrument. In this case, wait until condensation disappears before performing measurement.
- (5) Keep clean the objective glass of the examinee side. If it is stained with other substance, it may effect on error or inaccurate measurements.
- (6) Don't press the "TOUCH BUTTON" on LCD monitor by nail or sharp object. It may make scratch on the surface of LCD.
- (7) Disconnect the power supply and consult the dealer in case there is smoke, strange odor or noise on working.
- (8) Don't use organic solution such as alcohol, thinner, benzene, etc. to clean the surface of this instrument. It may damage the instrument.
- (9) When moving this RC-900, fix the stage by using stage holding knob, always check if the power supply is off, and then lift the bottom of the unit with both hands.
- (10) If you leave RC-900 without using for certain period, disconnect the power supply and protect the unit with dust cover.
- (11) Giving an excessive force when rotating the monitor may cause a malfunction.

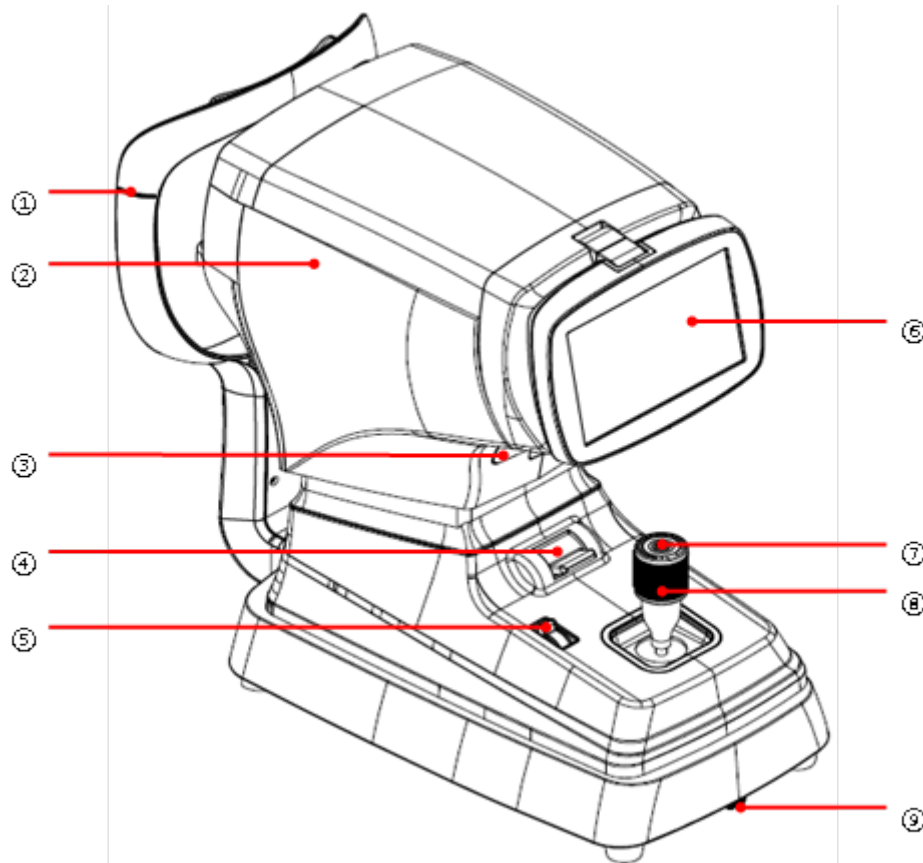


**CAUTION**

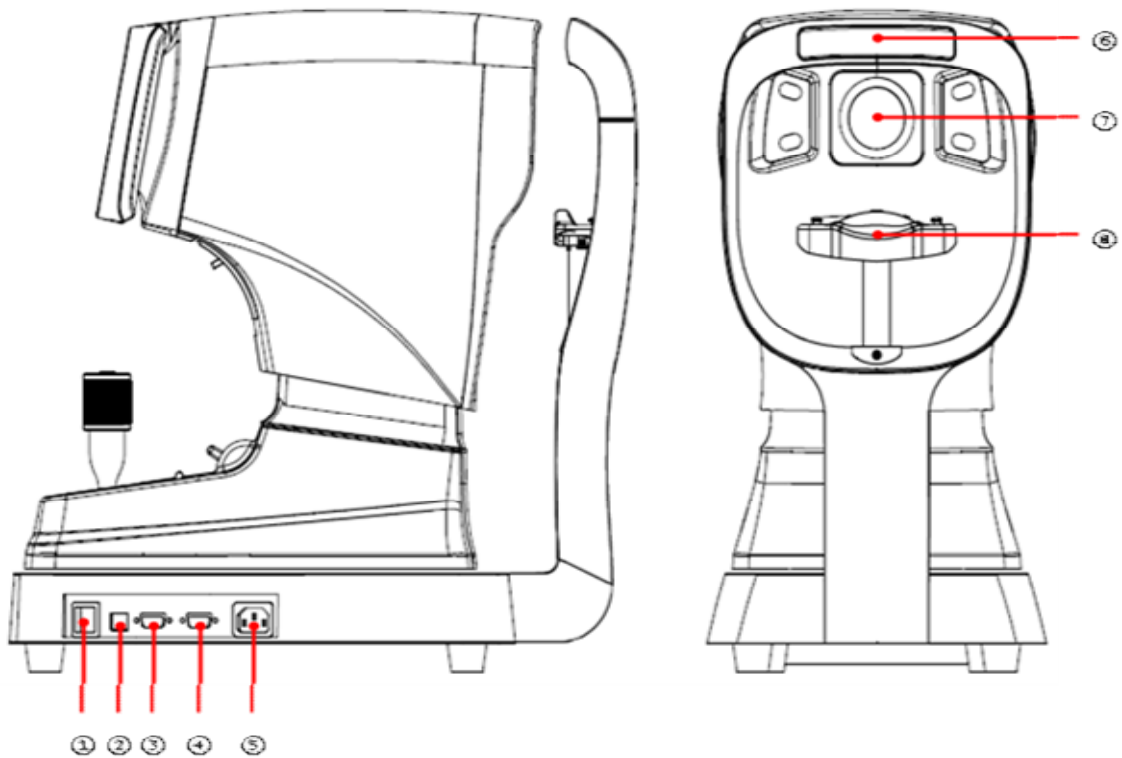
Do not Use this device for any purposes other than those intended. TOMEY is not responsible for accidents or malfunctions caused by misuse.

### 3. Description

#### 3.1 Main Unit



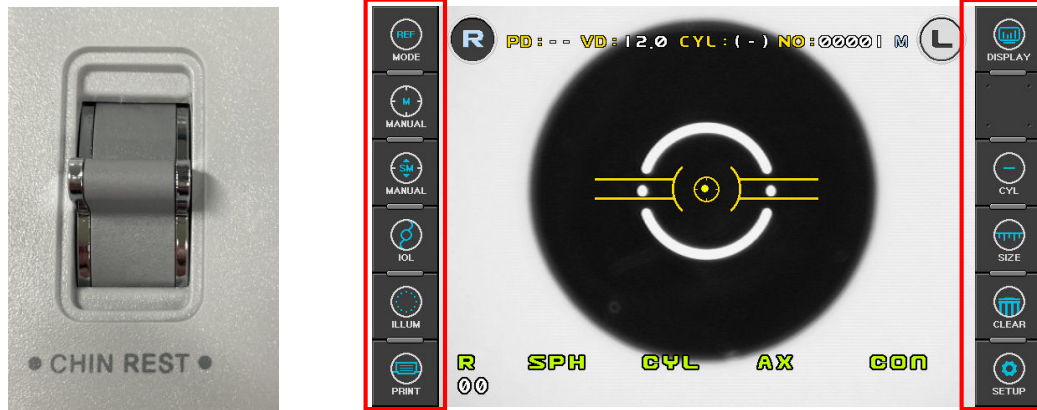
Name	Function
① Height Adjustment mark	Align the height of the examinee's eye with this mark by adjusting the height of chin rest.
② Measurement Head	Unit that performs measurement.
③ Printer	Print the measured result.
④ Stage Holding Lever	Holds the movement of stage (sliding table).
⑤ Chinrest Lever	Align the height of chin rest up and down.
⑥ Monitor	Monitor that displays Measurement and SET Modes displays.
⑦ Measuring button	Press this button for measurement.
⑧ Operation Lever	Use this lever for alignment and focusing.
⑨ Clamping bolt	Makes the system stage fixed.



Name	Function
① Power switch	Switch for turning power ON and OFF
② USB	USB connector for other instruments
③ RS-232	RS-232 connector for other instruments
④ Video Output	Connector for the VGA monitor cable
⑤ Power supply connector	Connector for the power supply cable
⑥ Forehead Rest rubber	Place the examinee's forehead against this rest
⑦ Measurement window	Window for the examinee to look into for measurement
⑧ Chin Rest	Place the examinee's chin on this rest

If you want to connect the input / output signal ports and other devices that must meet IEC standards (IEC60950 IT equipment, IEC60601 medical equipment)  
 If in doubt should contact TOMEY or your authorized distributor.

### 3.2 Operation Panel



**CHINREST LEVER**

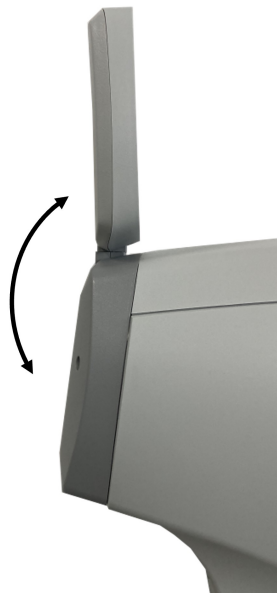
**Touch Button**

<b>CHINREST LEVER</b>	This Lever is for raising/lowering the chin rest. Press “up” lever in order to raise and “down” lever to lower the chin rest.
-----------------------	---

	Press this button in order to change measurement mode.		Press this button in order to enter DISPLAY Mode, where you can see measurement data stored in memory
	Press this button in order to start manual or automatic measurement.		Change to Comparison of vision mode.
	Press this button in order to OFF/ON semi-automatic eye tracking		Press this button in order to change CYL form.
	Press this button when the examinee’s eye is difficult to measure due to cataract or examinee with intraocular lens (IOL).		Press this button in order to enter SIZE Mode, where you can measure the diameter of cornea, etc.
	Press this button in order to enter RET (Retroillumination) Mode, where you can observe the image obtained by retroillumination.		Press this button to clear all stored data in memory.
	Press this button in order to print or transfer the measurement.		Press this button in order to enter SETUP Mode, where you change all the settings about measurements, printouts etc.

### 3.3 Rotating the Monitor

By rotating the monitor, you can view the screen from various directions. When you rotate the monitor, hold both sides of the monitor then rotate smoothly given the power. Forcibly rotating may cause a malfunction.

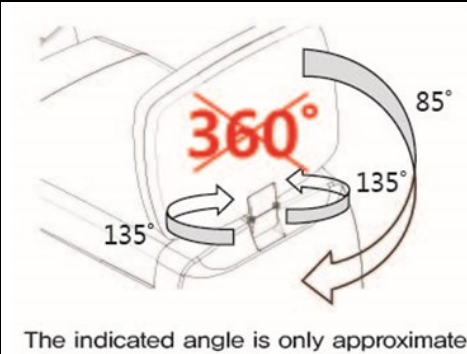


Tilting: Up and Down



Rotation: Left and right

#### NOTE



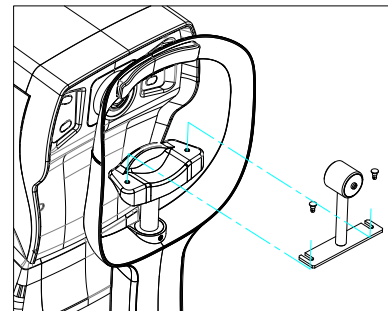
- Be careful not to force and break the hinge when rotating the LCD screen.
- Do not LIFT The RC-900 by holding LCD monitor.
- Over-rotating may cause damage to the inside of the hinge that connects the LCD screen to the RC-900

## 4. Practicing through Model Eye

Practice measurement by using the accessory Test Model Eye before doing the actual measurement.

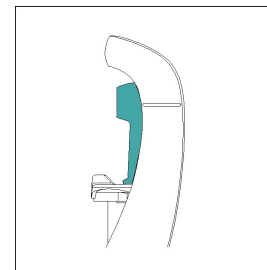
- (1) Turn ON the power  
Turn ON the **power switch** of the instrument.

- (2) Attach the model eye  
Remove the chin rest paper and align the holes on the base of the model eye with the holes on the chin rest. And insert pins.

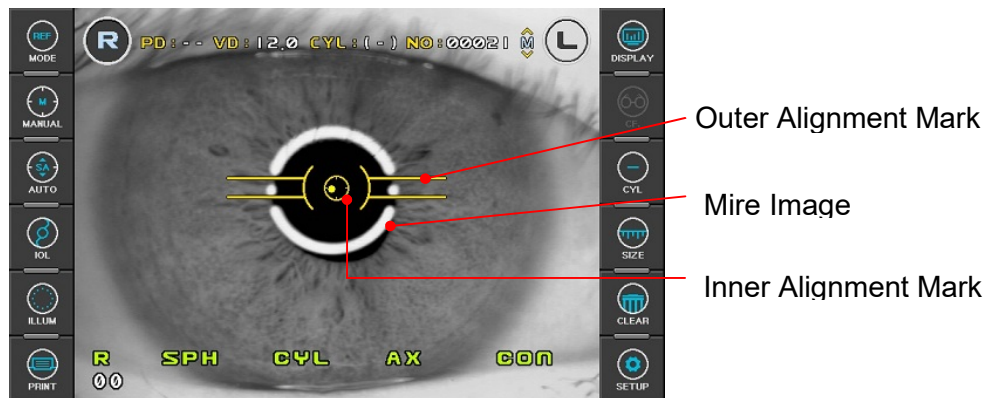


- (3) Release stage lock  
Turn the stage holding knob in counterclockwise direction to release the stage lock.

- (4) Adjust height of Test Model Eye  
Adjust the height of the chin rest by pressing "**CHINREST LEVER**" so that the Test Model Eye is aligned with the "Height Adjustment mark" on the face rest.



- (5) Enter K/R or REF Mode.  
If neither "K/R" nor "REF" is displayed on the monitor, press **MODE button** until either one is displayed.
- (6) Please select measurement step to 0.12D  
For more details, kindly see "6.6 SETUP mode"
- (7) Adjust the position and focus on the model eye



Looking at the monitor, incline the **operation lever** toward the model eye until a bright dot appears near the **Inner Alignment Mark**. Place the **Bright Dot** in the center of Inner Alignment Mark. If position cannot be adjusted just by inclining the operation lever, slide the lever in the direction required.

Focus on the model eye by inclining the operation lever forward and backward so that the Mire Ring image is displayed clearly on the monitor. The focus is correct, the color of the aiming mark changes to yellow color.

- Guide image

In the focus away from → Tilt the lever to patient	That closer focus → Tilt the lever to operator

## (8) Measurement


- Manual measurement
  - Adjust the position and focus on the model eye like the procedure (6).
  - Press the Measuring button . At this point, if measurement is failed with messages like **ERROR**, repeat the procedure (a) and press the Measuring button again.
  - Check whether diopter value is measured or not. Diopter value is recorded in the bottom area of the model eye. If you are not satisfied with the measured value, measure in the same way and check again.
- Automatic measurement
 

Continuous measurement starts automatically and will be performed 3 times or 5 times.

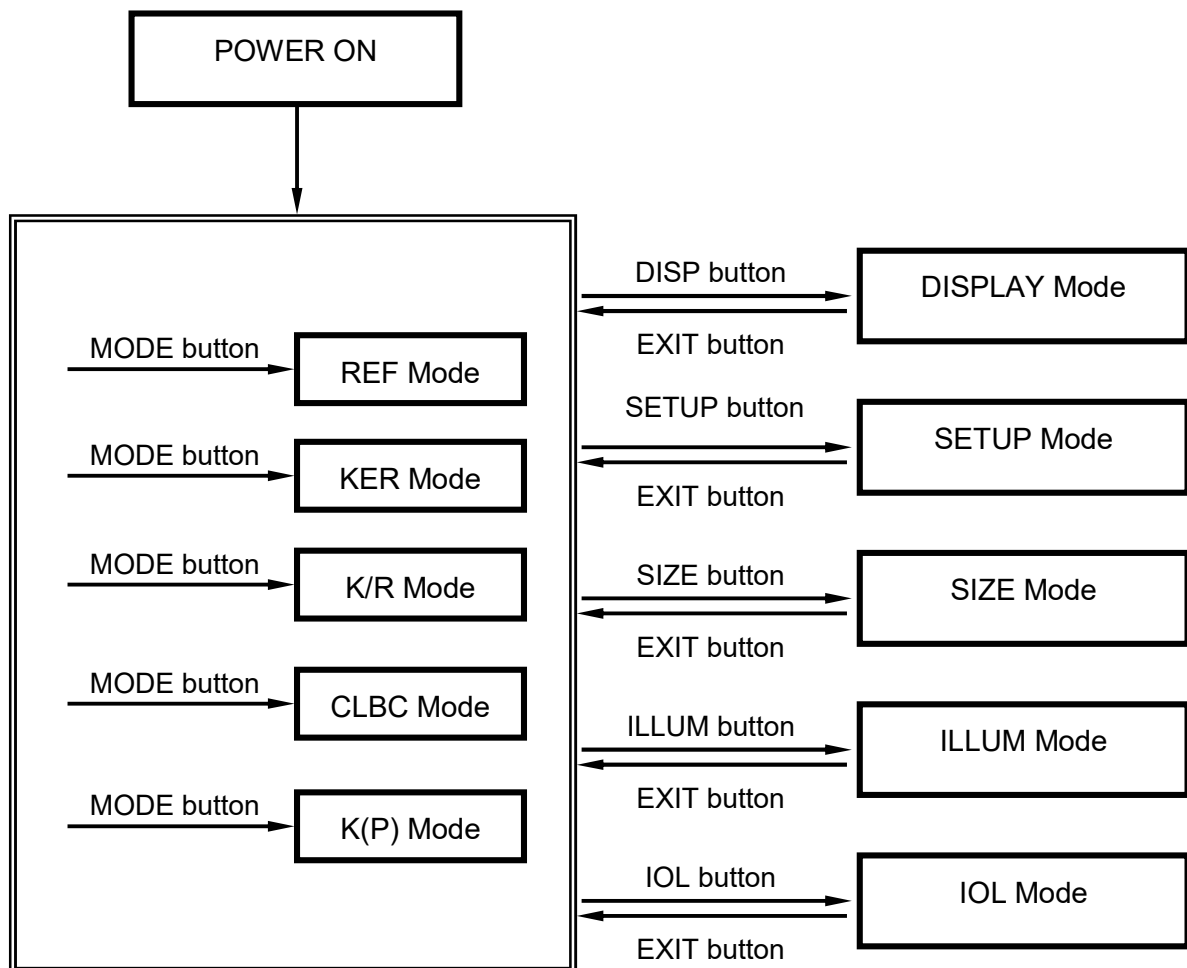
  - Press the AUTO button on the operation panel.
  - Adjust the position and focus on the model eye like the procedure (6) at previous page.
  - When the Bright Dot enters the Inner Alignment Mark and model eye is in focus properly, measurement starts automatically.

Execute the procedures (c) of manual measurement.

## 5. Measurement

 <b>WARNING</b>	<p>Should any of the following occur, immediately turn OFF the power switch, unplug the power cable from the AC outlet, and contact the dealer or the agent who/where you purchase this instrument.</p> <ul style="list-style-type: none"> <li>● When there is smoke, strange odor or abnormal sound.</li> <li>● When liquid has been spilled into the instrument or a metal object has entered through an opening.</li> <li>● When the product has been dropped or its housing damaged.</li> </ul>
--	---

### Relation between buttons and modes



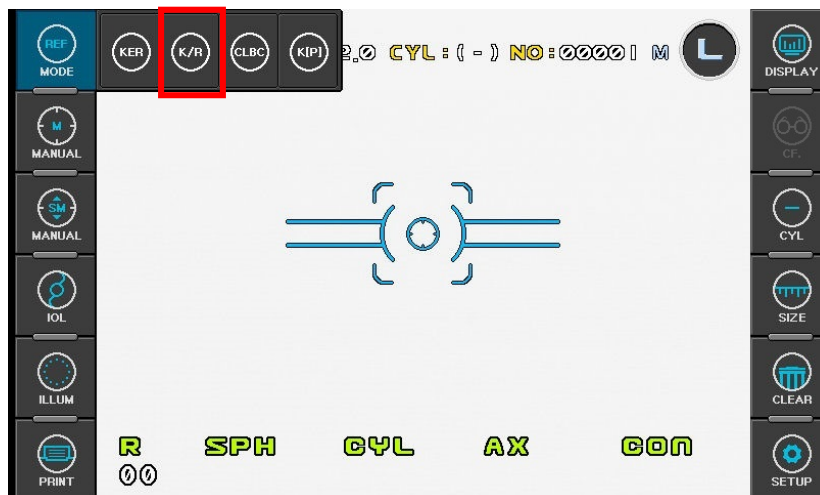
<b>NOTE</b>	<p><b>IOL button will be enabled at K/R mode and REF mode only. If IOL button is pressed, IOL measurement will be performed and pressed again to render the basic measurement.</b></p>
-------------	--

## 5.1 Continuous Keratometry and Refractometry [K/R Mode]




In the K/R mode, refractometry is automatically performed after keratometry.

- (1) Enter K/R Mode

Press **MODE** button on the left side of the display, and then select “K/R”.




- (2) Adjust height of examinee’s eye.

 <b>CAUTION</b>	Ensure that the examinee has not placed his/her hand or fingers under the chin rest. Otherwise, hand or fingers may be hurt.
 <b>CAUTION</b>	Wipe the forehead rest with ethanol or glutaraldehyde solution to disinfect it each time a different examinee uses it, in order to prevent infection.
 <b>CAUTION</b>	Change the chin rest paper each time the examinee changes in order to keep the chin rest clean.

Have the examinee sit and place his/her chin and forehead against the chin rest and forehead rest.

Adjust the height of the chin by pressing “**CHINREST LEVER**” so that the eye of the examinee is aligned with the height adjustment mark on the face rest.

(3) Perform alignment and Focusing

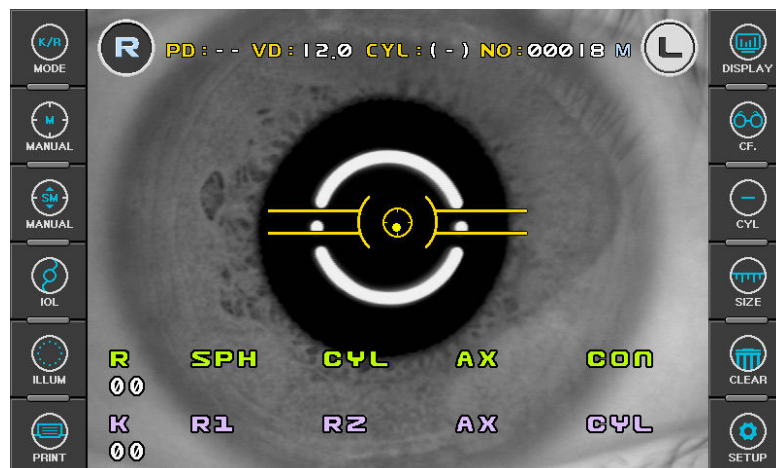
 <b>CAUTION</b>	Do not place your hand or fingers between the stage and base. Also ensure that the examinee does not place his/her hand or fingers there either. Otherwise, hand or fingers may be hurt.
--	--

Slide the operation lever to the left so that the right eye of the examinee is displayed on the monitor.

Ask the examinee to look at the red roof in the center of the scene (eye fixation target). Looking at the monitor, check that image of the mire ring is not obscured by the upper eyelid. If it is covering the ring, instruct the examinee to keep his/her eye opened wide until measurement ends. Or help them open the eye wider by lifting up his/her upper eyelid lightly with your fingers.

Looking at the monitor, incline the operation lever to right or left, and turn the operation lever so the pupil is concentric with the inner alignment mark. If the pupil is large, align it with the outer alignment mark.

Focus on the mire image by inclining the operation lever forward and backward. The focus is correct, the color of the aiming mark changes to yellow color.



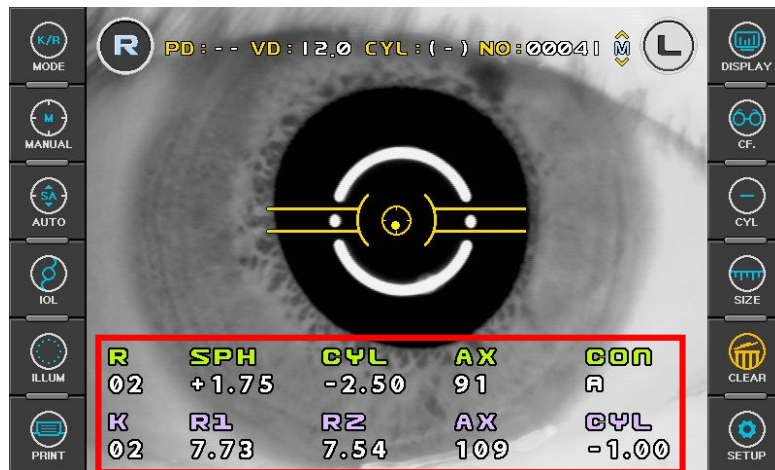
<p><b>NOTE</b></p>	<ol style="list-style-type: none"> <li>① Slide stage to the forward/backward and right/left if you are unsatisfied with the operation lever control.</li> <li>② If the alignment marks and the pupil are not concentric, instruct the examinee to look at the red roof at the center of the picture. Otherwise, measurement error may occur due to aberration.</li> </ol>
--------------------	---

(4) Measurement

Press the Measuring button.

Measurement will be continuously performed when the Measuring button is kept pressed.

- The newest measured results will be displayed on the monitor.
- In case of the continuous measurement, the result of previous measurement will be displayed.
- If you change setting for REF/KER of SETUP Mode, you can select the vertex distance.
- If you change setting for REF/KER of SETUP Mode, you can change display format of CYL value.
- When measured results are displayed, changing for REF/KER of SETUP Mode renders each cornea measured result of **R1/R2/AX** → **K1/K2/AX** → **AR/CY/AX** displayed in turn.



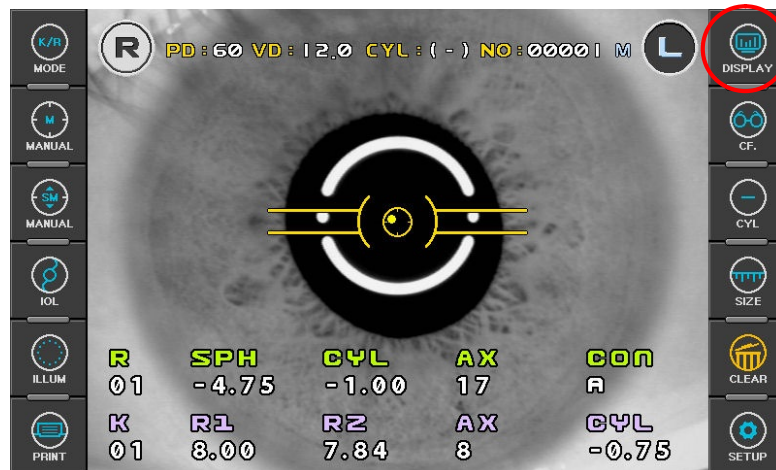
<b>NOTE</b>	<ol style="list-style-type: none"> <li>① There can be error if the Outer Alignment Mark and the pupil is eccentric.</li> <li>② There may be some aberration to the measurement value due to the eccentricity or inclination of lens, or deformation of cornea after surgery.</li> <li>③ Reliability of the measurement with IOL switch turned ON may be low.</li> </ol>
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(5) Repeated measurement

Measurement could be repeatedly performed if necessary.

- The newest result will be displayed on the monitor whenever measured.
- Maximum of 10 newest data items for both right and left eyes will be stored in memory except error data. And those data can be showed in the DISPLAY mode window.

- (6) Measure the Other Eye.  
Slide the stage to the right side and measure the left eye.



- After both eyes are measured, pupil distance(PD) will be displayed on the monitor.
- If stage is slid to the right eye again without pressing the PRINT button, the last measurement will be displayed. And when measuring button is pressed, the new value will be added to them.

<b>NOTE</b>	<p>Safety information about infrared light radiation for measurement</p> <p>As light sources for measurement, this instrument adapted two types of infrared LED. It was chosen to satisfy the amount of energy exiting from the instrument never exceed the limit value recommended by the international standard ISO 15004. This condition is satisfied even when the instrument is operating at maximum light intensity and maximum aperture! (Maximum intensity is the highest brightness the instrument is capable of delivering, including the highest brightness achievable if overvoltage is provided)</p>
-------------	---

(7) Print

Press the Print button.

The selected data in the SETUP mode will be printed. (See page 31).

Lift the printing paper from one side and give it a sharp tug to tear it off after printing is completed.

Fill the name of the examinee in the NAME box if necessary.

<b>NOTE</b>	<p>① Results will be erased after printing/transfer is performed.</p> <p>② It is recommended that a hard copy of the printouts be made if you wish to store it for a long time, because printouts on the thermal paper are apt to deteriorate.</p>
-------------	--

< example of printout >

```

RC-900
2022/07/25 17:09:04
NO: 00024
NAME:
-----
<RIGHT>
[REF]      VD: 12.0
      Cyl. Form: (-)

      SPH  CYL  AX
      -1.75 -0.25 87A
      -1.75 -0.25 87A
      -1.75 -0.25 86A
      -1.75 -0.25 87A
AVE -1.75 -0.25 87

[KER]      INDEX: 1.3375

      R1    R2    AX
      8.22  8.10  87A
      8.22  8.10  85A
      8.22  8.11  86A
      8.23  8.11  84A
      mm    D    AX
R1  8.22  41.00  86
R2  8.11  41.75  176
AVE 8.16  41.50
CYL      -0.75  86

<LEFT>
[REF]      VD: 12.0
      Cyl. Form: (-)

      SPH  CYL  AX
      -4.50 -0.25 88A
      -4.50 -0.25 88A
      -4.50 -0.25 87A
      -4.50 -0.25 88A
AVE -4.50 -0.25 88

[KER]      INDEX: 1.3375

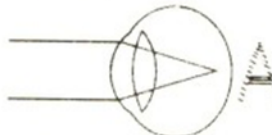
      R1    R2    AX
      8.19  8.08  88A
      8.21  8.11  82A
      8.20  8.11  83A
      8.21  8.11  81A
  
```

Confidence of Result

Level	Quality
A	(High)
B	↕
C	
D	(Low)
F	(Fail)

```




      mm    D    AX
R1  8.20  41.25  81
R2  8.10  41.75  171
AVE 8.15  41.50
CYL      -0.50  81
PD = 63mm

RIGHT & LEFT

TOMEY
  
```

## 5.2 Refractometry [REF Mode]

Only refractometry can be performed in the REF mode.

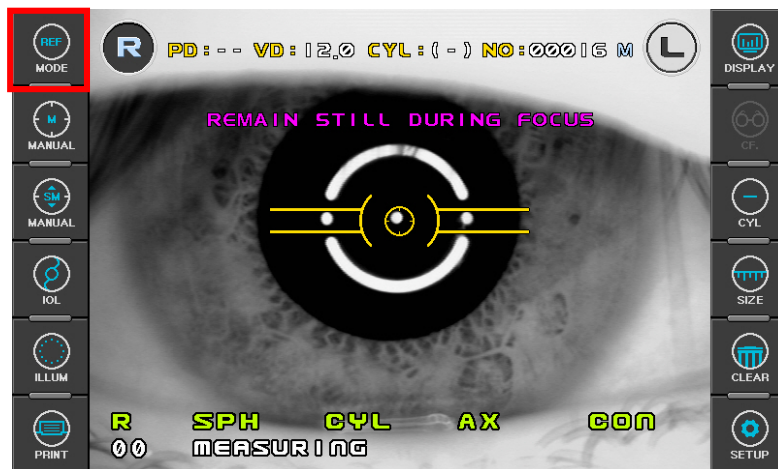
- (1) Enter REF Mode  
Press **MODE button** on the left side of the display, and then select “**REF**”.
- (2) Adjust height of examinee’s eye.

 <b>CAUTION</b>	Ensure that the examinee has not placed his/her hand or fingers under the chin rest. Otherwise, hand or fingers may be hurt.
 <b>CAUTION</b>	Wipe the forehead rest with ethanol or glutaraldehyde solution to disinfect it each time a different examinee uses it, in order to prevent infection.
 <b>CAUTION</b>	Change the chin rest paper each time the examinee changes in order to keep the chin rest clean.

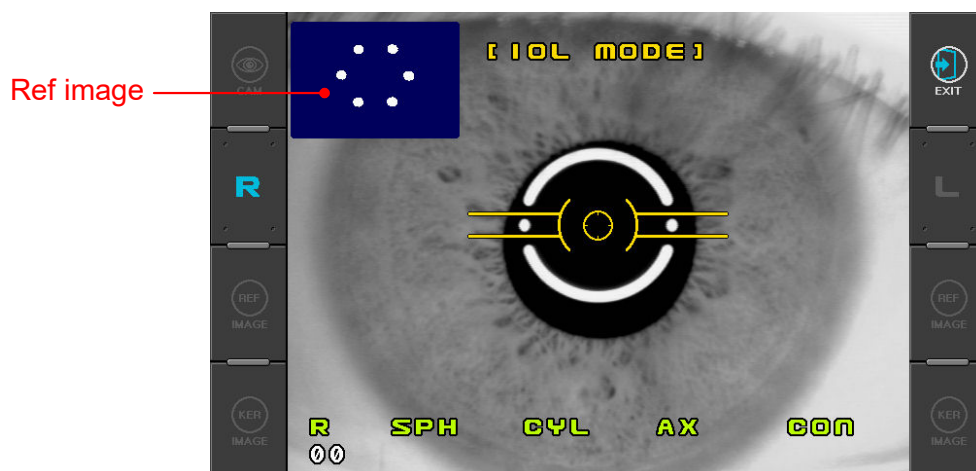
Have the examinee sit and place his/her chin and forehead against the chin rest and forehead rest.

Adjust the height of the chin by pressing “**CHINREST LEVER**” so that the eye of the examinee is aligned with the height adjustment mark on the face rest.

- (3) Perform alignment and Focusing  
Align the pupil and alignment marks and focus on the mire image by using the operation lever. The focus is correct, the color of the aiming mark changes to yellow color.
- (4) Measurement  
Press the measuring button.  
The message "REMAIN STILL DURING FOCUS" appears while the chart motor is moving slowly to relax the eyes of the subject.  
Keep aiming until measured value is output.  
Measurement will be continuously performed when the measuring button is kept pressed.
  - If you change setting for REF/KER of SETUP Mode, you can select the vertex distance.
  - If you change setting for REF/KER of SETUP Mode, you can change display format of CYL value.



<b>NOTE</b>	<ol style="list-style-type: none"> <li>① If you get out of focus while the "REMAIN STILL DURING FOCUS" messages be shown on the monitor after clicking the measurement button, a measurement difference may occur. Maintain the level of the measurement until the measurement value is reached.</li> <li>② If the pupil is outside the external calibration mark, it can cause an error.</li> <li>③ Corneal deformation or lens contamination can cause some errors in the measurement results after surgery.</li> <li>④ If error occurs or the measurement value is instable during the REF measurement, follow as the below instructions. <ul style="list-style-type: none"> <li>➤ Click the IOL button then REF Image is shown on the monitor.</li> <li>➤ Make the six circles seen clearly by moving the operation lever.</li> <li>➤ Measure the REF by clicking the measurement button.</li> </ul> </li> </ol>
-------------	--



- (5) Follow the same procedure (5)~(7) of the Continuous Keratometry and Refractometry [K/R Mode].

< example of printout >

```

RC-988
2822/07/25 17:11:35
NO: 88024
NAME:
-----

<RIGHT>
[REF]          VD: 12.8
      Cyl. Form: (-)

      SPH      CYL      AX
      -1.75   -0.25   87A
      -1.75   -0.25   87A
      -1.75   -0.25   86A
      -1.75   -0.25   87A
AVE -1.75   -0.25   87

<LEFT>
[REF]          VD: 12.8
      Cyl. Form: (-)

      SPH      CYL      AX
      -4.58   -0.25   88A
      -4.58   -0.25   88A
      -4.58   -0.25   87A
      -4.58   -0.25   88A
AVE -4.58   -0.25   88
PD = 63mm

TOMEY
  
```

Confidence of Result

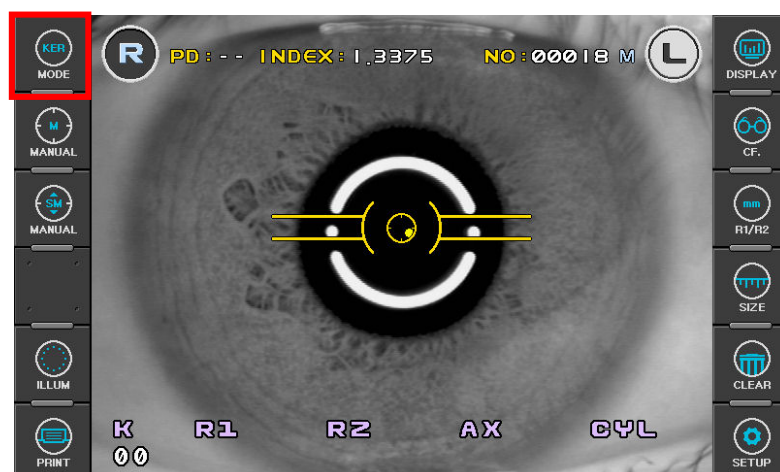
Level	Quality
A	(High)
B	
C	↕
D	(Low)
F	(Fail)

### 5.3 Keratometry [KER Mode]

Only the radius of curvature of the cornea can be measured in KER Mode.

<b>NOTE</b>	Don't measure the base curve of contact lens in this mode. Measurement error will occur when it is measured in KER mode.
-------------	---

- (1) Enter KER Mode.  
Press MODE button on the left side of the display, and then select "KER".
- (2) Follow the same procedure (2) and (3) of the Continuous Keratometry and Refractometry [K/R Mode].
- (3) Measurement  
Press the Measuring button.  
Measurement will be continuously performed when the Measuring button is kept pressed.
  - The measured results will be displayed on the monitor.
  - In case of the continuous measurement, previous measured result will be displayed.
  - When measured results are displayed, changing for REF/KER of SETUP Mode renders each cornea measured result of **R1/R2/AX** → **K1/K2/AX** → **AR/CY/AX** displayed in turn.



- (4) Follow the same procedure (5)~(7) of the Continuous Keratometry and Refractometry [K/R Mode].

< example of printout >

```

RC-988
2822/07/25 17:13:08
NO: 88824
NAME:
-----

<RIGHT>

[KER] INDEX: 1.3375

      R1      R2      AX
      8.22    8.18    87A
      8.22    8.18    85A
      8.22    8.11    86A
      8.23    8.11    84A
      mm      D      AX
R1    8.22    41.88    86
R2    8.11    41.75    176
AVE   8.16    41.58
CYL   -0.75    86

<LEFT>

[KER] INDEX: 1.3375

      R1      R2      AX
      8.19    8.88    88A
      8.21    8.11    82A
      8.28    8.11    83A
      8.21    8.11    81A
      mm      D      AX
R1    8.28    41.25    81
R2    8.18    41.75    171
AVE   8.15    41.58
CYL   -0.58    81
PD = 63mm

TOMEY
  
```

Confidence of Result

Level	Quality
A	(High)
B	
C	↕
D	(Low)
F	(Fail)

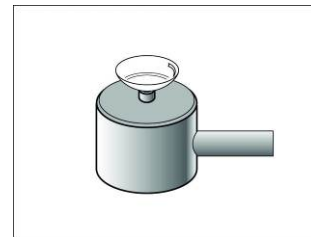
## 5.4 Contact Lens Base Curve Measurement [CLBC mode]

Base curve (posterior curve) of hard contact lens can be measured in the CLBC Mode.

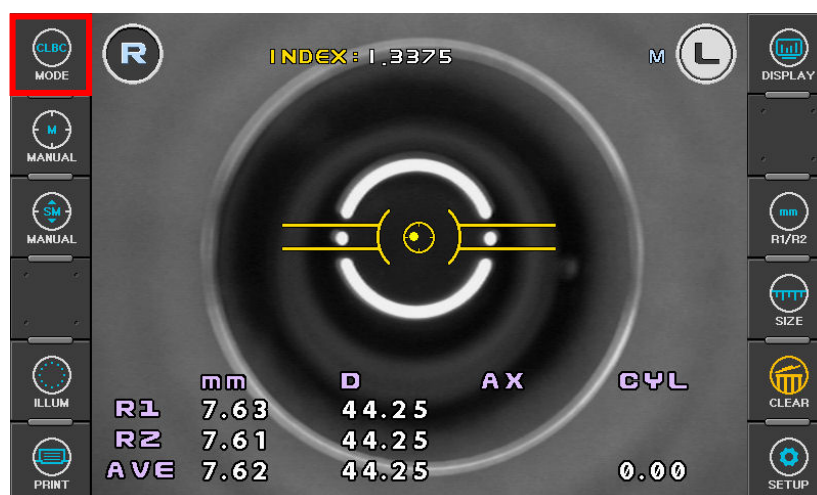
- (1) Enter CLBC Mode  
Press **MODE** button on the left side of the display, and then select “CLBC”.

- (2) Attach Contact Lens.

Put water in the concave section of contact lens holder at backside of the TEST Model Eye and place the contact lens on the holder with the concave surface facing upward. Contact lens is attached by surface tension. Take care that the contact lens is not attached inclined. Also, take care that there are no bubbles behind the contact lens.



- (3) Attach the TEST Model Eye.  
Remove the chin rest paper. Fix the model eye attached with contact lens using pin. Place the contact lens to face the measurement window.
- (4) Perform alignment and Focusing  
Align alignment marks and mire image.  
Then, focus on the mire image.
- (5) Measurement  
Press the Measuring button.  
Measured results will be displayed on the monitor.



- (6) Print  
Press the PRINT button.

## 5.5 Peripheral Keratometry [K(P) Mode]

In K(P) Mode, peripheral corneal curvatures can be measured by having the examinee look at the peripheral eye fixation lamps. Measuring the corneal periphery will help you examine irregular astigmatism, and also determine a better fitting for a contact lens.

There are two modes for lighting the peripheral eye fixation lamps:

**AUTO Mode:** After measuring the center of cornea, four peripheral eye fixation lamps light automatically in turn according to the corneal astigmatism axis.

**MANU Mode:** Peripheral eye fixation lamp to be lit can be selected from eight positions by pressing the touch screen.

When you enter this mode after measuring the center of cornea in K/R or KER Mode, or if you measure the center first after entering this mode, you will automatically enter AUTO Mode first.

- (1) Enter K(P) Mode.

Press **MODE button** on the left side of the display, and then select “**K(P)**”.

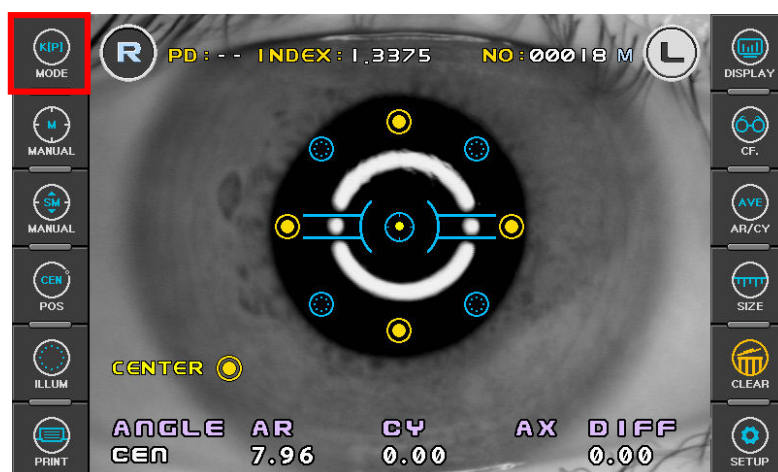
- (2) Follow the same procedure (2) and (3) of the Continuous Keratometry and Refractometry [K/R Mode].

Have the examinee look at the lit peripheral eye fixation lamp. Blinking circle on the monitor show the lamp at the examinee’s side is lit in order to make measurement.

Looking at the monitor, align the mire image and alignment mark, and focus on the mire image by using the operation lever.

- (3) Measurement

After ensuring that the positioning and focusing are proper, press measuring button .



[AUTO Mode]

After each measurement, the target at the position to be measured next blinks automatically on the monitor. Each time, have the examinee look at the lamp, perform alignment and focusing, and then measure.

If the center area has not been measured yet, the target on the left side of the word “CEN” on the monitor will be blink. Have the examinee look at the red roof in the center of the scenery, and measure.

If “ERR” is displayed as a result of measuring the center, peripheral eye fixation lamp will not light until the center is measured properly.

Change to MANU Mode as required.

[MANU Mode]

You can enter MANU Mode by pressing the touch screen. As you select one from eight target positions, the position of blinking target changes. Select the target, perform alignment and focusing, and measure.

- Only the value of the last measurement will be displayed on the monitor. You cannot see any one of the previous measurements even if you select the target which has already been measured by pressing the touch screen. Enter DISPLAY Mode if you wish to see the result of measuring other parts. (See chapter 6)

<b>NOTE</b>	<p>① Once you have entered MANU Mode, you must end the measurement, press PRINT button, and start a new measurement in order to return to AUTO Mode.</p> <p>② Eccentricity (“E” and “EQ”) will not be calculated unless the center of cornea is measured.</p>
-------------	---

- (4) Repeat the measurement as required.  
Measure the same eye for a second time as required.
- (5) Measure the other eye.  
Measure the other eye in the same manner.

< example of printout >

```

RC-988
2022/07/25 17:19:58
NO: 00027
NAME:
-----

<RIGHT>

[KER] INDEX: 1.3375

      R1      R2      AX
      8.22    8.11    82A
      mm      D      AX
R1    8.22    41.00    82
R2    8.11    41.50    172
AVE   8.17    41.25
CYL           -0.58    82

[K(P)]

<R>   r(m)   EQ   E
0'    NAS
      8.22 +0.006 0.08
180'  TEM
      8.23 +0.018 0.13
90'   SUP
      8.22 +0.018 0.18
270'  INF
      8.23 +0.026 0.16
AVE   8.23 +0.015 0.12

<LEFT>

[KER] INDEX: 1.3375

      R1      R2      AX
      8.23    8.13    83B
      mm      D      AX
R1    8.23    41.00    83
R2    8.13    41.50    173
AVE   8.18    41.25
CYL           -0.58    83

[K(P)]

<L>   r(m)   EQ   E
180'  TEM
      8.24 +0.028 0.17
0'    NAS
      8.24 +0.026 0.16
90'   SUP
      8.24 +0.029 0.17
270'  INF
      8.24 +0.024 0.15
AVE   8.24 +0.027 0.16
PD = 63mm

PD = 63mm

TOMEY

```

Right Eye	Left Eye	Symbol
0'	180'	NAS
45'	135'	N-S
90'	90'	SUP
135'	45'	T-S
180'	0'	TEM
225'	315'	T-I
270'	270'	INF
315'	225'	N-I

r(m): Radius of curvature on measured meridian  
EQ: Quadrate of eccentricity on measured meridian (If the peripheral radius of curvature is larger than the center, +sign will be displayed. If it is smaller, -sign will be displayed.)  
E: Eccentricity on measured meridian

## 6. Other Modes

### 6.1 Semi-Auto Eye Tracking

Identifying the pupil position of the examinee, optical head moves automatically to fit the height of the pupil.

(1) ON/OFF semi-automatic eye tracking

If you press '3rd button' on the left side of the display, semi-automatic eye tracking is enabled or disabled.



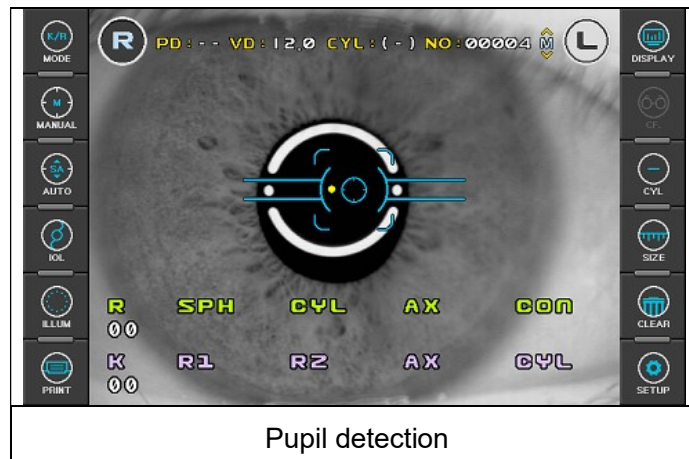
: Y-axis automatic eye tracking is enabled state



: Y-axis -automatic eye tracking is disabled state

(2) Focusing

In the measurement screen, adjust the focus so that the yellow dot appears in the center of the pupil. When semi-automatic eye tracking is enabled state, if the pupil position is detected the optical head height is automatically adjusted.



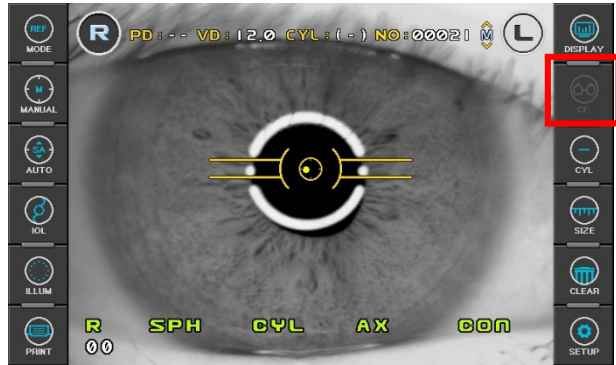
**NOTE:**

<b>NOTE</b>	<b>Can be used for Y-axis automatic operation function → REF, KER, K/R, CLBC, K(P) MODE</b>
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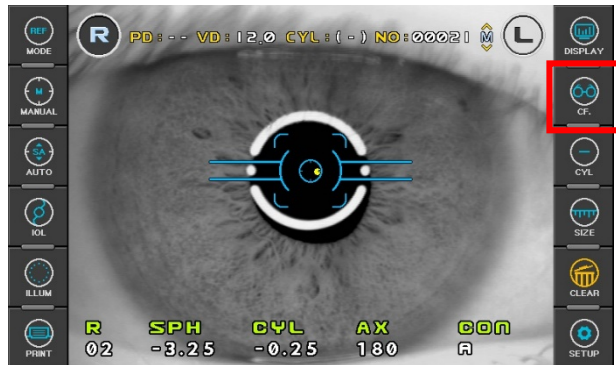
## 6.2 Comparison of vision

The CF(Comparison of vision function) mode allows the examinees to experience the corrected vision by applying additional degrees. If the examinee is not presbyopia or primitive, it may be difficult to feel the effect.

- (1) If there is no REF measurement value, CF mode cannot be selected. In order to activate the CF mode, at least one measurement must be made in REF or K / R mode.



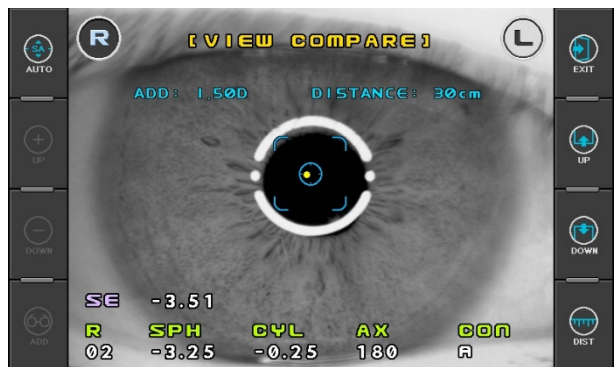
- (2) If there is a REF measurement value, the CF mode button on the right of the measurement screen is activated. Press the CF button to switch to CF mode.



- (3) When set to the CF mode, the examinee will see a chart corresponding to the corrected vision acuity measured by the optometrist measurement.

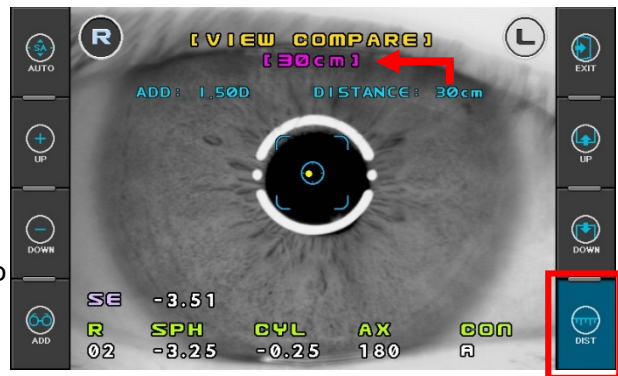


[Chart image]

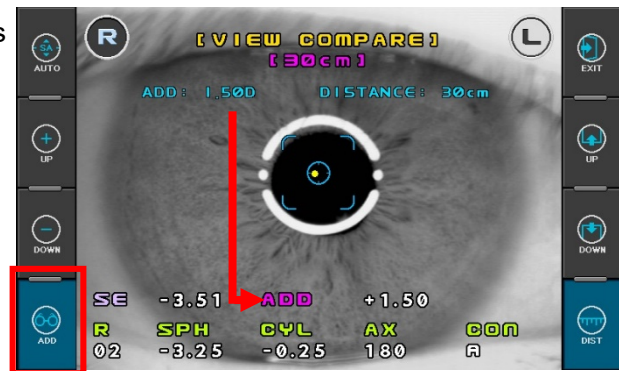


The corrected visual acuity is calculated as the Increment of sphere and cylinder value.

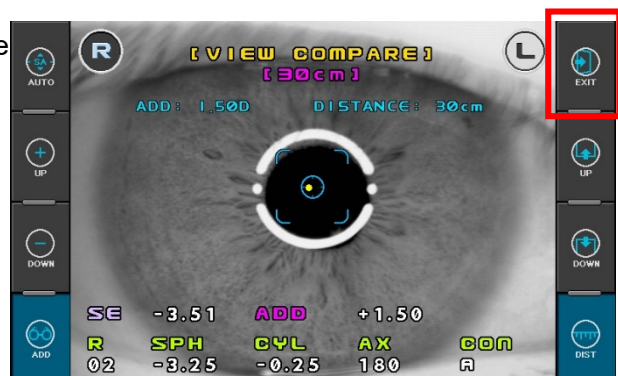
- (4) Set the distance with UP and DOWN buttons on the right. The settable distances are 30cm, 40cm, 50cm, 60cm, 70cm.
- (5) Pressing the DIST button displays the DISTANCE value in purple at the top of the screen. The chart moves according to the set distance and the examinee will experience near vision.
- (6) press DIST button once more to release DISTANCE.



- (7) When DISTANCE is set, the left button is activated.
- (8) Set ADD value with UP and DOWN buttons on the left. The ADD values that can be set are + 1.50D, + 1.75D, + 2.00D, + 2.25D and + 2.50D.
- (9) Pressing the ADD button displays the ADD value at the bottom center of the value displayed in ADD. The examinee will experience close range vision with additional degrees applied.
- (10) ADD button once more to release ADD.



- (11) Press the EXIT button to return to the measurement screen.



When the stage is moved to change the left / right direction, all applied DISTANCE and ADD values are released.

## 6.3 Measuring Cornea Diameter [SIZE Mode]

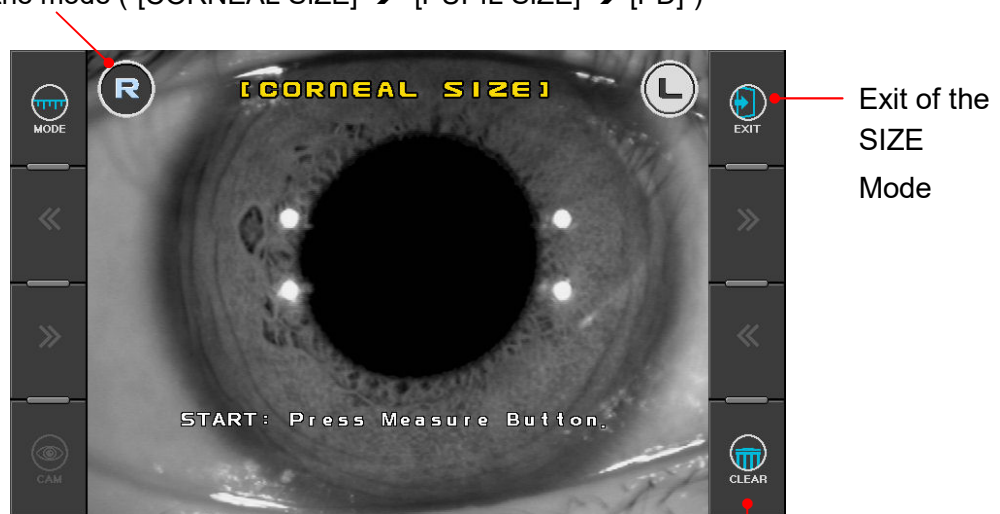
Diameter of cornea can be measured in SIZE Mode for prescribing contact lens.

The size of pupil can also be measured to see how much it is dilated, and the size of contact lens can be measured without having the examinee remove it.

(1) Enter SIZE Mode.

Press SIZE button in the Measurement Mode. Press Exit button in order to go out SIZE Mode.

Change the mode (“[CORNEAL SIZE]” → “[PUPIL SIZE]” → “[PD]”)



Unfreeze the image and delete the

(2) Positioning and Focusing

Ask the examinee to look at the red roof of the eye fixation target.

Control operation lever to align the pupil between the two vertical bars

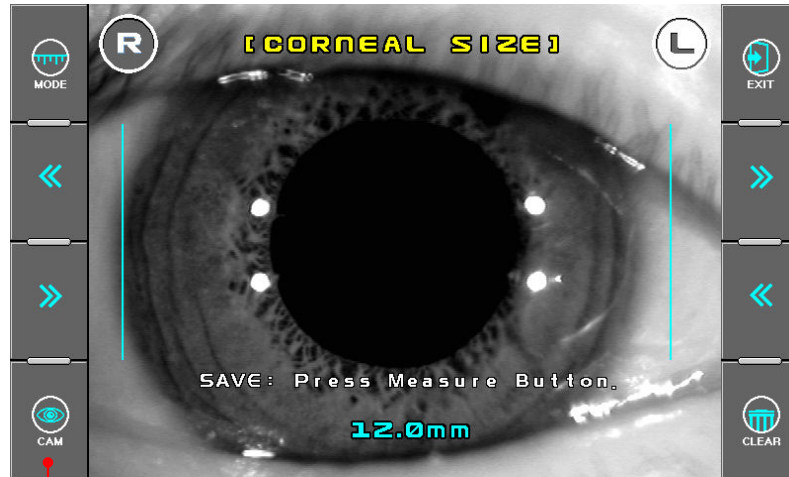
- If the diameter of contact lens is going to be measured, focus on the edge of lens.
- If the diameter of pupil is going to be measured, focus on the iris.

(3) CORNEAL SIZE Measurement

Press the measuring button to pause the window.

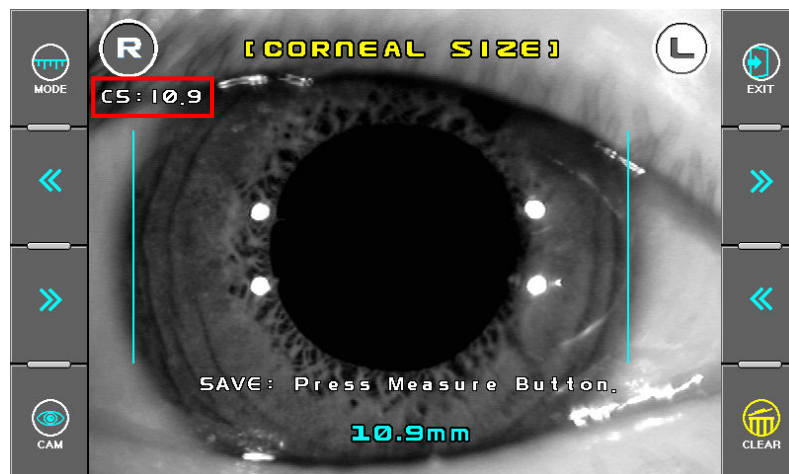
If the frozen image is not clear, you can unfreeze the image by pressing the CAM button.

To move the vertical bar by pressing the ">>" button or "<<" button.



Unfreeze the image

The measured value will be displayed on the monitor. When you press the Measuring button, it will save the measured value



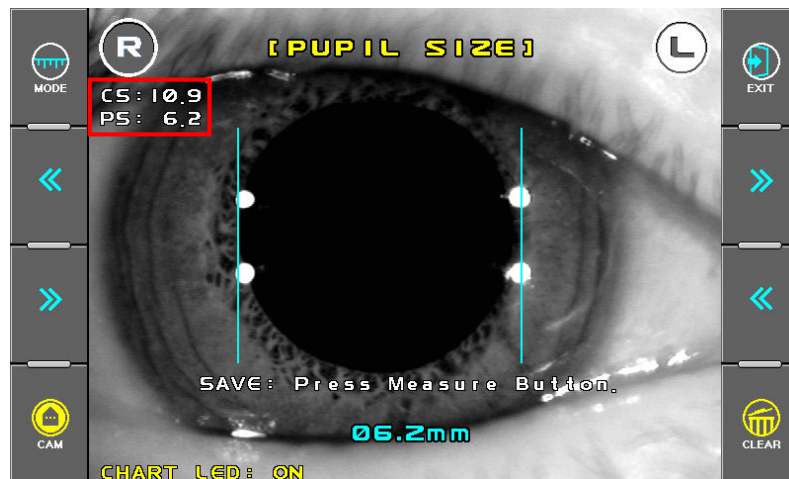
(4) PUPIL SIZE Measurement

Press the Mode button to select Pupil Size mode.

Press the measuring button to pause the window.

If the frozen image is not clear, you can unfreeze the image by pressing the CAM button.

To move the vertical bar by pressing the ">>" button or "<<" button. Also only need to drag your finger across the screen to move the vertical bar.



The measured value will be displayed on the monitor. When you press the Measuring button, it will save the measured value

(5) PD Measurement

Press the Mode button to select PD mode.

After proper alignment of the right eye and left eye, press the measuring button each time

When the measurement is complete, the PD is displayed on the screen.

(6) Print

Press the Exit button → The screen returns to the measurement screen.

Press the Print button → The result of corneal diameter, pupil diameter, PD will be printed as each item.

## 6.4 Observe image obtained by Retro-illumination [ILLUM Mode]

By directing a light into the pupil, you can observe the condition of cataract or scratches on contact lens on the monitor in ILLUM Mode.

Maximum of ten images for each eye can be displayed and stored in one display. When measuring more than 10 times, the oldest image is erased.

You can select an image and display it in a magnified size.

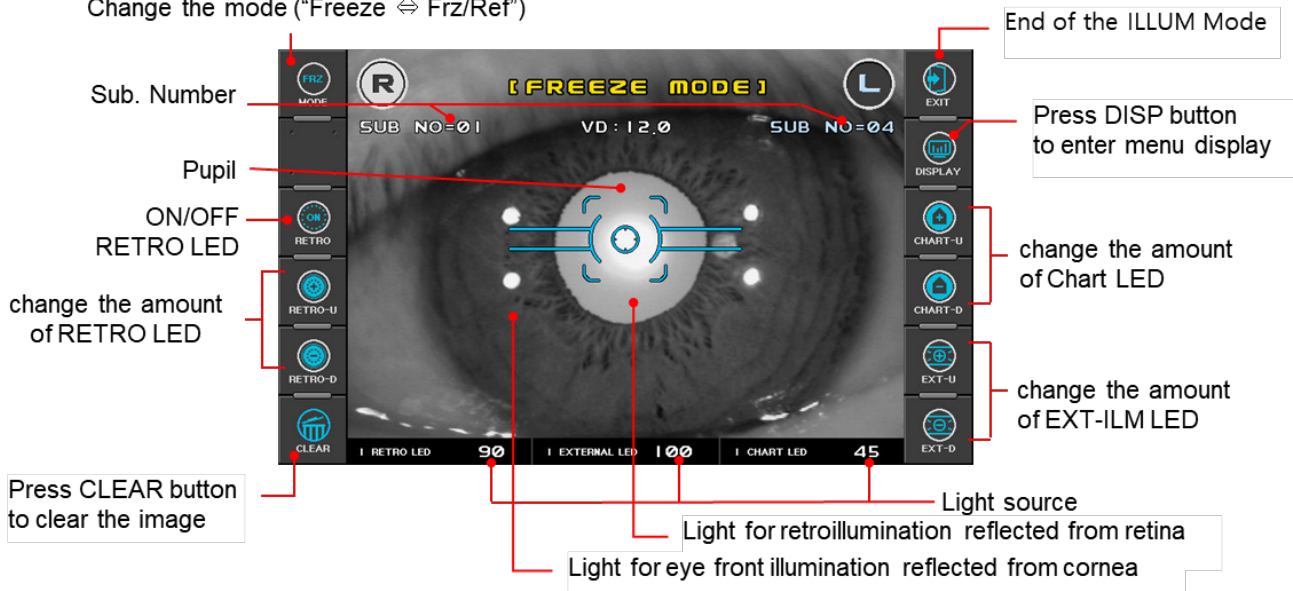
You can upload an image and display it in a magnified size to a computer.

(1) Enter ILLUM mode.

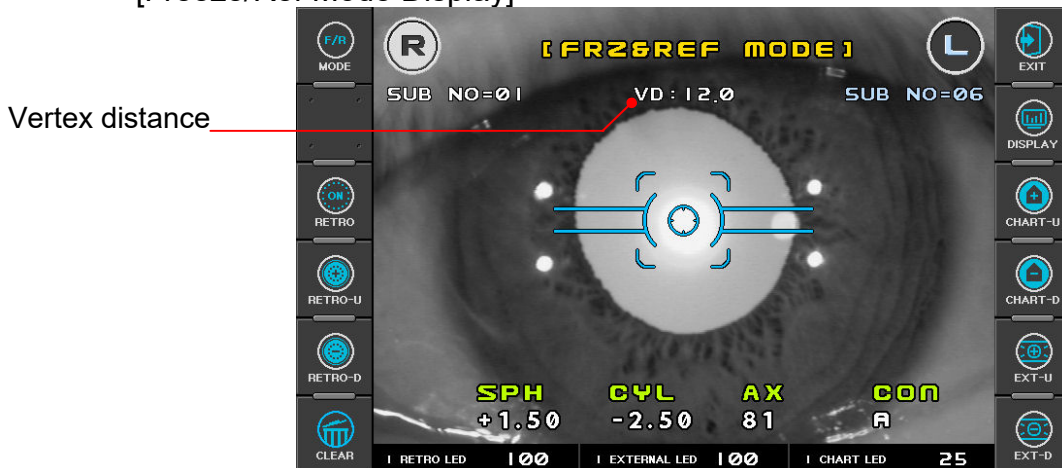
Press ILLUM button in the Measurement MODE. Press Exit button in order to go out ILLUM mode.

[Freeze Mode Display]

Change the mode ("Freeze ⇔ Frz/Ref")



[Freeze/Ref Mode Display]



(2) Ready for Observation

Ask the examinee to look at the red roof of the eye fixation target.

See procedure (3) of the Continuous Keratometry and Refractometry [K/R Mode].

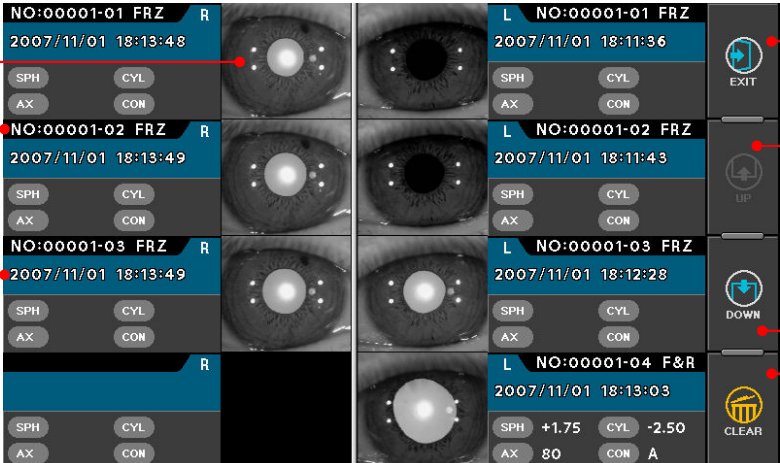
(3) Observation

- Adjust the amount of light of each light source so the image can be seen clearly. Press one of buttons for each light source on the side of display. The light source is adjustable from 0 to 100. If it is set to 0, the light turns off.
  - RETRO LED: The observation light source
  - CHART LED: Inside Fixed target light the patient sees
  - EXTERNAL LED: A light that turns around the eyes
- Position the light for retro-illumination reflected from cornea to a part that is not opaque by using the operation lever. If the light is directed from the edge of the pupil, it will be easier to observe the image. Focus on the image.
- After confirming that the image is focused, press measuring button. The image will freeze.
- Because the LED light in ILLUM mode is more brighter than normal measurement mode, if you observe a long period of time it can give stress in the eye of the examinee.
- In the RETRO LED ON status, if there is no operation for more than 30 seconds, the RETRO LED will be OFF automatically.

(4) Displaying of stored Image

- Press DISP button in observation display. Images stored in memory will be displayed.

[Menu Display]



Images of eye

Serial number – Sub number

Date & Time of the selected image

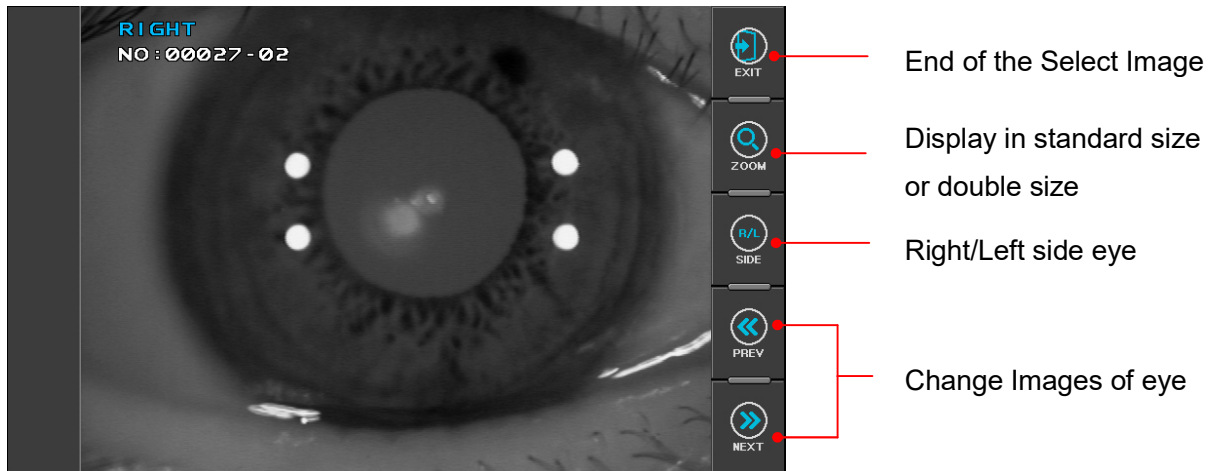
End of the Display Mode

Change Images of eye

Clear stored Image & Measurement result

- When you press the Image button, selecting Image will be displayed.

[Standard Size Display / Double Size Display]



- In the enlarged image screen, the image can be moved by dragging the lower left image.

## 6.5 DISPLAY Mode

The stored data (maximum 10 data for each eye) in memory can be displayed in this mode. To enter DISPLAY Mode, press DISP button in the Measurement Mode. Press EXIT button in order to go out DISPLAY Mode.

<b>NOTE</b>	<ol style="list-style-type: none"> <li>① Press one of four tab buttons on upper side of display. Result of selected page will be displayed.</li> <li>② Press PRINT button to print the stored data.</li> <li>③ Press CLEAR button to clear all stored data in memory.</li> </ol>
-------------	--

Mode  
select

EXIT

Change Cylinder Form

	RIGHT				LEFT				
	SPH	CYL	AX	CON	SPH	CYL	AX	CON	
REF [ILL]	1	-5.50	+0.00	178	A	-5.37	+0.00	24	A
	2	-5.50	+0.00	173	A	-5.37	+0.00	60	A
	3	-5.50	+0.00	176	A	-5.37	+0.00	92	A
KER	4	-5.50	+0.00	165	A				
	5	-5.50	+0.00	173	A				
	6	-5.50	+0.00	141	A				
CLBC	7								
	8								
	9								
K[P]	10								
AV	-5.50	+0.00			-5.37	+0.00			

<REF screen>

	RIGHT				LEFT					
	AR	CY	AX	DIFF	AR	CY	AX	DIFF		
REF [ILL]	1	7.95	0.00	+0.01	A	9.49	-0.25	159	+0.06	A
	2	7.96	0.00	+0.01	A	9.49	-0.25	153	+0.06	A
	3	7.95	0.00	+0.00	A	9.49	-0.25	154	+0.05	A
KER	4	7.96	0.00	+0.02	A	9.49	-0.25	155	+0.06	A
	5	7.95	0.00	+0.00	A	9.49	-0.25	158	+0.06	A
	6	7.95	0.00	+0.00	A	9.49	-0.25	158	+0.05	A
CLBC	7	7.95	0.00	+0.00	A	9.49	-0.25	160	+0.06	A
	8	7.95	0.00	+0.00	A	9.49	-0.25	168	+0.06	A
	9					9.48	-0.25	167	+0.08	A
K[P]	10					9.49	-0.25	153	+0.04	A
AV	7.95	0.00				9.49	-0.25	158		

<KER screen>

	RIGHT				LEFT					
	AR	CY	AX	DIFF	CON	AR	CY	AX	DIFF	CON
REF	1	7.98	-0.50	96	+0.07	A				
	2	7.99	-0.50	97	+0.06	A				
	3	7.99	-0.50	95	+0.07	A				
KER	4	9.52	-0.25	169	+0.04	A				
	5	9.51	0.00	142	+0.03	A				
	6	9.52	-0.25	163	+0.04	A				
CLBC	7	9.52	0.00	156	+0.03	A				
	8	9.52	0.00	163	+0.04	A				
	9									
K[P]	10									
AV	9.52	0.00			159					

<CLBC screen>

	RIGHT				LEFT					
	AR	CY	AX	DIFF	CON	AR	CY	AX	DIFF	CON
REF	CEN	7.95	0.00	+0.00	A	9.49	-0.25	153	+0.04	A
		r(m)	EQ	E		r(m)	EQ	E		
	NAS	7.96	+0.001	0.04		9.51	+0.028	0.17		
KER	TEM	7.96	-0.004	0.06		9.52	+0.027	0.16		
	SUP	7.96	+0.005	0.07		9.52	+0.019	0.14		
	INF	7.95	-0.001	0.03		9.53	+0.028	0.17		
CLBC	N-S					9.52	-0.000	0.02		
	T-I					9.52	+0.004	0.06		
	T-S					9.52	-0.004	0.06		
	N-I					9.52	+0.003	0.05		
K[P]	AV	7.96	+0.000	0.05		9.52	+0.013	0.10		

<K(P) screen>

CLEAR  
button

PRINT  
button

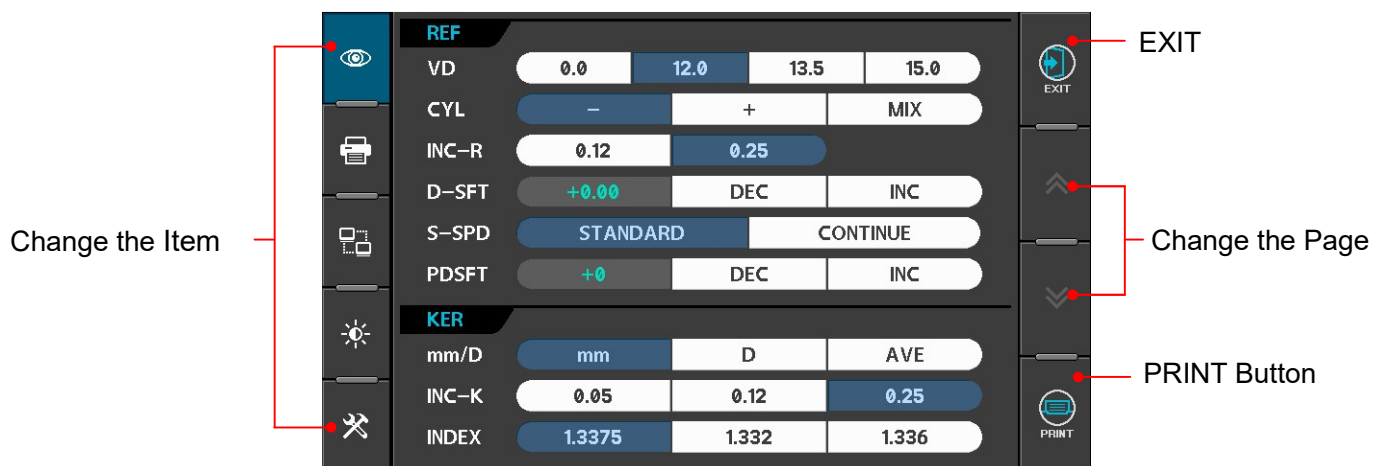
## 6.6 SETUP Mode

Change all the settings about measurements, printouts etc.

Press SETUP button in Measurement Mode. Setting item for REF/KER will be displayed.

Press EXIT button in order to return to Measurement Mode. Some of the setting items consists of the two pages, the conversion page is available.

### (1) REF/KER



#### [How to change **Setting Items**]

Press one button on the left side of display.

#### [How to Change the Item]

Pressing any button on display yields the selection of related item.

#### [How to Change the Contents]

Press any un-pressed button on display. The selected button will be displayed in pressed button and the content will be changed.

<b>NOTE</b>	There are some contents to be changed in the other way. And such procedures will be instructed under the description of each item.
-------------	---

#### [How to Enter the Measurement Mode]

Press EXIT button to quit the SETUP mode and enter the Measurement mode.

#### [Items for REF]

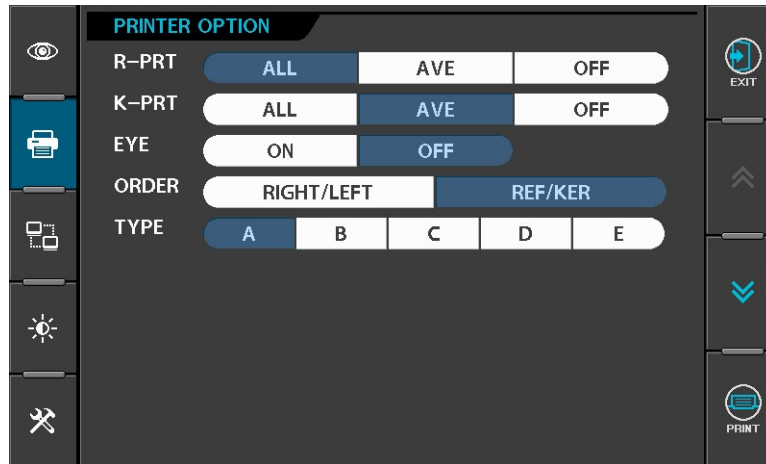
VD	Vertex distance
CYL	Cylinder form
INC-R	Increment of sphere and cylinder
D-SFT	Diopter Shift of Sphere
	Press INC or DEC button to change the value of sphere by 0.12.
S-SPD	Adjustment for Fogging speed
PDSFT	Value Shift of Pupil Distance
	Press INC or DEC button to change the value of Pupil Distance.

[Items for KER]

mm/D	Form of displaying result of keratometry	
mm	R1 .....	Radius of curvature on minimum meridian
	R2 .....	Radius of curvature on maximum meridian
	AX .....	Axis on maximum meridian
D	K1 .....	Refractive power on minimum meridian
	K2 .....	Refractive power on maximum meridian
	AX .....	Axis on minimum meridian
AVE	AR .....	Average radius of curvature
	CY .....	Corneal astigmatism
	AX .....	Axis of corneal astigmatism
INC-K	Increment of corneal power and astigmatism	
INDEX	Corneal equivalent refractive index	

(2) Printouts

Print setup consists of 2 pages. You can move the page by pressing the page up/down button.



[ page1: Print Format ]

[Items]

R-PRT Result of Refractometry to be printed out

ALL: Maximum of the 10 newest measurements and an average value for each eye.

AVE: Average values only

OFF: Not printed.

K-PRT Result of Keratometry to be printed out

ALL: Maximum of the 10 newest measurements and an average value for each eye.

AVE: Average values only

OFF: Not printed.

EYE ON: A sketch of eyeball and refraction diagram to the results of refractometry are printed.

OFF: Not printed.

ORDER Order of displaying the date

TYPE Print economy mode

<pre> RC-988 2822/87/25 17:46:04 NO: 88828 NAME: ----- &lt;RIGHT&gt; [REF]          VD: 12.8           Cyl. Form: (-)           SPH  CYL  AX           -1.75 -0.25 89A           -1.75 -0.25 89A           -1.75 -0.25 93A           -1.75 -0.25 92A AVE -1.75 -0.25 91  &lt;LEFT&gt; [REF]          VD: 12.8           Cyl. Form: (-)           SPH  CYL  AX           -4.58 -0.25 93A           -4.58 -0.25 98A           -4.58 -0.25 98A           -4.58 -0.25 92A AVE -4.58 -0.25 91 PD = 62mm  TOMEY </pre>	<pre> RC-988          2822/87/25 17:46:17 NO: 88828 NAME: ----- [REF]          VD: 12.8          Cyl. Form: (-) A           &lt;R&gt; SPH  CYL  AX  &lt;L&gt; SPH  CYL  AX           -1.75 -0.25 89A          -4.58 -0.25 93A           -1.75 -0.25 89A          -4.58 -0.25 98A           -1.75 -0.25 93A          -4.58 -0.25 98A           -1.75 -0.25 92A          -4.58 -0.25 92A AVE -1.75 -0.25 91 AVE -4.58 -0.25 91  PD = 62mm  TOMEY </pre>
<p>[ TYPE : A ]</p>	<p>[ TYPE : E ]</p>



[ page2: Messages for Internal Printer ]

Enter a message to be printed out with the results of measurement using the internal printer in this window.

You can enter a messages in 24 characters × 2 lines.

#### [Cursor Position]

The cursor blinking in the upper area represents the input position.

Press LINE button to change the row of the blinking cursor.


Pressing “←” or “→” button yields the right and left change of the position of the cursor.

#### [Input of Messages]

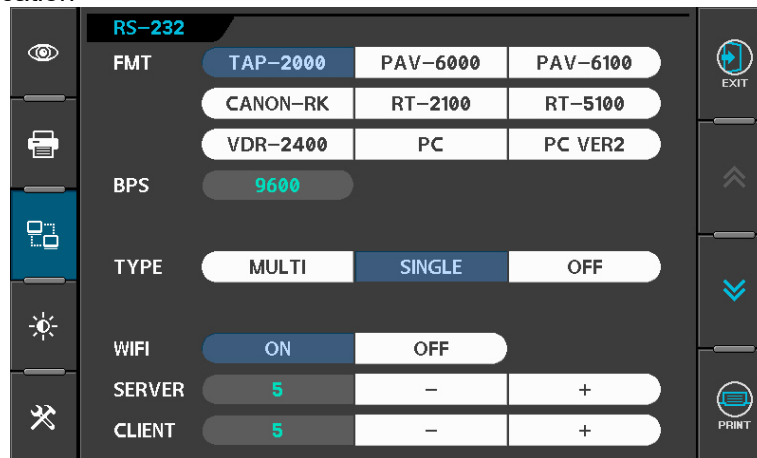
Press any one of alphanumeric buttons to add character in the position of the blinking cursor.

#### [Deletion of Messages]

If you press the DEL button, the character of blinking cursor will be deleted.

If you press the  button, the character in front of the blinking cursor will be deleted.

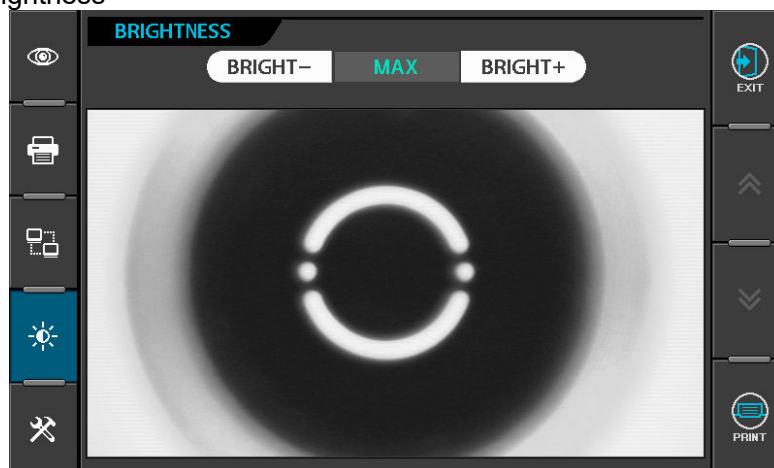
(3) Communication



[Items]

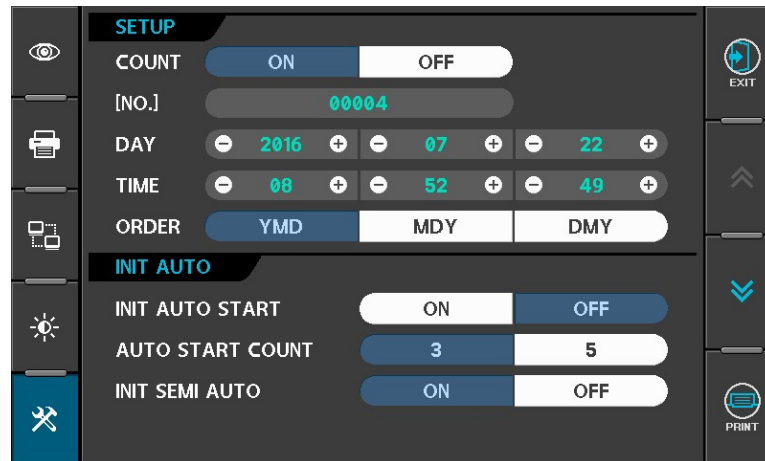
- FMT RS-232 data format  
**TAP-2000**, PAV-6000, PAV-6100, CANON-RK, RT-2100, RT-5100, VDR-2400, PC
- BPS RS-232 data transfer speed  
2400, 4800, **9600**, 19200, 57600, 115200  
(It is only possible to select the 'BPS' in PC mode.)
- TYPE Set external device communication.  
MULTI: Not used  
SINGLE: Common 1: 1 communications.  
OFF: Communication with external devices is disabled.
- WIFI  
ON: Enable Wifi communication  
OFF: Disable Wifi communication

(4) Adjust Brightness



Adjust the brightness of monitor.  
Press "BRIGHT-" or "BRIGHT+" button to adjust the brightness of monitor (1~23).

- (5) Instrument settings  
 Instrument setup consists of 2 pages. You can move the page by pressing the page up/down button.



[ page1 ]

[Serial Number, Date and time]

COUNT To select whether using the serial number or not.

[NO.] Setting of the serial number

Pressing DEC or INC button renders the serial number to be decreased or increased by "1".

Pressing INPUT button enables you input number from Dialog Box.

DAY Date

Pressing '-' or '+' button renders the related item to be decreased or increased by "1".

2001 ~ 2099 : Year

01 ~ 12 : Month

01 ~ 31 : Day

TIME Time

Pressing '-' or '+' button renders the related item to be decreased or increased by "1".

00 ~ 23 : Hour

00 ~ 59 : Minute

00 ~ 59 : Second

ORDER Order of displaying the date

[Auto Measurement]

INIT AUTO START

OFF: Manual start after power ON

ON: Automatic start after power ON

AUTO START COUNT

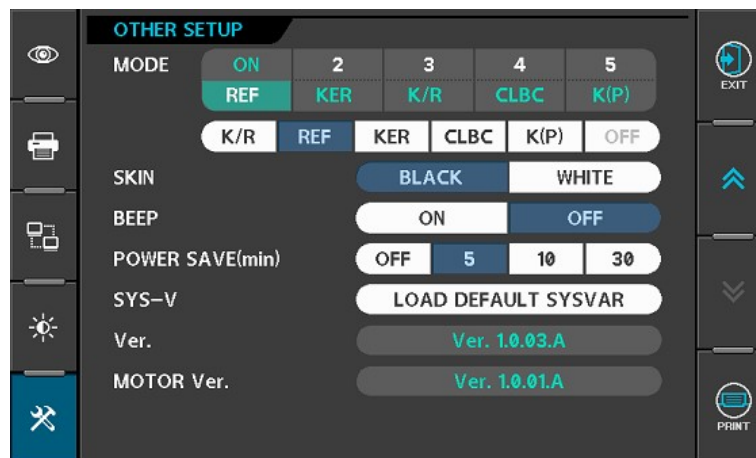
3: Continuous measurement starts automatically and will be performed 3 times.

5: Continuous measurement starts automatically and will be performed 5 times.

INIT SEMI AUTO

OFF: When the power is turned on, it makes semi-automatic eye tracking is disabled state.

ON: When the power is turned on, it makes semi-automatic eye tracking is enabled state.



[ page2 ]

[Measuring Modes, etc.]

**MODE** Assigns order of Measurement Modes “REF, KER, K/R, CLBC, K(P)” and delete unnecessary modes.


1: First mode that is displayed when power is turned ON. It cannot be set to “OFF”.

2~5: Second modes and after.

- Assign First Measurement Mode and after.
- If you want to delete unnecessary modes, delete from last(5<sup>th</sup>) one.

**SKIN:** Set the background color of menu button.

Color changes will apply from then exit the SETUP mode.

**BLACK:**  Set menu background color to black.

**WHITE:**  Set menu background color to white.

**BEEP**

**ON:** Enable BEEP sound in measurement mode.

**OFF:** Disable BEEP sound.

**POWER SAVE TIME (min)**

**OFF:** Disable Power Save Function.

**5:** Enter Power Save Mode if there is on operation by operator about 5 minutes.

**10:** Enter Power Save Mode if there is on operation by operator about 10 minutes.

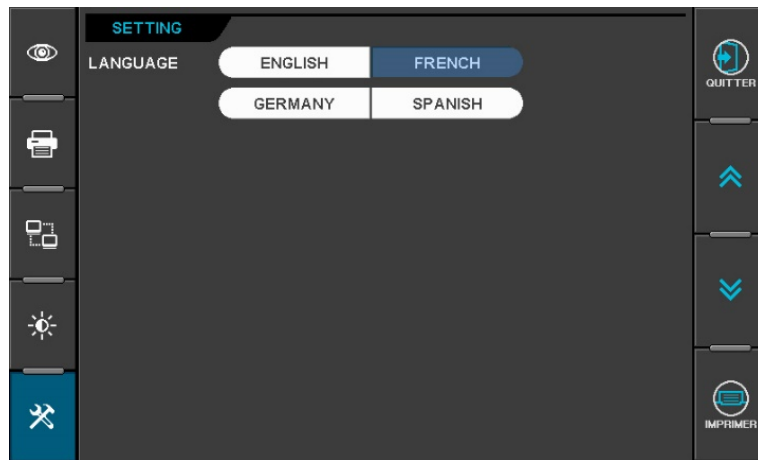
**30:** Enter Power Save Mode if there is on operation by operator about 30 minutes.

**SYS-V** If you press the “LOAD DEFAULT SYSVAR” button, the system variable will be initialized.

**Ver.** It displays the version of the Software that is currently applied to the product.

**MOTER Ver.**

It displays the version of the MOTOR control Software that is currently applied to the product.



[ page3 ]

LANGUAGE    Setting of the Language

## 7. Self Inspection and Maintenance

### 7.1 Before Calling a Service Person

Warning messages will be displayed on the monitor if some problems occur. It might be operation errors or problems of the machine.

In this case, refer the following instructions.

If the function is still not salvaged or recovered, disconnect the power supply and consult the dealer.

#### (1) Message When Power On.

Message	Cause	Remedy
REF/KER CCD CHECK...	Internal error	Turn OFF the power switch and turn on again after 10 seconds. If the message appears again, consult the dealer.
REF MOTOR ORIGIN... FAILED		
INVALID SETUP DATA - REF	Internal Setup Data for Refractometry is invalid.	Consult the dealer.
INVALID SETUP DATA - KER	Internal Setup Data for Keratometry is invalid.	Consult the dealer.

#### (2) Message On Measuring

Message	Cause	Remedy
ERROR	Alignment is improper	Measure after aligning the pupil and the Alignment Mark properly.
	Eyelid or eyelashes are covering the pupil.	Instruct the examinee to open his or her eyes wide, or lift up the eyelid lightly with your fingers and measure again
	When the pupil is smaller than the Outer Alignment Mark.	The minimum pupil diameter that can be measured is 2.0 mm. Although it is possible to measure in the bright place, don't expose examinee's eyes to the direct sunlight or too bright indoor lights to prevent the contraction of the pupil.
	When the examinee has some illness like cataract.	Observe the eye in RET Mode. If cataract is not severe, measurement can be performed in the IOL mode.

	Examinee has IOL(intra-ocular lens) implanted.	Measure in the IOL mode.
	When the Mire Image is odd shaped because of tears.	Instruct the examinee to open and close his or her eyes several times and measure again.
ERROR	When the Mire Image is not clear because the cornea is dry.	Instruct the examinee to open and close his or her eyes several times and measure again.
	Examinee has strong irregular astigmatism or corneal disease.	Impossible to measure
+ OUT	Sum of SPH and CYL of examinee's eye is over <b>+25D</b> .	Impossible to measure
	Radius of curvature is over <b>13.0mm</b> .	
	Objective glass in the measurement window is dirty	Clean the glass
- OUT	Sum of SPH and CYL of examinee's eye is over <b>-30D</b> .	Impossible to measure
	Radius of curvature is under 5.0mm.	
	Objective glass in the measurement window is dirty	Clean the glass
C OUT	Astigmatism is over 10D.	Impossible to measure
	Corneal stigmatism is over 15D.	
	Objective glass in the measurement window is dirty.	Clean the glass

(3) Message On Printing

Message	Cause	Method to deal with
No Print Data	There is no measurement data	Print after measurement
PRINTER PAPER EMPTY	No printing paper	Load a roll of printing paper.

## 7.2 Replacement

### 7.1.1 Printing Paper

Replace the roll of printing paper as soon as possible if the red line appears in the paper.

- (1) Press the printer button to open the printer cover.
- (2) Remove the used paper.
- (3) Install a roll of new paper into the printer housing and close the printer cover.
- (4) At this time, the printer detects the change of paper, and cuts the paper approximately '2cm' for initializing paper settings. (It takes about 3 seconds to complete.)

### 7.1.2 Chin Rest Paper

- (1) Pull out the two pins on the chin rest.
- (2) Insert the pins into the holes on the chin rest paper. More than 50 sheets of paper can be attached.
- (3) Insert the pins straight into the holes on the chin rest.

### 7.1.3 Fuses

- (1) Turn off the power.
- (2) Remove the power cord from the electrical inlet.
- (3) Insert flat blade screwdriver into notches in the fuseholder cover. Then turn the screwdriver counterclockwise.
- (4) Replace the fuses and reset the fuseholder cover in its original positions.
- (5) Fuse rating: T3.15A 250V

## 7.3 Cleaning

- (1) Basically, keep this instrument clean. Don't use volatile object, thinner or benzene, etc.
- (2) Polish each part with a dry cloth containing detergent solution.

## 7.4 When Moving the Instrument

- (1) Turn OFF the power switch.
- (2) Disconnect the power cable.
- (3) Close the stage holding dial in the clockwise direction.
- (4) Move this machine holding the lower part of the mains to keep horizontally.

## 7.5 Service Information

### (1) Repair

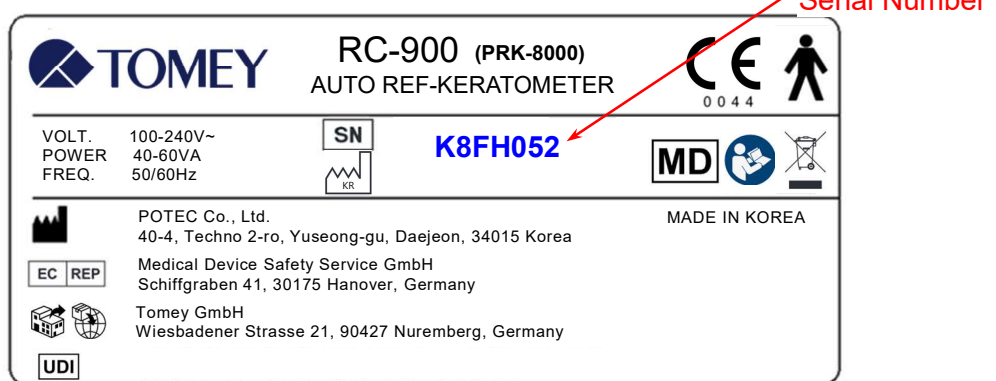
If problem cannot be solved even after taking the measures indicated in section 7.1, contact TOMEY representative or distributor for repair.

Please refer to the name plate and let us have the following information:


Name of the instrument: RC-900

Serial Number: 7-digit characters indicated on the name plate

Phenomenon: In detail



### (2) Disposal of the instrument

 <b>CAUTION</b>	<p>This instrument incorporates a lithium battery, which may pollute the environment if the instrument is abandoned.</p> <p>Please ask a professional waste disposal company to handle disposal, or contact TOMEY representative or distributor before disposing of the instrument.</p>
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## 8. Classifications and Specifications

### 8.1 Classifications

Classification of equipment: Class I m

Applied part of equipment: TYPE **B** Applied Part(Chinrest & Headrest)

Protection against electric shock: Class I

Protection against harmful ingress of water: Ordinary (IPX0)

Method of sterilization: Not applicable

Stability of use in an Oxygen Rich Environment: Not suitable

Mode of operation: Continuous operation

## 8.2 Specifications

### Refractometry

Vertex Distance (VD)	0.0, 12.0, 13.5, 15.0 mm
Sphere Power (SPH)	-30.00 ~ +25.00 D (at the vertex distance of 12 mm) (Increments selectable between 0.12 and 0.25 D)
Cylinder Power (CYL)	0.00 ~ ±10.00 D (Increments selectable between 0.12 and 0.25 D)
Axis (AX)	1 ~ 180° (Increments: 1°)
Cylinder Form	-, +, MIX
Minimum Pupil Diameter	Ø 2.0 mm

### Keratometry

Radius of Curvature	5.0 ~ 13.0 mm (Increments: 0.01 mm)
Corneal Power	25.96 ~ 67.50 D (n = 1.3375) (Increments selectable from 0.05, 0.12, 0.25 D)
Corneal astigmatism	0.00 ~ -15.00 D (Increments selectable from 0.05, 0.12, 0.25 D)
Axis	1 ~ 180° (Increments: 1°)
Pupil Distance (PD)	10 ~ 88 mm
Corneal Diameter	2.0 ~ 14.0 mm (Increments: 0.1 mm)
Working range of auto-tracking	Up and down ±16mm
Working range of auto-shooting	Up and down ±0.13mm or less
Memory of Data	10 measured value for each right and left eye
Internal Printer	Thermal line printer with Auto-Cutter function
Monitor	7-inch TFT LCD monitor (800x480 pixels, tiltable/swivel)
Environmental requirements	
Operation	Temperature: +10 to +40°C Humidity: 30 to 85% RH Atmospheric pressure: 70 to 106 kPa
Storage and Transportation	Temperature: -10 to +55°C Humidity: 10 to 95% RH Atmospheric pressure: 50 to 106 kPa
Power supply	AC100-240V, 50/60Hz
Power consumption	40 ~ 60 VA
Size	Approximately 260(W) × 500(D) × 450(H) mm
Weight	Approximately 20kg

## 9. Components

RC-900 Main Unit .....	1
Operation Manual .....	1
Power Supply Cable .....	1
Test Model Eye .....	1
Chin Rest Paper .....	about 100 sheets
Printing Paper .....	2 rolls
Dust Cover .....	1

### Optional Accessories

Chin Rest Paper .....	500 sheets
Printing Paper .....	10 rolls

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Original instructions