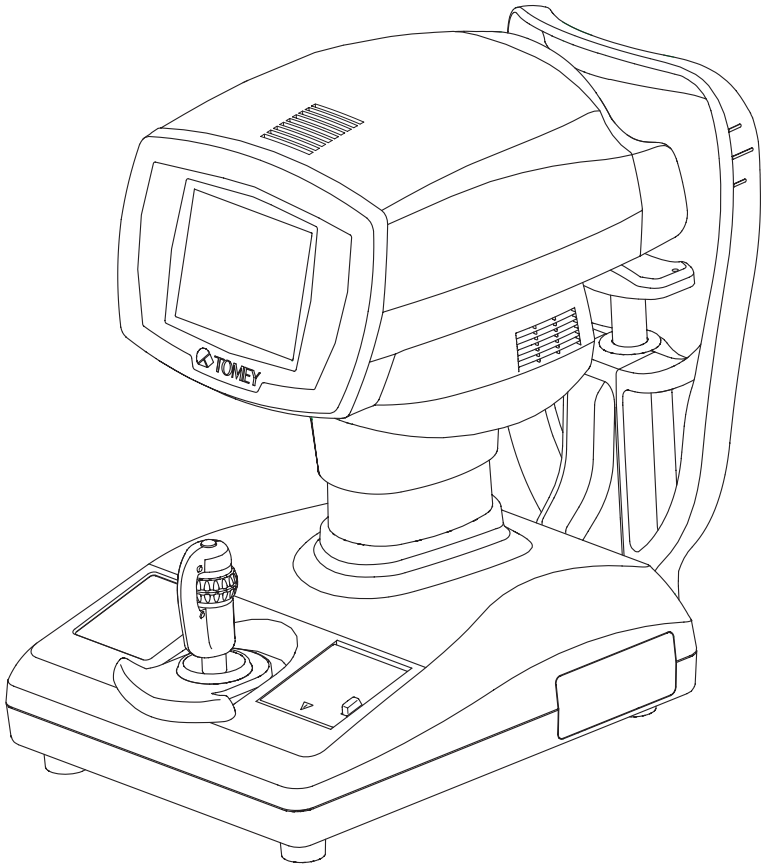
OPERATOR MANUAL

AUTO REFKERATOMETER

RC-5000



Read this operator manual completely before attempting to use this instrument in order to operate it properly and safely.

Note **Do not use procedures other than those specified in this manual.**

Note **Keep this operator manual in a place you can access easily.**

Note **If you lose this operator manual, contact your Tomey representative.**
Contact your Tomey representative if you have any questions or problems.

VIEWLIGHT
POWERED BY INNOVATION

TOMEY

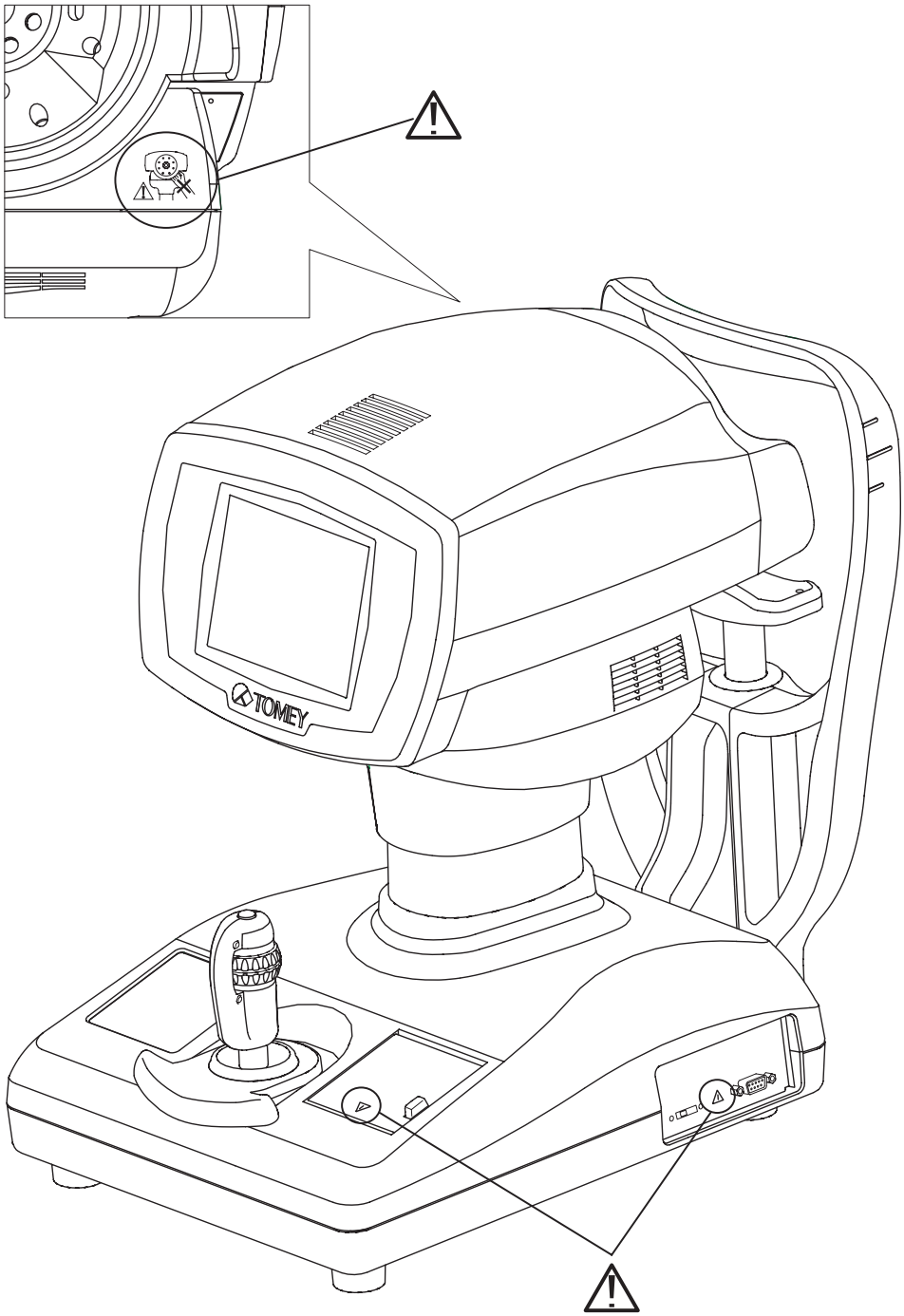
To the User of the RC-5000 AUTO REFKERATOMETER

The RC-5000 AUTO REFKERATOMETER is especially designed for measuring eye's refractive power and corneal curvature.

The RC-5000 provides the additional functions of PD, corneal diameter, pupillary diameter, and CL base curve measurements. Since, however, the measurement quality of these functions is not guaranteed, the exclusive equipment designed for respective measurements should be used.

CAUTION LABELS

■ ***Do not stain or damage the caution labels.***
If the caution label is stained or damaged, ask Tomey Corporation or your local distributor or representative for its replacement.



THE STRUCTURE OF THIS OPERATOR MANUAL

The structure of this Operation Manual is as follows.

1. PRIOR TO USE

Precautions and confirmations for the installation and usage of the instrument.

2. NAMES AND FUNCTIONS OF THE COMPONENTS

Names and functional descriptions of the components.

3. OPERATING PROCEDURE

Vital information needed for installing and using of the instrument.

4. REFERENCE TECHNICAL INFORMATION

Useful technical information for your operation.

5. INSPECTION AND MAINTENANCE

Routine replacement of spare parts, routine maintenance and inspections.

6. TROUBLESHOOTING

How to remedy problems.

7. SUPPLIES (Available separately)

Available at option.

8. SPECIFICATIONS

Specifications for this instrument.

SYMBOLS USED IN THIS OPERATOR MANUAL

The symbols used in this manual represent the following meanings.

■ **Precaution that, if unheeded will cause a hazardous situation where there is imminent danger of serious injury or death.**

■ **Precaution that, if unheeded, will cause a hazardous situation where there is possibility of serious injury or death.**

■ **Precaution that, if unheeded, will cause a situation where there is a possibility of minor or moderate injury or damage to property.**

■ **Special precaution suggested by Manufacturer that either directly or indirectly relates to the safety of personnel or to the protection property.**

CONTENTS

1. PRIOR TO USE

Note ***Please read this Operation Manual throughout before operating this instrument.***

Note ***Do not use any procedures other than specified in this Manual.***

1.1 SAFETY PRECAUTIONS

■ ***The following precautions shall be given for installing this instrument.***

- *Do not install the instrument in a place where any chemicals are stored or any gas is generated, or it may otherwise be inflamed to catch a fire, if such chemicals or gas is spilled or evaporates into the inside of the instrument.*
- *Do not lift the instrument by holding the Chin Rest or the Head Rest, which may otherwise cause the instrument to slip to fall down and possibly harm you.*
- *Make sure that the frequency, voltage, allowable current (or consumption power) of your power source used for the instrument are proper. The wrong power, if used, may cause inflammation or electric shock.*
- *Properly connect the grounding wire, which may otherwise cause struck by electricity.*
- *Do not place a heavy object over the power cord nor squeeze it with undue force, or it may cause inflammation or electric shock.*
- *Be sure to securely connect the power cord with the instrument. The power cord, if improperly connected in contact failure, with the metallic part, or with the exposed plug terminal covered with dust, may cause inflammation or electric shock.*
- *Do not connect the instrument to any equipment of which data transfer code is different from that for this instrument. Which may cause inflammation or struck by electricity. In case of connecting this instrument to the communication connector, be sure to consult with Tomey Corporation.*

- *Install the instrument in a place where it is not exposed to water and / or chemicals. In case Water and / or chemicals enter into instrument, it may cause struck by electricity or malfunction.*
- *Install the instrument in a place where it is fear free of adverse influences by direct sunbeams, high temperature, high moisture, dust, salt, sulfur contained air, which may otherwise cause the instrument with malfunction or erroneous operation.*
- *Install the instrument in a stable place where it is free of inclination, vibration and/or shocks, which may cause incorrect measurement, tilting, or falling, possibly resulting in inflammation or physical injury.*

■ ***Sufficient care shall be taken on the following items while operating the instrument.***

- *In the event the instrument causes smokes, odors, or abnormal noises, immediately turn the power off, disconnect the power plug from the receptacle, and then report so to your local distributor, representative, or Tomey Corporation.*
- *Pay attention and carefully to the position of Patient's face and hand or fingers ,When operating Measurement Head and Chin rest. It may cause physical injury depend on movement of Measurement Head and Chin rest.*
- *Advise the Patient not to place his hand and fingers in the under space of the Measurement Head or below Chin rest, which may otherwise cause his hand and fingers to be pinched and harmed.*
- *Do not either lean or compress the instrument, which may otherwise cause its fall or malfunction, or personal injuries.*
- *Do not place or leave any liquid contained bin or container on the instrument, which may cause struck by electricity or malfunctions.*

- *Do not touch the Printer paper cutter with your fingers, which may cut yourself.*
- *Before measuring the next Patient, remove the top sheet of paper from the Chin Rest and clean the Head Rest with clean cloth. Also, clean the Head Rest and the Chin Rest with sterilization alcohol-soaked cloth for sterilization.*

■ ***Care shall be taken on the following items, after using the instrument.***

- *Do not use organic solvents, such as thinner, benzene, and acetone, for cleaning the instrument, which may cause inflammation or struck by electricity.*
- *Do not apply an undue force to the power cord when disconnecting from the receptacle, but hold the plug unit instead. If the cord is forcedly pulled, the core wire inside of the cord may be broken, causing struck by electricity or inflammation.*
  If the instrument is suspended for a long period of time, disconnect the power cord from the receptacle for safety.

■ ***When the instrument is malfunctioned, discontinue its operation and display such failure. Then, ask your distributor for repair.***

- *Do not remodel or modify this instrument, which may disorder the functions and/or cause of struck by electricity or malfunctions. It should also be noted that the instrument provides the high voltage generating source inside its unit which may induce struck by electricity, if touched, causing fatal injuries or death to the worst.*

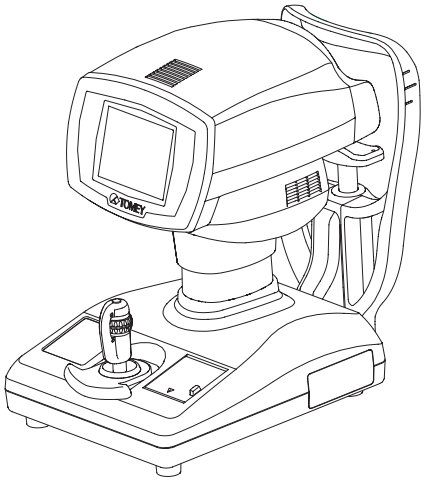
- *Replacement of the fuse shall be performed with the power cord as being disconnected from the receptacle, which may otherwise induce struck by electricity, serious injury or death to the worst.*

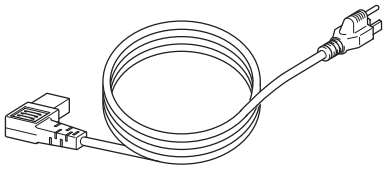
- *If the instrument has not been used for a long period of time, make sure before reuse that it works properly and safely. As for the procedure of its confirmation, see "5.4 ROUTINE MAINTENANCE" of this Manual.*

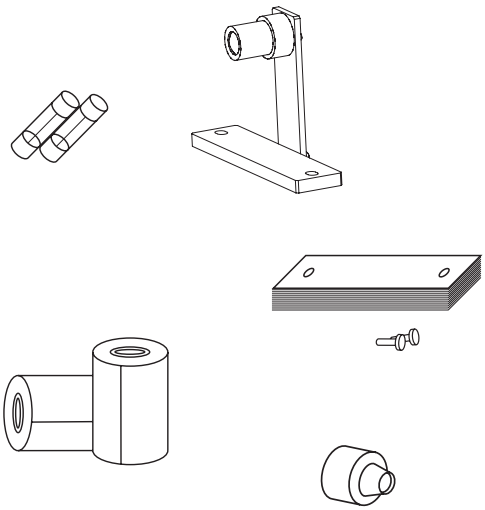
1.2 UNPACKING

After unpacking, make sure that you have received the following items without damages. In the event that any item is found missing or damaged, contact your local distributor.

Note ***The packing box and the cushion materials should be kept, since they may be necessary, if the instrument is moved or transported to other places.***







- Main unit
- Power cord 1
- Model eye 1
- Fuse 4

  (Two fuses have already been mounted in the main unit.)
- Chin Rest paper 1
- Chin Rest paper fixing pin 2
- Built-in Printer paper roll 3

  (One roll has been mounted. in the Main Unit.)
- CL holder 1
- Dust cover 1
- Operator Manual (This book) 1

1.3 GLOSSARY

[A/AX/AXIS]	Astigmatism axial angle [0° to 180°] Represents the angle of astigmatism at which the power is located in the direction crossing theastigmatismaxis.
[AA]	Auto-alignment.
[AS]	Auto shot.
[AVG]	Average of strong and weak principal meridians.
[BC]	Contact lens inner curvature (base curve) [mm]
[C/CYL]	Cylindrical power [D]
[CAT MODE]	Cataract mode at the time of refractive measurement.
[CL MODE]	Measuring mode for hard contact lens base curve.
[CL DATA]	First prior selection of base curve by contact lens brand on the basis of refkerato-data, which is useful for selection of reference triallens.
[CORNEA]	Represents corneal diameter in the corneal diameter and pupillary diameter measurement [DIA] mode.
[IOL MODE]	IOL measuring mode at refractive measurement.
[K1]	Weak Principal meridian [mm or D]
[K2]	Strong Principal meridian [mm or D]
[P]	Contact lens power.
[PD]	Pupillarydistance[mm]
[PUPIL]	Represents the pupillary diameter in the corneal diameter and pupillary diameter measuring [DIA] mode.
[RA]	Residualastigmatism(See[Residualastigmatism])
[S/SPH]	Spherical power [D]
[Temporary]	Changes measurement conditions temporarily.

[VD]	Vertex distance [mm], which represents the distance between the corneal vertex and the posterior of the corrective lens to be prescribed. (When VD=CL is displayed, calculation is made for a corneal vertex distance of "0").
[AUTO SHOT]	Function by which measurement is automatically started when focusing in the directions of up/down/left/right becomes optimum.
[AUTO ALIGNMENT]	Function by which alignment in the up/down/left/right directions and the focusing direction is automatically made.
[AUTO POWER OFF FUNCTION]	The LCD screen is automatically ceased if operation is suspended for a specified period of time, with the power lamp as being left flickering. (Auto Power-Off Mode) Pressing of whichever button returns the screen to the initial operation screen.
[HIGH-SPEED MODE]	Doing Automatic fogging at the time starting refractive measurement and continue measurement by maintaining the fogging condition, which is useful for measurement of a Patient who has unstable eye fixation.
[AUTO FOGGING]	Target is automatically moved to the far sighted side to provide fogging, which eliminates Patient's eye adjustment.
[TOUCH ALIGNMENT]	Touching of the target bright spot in the screen moves the measuring head to position the target bright spot to the center of the screen. Alignment can be made without operating the Joystick.
[TOUCH PANEL]	Directly touching of the Monitor enables various operations as well as touch alignment.
[RESIDUAL ASTIGMATISM]	This implies a residual astigmatism which is calculated by assumedly having the Patient wear a virtual hard contact lens, which may differ the value from that for simple astigmatism or corneal astigmatism.
[SPHERICAL EQUIVALENCE]	Calculated with refractometry values, SPH + CYL/2

1.4 OUTLINE OF OPERATIONS

The Auto Refkeratometer, RC-5000, is an objective refractive power measuring instrument which provides the ophthalmometry function to measure corneal curvature.

The Patient places his chin on the Chin Rest and looks the fixation target through the measurement window. The examiner adjusts the focusing direction by moving the Joystick up/down/left/right. After this adjustment above, press the measurement button to start measurement.

This instrument also provides the Auto Alignment mechanism for automatic alignment; therefore, easy measurement operation is obtainable. In addition, the instrument provides the Auto Shot function which automatically starts measurement when the instrument enters in the area of measurement. Once automatic measurement starts, the infrared light is projected for measurement to analyze the refractive power and the corneal curvature of the eye.

Measurement data is printed out by pressing the Print button.

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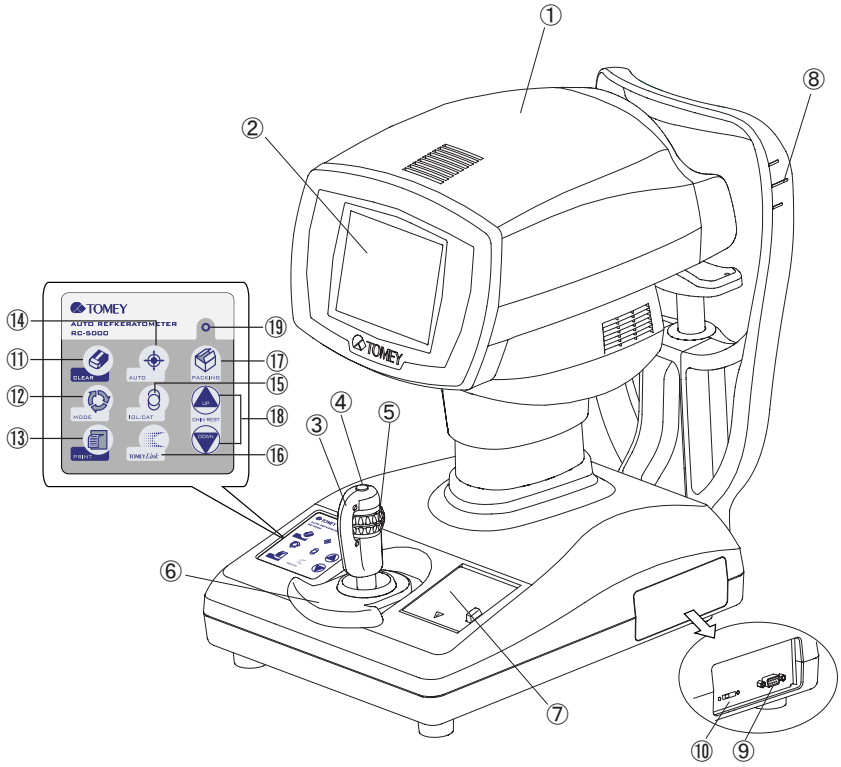
2. NAMES AND FUNCTIONS OF THE COMPONENTS

2.1 EXAMINER'S SIDE



① MEASUREMENT HEAD

Part where measurement is performed.

② MONITOR/TOUCH PANEL

The Measurement screen and various setting screens are displayed. Various settings and operations are also performed by pressing of the touch panel buttons provided in the liquid crystal monitor. (See Section 2.5.)

③ JOYSTICK

The Measurement Head is adjusted up/down/left/right with the Joystick. (See Section 2.5.)

④ MEASUREMENT SWITCH

Measurement is started with this switch.

⑤ UP/DOWN ADJUST RING

The Measurement Head is rough adjusted by up and down the Ring. Slight adjusted by turning the Ring. (See Section 2.4.)

⑥ HAND REST

The Hand Rest is used to place the hand while it is used to turn the Joystick. The Hand Rest is also used for roughly adjusting the Measurement Head front/rear/left/right. (See Section 2.4.)

⑦ PRINTER

Prints measurement results.

⑧ EYE LEVEL MARK

The level of the patient's eye to be measured is adjusted to this mark.

⑨ RS232C CONNECTOR

This Connector terminal is used to connect external equipment to this instrument. (See "2.6 RS-232C CONNECTOR".)

⑩ SERVICE MODE SELECT SWITCH

This Select Switch is used for version-up of the software.

⑪ CLEAR BUTTON

Measurement data are deleted with this button.

⑫ MODE BUTTON

The measurement mode is selected.

⑬ PRINT BUTTON

Starts the printing.

⑭ AUTO BUTTON

Changes over Auto Measurement or Manual measurement.

⑮ IOL/CAT BUTTON

When Refractive measurement, the IOL mode or the CAT mode is changed over.

⑯ DATA Link BUTTON

Sends out the measured data into a computer etc.

⑰ PACKING BUTTON

The Measurement Head is moved to a place which is appropriate for packing.

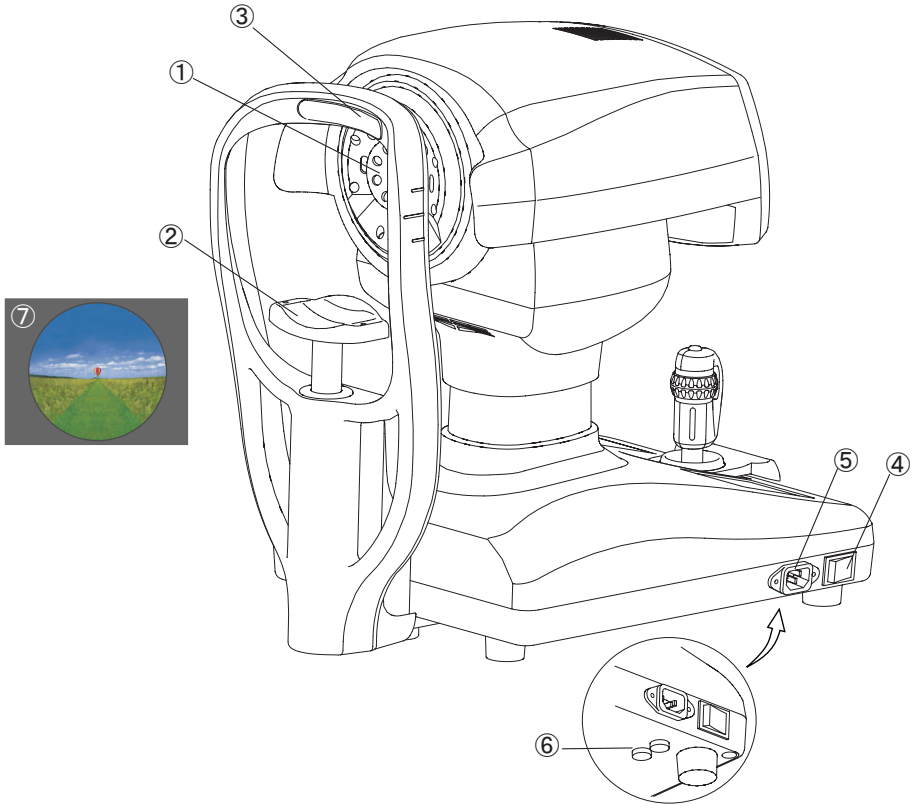
⑱ CHIN REST BUTTON

The Chin Rest rises by pressing the "▲" Button and lowers by pressing the "▼" button.

⑲ POWER LAMP

The Power Lamp lights up while the Power is on.

2.2 PATIENT'S SIDE



① MEASUREMENT WINDOW

The Patient looks at the fixation target through the Measurement Window.

② CHIN REST

Patient's chin is placed on the Chin Rest.

③ HEAD REST

Patient's forehead is placed to the Head Rest.

④ POWER SWITCH

The power is turned on by pressing the side of " I (ON)" and turned off by pressing the side of " O (OFF)".

⑤ POWER CONNECTOR

The power cable is connected to the Power Connector.

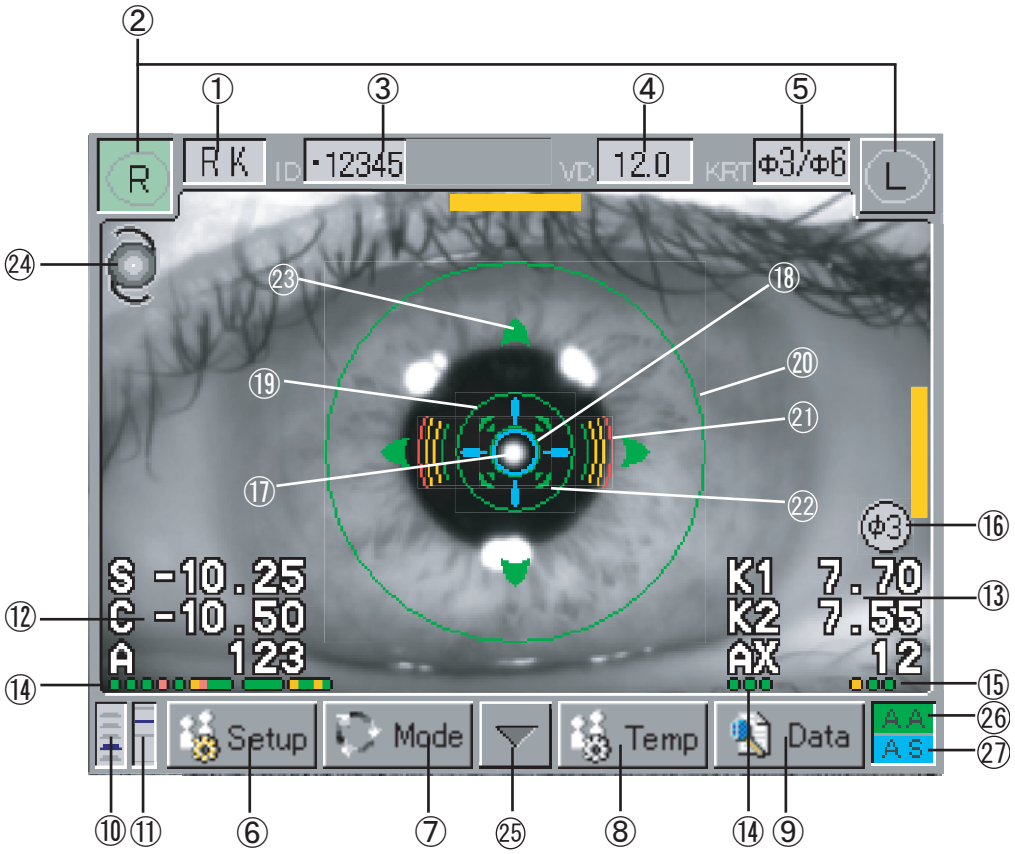
⑥ FUSE HOLDER

The fuse is placed in the Fuse Holder.

⑦ FIXATION TARGET

Fixation target is in the measurement window. Leading Patient's eye fixation.

2.3 MEASUREMENT SCREEN



① MEASUREMENT MODES DISPLAY "RK" / "REF" / "KRT" / "DIA" / "CL"

Measurement modes (Ref-keratometer "RK" / Refractometer "REF" / Keratometer "KRT" /Corneal diameter·Pupil diameter "DIA" / Contact lens base curve "CL" are displayed.

② EXAMINATION EYE DISPLAY BUTTON "R" / "L"

The Right or Left side of eye being examined is displayed in color. If pressing of this Button when changing to the other side examination eye, largely moves the Measurement Head.

③ IDENTIFY NUMBER "No."

The identify number is displayed. "1" is added to the previous identify number for the new measurement.

④ VERTEX DISTANCES "CL" / "12.0" / "13.5" / "14.0" / "15.5" / "16.0"

The distance between cornea vertex and corrective lens posterior is displayed. (Unit: mm) "CL" represents vertex distance (VD) of 0mm.

⑤ KERATOMETER CORNEAL MEASURING PART DISPLAY "Ø3" / "Ø6" / "Ø3/Ø6"

In the Keratometer measurement, the corneal measurement part (center "Ø3mm" / periphery "Ø6 mm" / center & periphery "Ø3/Ø6 mm" simultaneous measurement) are displayed. Ø3mm and Ø6 mm are the figures obtained on the assumption that the corneal curvature is 8 mm.

⑥ SETUP BUTTON

Operating conditions of each functions are set with this Button.

⑦ MODE BUTTON

The measurement mode is selected with this Button.

⑧ Temporary Button

This Button is used to temporarily set the measurement conditions for a single examination.

⑨ DATA BUTTON

Data stored in the memory are displayed.

⑩ CHIN REST HEIGHT DISPLAY

The present height of the Chin Rest is displayed in seven levels.

⑪ MEASUREMENT HEAD HEIGHT DISPLAY

The present height of the Measurement Head is displayed in ten levels.

⑫ REFRACTOMETER MEASUREMENT DATA

The latest refractometer measurement data are displayed.

S: Spherical power
C: Cylinderical power
A: Astigmatism axial angle

⑬ KERATOMETER MEASUREMENT DATA

The latest keratometer measurement data are displayed.

K1: Weak principal meridian
K2: Strong principal meridian
AX: Corneal astigmatism axial angle

⑭ MEMORY DATA NUMBER DISPLAY

Display the number of memory data with three color leliance priority in order "Green" "Yellow" "Red".

⑮ LATEST DATA RELIABILITY

Display the latest Keratometer data with three color leliance priority in order "Green" "Yellow" "Red".

⑯ KERATOMETER MEASUREMENT PART DISPLAY

Ø3: F implies that measurement has been given to the corneal center part.
Ø6: F implies that measurement has been given to the corneal periphery part.

⑰ TARGET LUMINOUS SPOT

The corneal vertex position of the eye to be examined is indicated.

⑱ TARGET RING

The indicator for positioning the eye to be examined when measurement.

⑲ MINIMUM PUPILLARY DIAMETER RING

The measurable minimum pupil diameter is indicated.

⑳ AUTO ALIGNMENT RING

The effective range of auto alignment is displayed.

㉑ FOCUS INDICATOR

The distance between the Measurement Head and the eye to be examined is indicated. When the bar appears left and right, the Joystick is tilted forward, and when the bar appears up/down, the Joystick is tilted toward your side, for focusing.

㉒ AUTO SHOT MARK

The Auto Shot Mark is displayed in the effective time of auto shot.

㉓ AUTO ALIGNMENT MARK

The Auto Alignment Mark is displayed in the effective time of auto alignment.

㉔ IOL/CAT MODE DISPLAY

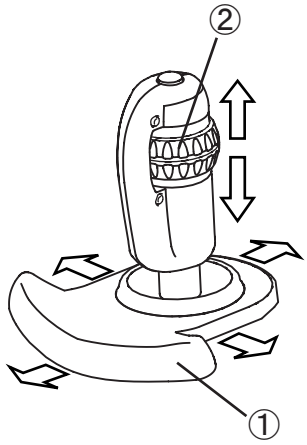
The IOL mode displays an IOL picture, CAT mode displays a crystalline lens picture.

㉕ HEAD BACKUP BUTTON

The head backs up toward the operator.

2.4 OPERATING PROCEDURES OF THE JOYSTICK

Two ways of Joystick operation, one is for rough adjustment and the other is for slightly adjustment. The Measurement Button is provided at the upper part of the Joystick.



<Rough adjustment>

Front/rear and right/left

Slide the Hand Rest ① to the expected direction of the Measurement Head. Largely sliding amount is given, moving speed is also faster.

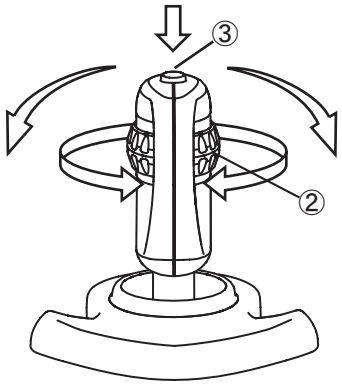
Up/down

Slide the Joystick Up/down Move Ring ② to the expected direction of the Measurement Head.

<Slightly adjustment>

Front/rear and right/left

Tilt the Joystick toward the expected direction of the Measurement Head.



Up/down

Rotate the Up/down Move Ring ① of the Joystick.

Clockwise ..... Moves to upward

Counterclockwise ..... Moves to downward

<Start Measuring>

Press the Measurement Button ③ to start measurement.

2.5 TOUCH ALIGNMENT

Touch alignment is performed by Touch Alignment Function, which is operated with the touch panel. This function shall have been pre-activated before touch alignment is given, which function can be used for all the measurement modes. (See "3.7.1 Setup".)

Note ***The Touch Alignment Function is used for rough positioning adjustment, while the Joystick is used for more slightly adjustment.***

Note ***Do not forcedly press the LCD display screen nor use any sharply pointed stick for touching the screen, which damages the display screen or disorders the instrument otherwise.***

If touching the LCD screen showing the anterior ocular view, the Measurement Head will be moved to position the image in the center of the screen.

2.6 RS-232C CONNECTOR

This Connector is used to output measurement data by connecting it to the LAN adapter of your personal computer or the TOMEY Link. (See "3.6 DATA MANAGEMENT WITH TOMEY Link".) Ask your Tomey's distributor or representative for detail information.

It is noted that any external equipment, if it is connected to the instrument, shall conform with the IEC60601-1 or the IEC950 of which power source is isolated with an isolating transformer, which may otherwise cause struck by electricity.

3. OPERATING PROCEDURES

3.1 INSTALLING

3.1.1 Precautions for installation

Install the instrument in a place where it is free from water and chemicals, if such things are enter into the instrument inside, may cause struck by electricity or system malfunctions.

Do not install the instrument in a place where any chemicals are stored or any gas is generated, if such chemicals are spilled or evaporated to enter into instrument inside part, may cause inflammation or subsequently a fire.

Do not hold the Chin Rest or the Head Rest when lifting the instrument, which may cause it to slip and fall off from your hand and harm you or damage the instrument.

Do not install the instrument in a place where it is subjected to direct sunbeams, high temperature or high humidity, or exposed to air including dust, salts, or sulfur, or in any place where it may have any adverse influences, since it may otherwise cause its malfunction or erroneous operation.

Install the instrument in a stable place where it is free from tilting, vibration, or shocks, or it may otherwise not perform correct measurement, or may cause its inflammation or human injuries.

3.1.2 Precautions for connecting of the Power Cord

Make sure that the frequency, voltage, and allowable current (or consumption power) of the power source are proper as specified, which may otherwise cause inflammation or struck by electricity.

The Power Plug shall be connected to the receptacle grounding wire, which may otherwise cause struck by electricity.

Care shall be given not to cause the Power Cord to be placed under a heavy object or weighted with undue pressure, which may cause inflammation or struck by electricity.

Securely connect the Power Cord. If the Power Cord is not properly connected, touches the metallic part or connected with dust-exposed plug terminal, may cause inflammation or struck by electricity.

3.1.3 Checking of the printer paper

Do not touch the Printer Paper Cutter with your hand, or you may cut yourself.

Remove the Printer cover and make sure that the Printer paper roll is installed in its proper position. As for the details of removing the Printer cover, see "5.5.1 Replacing of the Printer Paper".

In case of using an externally connected Printer, ask Tomey Corporation of your distributor or representative.

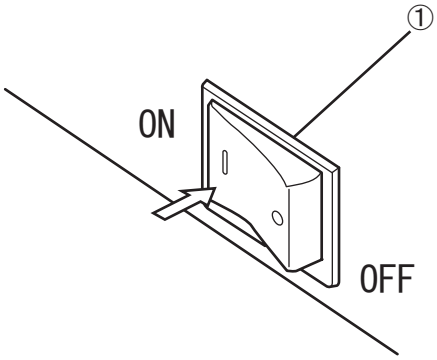
3.2 PREPARATION FOR MEASUREMENT

In the event this instrument encounters smokes, odors, or abnormal noises, immediately turn the power off, disconnect the Power plug from the receptacle. Next report such abnormal condition to your local distributor, representative, or Tomey Corporation.

Do not lay yourself nor apply undue force to this instrument, or it may fall down, also possibly causing instrument damages or personal injuries.

Do not place or leave any bin or bottle containing any liquid on the instrument, or it may cause struck by electricity or malfunctions.

3.2.1 Starting of instrument operation

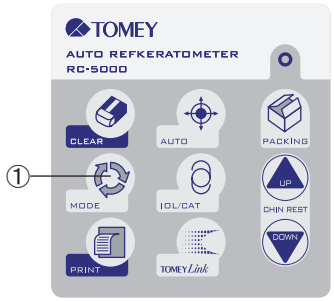


Turn the Power Switch ① on.

The Power Lamp will light up and the Measurement Screen will be displayed.

The machine starts at the measurement mode in which it was turned off.

3.2.2 Selecting of the measurement mode and setting of the measuring conditions

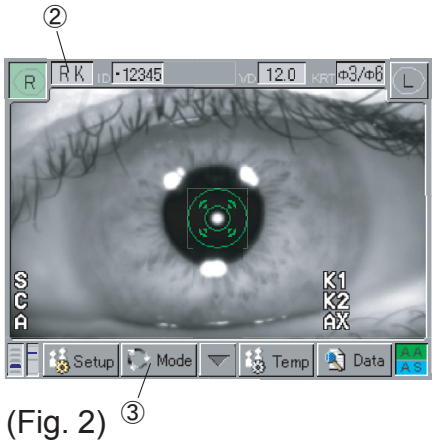


(Fig. 1)

<Selecting of the measurement mode>

Press the Mode Button ① of the Operation Buttons (Fig. 1), so the mode will change in order of " RK → KRT → REF → RK ".

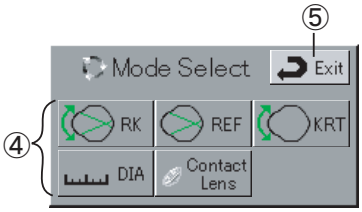
The selected mode will be displayed in the mode display ② of the Measurement Screen (Fig. 2).



(Fig. 2)

The Measurement mode can also be selected with the Mode Button ③ in the Touch Panel. Pressing the Mode Button ③ displays the Mode Select Screen (Fig. 3). Set the mode with the respective Setting Button ④. The DIA mode and the Contact Lens mode can be set with the Mode Select Screen (Fig. 3) only.

Pressing of the Exit button ⑤ returns the screen to the initial screen, even without giving any further operation.



(Fig. 3)

Display	Measurement mode
RK	Refractive power and corneal curvature measurement mode
REF	Refractive power measurement mode
KRT	Corneal radius of curvature measurement mode
DIA	Corneal diameter and pupil diameter measurement mode
Contact Lens	Contact lens measurement mode

<Setting of measuring conditions>

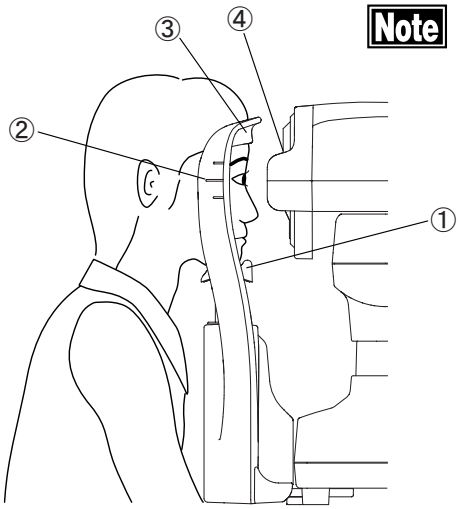
Set the measuring conditions. (See "3.8 SETUP OF MEASUREMENT CONDITIONS".)

3.2.3 Adjusting of Patient's position

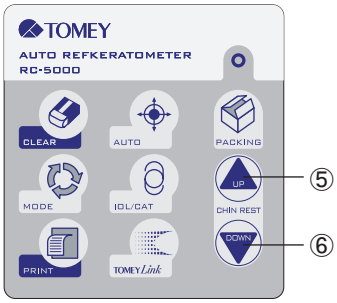
Note ***The Chin Rest is attached with the Chin Rest paper to maintain it cleanly. It is suggested to use the Chin Rest paper so as not to give an uncomfortable feeling to the Patient.***

Note ***Before proceeding to the measurement for the next Patient, first remove the top sheet of the Chin Rest paper and next clean the Head Rest and wipe the Head Rest cleanly with a piece of clean cloth. Wipe up the Head Rest and the Chin Rest with a piece of cloth soaked with rubbing alcohol when needed.***

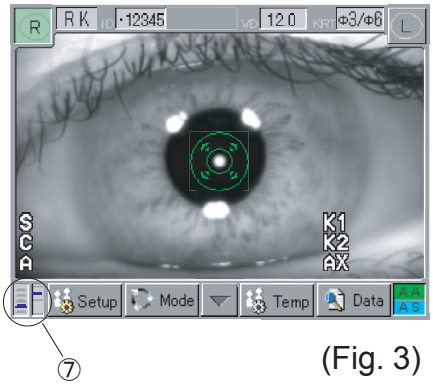
Note ***Have the Patient look at the fixation target through the measurement window with not to feel to tense. The wrong direction looking or eye movement causes incorrect measurement.***



(Fig. 1)



(Fig. 2)



(Fig. 3)

The Patient places his face on the Chin Rest ① and adjust the level of the Chin Rest so that the tail of the eye aligns to the eye level mark ②. If pressing the Chin Rest Button UP ⑤ of the Operation Button (Fig. 2), the Chin Rest will rise, while if pressing the DOWN ⑥, the Chin Rest will be lowered. The positioning relation of the Chin Rest and the Measurement Head is confirmed by the height indication ⑦ displayed in the left lower part of the Measurement Screen. Measurement window and eye level mark ② is same height level when height indication mark is situated in the halfway point of above and below. The Patient's forehead is lightly applied and secured to the Head Rest ③ after decided Patient's eye level.

3.2.4 Alignment procedure

Pay attention and carefully to the position of Patient's face and hand or fingers ,When operating Measurement Head and Chin rest. It may cause physical injury depend on movement of Measurement Head and Chin rest.

Advise the Patient not to place his hand and fingers in the under space of the Measurement Head or below Chin rest, which may otherwise cause his hand and fingers to be pinched and harmed.

Note ***Too large movement of the Patient's eye may not be followed by auto-alignment. In such a case, use the Joystick for realign the corneal center bright spot to relocate it in the auto alignment ring.***

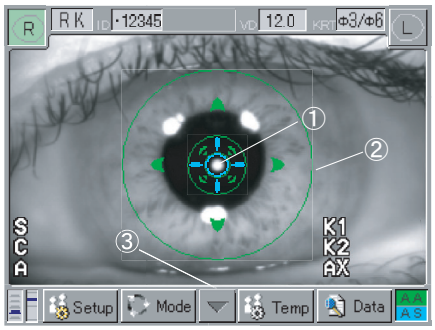
Note ***If an eye which blinks a lot or has any corneal disease in the corneal surface is measured, the Auto Alignment Function may not work properly.***

Note ***A yellow bar appearing close to one of four sides of the screen shows that Optical Head is standing close to the edge of its moving area. Auto Alignment may not work properly in this situation.***

<When using touch alignment>

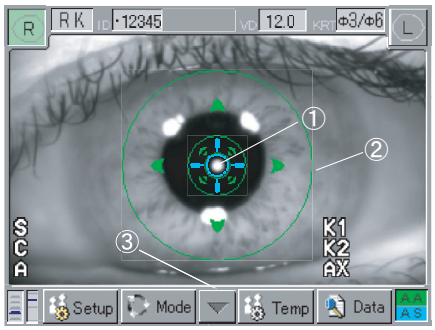
With touching Patient's eye on the screen, which is able to alignment.

1) Operating the Joystick for Patient's eye is on the screen.
2) Touch softly neighborhood part of Patient's pupil.
3) Measurement Head moves for Patient's eye comes to center of the screen.
4) When auto alignment is ON, if the reflected light spot of the cornea ① comes into the auto alignment ring ②, alignment for the up/down and right /left directions and focusing frontward/rearward are automatically started.
5) Touching center part of the screen with slightly pushing, Measurement head moves to Patient's side and bring into focus when Measurement head locate Examiner side and out of focus.
6) In case Optical Head is too close to the patient and out of range of Auto Alignment, please move back the head by touching the allow mark ③ on bottom of screen.



(Fig. 1)

7) When Auto Shot is ON, automatically measurement till the number of measurement times which is set.
8) Touch an icon of other side eye (R or L), Measurement Head moves automatically to the other side eye when finish measurement of the one side eye.

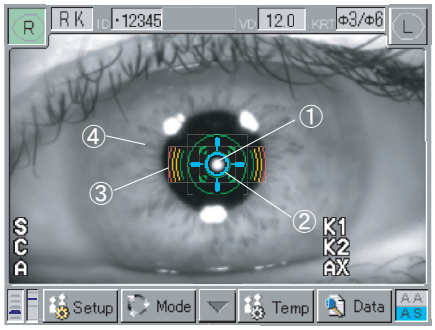


(Fig.2)

<When auto alignment is ON>

The background color of [AA] displayed in the right bottom of the screen turns to green.

Use the Joystick to locate the target bright spot ① is in the auto alignment ring ②. When the reflected light spot of the center of the cornea ① comes into the auto alignment ring ②, alignment for the up/down and right/left directions and focusing frontward /rearward are automatically started. As for the setting of auto alignment, see "3.7.1 Setup".

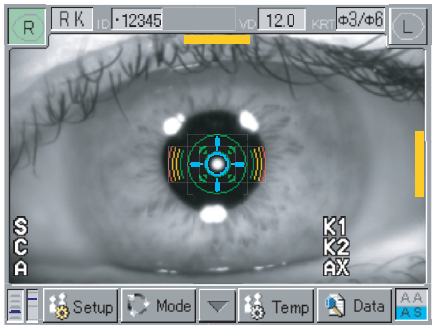


(Fig.3)

<When auto alignment is OFF>

The background color of [AA] displayed in the right bottom of the screen turns to gray.

Locate the reflected light spot of the center of the cornea ① into the target ring ② by using the Joystick. Move the Joystick back and forth to make the focus indicator ③ smaller. When the focus indicator ③ is not displayed, adjust focusing on the target reflected light spot ① or the iris ④.



(Fig.4)

<Optical Head moving area>

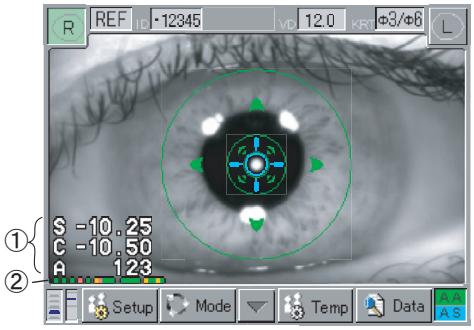
When Optical Head comes to close to the edge of its moving area, a yellow bar appears at side of the screen. Adjust poison of the patient's head and take a measurement with the bar disappeared.

3.3 MEASUREMENT

Note ***Advise the Patient not to blink while measuring eye.***

Note ***If the Patient's eye has too many blinks or such an abnormal condition of corneal disease, not be able to perform measurement by auto shot. If so, try by manual measurement.***

3.3.1 Refractive power measurement mode



(Fig. 1)

<Refractometer Measurement Screen>

The latest measurement data ① are displayed in the left lower part of the Monitor.

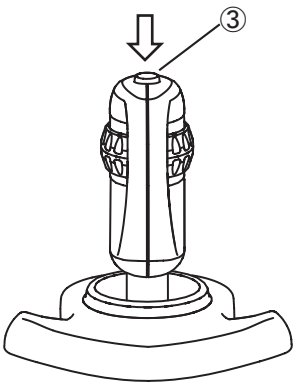
Each data indicate below.

S: spherical refractive power
C: cylindrical refractive power
A: astigmatism axial angle

These numeral data are indicated by color "White" "Yellow" "Red" in order of reliability.

A dot marks below numeral data indicate the number of memorized measurement data ②. A dot increase in order left to right. The colors of a dot displayed in three colors of "Green", "Yellow", and "Red" in order of reliability. Print out error message correspond to these colors "No mark", "e", "E" in order of reliability.

Twenty (20) data of refractometer measurements are memorized. If more than 20 data are acquired, memorized data will automatically be deleted from the oldest one or from "Red" "Yellow" color data in order low reliability.



(Fig. 2)

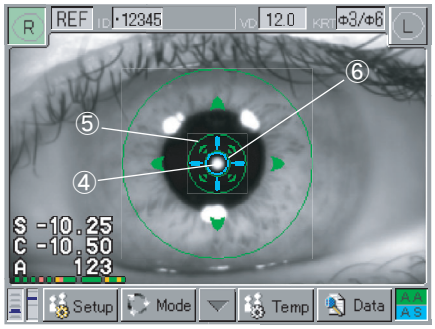
<Measuring procedure>

1) Select the measurement mode of "REF". (See "3.2.2 Selecting of the measurement mode and setting of the measurement conditions")
2) First make alignment and next press the Measurement Switch ③ to start measurement. (See "3.2.4 Alignment procedure".) If the Auto Shot is set, measurement will automatically start at the time when alignment has been completed and will continue measurement until a set number of measurements (3 to 5 times) are completed. As for setting procedure of Auto Shot, see "3.7.1 Setting procedure of Auto Shot".

3) When measurement has been finished, the message of "Finished" is displayed in the screen. If auto shot is active, it will be released from its activated state.

<Countermeasures for measurement problems>

In case measurement is unable or the error message is displayed for measurement results, the following problems are possibly caused. The following will be the countermeasures to be taken for such problems.



(Fig. 3)

- Blinking or nystagmus

  Advise the Patient to look at the fixation target with his eye to be examined and again start measurement. If auto shot does not work due to nystagmus with severe eye movement, press the Measurement Switch ③ in good timing with the Target light Spot ④ as being viewed, so measurement is thereat taken (by manually measurement). If, however, correct positioning is not been made, measurement deviations will possibly be caused. Such manually measurement should be used only when you have to give measurement even in an unstable condition.

- Interfering the minimum pupil diameter ring with the eyelid or the eyelash

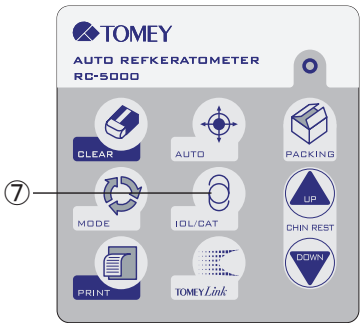
  Instruct the Patient open his eye widely until measurement ends, or again take measurement by lightly lifting the Patient's upper eyelid with the examiner's finger.

- A small pupil

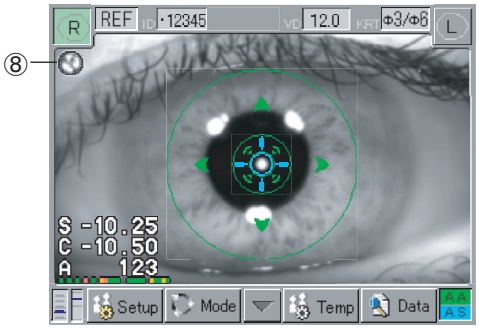
  If the pupil is smaller than the minimum pupil ring diameter ⑤, cause may not proper measurement.

- Corectopia

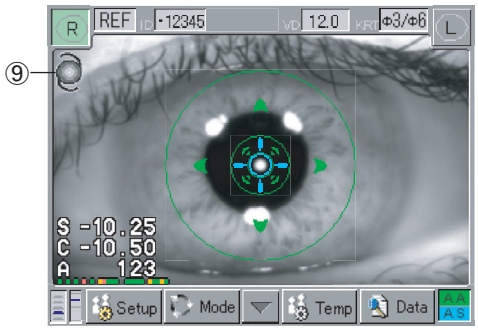
  If the pupil interferes the minimum pupil diameter ring ⑤, cause may not proper measurement. If so, release the Auto-alignment Function and next take measurement in the position that the concentricity of the pupil and the target ring ⑥ is made.



(Fig. 4)



(Fig. 5)



(Fig. 6)

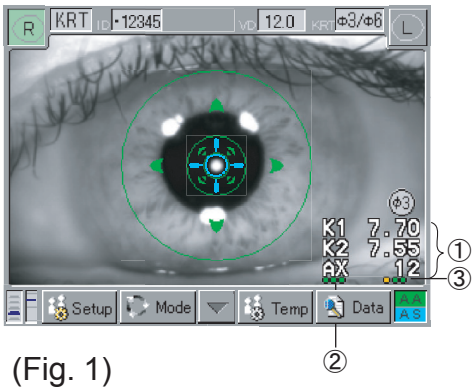
- It may not measurement properly for cataract or vitreous hemorrhage eye which Optic media opacity and the ocular fundus reflective light is extremely small.
  Press the IOL/CAT button ⑦ of the operation button (Fig. 4) to select the CAT mode ⑧ to start measurement. The mode is changed in order of CAT mode → IOL mode → Normal mode every time when the button is pressed.

- Unnecessary light as reflection light in the IOL surface.
  Press the IOL/CAT button ⑦ of the Operation buttons (Fig. 4) to select the IOL mode ⑨ and perform measurement. The mode is changed in order of CAT mode → IOL mode → Normal mode every time when the button is pressed.

- Interference of ocular adjustment
  No correct measurement can be obtained from the eye right after its correcting lens is taken off or after the eye continues near sight work with ocular adjustment as still remaining. Measurement should be given after a while or after instruct Patient look at faraway distance.

3.3.2 Corneal curvature (keratometer) measurement mode

<Keratometer Measurement Screen>



(Fig. 1)

The latest measurement value is displayed in ①.

The number of dot in ② indicate saved measurement data number, and ③ indicate measuring number with latest measurement.

The colors of measurement data ① and dots ②, ③ which indicate reliability of measurement.

Reliability of color display indicates as "Yellow" for lack of measurement point caused with eyelid or eyelash.

When reliability of measurement data is too low, red color is indicated on ①.

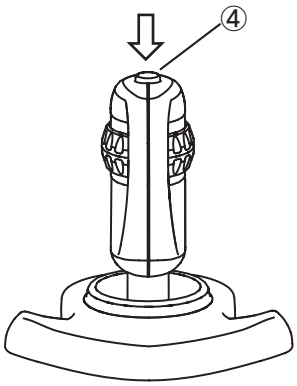
When measurement fails, [E] mark is displayed on ① in red and data is not shown.

The keratometer measurement memories three times of measurement data. If more than three times measurement data are taken, it will be deleted from the oldest one. If, however, dates colored with "Red" and "Yellow" are indicated, this data will be deleted first.

Displays Keratometer measurement data of cornea center part, when "Ø3" mark is attached to the right upper part of the measurement value.

Displays Keratometer measurement data of the circumference part of cornea when "Ø6" mark is attached.

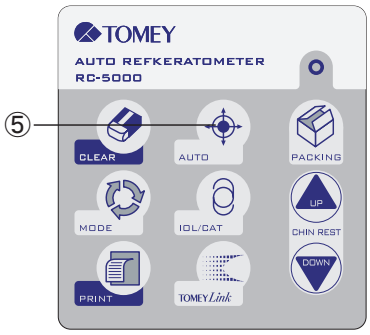
Displays "Ø3" measurement value when measured both Ø3/Ø6. Measurement value of "Ø6" can be seen by Data mode. (See "3.5 Display of data in the memory".)



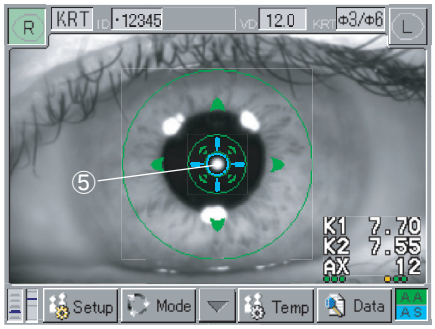
(Fig. 2)

<Measuring procedure>

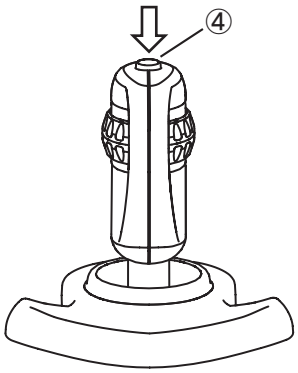
1) Select the "KRT" measuring mode. (See "3.2.2 Selecting of the measuring mode and setting of the measuring conditions".)
2) Give alignment. (See "3.2.4 Alignment procedure".) Next press the Measurement switch ④. If Auto Shot is set at "ON", measurement will automatically be started when alignment is finished. Measurement will consecutively be given as many times as set (1 or 3 times). After measurements are finished, Auto Shot will be released regardless of acquirement of measurement data.
3) At the time when set times of measurement data have been taken, the message of "Finished" will be displayed in the screen.



(Fig. 3)



(Fig. 4)



(Fig. 5)

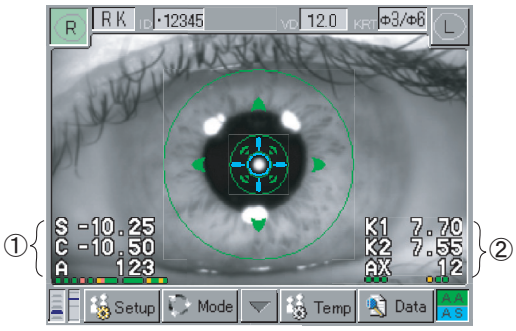
In case the measurement cannot be repeated the set times for some reason, "KRT ?" will be displayed. In this case, measurement can be done again automatically by pressing AUTO button ⑤ or manually by pressing the measurement switch ④.

<Countermeasures for difficult measurement>

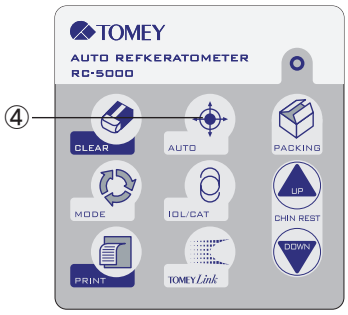
In the event measurement can not be made or the error message is displayed for any measurement results, such measurement inconveniences are assumed to be mainly caused by the following reasons. If so, the following countermeasures shall be given for solution.

- Blinking or nystagmus
  Advise the Patient to look at the fixation target with his eye to be examined and again start measurement. If Auto Shot does not work due to nystagmus with severe eye movement, press the Measurement Switch ④ in good timing with the Target light Spot ⑤ as being viewed, so measurement is thereat taken (by manually measurement). If, however, correct positioning is not been made, measurement deviations will possibly be caused. Such manually measurement should be used only when you have to give measurement even in an unstable condition.
- Interfering the minimum pupil diameter ring with the eyelid or the eyelash
  Have the Patient open his eye widely until measurement ends, or again take measurement by lightly lifting the Patient's upper eyelid with the examiner's finger.
- Reflected light in the IOL surface
  When measuring an IOL implanted eye, correct measurement cannot sometimes be taken due to the reflection in the IOL surface.
- External light as luminous light is projected to the eye to be examined
  Adjust the patient's eye to be examined so it is not subjected to an external light and again take measurement.
- An abnormal condition with the eye with corneal disease in the corneal surface
  Carry out manual measurement, provided that, if the eye suffers from a serious disease, even manual measurement may show an erroneous measurement.

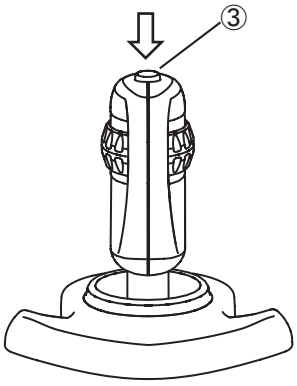
3.3.3 Refractive power and corneal curvature (refkeratometer) measurement mode



(Fig. 1)



(Fig. 2)



(Fig. 3)

<Refkeratometer Measurement Screen>

The Refkeratometer Measurement Screen shows a refractive measurement value ① in the left lower part of the monitor and a keratometer measurement value ② in the right lower part of the monitor. As for these two measurements, see "3.3.1 Refractive power (refractometer) measurement".) and "3.3.2 Corneal curvature (keratometer) measurement)".

<Measuring procedure>

1) Select the measurement mode of "RK". (See "3.2.2 Selecting of the measurement mode and setting of the measuring conditions".)

2) Give alignment (in accordance with "3.2.4 Alignment procedure") and press the Measurement Switch ③ to start measurement. If auto shot is set ON, measurement will automatically start at the time when alignment is completed. Measurement starts with keratometer measurement and next refractometer measurement.

3) After continuation measurement till set up times of measurement data, Displayed "Finished" or "KRT OK?". Then, Auto Shot will be released.

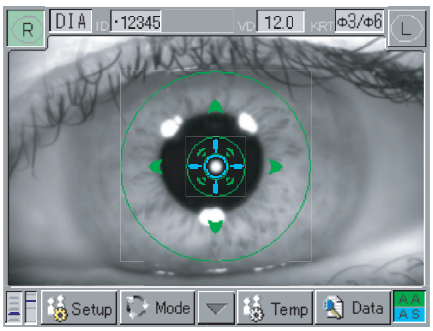
4) When the display of "Finished", it show keratometer measurement and reflectometer measurement has been done till set up times of measurement. When the display of "KRT OK?", it show keratometer measurement has not been done till set up times of measurement. In this case, enter Keratometer mode and measuring keratometer measuring only or press again measurement switch ③ or press Auto button ④. Then, again give keratometer and refractometer measurement.

<Countermeasures for difficult measurements>

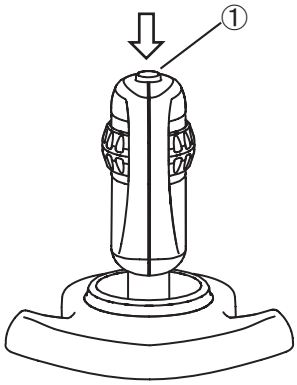
See "3.3.1 Refractive power (refractometer) measurement" and See "3.3.2 Corneal curvature measurement" (keratometer).

3.3.4 Corneal diameter and pupillary diameter measurement mode

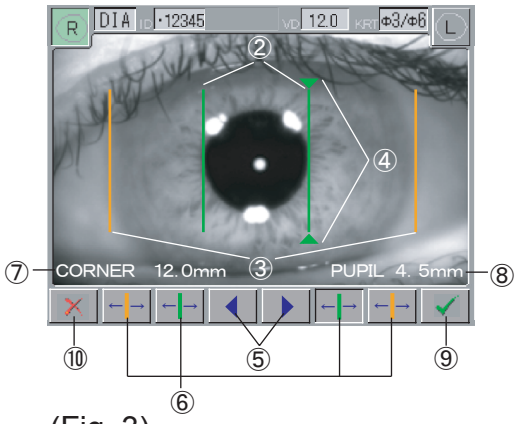
Acquire the image of the anterior ocular segment and align the cursors to the pupil or both ends of the cornea, to measure the distance between the cursors, with which the sizes of the pupil and the cornea are measured.



(Fig. 1)



(Fig. 2)



(Fig. 3)

<Measuring procedures>

1) Select the "DIA" measurement mode. (See "3.2.2 Selection of measurement mode and setting of measuring conditions".)

2) Give alignments (See "3.2.4 Alignment procedures".) and next press the Measurement Switch ① to acquire the images of the anterior ocular segment.

3) If such images are acquired, the cursor for pupillary diameter measurement ② is colored in green and that for corneal diameter measurement ③ is colored in orange. (Fig. 2) After this, adjust each cursor so as to meet the sizes of the corneal diameter and the papillary diameter. The active cursors marks are accompanied ④ at the upper and lower parts of the cursors, of which cursor are moved left and right by pressing the CURSOR MOVE button ⑤.

4) The active cursor is selected by pressing the CURSOR SELECT button ⑥.

5) The distance between the cursors for corneal diameter measurement is shown in the CORNER ⑦ and that between the cursors for pupil diameter measurement is shown in the PUPIL ⑧.

6) Press the OK button ⑨, so the measurement results will be saved in the memory and the initial screen (Fig. 1) will be returned. If the Cancel button ⑩ is pressed, the initial screen (Fig. 1) will be returned without giving any operation.

7) The calculated value will be printed out by pressing PRINT button after OK button ⑨.

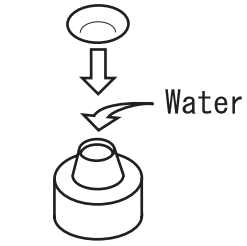
3.3.5 Contact lens measurement mode

This mode is of the function by which the base curve of the hard contact lens is measured.

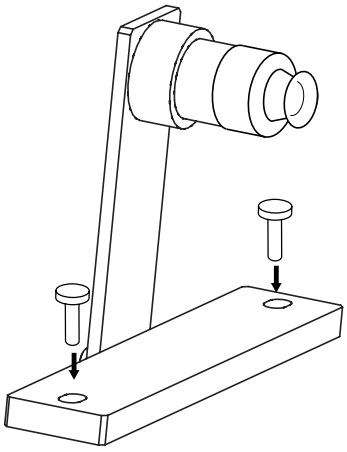
Note ***Care shall be taken not to cause air bubbles in the measuring area.***

Note ***Care shall be taken not to cause water or dust to adhere to the measurement surface.***

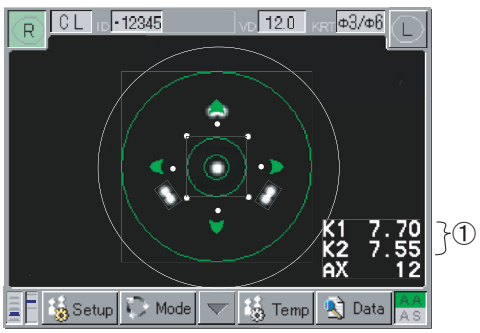
Note ***Auto Shot and Auto Alignment do not function in this mode.***



(Fig. 1)



(Fig. 2)



(Fig. 3)

<Measuring procedures>

1) Put water in the concaved part of the contact lens holder.

2) Turn the contact lens with the concaved side up side and place it in the center part of the holder as shown in Fig. 1.

3) Attach model eye to the chin rest.

4) Place the contact lens holder into the model eye as shown in Fig. 2 and adjust contact lens is parallel to the measurement window.

5) Select the "CL" measurement mode. (See "3.2.2 Selecting of the measurement mode and setting of the measuring conditions".)

6) Press the Measurement switch in the position where the measurement bright spot is focused and next take measurement. The base curve value of the contact lens is displayed in the kerato value displaying position ①.

3.4 PRINTOUT

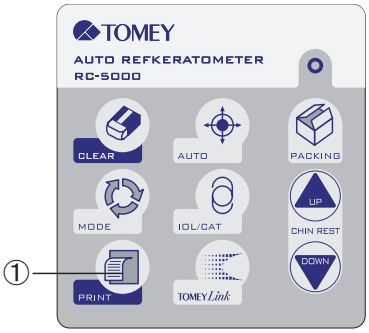
3.4.1 Printing-out procedures

Note ***Make sure that the built-in Printer is loaded with the paper roll. (See "5.5.1 Replacing of the Printer Paper")***

Note ***If the Printout for built-in Printer is off at the time of setting data output, printing out cannot be made. Set the printing out of the built-in Printer ON, by referring to "3.8.1 Setup".***

Note ***If making the following measurement after printing out, previously measured data will automatically be deleted and the measurement number will be added with "1".***

Note ***Since the built-in Printer of this instrument is of thermal printing, the print made will gradually fade as the elapse of time. Duplicate copies of the printout of measurement data, if will be preserved for long time.***



Printing-out after measurement is performed by pressing the PRINT button ①. If Auto Print is set on, measured data will be automatically printed out after both eyes are measured properly by set up times of measurement. But in following case, consider to require additional measurement or going to additional measurement, do not print out automatically. As for setting of Auto Print, see "3.8.1 Setup".

- Changed measurement mode halfway.
- Measured by measurement switch of joystick.
- Not using Auto Shot.
- Not getting set up measurement data with measurement error.

See "3.8.1 Setup" for setting automatic printing.

3.4.2 Print mode

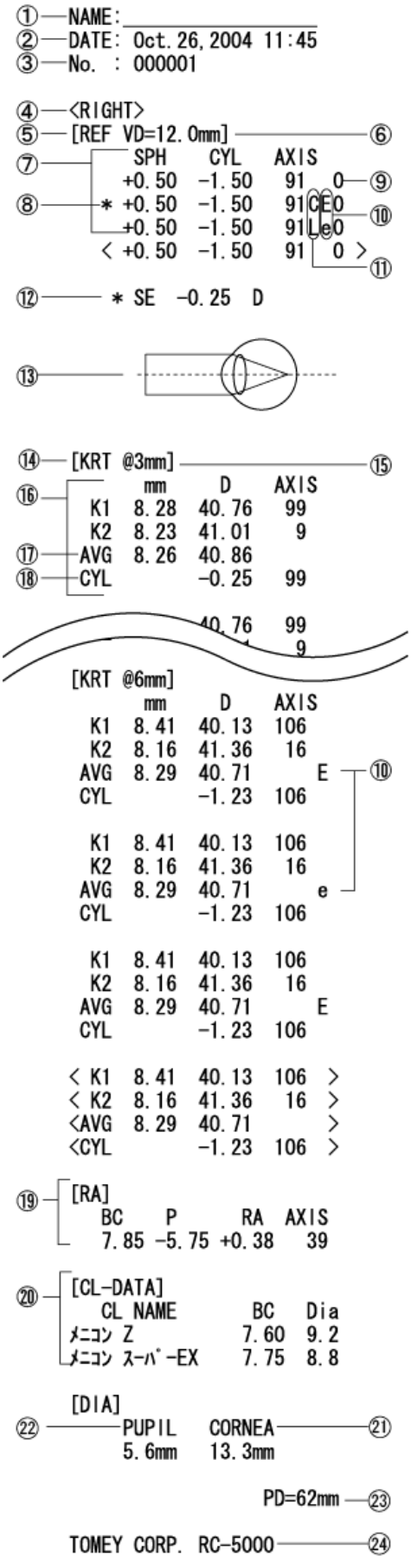
The selection of a printout mode is carried out with "Print Form" in the Output Setup Screen. See "3.8.1 Setup".

Note ***Use CL data for the reference of selecting a trial lens used for prescription of a contact lens. The prescription of a contact lens shall be determined by giving the fitting test.***

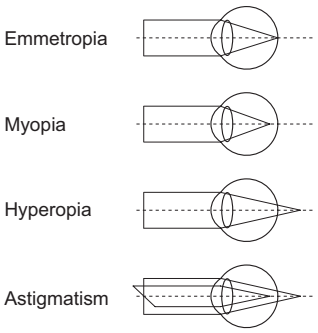
Setting items for mode *Default setting

Setting mode	Setting items for mode	
R/L Separation	Enable * Disable	Measurement data for right and/or left eye respectively printed out. Measurement data for measurement mode respectively printed out.
Date/Time	Enable * Disable	Date and time are printed. No print is made.
Date Form	Y.M.D * M.D.Y D.M.Y	Year, month, and day are displayed in order. Month, day, and year are displayed in order. Day, month, and year are displyaed in order.
Exam. No.	Enable * Disable	Exam number is printed. No print is made.
Name	Enable * Disable	Patient's writing column is printed. No print is made.
Refractometer Data	All * Typical +Typical	Saved data including the representative value in the memory are printed. The representative value only is printed. Saved data and the representative value in the bottom line are prinred.
Coefficient of reliability	Enable * Disable	Print out Coefficient of reliability. No print is made.
Keratometer Data	All * Typical Average +Typical +Average	Saved data including the representative value and the average are printed. The representative value only is printed. The average value only is printed. Saved and representative values are printed. Saved and average values are ptinted.
Remaining Astigma-tism	Enable * Disable	Residual astigmatism is printed. No print is made.
CL DATA	Enable * Disable	Selected brand CL data are printed. No print is made.
PD	Enable * Disable	Pupillary distance is printed. No print is made.
Eye Print	Enable * Disable	Oculogram is printed. No print is made.
Product Name	Enable * Disable	Product name (RC-5000) is printed. No print is made.
Line Space	Normal * Narrow	Printing is made in the normal line spaces. Printing is made in narrowered line spaces.

<Printout example A>　Printing all the items.



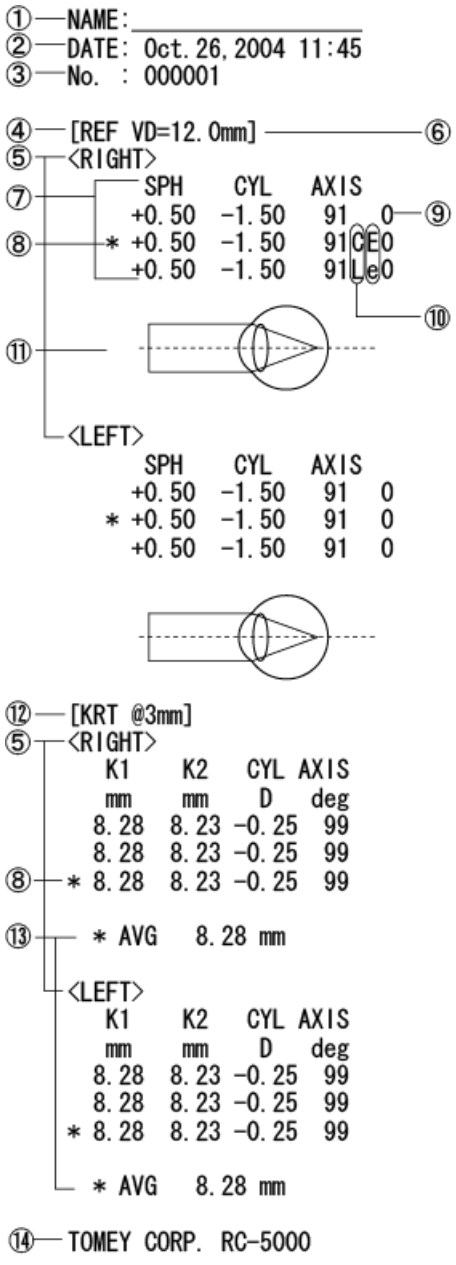
① Patient's name
② Measuring date and time
③ Measuring number
④ Measured eye
⑤ Refractometer display
⑥ Corneal vertex distance
⑦ Refraction values
⑧ Representative value
⑨ Data reliability coefficient
　10 levels (0 to 9) display
　The higher reliability with the smaller number
⑩ Error message
　Low reliability data → "e"
　Lower reliability data → "E"
⑪ Measurement mode
　CAT mode → "C"
　IOL mode → "L"
⑫ Spherical equivalence
⑬ Eye charts



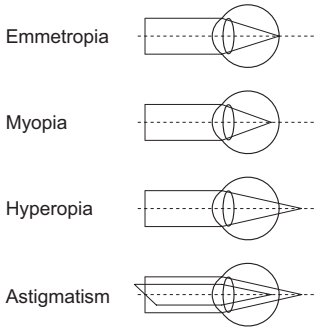
⑭ Keratometer display
⑮ Measurement position of keratometry
⑯ Keratometry values
⑰ Average
⑱ Corneal astigmatism
⑲ Residual astigmatism (RA is the value)
⑳ CL DATA
㉑ Pupil diameter
㉒ Corneal diameter
㉓ Interpupillary distance
㉔ Product name

<Printout example B>　Printing the following items.

R/L separation → Disabled
Refractometry values → No average
Keratometry values → No avarage
Keratometry data form → K1K2, No dioptory



① Patient's name
② Measuring date and time
③ Measuring number
④ Measured eye
⑤ Refractometer display
⑥ Corneal vertex distance
⑦ Refreactometry values
⑧ Representative value
⑨ Data reliability coefficient
　10 levels (0 to 9) display
　The higher reliability with the smaller value
⑩ Error message
　Low reliability data → "e"
　Lower reliability data → "E"
⑪ Eye charts



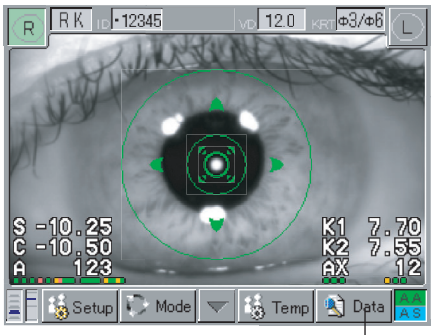
⑫ Keratometer display
⑬ Average
⑭ Product name

3.5 DISPLAY OF MEMORY DATA

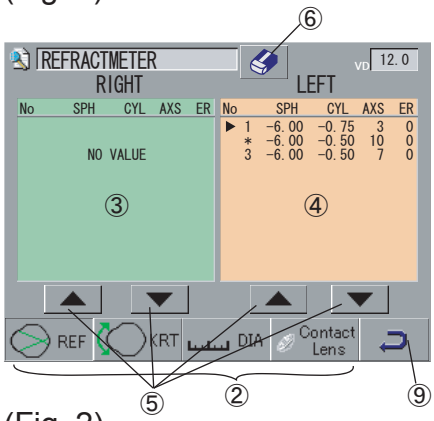
This function displays various measurement data saved in the memory in the Monitor.

Note ***Pressing of the Clear button deletes all the data saved in the Memory.***

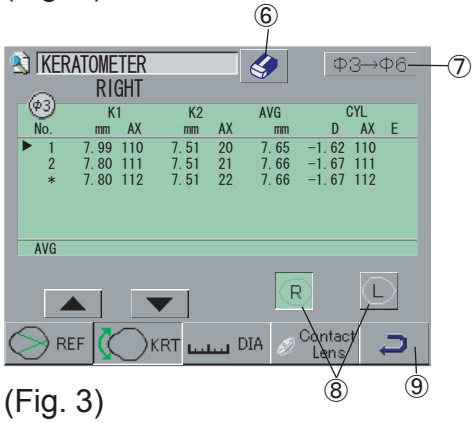
Note ***If measurement is given after measured data has been printed out, such printed out data will be deleted from the Memory.***



(Fig. 1)



(Fig. 2)



(Fig. 3)

1) The data display screen (Fig. 2) will be shown when Data button on the touch panel ①.
2) Select the measured data with Mode button ② down on the screen. The selected data will be shown. "NO VALUE" will be shown in case no data is stored.
3) Pressing ▼button / ▲button ⑤ moves the triangular mark on the head of the data line. The data with the triangle can be erased with Eraser button ⑥.
4) In the Kerato data screen (Fig. 3) each of Ø3 data and Ø6 will be shown by pressing Ø3/Ø6 Change button ⑦ alternatively when both of the data are stored. And pressing R/L button ⑧ changes the right screen and left dataascreen.
5) Return button ⑨ will bring back to the former screen (Fig.1).

3.6 DATA MANAGEMENT WITH "TOMEY LINK"

Tomey's TOMEY Link (including the LAN adapter) is conveniently used for data management which corresponds to the computer network.

WARNING

If the TOMEY Link is connected to external equipment other than the LAN Adapter (LA-100), observe the following requirements, which may otherwise cause struck by electricity .

- ***Use the serial communication cable for connecting the TOMEY Link.***
- ***The equipment to which the TOMEY Link is connected shall conform with the IEC60601-1 or the IEC950 and of which power source shall be isolated with the isolating transformer.***

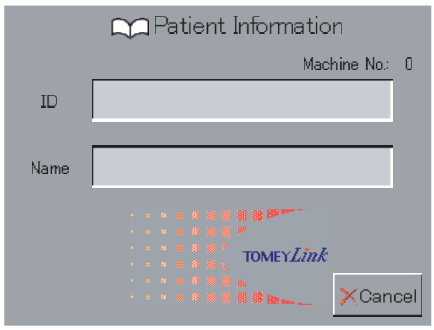
Note

Setting-up of the TOMEY Link server software and the LAN Adapter (LA-100) to the TOMEY Link shall be referred to the instruction manual of the TOMEY Link. This Manual prescribes the connection procedure of the TOMEY Link with the RC-5000 only.

Note

No data communications can be obtained unless entering the Patient's ID.

3.6.1 Setup



1) For setting of External communication in the Output Setup, select TOMEY Link. (See "3.8.1 Setup".)
2) After finishing the Setup screen, the Input Patient's ID screen will be displayed. If the connection with the TOMEY Link is selected, this Input Patient's ID screen is always displayed when a new measurement is started.

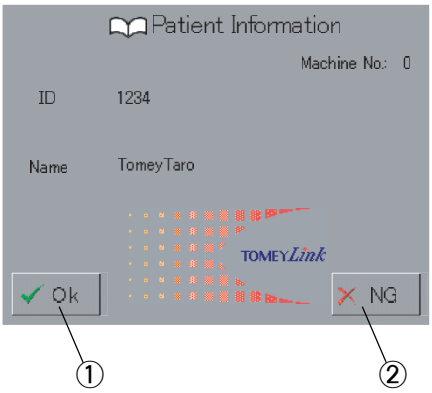
Note

If you measuring Temporally without sending Patient's information or data, press Cancel Button.

3.6.2 Receiving of Patient's ID

Note ***A Patient's ID to be listed in the identify number column shall be entered with no more than 14 figures. Special caution is given not to enter a Patient's ID of more than 14 figures.***

Note ***A Patient's ID is received from the LAN Adapter even if the instrument is in the state of auto power off, if the TOMEY Link has once been selected.***

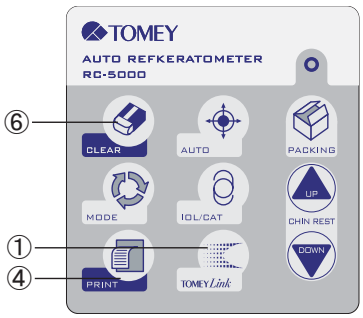


1) Enter a Patient's ID from the LAN Adapter with the Input Patient's ID screen of the instrument as being displayed. At the time boot up or after sending data, if you select TOMEY Link, stand by Patient's ID input screen, not measurement screen.
2) The Patient's ID is inquired to the server and received by TOMEY Link through the LAN Adapter. As soon as the Patient information is received as above, the screen is changed to that for measurement with the Patient's ID being listed in the identify number column. If you press OK Button ①, change to measurement screen and Patient's ID is displays at identify number column. Then you are ready for measurement. If you press NG Button ② back to Patient's ID input screen, then you can change Patient's ID.

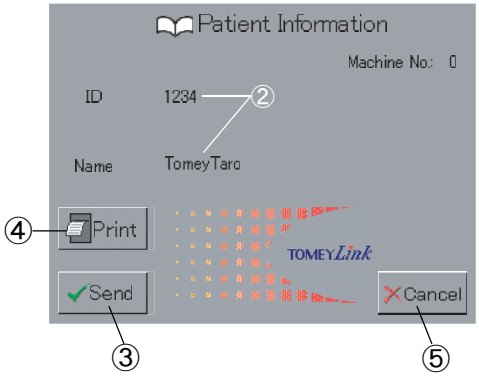
3.6.3 Sending of measurement data

Note ***Carefully certify the Patient's ID. If you send data with mistake Patient's data (for example another patient's ID), since the TOMEY Link (including LAN Adapter) does not judge if they are wrong or correct.***

Note ***The TOMEY Link is able to receive a Patient's ID through the LAN Adapter, even if the instrument is in the state of auto power off, as long as the TOMEY Link has been selected.***



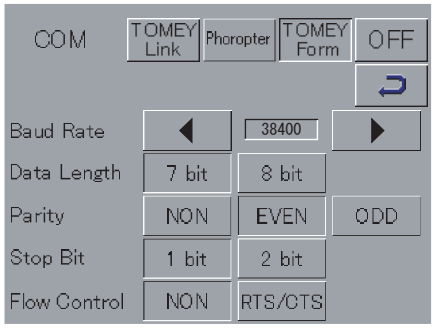
(Fig. 1)



(Fig. 2)

1) By pressing the TOMEY Link button ① after measurement is finished, the "Patient Information, Send data screen" (Fig. 2) is displayed. In case Auto print is available, Displays "Patient Information, Send data screen" (Fig. 2) automatically when print out automatically. If you pres Print out button ④ before sending data, you can print out measurement data.
2) Confirm the Patient's ID ② and, if correct, press the Send button ③. Then, the Patient's ID and related measurement data will be sent.
3) If Patient's ID is not correct, Press Clear button ⑥, then re-enter correct Patient information and measurement again.
4) In case press the TOMEY Link button ① by mistake, if pressing Cancel button ⑤, return to measurement screen with preserve Patient's ID and measurement data.

3.7 ID INPUT WITH TOMEY FORM



(Fig. 1)

(Fig. 2)

With TOMEY FORM for data output the measured data can be transferred through RS-232C port by setting as in Fig. 1. When TOMEY Link button on the base is pressed after setting this way, The key display for patient's ID input will be shown on the display and the ID can be input by touching the panel/

After the measurement, the measured data will be output almost the same time as the printout.

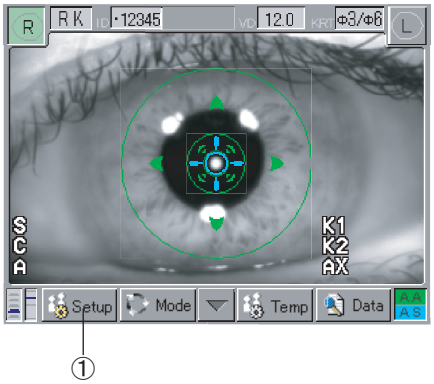
Please consult TOMEY CORPRATION or its authorized distributor for the detail.

3.8 SETUP OF MEASUREMENT CONDITIONS

3.8.1 Setup

The operating conditions are set, which will be effective as long as the set up conditions are not changed.

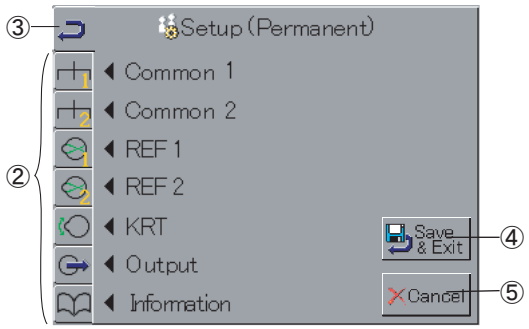
Note ***Before changing the setup conditions, always press the Save & Exit button to finish the operation. If the operation is finished with the Cancel button, the setup conditions will be returned to the previously setup screen, without saving the change.***



(Fig. 1)

Press the Setup button ① in the Touch Panel to change the screen to the Setup Screen (Fig. 2). Next, select the items to be set by pressing the icons ② on the left side of the screen. and set them at each of their Setup screen.

After setting-up has been completed, press the icon ③ and change the screen to the Setup Screen (Fig. 2). Next press the Save & Exit button ④, so the setup items will be saved and the screen will be returned to the initial measurement screen. If pressing the Cancel button ⑤, the screen will be returned to the initial measurement screen without doing any operation.

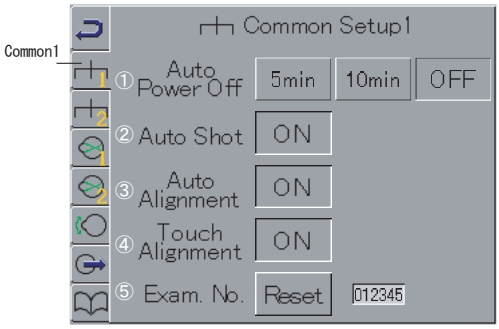


(Fig. 2)

- Common 1: Item common to each measurement
- Common 2: Item common to each measurement
- REF 1: Item related to refractometer measurement
- REF 2: Item related to refractometer measurement
- KRT: Item related to keratometer measurement
- Output: Item related to data output
- Information: Product information

a) Common 1: Common setup 1

Items common to each measurement mode are set up.



Auto Power Off

5min: If no operation continues for 5 minutes, the Power Off will be actuated.

10min: If no operation continues for 10 minutes, the Power Off mode will be actuated.

OFF: No Auto Power Off will be actuated.

Auto Shot

ON: The Auto Shot function is enable.
The grayed-out [AS] on right bottom of the screen turns bright when Auto Shot is active.

OFF: The Auto Shot function is disable.

Auto Alignment

ON: The Auto Alignment function is enable.
The grayed-out [AA] on right bottom of the screen turns bright when Auto Alignment is active.

OFF: The Auto Alignment function is disable.

Touch Alignment

ON: The Touch Alignment function is enable.

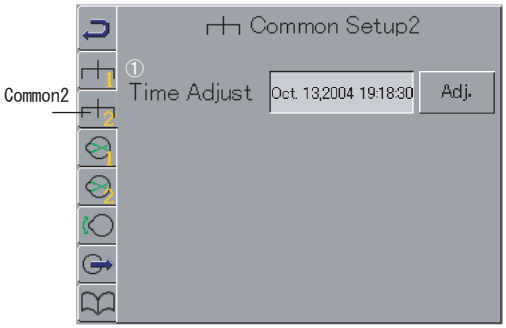
OFF: The Touch Alignment function is disable.

Exam. No.

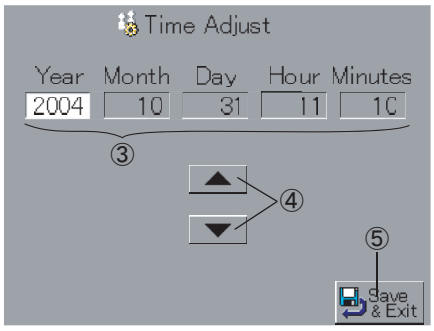
Reset: The exam number is reset to "000001".

b) Common 2: Common setup 2

Items common to each measurement mode are set up.



(Fig. 1)



(Fig. 2)

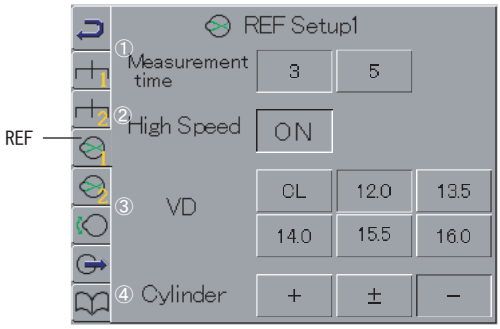
Time Adjust

Adj.: Date and time are set.

Pressing of the Adj button ② displays the Time Adjust Screen (Fig. 2). If each Date and Time column ③ is touched, its display will be a changeable condition. Next press the Up/Down button ④ to enter the date and time. Pressing of the Save & Exit button ⑤ saves changed date and time and the screen is returned to the Common Setup 2 Screen (Fig. 1).

c) REF Setup: Refractometer setup

Refractometer measurement conditions are set up.



(Fig. 1)

Measurement Times

3: When Auto Shot is ON, 3 consecutive measurements will be made.

5: When Auto Shot is ON, 5 consecutive measurements will be made.

High Speed

ON: The High Speed mode is enable.

OFF: The High Speed mode is disable.

VD

The Vertex distance is set.

CL / 12.0mm / 13.5mm / 14.0mm / 15.5mm / 16.0mm

Cylinder

The display mode of cylindrical value (astigmatism) is set.

+ / ± / -

Diopter Step

Step setting for Ref measurement.

0.25 / 0.12 / 0.01

(Fig. 2)

Axis Step

Step setting for Axis value.

1 / 5

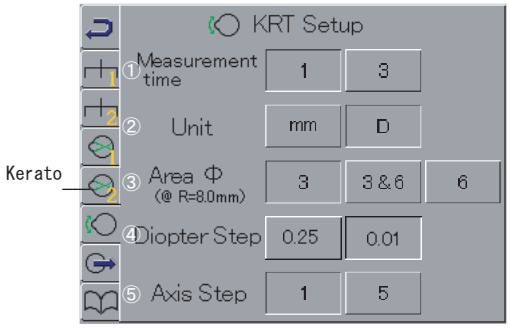
CAT Mode

Cataract mode is set.

Auto / Manual

d) KRT Setup: Keratometer setup

The measurement conditions for keratometer measurement are set up.



(Fig. 1)

Measurement times

1: One measurement is made when Auto Shot is ON.

3: Three consecutive measurements are made when Auto Shot is ON.

Unit

mm: Keratometer measurement values are displayed in mm unit.

D: Keratometer measurement values are displayed in D unit.

Measurement Part Ø

The keratometer measurement part is set.

3: Measurement is taken for the part Ø3 from the corneal apex.

3&6: Both Ø3 and Ø6 part from the corneal apex are measured at the same time.

6: The part of Ø6 from the corneal apex is measured.

Diopter Step

Step setting for Kerato measurement. (only Diopter)

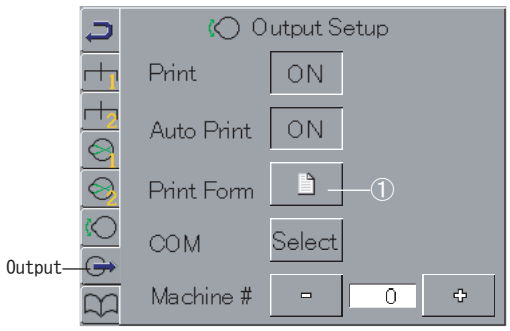
0.25 / 0.01

Axis Step

Step setting for Axis value.

1 / 5

e) Output Setup



(Fig. 1)

The output of the measured data is set.

Print

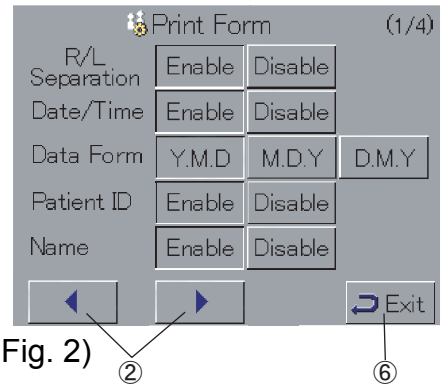
ON: The measured data is printed by built-in printer.
OFF: Printing is disable.

Auto Print

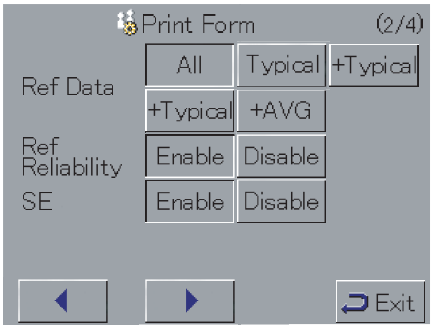
ON: The Auto Print function is enable.
OFF: The Auto Print function is disable.

Print Form

The print mode of the built-in printer is set.
Pressing the Print Form button ① displays the Print Form screen (Fig. 2). Sixteen setup items are used which are divided into four screens, of which screen movement is carried out by Arrow Mark buttons ②. The Ongoing screen is identified in the upper part of the screen. As for the details of each item, see "3.4.2. Print mode".

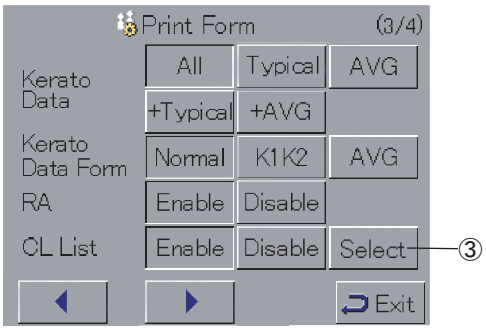


(Fig. 2)



(Fig. 3)

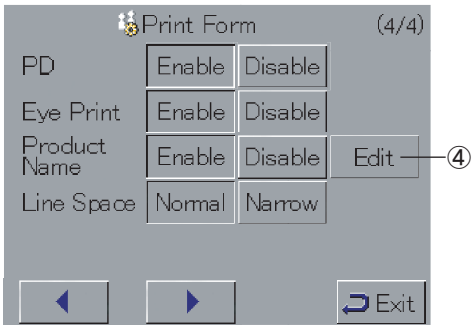
Pressing CL List button ③ on the 3/4 screen (Fig. 4) displays the list of contact lenses which are used to select the brand name of the contact lenses which will be displayed (Fig. 5 CL List Select).



(Fig. 4)

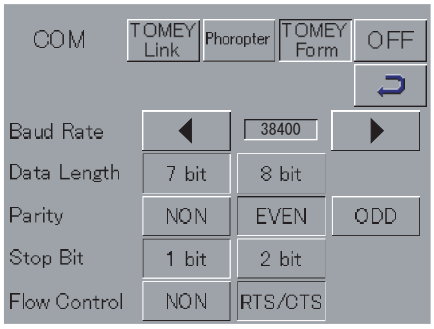
(Fig. 5)

Press the button of the lens to be printed and make it ON. Make the button off for the lenses not to be printed.



(Fig. 6)

The product name is selected by pressing the Edit button on the 3/4screen (Fig. 6).



(Fig. 7)

External communication

TOMEY Link: Connects to TOMEY Link for data communication.

Ref Tester: Connects to Ref Tester for data communication.

OFF: Disables external communication.

Unit number

Identifies the unit in case two and more units are used for data communication.

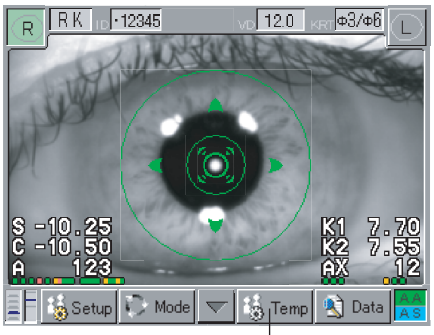
f) Information

The product information is displayed.

3.8.2 Temporary Setup

Note ***Please us the CL data just as a reference for selecting the trial lens in contact lens fitting. Please make sure fitting inspection when fitting contact lenses.***

Note ***Please be sure that the auto fogging is released only in the case the accommodation can be ignored. Otherwise accommodation will be Included in refractory data. Release of auto fogging makes the measurement time shorter and the refactometry easier, but it is an important method to reduce the accommodation.***



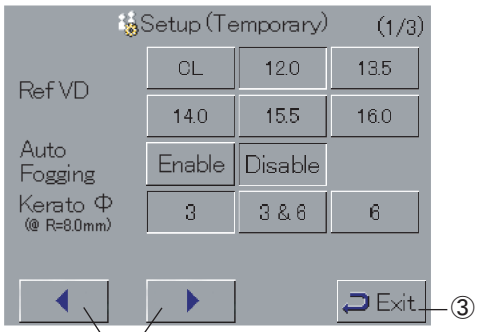
(Fig. 1)

①

This setting is for temporary measurement. This set up is released when Printout (or data output) is done or Clear button is pressed as these actions are regarded preparation of the next patient. See "3.8.1 Setup" to set up for continuous operation.

Press Temp button ① in Fig.1. There are seven setting items divided into three screens and the level selection of each item is done on each screen with Arrow keys.

After the selection press Exit button ③. The selected level is fixed and the measurement screen will be displayed.



(Fig. 2)

②

③

REF VD

In refractometry the Corneal Vertex Distance can be changed temporarily.

CL / 12.0 / 13.5 / 14.0 / 15.5 / 16.0

AutoFogging

Auto fogging which is used to reduce the accommodation can be released temporarily. In case refractometry is difficult because of too much nystagmus and poor fixation, make the measurement time of refractometry shorter by releasing the Auto Fogging temporarily.

Disable : Auto Fogging is temporarily released.

Enable : Auto Fogging works.

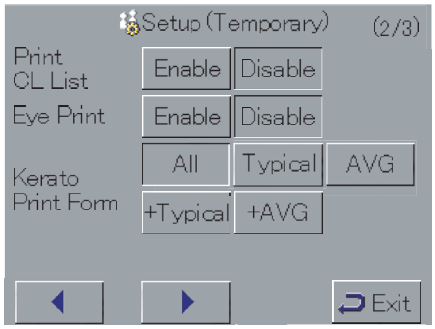
KRT Ø

The measurement area of keratometry can be changed temporarily.

3: On the circle of 3 mm of diameter centered on the corneal vertex.

3&6: On the circles of 3mm and 6 mm of diameters centered on the corneal vertex.

6: On the circle of 6 mm of diameter centered on the corneal vertex.



(Fig.3)

Print CL List

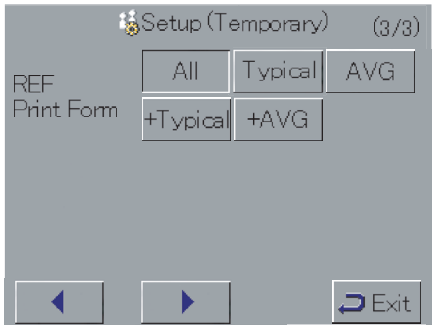
See "3.4.2 Print mode".

Eye Print

See "3.4.2 Print mode".

Kerato Print Form

See "3.4.2 Print mode".



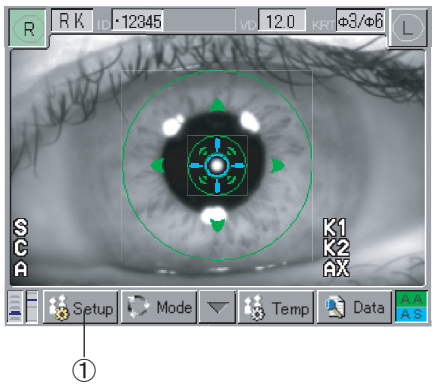
(Fig.4)

REF Print Form

See "3.4.2 Print mode".

3.9 LANGUAGE SELECTION

RC-5000 has Multilanguage function. You can select your favorite one from "English", "Japanese", "German", "Chinese", "Spanish", "Spanish Latin America", "Italian", "Portuguese", "French" and "Russian".

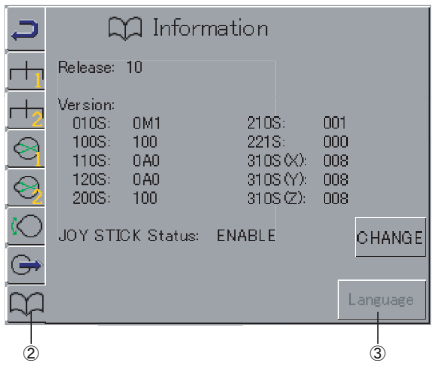


(Fig. 1)

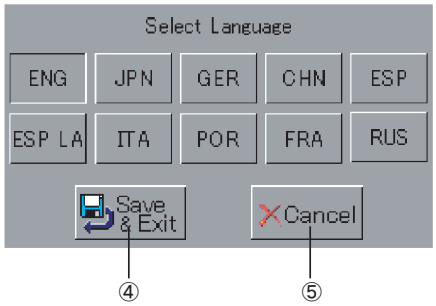
Press the Setup button ① in the Touch Panel to change the screen to the Setup screen. Next, press the icon located in left bottom ② to go Information screen.

Keep the "Language" button ③ pressed till screen is switched to Select Language.

Select the your favorite language and then press Save&Exit button ④ to change language. It is required to reboot main unit to save this change. Please follow the instruction displayed in screen after this change. Pressing the Cancel button ⑤ makes no change on language setting, but reboot of main unit is also required for cancel procedure.



(Fig.2)



(Fig. 3)

4. REFERENCE TECHNICAL INFORMATION

Corneal refractive index used for calculating corneal refractive power

The corneal refractive index is primarily n=1.376: however, n=1.3375, which is converted refractive index used for many types of keratometer measurement equipment, is used for this instrument.

The total corneal refractive index is determined by the sum of anterior and posterior refractive powers. Since this instrument (RC-5000) measures the curvature of the corneal anterior part, the refractive power of the whole cornea cannot be obtained.

For this reason, this conversion refractive index is clinically used to assume the total refractive power of cornea.

Calculation for Residual Astigmatism

When put hard contact lens at Patient's eye, the tear fluid layer that is form between cornea with hard contact lens become lens and correct cornea astigmatism. This astigmatism degree of tear fluid lens is able to calculate by supposing keratometer measurement data and back side curve of hard contact lens as spherical.

This instrument calculate as Residual Astigmatism that can not corrected by tear fluid lens against toal astigmatism that is measured by refractometer measurement.

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5. INSPECTION AND MAINTENANCE

5.1 WARRANTY

One-Year Limited Warranty

The seller warrants this product to be free from defects in material and workmanship under the normal use of this product for one (1) year or other term complying with local regulations from the date of invoice issued by Seller to the original purchaser.

Lamps, paper and other consumable items shall not be covered by this warranty.

This warranty also shall NOT apply if the product has not been installed, operated or maintained in accordance with the OPERATOR MANUAL of Tomey Corporation (here in after called "Tomey"). Neither seller not Tomey shall be liable for any damages caused by purchaser's failure to follow instruction for proper installation, use and maintenance of product.

This warranty is only applicable to the new product and DOES NOT cover any damage resulting from or caused by accident or negligence, abuse, misuse, mishandling, improper modification of this product, by persons other than personnel duty authorized by Tomey, not to a product whose serial number or batch number is removed, altered or effaced.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED (INCLUDING SPECIFICALLY, WITHOUT LIMITING THE GENERALITY OF THE FOREGOING, ALL WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE), AND ALL OTHER OBLIGATION AND LIABILITY ON THE PART OF SELLER AND TOMEY. NEITHER SELLER NOR TOMEY SHALL BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES UNDER ANY CIRCUMSTANCES OR FOR MORE THAN REPAIR, REPLACEMENT OR REFUND OF THE PURCHASE PRICE OF DEFECTIVE GOODS.

5.2 LIFE OF PRODUCT

The life of this product is eight years if used in proper atmoshere and with suitable maintenance.

5.3 INSPECTION

Note ***For measuring the model eye, make sure that it is free of dust and stain adhesion.***

In order to check to see if the internal functions of this instrument properly work and maintain their performance, check working condition of this instrument with an accessory model eye before use this instrument.

How to check
Securely place an accessory model eye to the Chin Rest with the Chin Rest paper fixing pins. Then, take measurement model eye in a similar way to that performed for Patient's eye. Make sure that measurement data (refractometer value and keratometer value) of model eye is within a range that mentioned at model eye.

Note ***In case established the service correction menu, measurement value of model eye is may not in the range that mentioned at model eye. In this case measure an accessory model eye and record refractometer value at the time establish service correction. This refractometer value become standard value for inspection.***

5.4 ROUTINE MAINTENANCE

Do not apply undue force to the Power Cord by holding the Cord itself, but hold the plug, when you disconnect it from the receptacle. The core wires inside of the Cord may otherwise be damaged, possibly causing struck by electricity or inflammation.

Do not use organic solvents, such as thinner, benzene nor acetone, or inflammation or struck by electricity may be caused otherwise.

Occasionally clean the inner surface of the measurement window with a piece of soft cloth. The optical devices and parts, if they are subjected to dust or stains, extremely affect on the preciseness of measurement.

If the instrument is not used, place the dust cover on it. The optical devices and parts, if they are subjected to dust or stains, extremely affect on the preciseness of measurement.

For cleaning the instrument, use a piece of soft cloth. If the instrument is subjected to an excessive amount of stains, use a piece of soft cloth which is soaked in a diluted neutral cleanse and dehydrated.

The Chin Rest and the Head Rest shall be cleaned with a piece of sterilization alcohol soaked cloth.

5.5 REPLACING OF SPARE PARTS

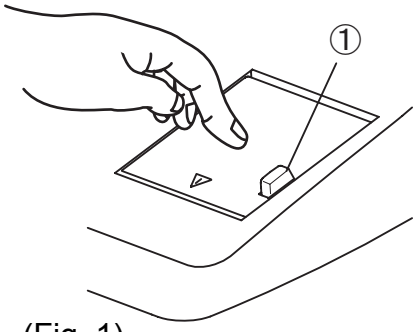
5.5.1 Replacing of the Printer Paper

Caution ***Sufficient care shall be given not to touch the Printer cutter with your hand. Do not also cause your Patient to touch the cutter, which may otherwise harm you and Patients.***

Note ***No other printer paper other than specified shall be used, which may otherwise cause to disorder the Printer operation.***

Note ***Do not give an idle printing to the Printer without the Printer paper as being loaded, which may otherwise damage the Printer head.***

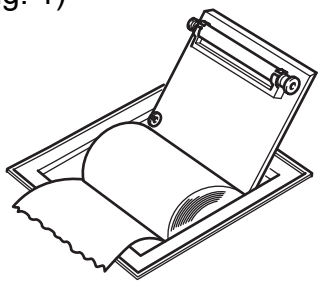
Note ***Do not forcedly pull out the Printer paper, which may cause the Printer malfunction. Feeding of the Printer paper shall be given with the data as not being held, by pressing the Print button.***



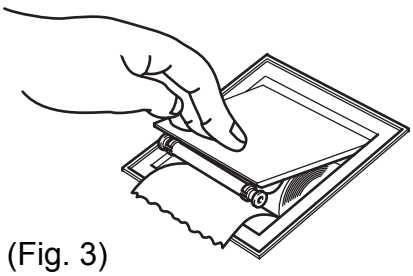
(Fig. 1)

Replace the Printer paper roll with the new roll when the red line appears on both sides.

1) Press the button ① and open the Printer cover upward.
2) Removed the used Printer paper roll out.
3) Put the new Printer paper roll in the Printer. Care is to be taken not to place the paper roll in the adverse direction, which will not enable to give printing. (Fig. 2)
4) Close the Printer with the Printer cover with the Printer paper end as being exceeding the paper discharging slot. Securely close the Printer cover until a click sound is made.
5) Cut out an extra margin of the paper.



(Fig. 2)



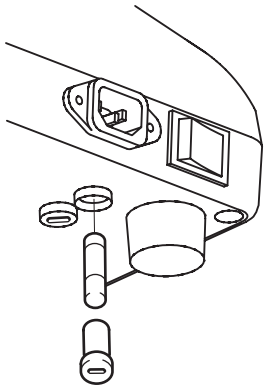
(Fig. 3)

5.5.2 Replacing of the fuse

Be sure to replace the fuse with the Power Cord being disconnected from the receptacle, or a serious injury or struck by electricity may otherwise be caused.

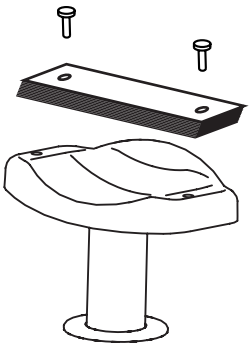
Note ***Be sure to use the fuse specified for the RC-5000.***

If any operation failure occurs after the fuse has been replaced, other troubles may have caused the failure. Then, turn the power off immediately and report such failure to your local distributor or representative.



1) Turn the Power Switch off.
2) Disconnect the Power Cord from the receptacle.
3) Place the coin into the slot provided in the bottom plate of the main unit and turn it counterclockwise to remove the fuse holder.
4) Replace the broken fuse with the new part.
5) Assemble the fuse holder in the order reverse to its removing procedure.

5.5.3 Replacing of the Chin Rest Paper



1) Remove the two Chin Rest fixing pins.
2) Place the new paper on the Chin Rest and again hold the paper to the Chin Rest with the pins.

5.6 STORING

Store the instrument in a place where it is free of water and chemicals. If such a thing enters the internal part of the instrument, struck by electricity or malfunction may be caused.

The instrument shall not be stored in a place where chemicals are stored or any gases are generated. If such chemicals or gas are spilled or evaporated to enter the system of the instrument, inflammation may occur to cause a fire.

Do not hold the Chin Rest or the Head Rest of the instrument when lifting, which may otherwise cause the instrument to slip and fall off and possibly to cause personal injuries.

If the instrument is suspended for a long period of time, disconnect the Power Cord from the receptacle for your safety.

Store the instrument in a place where it is free of direct sunbeams, high temperature, high humidity, dust, salts and sulfur, which may cause the instrument adverse influences, such as malfunction or erroneous operation.

Store the instrument in a place where it is not subjected to inclination, vibration, or shock, which may provide incorrect measurement or cause falling, inflammation, or personal injuries.

While the instrument is not used, protect it with the dust cover. Dust and/or stains, if adhered to the optical devices of the instrument, may extremely affect its measurement quality.

5.7 DISPOSAL OF PACKING MATERIALS

Note ***The packing materials used for shipping of the instrument will be necessary when the instrument is moved or transported to other places. Therefore, do not dispose them.***

Note ***The cushion materials used for packing of the instrument should also be stored together with packing materials.***

Note ***Disposal of the instrument and packing materials shall be sorted by material types for disposal, in accordance with the national and local rules and regulations.***

Note ***This instrument is provided with lithium cells, of which disposal shall be made in accordance with the rules and regulations of the national and local governments. If you have any question, ask your local representative or distributor.***

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6. TROUBLESHOOTING

Before you conclude your problem as a functional trouble, check the following items. If any problem cannot be corrected by the following countermeasures, consult your local distributor or representative.

■ ***Do not remove the Main Unit Cover of this instrument. You may be exposed to high voltage.***

Note ***Do not take any corrective measures other than mentioned in the following items.***

Note ***If your problem cannot be corrected by the following items, ask your distributor or representative for inspection and repair.***

● **The Power Lamp and the Monitor do not light, even if the Power switch is turned ON.**

? Cause 1 **The Power Plug or the Power cord is the problem.**

Remedy ➡ **Check to see if the Power Plug is securely connected to the Power receptacle. Make sure also that the Power Cord has neither flaw nor crack.**

? Cause 2 **The Power Source is not properly supplied.**

Remedy ➡ **Make sure that the Power receptacle is properly supplied with electricity.**

? Cause 3 **The fuse is broken.**

Remedy ➡ **Check to see if the fuse is proper. If broken, replace it with the new part. (See "5.4.2 Replacing of the fuse".) If the replaced fuse is again broken, the instrument may have been disordered. If so, ask your local distributor or representative for repair.**

- **The Power switch is ON, but the Monitor is off.**

  Cause 1 **The Auto Power Off function (which turns the Monitor off, if operation suspends for a certain period of time) is being activated.**

  Remedy **Touch the Monitor screen.**

- **No print out can be made with the built-in Printer.**

  Cause 1 **The Printer paper ran out. The message of "Printer Paper End" is displayed.**

  Remedy **Check to see if there is any Printer paper left. (See "5.5.1 Replacing of the Printer Paper".) If not, place the new Printer paper.**

  Cause 2 **The Printer cover is left open. The message of "Printer Cover Open" is displayed.**

  Remedy **Close the Printer cover and make sure that the cover is properly placed in position.**

  Cause 3 **The Printer paper is loaded up side down.**

  Remedy **Replace the Printer paper in its correct position. (See "5.5.1 Replacing of the Printer Paper".)**

- **The message of "Printer Error" is displayed.**

  Cause 1 **The problem is the Printer function.**

  Remedy **Consult with your distributor or representative.**

- **Measurement values are not stable or appropriate, which are largely different from those obtained in your previous measurements.**

  Cause 1 **The Measurement Window is stained.**

  Remedy **Clean the Measurement.**

- **"Internal Error" is displayed.**

  Cause 1 **The internal function has the problem.**

  Remedy **Discontinue operation and consult your distributor or representative.**

- **"Internal Battery Empty" is displayed.**

  Cause 1 **The Internal Battery power has run out.**

  Remedy **Ask your distributor for a new Internal Battery for replacement.**

- **"Calender/Clook Error" is displayed.**

  Cause 1 **The Date/Time Function has the problem.**

  Remedy **Ask your distributor for correction.**

- **"Refractometer Error" is displayed.**

  Cause 1 **The problem is with the Refractometer Measurement Function.**

  Remedy **Consult your distributor.**

- **"Keratometer Error" is displayed.**

  Cause 1 **The Keratometer Measurement Function has a problem.**

  Remedy **Consult your distributor.**

- **"Chin Rest Error" is displayed.**

  Cause 1 **The Chin Rest up and down function has a problem.**

  Remedy **Consult your distributor.**

- **"Joy Stick Error" is displayed.**

  Cause 1 **The Joystick has a problem.**

  Remedy **Consult your distributor.**

- **"Alignment Motor Error" is displayed.**

  Cause 1 **The Alignment Function has the problem.**

  Remedy **Consult your distributor.**

● **"Unknown Error" is displayed.**

Cause 1 **A problem which cannot be specified arose.**

Remedy **Discontinue your operation and consult your distributor.**

7. SPARE PARTS

As for your purchasing of the following supply parts, please ask your local Tomey's distributor or representative for order placement.

- Built-in Printer paper
  Specify "Printer paper for RC-5000 built-in Printer".

- Chin Rest paper (100 sheets/set)

- Fuses
  Specify "Fuses for RC-5000".

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8. SPECIFICATIONS

8.1 SPECIFICATIONS

8.1.1 Refractive power measurement

- Spherical refractive power (S)
  - Measurement range: -25.00D to +22.00D (at VD=12.0mm)
  - Display unit: 0.01D / 0.12D / 0.25D
- Cylindrical refractive power (C)
  - Measurement range: 0D to ±10.00D (at VD=12.0mm)
  - Display unit: 0.01D / 0.12D / 0.25D
- Astigmatism axial angle (A)
  - Measurement range: 0° to 180°
  - Display unit: 1°
- Minimum pupil diameter: Ø2.2mm
- Vertex distance:
  0mm/12.0mm/13.5mm/14.0mm/15.5mm/16.0mm
- Measurement time: 0.2 second/single eye (data taking time)

8.1.2 Corneal curvature measurement

- Corneal curvature (K1, K2, AVG)
  - Measurement range: 5.00mm to 11.00mm
  - Display unit: 0.01mm
- Corneal refractive power (K1, K2, AVG)
  - Measurement range: 30.68D to 67.50D (n=1.3375)
  - Display unit: 0.01D
- Corneal astigmatism (CYL)
  - Measurement range: 0D to 10D (n=1.3375)
  - Display unit: 0.01D
- Corneal astigmatism axial angle: (AXS)
  - Measurement range: 0° to 180°
  - Display unit: 1°
- Measurement area: Cornea: Ø3.0mm/Ø6.0mm
  (at 8.00mm corneal curvature)
- Measurement time: 0.1 seconds/single eye (data taking time)

8.1.3 Pupillary distance measurement

- Measurement range: 50 to 86mm
- Display unit: 1mm

8.1.4 Corneal diameter and pupillary diameter measurement

- Measurement range: 1.0 to 14.0mm
- Display unit: 0.1mm

8.1.5 Observation range

Approximately 15mm x 9mm

8.1.6 Auto-alignment range

- Up-down / left-right directions: Ø7 mm
- Focusing direction: ±5 mm

8.1.7 Main unit

- Built-in Printer: Thermal printer
- Movable part movement range
  - ■ Front-rear: 40mm
  - ■ Left-right: 88mm
  - ■ Up-down: 50mm
- Chin Rest movable range: 70mm
- Data output type: RS232C
- Display: 5.7 inch color liquid crystal display
- Dimensions and weight: 300(W)x493(L)x466(H)mm Approx. 19kg

8.1.8 Power source

- Voltage: AC 100V to 240V
- Frequency: 50 / 60 Hz
- Consumption power: From 130VA to 150VA

8.2 NOISE OCCURRENCE

This instrument makes noises at the following operations.

- when turning the power on.
- when starting printout
- when moving the measuring area
- when adjusting the Chin Rest
- when carrying out measurement (while taking measurement data)

8.3 ENVIRONMENTAL CONDITIONS

This instrument shall be used in the following environmental conditions.

- Installing place: indoors where the instrument is free from direct sunbeams.
- Temperature: +10 to +40°C
- Humidity: 30 to 75 %
- Atmospheric pressure: 700 to 1060 hPa
- Power modulation: within nominal voltage ±10%

8.4 REGULATORY COMPLIANCE

IEC60601-1: 1988
Amendment 1: 1991
Amendment 2: 1995
IEC60601-1-2: 2001

8.5 EMC COMPATIBILITY DECLARATION

Caution: Any and all of medical equipment shall conform with the installing and using requirements stipulated by EMC (Electro Magnetic Compatibility).

Note: A portable type and a movable type RF communication device may have influence on medical instruments.

GUIDANCE AND MANUFACTURER'S DECLARATION
ON ELECTROMAGNETIC EMISSIONS

Table 201

This RC-5000 is intended for use under the following electromagnetic conditions. The customer and the user of the RC-5000 are advised to guarantee the following use conditions of said instrument.

Emission test	Compatibility	Elecromagnetic environment-guidance
RF emissions CISPR 11	Group 1	The RC-5000 uses RF energy for the internal function, since RF emissions are very low and do not induce any interference to the internal function located close to the electric equipment.
RF emissions CISPR 11	Class B	The RC-5000 is suitable for use in all the clinics, and general dwelling homes and public facilities which are directly connected to public low voltage distribution networks to supply electricity for domestic purposes.
High frequency emissions IEC 61000-3-2	Class B	
Voltage fluctuation/ flicker emissions IEC 61000-3-3	Comparative	

GUIDANCE AND MANUFACTURER'S DECLARATION ON ELECTROMAGNETIC IMMUNITY

Table 202

The RC-5000 is intended for use in the following electromagnetic environments. The customers and the user of the RC-5000 is advised to guarantee the following environments.

Immunity test	IEC 60601 Test level	Compatibility level	Electromagnetic environments-guidance
Electrostatic discharge (ESD) IEC 61000-4-2	± 6kV contact ± 8kV air	± 6kV contact ± 8kV air	Wooden, concrete, or ceramic flooring material is preferable. If synthetic materials are used, a relative humidity of at least 30% is preferable.
Electrically high speed transient phenomena/burst IEC 61000-4-4	± 2kV for power source cord ± 1kV for input & output cords	± 2kV for power cord ± 1kV for input & output cords	As for the power source quality, typically commercial or hospital purpose quality is preferable.
Surge IEC 61000-4-5	± 1kV differential mode ± 2kV common mode	± 1kV differential mode ± 2kV common mode	As for the power source quality, the typically commercial or hospital purpose quality is preferable.
Voltage dip, instantaneous stop, and power voltage fluctuation with power input cord IEC 61000-4-11	<5 % UT (at >95 % dip UT) for 0,5 cycle 40 % UT (at 60 % dip UT) for 5 cycles 70 % UT (at 30 % dip UT) for 25 cycles <5 % UT (at >95 % dip UT) for 5 sec.	<5 % UT (at >95 % dip UT) for 0,5 cycles 40 % UT (at 60 % dip UT) for 5 cycles 70 % UT (at 30% dip UT) for 25 cycles <5 % UT (at>95% dip UT) for 5 sec.	The electric power quality for typical commercial use or hospital environment is preferable. If the user of the RC-5000 requires continuous operation at the time of power suspension, the RC-5000 is recommended to be powered by interruptible power source.
Electric power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	The electric power frequency magnetic field is preferably rated at the level equivalent to that for typical commercial or hospital environments.

Remarks: "UT" is the AC mains voltage prior to application of the test level.

GUIDANCE AND MANUFACTURER'S DECLARATION
ELECTROMAGNETIC IMMUNITY

Table 204

The RC-5000 intended for use in the following electromagnetic environments. The customer and the user of the RC-5000 is advised to guarantee its use in the following environments.

Immunity test	IEC 60601 Test level	Compatibility level	Electromagnetic environments-guidance
			It is preferable that the portable type or movable type RF communication equipment should not be used for any part of the RC-5000 including the cables, within the recommended separation distance which is calculated by the formula applicable for the frequency of the transmission equipment Recommended separation distance
Conductive RF IEC 61000-4-6	3 V rms 150kHz to 80MHz	3 V	$d = 1.2\sqrt{P}$ $d = 1.2\sqrt{P}$ 80 MHz to 800 MHz
Radiated RF IEC 61000-4-3	3 V/m 80MHz to 2,5GHz	3 V/m	$d = 2.3\sqrt{P}$ 800 MHz to 2.5 GHz where, "P" is the maximum output rating for the transmitter of which is expressed in watts (W) as specified by equipment manufacturer and "d" is the recommended separation distance expressed in the unit of meter(m). The intensity of electromagnetic field emitted from the fixed transmitter is determined by field examination value "a" obtained from the electromagnetic field, which is preferred to be les than the compatibility level for each frequency range of ." b" Interference may occur close to the equipment identified with the following mark. 

Remark 1: Higher frequency is applied at 80MHz and 800MHz.
Remark 2: The guidance is not always applicable for all conditions. Electromagnetic transmission is influenced by absorption and reflection from structure, objects, and human body.

[a] The electromagnetic intensity of fixed transmitters, such as wireless devices (cyber/cordless), telephone station, on-shore movable radio transmission, amateur radio transmission, AM and FM radio stations, TB stations are theoretically difficult to be assumed. It is advised that field examination of electromagnetic environment is given to evaluate the electromagnetic condition induced by fixed RF transmitter. If the electromagnetic intensity of the RC-5000 in its use position exceeds the abovementioned RF compatibility level, its operation under such conditions above should be examined. If any abnormal condition is observed, an additional means, for instance, changing of RC-5000 direction or place may be necessary.

[b] 150 kHz to 80 MHz The electromagnetic intensity is preferred to be not more than 3 V/m at a frequenncy range of 150 kHz to 80 MHz.

RECOMMENDED SEPARATION DISTANCE BETWEEN THE PORTABLE AND MOVABLE TYPE RF-COMMUNICATION EQUIPMENT AND THE RC-5000

Table 206

The RC-5000 is intended to be used in the electromagnetic environments where the radiation interference is provided. The customer or the user of the RC-5000 will be able to contribute to the prevention of electromagnetic interference by maintaining the minimum distance between the portable or movable type RF-communication equipment (transmitter) and the RC-5000. The minimum distance shall be in conformance to the maximum output by communication equipment, as recommended below.

Maximum rated output for trnasmitter W	Seperation distance by transmitter frequency m		
	150 kHz to 80 MHz $d = 1.2\sqrt{P}$	80 MHz to 800 MHz $d = 1.2\sqrt{P}$	800 MHz to 2.5 GHz $d = 2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.37	0.37	0.74
1	1.2	1.2	2.3
10	3.7	3.7	7.4
100	12	12	23

The recommended separation distance, d, in a unit of meter (m) for a transmitter other than listed above which is not listed, is determined by using the equations which apply for transmitter frequency, where "P" is the maximum rated output of a transmitter in the unit of watts (W), which is specified by transmitter manufacturer.

Remark 1: Higher frequency range is applicable for 80MHz and 800MHz.
Remark 2: These guidance items are not always applicable for all cases. The transmission of electromagnetic emissions is influenced by the absorption and reflection of emissions from structural objects, physical objects, and human bodies.

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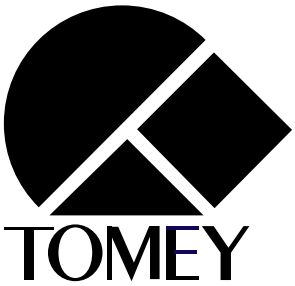

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VIEWLIGHT
POWERED BY INNOVATION

CE 0123