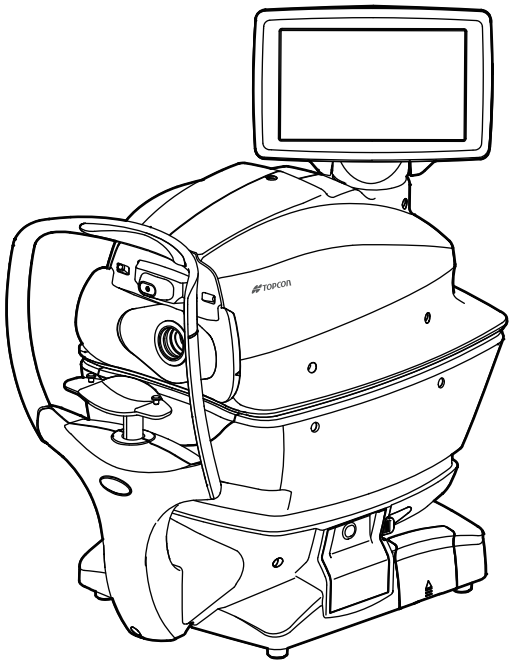
TOPCON



USER MANUAL

# AUTO KERATO-REFRACTO TONOMETER
# TRK-2P

# INTRODUCTION

Thank you for purchasing the TOPCON Auto Kerato-refracto tonometer TRK-2P.

## INTENDED USE / INDICATIONS FOR USE

This instrument is used to measure refractive power of eyeball, radius of cornea curvature, cornea thickness and ocular pressure.

## FEATURES

**This instrument features the following:**

- The position of the touch panel can be adjusted to accommodate the user's preferred position.
- Auto alignment function enables quick easy measurement under optimal conditions.

## PURPOSE OF THIS MANUAL

This User Manual provides an overview of the basic operation, troubleshooting, checking, maintenance and cleaning of the TOPCON Auto Kerato-refracto tonometer TRK-2P.
To get the best use of the instrument, read Safety Displays and Safety Cautions.
Keep this Manual at hand for future reference.

- Since this product is a precision instrument, always use and keep it in a normally controlled living environment, within a temperature range of 10-40°C, humidity levels between 30-90% and an atmospheric pressure range of 700hPa-1,060hPa.
- The instrument should also be placed away from direct sunlight.
- To ensure smooth operation, install the instrument on a level floor free of vibrations. Also, do not place anything on the instrument.
- Connect all cables properly before using.
- Use the power at a rated voltage.
- When not in use, switch off the power source and apply the rubber cap and dust cover.
- For accurate measurement results, take care to keep the measuring window clean and free of fingerprints, spots and dust.

**[CAUTION]** Federal laws restricts this device to the sale by or on the order of a physician.

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1. No part of this manual may be copied or reprinted, in whole or in part, without prior written permission.
2. The contents of this manual are subject to change without prior notice and without legal obligation.
3. The contents of this manual are correct to the best of our knowledge. Please inform us of any ambiguous or erroneous descriptions, missing information, etc.
4. Original Instructions
   This manual was originally written in English.

# CONTENTS

# GENERAL SAFETY INFORMATION

## ⚠ CONTRAINDICATIONS•PROHIBITION

| Ensuring the Safety of Patients and Operators |
|---|
| To prevent corneal damage, do not measure a patient with corneal disease or one who's had corneal surgery. |
| To prevent corneal damage, do not measure a patient wearing a contact lens.<br>Tell the patient to remove the contact lens. |

## ⚠ WARNINGS

| Ensuring the Safety of Patients and Operators |
|---|
| When operating the instrument, do not touch the patient's eye or nose. |

| Preventing Electric Shocks and Fires |
|---|
| To avoid fire and electric shock, install the instrument in a dry place free of water and other liquids. |
| To avoid fire and electric shock, do not put cups or other containers with liquids near the instrument. |
| To avoid electric shocks, do not insert metal objects into the instrument body through the vent holes or gaps. |
| To avoid fire in the event of an instrument malfunction, immediately turn OFF the power switch "○" and disconnect the power plug from the outlet if you see smoke coming from the instrument, etc. Don't install the instrument where it is difficult to disconnect the power plug from the outlet. Ask your dealer for service. |

# ⚠ CAUTIONS

| Important caution |
| --- |
| The following patients need extra attention.<br>• Patients with infectious disease such as Keratoconjunctivitis Epidemica |

| Ensuring the Safety of Patients and Operators |
| --- |
| To avoid injury when operating the up/down button for the chinrest, be careful not to catch the patient's fingers. |
| The light emitted from this instrument involves potential risk; the longer the irradiation time, the more risk of damage to the eye.<br>When the instrument operates with the maximum light volume, exposure for more than 2 hours will exceed the safety guideline. |
| During alignment operation, please pay attention so that a patient's face does not move.<br>If the face moves, there is a danger that the main body will touch the patient's face. |
| When operating the instrument use much care so that operator's finger or hand is not pinched between the reverse side of forehead rest, an measuring head and an ocular pressure measurement window. Or the operator may be injured. |

| Preventing Electric Shocks and Fires |
| --- |
| To avoid injury by electric shock, do not open the cover. For repair, call your service engineer. |
| To avoid injury by electric shock when changing the fuse, turn off the power supply and pull out the power cable. Use the rated fuse. |

| Electromagnetic Compatibility (EMC) |
| --- |
| This instrument has been tested (with 100/120/230V) and found to comply with IEC60601-1-2:Ed.3.0:2007. This instrument radiates radio frequency energy within standard and may affect other devices in the vicinity. If you have discovered that turning on/off the instrument affects other devices, we recommend you change its position, keep a proper distance from other devices, or plug it into a different outlet. Please consult your authorized dealer if you have any additional questions. |

# HOW TO READ THIS MANUAL

- Read the instructions on pages 1 to 10 before using the machine.
- If you would like an overview of the system, begin by reading "BASIC OPERATIONS" (page 30).
- Regarding connection to various devices, see "CONNECTING EXTERNAL I/O TERMINALS" on page 26.
- For setting various functions, see "SETTING FUNCTIONS ON SETUP SCREEN" on page 77.

The Abbreviation used in this manual.

| Abbreviation | original meaning |
|---|---|
| REF | Refractometer: Measurement of Spherical refractive power, Cylindrical refractive power and Direction of astigmatic axis |
| KRT | Keratometer: Measurement of Cornea curvature radius, Direction of corneal astigmatic axis and Corneal refractive power |
| TONO | Tonometer: Ocular pressure measurement |
| PACHO | Pachometer: Cornea thickness measurement |

# GENERAL MAINTENANCE INFORMATION

## USER MAINTENANCE

To maintain the safety and performance of the equipment, never attempt to repair or perform maintenance. These tasks should be performed by an authorized service representative.
Maintenance tasks that can be performed by the user are as follows; for details, follow the manual's instructions.

### FUSE CHANGE

For details, See "FUSE CHANGE" on page 96.

### CLEANING THE MEASURING WINDOW GLASS

For details, See "CLEANING THE INSTRUMENT" on page 92.

### CLEANING THE MEASURING NOZZLE AND WINDOW GLASS INSIDE THE MEASURING NOZZLE

Regarding the measuring nozzle and the glass surface inside the measuring nozzle, cleaning is allowed. For details, see "CLEANING THE MEASURING NOZZLE AND THE GLASS INSIDE THE MEASURING NOZZLE" on page 93.

# DISCLAIMERS

- TOPCON is not responsible for damage due to fire, earthquakes, actions or inactions of third persons or other accidents, or damage due to negligence and misuse by the user and any use under unusual conditions.
- TOPCON is not responsible for damage derived from inability to properly use this equipment, such as loss of business profits and suspension of business.
- TOPCON is not responsible for damage caused by operations other than those described in this User Manual.
- The device does not provide a diagnosis of any condition or lack thereof or any recommendations for appropriate treatment. The relevant healthcare provider is fully responsible for all diagnosis and treatment decisions and recommendations.

# DISPLAYS AND SYMBOLS FOR SAFE USE

In order to encourage the safe use of the instrument and to avoid danger to the operator and others as well as damage to properties, warnings are described in the User Manual and marked on the instrument body.
We suggest you thoroughly understand the meaning of the following displays/icons and Safety Cautions, as well as read the Manual, and strictly observe the instructions.

### DISPLAYS

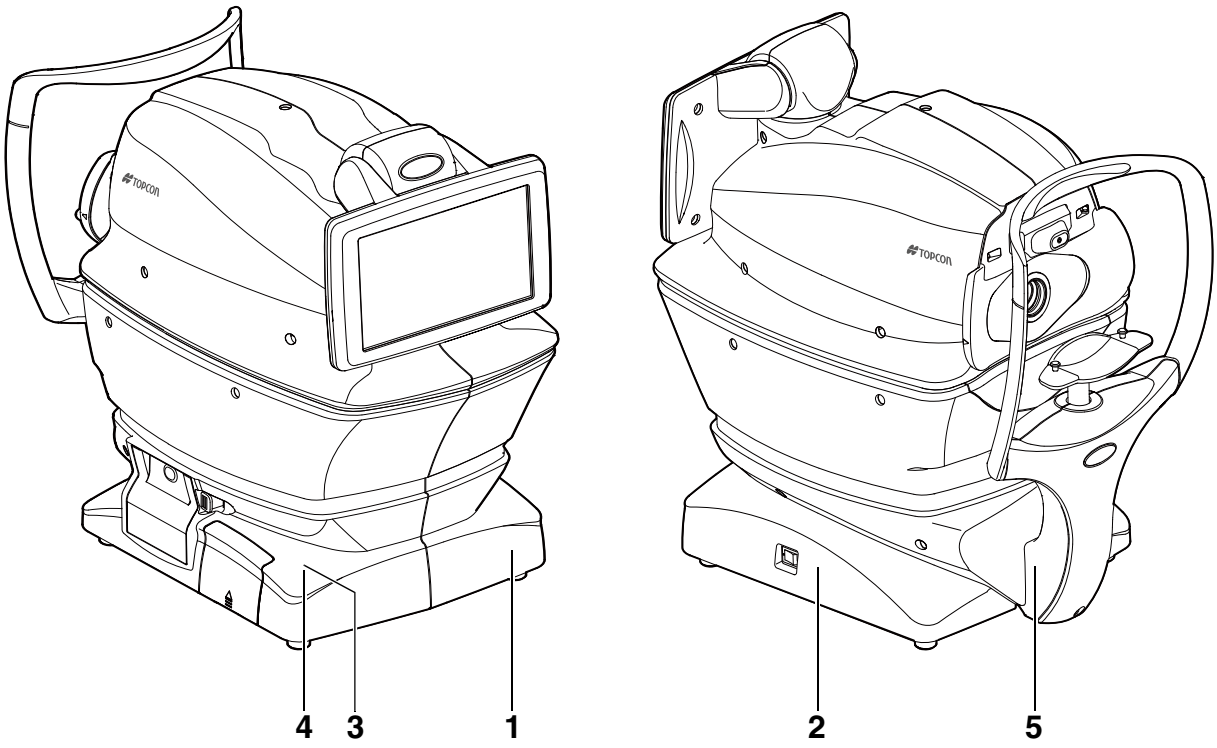
| DISPLAY | MEANING |
|---|---|
| **WARNING** | A WARNING is provided to alert the user to potential serious outcomes (death, injury, or serious adverse events) to the patient or the user. |
| **CAUTION** | A CAUTION is provided to alert the user to use special care necessary for the safe and effective use of the device. They may include actions to be taken to avoid effects on patients or users that may not be potentially life threatening or result in serious injury, but about which the user should be aware. Cautions are also provided to alert the user to adverse effects on this device of use or misuse and the care necessary to avoid such effects. |
| **NOTES** | A NOTE is provided when additional general information is applicable. |

## SYMBOLS

| Symbol | IEC/ISO Publication | Description | Description (French) |
|---|---|---|---|
|  | IEC 60417-5032 | Alternating Current | Courant alternatif |
|  | IEC 60417-5008 | Off (power: disconnection from the main power supply) | Éteint (courant: coupure avec le secteur) |
|  | IEC 60417-5007 | On (power: connection to the main power supply) | Allumé (courant: raccordement sur le secteur) |
|  | IEC 60878-02-02 | Type B applied part | Partie appliquée du Type B |
|  | ISO 7010-W001 | General warning sign | Symbole d'avertissement général |
|  | ISO 7010-M002 | Refer to User manual/ booklet | Voir le manuel/la brochure |
|  | ISO 7000-2497 | Date of manufacture | Date de fabrication |
|  | ISO 7000-2498 | Serial number | Numéro de série |

# POSITIONS OF WARNING AND CAUTION INDICATIONS

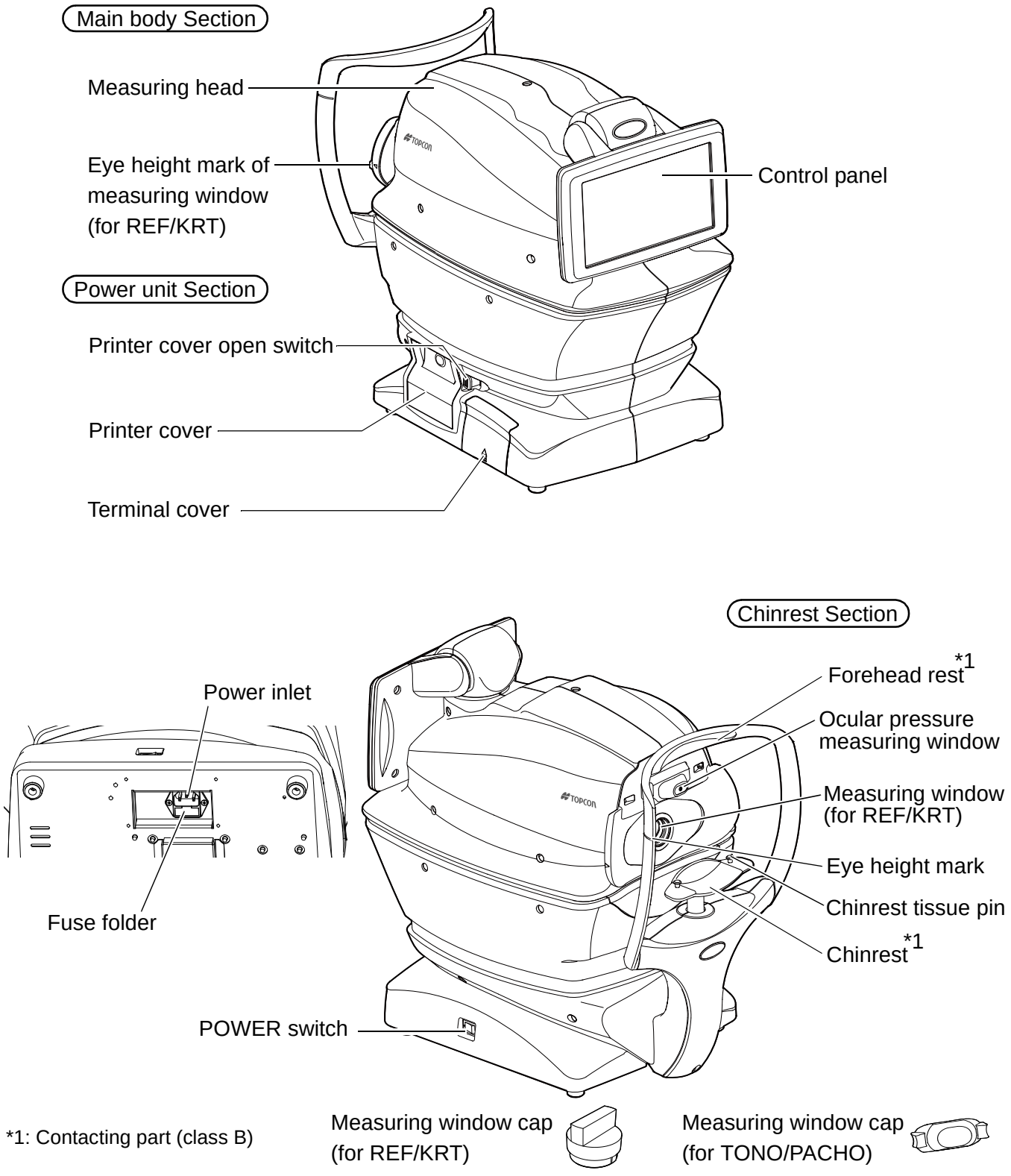
To secure safety, this equipment provides warnings.
Correctly use the equipment following these warning instructions. If any of the following marking labels are missing, please contact your dealer or TOPCON at the address stated on the back cover.




| No. | Label | Meaning |
|---|---|---|
| 1 |  | **WARNING**<br>To avoid injury caused by electric shock, do not open the cover.<br>Ask your dealer for service. |
| 2 |  | **WARNING**<br>Electric shock may cause burns or a possible fire. Turn the power switch OFF and unplug the power cord before replacing the fuses. Replace only with fuses of the correct rating. |
| 3 |  | **CAUTION**<br>Be careful not to hit the patient's eyes or nose with the instrument during operation.<br>The patient may be injured. |
| 4 |  | **CAUTION**<br>When operating the chinrest up/down switch, be careful not to pinch the patient's hand.<br>The patient may be injured. |
| 5 |  | Degree of protection against electric shock:<br>TYPE B APPLIED PART |

# COMPONENTS

## COMPONENT NAMES




## COMPOSITION OF PARTS WHICH CONTACT THE HUMAN BODY

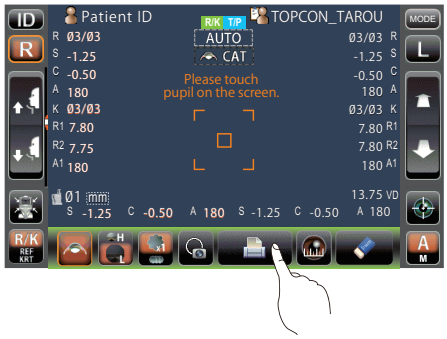
Forehead rest : Silicone rubber
Chinrest : Acrylonitrile butadiene styrene resin

# OPERATION METHOD OF CONTROL PANEL

The control panel is designed as a touch panel for performing various operations and settings. It displays images and shows information, including set conditions and measurement results.

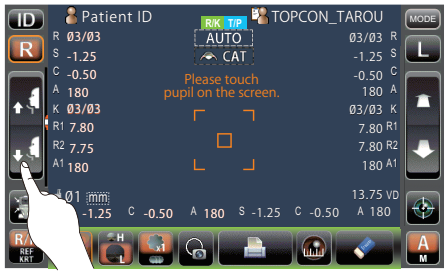
| NOTE | • The control panel is a touch panel. Do not use any sharp tools; e.g. ball point pen.<br>• Do not touch two points on a control panel simultaneously. |
|---|---|

Tap → To select any relevant item.



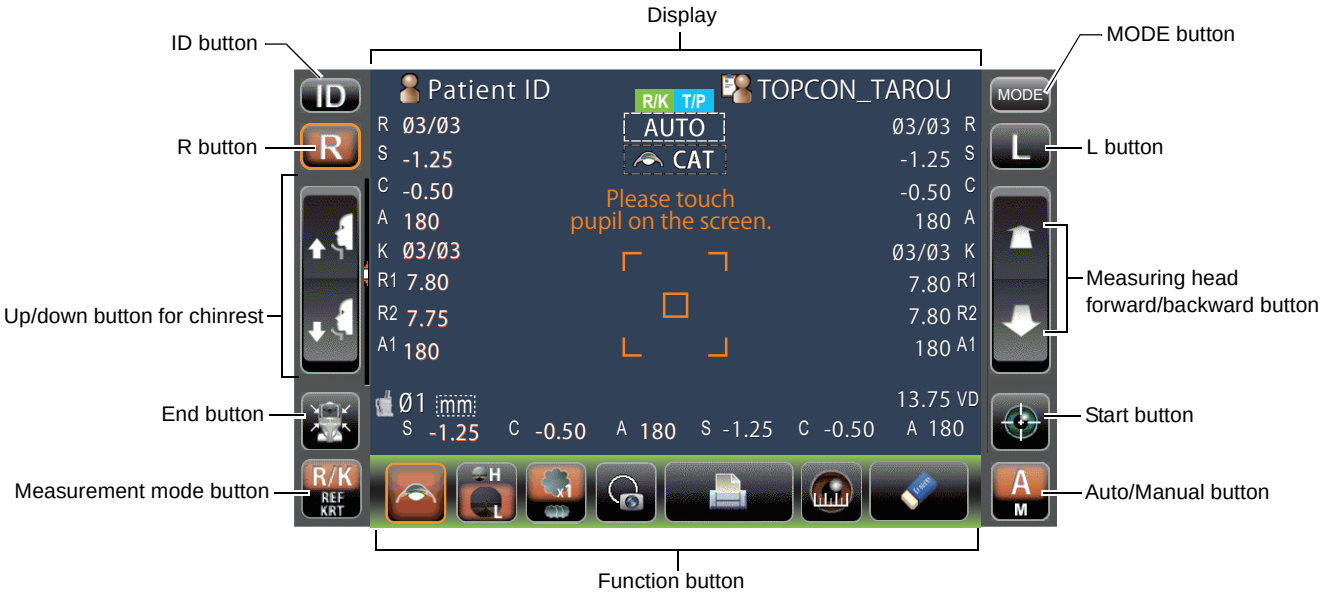

Touch the screen softly with a finger.

Continue to press → Used for continuous moving.
(Moving of chinrest and measuring head)




Continue to touch the screen softly with a finger.

# CONTROL PANEL COMPONENTS (IN REF/KRT MEASUREMENT MODE)




ID button ..... Input the patient ID (up to 13 characters) and operator ID (up to 13 characters). However, if no patient ID is inputted, the patient No. of each patient is allocated automatically.
As for an operator ID, the input column may not be displayed by setup. (See page 91)

Measurement mode button ..... Selects a measurement mode from REF (Measurement of Spherical refractive power, Cylindrical refractive power and Direction of astigmatic axis), KRT (Measurement of Cornea curvature radius, Direction of corneal astigmatic axis and Corneal refractive power) and R/K (REF/KRT continuous measurement)

R/L button.....Selects the right/left eye. By tapping the button, the main body moves to the selected direction. The selected button is framed in orange. The layout where the R/L button is displayed reverses according to the position of the control panel.

Up/down button for chinrest .....Moves the chinrest up/down.

End button.....The chinrest and measuring head move to the last position.

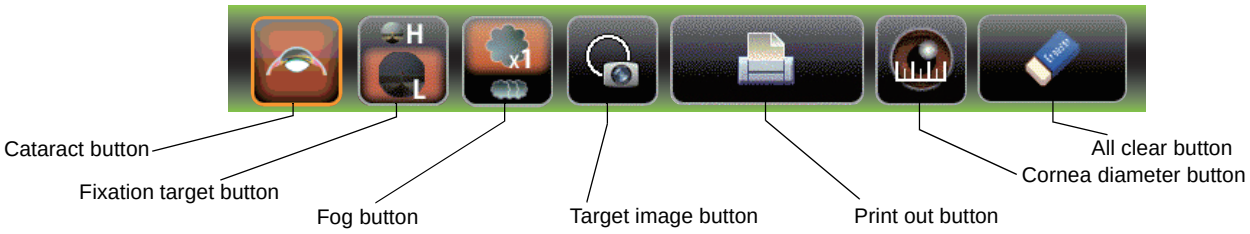
Measuring head forward/backward button .....Moves the measuring head closer to/away from the patient's eye. The forward and backward operations reverse according to the position of the control panel.

Start button .....Starts measurement.

Auto/Manual button.....Switches between Auto mode and Manual mode.
If "A" is displayed on the control panel it is in Auto mode, if "M" is displayed it is in Manual mode.
The name of the selected mode (Auto/Manual) is displayed on the control panel.

MODE button.....Selects R/K, T/P and R/K→T/P measurement mode or setting up screen.

## FUNCTION BUTTON




Cataract button .....If error messages occur in patient's with cataracts, selecting the Cataract button may improve measurements. When the button is selected, "CAT" is displayed on the control panel and the selected button is framed in orange.

Fixation target button .....Brightness of the fixation target can be changed.

Fog button .....Changes setting temporarily to perform fogging only in the first measurement or each time in the continuous measurement.

Target image button .....The captured measurement target can be observed on the control panel.

 Print out button .....Prints measurement results. Tap the button when no measurement data is present to feed the paper.
By setting the printer mode to Graphic Printer on the Settings screen, figures showing refractive conditions can be printed.

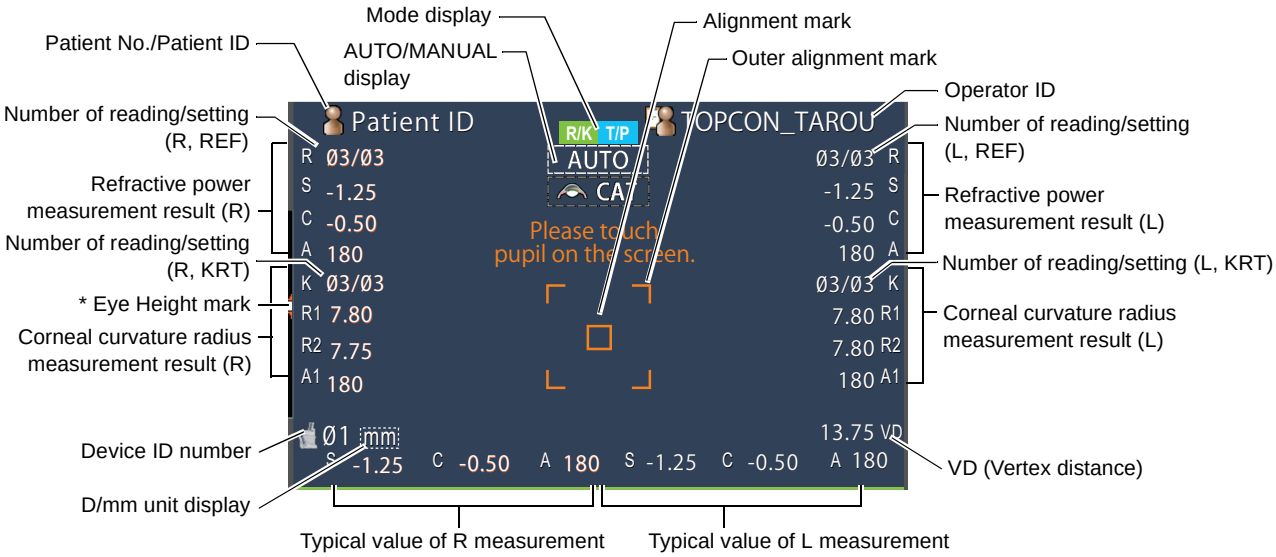
In this case, the printer button changes to  .

 Cornea diameter button .....Changes to cornea diameter measurement mode.

 All clear button .....Clears all measurement data.

## MONITOR SCREEN

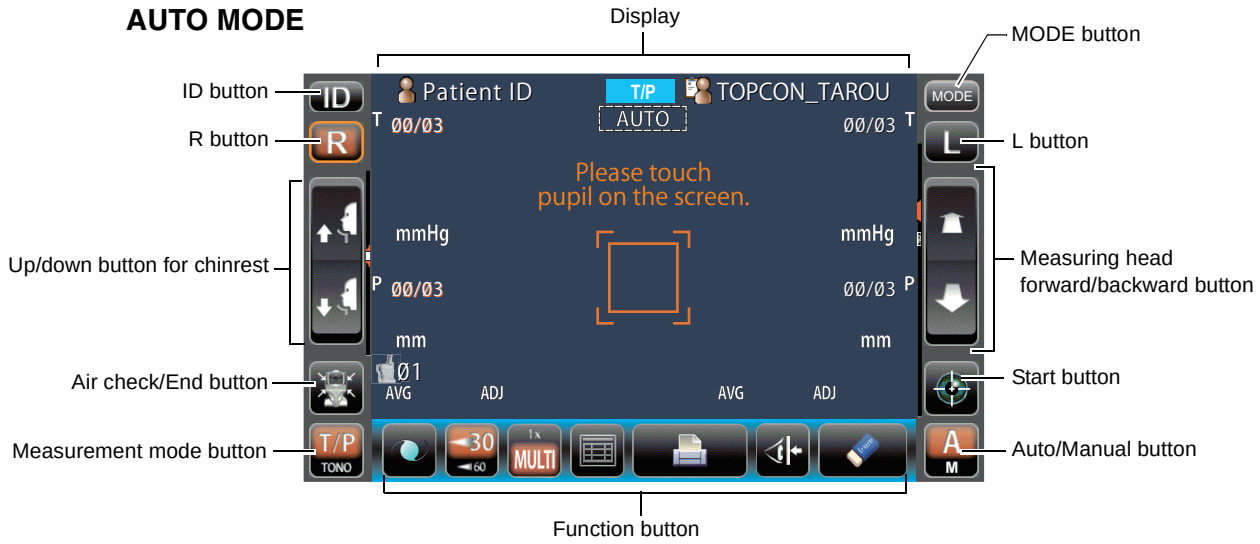
### MEASUREMENT SCREEN



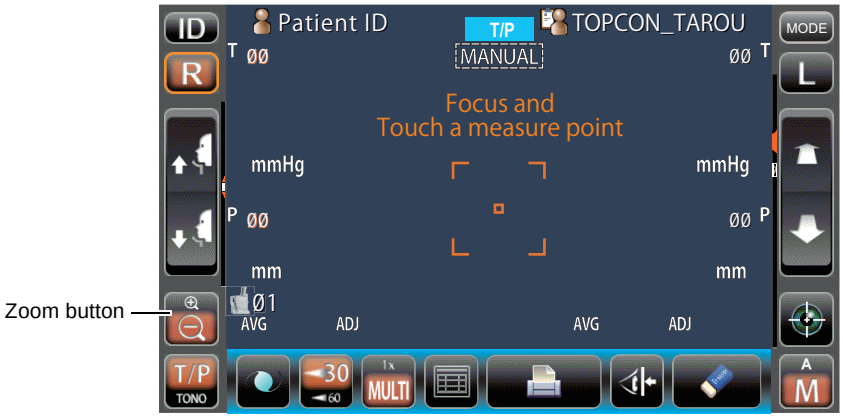

*Eye Height mark: Shows the position of the eye height mark on the chinrest.

# CONTROL PANEL COMPONENTS (IN TONO/PACHO MEASUREMENT MODE)

## AUTO MODE




## MANUAL MODE




ID button.....Input the patient ID (up to 13 characters) and operator ID (up to 13 characters). However, if no patient ID is inputted, the patient No. of each patient is allocated automatically.
As for an operator ID, the input column may not be displayed by setup. (See page 91)

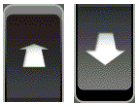
Measurement mode button .....Selects a measurement mode from TONO (Ocular pressure measurement) and T/P. (Ocular pressure and Cornea thickness measurements.)

R button/L button .....Selects the right/left eye. By tapping the button, the main body moves to the selected direction. The selected button is framed in orange. The layout where the R/L button is displayed reverses according to the position of the control panel.

Up/down button for chinrest .....Moves the chinrest up/down.

Air check/End button.....Displayed under Auto mode: Selects Air check or End operation. Air check operation checks that the measurement system of the instrument operates properly. End operation is to move the chinrest and measuring head to the measurement last position.

Zoom button.....Displayed under Manual mode: Enlarges the patient eye display.



Measuring head forward/backward button.....Moves the measuring head closer to/away from the patient's eye. The direction of movement is reversed according to the position of the control panel.

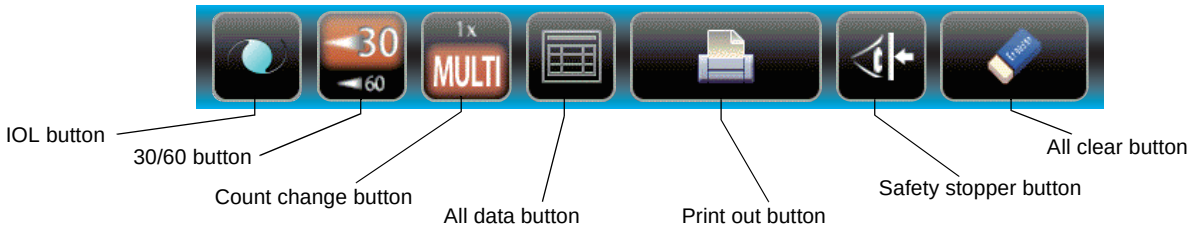
Start button.....Starts measurement.

Auto/Manual button.....Switches between Auto mode and Manual mode.
If "A" is displayed on the control panel it is in Auto mode, if "M" is displayed it is in Manual mode.
The name of the selected mode (Auto/Manual) is displayed on the control panel.

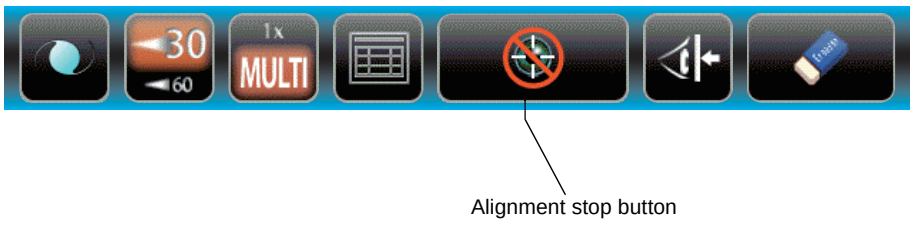

MODE button.....Selects R/K, T/P and R/K→T/P measurement mode or setting up screen.

## FUNCTION BUTTON

### UNDER MEASUREMENT STANDBY




### DURING MEASUREMENT




IOL button.....If alignment does not work with a patient who as an IOL, tapping this button may allow the measurement. When the button is selected, "IOL" is displayed on the control panel and the selected button is framed in orange.
Sets focusing for IOL and LED brightness for IOL. Refer to "OPTIONAL OPERATIONS" on page 57.

30/60 button.....Switches between 1-30mmHg range and 1-60mmHg range.


Count change button.....Switches between "Multi" and "1x" in Auto mode.

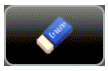
Multi: takes the number of measurements setup by the user

1x: measurement once (Before shipment, the default setting is "1x")

When "R/L move" is set to "Full Auto" or "Auto(RL)", after measuring the first eye, the main body automatically moves to the settings for the other eye.

All data button .....Displays all measurement data on the screen.

Print out button.....Prints measurement results. Tap the button when no measurement data is present to feed the paper.



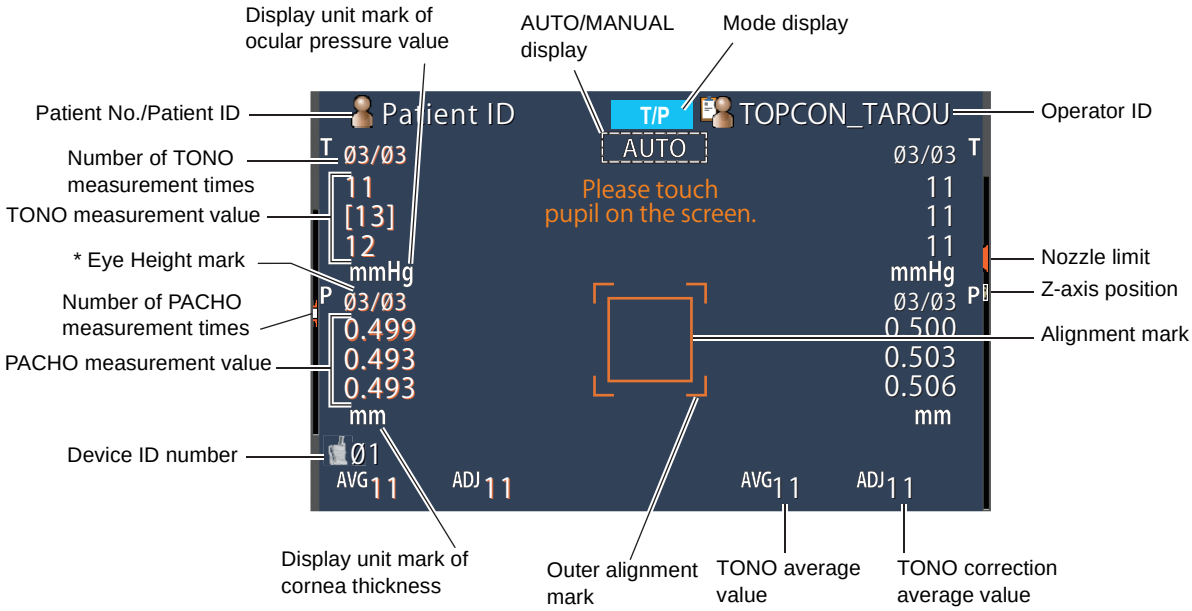
All clear button.....Clears all measurement data.

Safety stopper button .....Switches to the setting screen of the nozzle limit position to prevent the measuring window glass from hitting the patient's eye during the measurement.

Alignment stop button.....Displayed during a measurement, the alignment operation is stopped and the measuring head moves backward.

## MONITOR SCREEN

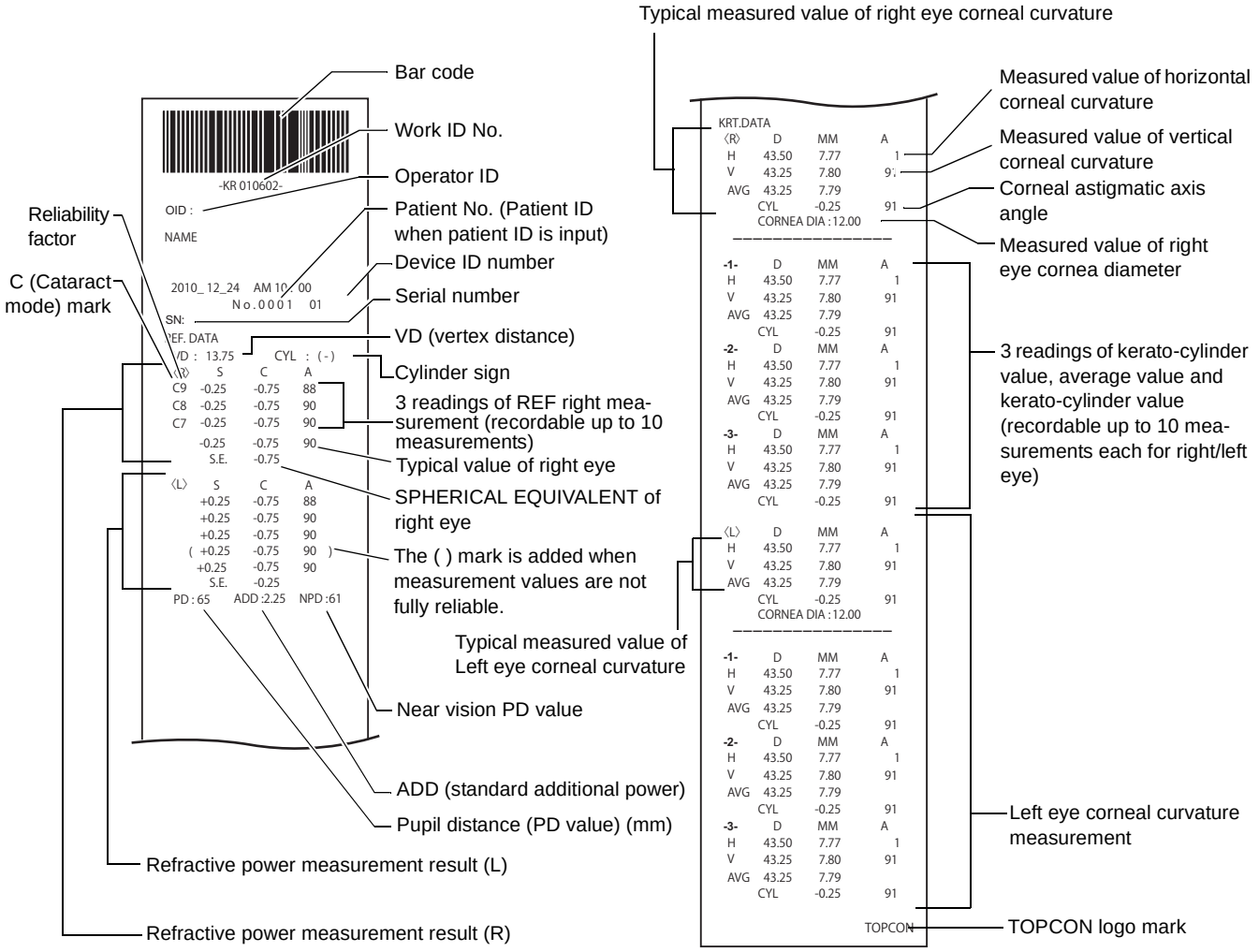
### MEASUREMENT SCREEN




*Eye height mark: Shows the position of the eye height mark on the chinrest.

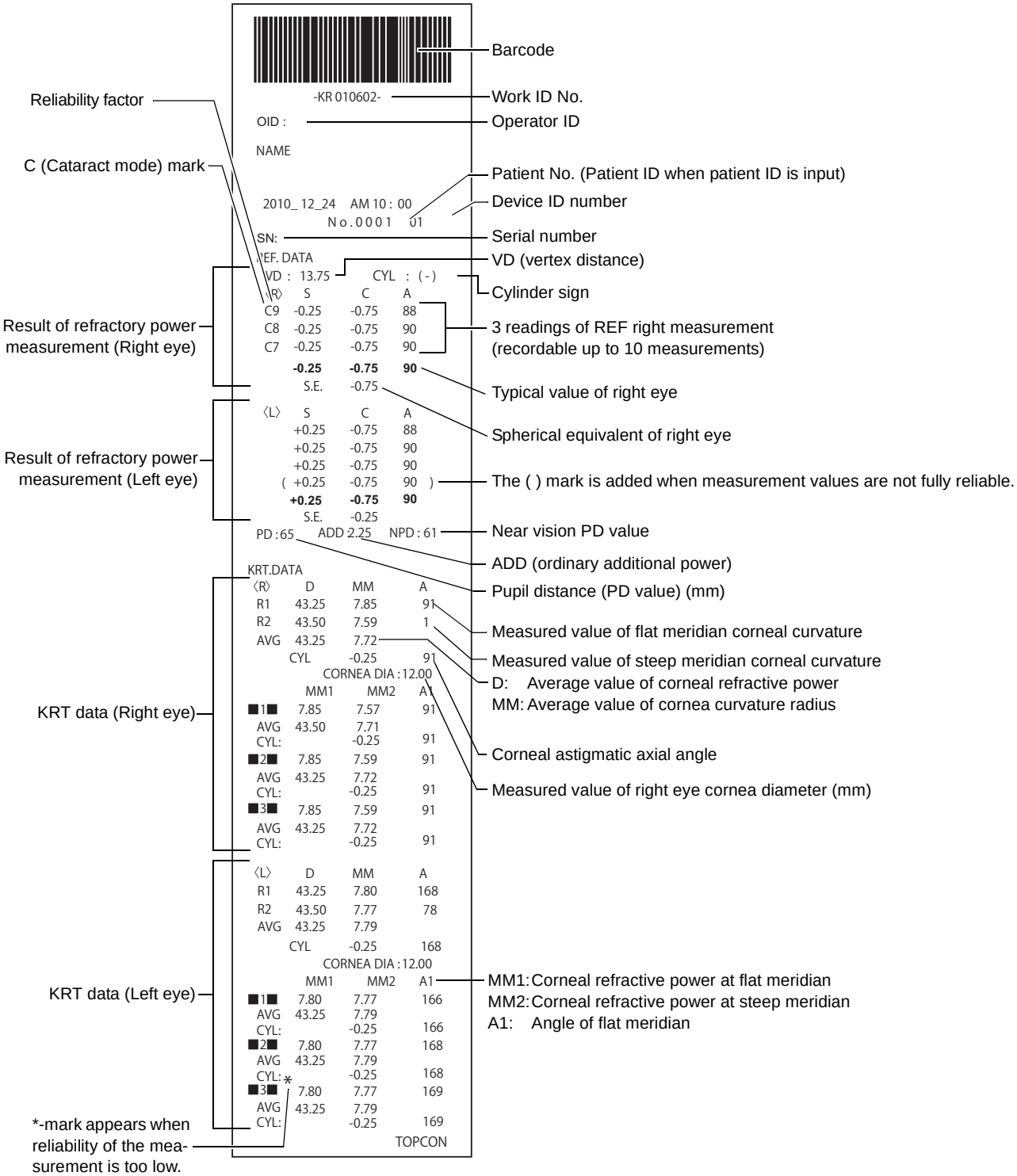
# PRINTER OUTPUT (IN REF/KRT MEASUREMENT MODE)

KRT typical value style and KRT print data are HV




| | |
|---|---|
| **NOTE** | • The reliability factor is defined with integers 1 to 9 in increasing order of reliability.<br>• Additionally, if the reliability is high enough, the reliability factor is not shown on the printout.<br>• The Near PD value is calculated based on the ADD.<br>• ( ) appears when normal measurement is not expected due to eyelid, eyelash, or blinking.<br>• *-mark appears when normal measurement is not expected with the [Cataract] button selected. |

KRT typical value style and KRT print data are R1R2




**NOTE**

- The reliability factor is defined with integers 1 to 9 in increasing order of reliability.
  Additionally, if the reliability is high enough, the reliability factor is not shown on the printout.
- The Near PD value is calculated based on the ADD.
- ( ) appears when normal measurement is not expected due to eyelid, eyelash, or blinking.
- *-mark appears when normal measurement is not expected with the [Cataract] button selected.

## PRINTOUT FORMAT SETTING

Printout format can be changed by tapping "Print" in the Settings screen. For Print settings, see "SETTING FUNCTIONS ON SETUP SCREEN" on page 77.

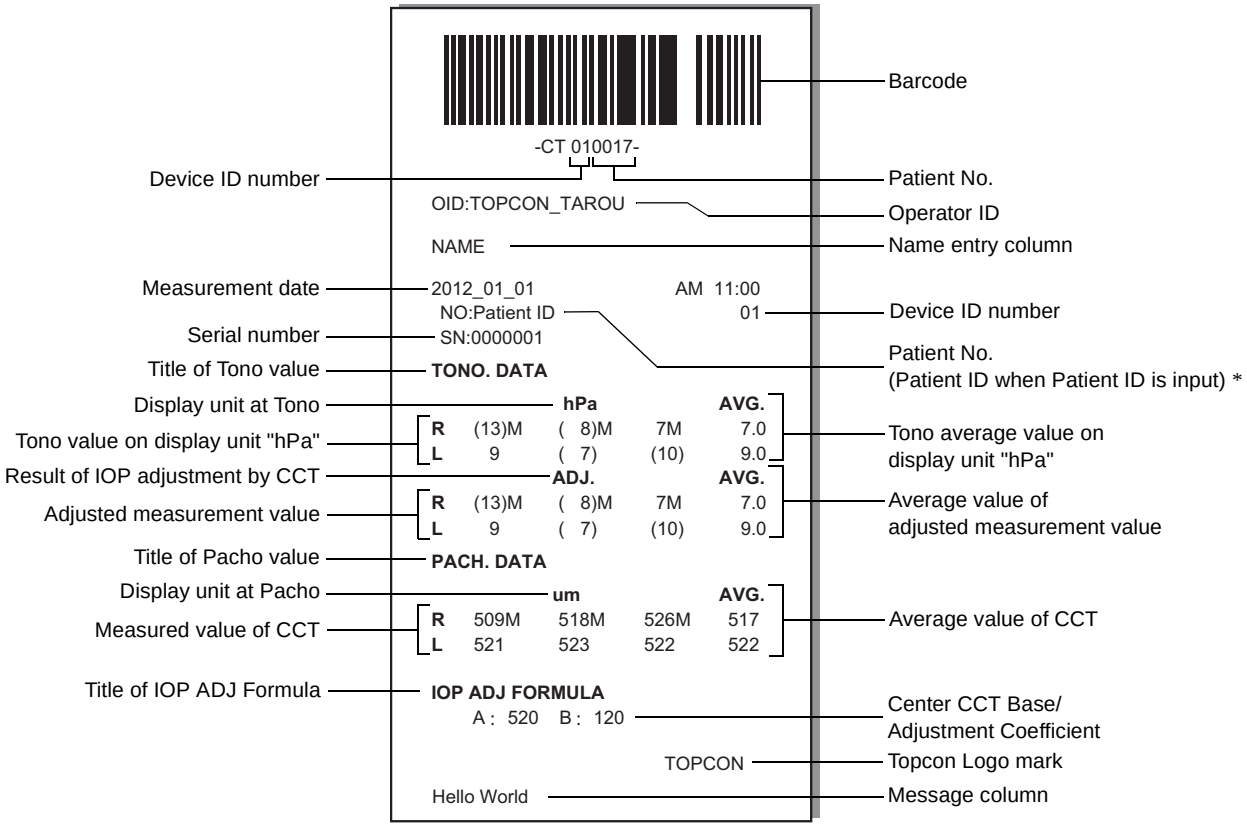
PRESET
- All: Initial setting (all measurement values are printed.)
- Avg: Only average values are printed.
- Classic: Equivalent with RM/KR-8900 Classic 2

| | ITEM | INITIAL | PRESET | | |
|---|---|---|---|---|---|
| | | | All | Avg | Classic |
| Common | Barcode | OFF | OFF | OFF | OFF |
| | Operator ID | OFF | OFF | OFF | OFF |
| | Name | ON | ON | ON | ON |
| | Date | ON | ON | ON | ON |
| | Date style | DMY* | DMY* | DMY* | DMY* |
| | Patient No/Patient ID | ON | ON | ON | ON |
| | Device ID number | OFF | OFF | OFF | OFF |
| | Serial number | ON | ON | ON | ON |
| | TOPCON logo | ON | ON | ON | ON |
| | Message | OFF | OFF | OFF | OFF |
| | Message data | NULL | NULL | NULL | NULL |
| | Line space | 0 | 0 | 0 | 0 |
| | Auto Cut | ON | ON | ON | ON |
| REF/KRT | Print order | DATA | DATA | DATA | DATA |
| | Include error data | OFF | OFF | OFF | OFF |
| | VD | ON | ON | ON | ON |
| | Cylinder sign | ON | ON | ON | ON |
| | REF format | ALL | ALL | AVG | ALL |
| | Credibillity | OFF | OFF | OFF | OFF |
| | S.E. | ON | ON | ON | ON |
| | PD | ON | ON | ON | ON |
| | ADD | OFF | OFF | OFF | OFF |
| | KRT print order | D/mm | D/mm | D/mm | D/mm |
| | KRT fomat | ALL | ALL | AVG | AVG |
| | KRT style | R1R2 | R1R2 | R1R2 | HV |
| | KRT print format | R1R2 | R1R2 | R1R2 | HV |
| | KRT average | ON | ON | ON | ON |
| | KRT cylinder | ON | ON | ON | ON |
| | Cornea diameter | ON | ON | ON | ON |
| REF | VD | ON | ON | ON | ON |
| | Cylinder sign | ON | ON | ON | ON |
| | REF format | ALL | ALL | AVG | ALL |
| | Credibility | OFF | OFF | OFF | OFF |
| | S.E. | ON | ON | ON | ON |
| | PD | ON | ON | ON | ON |
| | ADD | OFF | OFF | OFF | OFF |
| KRT | KRT print order | D/mm | D/mm | D/mm | D/mm |
| | KRT fomat | ALL | ALL | AVG | ALL |
| | KRT style | R1R2 | R1R2 | R1R2 | HV |
| | KRT print format | R1R2 | R1R2 | R1R2 | HV |
| | KRT average | ON | ON | ON | ON |
| | KRT cylinder | ON | ON | ON | ON |
| | Cornea diameter | ON | ON | ON | ON |

* : Depending on the destination, preset values differ.

## PRINTER OUTPUT (IN TONO/PACHO MEASUREMENT MODE)

Printed example when "Printer order" of "Print" is set to "SIMPLE"



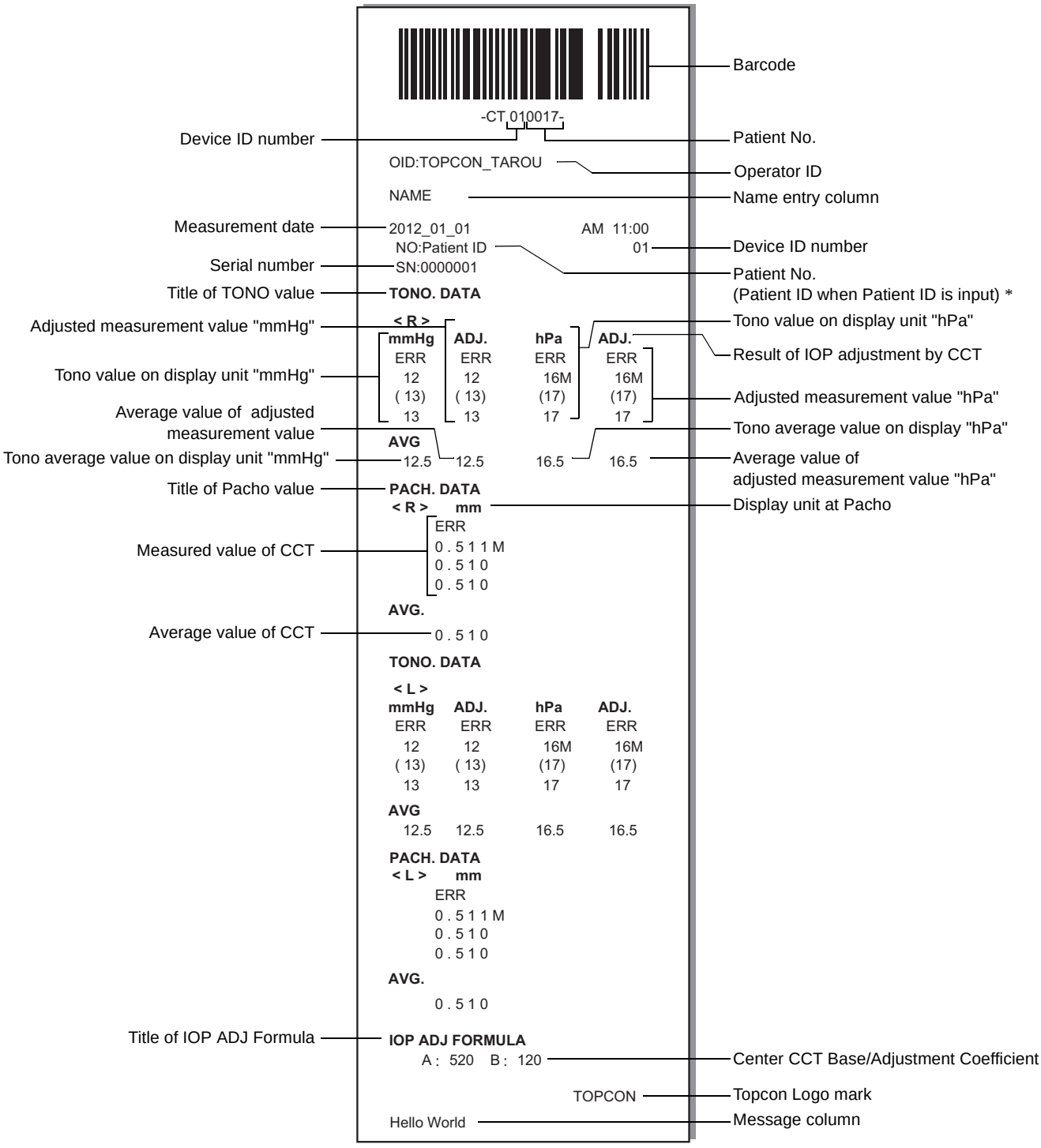

* As for the patient No., the result of the printing will differ depending on whether the patient ID is inputted or not inputted.

  Input : Patient ID is printed.

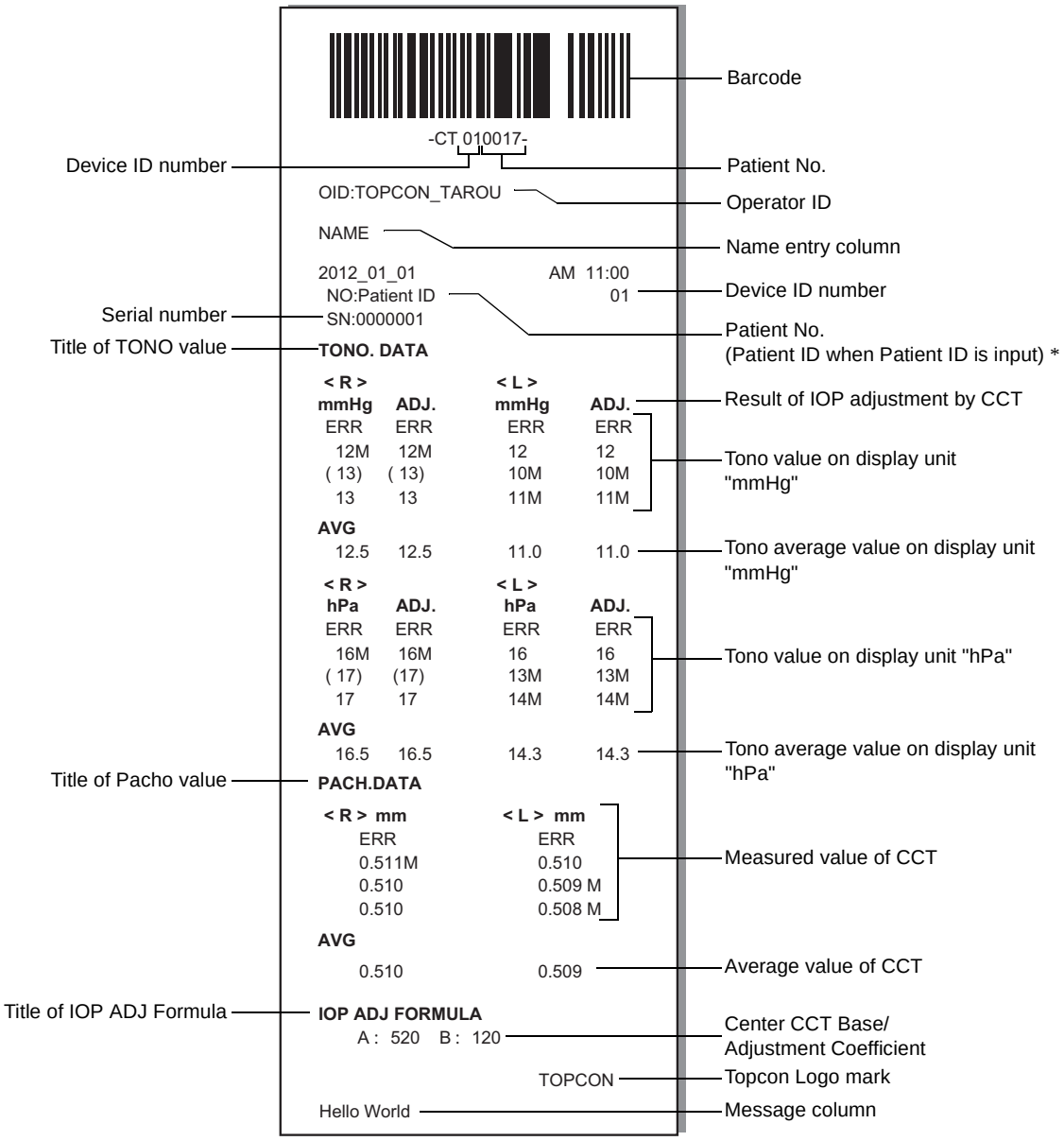
  Not input : Patient No. (starts from 0001, automatically added +1 upon completion of measurement) is printed.

| NOTE | • The "M" mark is printed on the value measured by manual measurement or measured by start button in Auto mode. (In the error of ERR, OVER, etc., the "M" mark is not printed.)<br>• The value with low reliability is outputted with the parenthesis notation. |
|---|---|

Printed example when "Printer order" of "Print" is set to "R/L"

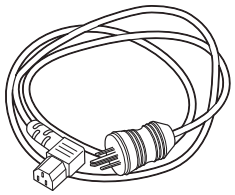
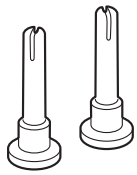
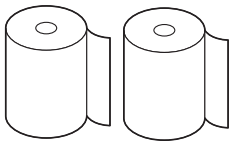
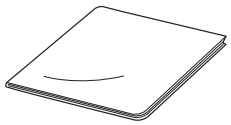
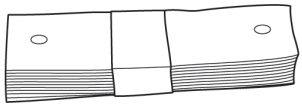
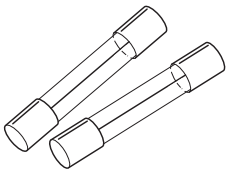
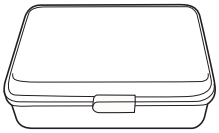
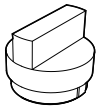
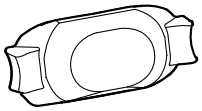
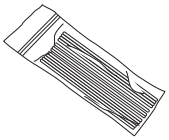
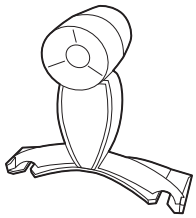


Printed example when "Printer order" of "Print" is set to "DATA"



## STANDARD ACCESSORIES

The following are standard accessories. Make sure that all these items are included (quantity).

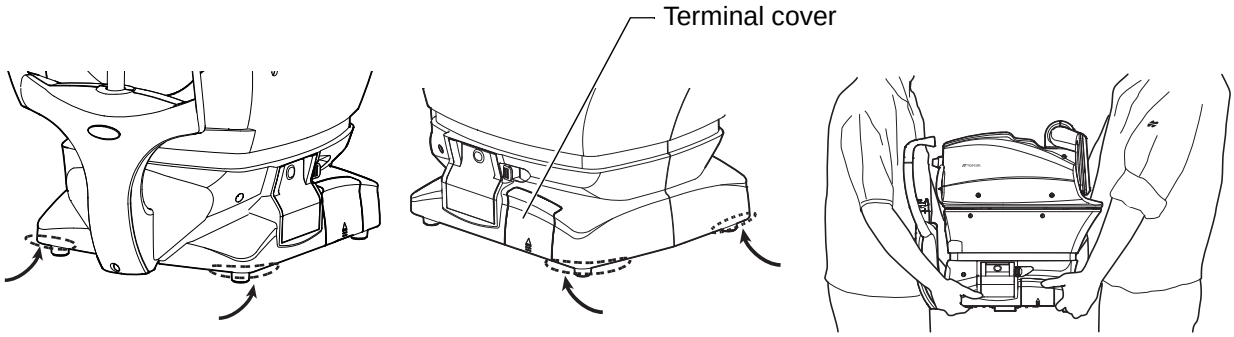
| | |
|---|---|
| Power cable (1)<br>  | Chinrest tissue pin (2)<br>  |
| Printer paper (2)<br>  | Monitor cleaner (1)<br>  |
| Chinrest tissue (1)<br>  | Dust cover (1)<br>  |
| Fuse (2)<br>  | User Manual, Instruction Manual, Unpacking and Assembling, Cleaning Procedure (1 each)<br>  |
| Accessory case (1)<br>  | Measuring window cap (for REF/KRT) (1)<br>  |
| Measuring window cap (for TONO/PACHO) (1)<br>  | Applicator (1)<br>  |
| Blower (1)<br>  | Model eye (1)<br>  |

# PREPARATIONS

## INSTALLATION

| | |
|---|---|
| **⚠ CAUTION** | • When moving the instrument, two people should lift from the bottom of the device.<br>One person lifting the device may cause harm to his back or injury by falling parts. Also, holding areas other than the bottom and holding the Terminal cover may cause injury, as well as damage to the instrument.<br>• To prevent damage and injuries, do not install the instrument on an uneven, unsteady or sloped surface.<br>• When setting an instrument on an instrument table, pay attention not to injury a finger between the instrument and the table. |

***1*** Firmly hold the instrument at the position shown below and place it on the automatic instrument table. For the adjustable instrument table, see "OPTIONAL ACCESSORIES" on page 112.




Holding positions

Holding the instrument

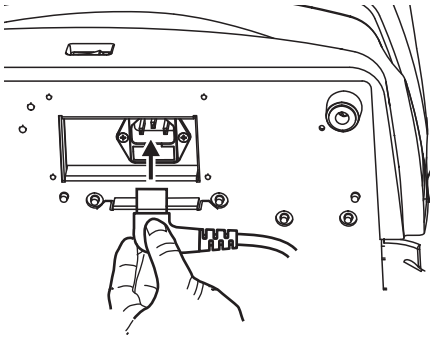
## CONNECTING POWER CABLE

| | |
|---|---|
| **⚠ WARNING** | Be sure to connect the power plug to an AC 3-pin receptacle equipped with grounding. Connection with receptacle without grounding may cause fire and electric shock in case of short-circuiting. |
| **⚠ CAUTION** | To avoid electric shocks, do not handle the power plug with wet fingers. |

***1*** Make sure the POWER switch of the instrument is OFF.

***2*** Tilt the body slowly so that the POWER switch is on top and the power inlet at the bottom can be seen.

***3*** Connect the power cable to the Power inlet.



***4*** Insert the power cable plug into the commercial power (the 3-pin AC grounding receptacle.)

## CONNECTING EXTERNAL I/O TERMINALS

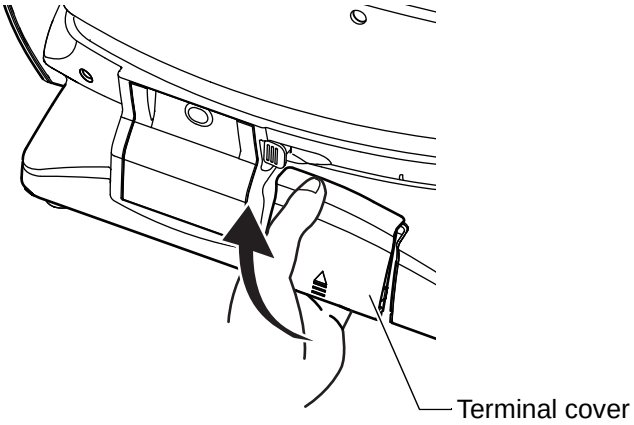
| | |
|---|---|
| **CAUTION** | To avoid electric shock, do not touch the external connection terminal and the patient at the same time. |

| | |
|---|---|
| **NOTE** | When connecting this product with a commercial personal computer, use one conforming to IEC60950/IEC60950-1, with a separation unit. |

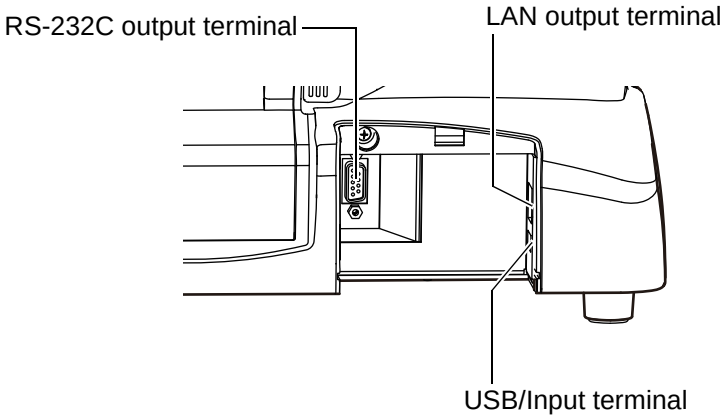
### DATA OUTPUT

This product can be connected to a personal computer (PC) and other external devices via RS-232C or LAN.

***1*** Remove the Terminal cover by pulling up as follows.




***2*** Connect the connection cable to the external I/O terminals of the instrument.




***3*** Connect the other end of the connection cable to the PC, etc.

***4*** Replace the Terminal cover.

### DATA INPUT

This product can be connected to a bar-code reader and other external devices via USB.

***1*** Connect the connection cable to the input terminal of the instrument.

***2*** Connect the other end of the connection cable to the external device.

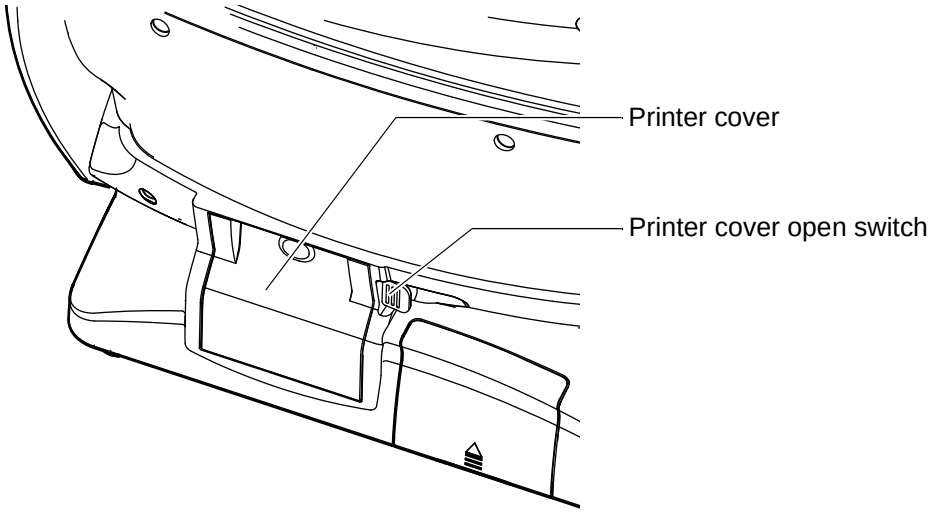
| | |
|---|---|
| **NOTE** | For questions about connections, contact your TOPCON dealer. |

## PRINTER PAPER SETTING

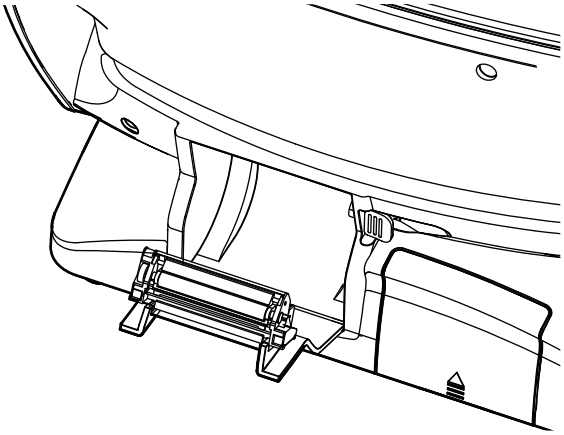
| | |
|---|---|
| **CAUTION** | • To avoid failure or potential injury, do not open the printer cover while the printer is in operation.<br>• To avoid potential injury in case of malfunction, including a paper jam, be sure to shut off the power before attempting to repair it.<br>• To avoid potential injury, do not touch the printer body including metal parts or the paper cutter, while the printer is in operation or when replacing the printer paper. |

| | |
|---|---|
| **NOTE** | If you insert the printer paper backwards, nothing is printed. |

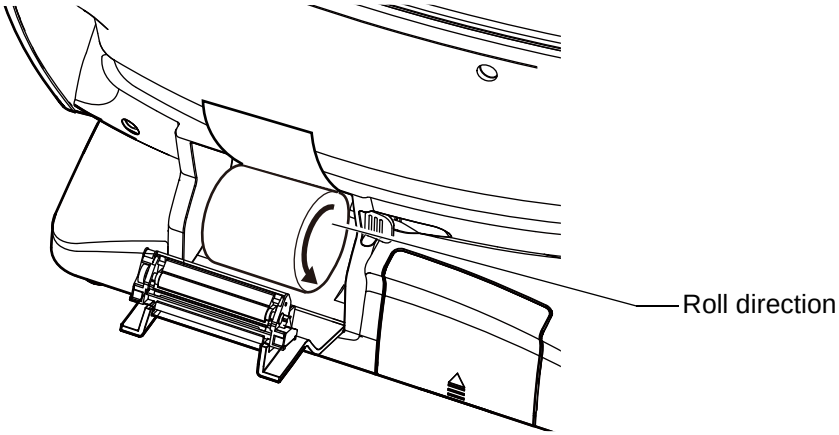
***1*** Press the printer cover open switch to open the printer cover.



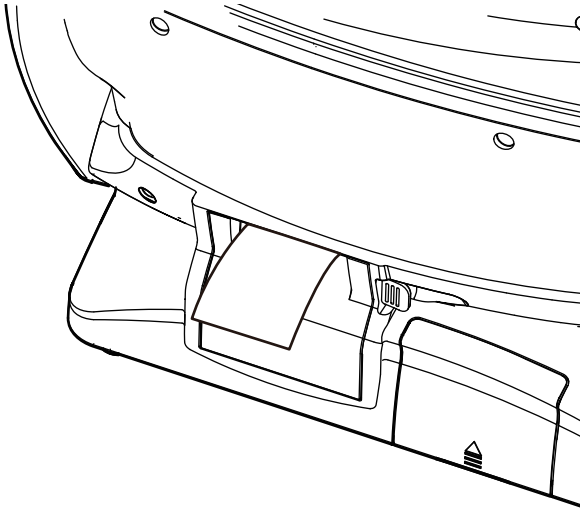
***2*** Open the printer cover to the limit.



***3*** Insert the printer paper in the direction shown below and pull out the paper end to your side by 7 to 8cm.




***4*** Bring the paper into the center, then close the printer cover.



| | |
|---|---|
| **NOTE** | • In case the printer cover is not firmly closed, printing will not start.<br>• A 58mm wide paper roll (example: TP-50KJ-R [Nippon Paper Co.]) is recommended.<br>Other paper rolls may cause an abnormal printing noise or an unclear print. |

## RECOVERY FROM POWER SAVE STATUS

This instrument adopts the power save system for saving electric power. When the machine is not operated for a set time, the control panel becomes a screensaver.

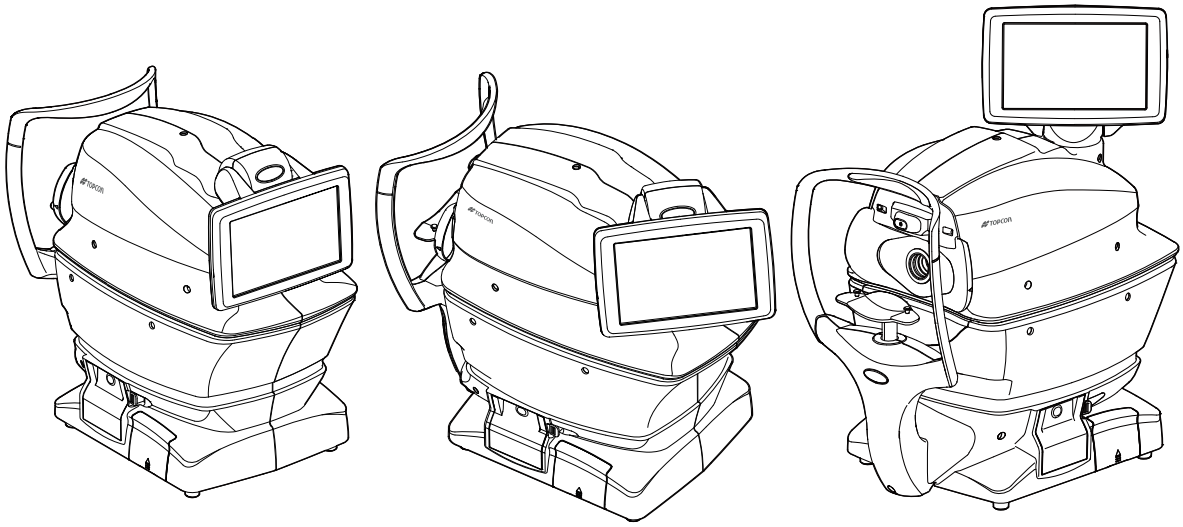
***1*** Tap the control panel.

In a few seconds, the measurement screen is displayed and measurement is enabled.

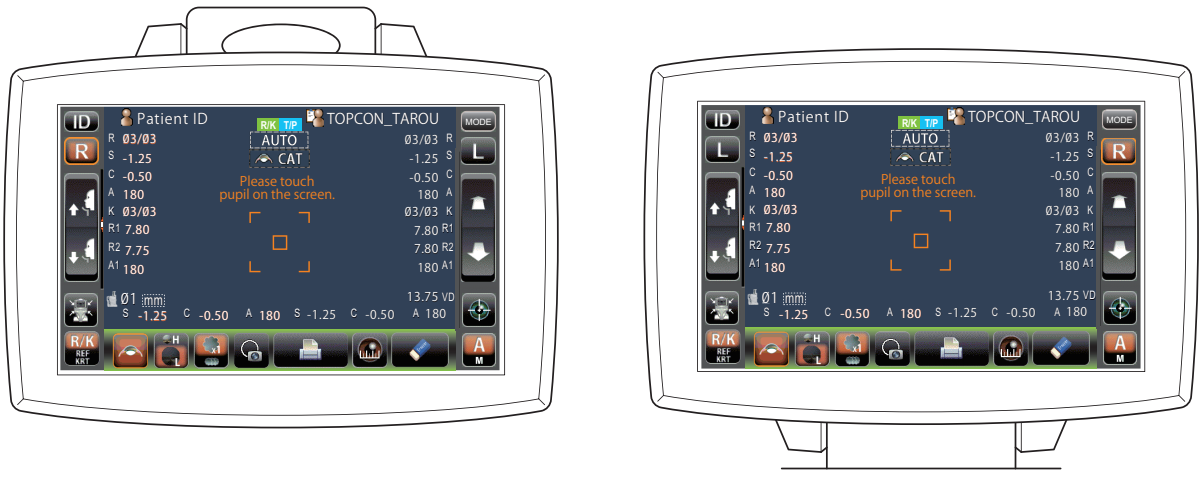
| NOTE | The time to start the power save status can be changed at "Auto power save" of "Common" in the "Initial". (See page 85). |
|---|---|

## ADJUSTING THE CONTROL PANEL POSITION

The control panel may be positioned by swinging and tilting the monitor to your desired position. Touching the control panel controls operations including chinrest movements, alignment and measurement.



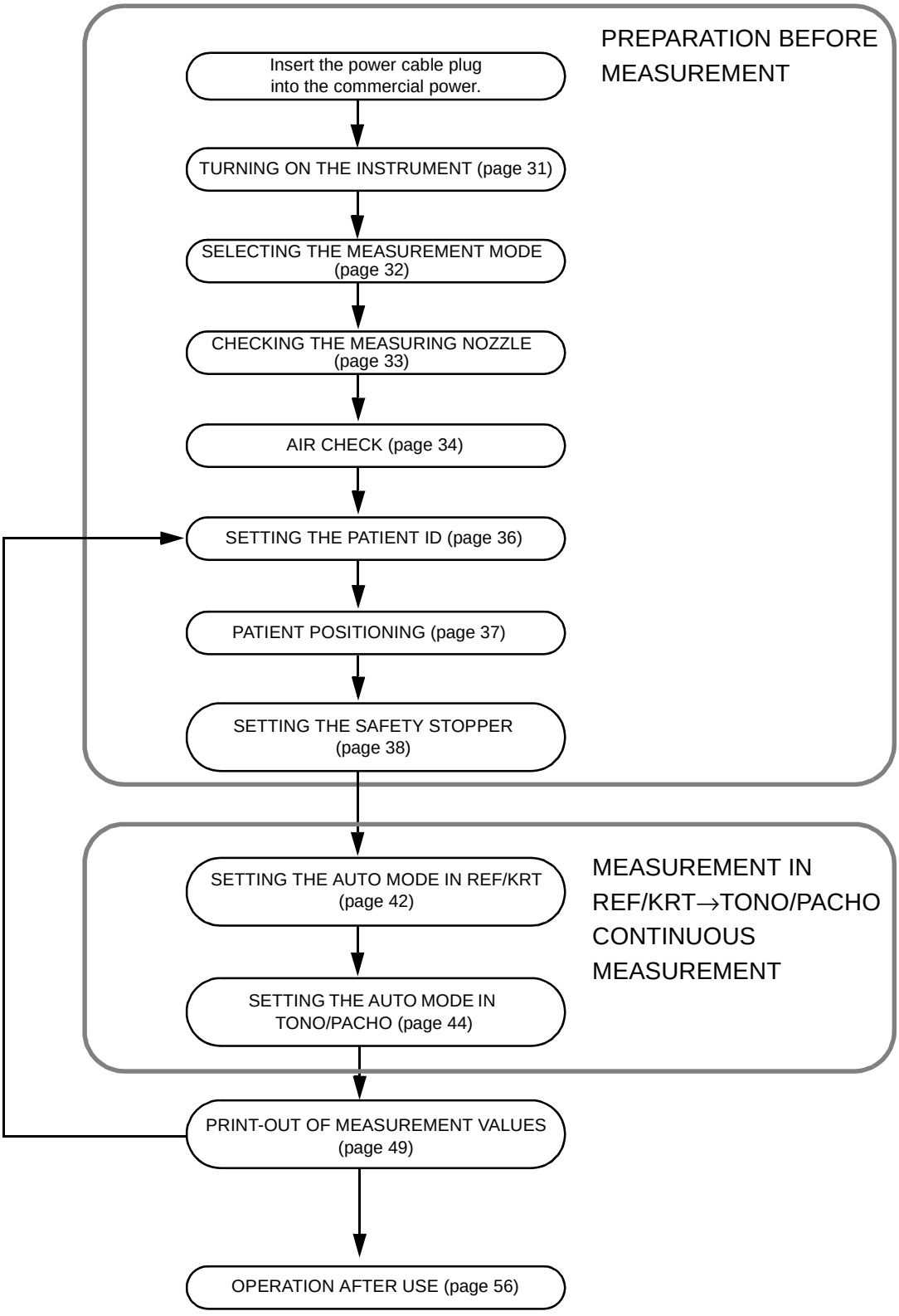
| NOTE | • The layout of R button/L button is reversed according to the position of the control panel.<br>• The moving direction by tapping is changed according to the position of the control panel.<br>• The moving direction when pushing continuously on control panel changes according to the "XZ MOTOR direction". of "Common" in the "Initial". (See page 85) |
|---|---|



# BASIC OPERATIONS

## OPERATION FLOW CHART

### MEASURING PROCEDURE IN REF/KRT→TONO/PACHO CONTINUOUS MEASUREMENT



# PREPARATION BEFORE MEASUREMENT

| NOTE | • Do not put the patient's chin on the chinrest until the power is on.<br>• If the POWER switch is turned ON immediately after turning OFF the POWER switch, it may be unable to restart by the protective function of power supply. Please turn ON the POWER switch after waiting 3 seconds or more, when the POWER switch is turned OFF. |
|---|---|

## TURNING ON THE INSTRUMENT

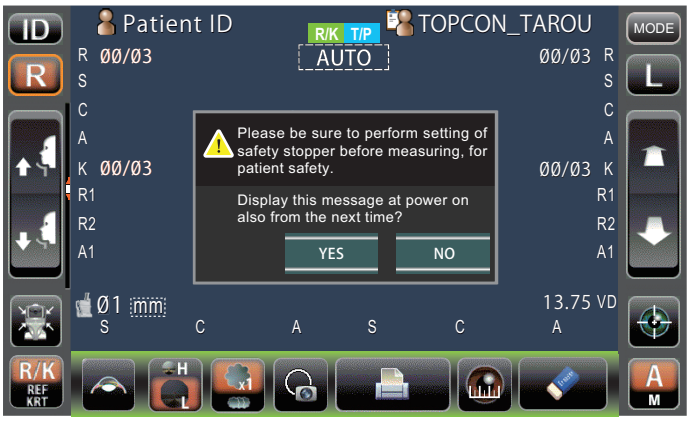
**1** Make sure the power cable is connected properly.

For the details of the connection, refer to "CONNECTING POWER CABLE" on page 25.

**2** If connecting external device is required, connect the external device and turn on the device.

**3** Press on the POWER switch.

**4** The title screen and measurement screen are displayed and the confirmation message of setting of safety stopper is displayed in a few seconds.




**5** Tap either the YES button or NO button, return to the Measurement screen.

| NOTE | • Refer to page 38 for SETTING THE SAFETY STOPPER.<br>• If "YES" is tapped, the confirmation message of setting of safety stopper is displayed upon power ON at next time, too.<br>• If "NO" is tapped, the confirmation message of setting of safety stopper is not displayed upon power ON from next time. |
|---|---|

## SELECTING THE MEASUREMENT MODE

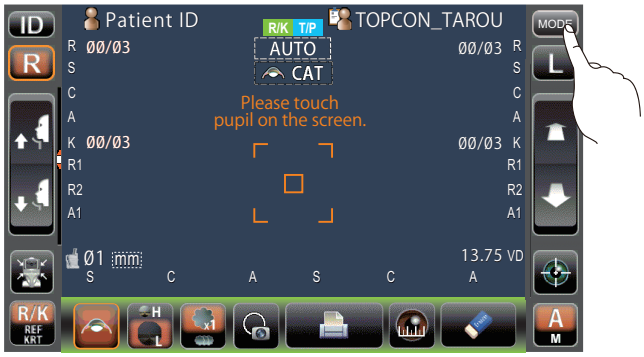
On this product, measurement mode can be changed in the following three modes. Before shipment, the default setting is R/K→T/P mode.

- R/K: REF/KERT measurement mode
  REF (Measurement of Spherical refractive power, Cylindrical refractive power and Direction of astigmatic axis), and KRT (Measurement of Cornea curvature radius, Direction of corneal astigmatic axis and Corneal refractive power)
- T/P: TONO/PACHO measurement mode
  TONO (Ocular pressure measurement) and PACHO (Cornea thickness measurement)
- R/K→T/P: REF/KRT→TONO/PACHO continuous measurement mode

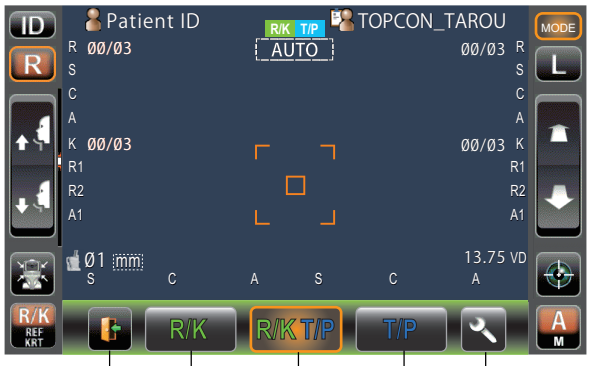
* Under R/K it is possible to select the measurement of REF/KRT continuously or to select REF/KRT measurement individually, and under T/P it is possible to select the measurement of TONO/PACHO continuously or to select the TONO measurement individually. Refer to page 58 "SELECTING THE DETAILS IN MEASUREMENT MODE".

**1** Confirm the Measurement screen.

**2** Tap the MODE button on the control panel.




**3** Select a measurement mode. The mode display is switched.



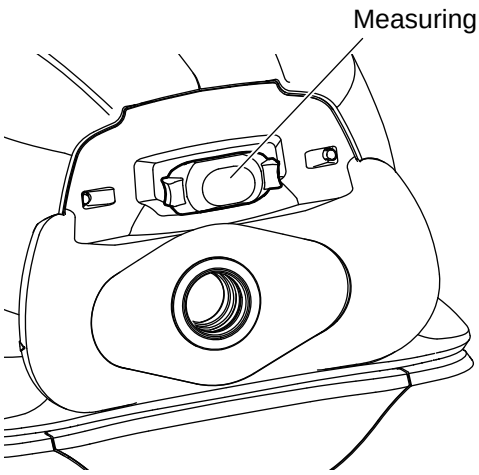

Exit button
REF/KRT measurement mode button
REF/KRT→TONO/PACHO continuous measurement mode button
TONO/PACHO measurement mode button
Settings button

## CHECKING THE MEASURING NOZZLE

Before TONO/PACHO measurement, a check of the measuring nozzle is required.

| | |
|---|---|
| **⚠CAUTION** | Before measuring, check if there is any foreign matter on and around the measuring nozzle.<br>If there is any, it may enter and damage the patient's eye during the measurement. |

**1** Remove the measuring window cap.



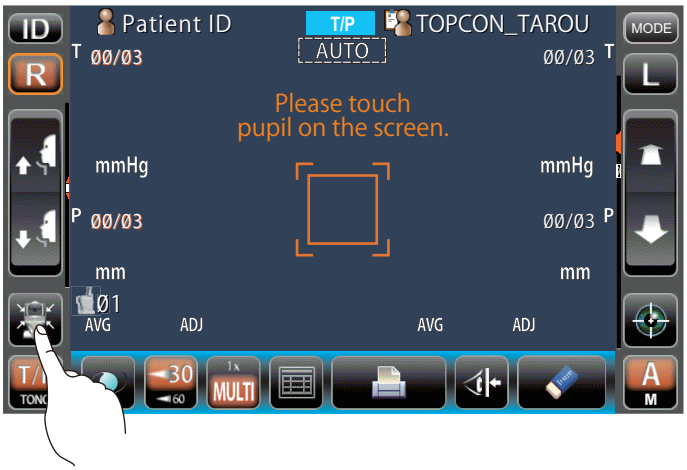

**2** Check if there is any foreign matter on and around the measuring nozzle. If there is any, turn OFF the (POWER) switch, clean it off and then turn ON the (POWER) switch.
For cleaning, see "CLEANING THE MEASURING NOZZLE AND THE GLASS INSIDE THE MEASURING NOZZLE" on page 93.

## AIR CHECK

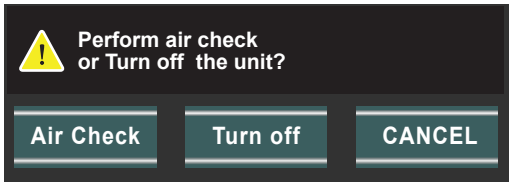
Before TONO/PACHO measurement, an air check is required.

This instrument is equipped with a function for checking correct operations of the measurement system inside the instrument.

**1** On the measurement standby screen of Auto mode in T/P mode, tap the [Air check/End] button.

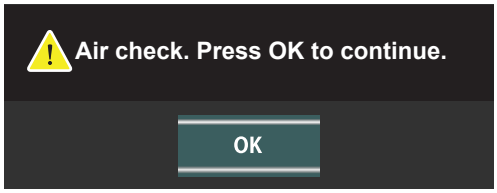



**2** Then, the confirming message of Air check/End operation is displayed.

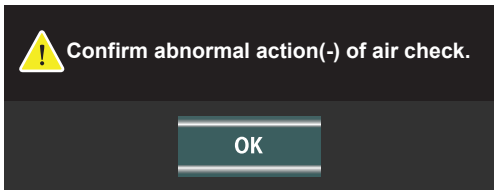



**3** Press the [Air Check] button. Then, air is blown out from the measuring nozzle automatically.

**4** Make sure the message box of "Air check. Press OK to continue." is displayed on the control panel.

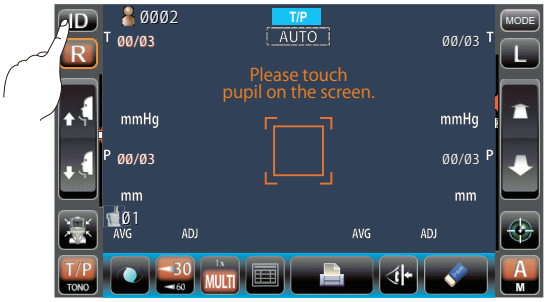



**5** Press the [OK] button, return to Measurement screen.

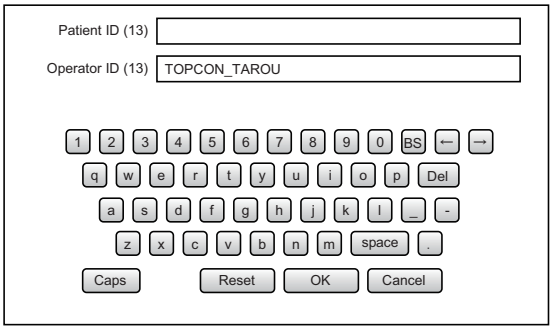
| | |
|---|---|
| **NOTE** | If "Confirm abnormal action(+) of air check." or "Confirm abnormal action(-) of air check." is displayed, the condition is not normal.<br>If there is any, remove it, press the [OK] button and do the check again.<br>If there is no object, a failure is suspected. Turn the [POWER] switch to OFF, unplug the power cable, and call your dealer or TOPCON at the address printed on the back cover of this manual.<br>  |

## SETTING THE PATIENT ID

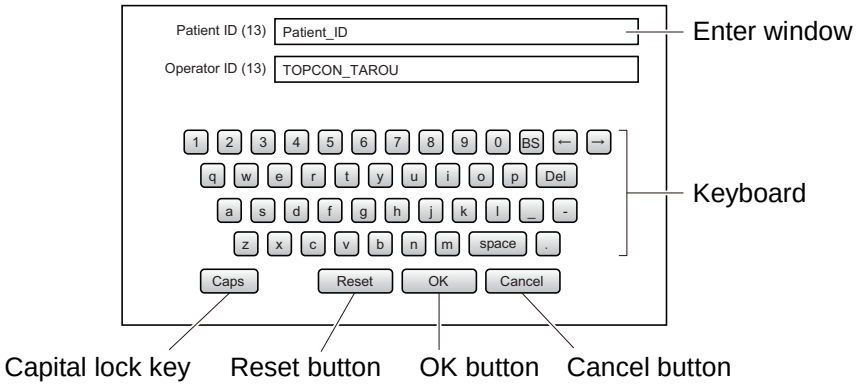
**1** Tap the (ID) button on the control panel.



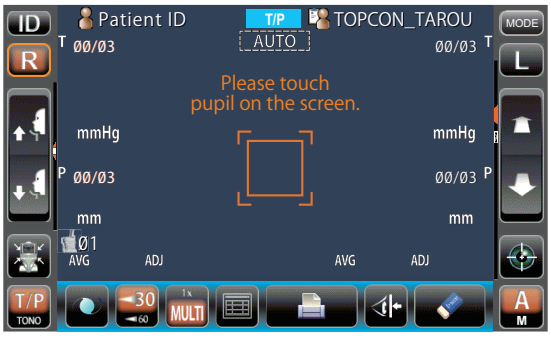

**2** The Patient ID Input screen is called up.




**3** Enter the patient ID using the keyboard on the screen.




**4** Return to the Measurement screen, and confirm that the patient ID is updated.




| NOTE | If the "Patient ID" is set to "OFF" in the "Common" of the "Initial", the patient No./patient ID is not displayed on the measurement screen. |
|---|---|

## PATIENT POSITIONING

| | |
|---|---|
| **CAUTION** | • To avoid electric shock, do not touch the external connection terminal and the patient at the same time.<br>• To avoid injury when moving the button for chinrest, be careful not to catch the patient's fingers. Tell this to the patient, too.<br>• To avoid injury when operating the machine, be careful about the cover not to catch the fingers of the patient. |

| | |
|---|---|
| **NOTE** | • Adjust the height of the adjustable instrument table so that the patient can sit on the chair comfortably. Otherwise, correct measurement values may not be obtained.<br>• Before starting measurement, explain the functioning so patients are not surprised by the air puff.<br>• When operating the instrument, be careful that the instrument does not touch the patient's eye or nose. If touched, clean the instrument following "CLEANING THE MEASURING WINDOW GLASS" on page 92.<br>• If no patient ID is registered, a "patient No." is assigned automatically in order of examination. |

**1** Check the measurement screen.

**2** Make sure that the eye height mark is at the center position as explained below.

If the eye height mark is above the center position, press the lower side of the control panel display, or if it is below the center position, press the upper side of the control panel display, so as to move the eye height mark to the center position.





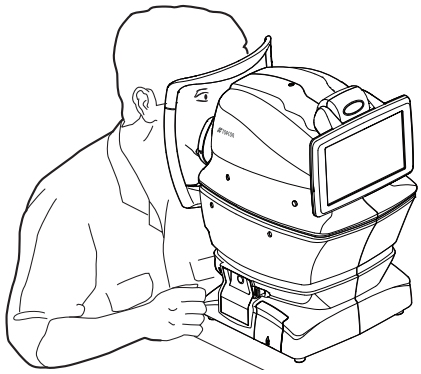
**3** Take off one sheet of chinrest tissue on the chinrest. If the tissue has run out, please supply new chinrest tissues.

**4** Wipe the dirt form forehead rest.

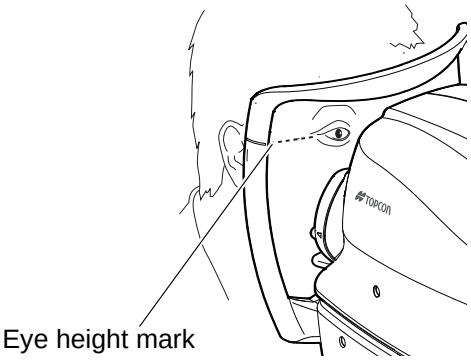
**5** Have the patient sit in front of the instrument.

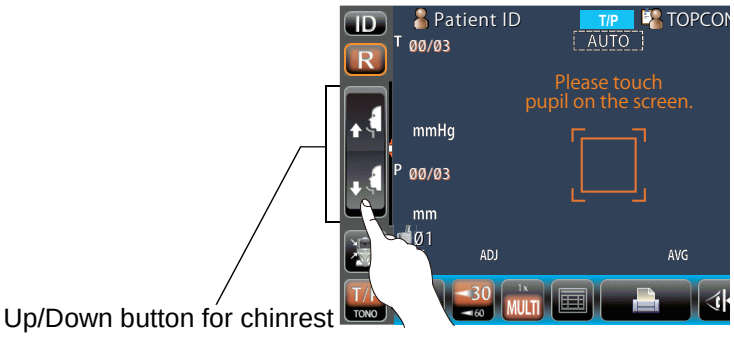
**6** Adjust the adjustable instrument table or the chair height for the patient to put his/her chin on the chinrest comfortably.

**7** Place the patient's chin on the chinrest and check that his/her forehead is touching to the forehead rest.



**8** Press the UP/DOWN button to adjust the chinrest height until the eye height mark of the chinrest reaches the same height as the patient's eye.




## SETTING THE SAFETY STOPPER

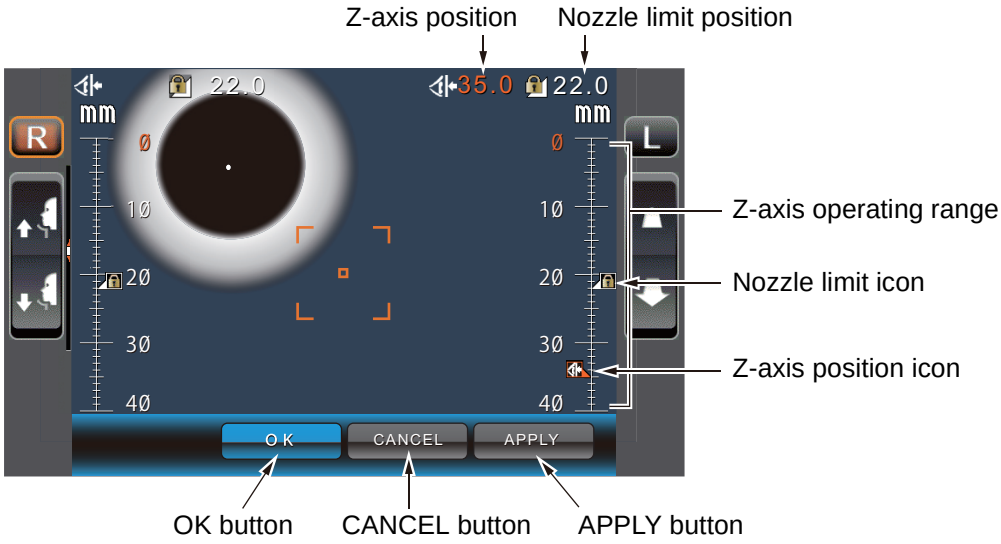
| | |
|---|---|
| ⚠ **CAUTION** | • Before measuring, set the safety stop to prevent the measuring window glass from hitting the patient's eye. Set it respectively for the right and left eyes.<br>• Set the safety stop from the side of the instrument. Setting operations from other positions, it is not easy to check positions of the eye and ocular pressure measuring window, may cause injury by touching ocular pressure measuring window to a patient. |

**1** Select the right/left eye by tapping the R button/L button.

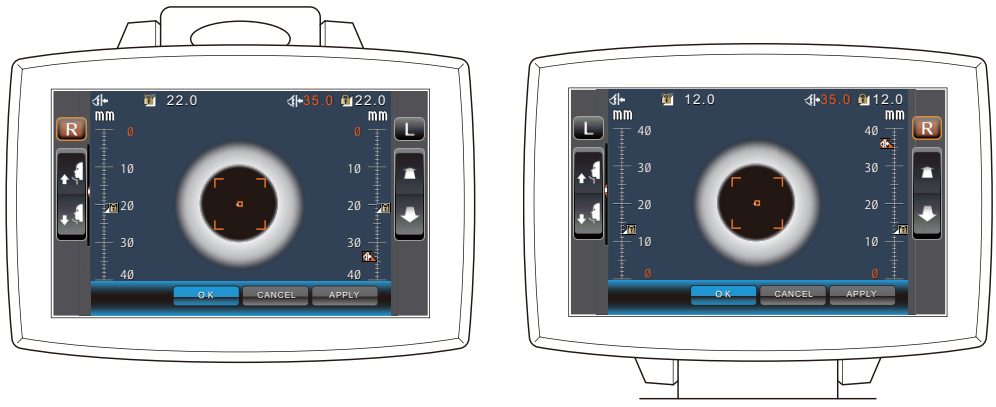
**2** Tap the [Safety Stopper] button on the control panel.


| NOTE | Set the nozzle limit individually for the right/left eye.<br>If measurement is performed by setting the safety stopper only for one eye, or without setting the safety stopper at all, the measurement window glass might hit the patient's eye. |
|---|---|

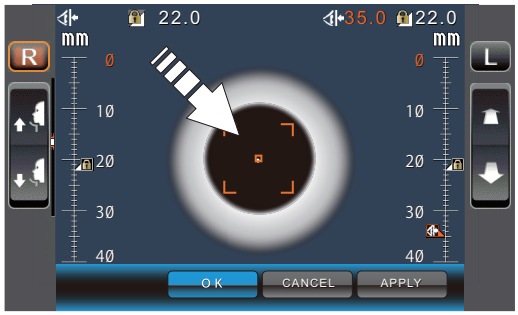
**3** When the [Safety Stopper] button is tapped, the Safety Stopper screen is called up.




| NOTE | By the position of a control panel, arrangement of the [R] button/[L] button, Z-axis position, nozzle limit position, Z-axis operating range, nozzle limit icon, and Z-axis position icon is reversed. |
|---|---|



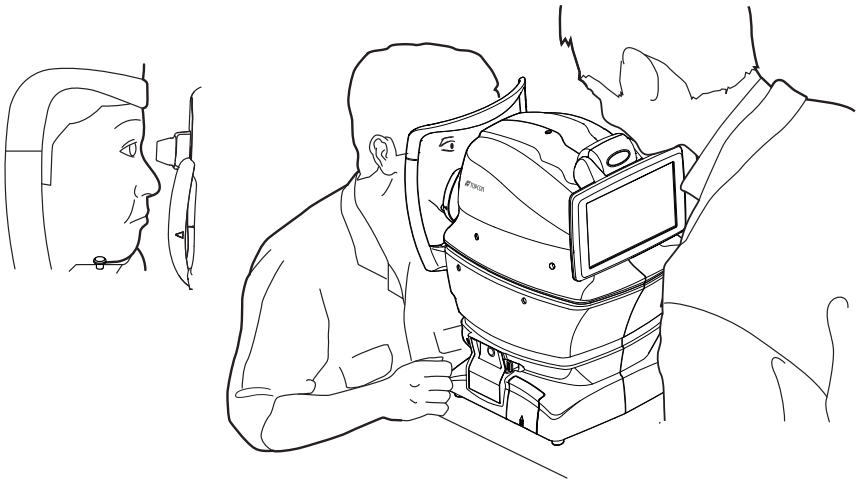
**4** Operating the control panel, set the center of the measurement screen to the cornea center of the patient.

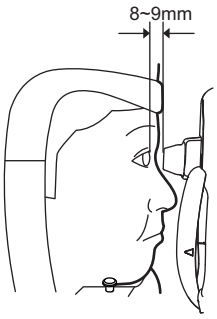

**5** By tapping the Measuring head forward/backward button, adjust the position of the z-axis position icon for the right/left eyes.


**NOTE**

At this moment, confirm alternately the distance between the patient's eye and the measuring nozzle and the safety stopper screen, and adjust the position of the z-axis position icon.



**6** At a position where the measuring nozzle is 8-9mm from the cornea, tap the OK button and thereby set the position of the nozzle limit.





**7** Return to the Measurement screen and confirm that the position of the nozzle limit icon is changed, push the main unit a little forward by operating the Measuring head forward/backward of the control panel, and then confirm that a message "Nozzle at limit position" is displayed on the screen. Setting is complete if the main unit does not go forward any more.

## MEASUREMENT IN REF/KRT→TONO/PACHO CONTINUOUS MEASUREMENT MODE

In this mode the measurement is performed continuously left and right eye in REF/KRT and TONO/PACHO.

Before shipment the default setting is following order; right eye in REF/KRT, left eye in REF/KRT, left eye in TONO/PACHO and right eye in TONO/PACHO. When the measurement switches REF/KRT to TONO/PACHO, it takes about 10 seconds for vertical movement of the measuring head.

| | |
|---|---|
| **NOTE** | • Auto mode may not be possible, in cases where the eyelid and the eyelashes cover the pupil. If this occurs, the operator should tell the patient to open their eyes as wide as possible, or lift the eyelid to allow for measurement.<br>• Auto mode may not be possible due to frequent blinks or existing abnormalities in the corneal surface caused by corneal disease etc. In this case, select Manual mode.<br>• The ocular pressure varies due to heart beats and tears. So, if it is not possible to obtain exact measurement values by measuring only once or twice, it is recommended to perform ocular pressure measurements several times.<br>• When operating the instrument, be careful that the instrument does not touch the patient's eye or nose. If touched, clean the instrument as specified in "CLEANING THE INSTRUMENT" on page 92.<br>• If the patient is wearing make up on the eyelid or around the eyelid using glitter, the auto alignment may not function properly. In this case, select Manual mode.<br>• If the machine is moved before the measurement values are displayed, it might cause an incorrect measurement.<br>• The beep function for urging cautions is provided so that a finger or a hand is not pinched between the reverse side of forehead rest, a measuring head and an ocular pressure measurement window.<br>• If area far away from the pupil is tapped, the instrument may touch the patient's eye, eyelid or nose due to auto alignment. |

## CHECKING THE MEASUREMENT MODE –REF/KRT→TONO/PACHO CONTINUOUS MEASUREMENT MODE

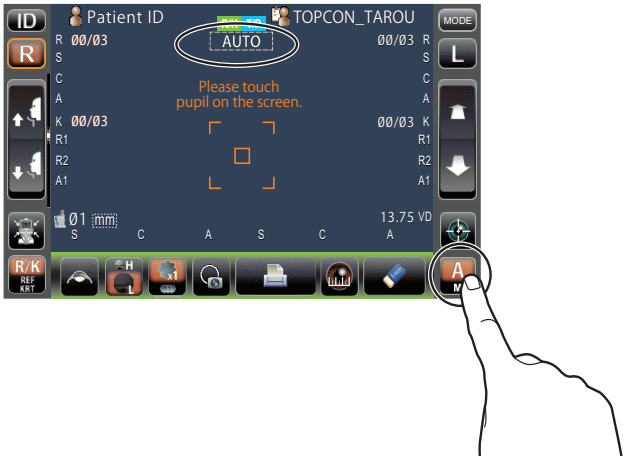
**1** Check that the mode display is at R/K→T/P on control panel.

**2** If the display is other than "R/K→T/P", tap the [MODE] button and change to the "R/K→T/P" mode.

## SETTING THE AUTO MODE IN REF/KRT

**1** Make sure the [Auto/Manual] button is on A on the measurement screen. "A" is Auto mode.

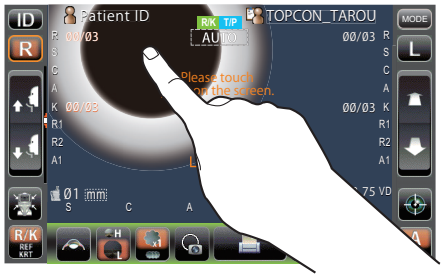
**2** If "M" (Manual mode) is displayed, tap it and change to the Auto mode.

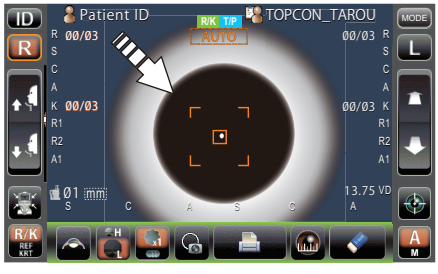



## ALIGNMENT AND MEASUREMENT IN REF/KRT

Alignment can be operated from the control panel.

**1** When the pupil is displayed, tap the display around the pupil. The measuring head moves to display the pupil image and alignment dot on the center of the screen. Then tell the patient to look at red-roof house.




**NOTE**

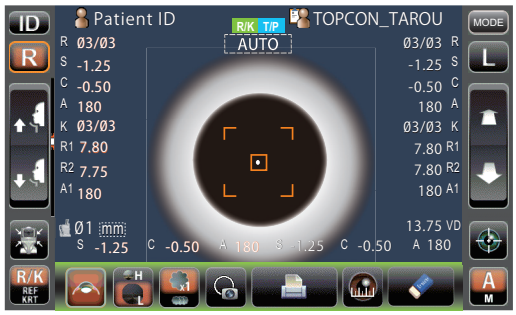
- If the pupil is not displayed on the control panel, move the measuring head by press the control panel, checking the eye height mark on the measurement window as a guide (See page 37).

**NOTE**

- When the measuring head has reached the limit of movement (vertical/lateral directions), a yellow-colored limit mark appears on the control panel corner, showing it is the movement limit in that direction. Tap the display to move the measuring head to a position that aligning is possible.


- When the measuring head is at the limit of movement in the forward direction, "TOO CLOSE" is displayed and the buzzer sounds, and when it is at the limit of movement in the backward direction, "TOO FAR" is displayed. Using the [Measuring head forward/backward] button, move the measuring head to a position that aligning is possible.


**2** Alignment starts automatically, and measurement is performed. Move the measuring head to the other eye measurement position automatically and measurement is performed. The measurement results are displayed.




**NOTE**

- When the "Full Auto" of "R/L move" is selected in "REF/KRT" of the "Initial", the instrument measuring head moves automatically to the other eye side for measuring. If the patient closes or blinks their eyes at the time of the right-and-left eye change, the change may be unable to be performed correctly.

  If the "Manual" of "R/L move" is selected, press the [R] button or [L] button of the other eye side. If the "Auto(RL)" of "R/L move" is selected, the measuring head moves automatically to the other eye side, however a measurement is not performed.

| NOTE | • When "Focus and Touch pupil on screen" is displayed, please confirm if the patient's eye fits normal conditions for measuring. Then tap the pupil on the control panel again.<br>• If measurement values were not obtained for the set measurement count due to measurement errors, an additional measurement is performed. For the additional measurement, see page 86. |
|---|---|

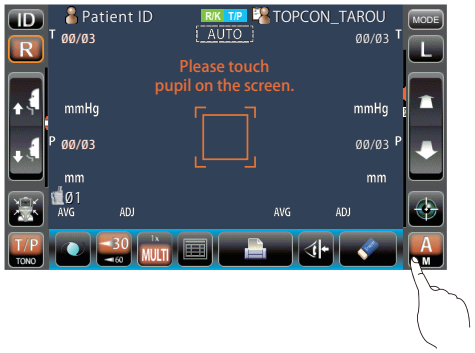
**3** After Right/Left eye continuous measurement is complete, the measuring head moves downward for stand-by of TONO/PACHO measurement.


| NOTE | In R/K→T/P continuous measurement mode TONO/PACHO measurement starts automatically. |
|---|---|

## SETTING THE AUTO MODE IN TONO/PACHO

**1** Check that the MEASUREMENT screen is on. If the Auto/Manual button is "A," the mode is Auto mode.

**2** If "M" (Manual mode) is displayed, tap it and change to the Auto mode.

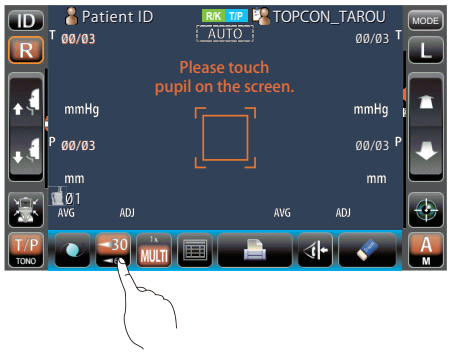


## SETTING THE MEASURING RANGE

In this instrument, the measuring range can be switched in 2 steps between "1-30" and "1-60." Normally, "1-30" is used, but if the patient's ocular pressure is high, switch it to "1-60." The default setting is "1-30" upon power on.

**1** Check the measurement screen.

**2** Tap the 30/60 button and set the measuring range.




## ALIGNMENT AND MEASUREMENT IN TONO/PACHO

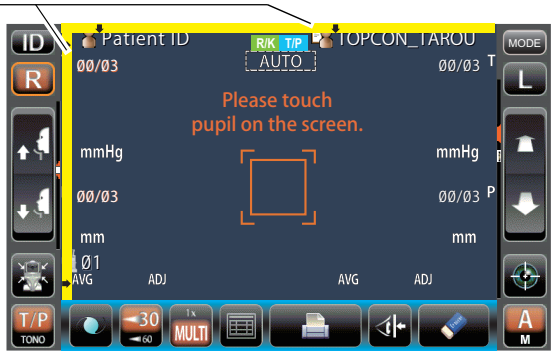
**1** When the pupil is displayed, tap the display around the pupil. The measuring head moves to display the pupil image and alignment dot on the center of the screen.



**NOTE**

- If the pupil is not displayed on the control panel, move the measuring head by press the control panel, checking the eye height mark on the measurement window as a guide (See page 37).
- When the measuring head has reached the limit of movement (vertical/lateral directions), a yellow-colored limit mark appears on the control panel corner, showing it is the movement limit in that direction. Tap the display to move the measuring head to a position that aligning is possible.

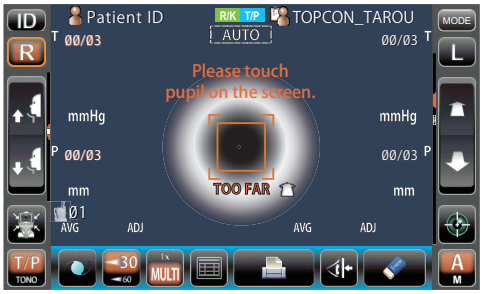
Limit mark



**NOTE**

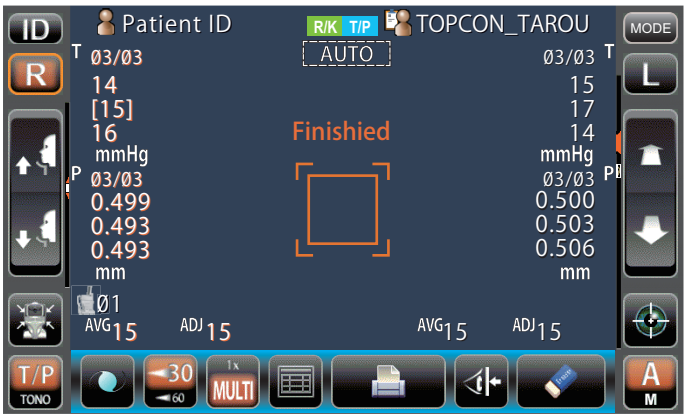
- When the measuring head is at the limit of movement in the forward direction, "TOO CLOSE" is displayed and the buzzer sounds, and when it is at the limit of movement in the backward direction, "TOO FAR" is displayed. Using the [Measuring head forward/backward] button, move the measuring head to a position that aligning is possible.


Limit of movement in the forward direction




Limit of movement in the backward direction

**2** Alignment starts automatically. While moving the main body toward the patient, the focus of measurement screen is changed, then measurement is performed. The measuring head moves automatically to the other eye side and measurement is performed. The measurement results are displayed.

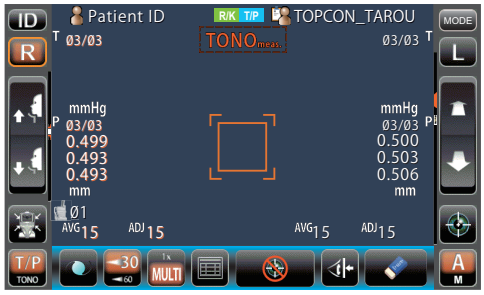



**NOTE**

- When the "Full Auto" of "R/L move" is selected in the "TONO/PACHO" of the "Initial", the instrument measuring head moves automatically to the other eye side for measuring. If the patient closes or blinks their eyes at the time of the right-and-left eye change, the change may be unable to be performed correctly. If the "Manual" of "R/L move" is selected, press the [R] button or [L] button of the other eye side. If the "Auto(RL)" of "R/L move" is selected, the measuring head moves automatically to the other eye side, however a measurement is not performed.
- Auto print (available only under Auto mode)
  When the "Auto print" is set to "ON" in the "Common" of the "Initial", measurement results are printed out automatically after measuring the right and left eyes. (See page 84.)

**NOTE**

- When "Focus and Touch pupil on screen" is displayed, please confirm if the patient's eye fits normal conditions for measuring. Then tap the pupil on the control panel again.
- If measurement values were not obtained for the set measurement count due to measurement errors, an additional measurement is performed. For the additional measurement, see page 86.
- When the alignment status has continued for more than 30 seconds, "Focus and Touch a measure point" is displayed, then the mode is changed automatically to the Manual mode.
- To stop alignment in the middle, tap the [Alignment stop] button. It is possible to stop alignment also by tapping the control panel anywhere, while an [Alignment stop] button is displayed. When "Align Stopped. Re-touch pupil. " is displayed, please tap the pupil on the control panel again.
- When PACHO measurement is performed, AUTO/MANUAL display is changed to "PACHO meas.". When TONO measurement is performed, the mark is changed to "TONO meas.". The mark indicates the current status of measurement.


- If the alignment status has continued for more than 3 seconds in PACHO measurement, the measurement stops to change to TONO measurement. In this case, PACHO data is not measured for remaining number of times is treated as error data.
- If the start button is tapped before all PACHO measurements are complete, PACHO data is not measured for remaining number of times is treated as error data.
- If the "Stop Focus" is set to "ON" in the "TONO/PACHO" of the "Initial" and focusing in Auto mode fails continuously, "CLOSE" displays and stop auto alignment temporarily. (See page 87)

## DISPLAYING MEASUREMENT VALUES

With regard to measurement values, for REF, KRT, TONO and PACHO, data of the latest measurement (only for TONO/PACHO, latest 3 measurements) are displayed on the control panel.

Figures only: Measurement was done correctly.
[ ] figures: When the reliability of measurement is low. (only TONO)
ERROR: Measurement was not done correctly.
OVER: When the measurement range is exceeded. (only TONO)

| | |
|---|---|
| **NOTE** | • In TONO average value display, low-reliability numerical data with [ ] are not added to average value calculation. However, if all measurement data are numerical data with [ ], average value calculation is done using these data.<br>• For explanation of the messages on the control panel screen, refer to "MESSAGE LIST" on page 99.<br>• In the data printout, manual measurement values will have M marks beside them. (only for TONO/PACHO)<br>• When the "Auto print" is set to the "OFF" in the "Common" of the "Initial", print out measurement results by tapping the Print out button, as necessary. |

## PRINT-OUT OF MEASUREMENT VALUES

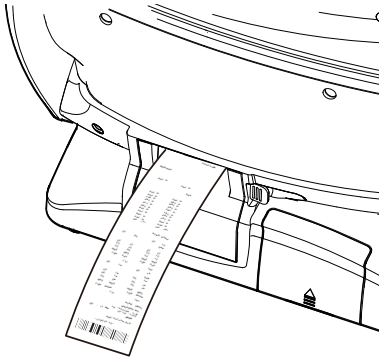
| NOTE | • To avoid a paper jam in the printer, do not feed the paper if it is partly cut or wrinkled.<br>• To avoid discoloring of the printer paper (particularly the recording area) during storage, use a polypropylene bag and not one containing plasticizer (PVC, etc.).<br>• To avoid discoloring of the printer paper (particularly the recording area) after pasting, use water-soluble glue and not one containing solvent.<br>• Since the printer paper is thermosensitive, it is not suitable for keeping records for a long period. If necessary, prepare copies separately. |
|---|---|

This instrument can print out measurement values with a printer.

**1** Check that the Measurement screen is on.

**2** Tap the [Print out] button on the control panel.

Measurement values on the monitor are printed out.



| NOTE | • When a red line is printed at the edge of the printer paper, replace it with a new one. For details about the replacement of the printer paper, see PRINTER PAPER SETTING on page 27. 58mm wide printer paper (example: TP-50KJ-R, Nippon Paper) is recommended.<br>• When the "Auto print" is set to "ON" in the "Common" of the "Initial", measurement is performed under Auto mode, and measurement results are printed out automatically. (See page 84.)<br>• When the "Auto cut" is set to "OFF" in the "Common" of the "Print" and you need to cut a printer form, the way is that erase the measurement value by tapping the [All clear] button, and tap the [Print out] button to cut.<br>• When the print out button is tapped again after all the data is cleared by printing out the measuring data, the previous measuring data is printed out. |
|---|---|

## END OF MEASUREMENT

Tell the patient a measuring is end and leave from the instrument.

# CLEARING MEASUREMENT VALUES

**1** Tap the [All clear] button on the control panel.

All measurement values of both eyes are cleared.

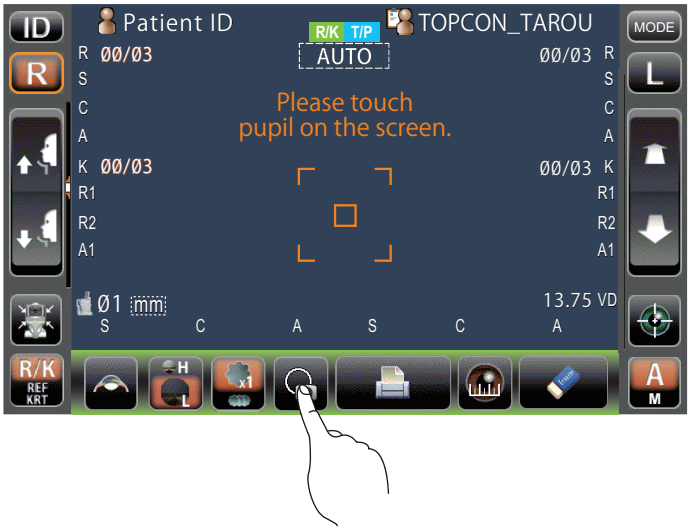

| NOTE | After clearing the measurement values, the measuring head moves to the "Stand by mode" position selected in the "Common" of "Initial". (See page 84.) |
|---|---|

# DISPLAYING ALL MEASUREMENT DATA

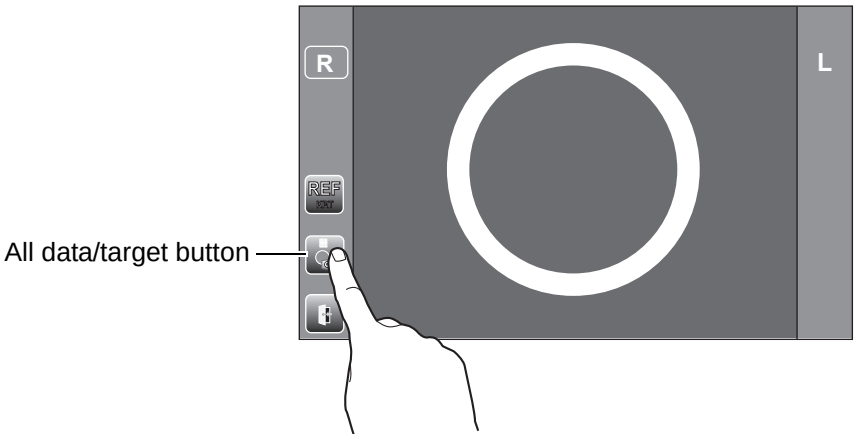
It is possible to confirm all measurement data.

## R/K MEASUREMENT DATA

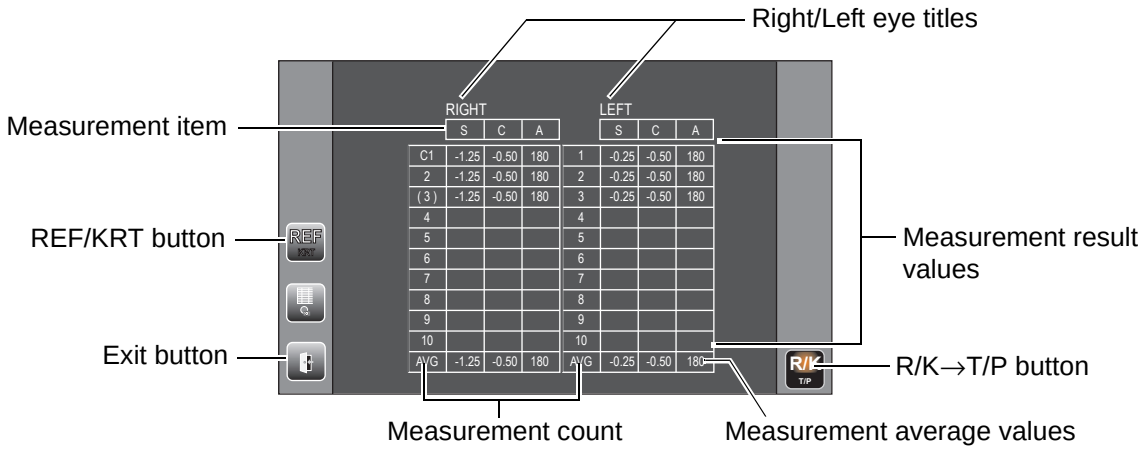
**1** Tap the [Target image] button.




**2** Tap the [All data/target] button.

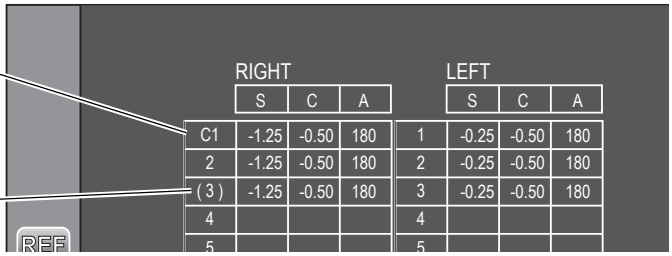


**3** The Data Display screen is displayed.




When measurement is performed with the Cataract button ON, "C" comes at the head of figures.

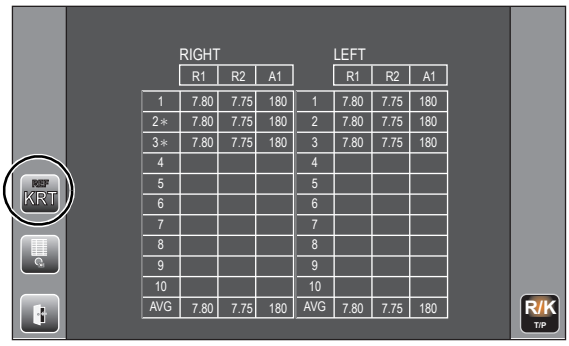
When Cataract mode starts automatically during the measurement, figures will be put in ( ).



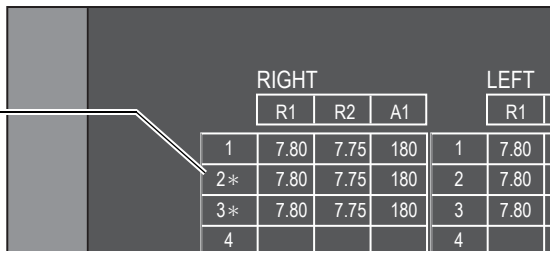

**NOTE**

- When no data is memorized, the data table shows blank.
- R/K→T/P button appears only when measurement values exist in R/K and T/P measurement mode each. Tap the R/K→T/P button to change to the Data Display screen of TONO/PACHO.

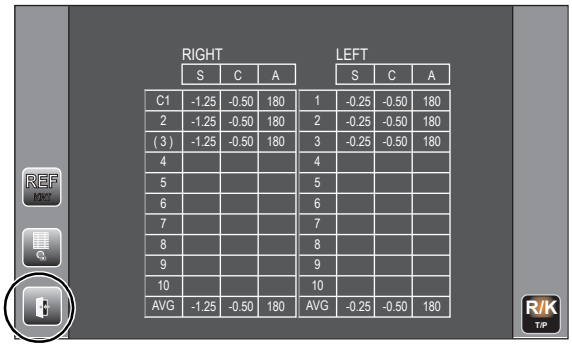
**4** To change "REF data" and "KRT data," tap the REF/KRT button.




When the reliability of KRT data is low, "*" is attached after the figures.

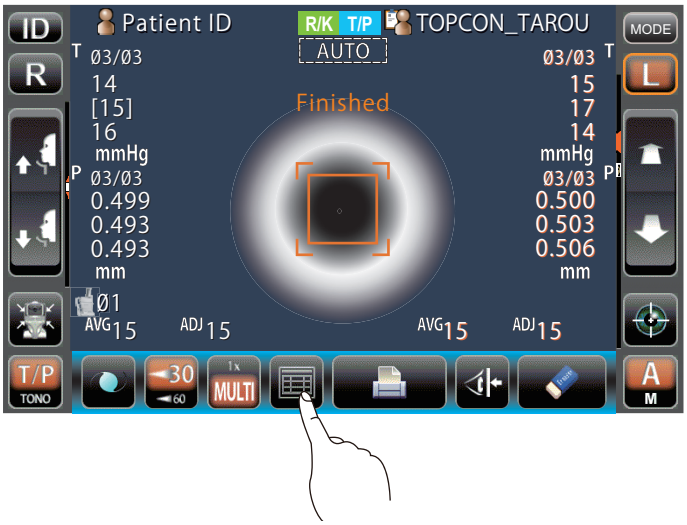


**5** To exit the data display and return to the Measurement screen, tap the [Exit] button.



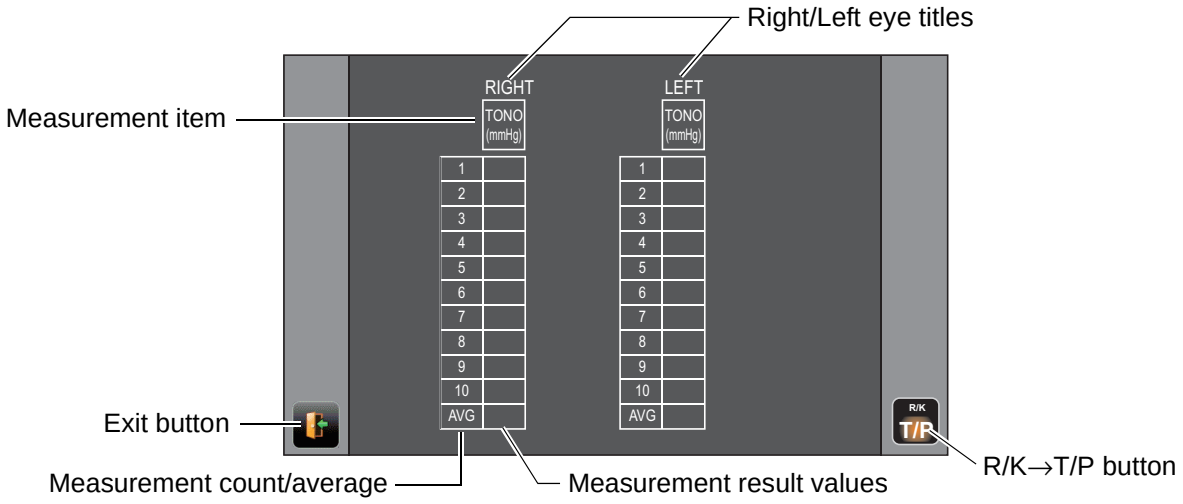

## T/P MEASUREMENT DATA

**1** Tap the [All data] button.

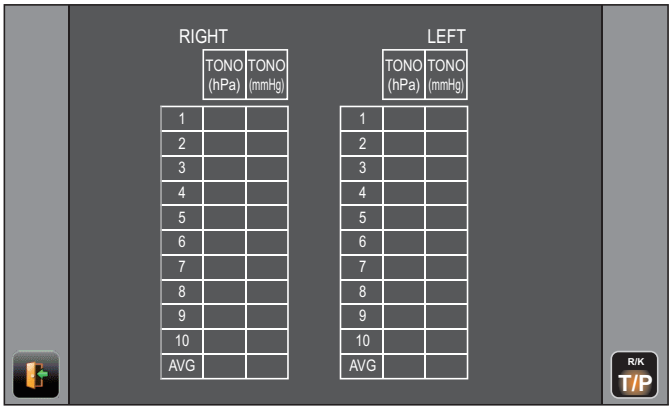



**2** The Data Display screen is displayed.

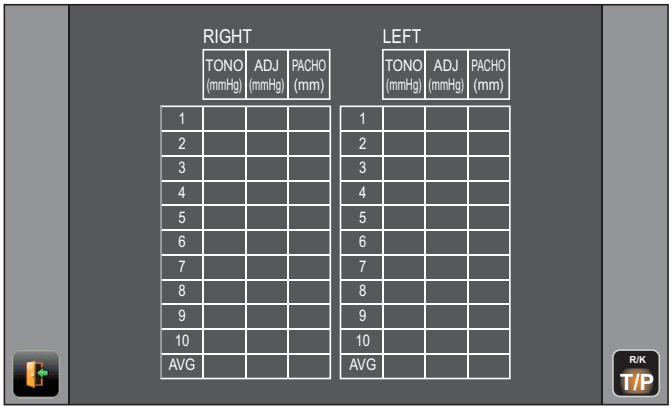
- The display unit is varied according to the Settings of setup.
  Setup item: TONO display unit in ocular pressure measurement "mmHg" in TONO measurement mode



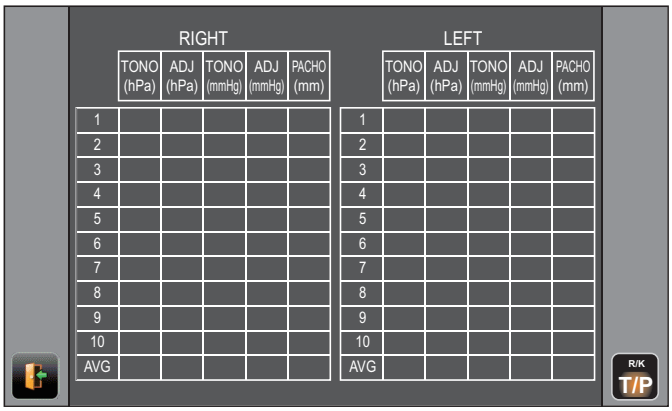
Setup item: TONO display unit in ocular pressure measurement "hPa" in TONO measurement mode




Setup setting: Display unit in ocular pressure measurement "mmHg," IOP adjustment "ON," T/P measurement mode



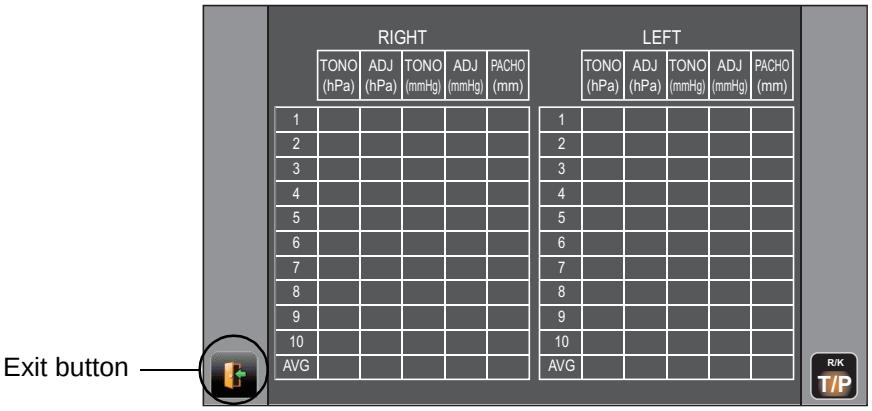

Setup setting: Display unit in ocular pressure measurement "hPa," ocular pressure adjustment "ON," T/P measurement mode




**NOTE**

- For data in manual measurement or for data of measuring by Start button in Auto mode of TONO/PACHO measurement, the color of a character turns to yellow.
- R/K→T/P button appears only when measurement values exist in R/K and T/P measurement mode each. Tap the R/K→T/P button to change to the Data Display screen of REF/KRT.

**3** To exit the data display and return to the Measurement screen, tap the Exit button.

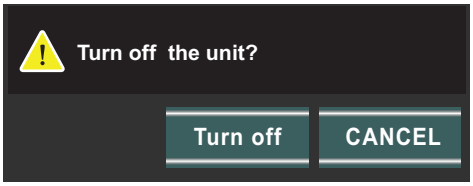


# OPERATION AFTER USE

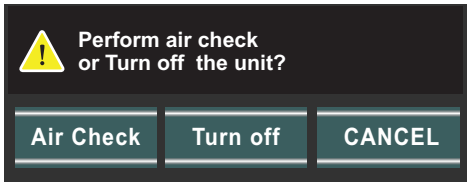
**1** Tap the [End] button on control panel in R/K measurement mode, and tap the [Air check/End] button on control panel in T/P measurement mode.

**2** Then, the confirming message of End operation is displayed in R/K measurement mode, and the message of Air check/End operation is displayed in T/P measurement mode.

R/K measurement mode




T/P measurement mode




**3** Tap the [Turn off] button. Return the chinrest and measuring head to their last positions.

**4** The message of "Please don't turn the main switch off until the unit stops." is displayed.

**5** The operation is complete, then the message of "The unit stops completely. Please turn the main switch off." is displayed.

**6** Turn the [POWER] switch to off.

| NOTE | When external devices are connected to external I/O terminals, turn off the power of these devices too. (If the [POWER] switch is provided.) |
|---|---|

**7** If external device is connected, turn off the device.

**8** Unplug the power cable from a 3-pin AC inlet with grounding.

| NOTE | When the instrument is not used for a long period of time, unplug the power supply cable, and detach the cable connected to the external I/O terminal. |
|---|---|

# OPTIONAL OPERATIONS

## DISPLAYING THE PATIENT ID (PATIENT No.) OR OPERATOR ID

A patient ID or operator ID of up to 13 characters can be input and displayed on the control panel and printout.
However, if no patient ID is input, the patient No. is allocated automatically by the device.

***1*** Tap [ID] button.

***2*** Tap keyboard on the screen and enter characters. Tap [OK] button and fix the input value.

| | |
|---|---|
| **NOTE** | • Patient ID is reset when measurement values are printed or if the [All clear] button is tapped.<br>• Patient No. reset condition can be selected such that the patient No. is reset upon power on or not, at "Patient No. reset" in the "Common" of the "Initial". (See page 84) |

# SELECTING THE DETAILS IN MEASUREMENT MODE

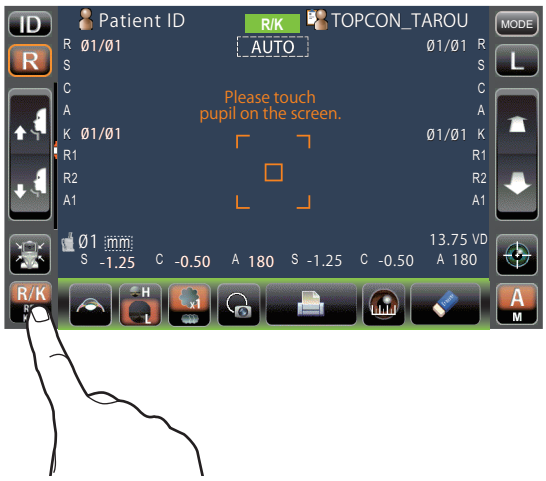
It is possible to select the measurement of REF/KRT continuously or each of REF and KRT separately in R/K measurement mode, and to select the measurement of TONO/PACHO continuously or TONO individually in T/P measurement mode.

Selecting the details in REF/KRT measurement mode

***1*** Confirm the Measurement screen.

***2*** Tap the [Measurement mode] button on the control panel and select a measurement mode. Indication of the [Measurement mode] button is changed.

REF: Only REF measurement
KRT: Only KRT measurement
R/K: REF/KRT continuous measurement

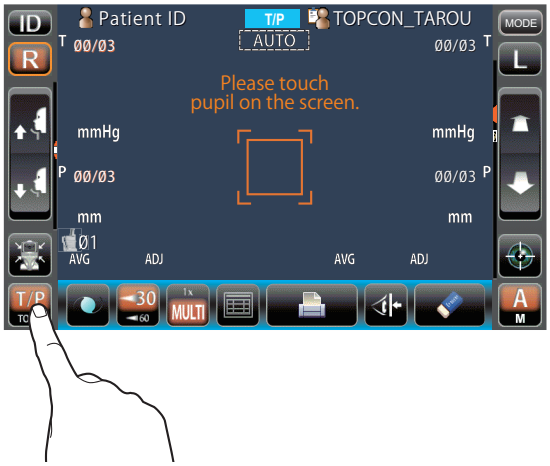



Selecting the details in TONO/PACHO measurement mode

***1*** Confirm the Measurement screen.

***2*** Tap the [Measurement mode] button on the control panel and select a measurement mode. Indication of the [Measurement mode] button is changed.

TONO: Only TONO measurement
T/P: TONO/PACHO continuous measurement



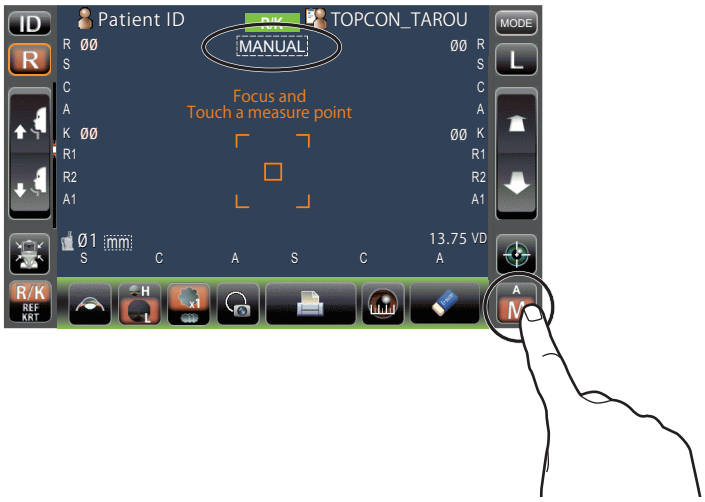
# MANUAL MODE IN REF/KRT

| NOTE | • Adjust the height of the instrument table so that the patient can sit comfortably. Otherwise, correct measurement values may not be obtained.<br>• If the machine is moved before measurement values are displayed, it may cause incorrect measurement results.<br>• The beep function for urging cautions is provided so that a finger or a hand is not pinched between the reverse side of forehead rest, a measuring head and an ocular pressure measurement window. |
|---|---|

## MANUAL MODE

***1*** Check that the MEASUREMENT screen is on. If the Auto/Manual button is "M," the mode is Manual mode.

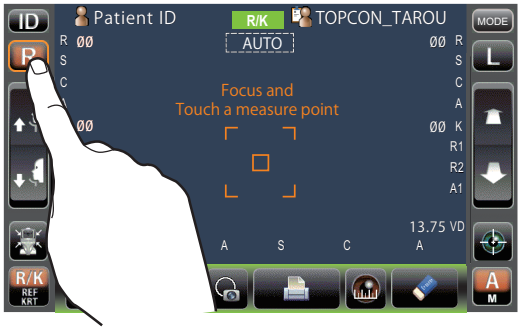
***2*** If "A" (Auto mode) is displayed, tap it and change to "M".



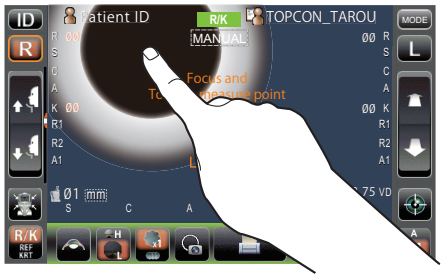

## ALIGNMENT AND MEASUREMENT

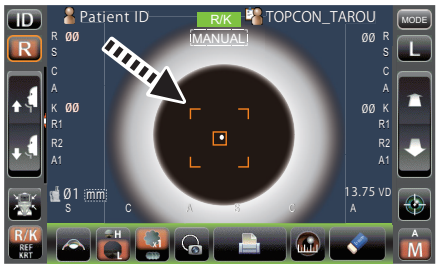
Alignment is operated on the control panel.

***1*** Select the right/left eye by tapping the R button/L button.



**2** When the pupil is displayed, tap the display around the pupil. For adjusting Z direction distance, the measuring head moves to display the pupil image and alignment dot on the center of the screen. Then tell the patient to look at red-roof house.

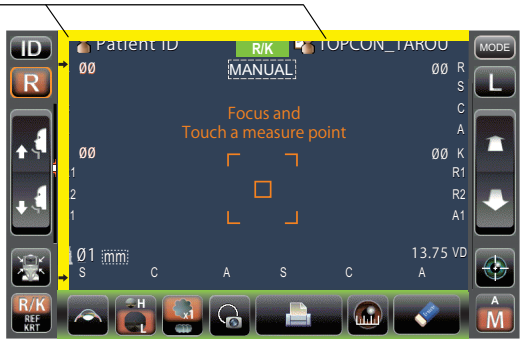


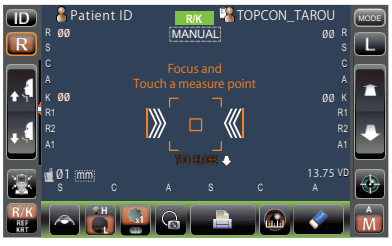

## NOTE

- If the pupil is not displayed on the control panel, move the measuring head by pressing the control panel, checking the eye height mark on the measurement window as a guide (See page 37).
- When the measuring head has reached the limit of movement (vertical/lateral directions), a yellow-colored limit mark appears on the control panel corner, showing it is the movement limit in that direction. Tap the display to move the measuring head to a position that aligning is possible.

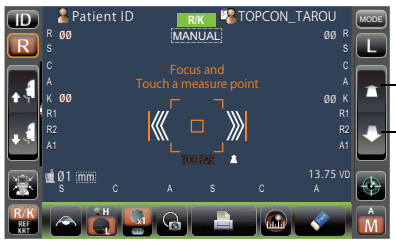
Limit mark




- When the measuring head is at the limit of movement in the forward direction, "TOO CLOSE" is displayed and the buzzer sounds, and when it is at the limit of movement in the backward direction, "TOO FAR" is displayed. Using the [Measuring head forward/backward] button, move the measuring head to a position that aligning is possible.




Limit of movement in the forward direction



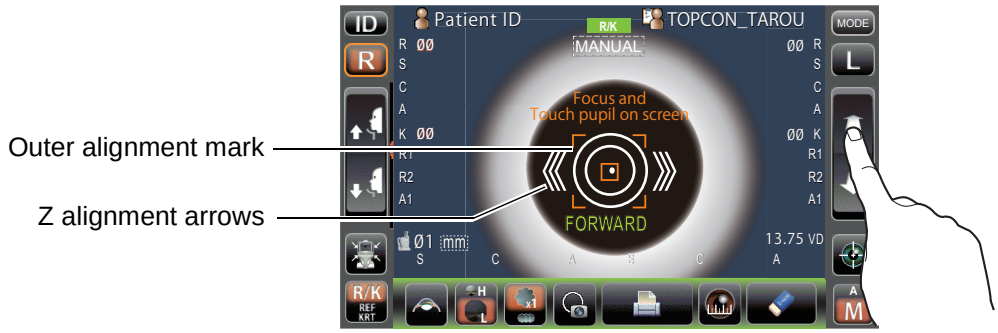

Limit of movement in the backward direction

Measuring head forward/backward button

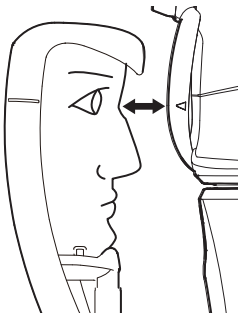
- If "Touch measure" is set to "ON" in "REF/KRT" of the "Initial", the measurement starts only by tapping the screen (See page 85).

**3** Tap the Measuring head forward/backward button and focus on the patient's eye. The alignment dot is reflected off-focus on the cornea.

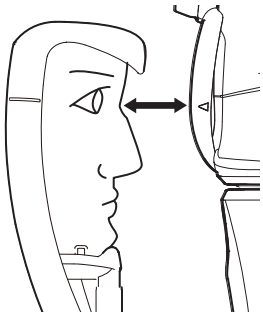

**4** When the main body is brought closer to the patient's eye, Z alignment arrows appear on the control panel screen.



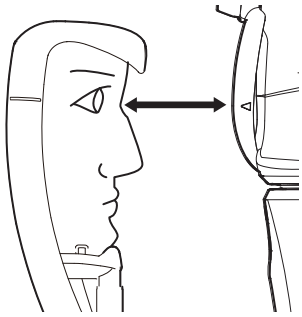

| | |
|---|---|
| **NOTE** | • Do not allow the eyelash and eyelid to cover the outer alignment mark to ensure stable measurement.<br>• If the machine is too close to the patient's eye in comparison with the optimal alignment position, inward Z alignment arrows appear with a message "BACKWARD," or if it is too far the arrows are changed to outward with a message "FORWARD". The number of arrows are reduced accordingly as the optimal alignment reference position comes closer. |




Too close



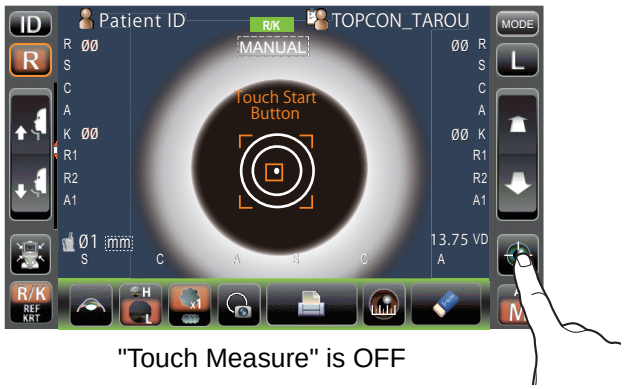

Too far




Off the alignment range

***5*** When the alignment dot becomes smaller in size and "ALINGMENT OK" is displayed, tap the Start button to start measurement.
If "Touch Measure" is set to "ON", the measurement starts only by tapping the screen. (See page 85)

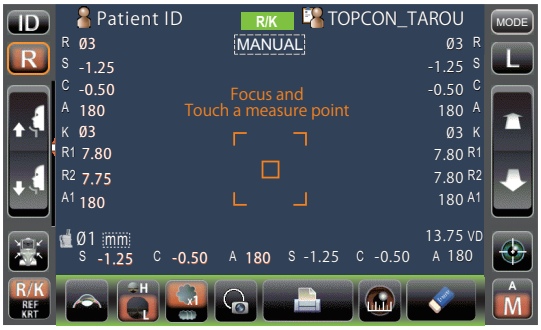

"Touch Measure" is ON




"Touch Measure" is OFF

| NOTE | • Even if the alignment is not correct, measurement can be performed by tapping the Start button. To ensure correct measurement with high accuracy, try to get correct alignment.<br>• If the machine is moved before measurement values are displayed, it may cause incorrect measurement result.<br>• When rotating the control panel to operate it at the upper part of the product, do not press the Start button too hard, so as not to lose the alignment. |
|---|---|

***6*** Measurement is performed and measurement values are displayed on the control panel.




## DISPLAYING MEASUREMENT VALUES

With regard to measurement values, data of the latest measurement is displayed on the control panel.

Figures only: Measurement was done correctly.

ERROR: Measurement was not done correctly.

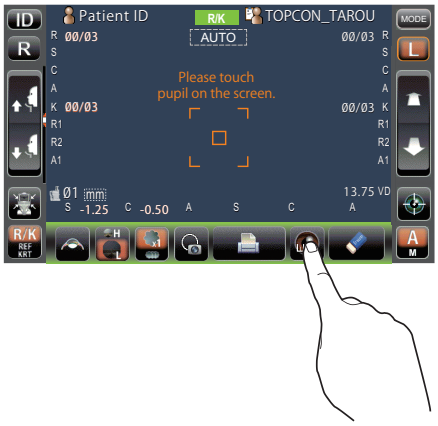
| NOTE | For explanation of the messages on the control panel screen, refer to "MESSAGE LIST" on page 99. |
|---|---|

# MEASUREMENT OF CORNEA DIAMETER (IN REF/KRT)

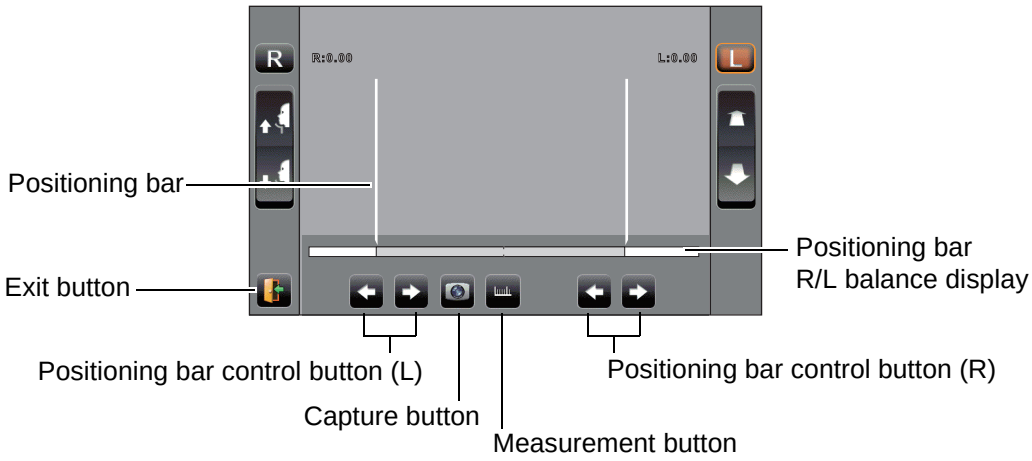
## MEASUREMENT ON THE ACTUAL IMAGE

**1** Tap the [R] button or [L] button to select measured eye.

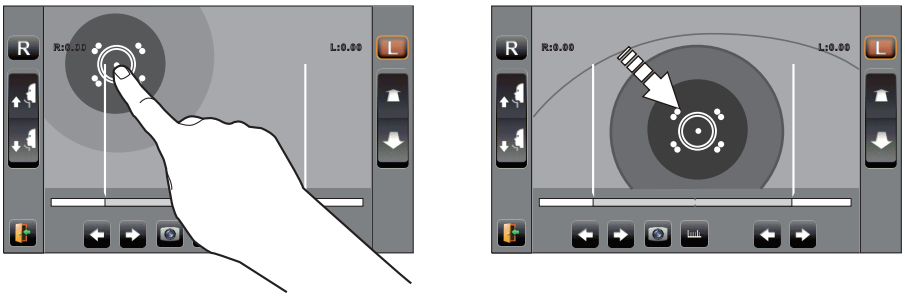

**2** Tap the [Cornea diameter] button.



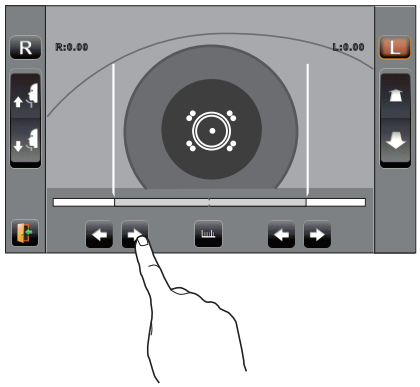

**3** The Cornea Diameter Measurement screen is displayed.
The positioning bar is displayed.



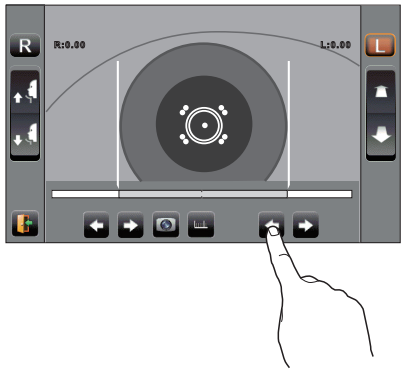
**4** When the pupil is displayed tap the pupil. The measuring head moves to the position the pupil image and alignment dot are at the center of the screen.



**5** Using the Positioning bar control button (L), move the left positioning bar to the left end of the iris from the control panel side.



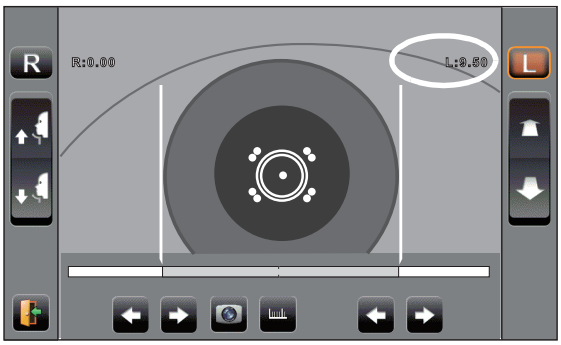
**6** Using the Positioning bar control button (R), move the right positioning bar to the right end of the iris from the control panel side.



| NOTE | It is possible to move the positioning bar by tapping the positioning bar R/L balance display. |
|---|---|

**7** Tap the Measurement button.

***8*** The cornea diameter is displayed.




***9*** Tap the R button or L button to move the measuring head to the other eye.
In the like manner, measure the other eye.

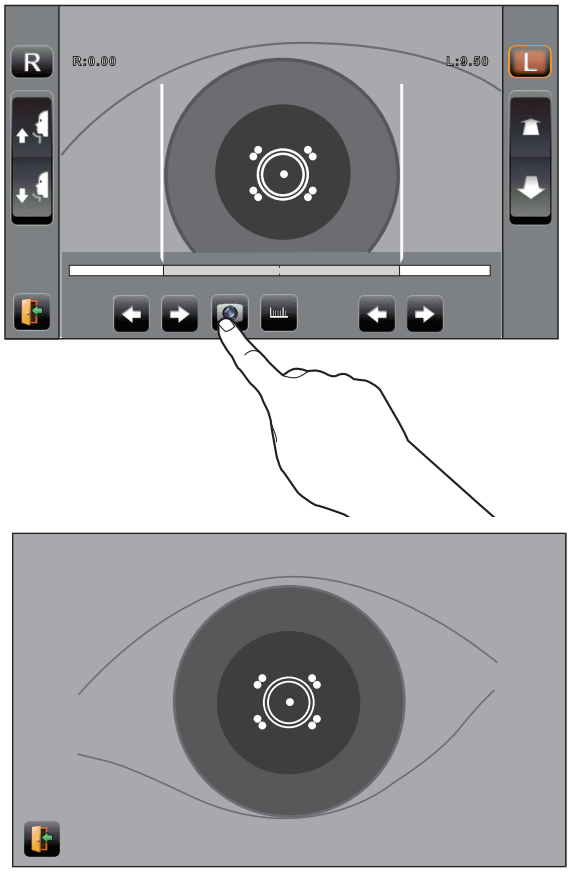
***10*** Tap the Exit button and return to the Measurement screen.

## MEASUREMENT ON THE STILL IMAGE

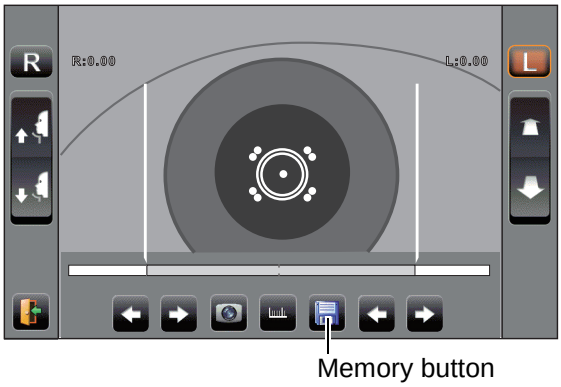
When KRT measurement values are available, the still image of the measurement is displayed.

***1*** Follow steps ***1*** to ***4*** of "MEASUREMENT ON THE ACTUAL IMAGE" and display the cornea image at the screen center.

***2*** Tap the Capture button. The eye image is displayed full-screen, and the cornea image is saved.



**3** Tap [Exit] button to exit the full-screen display. The [Memory] button appears indicating that the image is saved.

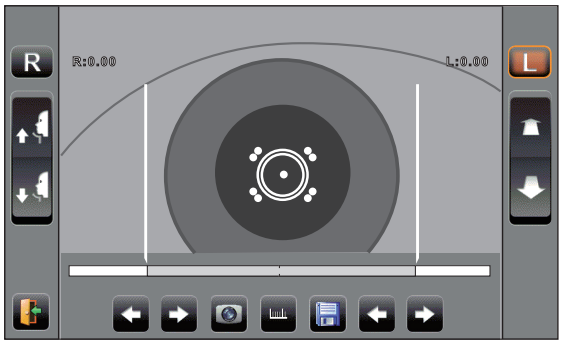



Memory button

| NOTE | If retaking still image is required, tap the capture button again. |
|---|---|

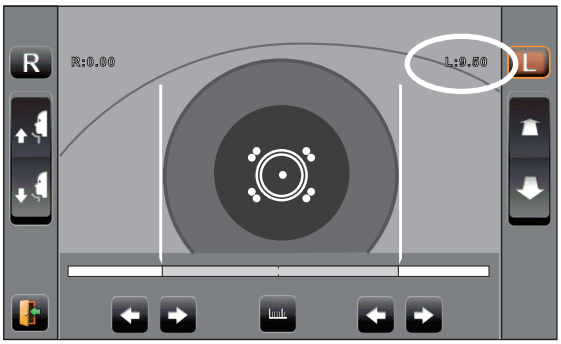
**4** Tap the [Memory] button to display the saved image.

**5** Tap either of the (R)/(L) [Positioning bar control] buttons and move the positioning bar.




**6** Follow steps 5 to 7 of "MEASUREMENT ON THE ACTUAL IMAGE."

**7** The cornea diameter is displayed.




**8** Tap the [R] button or [L] button to move the measuring head to the other eye. In the like manner, measure the other eye.

**9** Tap the [Exit] button and return to the Measurement screen.

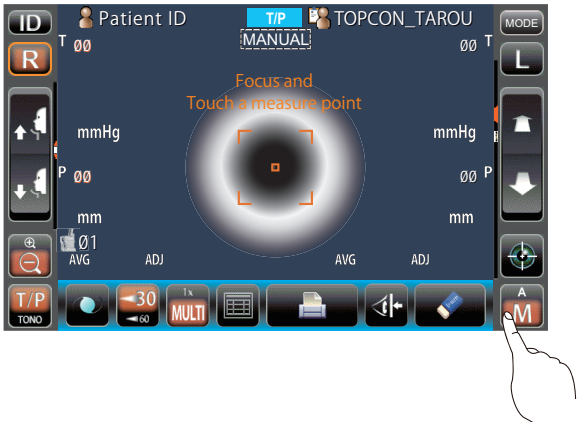
# MANUAL MODE IN TONO/PACHO

| NOTE | • Adjust the height of the instrument table so that the patient can sit comfortably. Otherwise, correct measurement values may not be obtained.<br>• Do not perform measurement if the patient holds their breath or is nervous. Otherwise, correct measurement values may not be obtained.<br>• If the machine is moved before measurement values are displayed, it may cause incorrect measurement results.<br>• The beep function for urging cautions is provided so that a finger or a hand is not pinched between the reverse side of forehead rest, a measuring head and an ocular pressure measurement window. |
|---|---|

## SETTING THE MANUAL MODE

**1** Check that the MEASUREMENT screen is on. If the [Auto/Manual] button is "M," the mode is Manual mode.

**2** If "A" (Auto mode) is displayed, tap it and change to "M".

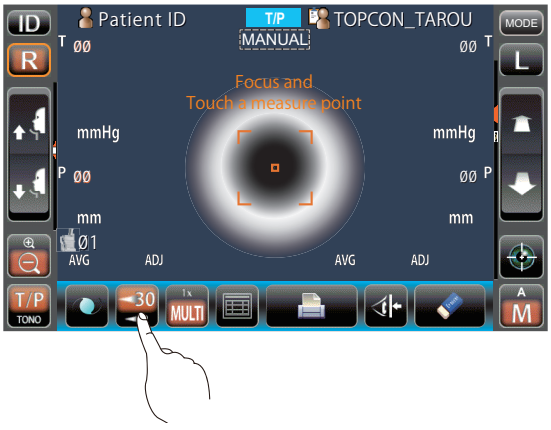



## SETTING THE MEASURING RANGE

In this instrument, the measuring range can be switched in 2 steps between "1-30" and "1-60." Normally, "1-30" is used, but if the patient's ocular pressure is high, switch it to "1-60." The default setting is "1-30" upon power on.

**1** Check the measurement screen.

**2** Tap the [30/60] button of the control panel and set the measuring range.

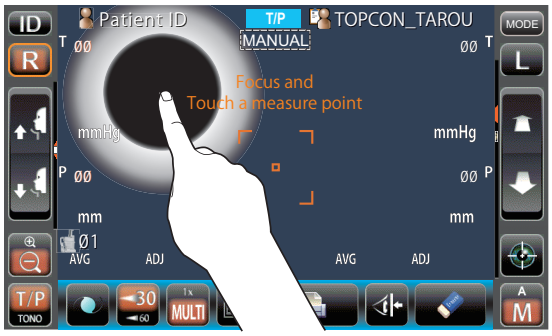


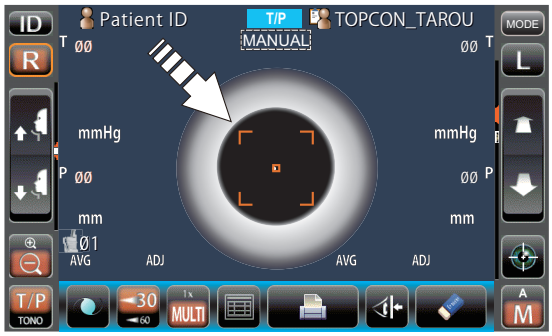
## ALIGNMENT AND MEASUREMENT

Alignment is operated on the control panel.

**1** Select the right/left eye by tapping the (R) button/(L) button.


**2** When the pupil is displayed, tap the display around the pupil. For adjusting Z direction distance, the measuring head moves to display the pupil image and alignment dot on the center of the screen.

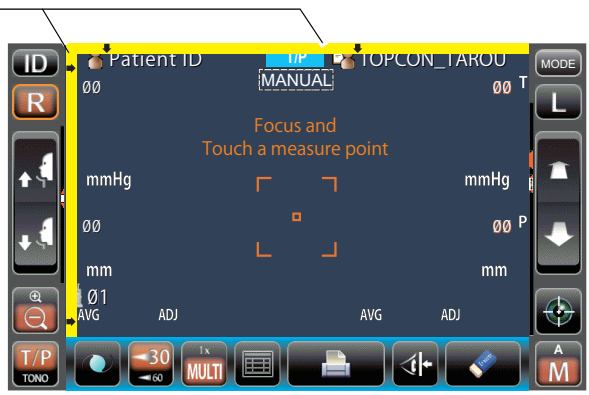



**NOTE**

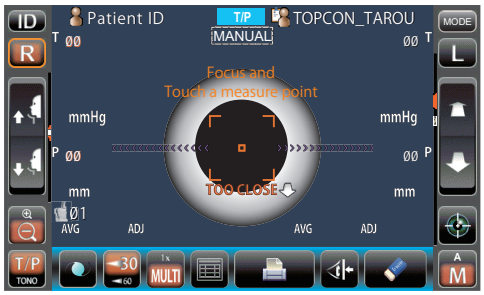
- Depending on the alignment condition, the alignment mark is displayed differently:
  - ⬚ : When alignment is insufficient/out of the measuring range
  - □ : When alignment is within the measuring range in all directions (front/rear, right/left, top/bottom)
- If the pupil is not displayed on the control panel, move the measuring head by pressing the control panel, checking the eye height mark on the measurement window as a guide (See page 37).
- When the measuring head has reached the limit of movement (vertical/lateral directions), a yellow-colored limit mark appears on the control panel corner, showing it is the movement limit in that direction. Tap the display to move the measuring head to a position that aligning is possible.

Limit mark

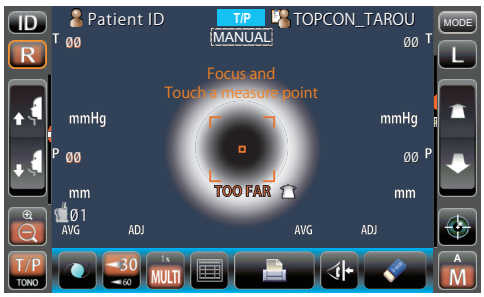


**NOTE**

- When the measuring head is at the limit of movement in the forward direction, "TOO CLOSE" is displayed and the buzzer sounds, and when it is at the limit of movement in the backward direction, "TOO FAR" is displayed. Using the [Measuring head forward/backward] button, move the measuring head to a position that aligning is possible.

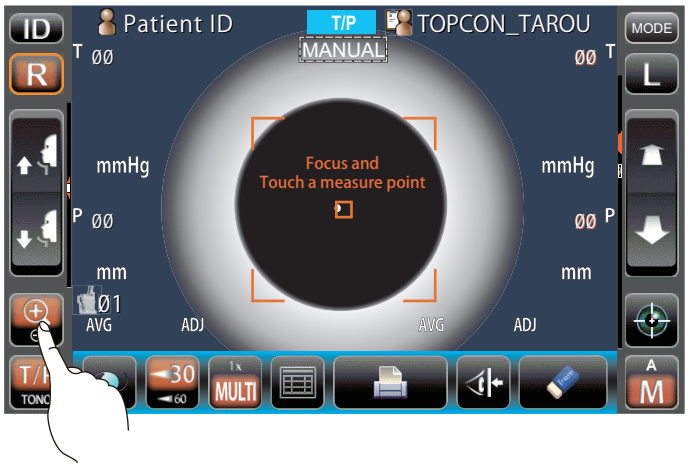



Limit of movement in the forward direction

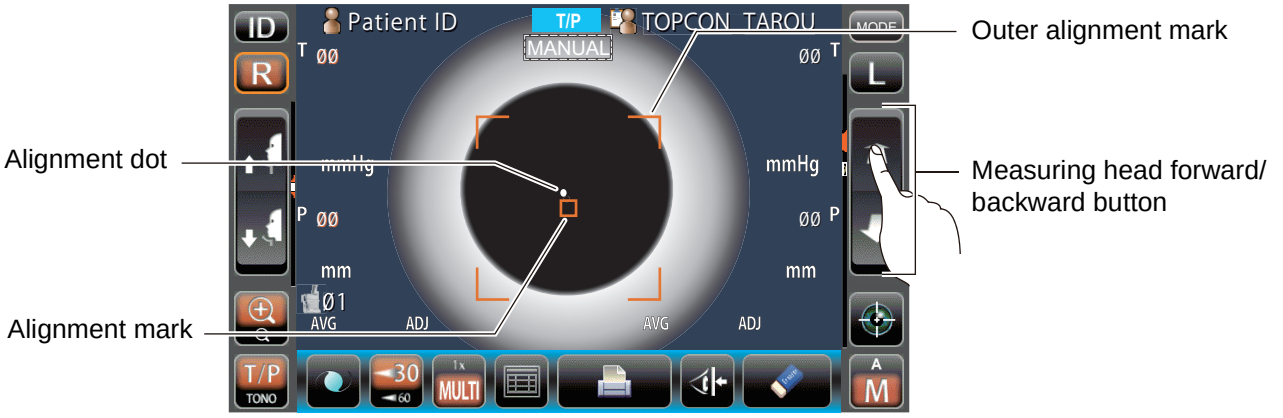



Limit of movement in the backward direction

***3*** When the [Zoom] button is tapped, the displayed patient's eye is enlarged.



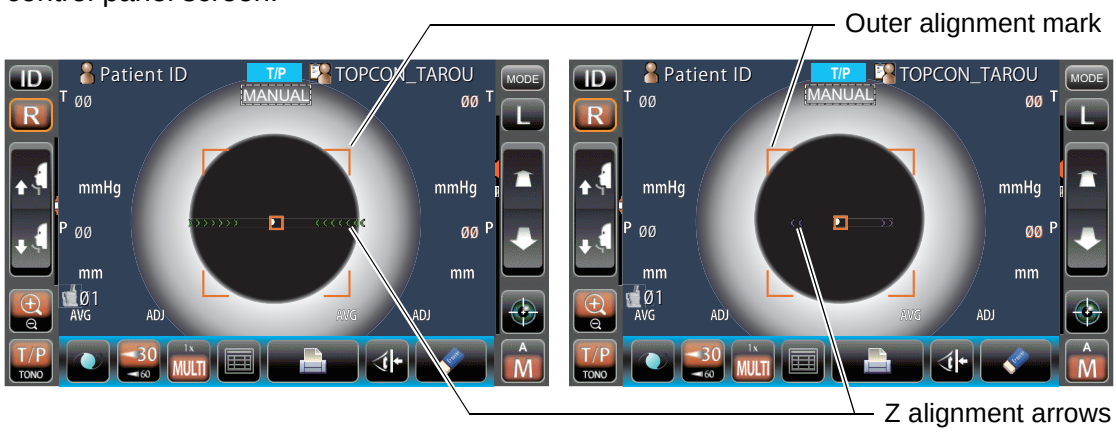

***4*** Tap the [Measuring head forward/backward] button and focus on the patient's eye. The alignment dot is reflected off-focus on the cornea.



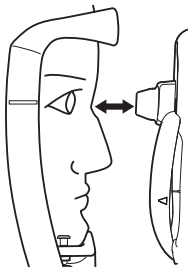

**NOTE**

As the main body approaches the patient, focus of measurement screen changes.

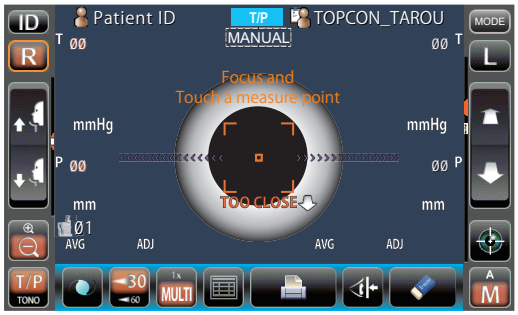
**5** When the main body is brought closer to the patient's eye, Z alignment arrows appear on the control panel screen.

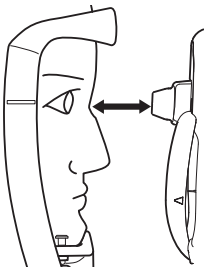



| NOTE | • Do not allow the eyelash and eyelid to cover the outer alignment mark to ensure stable measurement.<br>• If the machine is too close to the patient's eye in comparison with the optimal alignment position, outward magenta-colored Z alignment arrows blink with a message "TOO CLOSE," or if it is too far the arrows are changed to inward lime green color, and if the machine is completely off the alignment range, the message "TOO FAR" is displayed." The number of arrows are reduced accordingly as the optimal alignment reference position comes closer. If the alignment reaches the measuring range, the arrow is displayed in aqua color. |
|---|---|

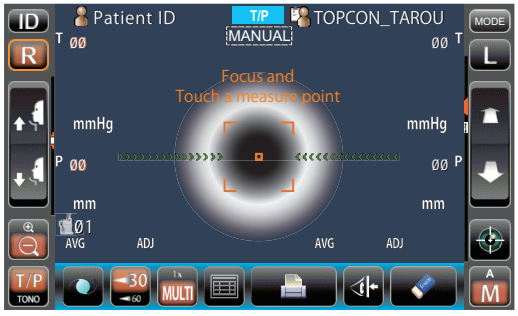


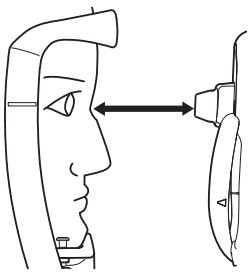
Too close



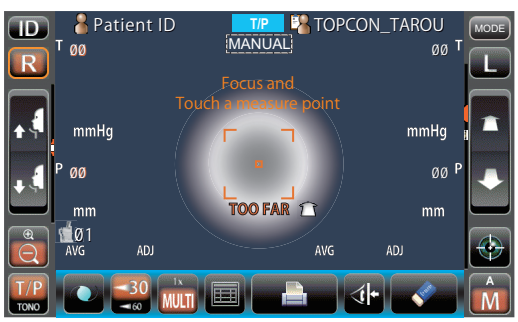



Too far



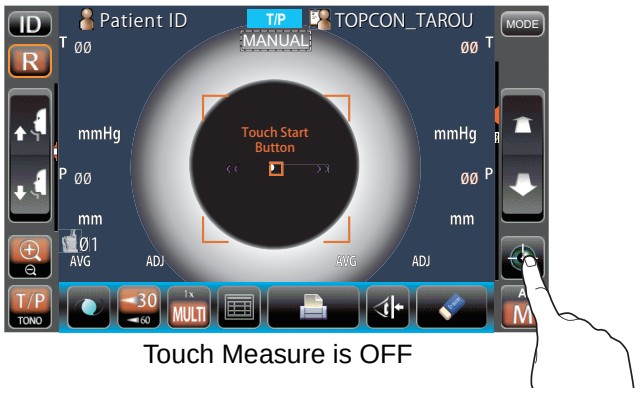



Off the alignment range



**6** Measurement starts by tapping the Start button. If "Touch Measure" is set to "ON", the measurement starts only by tapping the screen. (See page 86)

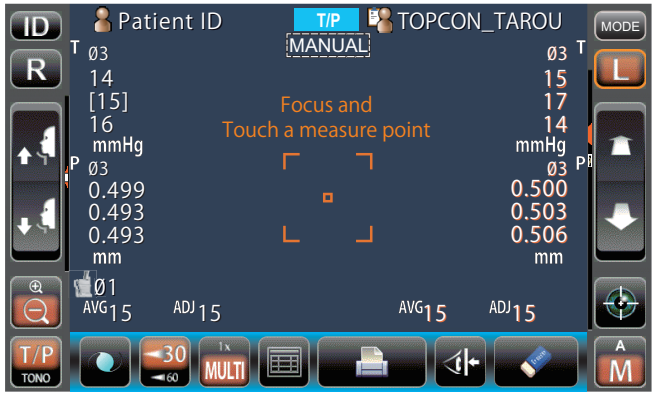

Touch Measure is ON




Touch Measure is OFF

| NOTE | |
|---|---|
| | • Even if fine alignment has not been achieved, measurement can be performed by tapping the Start button. To ensure correct measurement, try to get fine alignment.<br>• Only when the outer alignment mark is displayed, measurement can be done by pressing the Start button or by tapping the screen.<br>• When rotating the control panel to operate it at the upper part of the product, do not press the Start button too hard, so as not to lose the alignment. |

**7** Measurement is performed and measurement values are displayed on the control panel.




## DISPLAYING MEASUREMENT VALUES

With regard to measurement values, for both TONO and PACHO, data of the latest three measurements are displayed on the control panel.

Figures only: Measurement was done correctly.
[ ] figures: When the reliability of measurement is low.(only TONO)
ERROR: Measurement was not done correctly.
OVER: When the measurement range is exceeded.(only TONO)

| NOTE | |
|---|---|
| | • In TONO average value display, low-reliability numerical data with [ ] are not added to average value calculation. However, if all measurement data are numerical data with [ ], average value calculation is done using these data.<br>• In the data printout, manual measurement values will have M marks beside them.<br>• For explanation of the messages on the control panel screen, refer to "MESSAGE LIST" on page 99. |

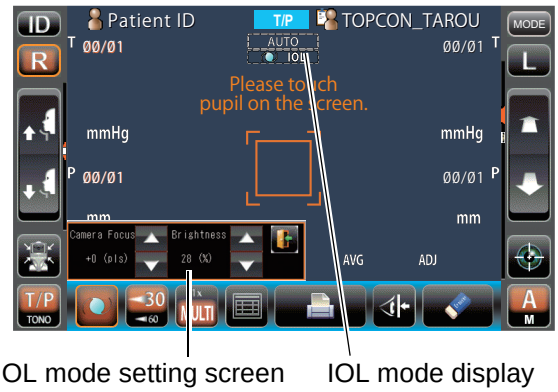
# IOL MODE IN TONO/PACHO

| NOTE | Alignment may not be performed normally with IOL inserted eye. If it occurs, carry out measurement in IOL mode. |
|---|---|

## SETTING THE IOL MODE

**1** Check the measurement screen; If [IOL] displays beneath AUTO/MANUAL display, IOL mode is set.

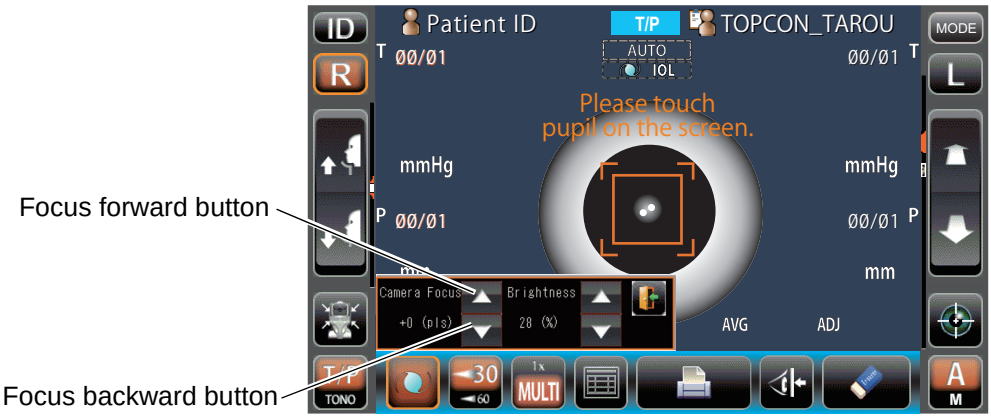
**2** If no [IOL] is displayed, tap the (IOL) button to change to IOL mode.

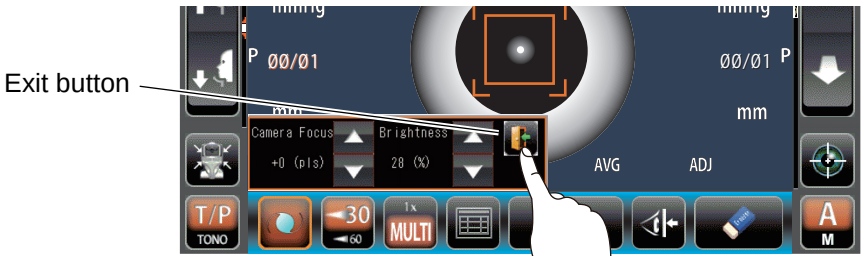

IOL mode setting screen IOL mode display

## SETTING THE IOL CAMERA FOCUS

**1** If more than 2 alignment dots appear, adjust focusing point using the (Focus forward/backward) button in "Camera Focus" so that alignment dot becomes one.



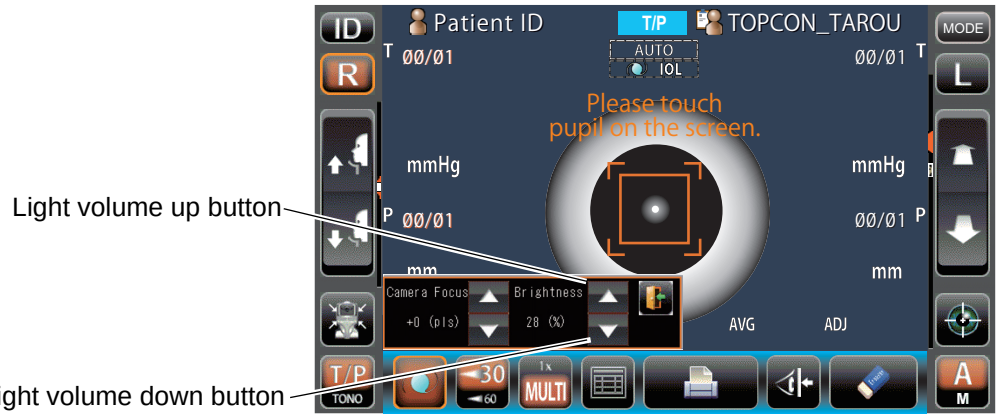

**2** Tap the (Exit) button and IOL mode setting screen disappears.



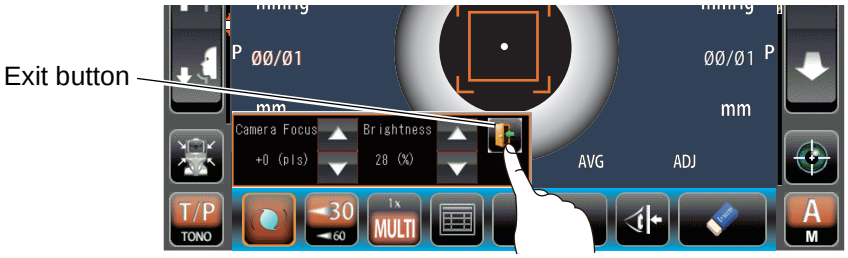

| NOTE | The value sets at "Camera Focus" remains in the "IOL Camera Focus" in "TONO/PACHO" of the "Initial". |
|---|---|

## SETTING THE IOL LED BRIGHTNESS

**1** If it is difficult to see an alignment dot, adjust LED brightness using the Light volume up/down button in "Brightness" so that it may be easy to check an alignment dot.




**2** Tap the Exit button and IOL mode setting screen disappears.

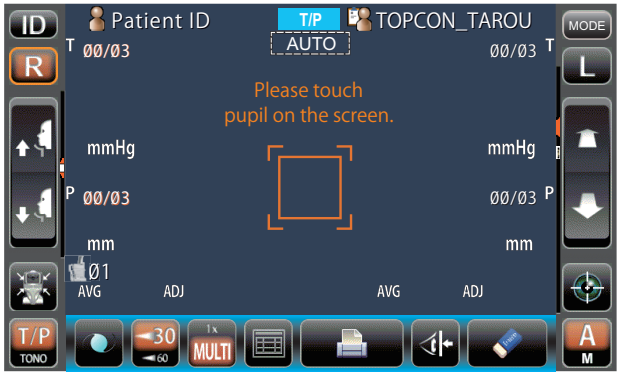



| NOTE | The value sets at "Brightness" remains in "IOL LED Brightness" in the "TONO/PACHO" of the "Initial". |
|---|---|

# MEASURING ONE EYE ONLY

In Auto mode, it is possible to measure one eye only.

The current measurement position is distinguished by the color of the (R)/(L) button; orange indicates an active measurement position.




## MEASURING THE RIGHT EYE ONLY

***1*** Tap the (R) button to move the measuring head to the right.

***2*** When the measuring head stops, moving tap the (R) button once again: the lock icon is displayed .

| NOTE | When the lock icon is displayed, the measuring head does not move to the other eye even when the measurement of one eye is finished. |
|---|---|

***3*** To release the lock, tap the (R) icon: The lock icon disappears.

## MEASURING THE LEFT EYE ONLY

Operation is the same as measuring the right eye.

| NOTE | In order to measure the other eye when the lock icon is displayed, tap the other side (R) button or (L) button. |
|---|---|

## OUTPUT USING RS-232C

This instrument can output data to a PC, etc. via the RS-232C interface.

1. Connect the interface cable to RS-232C OUT.
   Refer to "CONNECTING EXTERNAL I/O TERMINALS" on page 26.
2. Set up of data communication settings.
   For details, refer to "DATA COMMUNICATION (COMM)" on page 90.
3. Perform measurements.
4. Tap the [Print out] button on the control panel.
   When output is completed, "RS-232C SUCCESS" is displayed on the screen.

## INPUT USING USB

This instrument can input ID numbers from a bar code reader, etc. via the USB.

1. Check the connection of USB IN.
   For connection, refer to "CONNECTING EXTERNAL I/O TERMINALS" on page 26.
2. Input ID numbers from the external device.
   The inputted ID numbers are displayed on the screen.

## OUTPUT USING LAN

This instrument can output data to a PC, etc. via the LAN interface.

1. Connect the network cable to LAN OUT.
   For connection, refer to "CONNECTING EXTERNAL I/O TERMINALS" on page 26.
2. Set up of LAN connection settings.
   For details, refer to "LAN CONNECTION (LAN)" on page 90.
3. Perform measurements.
4. Tap the [Print out] button of the control panel.
   Output is completed.

| NOTE | For explanation of messages during communication refer to the "MESSAGE LIST" on page 99. |
|---|---|

# SETTING FUNCTIONS ON SETUP SCREEN

## OPERATING THE SETUP SCREEN

Various functions can be set on the SETUP screen.

### PREPARATONS FOR SETTING

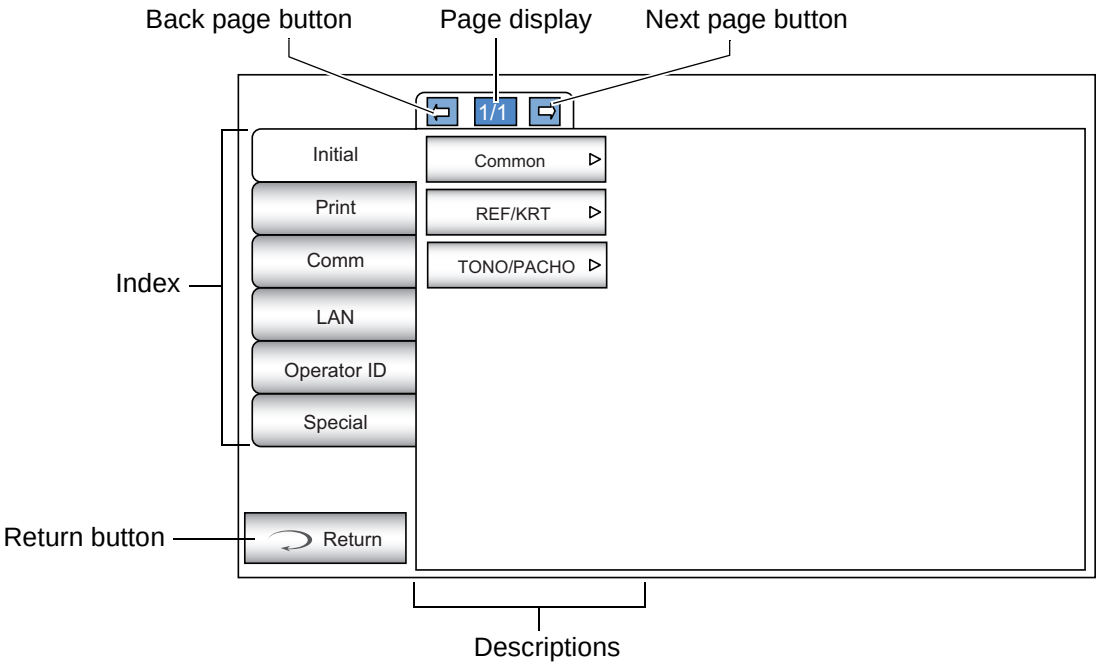
***1*** Make sure that the power cable is connected.
For connection, refer to "CONNECTING POWER CABLE" on page 25.

***2*** Turn ON the [POWER] switch.

***3*** Tap the [MODE] button on the control panel.

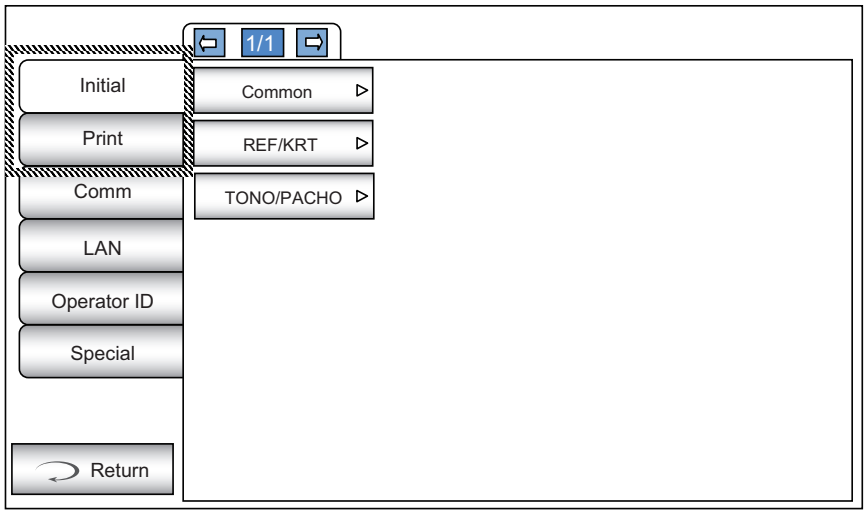

***4*** Tap the [Settings] button on the control panel.


The SETUP screen is displayed.

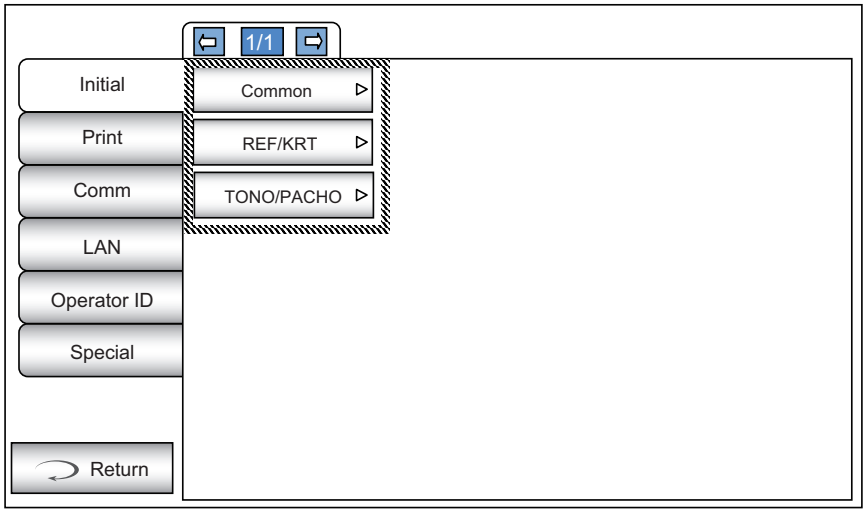


## OUTLINE OF SETUP SCREEN OPERATIONS (IN CASE OF INITIAL AND PRINT)

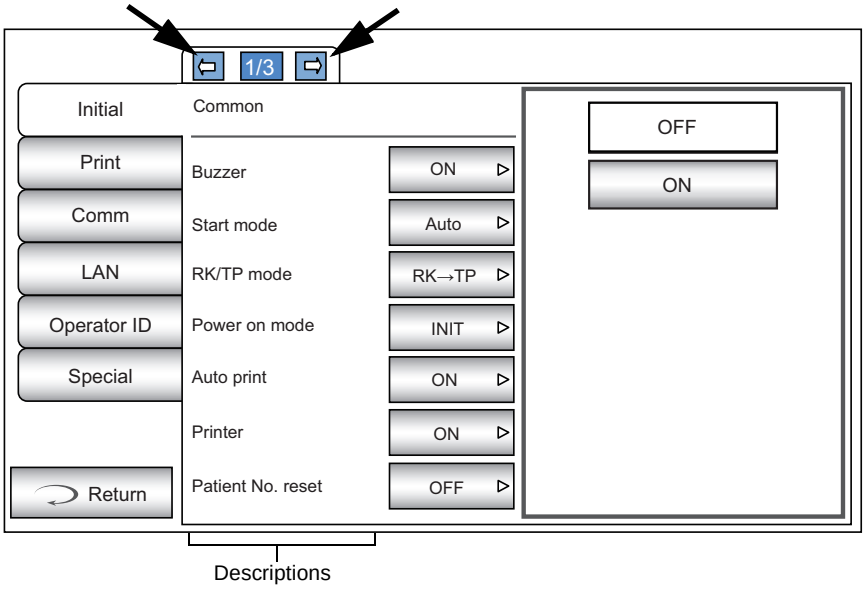
***1*** Tap Index and select "Initial" or "Print".



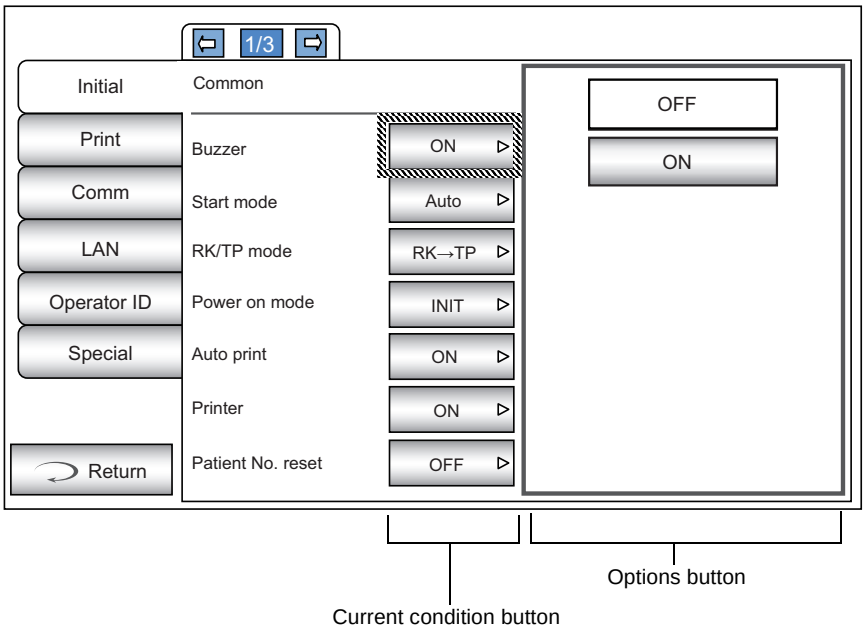

***2*** Select the settings "REF/KRT function", "TONO/PACHO function" or "common function". In the "Print" setting it is possible to select REF and KRT individually.



***3*** When "Descriptions" are displayed, operate the [Next page] button or [Back page] button, as necessary, and display the page to confirm/change.



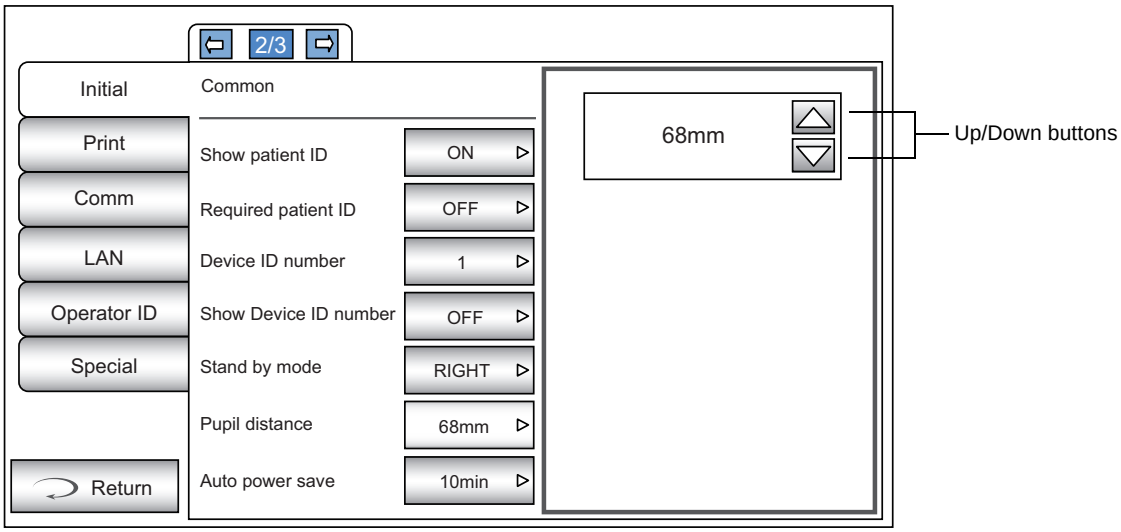

***4*** Tap the [Current condition] button of the item to be changed and find the [Options] button.




Instead of the [Options] button, the UP/DOWN buttons and numerical pad would be displayed.

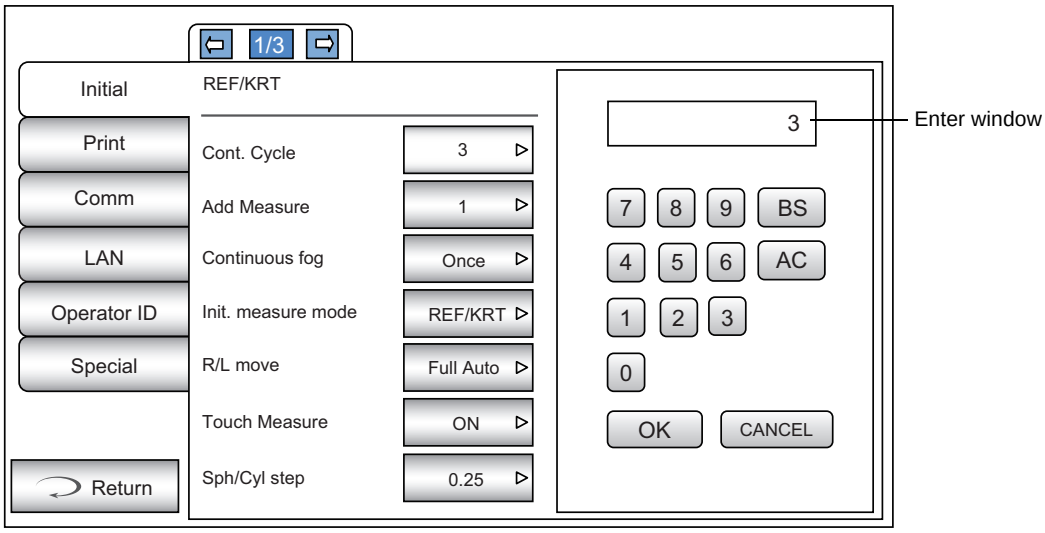
UP/DOWN BUTTON:

Tap the up or down button on the screen to change the setting.



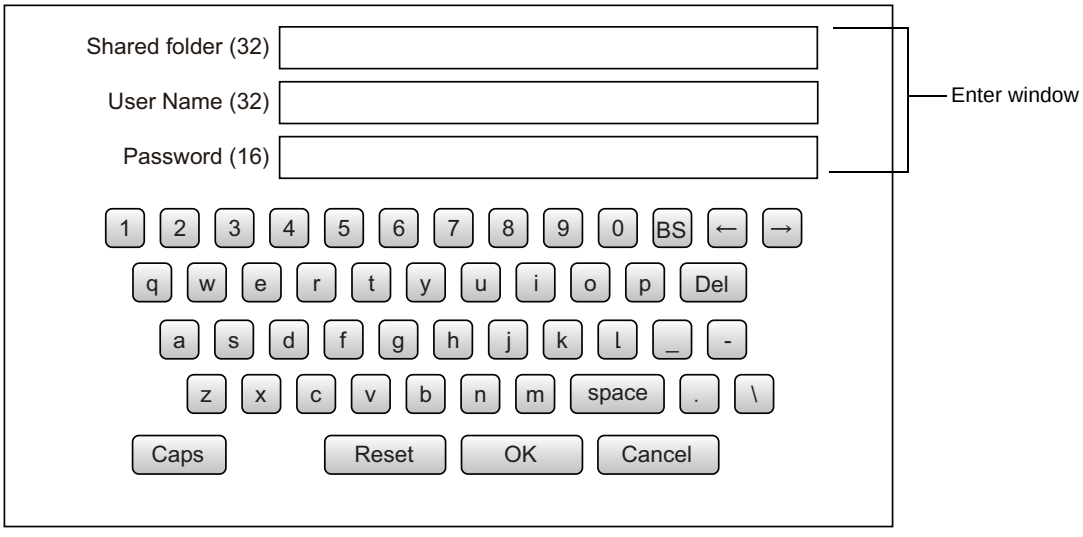

NUMBER KEY:

Tap Number Key on the screen and enter the figure. If there are several windows to enter, tap the window to enter the figure by Number Key. Tap the OK button to set the input value.

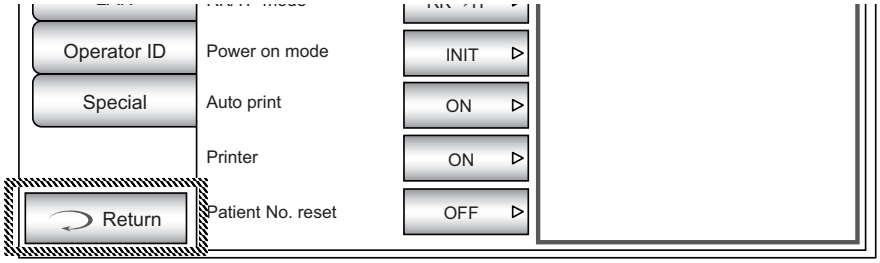



KEYBOARD:

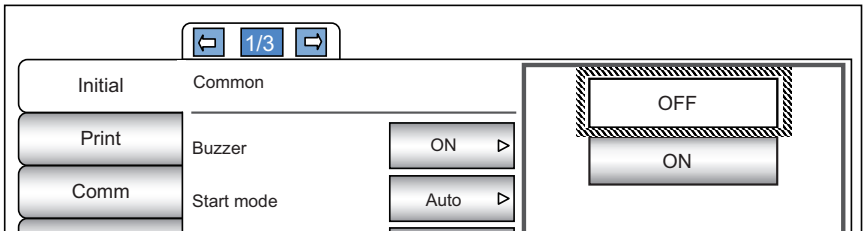
Tap the keyboard on the screen and enter characters. If there are several windows to enter, tap the window to enter the figure by keyboard. Tap the OK button to set the input value.



If return to previous page is required, tap the Return button.



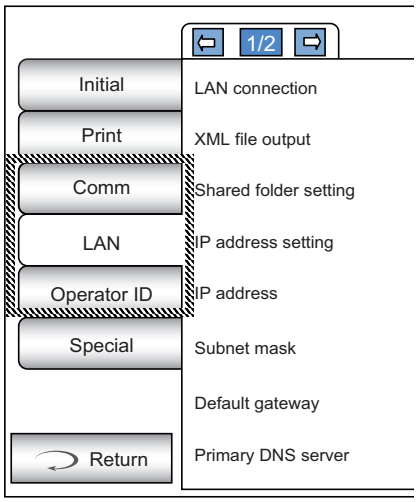

***5*** Tap the Options button and change the setting.



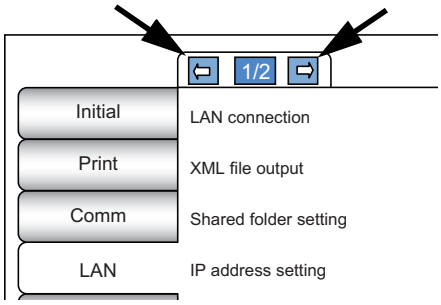

**NOTE** The set value is updated when an Options button is tapped.

## OUTLINE OF SETUP SCREEN OPERATIONS (IN CASE OF "Comm", "LAN", AND "OPERATOR ID")

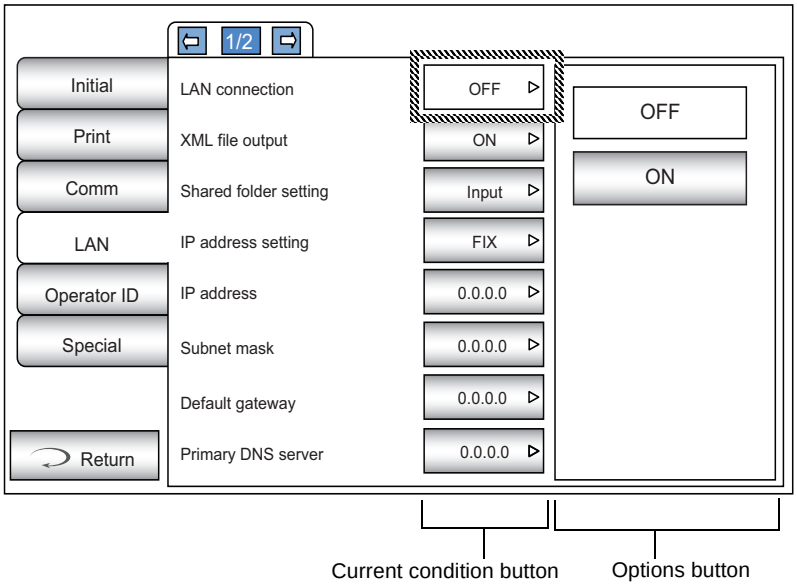
***1*** Tap Index and select the setting items.



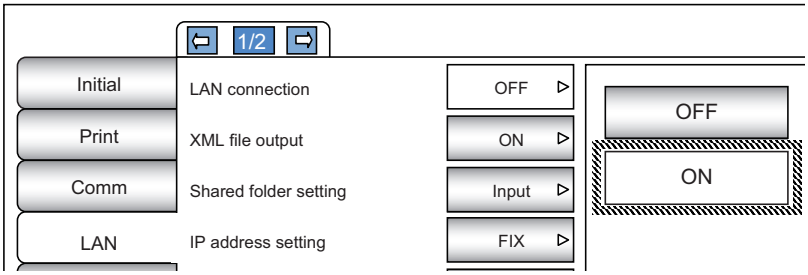
**2** Operate the Next page button or Back page button, as necessary, and display the page to confirm/change.




**3** Tap the Current condition button of the item to be changed and find the Options button.




**4** Tap the Options button and change the setting.

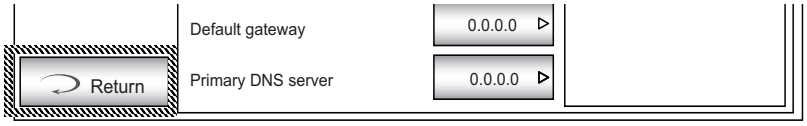



Instead of the Options button, the UP/DOWN buttons and numerical pad would be displayed. (See page 80)

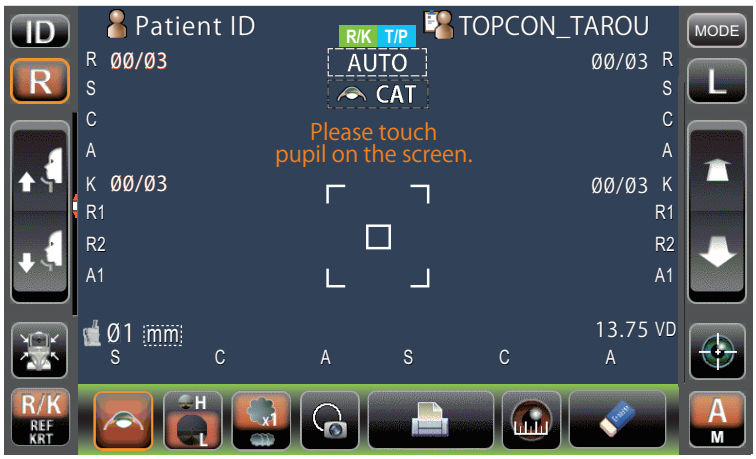
| NOTE | The set value is updated when an Options button is tapped. |
|---|---|

## RETURNING TO THE MEASUREMENT SCREEN

**1** Tap the Return button.




**2** The Measurement screen is displayed.



# LIST OF SETUP ITEMS

Setup items are categorized into 6 large indexes.

"Initial" .....items related to the initial status after power on
"Print" .....items related to output from the internal print
"Comm" .....items related to data output with the external device
"LAN".....items related to output using the LAN
"Operator ID".....items related to Operator ID
"Special" .....items related to maintenance (for service engineer only)

## INITIAL SETTINGS

Initial contains settings related to the initial status after power on, clearing all measurement values, etc.

Common.....The function common to REF/KRT and TONO/PACHO is set up.
REF/KRT .....The REF/KRT function is set up.
TONO/PACHO .....The TONO/PACHO function is set up.

### Common

In the "Common" the function common to REF/KRT and TONO/PACHO is set up.

| Descriptions | Options | Details | Initial value |
|---|---|---|---|
| Buzzer | OFF | Buzzer does not sound. | ON |
| | ON | Buzzer sounds. | |
| Start mode | Manual | Default measurement mode is Manual. | Auto |
| | Auto | Default measurement mode is Auto. | |
| RK/TP mode | RK→TP | Default measurement mode is R/K→T/P continuous measurement. | RK→TP |
| | R/K | Default measurement mode is R/K measurement. | |
| | T/P | Default measurement mode is T/P measurement. | |
| Power on mode | INT | Measurement mode is set to initial setting at power on. | INIT |
| | PREV | Measurement mode is set to previous measurement at power on. | |
| Auto print | OFF | Not printed automatically. | ON |
| | ON | After measurement of left/right eye in Auto mode, results are printed out automatically. | |
| Printer | OFF | Internal printer is disabled. | ON |
| | ON | Internal printer is active. | |
| Patient No. reset | OFF | Patient No. is not reset upon power on. | OFF |
| | ON | Patient No. is reset upon power on. | |
| Show patient ID | OFF | Patient ID is not displayed. | ON |
| | ON | Patient ID is displayed. | |
| Required patient ID | OFF | Patient ID is not required. | OFF |
| | ON | Patient ID is required. | |
| Device ID number | 1-99<br>Set by number display | Sets the Device ID number. | 1 |
| Show Device ID number | OFF | Device ID is not displayed. | OFF |
| | ON | Device ID is displayed. | |
| Stand by mode | RIGHT | Waiting at the initial position for right eye measurement. | RIGHT |
| | LEFT | Waiting at the initial position for left eye measurement. | |
| | LAST | Waiting at the last position of the measured eye. | |

| | | | |
|---|---|---|---|
| Pupil distance | 58mm<br>60mm<br>62mm<br>64mm<br>66mm<br>68mm<br>70mm<br>72mm<br>74mm<br>Set by<br>up/down button. | Sets the pupil distance between right and left eyes.<br>(Setting is required when R/L move is "Full Auto" or "Auto(RL)".) | 68mm |
| Auto power save | OFF | Power save function is not used. | 10min |
| | 1min | Power save status in 1min after last operation. | |
| | 5min | Power save status in 5min after last operation. | |
| | 10min | Power save status in 10min after last operation. | |
| | 20min | Power save status in 20min after last operation. | |
| | 30min | Power save status in 30min after last operation. | |
| | 60min | Power save status in 60min after last operation. | |
| Date/Time | Set by number display | Sets year, month, day, time (24hrs), minute and second. | Installation date/time |
| R/L notation | R/L | Right/left eyes is displayed by R/L. | R/L |
| | OD/OS | Right/left eyes is displayed by OD(R)/OS(L). | |
| Chin rest height | High | Default chinrest height. | Low |
| | Center | | |
| | Low | | |
| Control panel brightness | LEVEL 1 (dark) | The brightness of control panel is set up. | LEVEL 4 |
| | LEVEL 2 | | |
| | LEVEL 3 | | |
| | LEVEL 4 (bright) | | |
| Packing mode | Execute | Starts packing mode. | – |
| Shaded characters | ON | Font style of measurement values is shaded. | ON |
| | OFF | Font style of measurement values is not shaded. | |
| XZ MOTOR direction | Adjust | The moving direction is changed according to control panel position. | Adjust |
| | Fixed | The moving direction is not changed according to control panel position. | |

### REF/KRT

In the "REF/KRT" the function common to REF/KRT is set up.

| Descriptions | Options | Details | Initial value |
|---|---|---|---|
| Cont. Cycle | 1-10<br>Set by number display | The number of continuous measurements. | 3 |
| Add Measure | 0-99<br>Set by number display. | When the measurement is error,<br>set the number of times of remeasurement. | 1 |
| Continuous fog | Every time | Continuous fog is applied every time. | Once |
| | Once | Continuous fog is applied only once before the 1st measurement. | |
| Init. measure mode | REF | Default measurement mode on is REF. | REF/KRT |
| | REF/KRT | Default measurement mode is R/K. | |
| | KRT | Default measurement mode is KRT. | |
| R/L move | Manual | The switching of right and left eyes is performed at "Manual". | Full Auto |
| | Full Auto | The switching of right and left eyes is performed at "Full Auto". | |
| | Auto (RL) | The switching of right and left eyes is performed at "Auto(RL)". | |
| Touch Measure | OFF | Touch measurement is not performed in Manual mode. | ON |
| | ON | Touch measurement is performed in Manual mode. | |
| Sph/Cyl step | 0.12 | Sph/Cyl is displayed by 0.12D step. | 0.25 |
| | 0.25 | Sph/Cyl is displayed by 0.25D step. | |
| Axis step | 1° | Axial angle is displayed by 1° step. | 1° |
| | 5° | Axial angle is displayed by 5° step. | |
| VD | 0.00 | VD value is set to 0mm (contact lens). | 13.75* |
| | 12.00 | VD value is set to 12.00mm (eyeglass lens). | |
| | 13.75 | VD value is set to 13.75mm (eyeglass lens). | |

* : Depending on the destination, preset values differ.

| | | | |
|---|---|---|---|
| ADD | No<br>40-44<br>45-49<br>50-54<br>55-59<br>60-64<br>65-69<br>70-74 | The typical additional power for the age can be selected. | No |
| D or mm(KRT) | D | D (diopter) of corneal refractive power. | mm |
| | mm | mm of corneal curvature. | |
| HV or R1R2 | HV | Corneal curvature radius measurement result on screen is displayed by HV. | R1R2 |
| | R1R2 | Corneal curvature radius measurement result on screen is displayed by R1R2 (flat/steep meridian). | |
| Display KRT unit | OFF | KRT unit is not shown. | ON |
| | ON | KRT unit is shown. | |
| Cylinder sign | - | Cylinder sign is "−". | − |
| | + | Cylinder sign is "+". | |
| | MIX | Cylinder sign is "+" and "−". | |
| Picture printer | Normal Printer | Picture of refractive condition is not printed. | Normal Printer |
| | Graphic Printer | Picture of refractive condition is printed. | |
| REF average | OFF | REF average is not displayed. | OFF |
| | ON | REF average is displayed. | |
| Model Eye Measure Mode | Execute | Model eye measurement mode will start. | − |

### TONO/PACHO

In the "TONO/PACHO" the function common to TONO/PACHO is set up.

| Descriptions | Options | Details | Initial value |
|---|---|---|---|
| Cont. cycle(TONO) | 2-10<br>Set by number display | The number of continuous measurements (TONO). | 3 |
| Cont. cycle(PACHO) | 2-10<br>Set by number display | The number of continuous measurements (PACHO). | 3 |
| Add Measure | 1-99<br>Set by number display | The number of additional measurements. | 1 |
| Low Credibility Measure | No Including | The value of low reliability is excluded form count cycle. | Including |
| | Including | The value of low reliability is included to count cycle. | |
| Init. Measure mode | TONO | Default measurement mode on is TONO. | T/P |
| | T/P | Default measurement mode is T/P. | |
| R/L mode | Manual | Measurement head moves right and left manually. | Full Auto |
| | Full Auto | Measurement head moves right and left automatically. | |
| | Auto(RL) | The switching of right and left eyes is performed at "Auto(RL)". | |
| Touch Measure | OFF | Touch measurement is not performed in Manual mode. | ON |
| | ON | Touch measurement is performed in Manual mode. | |
| Show Tono value | OFF | Tono value is not displayed. | ON |
| | ON | Tono value is displayed. | |
| Show Pacho value | OFF | Pacho value is not displayed. | ON |
| | ON | Pacho value is displayed. | |
| Show Tono average | OFF | Tono average value is not displayed. | ON |
| | ON | Tono average value is displayed. | |
| Show Adj value | OFF | Adjusted value is not displayed. | ON |
| | ON | Adjusted value is displayed. | |
| Tono display Unit | mmHg | Display in mmHg | mmHg |
| | digit | Display in digit | |
| | hPa | Display in hPa | |
| | Torr | Display in Torr | |
| Pacho display Unit | mm | Display in mm | mm |
| | µm | Display in µm | |
| Press average Mode | Integer | Display in Integer | Integer |
| | Real | Display in Real | |
| IOP Adjustment | OFF | IOP adjustment type is OFF. | OFF |
| | ON | IOP adjustment type is ON. | |
| Center CCT Base | 0-999<br>Set by number display | Sets the central cornea thickness base value.<br>(Used when IOP adjustment is "ON.") | 545 |
| Adjustment Coefficient | 0-999<br>Set by number display | Sets the adjustment coefficient.<br>(Used when IOP adjustment is "ON.") | 500 |

| | | | |
|---|---|---|---|
| Meas. Data recording way | Data on credibility | Measurement data is displayed in the order from low to high reliability. | Data with error |
| | Data without error | The measurement data without error is displayed. | |
| | Data with error | All the measurement data (including data with error) is displayed. | |
| Meas. Count change mode | 1x | Meas. count change mode is set to "1x" upon power on. | Multi |
| | Multi | Meas. count change mode is set to "Multi" upon power on. | |
| IOL Camera Focus | -19-+35<br>Set by up/down button | Adjusts focusing point of camera on the measurement screen in IOL mode. | +0 |
| IOL LED Brightness | 0-100<br>Set by up/down button | Sets brightness of alignment dot in IOL mode. | 28 |
| Stop Focus | OFF | Even if focusing in Auto mode fails continuously, do not stop auto alignment temporarily. | ON |
| | ON | If focusing in Auto mode fails continuously, stop auto alignment temporarily. | |

## INTERNAL PRINTER

Print contains settings related to output from the internal printer.

Common.....The function common to REF/KRT and TONO/PACHO is set up.
REF/KRT.....The REF/KRT function is set up.
TONO/PACHO .....The TONO/PACHO function is set up.

### Common

In the "Common" the function common to REF/KRT and TONO/PACHO is set up.

| Descriptions | Options | Details | Initial value |
|---|---|---|---|
| Barcode | ON | Barcode is printed. | OFF |
| | OFF | Barcode is not printed. | |
| Operator ID | ON | Operator ID is printed. | OFF |
| | OFF | Operator ID is not printed. | |
| Name | ON | "Name" space is available. | ON |
| | OFF | "Name" space is not available. | |
| Date | ON | Date is printed. | ON |
| | OFF | Date is not printed. | |
| Date style | YMD | Print in Year/Month/Day format. | DMY* |
| | MDY | Print in Month/Day/Year format. | |
| | DMY | Print in Day/Month/Year format. | |
| Patient No/Patient ID | OFF | Patient No./Patient ID is not printed. | ON |
| | ON | Patient No./Patient ID is printed. | |
| Device ID number | ON | Device ID number is printed. | OFF |
| | OFF | Device ID number is not printed. | |
| Serial number | ON | Serial No. is printed. | ON |
| | OFF | Serial No. is not printed. | |
| TOPCON logo | ON | TOPCON logo is printed. | ON |
| | OFF | TOPCON logo is not printed. | |
| Message | OFF | Message is not printed. | OFF |
| | ON | Message is printed. | |
| Message data | Set by keyboard display | String of up to 72 characters. | NULL |
| Line space | 0-24<br>Set by number display | Line space is set in dot units. | 0 |
| Auto Cut | OFF | Auto cut is not carried out. | ON |
| | ON | Auto cut is carried out. | |

* : Depending on the destination, preset values differ.

### REF/KRT

"REF/KRT" contains settings related to output from the internal printer.

| Descriptions | Options | Details | Initial value |
|---|---|---|---|
| Preset | All | Print format of preset is All. | All |
| | Avg | Print format of preset is Avg. | |
| | Classic | Print format of preset is Classic. | |
| Print order | R/L | Measurement values are printed in terms of REF or KRT. | DATA |
| | DATA | Both REF measurement value and KRT measurement value are printed in order of right eye and left eye. | |
| Include error data | OFF | "Error" data is not printed. | OFF |
| | ON | "Error" data is printed. | |
| VD | OFF | VD value (Vertex distance) is not printed. | ON |
| | ON | VD value (Vertex distance) is printed. | |
| Cylinder sign | OFF | Cylinder sign is not printed. | ON |
| | ON | Cylinder sign is printed. | |
| REF format | ALL | All the measurement value is printed. | ALL |
| | AVG | Only averaged is printed. | |
| Credibility | OFF | Credibility number is not printed. | OFF |
| | ON | Credibility number is printed. | |
| S.E. | OFF | S.E.is not printed. | ON |
| | ON | S.E. is printed. | |
| PD | OFF | PD value (pupil distance) is not printed. | ON |
| | ON | PD value (pupil distance) is printed. | |
| ADD | OFF | ADD value is not printed. | OFF |
| | ON | ADD value is printed. | |
| KRT print order | D/mm | KRT data is printed as follows, D (corneal refractive power)/mm (corneal curvature). | D/mm |
| | mm/D | KRT data is printed as follows, mm (corneal curvature)/D (corneal refractive power). | |
| KRT format | ALL | All the measurement value is printed. | ALL |
| | AVE | Only typical value are printed. | |
| KRT style | HV | Kerato style in print out is HV (horizontal/vertical). | R1R2 |
| | R1R2 | Kerato style in print out is R1R2 (flat/steep meridian). | |
| KRT print format | HV | KRT measurement result is printed in simple format. | R1R2 |
| | R1R2 | KRT measurement result is printed in full format. | |
| KRT average | OFF | KRT average value is not printed. | ON |
| | ON | KRT average value is printed. | |
| KRT cylinder | OFF | Kerato-cylinder value and axial angle are not printed. | ON |
| | ON | Kerato-cylinder value and axial angle are printed. | |
| Cornea diameter | OFF | Corneal diameter is not printed. | ON |
| | ON | Corneal diameter is printed. | |

### REF

"REF" contains settings related to output from the internal printer.

| Descriptions | Options | Details | Initial value |
|---|---|---|---|
| VD | OFF | VD value (Vertex distance) is not printed. | ON |
| | ON | VD value (Vertex distance) is printed. | |
| Cylinder sign | OFF | Cylinder sign is not printed. | ON |
| | ON | Cylinder sign is printed. | |
| REF format | ALL | All the measurement value is printed. | ALL |
| | AVG | Only averaged is printed. | |
| Credibility | OFF | Credibility number is not printed. | OFF |
| | ON | Credibility number is printed. | |
| S.E. | OFF | S.E.is not printed. | ON |
| | ON | S.E. is printed. | |
| PD | OFF | PD value (pupil distance) is not printed. | ON |
| | ON | PD value (pupil distance) is printed. | |
| ADD | OFF | ADD value is not printed. | OFF |
| | ON | ADD value is printed. | |

### KRT

"KRT" contains settings related to output from the internal printer.

| Descriptions | Options | Details | Initial value |
|---|---|---|---|
| KRT print order | D/mm | KRT data is printed as follows,<br>D (corneal refractive power)/mm (corneal curvature). | D/mm |
| | mm/D | KRT data is printed as follows,<br>mm (corneal curvature)/D (corneal refractive power). | |
| KRT format | ALL | All the measurement value is printed. | ALL |
| | AVG | Printout only typical value. | |
| KRT style | HV | Display style of KRT measurement results is set to<br>HV (horizontal/vertical). | R1R2 |
| | R1R2 | Display style of KRT measurement results is set to<br>R1R2 (flat/steep meridian). | |
| KRT print format | HV | KRT measurement result is printed in simple format. | R1R2 |
| | R1R2 | KRT measurement result is printed in full format. | |
| KRT average | OFF | Do not print KRT average value. | ON |
| | ON | Print KRT average value. | |
| KRT cylinder | OFF | Do not print kerato-cylinder value and axial angle. | ON |
| | ON | Print kerato-cylinder value and axial angle. | |
| Cornea diameter | OFF | Do not print corneal diameter. | ON |
| | ON | Print corneal diameter. | |

### TONO/PACHO

"TONO/PACHO" contains settings related to output from the internal printer.

| Descriptions | Options | Details | Initial value |
|---|---|---|---|
| Printer order | R/L | The order is right eye and left eye regardless of the TONO measurement value and PACHO measurement value. | SIMPLE |
| | DATA | TONO measurement value and PACHO measurement value are separately printed. | |
| | SIMPLE | Print in the SIMPLE format. | |
| Measure correction | OFF | Corrected measurement value is not printed. | ON |
| | ON | Corrected measurement value is printed. | |
| mmHg Display on hPa | OFF | mmHg is not printed on hPa. | ON |
| | ON | mmHg is printed on hPa. | |
| IOP ADJ Formula | OFF | Center CCT Base and Adjustment Coefficient for<br>IOP ADJ formula are not printed. | ON |
| | ON | Center CCT Base and Adjustment Coefficient for<br>IOP ADJ formula are printed. | |

## DATA COMMUNICATION (COMM)

Comm contains settings related to data output with the external device.

| Descriptions | Options | Details | Initial value |
|---|---|---|---|
| Output data | REF | Only REF data are output. | ALL |
| | KRT | Only KRT data are output. | |
| | REF/KRT | REF/KRT data are output. | |
| | TONO | Only TONO data are output. | |
| | T/P | TONO/PACHO data are output. | |
| | ALL | All measurement value is output. | |
| Format (In case of selecting of REF, KRT and R/K output) | OLD | OLD TOPCON format | OLD |
| | NEW | NEW TOPCON format | |
| | STD1 | TOPCON STD1 format | |
| | STD2 | TOPCON STD2 format | |
| | STD3 | TOPCON STD3 format | |
| | STD4 | TOPCON STD4 format | |
| Format (In case of selecting of TONO and T/P output) | MODE1 | Average value output format | MODE1 |
| | MODE2 | Latest value output format | |
| | STD1 | TOPCON STD1 format | |
| | STD2 | TOPCON STD2 format | |
| | STD3 | TOPCON STD3 format | |
| | STD5 | TOPCON STD5 format | |
| Format (In case of selecting of ALL output) | STD3 | TOPCON STD3 format | STD3 |
| Output port | OFF | Output port is disabled. | OFF |
| | ON | Output port is enabled. | |
| Baudrate | 2400bps | Baudrate value: 2400bps | 9600bps |
| | 9600bps | Baudrate value: 9600bps | |

## LAN CONNECTION (LAN)

LAN contains settings related to data output via LAN.

| Descriptions | Options | Details | Initial value |
|---|---|---|---|
| LAN connection | OFF | LAN connection is off. | OFF |
| | ON | LAN connection is on. | |
| XML file output | OFF | XML file is not outputted. | ON |
| | ON | XML file is outputted. | |
| Shared folder setting | Shared folder (up to 32 characters) User name (up to 32 characters) Password (up to 16 characters) Set by keyboard display | Path and permission to the shared folder is set. | – |
| IP address setting | FIX | Assign IP address manually. | FIX |
| | AUTO | Assign IP address automatically. | |
| IP address | 0. 0. 0. 0 Set by number display | IP address of PC to output data. | 0.0.0.0 |
| Subnet mask | 0. 0. 0. 0 Set by number display | Subnet mask address of TRK-2P. | 0.0.0.0 |
| Default gateway | 0. 0. 0. 0 Set by number display | Default gateway address of TRK-2P. | 0.0.0.0 |
| Primary DNS server | 0. 0. 0. 0 Set by number display | Primary DNS Server number. | 0.0.0.0 |
| Secondary DNS server | 0. 0. 0. 0 Set by number display | Secondary DNS Server number. | 0.0.0.0 |

## OPERATOR SETTINGS

OPERATOR contains settings related to Operator ID.

| Descriptions | Options | Details | Initial value |
|---|---|---|---|
| Use Operator ID | OFF | Operator ID will not be displayed on the control panel and printer output. | OFF |
| | ON | Operator ID will be displayed on the control panel and printer output. | |
| Prefix of Ope. ID | 3 characters Set by keyboard display | The Prefix of Operator ID can be registered. | NULL |
| Operator ID request | OFF | Operator ID is not required. | OFF |
| | ON | Operator ID is required. | |
| Fixed Operator ID | OFF | Operator ID is not fixed. | OFF |
| | ON | Operator ID is fixed. | |
| Input Fixed Ope. ID | 13 characters Set by keyboard display | Input fixed operator ID. | NULL |

## SPECIAL

SPECIAL is a mode for service engineers only; it can not be accessed.

# MAINTENANCE

## DAILY CHECKUPS

### CLEANING THE INSTRUMENT

- Dust on ocular pressure measuring window glass
  Blow off dust with a blower.
- Fingerprints and oil spots on ocular pressure measuring window glass
  Blow off dust with a blower and wipe the surface gently with a camera lens cleaner using clean gauze.
- Dirty instrument cover..... Wipe the surface with the attached monitor cleaner or a dry soft cloth. Never use solvents or a chemical duster.

### CLEANING THE MEASURING WINDOW GLASS

- To secure auto alignment and correct measurement values, clean the ocular pressure measuring window glass after each day's work.
- Clean the glass when "CLEAN THE MEASURING WINDOW GLASS" is displayed on the control panel screen.

| | |
|---|---|
| **⚠ CAUTION** | To clean the ocular pressure measuring window glass, measuring nozzle and the glass inside the measuring nozzle, use ethanol. Using other chemicals may cause damage to the patient's eye during measurement. |

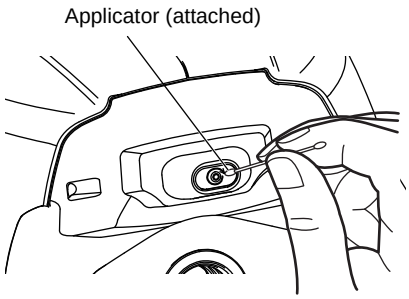
| | |
|---|---|
| **NOTE** | • Do not apply unreasonable force to the measuring nozzle while cleaning.<br>• Be sure to use only the attached applicator. |

***1*** Prepare the ethanol.

***2*** Using a blower, remove dust and dirt from the glass surface.

***3*** Moisten the applicator with ethanol.

***4*** Wipe the glass surface lightly with the applicator, from the center outward.



Wiping the glass surface

***5*** Use a new applicator and wipe the glass surface in a similar manner; repeat this several times.

| | |
|---|---|
| **NOTE** | To ensure thorough removal of grease from the ocular pressure measuring window glass, be sure to replace the applicator and use a new one for each of these repeated wiping operations. |

**6** The Cleaning is completed when grease is thoroughly removed.
If stains cannot be removed easily, call your dealer.

| NOTE | When the ocular pressure measuring window glass becomes stained, "CLEAN THE MEASURING WINDOW GLASS" is displayed on the control panel screen. |
|---|---|

## CLEANING THE MEASURING NOZZLE AND THE GLASS INSIDE THE MEASURING NOZZLE

- If there is any foreign matter on or around the measuring nozzle, it may enter and damage the patient's eye during the measurement. If there is any, clean the measuring nozzle.
- When the glass inside the measuring nozzle becomes stained, it makes the fixation target unclear, causing errors in auto alignment and measurement values. If the fixation target is unclear or measurement values with parentheses are frequent, clean the glass inside the measuring nozzle.
- Clean the glass when "CLEAN INSIDE NOZZLE/GLASS" is displayed on the control panel screen.

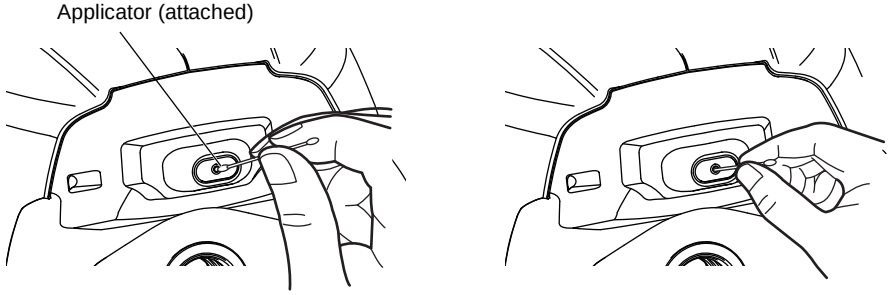
| CAUTION | To clean the ocular pressure measuring window glass, measuring nozzle and the glass inside the measuring nozzle, use ethanol. Using other chemicals may cause damage to the patient's eye during measurement. |
|---|---|

| NOTE | • Do not apply unreasonable force to the measuring nozzle while cleaning.<br>• To avoid problems, do not leave the cotton fibers inside.<br>• Be sure to use only the attached applicator. |
|---|---|

**1** Prepare ethanol.

**2** Moisten the applicator with ethanol.

**3** Insert the applicator into the measuring nozzle, lightly touch the glass surface, and turn the applicator a few times.




**4** Use a new applicator and wipe the glass surface in a similar manner; repeat this a few times.

| NOTE | The used applicator contains grease and it only scatters grease if used again; the light transmittance is not improved at all. Be sure to replace the applicator and use a new one for each of these repeated cleaning operations. |
|---|---|

**5** If the fixation target is clearly seen, cleaning is completed. If stains cannot be removed easily, call your dealer.

| NOTE | When the glass becomes stained, "CLEAN INSIDE NOZZLE/GLASS" is displayed on the control panel screen. |
|---|---|

## CLEANING THE COMPONENTS THAT COME INTO CONTACT WITH THE PATIENT

- When the forehead rest and chinrest become stained, use a neutral tableware detergent and warm water. Dip a soft cloth in the solution, squeeze out the excess water and then wipe off the stain.

## DAILY MAINTENANCE

- For this instrument, dust may cause errors. When not in use, replace the measuring window cap and dust cover.
- When not in use, turn off the POWER switch.

| NOTE | When using the dust cover, tap the Turn off button and move the chinrest and measuring head to their last positions. |
|---|---|

## ORDERING CONSUMABLE ITEMS

When ordering consumable items, tell the product name, product code and quantity to your dealer or TOPCON at the address listed on the back cover.

| Product name | Product code |
|---|---|
| Chinrest tissue | 40310 4082 |
| Monitor cleaner | 44800 1001 |
| Dust cover | 42360 9002 |

| Product name | Product code |
|---|---|
| Printer paper | 44800 4001 |
| Printer paper | 44800 4001 |
| Fuse T 2AL 250V | 41852 5043 |


## USER MAINTENANCE ITEM

| Item | Inspection time | Contents |
|---|---|---|
| Inspection | Before using | • The instrument works properly.<br>• The objective lens must be free of stains and/or flaws.<br>• Confirm whether the foreign object is attached to the measuring nozzle and the area around the measuring nozzle.<br>• Air check<br>• Confirm that the safety stopper setting and measuring nozzle do not move to the patient's side beyond the safety stopper setting position. |
| Cleaning | When the part is stained | • Objective lens<br>• Instrument cover, control panel, etc. |
| Replacement | As required | • Fuse<br>• Printer form |

## MANUFACTURER MAINTENANCE ITEMS

| Item | Checking time | Contents |
|---|---|---|
| Cleaning each component | Within 12 months | • Cleaning outer covers<br>• Checking the optical system<br>• Cleaning POWER unit |
| Operation check | Within 12 months | • Checking the main body operation<br>• Checking switches |
| Accuracy check | Within 12 months | • Confirming the ocular pressure measurement functions (using special tools)<br>• Confirming the cornea thickness measurement functions (using special tools) |

## BRIGHTNESS ADJUSTMENT OF THE CONTROL PANEL

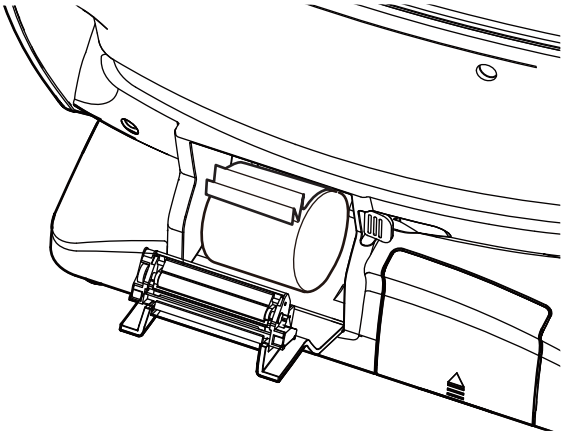
- The control panel is optimally adjusted when shipped.
- The brightness can be adjusted at "Control panel brightness" of "Common" in the "Initial". (See page 85)

## PRINTER PAPER JAM

| | |
|---|---|
| **CAUTION** | • To avoid failure or potential injury, do not open the printer cover while the printer is in operation.<br>• To avoid potential injury in case of malfunction, including a paper jam, be sure to shut off the power before attempting to repair it.<br>• To avoid potential injury, do not touch the printer body including metal parts or the paper cutter, while the printer is in operation or when replacing the printer paper. |

| | |
|---|---|
| **NOTE** | If the printer paper is jammed in the printer, printing will stop and the jam should be cleared. |

***1*** Shut off the power and open the printer cover, take out the jammed paper pieces.



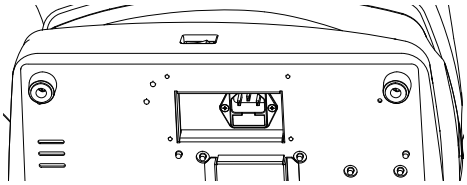
| | |
|---|---|
| **NOTE** | After shutting off the power and removing the jammed printer paper, turn the power on again, and then tap the [Print out] button to print out a blank sheet. |

## FUSE CHANGE

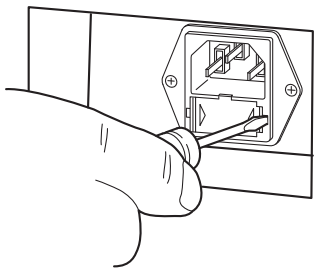
| | |
|---|---|
| **⚠ WARNING** | • To avoid electric shock during fuse change, be sure to unplug the power cable before removing the fuse lid.<br>Also, do not plug the power cable while the fuse lid is removed.<br>• Always use the attached fuse (T 2AL 250V). Using any other type may cause malfunction and/or fire. |

***1*** Make sure the power is off and the power cable is unplugged.

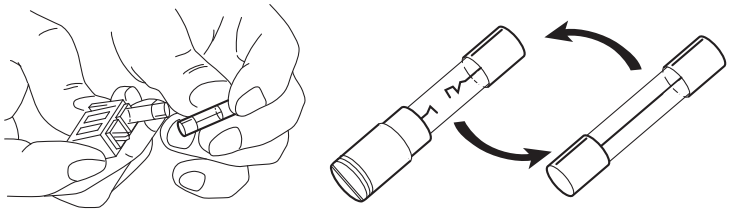
***2*** Tilt the body slowly so that the POWER switch comes up and the power inlet at the bottom can be seen.



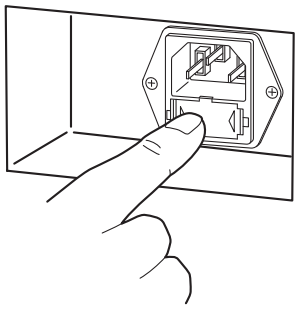
***3*** Press the fuse holder with a screwdriver and turn it counter-clockwise. The fuse holder can be taken out.



***4*** Replace the fuse with a spare one.

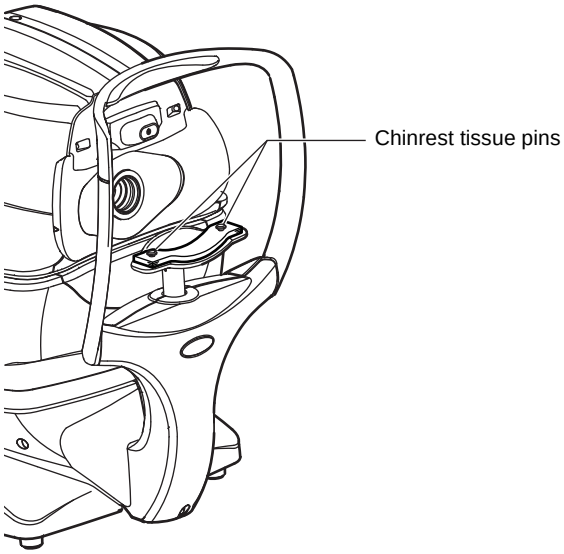


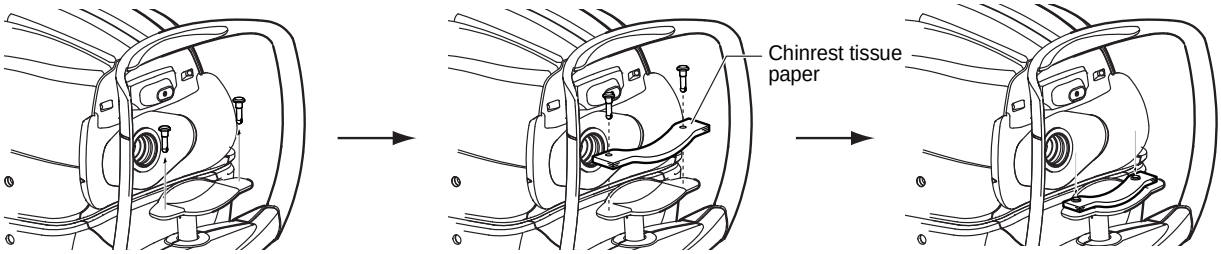
***5*** Press the fuse holder until it clicks.
The fuse holder is set.



## REPLACING THE CHINREST TISSUE PAPER

- When the chinrest tissue paper has run out, pull off the chinrest tissue pins and replace it with new tissue paper.



# MAINTENANCE

## CLEANING THE INSTRUMENT COVER

| | |
|---|---|
| **CAUTION** | Do not use or apply any aerosol-type cleaner near the instrument. If a drop of cleaner remains inside the measuring nozzle, the patient's eye may be injured during measurement. |

| | |
|---|---|
| **NOTE** | Do not clean plastic parts with solvents. Benzine, thinner, ether and gasoline may cause discoloring and decomposition. |

1. If the instrument cover, control panel, etc. get soiled, wipe the surface clean with a dry cloth.
2. If the instrument cover is noticeably stained, wipe the surface with a damp cloth which is moistened in a tepid water solution of neutral detergent.

## CLEANING THE CONTROL PANEL

| | |
|---|---|
| **NOTE** | • Since the control panel screen is a touch panel, be sure to turn off the POWER switch before wiping. The touch panel will react and malfunction.<br>• When the monitor cleaner has become dirty, wash it. When washing, rinse it thoroughly so no detergent is left. If any detergent remains, it may cause uneven wiping. |

### CONTAMINATION BY DUST

Remove the dust with a soft brush, and wipe with the attached monitor cleaner.

### CONTAMINATION BY FINGERPRINTS

Wipe with the attached monitor cleaner.

If the stain still remains, moisten the monitor cleaner with water and then wipe off the stain.

# TROUBLESHOOTING

## TROUBLE-SHOOTING OPERATIONS

### MESSAGE LIST

| | |
|---|---|
| OVER-SPH | Spherical power exceeds +25D or -30D. |
| OVER-CYL | Cylindrical power exceeds ±12D. |
| OVER-R | Corneal curvature exceeds 5.00-12.00mm. |
| NO TARGET | There is no target or the eye image is too dark. |
| ALIGN ERR | The alignment is significantly failed during the measurement. |
| AGAIN | There is more than ±5D difference from the previous measurement value. |
| NO CENTER | Center of eye can not be found. |
| ERROR | The patient's eye blinks or moves during measurement. |
| OVER | Displayed when the measurement is over. |
| Measuring | Displayed under measuring in R/K measurement mode. |
| Finished | Displayed when normal measurements are completed for the set measurement count. |
| CLEAN THE MEASURING WINDOW GLASS | Displayed when a blot is detected on the measuring window during T/P measurement. Clean the ocurar pressure measuring window glass by referring to "CLEANING THE MEASURING WINDOW GLASS" on page 92. |
| CLEAN INSIDE NOZZLE/GLASS | Displayed when a blot is detected on the measuring window during TONO measurement. Clean the measuring nozzle and the glass inside the measuring nozzle by referring to "CLEANING THE MEASURING NOZZLE AND THE GLASS INSIDE THE MEASURING NOZZLE" on page 93. |
| Close printer cover. | The printer cover is open. Close the cover until it clicks. |
| Paper end. | Printer paper is used up. Supply printer paper. |
| Fatal Error! | Displayed when the printer unit does not operate normally, such as the cutter does not work. Call the serviceman. |
| Please touch pupil on the screen | Displayed when the XY position is not aligned. Touch the pupil and bring the screen to the pupil center. |
| Focus and Touch pupil on screen | Displayed when the XYZ position is not aligned. Adjust the measuring head position by tapping Measuring head forward/backward button, tap the pupil again and bring it to the center of screen. |
| Check eyelid. | Displayed when the patient's eyelid covers the pupil. Tell the patient to open their eye as wide as possible. |
| Focus and Touch a measure point | Displayed as instruction of procedure for Manual mode. Adjust the measuring head position by tapping the Measuring head forward/backward button, and tap the measure point. |
| Touch Start Button | Displayed as an instruction of procedure for Manual mode when "Touch Measure" is set to "OFF" in REF/KRT or TONO/PACHO of the "Initial".<br>Adjust the measuring head position by tapping the Measuring head forward/backward button, and tap the Start button. |
| Align Stopped. Re-touch pupil. | Displayed when Alignment stop button is tapped under T/P measurement mode. |
| Nozzle at limit position | Warns that the measuring head position has reached the nozzle limit. |
| TOO CLOSE | Warns that the measuring head is too close to the patient's eye. |
| TOO FAR | Warns that the measuring head is too far from the patient's eye. |

| | |
|---|---|
| Turn off the unit? | Displayed to confirm whether to move the chinrest and measuring head to their last positions in R/K measurement mode. |
| Perform air check or Turn off the unit? | Displayed to confirm whether to perform air check or whether to move the chinrest and measuring head to their last positions in T/P measurement mode. |
| Air checked. Press OK to continue. | Displayed when normal air check operation is confirmed. |
| Confirm abnormal action(-) of air check | Displayed when an anomaly occurred during air check. Check the measuring nozzle for any foreign matter. |
| Confirm abnormal action(+) of air check | Displayed when an anomaly occurred during air check. Check the measuring nozzle for any foreign matter. |
| Please don't turn the main switch off until the unit stops. | Indicates that termination is in process. |
| The unit stops completely. Please turn the main switch off. | Indicates that termination is completed. |
| Please be sure to perform setting of safety stopper before measuring, for patient safety. Display this message at power on also from the next time? | Displayed when urged to set safety stopper. Set up safety stopper. |
| Please set the limit within 0 mm to 30 mm. | Displayed on the Safety Stopper screen, when the z-axis position is outside the 0-30mm. |
| Range of Input value is 1-10 | Displayed when the "Cont. Cycle" in "REF/KRT" of the "Initial" in R/K measurement mode is set to a value out of the specified input range. Enter a value within the input range. |
| Range of Input value is 2-10 | Displayed when the "Cont. Cycle(TONO)" or "Cont. Cycle(PACHO)" in "TONO/PACHO" of the "Initial" in T/P measurement mode is set to a value out of the specified input range. Enter a value within the input range. |
| Range of Input value is 0-24 | Displayed when the "Line space" in "Common" of the "Print" is set to a value out of the specified input range. Enter a value within the input range. |
| Range of Input value is 1-99 | Displayed when the "Device ID number" in "Common" of the "Initial" is set to a value out of the specified input range. Enter a value within the input range. |
| Chinrest Error | Displayed when the chinrest is not correctly connected or not connected at all. |
| Patient ID is required. Please set patient ID. | Displayed when the output operation is requested and the setting "Required patient ID" is "ON" in "Common" of the "Initial", but the patient ID is not inputted. Enter the patient ID and then request the output operation. |
| Operator ID is required. Please set Operator ID. | Displayed when the output operation is requested and the setting "Operator ID request" is "ON" in the "Operator ID", but the operator ID is not inputted. Enter the operator ID and then request the output operation. |
| Output not set | Displayed when all output settings are OFF. |
| No print data, please confirm measurement mode. | Displayed when the measurement mode in measuring differs from the measurement mode in printing. |
| LAN output... | LAN data output is in process. |
| LAN hostname error | Failed to resolve the host name of the destination (to be connected with the shared folder). Confirm the inputted host name or DNS server address. |
| LAN init error | Failed to reset the LAN connection. Confirm that the LAN cable connection and the LAN setting are in the correct way. |
| LAN mount error | Failed to connect to the shared folder. Confirm the address, folder name, user name and password of the destination (to be connected with the share folder). |
| Permission error of folder | Failed to create the file. Confirm that write permission to the share folder is set correctly. |
| Not enough storage space | Failed to write to the file. Check the free space capacity at the save location. |
| LAN start error | Failed to reset the LAN connection. Confirm that the LAN cable connection and the LAN setting are in the correct way. |

| | |
|---|---|
| LAN stop error | Failed to reset the LAN connection. Confirm that the LAN cable connection and the LAN setting are in the correct way. |
| LAN restruct error | Failed to reset the LAN connection. Confirm that the LAN cable connection and the LAN setting are in the correct way. |
| DHCP bind error(Timeout) | Failed to communicate to DHCP server. |
| DHCP bind error(NAK) | Failed to communicate to DHCP server. |
| IP address conflict. | Displayed when the IP address is duplicated. |
| Failed to get IP address. | Failed in IP address auto assignment. Set a fixed IP address, or check if the DHCP server is running. |
| Unknown Error | Displayed in case of a LAN error other than the LAN errors mentioned previously. |
| Applying network settings | Displayed when applying network setting as "LAN connection" in the "LAN" is switched to ON or OFF. |
| First Octet is 1-223 Range | Displayed when the first octet of "IP address", "Default gateway", "Primary DNS server" or "Secondary DNS server" of the "LAN connection" is set to a value out of the specified input range. Enter a value within the input rule. |
| The IP address is 0-255 Range | Displayed when either of each octet other than the 1st octet in "IP address", "Default gateway", "Primary DNS server" or "Secondary DNS server" of the "LAN connection" is set to a value out of the specified input range. Enter a value within the input range. |
| Value is irregular. Input valid value | Displayed when the "Subnet mask" of the "LAN connection" is set to a value off the input rule. Enter a value within the "Subnet mask" input rule. |
| At least 3 characters are required for operator ID prefix. | Displayed when the "Prefix of Ope. ID" of "Operator ID" is less than 3 characters. Enter a prefix with 3 characters. |
| RS-232C DATAOUT | RS-232C data output is in process. |
| RS-232C SUCCESS | RS-232C data output is completed. |
| RS-232C FAIL | RS-232C data transmission failed. |
| Previous measurements are left. Please press the Clear button. | Displayed when the output of all output-set data fails. |
| Please wait until packing mode is finished. | Indicates that the packing operation is in process. Wait until it is completed. |
| Packing mode is finished. Please turn off the device. | Indicates that the packing operation is completed. Switch off the machine. |
| Please check the DATE/TIME | The battery for the built-in clock has become worn out. Before using, confirm the time and date on the SETUP menu. If the message comes up frequently, call your service engineer. |
| Incorrect password | Displayed when the password inputted to select a special mode is incorrect. |

## AIR CHECK

If a problem is suspected, do the air check.
If the result is "abnormal action(+)" or "abnormal action(-)," call your dealer or TOPCON at the address printed on the back cover of this manual. For details about the air check, see "AIR CHECK" on page 34.

## TROUBLE-SHOOTING OPERATIONS

| **⚠ WARNING** | To avoid electrical shock, do not open the instrument. All service should be performed by a qualified service engineer. |
|---|---|

If a problem is suspected, use the following check list.
If following the instructions does not improve the condition, or if your problem is not included in the list, contact your dealer or TOPCON at the address on the back cover.

**CHECK LIST**

| Trouble | Condition | Check | Page |
|---|---|---|---|
| Control panel does not turn on. | ——— | Is power cable unplugged? | 25 |
| | | Is power cable connected to the instrument? | 25 |
| | • Fuse blows when the POWER switch is turned on. | Call our service engineer. | 96 |
| Control panel is not clear. | • The image is dark. | Confirm the brightness by "Control panel brightness." | 85 |
| A malfunction is found in a movable part. | ——— | Do not move it forcibly. Instead, call a service engineer. | 31 |
| Printing is not done. | • Paper comes out without printing. | Confirm the direction of the paper roll. If the direction is incorrect, reset the paper to the proper direction. | 27 |
| | • Paper does not come out. | If “Paper end.” displayed on the control panel, replenish the printer paper. | 27 |

# SPECIFICATIONS AND PERFORMANCE

## SPECIFICATIONS AND PERFORMANCE

| | |
|---|---|
| REF measurement | |
| Measurement Range | Spherical refractive power: -30D to +25D(Display unit: 0.12D/0.25D steps)<br>Cylindrical refractive power:0D to ±12D (Display unit: 0.12D/0.25D steps)<br>Direction of astigmatic axis: 0° to 180° (Display unit: 1°/5° steps)<br>(where, spherical refractive power + cylindrical refractive power≦+25D, or spherical refractive power + cylindrical refractive power≧-30D) |
| Measured minimum pupil diameter | ϕ2.0mm |
| PD measurement range | 20 to 85mm (1mm steps) |
| Target fixation | Auto fog system |
| KRT measurement | |
| Measurement Range | Cornea curvature radius: 5.00mm to 13.00mm (Display unit: 0.01mm)<br>Corneal refractive power: 67.50D to 25.96D (Display unit: 0.12D/0.25D steps)<br>(where, corneal refractive power =1.3375)<br>Corneal astigmatic power: 0D to ±12D (Display unit: 0.12D/0.25D steps)<br>Direction of corneal astigmatic axis: 0° to 180° (Display unit: 1°/5° steps) |
| Ocular pressure measurement | |
| Measuring range | 1mmHg to 60mmHg<br>(Display unit: 1mmHg step display, Average value: 1mmHg/0.1mmHg step display) |
| Measuring range | 1 to 30mmHg/1 to 60mmHg, 2 step display |
| Cornea thickness measurement | |
| Measuring range | 0.400mm to 0.750mm (Display unit: 0.001mm step display) |

| | |
|---|---|
| **NOTE** | Essential performance<br>• Measurement must be performed correctly.<br>• Monitor screen display must not be distorted. |

# GENERAL INFORMATION ON USAGE AND MAINTENANCE

## INTENDED PATIENT POPULATION

The patient who undergoes an examination by this instrument must maintain concentration for a few minutes and keep to the following instructions:

- To fix the face to the chinrest, forehead rest.
- To keep the eye open.
- To understand and follow instructions when undergoing an examination.

## INTENDED USER PROFILE

Since the Auto Kerato-refracto tonometer TRK-2P is a medical device, the operation should be supervised by a physician.

## ENVIRONMENTAL CONDITIONS OF USE

| | |
|---|---|
| Temperature: | 10°C to 40°C |
| Humidity: | 30% to 90% RH (without condensation) |
| Atmospheric pressure: | 700hPa to 1060hPa |

## STORAGE, USAGE PERIOD

1. Environmental conditions (without package)

   *Temperature : 10°C to 40°C
   Humidity : 10% to 95% (without condensation)
   Air pressure : 700hPa to 1060hPa

   * THIS INSTRUMENT DOES NOT MEET THE TEMPERATURE REQUIREMENTS OF ISO 15004-1 FOR STORAGE. DO NOT STORE THIS INSTRUMENT IN CONDITIONS WHERE THE TEMPERATURE MAY RISE ABOVE 40°C OR FALL BELOW 10°C.

2. When storing the instrument, ensure that the following conditions are met:
   (1) The instrument must not be splashed with water.
   (2) Store the instrument away from environments where air pressure, temperature, humidity, ventilation, sunlight, dust, salty/sulfurous air, etc. could cause damage.
   (3) Do not store or transport the instrument on a slanted or uneven surface or in an area where it is subject to vibrations or instability.
   (4) Do not store the instrument where chemicals are stored or gas is generated.
3. Normal life span of the instrument:

   8 years from delivery providing regular maintenance is performed [TOPCON data]

## ENVIRONMENTAL CONDITIONS FOR PACKAGING IN STORAGE

(Product in its normal transport and storage container as provided by manufacturer)

| | |
|---|---|
| Temperature | : -20°C to 50°C |
| Humidity | : 10% to 95% |

## ENVIRONMENTAL CONDITIONS FOR PACKAGING IN TRANSPORTATION

(Product in its normal transport and storage container as provided by manufacturer)

Temperature : -40°C to 70°C

Humidity : 10% to 95%

## ELECTRIC RATING

Source voltage : 100-240V AC, 50-60Hz

Power input : 100VA

## SAFETY DESIGNATIONS PER IEC 60601-1 STANDARD

- Type of protection against electric shocks: Class I
  The Class I equipment provides means to connect itself to the protective grounding system of utilities to thereby independently provide protection against electric shocks by keeping connectable metal components nonconductive in case of a failure in the basic insulation.
- Degree of protection against electric shocks: B type applied component
  The B type applied component provides the specified degree of protection against electric shocks with regard to the reliability particularly of leak current, patient measuring current and protective utility connection (in case of Class I equipment).
- Degree of protection against harmful intrusion of water (IEC 60529): IPX0
  This product does not provide protection against intrusion of water.
  (The degree of protection against harmful ingress of water defined in IEC 60529 is IPX0)
- Classification by sterilization/disinfection method specified by manufacturer
  This product does not have a component requiring sterilization/disinfection.
- Classification by safety of use in air/flammable anesthetic gas, oxygen or nitrous oxide/flammable anesthetic gas atmosphere
  - Equipment not suited for use in air/flammable anesthetic gas, oxygen or nitrous oxide/flammable anesthetic gas atmosphere
  - This product should be used in an environment free of flammable anesthetic gas and other flammable gases.
- Classification by operation mode
  Continuous operation refers to an operation under normal load conditions, within the specified temperature and without limitations on the operating time.

## DIMENSIONS AND WEIGHT

Dimensions: 293~396mm(W) × 505~601mm(D) × 470~682mm(H)

Weight : 22.0kg

## OPERATION PRINCIPLE

REF measurement:

The instrument projects a near infrared light to retina and the reflected image is received by a CCD camera, and the spherical refractive power, cylindrical refractive power and the axis of astigmatism that are required for the correction lens for making a patient's eye stigmatism, are determined through computation.

KRT measurement:

The instrument performs corneal curvature radius measurements through computation by projecting a kerato-ring to the cornea and receiving the reflected image by a CCD camera from the cornea surface, and by the corneal curvature radius computes the corneal refractive power, corneal astigmatic power, and corneal astigmatic axis angle.

Ocular Pressure Measurement:

By ejecting air from the measuring nozzle to the cornea, detect by a pressure sensor the internal cylinder pressure required for the cornea to reach a prescribed deformed state (with a certain plane area), and calculate the ocular pressure value by computing.

Cornea Thickness Measurement:

The slit light is projected onto the patient cornea at a slant, and the corneal thickness is measured by processing the reflected light, which is received by a sensor, from the corneal surface and the corneal back.

## CHECKPOINTS FOR MAINTENANCE

1. Regularly maintain and check the equipment and parts.
2. When resuming the use after a long period of storage, verify that the instrument operates correctly and safely.
3. To ensure the correct reading, do not mar the measuring window with finger prints, dust, etc.
4. If the measuring window is soiled, clean it following the "CLEANING THE MEASURING NOZZLE AND THE GLASS INSIDE THE MEASURING NOZZLE" instructions on page 93.

## DISPOSAL

When disposing of the instrument and/or parts, follow local regulations for disposal and recycling.

**NOTE**

This symbol is applicable for EU member countries only.
To avoid potential damage to the environment and possibly human health, this instrument should be disposed of (i) for EU member countries - in accordance with WEEE (Directive on Waste Electrical and Electronic Equipment), or (ii) for all other countries, in accordance with local disposal and recycling laws.

**[WARNING]**
This Product Contains Mercury in the backlighting of the LCD display. Prior to disposal remove or otherwise ensure that this is disposed of in accordance with Local, State and Federal Laws. This information is applicable in U.S.A only.

This product contains a CRL Lithium Battery which contains Perchlorate Material-special handling may apply.
See http://www.dtsc.ca.gov/hazardouswaste/perchlorate/
Note; This is applicable to California, U.S.A. only

## ELECTROMAGNETIC COMPATIBILITY

The product conforms to the EMC standard (IEC 60601-1-2 Ed3.0:2007)

a)MEDICAL ELECTRICAL EQUIPMENT needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in the ACCOMPANYING DOCUMENTS.

b)Portable and mobile RF communications equipment can affect MEDICAL ELECTRICAL EQUIPMENT.

c)The use of ACCESSORIES, transducers and cables other than those specified, with the exception of transducers and cables sold by the manufacturer of the EQUIPMENT or SYSTEM as replacement parts for internal components, may result in increased EMISSIONS or decreased IMMUNITY of the EQUIPMENT or SYSTEM.

d)The EQUIPMENT or SYSTEM should not be used adjacent to or stacked with other equipment. If adjacent or stacked use is necessary, the EQUIPMENT or SYSTEM should be observed to verify normal operation in the configuration in which it will be used.

e)The use of the ACCESSORY, transducer or cable with EQUIPMENT and SYSTEMS other than those specified may result in increased EMISSION or decreased IMMUNITY of the EQUIPMENT or SYSTEM.

<table>
<tr><th colspan="3">Guidance and manufacturer's declaration - electromagnetic emissions</th></tr>
<tr><td colspan="3">The TRK-2P is intended for use in the electromagnetic environment specified below.<br>The customer or the user of the TRK-2P should assure that it is used in such an environment.</td></tr>
<tr><th>Emissions test</th><th>Compliance</th><th>Electromagnetic environment - guidance</th></tr>
<tr><td>RF emissions<br>CISPR 11</td><td>Group 1</td><td>The TRK-2P uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.</td></tr>
<tr><td>RF emissions<br>CISPR 11</td><td>Class B</td><td rowspan="3">The TRK-2P is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.</td></tr>
<tr><td>Harmonic emissions<br>IEC61000-3-2</td><td>Complies</td></tr>
<tr><td>Voltage fluctuations/<br>flicker emissions<br>IEC61000-3-3</td><td>Complies</td></tr>
</table>

| Guidance and manufacturer's declaration - electromagnetic immunity | | | |
|---|---|---|---|
| The TRK-2P is intended for use in the electromagnetic environment specified below.<br>The customer or the user of the TRK-2P should assure that it is used in such an environment. | | | |
| **Immunity test** | **IEC 60601 test level** | **Compliance level** | **Electromagnetic environment - guidance** |
| Electrostatic discharge (ESD)<br>IEC 61000-4-2 | ± 6 kV contact<br><br>± 8 kV air | ± 6 kV contact<br><br>± 8 kV air | Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%. |
| Electrical fast transient/burst<br>IEC 61000-4-4 | ± 2 kV for power supply lines<br><br>± 1 kV for input/output lines | ± 2 kV for power supply lines<br><br>± 1 kV for input/output lines | Mains power quality should be that of a typical commercial or hospital environment. |
| Surge<br>IEC 61000-4-5 | ± 1 kV<br>line(s) to line(s)<br><br>± 2 kV<br>line(s) to earth | ± 1 kV<br>line(s) to line(s)<br><br>± 2 kV<br>line(s) to earth | Mains power quality should be that of a typical commercial or hospital environment. |
| Voltage dips, short interruptions and Voltage variations on power supply input lines<br>IEC 61000-4-11 | <5% $U_t$<br>(>95% dip in $U_t$)<br>for 0, 5 cycle<br>40% $U_t$<br>(60% dip in $U_t$)<br>for 5 cycles<br>70% $U_t$<br>(30% dip in $U_t$)<br>for 25 cycles<br><5% $U_t$<br>(>95% dip in $U_t$)<br>for 5 sec. | <5% $U_t$<br>(>95% dip in $U_t$)<br>for 0, 5 cycle<br>40% $U_t$<br>(60% dip in $U_t$)<br>for 5 cycles<br>70% $U_t$<br>(30% dip in $U_t$)<br>for 25 cycles<br><5% $U_t$<br>(>95% dip in $U_t$)<br>for 5 sec. | Mains power quality should be that of a typical commercial or hospital environment. If the user or the TRK-2P requires continued operation during power mains interruptions, it is recommended that the TRK-2P be powered from an uninterruptible power supply or battery. |
| Power frequency (50/60 Hz) magnetic field<br>IEC 61000-4-8 | 3 A/m | 3 A/m | Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment. |
| NOTE $U_t$ is the a.c. mains voltage prior to application of the test level. | | | |

| Guidance and manufacturer's declaration - electromagnetic immunity | | | |
|---|---|---|---|
| The TRK-2P is intended for use in the electromagnetic environment specified below.<br>The customer or the user of the TRK-2P should assure that it is used in such an environment. | | | |
| **Immunity test** | **IEC 60601 test level** | **Compliance level** | **Electromagnetic environment - guidance** |
| Conducted RF<br>IEC 61000-4-6<br><br>Radiated RF<br>IEC 61000-4-3 | 3 Vrms<br>150kHz to 80MHz<br><br>3 V/m<br>80MHz to 2, 5GHz | 3 V<br><br>3 V/m | Portable and mobile RF communications equipment should be used no closer to any part of the TRK-2P, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.<br><br>Recommended separation distance<br>$d = 1.2 \sqrt{P}$<br>$d = 1.2 \sqrt{P}$ 80MHz to 800MHz<br>$d = 2.3 \sqrt{P}$ 800MHz to 2, 5GHz<br><br>where $P$ is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and $d$ is the recommended separation distance in meters (m).<br><br>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, [a] should be less than the compliance level in each frequency range. [b]<br><br>Interference may occur in the vicinity of equipment marked with the following symbol:<br>  |
| NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.<br>NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people. | | | |
| a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the TRK-2P is used exceeds the applicable RF compliance level above, the TRK-2P should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the TRK-2P.<br>b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m. | | | |

| Recommended separation distance between portable and mobile RF communications equipment and the TRK-2P | | | |
|---|---|---|---|
| The TRK-2P is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the TRK-2P can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the TRK-2P as recommended below, according to the maximum output power of the communications equipment. | | | |
| **Rated maximum output power of transmitter W** | **Separation distance according to frequency of transmitter m** | | |
| | **150kHz to 80MHz** $d = 1.2\sqrt{P}$ | **80MHz to 800MHz** $d = 1.2\sqrt{P}$ | **800MHz to 2,5GHz** $d = 2.3\sqrt{P}$ |
| 0, 01 | 0, 12 | 0, 12 | 0, 23 |
| 0, 1 | 0, 38 | 0, 38 | 0, 73 |
| 1 | 1.2 | 1.2 | 2.3 |
| 10 | 3.8 | 3.8 | 7.3 |
| 100 | 12 | 12 | 23 |
| For transmitters rated at a maximum output power not listed above, the recommended separation distance *d* in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.<br>NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.<br>NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people. | | | |

## REQUIREMENTS FOR THE EXTERNAL DEVICE

The external device connected to the analog and digital interfaces must comply with the respective IEC or ISO standards (e.g. IEC 60950-1 for data processing equipment and IEC 60601-1 for medical equipment).

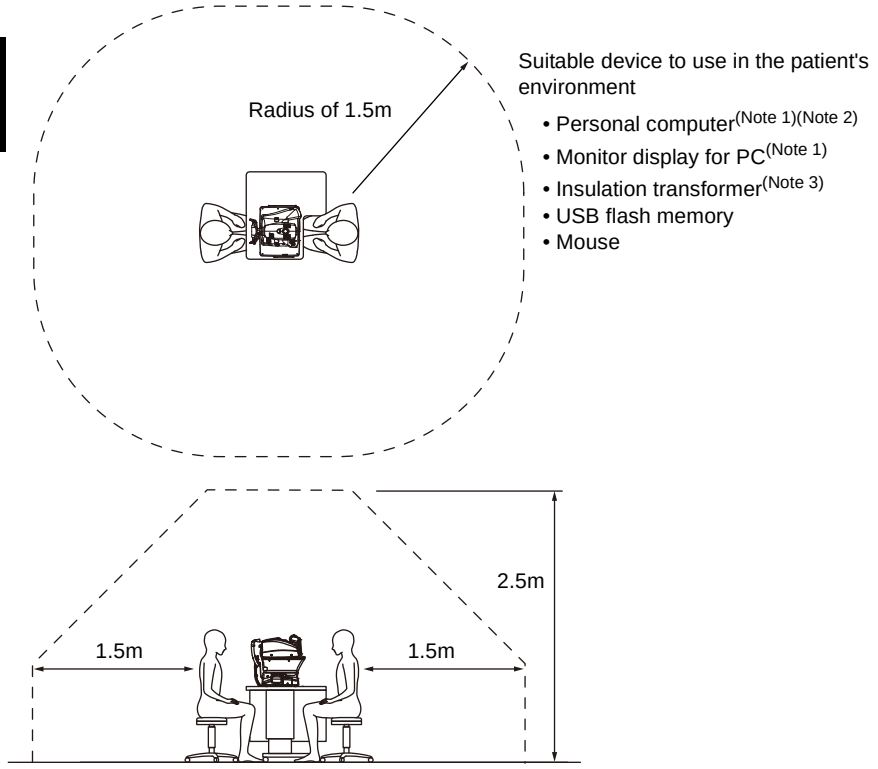
Anybody connecting additional equipment to medical electrical equipment configures a medical system and is therefore responsible that the system complies with the requirements for medical electrical systems. Attention is drawn to the fact that local laws take priority over the above mentioned requirements. If in doubt, contact your dealer or TOPCON (see the back cover).

## PATIENT'S ENVIRONMENT

When the patient or inspector comes into contact with the devices (including the connecting devices) or when the patient or inspector is in contact with the person that touches the devices (including the connecting devices), the patient's environment is shown below.

In the patient's environment, use devices conforming to IEC60601-1. If you are compelled to use any device not conforming to IEC60601-1, use an insulation transformer or the common protective earth system.

Do not use multiple outlet strip in the patient's environment.
Be sure to connect the power supply to commercial power.




Note 1: Use the personal computer conforming to IEC60950-1.

Note 2: Don't remove the cover from the personal computer.

Note 3: Use the insulation transformer conforming to IEC60601-1.

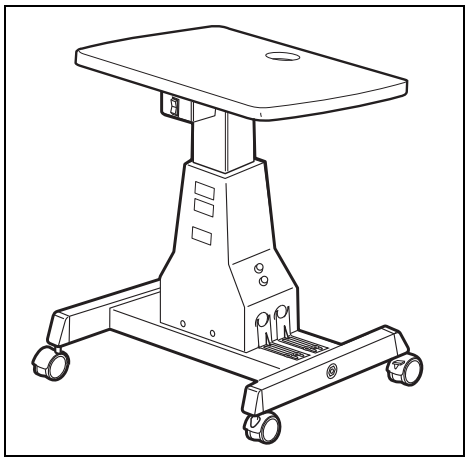
| | |
|---|---|
| ⚠ **CAUTION** | • Don't connect an additional power strip or an extension cord to the system.<br>• Don't connect any device which is not recognized as one component of the system.<br>• The total 1kVA is the maximum allowable load of the auxiliary power supply socket for the insulation transformer, which is provided for the system.<br>Don't connect the device exceeding this capacity.<br>• Use the auxiliary power supply socket of the insulation transformer to power only a device that will be a component of the system.<br>• It is dangerous to connect any device which is not used as a component of the system, to the insulation transformer.<br>• When the insulation transformer is not used, the personal computer and the monitor for the personal computer must be installed out of the patient's environment. |

# REFERENCE

## OPTIONAL ACCESSORIES

- Adjustable instrument table AIT-16

The table height can be adjusted to facilitate measurement.



Specifications

- Dimensions.....525(W)x490(D)mm
- Table height.....660~880mm
- Table size .....490x500mm
- Weight .....approx. 23kg
- Power consumption.....150VA (100-120V, 220-240V)

## SHAPE OF PLUG

| Country | Voltage/frequency | Shape of plug |
|---|---|---|
| Mexico | 110V/50Hz | Type C&E |
| Argentina | 220V/60Hz | Type A |
| Peru | 220V/60Hz | Type A |
| Venezuela | 110V/50Hz | Type C&E |
| Bolivia & Paraguay | 220V/60Hz | Type A (Most common)<br>Type H (Infrequently) |
| Chile | 220V/60Hz | Type A |
| Colombia | 110V/50Hz | Type C |
| Brazil | 220V/60Hz<br>127V/60Hz | Type A<br>Type C |
| Ecuador | 110V/50Hz | Type C&E |
| USA | 120V/60Hz | Type A (Hospital Grade) |
| Canada | 120V/60Hz | Type A (Hospital Grade) |

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- Serial No.: Marked on the rating nameplate.
- Period of use: Please inform us of the date of purchase.
- Defective condition: Please provide us with as much detail as possible.

AUTO KERATO-REFRACTO TONOMETER TRK-2P

USER MANUAL
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75-1 Hasunuma-cho, Itabashi-ku, Tokyo, 174-8580 Japan.

AUTO KERATO-REFRACTO TONOMETER

# TRK-2P


**TOPCON MEDICAL SYSTEMS, INC.**
111 Bauer Drive, Oakland, NJ 07436, USA Phone:+1-201-599-5100 Fax:+1-201-599-5250 www.topconmedical.com

**TOPCON CANADA INC.**
110 Provencher Avenue, Boisbriand, QC J7G 1N1 CANADA Phone:+1-450-430-7771 Fax:+1-450-430-6457 www.topcon.ca

**TOPCON EUROPE MEDICAL B.V.**
(European Representative)(European Sole Sales Company)
Essebaan 11; 2908 LJ Capelle a/d IJssel; P.O.Box145; 2900 AC Capelle a/d IJssel; THE NETHERLANDS
Phone:+31 -(0)10-4585077 Fax:+31 -(0)10-4585045 E-mail: medical@topcon.nl; www.topcon.eu

**ITALY OFFICE**
:Viale dell' Industria 60; 20037 Paderno Dugnano; (Milano), ITALY Phone:+39-02-9186671 Fax:+39-02-91081091 E-mail: topconitaly@tiscali.it; www.topcon.it

**DANMARK OFFICE**
:Praestemarksvej 25; 4000 Roskilde, DANMARK Phone:+45-46-327500 Fax:+45-46-327555 E-mail: topcon@topcondanmark.dk www.topcondanmark.dk

**IRELAND OFFICE**
:Unit 276, Blanchardstown; Corporate Park 2 Ballycoolin Dublin 15, IRELAND Phone:+353-18975900 Fax:+353-18293915 E-mail: medical@topcon.ie; www.topcon.ie

**TOPCON DEUTSCHLAND G.m.b.H.**
Hanns-Martin-Schleyer Strasse 41; D-47877 Willich, GERMANY Phone:+49-(0)2154-8850 Fax:+49-(0)2154-885177 E-mail:med@topcon.de; www.topcon.de

**TOPCON ESPAÑA S.A.**
**HEAD OFFICE**:Frederic Mompou 4 Esc. A Bajos 3, 08960 Sant Just Desvern Barcelona, Spain Phone:+34-93-4734057 Fax:+34-93-4733932 E-mail: medica@topcon.es; www.topcon.es

**TOPCON S.A.R.L.**
BAT A1 3 route de la révolte 93206 SAINT DENIS CEDEX, FRANCE Phone:+33 1 49 21 23 23 Fax:+33 1 49 21 23 24 E-mail:topcon@topcon.fr; www.topcon.fr

**TOPCON SCANDINAVIA A.B.**
Neongatan 2; P.O.Box 25; 43151 Mölndal, SWEDEN Phone:+46-(0)31-7109200 Fax:+46-(0)31-7109249 E-mail:medical@topcon.se; www.topcon.se

**TOPCON ( GREAT BRITAIN ) LTD.**
Topcon House,Kennet Side,Bone Lane,Newbury,Berkshire RG14 5PX United Kingdom
Phone:+44-(0)1635-551120 Fax:+44-(0)1635-551170 E-mail: info@topcon.co.uk; www.topcon.co.uk

**TOPCON POLSKA Sp. z. o. o.**
ul. Warszawska 23; 42-470 Siewierz, POLAND Phone:+48-(0)32-6705045 Fax:+48-(0)32-6713405 www.topcon-polska.pl

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1 Jalan Kilang Timor, Pacific Tech Centre #09-01 Singapore 159303 Phone:+65-68720606 Fax:+65-67736150 www.topcon.com.sg

**TOPCON INSTRUMENTS ( MALAYSIA ) SDN.BHD.**
No. D1, (Ground Floor), Jalan Excella 2, Off Jalan Ampang Putra, Taman Ampang Hilir, 55100 Kuala Lumpur, MALAYSIA Phone:+60-(0)3-42709866 Fax:+60-(0)3-42709766

**TOPCON INSTRUMENTS ( THAILAND ) CO.,LTD.**
77/162 Sinnsathorn Tower, 37th Floor, Krungthonburi Rd., Klongtonsai, Klongsarn, Bangkok 10600,THAILAND Phone:+66(0)2-440-1152~7 Fax:+66-(0)2-440-1158

**TOPCON CORPORATION BEIRUT OFFICE**
P.O.Box 70-1002 Antelias,Beirut, LEBANON Phone:+961-4-523525/523526 Fax:+961-4-521119

**TOPCON CORPORATION DUBAI OFFICE**
P.O.Box 293705, Dubai Airport Free Zone L.I.U J-12, Dubai, U.A.E. Phone:+971-4-299-5900 Fax:+971-4-299-5901

**Manufacturer**

## TOPCON CORPORATION

75-1 Hasunuma-cho,Itabashi-ku,Tokyo,174-8580 Japan.
Phone:3-3558-2520 Fax:3-3960-4214 www.topcon.co.jp



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