TOPCON

USER MANUAL

COMPUTERIZED TONOMETER
CT-800

INTRODUCTION

Thank you for purchasing the TOPCON Computerized Tonometer CT-800.

INTENDED USE / INDICATIONS FOR USE

Measured through the cornea based on the tension of the eye pressure within the eye ball, to provide information for diagnosis.

FEATURES

This instrument features the following:
• By spraying air, intraocular pressure can be correctly measured in non-contact.
• Easy operation can be performed by using Z alignment mark.

PURPOSE OF THIS MANUAL

This User Manual provides an overview of the basic operation, troubleshooting, checking, maintenance and cleaning of the TOPCON Computerized Tonometer CT-800.
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 nozzle cap and dust cover.
• For accurate Photographing image, take care to keep the Photographing window clean and free of fingerprints, spots and dust.

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

Since this product partly uses a program derived from IPA Font, using the product is regarded as consent to the IPA Font License Agreement v1.0.
For the IPA Font License Agreement v1.0, the following URL.
http://ipafont.ipa.go.jp/ipa_font_license_v1.html

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GENERAL SAFETY INFORMATION

⚠ CONTRAINDICATIONS/PROHIBITIONS

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. 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.
• Patients with infectious disease such as Keratoconjunctivitis Epidemica

Ensuring the Safety of Patients and Operators

To avoid injury when operating the chinrest up/down knob, 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.
When the instrument operates with the maximum light volume, exposure for more than 2 hours will exceed the safety guideline.

Preventing Electric Shocks and Fires

To avoid injury by electric shock, do not open the cover. For repair, call your service engineer.

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 USE THIS MANUAL

- Read the instructions on pages 1 to 10 before using the machine.
- Regarding connection to various devices, see "CONNECTING EXTERNAL I/O TERMINALS" on page 21.
- If you would like an overview of the system, begin by reading "BASIC OPERATIONS"(page 24).
- For setting various functions, see "SETTING FUNCTIONS ON SETUP SCREEN" on page 48.

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.

CLEANING OF THE INTRAOCULAR PRESSURE MEASURING WINDOW

For details, See "CLEANING THE INTRAOCULAR PRESSURE MEASURING WINDOW" on page 56.

CLEANING THE MEASURING NOZZLE AND WINDOW GLASS INSIDE THE 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 57.

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
⚠ **CONTRAINDICATIONS/ PROHIBITIONS**	Indicates a serious risk is more than the profits obtained by use of the instrument. A patient who should not be used according to a condition, a primary disease, complications, an anamnesis, family history and a predisposition is shown.
⚠ **WARNING**	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ **CAUTION**	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
NOTES	Useful functions to know. Paying attention to these will prevent the noted problems.

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 instruction manual/booklet	Voir le manuel/la brochure
📅	ISO 7000-2497	Date of manufacture	Date de fabrication
SN	ISO 7000-2498	Serial number	Numéro de série
⇨◯	IEC 60878 0020	Brake ON (Base fixed)	Freiner (Base fixée)
⇦◯	IEC 60878 0021	Brake OFF (Base fixation releasing)	Desserrer le frein (Désengagement de la fixation de la base)
◁⇦	———	Safety stopper setting position	Position de réglage de l'arrêt de sécurité
🏭	ISO 7000-3082	Manufacturer	Fabricant
EC REP	ISO 15223-1	Authorised Representative in the European Community	Représentant autorisé pour l'Union européenne

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** To avoid injury caused by electric shock, do not open the cover. Ask your dealer for service. **MISE EN GARDE** Ne pas ouvrir le couvercle pour éviter les blessures causées par un choc électrique. Demander au revendeur d'effectuer le service.
2	⚠	**CAUTION** Be sure to set the safety stop. If not, it may cause injury by touching the instrument to patient's eye or nose. **PRÉCAUTION** Veillez à configurer l'arrêt de sécurité. Si non, cela peut provoquer des blessures en heurtant l'œil ou le nez du patient avec l'instrument.
3	⚠	**CAUTION** Be careful not to hit the patient's eyes or nose with the instrument during operation. The patient may be injured. **PRÉCAUTION** Prendre garde de ne pas frapper les yeux ou le nez du patient avec l'instrument pendant l'opération.
4	⚠	**CAUTION** Pay much attention not to touch the internal printer's body when the cover is open. If touched, it may result in trouble due to electrostatic discharge. **PRÉCAUTION** Faites très attention à ne pas toucher le corps interne de l'imprimante lorsque le couvercle est ouvert. En cas de contact, des problèmes peuvent survenir en raison de la décharge électrostatique.
5	⭍	Degree of protection against electric shock: TYPE B APPLIED PART Degré de protection contre les chocs électriques: TYPE B PARTIE D'APPLICATION

COMPONENTS

COMPONENT NAMES

Main Body Section

Measuring head

Control panel

Printer cover open button

Printer cover

Power Unit Section

Base stopper

Measurement switch

Control lever

External I/O terminal
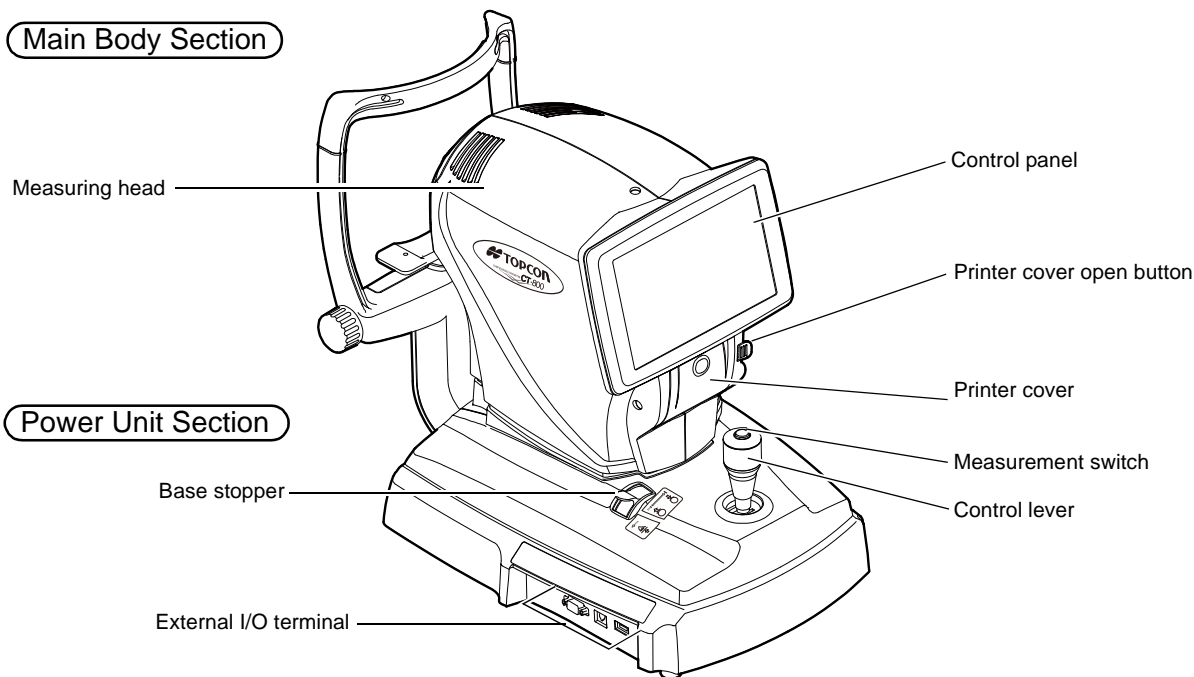
Position of the base stopper

Graphic symbol

Safety stopper
setting position

Base stopper
released position

Base stopper
fixed position

Chinrest Section

Forehead rest [1]

Eye height mark

Measuring window

Measuring nozzle

Nozzle cap holder

Chinrest [1]

Chinrest tissue pin

Chinrest up/down knob

POWER switch

Nozzle cap

Power inlet
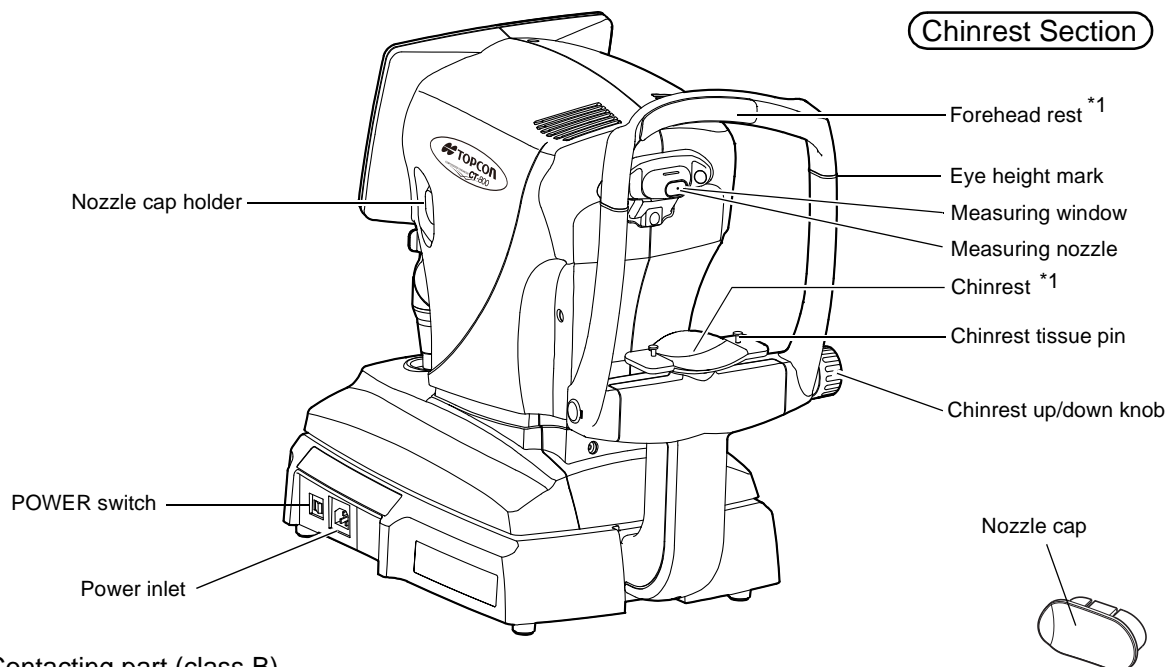
[1]: Contacting part (class B)

COMPOSITION OF PARTS WHICH CONTACT THE HUMAN BODY

Forehead rest : Silicone rubber
Chinrest   : Acrylonitrile butadiene styrene resin

OPERATION METHOD OF CONTROL PANEL

<table>
<tr>
<td>📝 NOTE</td>
<td>• The control panel is a touch panel. Do not use any sharp tools; e.g. ball point pen.
• Do not touch two points on a control panel simultaneously.</td>
</tr>
</table>

Tap → To select any relevant item.

Touch the control panel softly with a finger.

CONTROL PANEL COMPONENTS

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.

| ID | ID button...Input the patient ID (up to 13 characters) and operator ID (up to 13 characters). However, if no patient ID is input, the patient No. is allocated automatically. |

R L R display/L display..........................Shows the measured eye is R (Right eye) or L (Left eye). The measured eye is framed in orange.

Air check button ....Checks that the measurement system of the instrument operates properly.

 Auto Shoot button ....Switches Auto Shoot mode on and Auto Shoot mode off. When Auto Shoot is selected, "Auto Shoot" is displayed on the control panel, and this button is framed in orange.

 Settings button ....Displays the Settings screen.

FUNCTION BUTTON

IOL button

30/60 button

All data button

Print out button

ALL CLEAR button
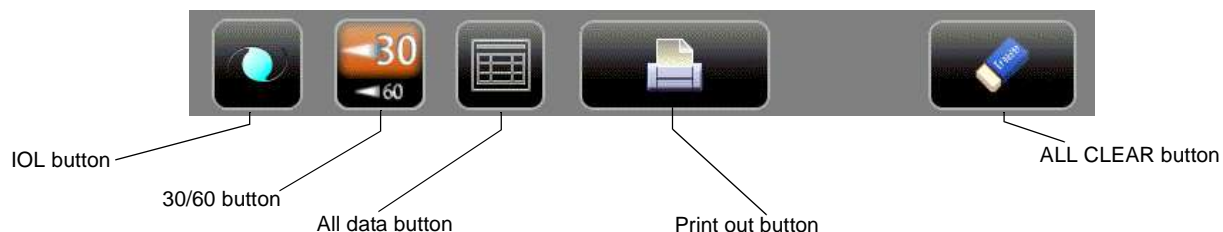
 IOL button ....If aligning is impossible in measuring an IOL-inserted eye, tapping this button may allow the measurement. When the button is selected, "IOL" is displayed on the control panel and the selected button is framed in orange.

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

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

 Print out button...............................Displays on measurement stand-by and prints measurement results. Tap the button when no measurement data is present to feed the paper.

 ALL CLEAR button ....Clears all measurement data.

MONITOR SCREEN

MEASUREMENT SCREEN

Display unit mark of ocular pressure value

Auto Shoot display

Patient No./Patient ID

Operator ID

Number of TONO measurement times

TONO measurement value

Sign of PACHO entered
00: not entered
01: entered

PACHO input value

Alignment mark

Device ID number

Display unit mark of cornea thickness

Outer alignment mark

TONO average value

TONO adjusted average value

Patient ID   Auto Shoot   TOPCON_TAROU

T Ø3   Ø3 T
11   11
[13]   11
12   11
mmHg   mmHg
P 01   P
0.499   0.500
mm   mm
Ø1
AVG 11   ADJ 11   AVG 11   ADJ 11

SETUP SCREEN

1/3			
Initial	Buzzer sound	ON ▷	OFF
Print	Auto Shoot	ON ▷	ON
Comm	Printer output	ON ▷	
LAN	Show Pacho value	ON ▷	
Operator ID	Show Tono average	ON ▷	
Special	Show Adj value	ON ▷	
	Patient No. reset	OFF ▷	
Return	Display of patient ID	ON ▷	

ALL DATA SCREEN

Measurement item

Right/Left eye titles

RIGHT
PACHO:0.555mm

LEFT
PACHO:0.555mm

	TONO (hPa)	ADJ (hPa)	TONO (mmHg)	ADJ (mmHg)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
AVG				

pacho

Exit button →

Measurement count/average

Measurement result values

PATIENT ID INPUT SCREEN

Patient ID (13)

Enter window

Keyboard

Capital lock key

Reset button

OK button
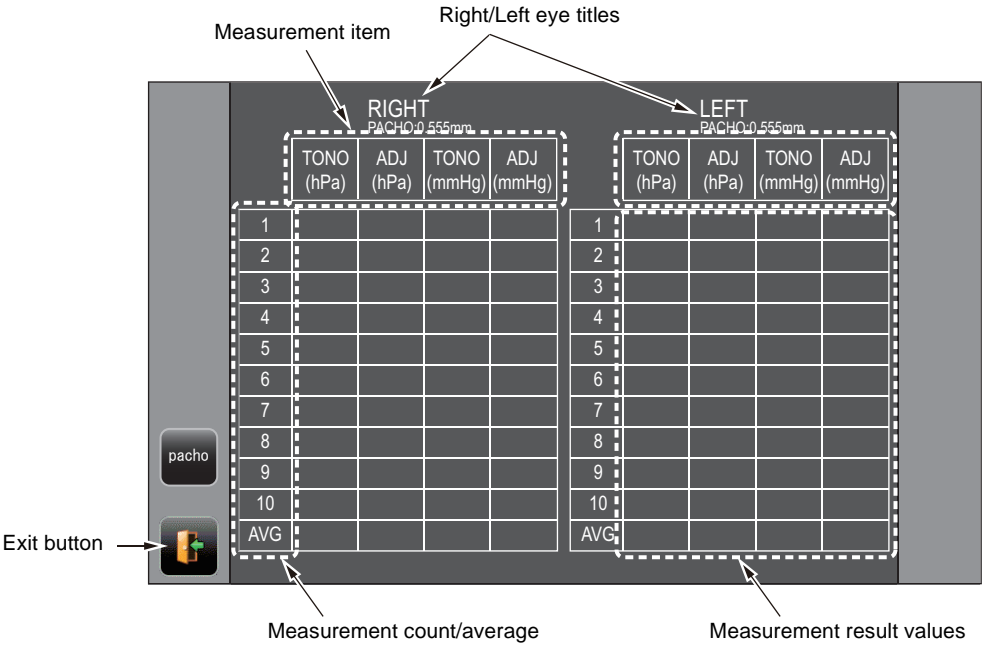
Cancel button
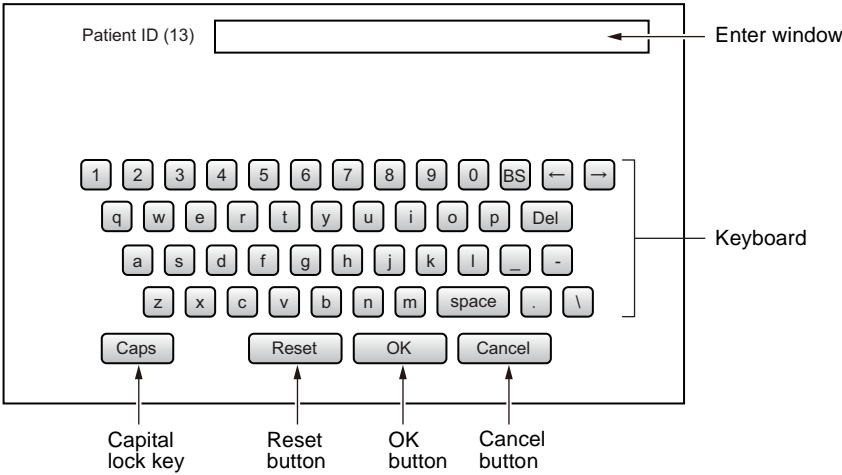
PRINTER OUTPUT

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

Device ID number	Barcode
	Patient No.
	Operator ID
	Name entry column
Measurement date	Device ID number
Serial number	Patient No. (Patient ID when Patient ID is input)∗
Title of Tono value	
Display unit at Tono	
Tono value on display unit "hPa"	Tono average value on display unit "hPa"
Result of IOP adjustment by CCT	
Adjusted Tono value	Average value of adjusted Tono value
Title of Pacho value	Display unit of CCT
Input value of CCT	
Title of IOP ADJ Formula	Center CCT Base/ IOP Adjustment Coefficient
	Topcon Logo mark
	Message column

Printout contents:

```
              -CT 010017-

OID:TOPCON_TAROU

NAME

2012_01_01            AM 11:00
NO:Patient ID                   01
SN:0000001
TONO. DATA
               hPa          AVG.
R   (13)M   ( 8)M   7M      7.0
L      9    ( 7)   (10)     9.0
              ADJ.          AVG.
R   (13)M   ( 8)M   7M      7.0
L      9    ( 7)   (10)     9.0

PACH. DATA
R   541 um
L   541 um

IOP ADJ FORMULA
  A : 520   B : 120

                        TOPCON
Hello World
```

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

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

Label (left)	Content	Label (right)
	(barcode)	Barcode
Device ID number — Patient No.	-CT 010017-	
	OID:TOPCON_TAROU	Operator ID
	NAME	Name entry column
Measurement date	2012_01_01 AM 11:00	
	NO:Patient ID 01	Device ID number Patient No. (Patient ID when Patient ID is input)*
Serial number	SN:0000001	
Title of TONO value	**TONO. DATA**	
Adjusted Tono value	**< R >**	Tono value on display unit "hPa"
	mmHg ADJ. hPa ADJ.	Tono value of IOP adjustment by CCT
Tono value on display unit "mmHg"	ERR ERR ERR ERR	
	12 12 16M 16M	
	(13) (13) (17) (17)	Adjusted Tono value "hPa"
Average value of adjusted measurement value	13 13 17 17	
	AVG	Tono average value on display "hPa"
Tono average value on display unit "mmHg"	12.5 12.5 16.5 16.5	Average value of adjusted measurement value "hPa"
Title of Pacho value	**PACH. DATA**	
Input value of CCT	**< R > mm**	Display unit at Pacho
	0 . 5 1 0	
	TONO. DATA	
	< L >	
	mmHg ADJ. hPa ADJ.	
	ERR ERR ERR ERR	
	12 12 16M 16M	
	(13) (13) (17) (17)	
	13 13 17 17	
	AVG	
	12.5 12.5 16.5 16.5	
	PACH. DATA	
	< L > mm	
	0 . 5 1 0	
Title of IOP ADJ Formula	**IOP ADJ FORMULA**	Center CCT Base/ IOP Adjustment Coefficient
	A : 520 B : 120	
	TOPCON	Topcon Logo mark
	Hello World	Message column

17
COMPONENTS

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

Label (left)	Printed content	Label (right)
	[Barcode]	Barcode
Device ID number	-CT 010017-	Patient No.
	OID:TOPCON_TAROU	Operator ID
	NAME	Name entry column
	2012_01_01 AM 11:00	
	NO:Patient ID 01	Device ID number
Serial number	SN:0000001	Patient No. (Patient ID when Patient ID is input)*
Title of TONO value	TONO. DATA	

< R >		< L >		
mmHg	ADJ.	mmHg	ADJ.	Tono value of IOP adjustment by CCT
ERR	ERR	ERR	ERR	
12M	12M	12	12	Tono value on display unit "mmHg"
(13)	(13)	10M	10M	
13	13	11M	11M	
AVG				
12.5	12.5	11.0	11.0	Tono average value on display unit "mmHg"

< R >		< L >		
hPa	ADJ.	hPa	ADJ.	
ERR	ERR	ERR	ERR	
16M	16M	16	16	Tono value on display unit "hPa"
(17)	(17)	13M	13M	
17	17	14M	14M	
AVG				
16.5	16.5	14.3	14.3	Tono average value on display unit "hPa"

Title of Pacho value — PACH.DATA

< R > mm	< L > mm	
ERR	ERR	
0.511M	0.510	Measured value of CCT
0.510	0.509 M	
0.510	0.508 M	
AVG		
0.510	0.509	Average value of CCT

Title of IOP ADJ Formula	IOP ADJ FORMULA	
	A : 520 B : 120	Center CCT Base/ Adjustment Coefficient
	TOPCON	Topcon Logo mark
	Hello World	Message column

STANDARD ACCESSORIES

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

Power cable (1)	Chinrest tissue pin (2)
Printer paper (2)	Monitor cleaner (1)
Chinrest tissue (1)	Dust cover (1)
Accessory case (1)	User Manual, Instruction Manual, Unpacking and Assembling, Cleaning Procedure (1 each)
Nozzle cap (1)	Blower (1)
Applicator (1)	Plastic container (1)

PREPARATIONS

INSTALLATION

⚠ **CAUTION**	• When moving the instrument, two people should lift from the bottom of the device. 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 External I/O terminal cover may cause injury, as well as damage to the instrument. • To prevent damage and injuries, do not install the instrument on an uneven, unsteady or sloped surface. • When setting an instrument on an instrument table, pay attention not to injury the patient's fingers between the instrument and the table.

1 Use the base stopper to fix the main body.
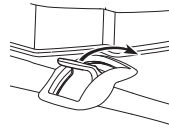
2 Firmly hold the instrument at the position shown below and place it on the automatic instrument table. For the adjustable instrument table, see "OPTIONAL ACCESSORIES" on page 74.
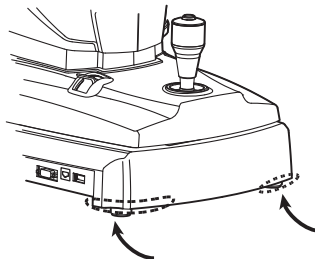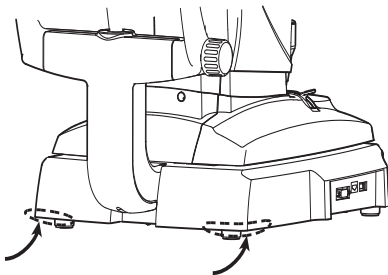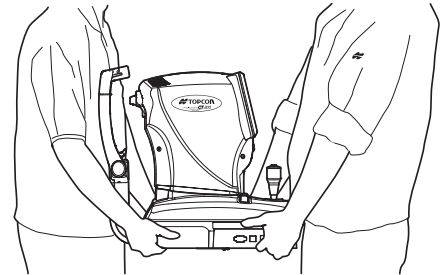
Holding positions   Holding the instrument

3 After installation, turn the base stopper down. The main body can be moved.

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 Connect the power cable to the power inlet at the right side of the instrument.

3 Insert the power cable plug into the 3-pin AC grounding receptacle.
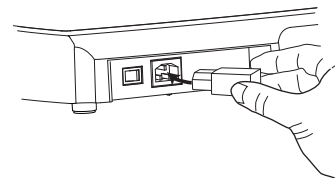
CONNECTING EXTERNAL I/O TERMINALS

⚠ **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 IEC60950-1, with a separation unit.

DATA OUTPUT

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

1 Connect the connection cable to the output terminal of the instrument

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

RS-232C output terminal

LAN output terminal
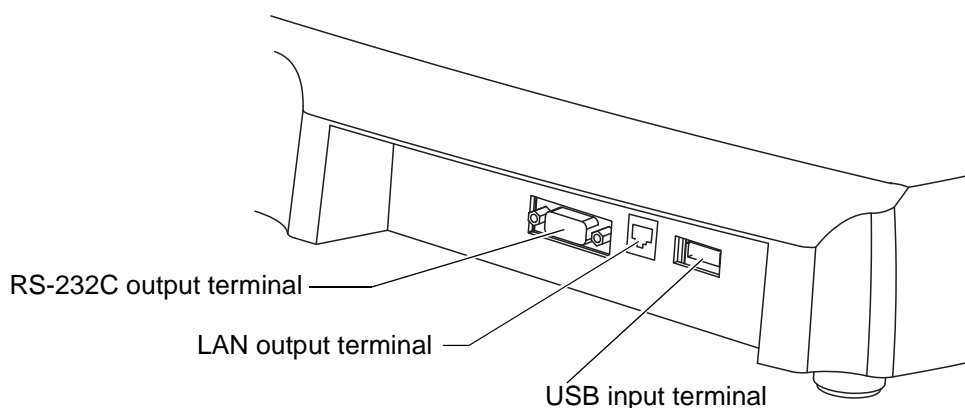
USB input terminal

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 USB 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**	• When setting a printer paper, keep a patient's face away from the instrument. Some part of the instrument may touch the patient's lip or nose if the printer button is pressed. • To avoid potential injury in case of malfunction, including a paper jam, be sure to shut off the power before attempting to repair it. • 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, printing will not start. • Please push the printer cover OPEN button using your right thumb while placing your index and middle fingers on the projecting part which is in reverse side below the button. Unexpected movement is avoided when the printer cover OPEN button is pressed.

1 Press the printer cover open button to open the printer cover.

Printer cover

Printer cover open button
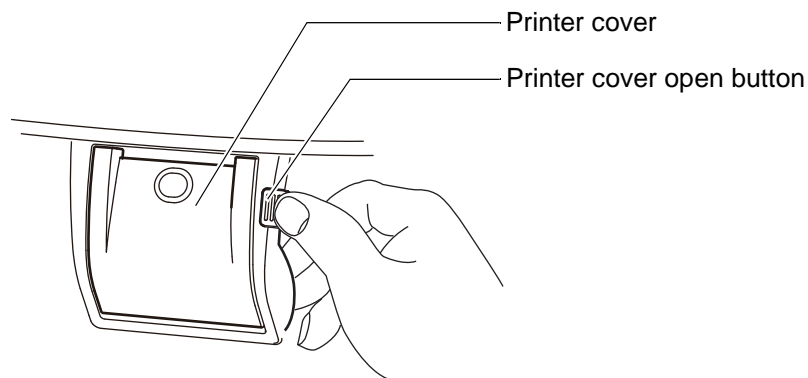
2 Open the printer cover to the limit.
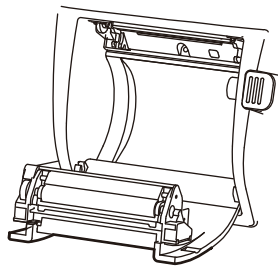
3 Insert the printer paper in the direction shown below and pull out the paper end to your side by 7 to 8cm.

Roll direction
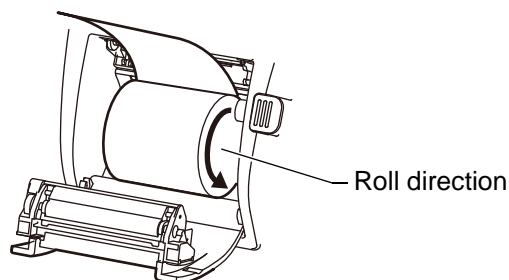
4 Bring the paper into the center, then close the printer cover.
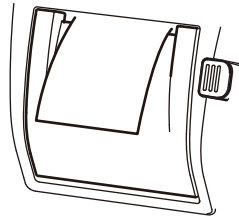
	• Please close the printer cover using your right thumb while placing your index and middle fingers on the projecting part which is in reverse side below the printer cover OPEN switch. Unexpected movement is avoided when closing the printer cover. • In case the printer cover is not firmly closed, printing will not start, and "CLOSE PRT COVER" will be displayed on the monitor screen. • A 58mm wide paper roll (example: TP-50KJ-R [Nippon Paper Co.]) is recommended. Other paper rolls may cause abnormal printing noise or unclear print.
NOTE	

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 or operate the control lever.

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

	The time to start the power save status can be changed in the initial setting "Start time of sleep mode" (see page 52).
NOTE	

BASIC OPERATIONS

OPERATION FLOW CHART

Basic operation of this instrument is as follows:

```
┌─────────────────────────────────────────────────────────────┐
│   ( Insert the power cable plug into the commercial power. )  │   PREPARATION BEFORE
│                         │                                    │   MEASUREMENT
│                         ▼                                    │   (page 25 to 29)
│        (  TURNING ON THE INSTRUMENT  )                       │
│                         │                                    │
│                         ▼                                    │
│        ( CHECKING THE MEASURING NOZZLE )   (page 25)         │
│                         │                                    │
│                         ▼                                    │
│        (        AIR CHECK        )   (page 26)              │
│                         │                                    │
│                         ▼                                    │
│        (  SETTING THE PATIENT ID  )   (page 27)            │
│                         │                                    │
│                         ▼                                    │
│        (    PATIENT POSITIONING    )   (page 28)           │
│                         │                                    │
│                         ▼                                    │
│        ( SETTING THE SAFETY STOPPER )   (page 29)          │
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                          ▼
         (      MEASUREMENT      )   (page 30)
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                          │          ▼
                          │   ( CLEARING MEASUREMENT
                          │         VALUES )
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                          ▼          ▼
  ( PRINTOUT OF MEASURE-   )   ( DISPLAYING ALL MEASURE-
         MENT VALUES )               MENT DATA )
              (page 36)                  (page 38)
                          │
                          ▼
         ( OPERATION OF AFTER USE )   (page 41)
```

PREPARATION BEFORE MEASUREMENT

TURNING ON THE INSTRUMENT

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

For the details of connection, refer to "CONNECTING POWER CABLE" on page 20.

2 Press on the (POWER) switch.

3 Make sure that the title screen is displayed and then the MEASUREMENT screen is displayed in a few seconds.

4 Release the base stopper.

CHECKING THE MEASURING NOZZLE

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

1 Remove the nozzle cap.
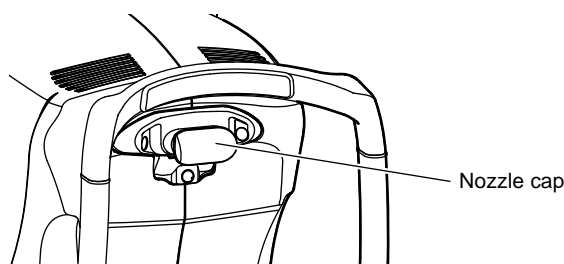
Nozzle cap

* The removed nozzle cap can be put into nozzle cap holder of the main body side.
Please set bended rim side of the nozzle cap to the bottom.
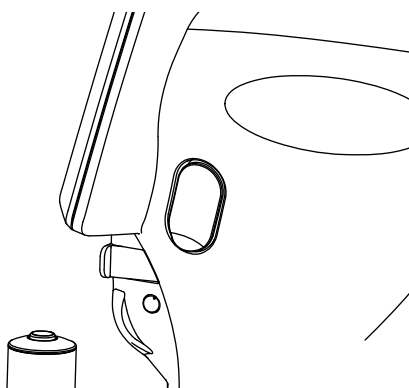
2 Check if there is any foreign matter on and around the measuring nozzle. If there is any, turn

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 57.

AIR CHECK

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

1 Tap the (Air check) button.
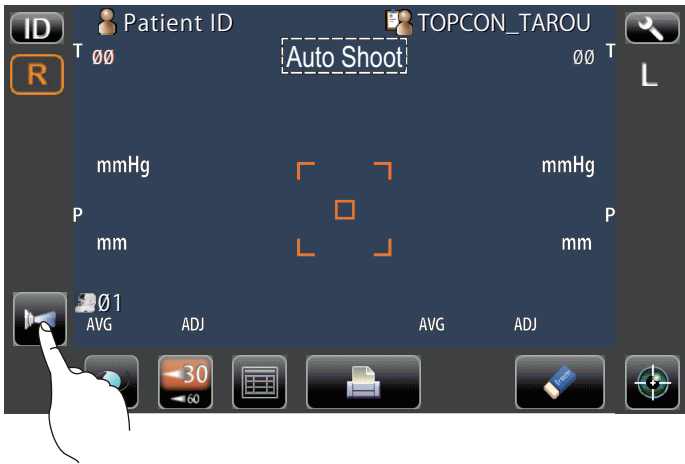
Then, the confirming message of Air check/End operation is displayed.

> ⚠ **Perform air check?**
>
> **Check**   **CANCEL**
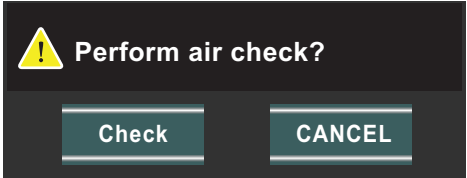
2 Press the (CHECK) button. Then, air is blown out from the measuring nozzle automatically.

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

> ⚠ **Air check. Press OK to continue.**
>
> **OK**
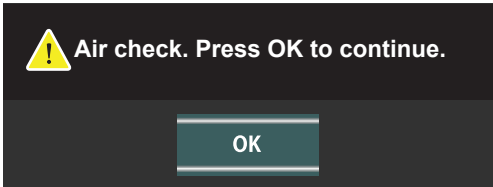
4 Press the (OK) button, return to Measurement screen.

📝 **NOTE**

If abnormal action(+) or abnormal action(-) is displayed, the condition is not normal. Check if there is any object before the measuring nozzle.
If there is any, remove it, press the (OK) button and do the check again.
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.

> ⚠ **Confirm abnormal action(-) of air check.**
>
> **OK**
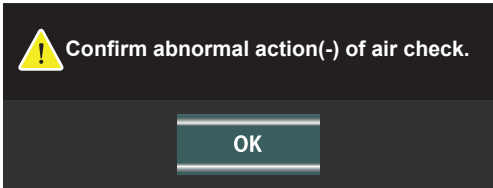
SETTING THE PATIENT ID

1 Tap the ⌈ ID ⌉ button on the control panel.
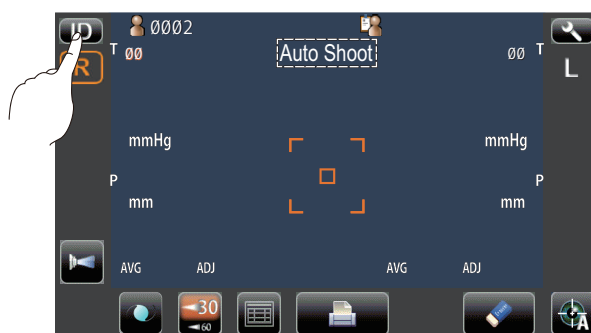
2 The Patient ID Input screen is called up.

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

Keyboard

4 Return to the Measurement screen, and confirm that the patient ID is updated.
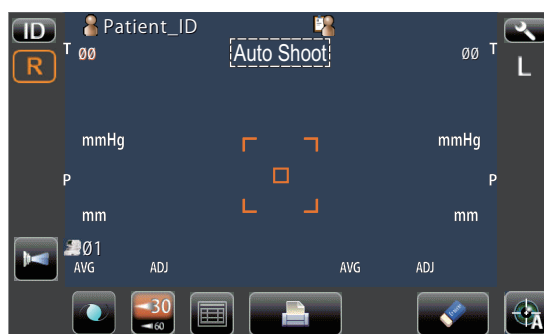
📋 **NOTE**	If "Display of patient ID" is set to "OFF" in the initial setting, the patient No./patient ID is not displayed on the measurement screen.

PATIENT POSITIONING

⚠ **CAUTION**	• To avoid electric shock, do not touch the external connection terminal and the patient at the same time. • To avoid injury, do not insert fingers under the chinrest. To avoid injury when moving the chinrest down, be careful not to catch the patient's finger. Tell this to the patient, too. • To avoid injury when operating the machine, be careful about the cover not to catch fingers of the patient. Tell this to the patient, too. • To avoid injury by raising, falling or dropping the instrument, do not apply the strong power downward on the chinrest. • When operating the instrument, be careful that the instrument does not touch the patient's lip or nose. If touched, clean the instrument following "CLEANING THE COMPONENTS THAT COME INTO CONTACT WITH THE PATIENT" on page 58.

🗒 **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. • Before starting measurement, explain the functioning so patients are not surprised by the air puff. • When operating the instrument, be careful that the instrument does not touch the patient's nose. If touched, clean the instrument following "CLEANING THE INTRAOCULAR PRESSURE MEASURING WINDOW" on 56. • If no patient ID is registered, a "patient No." is assigned automatically in order of examination.

1 Check the measurement screen.

2 Take off a chinrest tissue on the chinrest. If the tissue has run out, please supply new chinrest tissues.

3 Wipe the dirt form forehead rest.

4 Have the patient sit in front of the instrument.

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

6 Hold the control lever, pull the main body towards operator side fully, place the patient's chin on the chinrest and touch patient's forehead to the forehead rest.
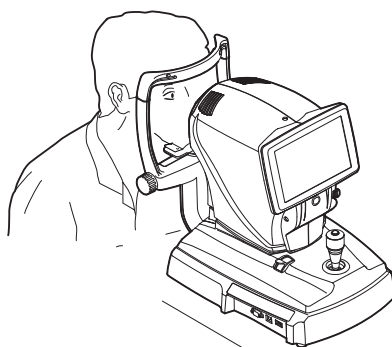
7 Adjust the chinrest height by chinrest up/down knob until the eye height mark of the chinrest reaches the same height as the patient's eye. At this moment, confirm that the measuring nozzle is at the height of the patient's visual line.

Eye height mark

Measuring nozzle

Chinrest up/down knob
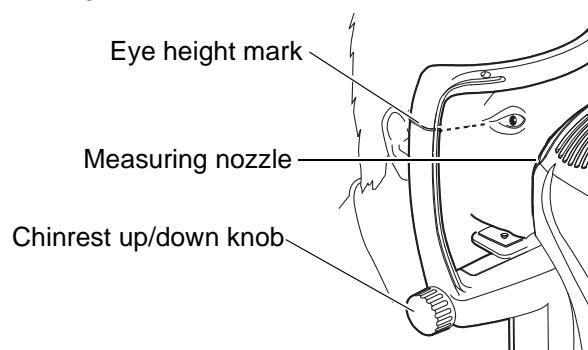
SETTING THE SAFETY STOPPER

A safety stop is set up by using a base stopper.

⚠ **CAUTION**	• Before measuring, be sure to set the safety stop. If not, it may cause injury by touching the measuring window glass to patient's eye. Set it respectively for the right and left eyes. • Set the safety stop from the side of the instrument. Setting operation from other positions, where checking of the eye position or intraocular pressure window position is not easy, may cause injury by touching intraocular pressure window to the patient's eye.

1 Hold the control lever and pull the machine body towards the operator fully.

2 Turn the control lever and adjust the height of the measuring nozzle to the center of the patient's cornea.

3 Keep depressing the base stopper, hold the control lever and push out the machine body slowly. "LOCKED" appears in the control panel.

4 When the measuring nozzle reaches a position 8-9mm from the cornea, release the base stopper.

8~9mm
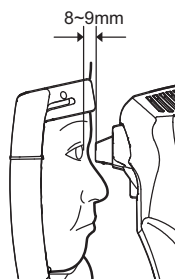
5 Holding the control lever, try to slightly push out the machine body to make sure the stopper is working. If the machine body does not move forward any further, the setting is completed.

6 Pull the machine body towards the operator fully.
"LOCKED" disappears in the control panel, so measuring is possible.

MEASUREMENT (AUTO SHOOT MODE)

⚠ **CAUTION**	When operating the instrument (for measurement and control panel operation), be careful that the instrument does not touch the patient's lip or nose. If touched, clean the instrument as specified in "CLEANING THE INSTRUMENT" on page 56.
📝 **NOTE**	• Auto Shoot mode measurement may not be possible, in case 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. • Auto Shoot mode measurement may not be possible due to frequent blinks or existing abnormalities in the corneal surface caused corneal disease etc. In this case, measure in auto shoot mode off. • 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. • If the machine is moved before the measurement values are displayed, it might cause an incorrect measurement.

SETTING THE AUTO SHOOT MODE

Before shipment the default setting is Auto shoot mode (Auto).

1 If (Auto Shoot) button of the measurement screen is framed in orange, it is in Auto Shoot mode.

2 If (Auto Shoot) button is not framed in orange, it is in Auto shoot mode off. Tap the (Auto Shoot) button to change to Auto Shoot 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 Tap the (30/60) button of the measurement screen and set the measuring range.
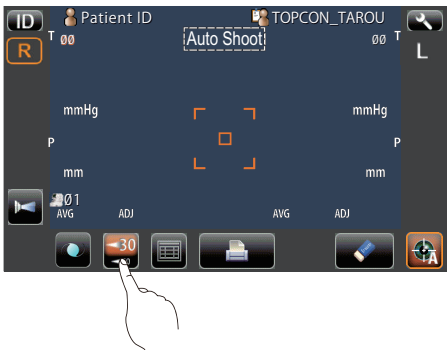
ALIGNMENT AND MEASUREMENT

⚠ **CAUTION**	To avoid injury when operating the machine (for measurement and control panel operation), be careful not to approach the finger to space of movable part.
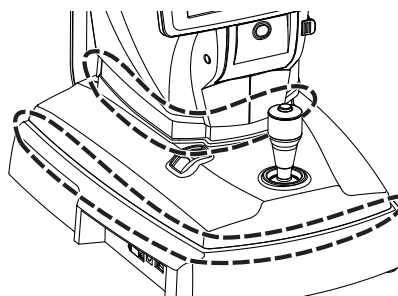
Alignment operations are done with the control lever.

- The main body position can be fine-adjusted longitudinally and laterally by inclining the control level to each direction.
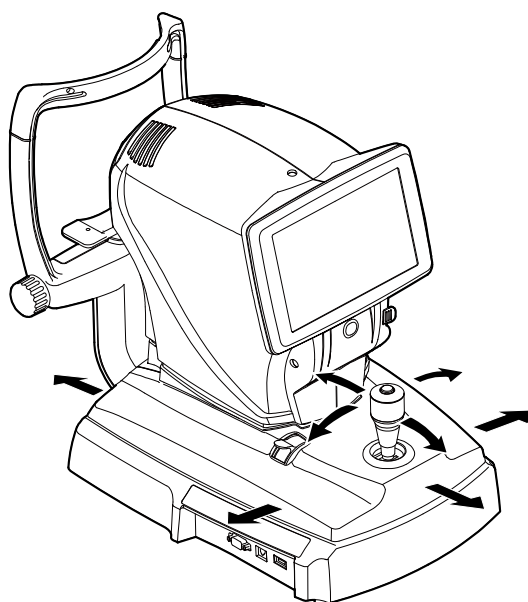
Operating the control lever
(for front, back, right and left
adjustment)

- The main body position can be fine-adjusted vertically by turning the control level right (up) and left (down).
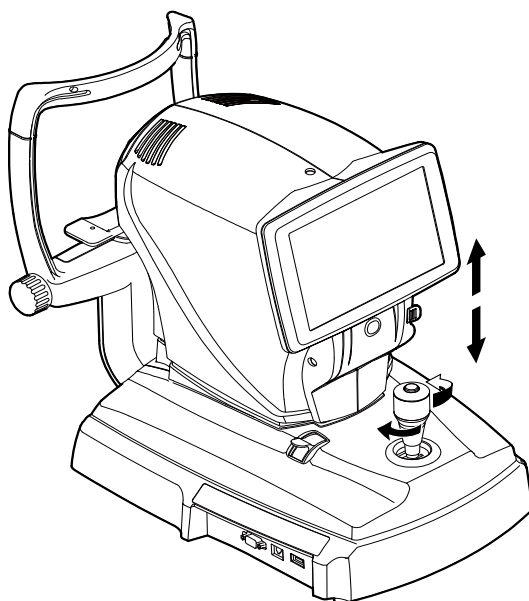
Operating the control lever
(for up/down adjustment)

1 Hold the control lever and move the main body to the operator side.
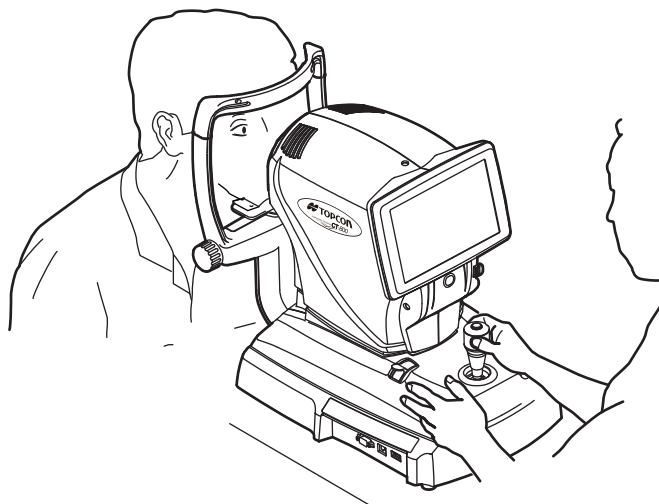
2 Operate the control lever laterally and vertically to obtain the target eye in the center of control panel screen. Then tell the patient to look at green luminous dot.

3 While moving the main body toward the patient, focus the target eye.

A vague, reflected alignment dot appears on the cornea.

Alignment dot

Alignment mark

Outer alignment mark
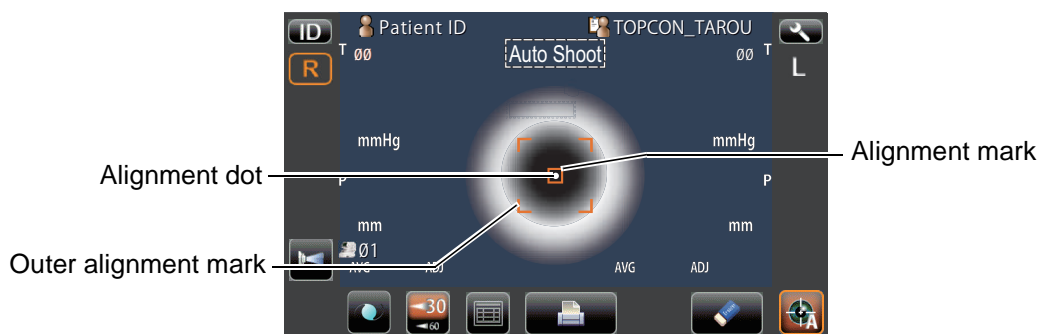
4 Fine-adjust the main body position in all directions so that the alignment dot point comes within the alignment mark.

5 Keeping the alignment dot within the alignment mark, slowly move the main body toward the patient. When the main body approaches the target eye, Z alignment arrows appear to the control panel screen.
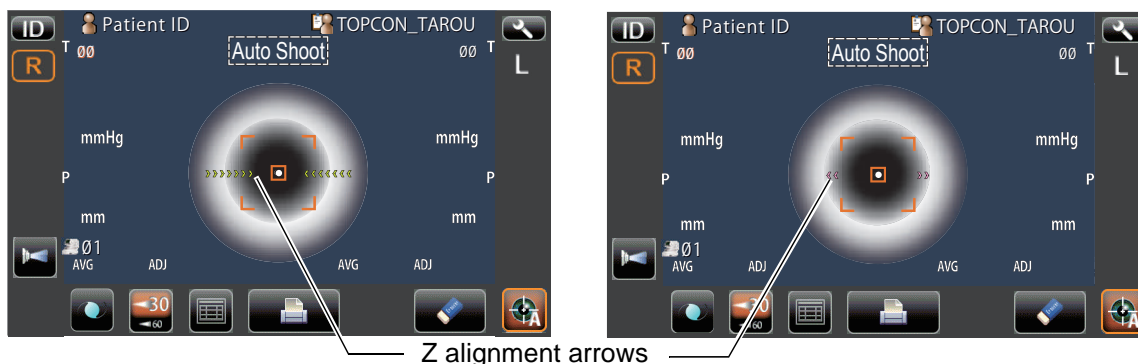
Z alignment arrows

NOTE	• Do not allow the eyelash and eyelid to cover outer alignment mark to ensure stable measurement. • If the machine is too near to the patient in comparison with the optimal alignment position, the alignment arrows are displayed outward or if it is too far from the patient, the alignment arrows are displayed inward.
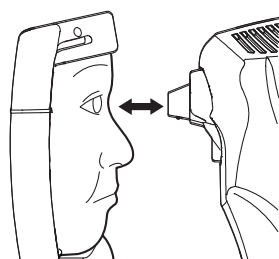
Too close

Outward Z alignment arrows (purple)
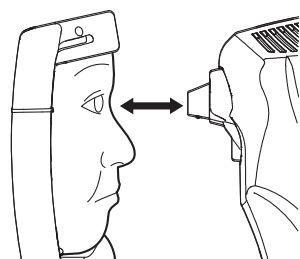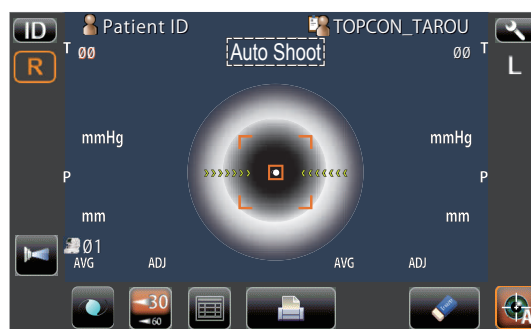
Too far

Inward Z alignment arrows (Green)
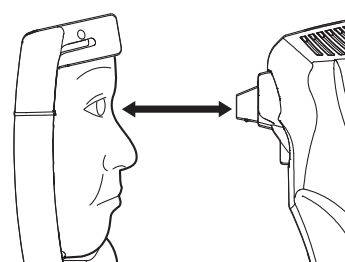
Positioning is incorrect at all.

Z alignment arrows are not appeared.

<table>
<tr><td>📝 **NOTE**</td><td>• When the measuring head approaches patient's eye too much, "TOO CLOSE" is displayed and when it keeps away from patient's eye too much, "TOO FAR" is displayed. Using the control lever, move the measuring head to a position where aligning is possible.

Limit of movement in the backward direction   Limit of movement in the forward direction</td></tr>
</table>

6 Align to make the Z alignment arrows short, and the measurement is carried out when the Z alignment arrows reach minimum, and then the measurement value is displayed on the control panel. For displaying measurement values, refer to "DISPLAYING MEASUREMENT VALUES" on page 35.

7 Hold the control lever and pull the main body to the operator side, then switch R or L and repeat the same procedure from "SETTING THE SAFETY STOPPER" on page 29 to previous item for the next eye measurement.

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

<table>
<tr><td>📝 **NOTE**</td><td>• If Auto Shoot mode measurement does not work, press the measurement switch when the alignment dot becomes minimum within the alignment mark.
Auto Shoot mode measurement may not work depending on the cornea condition.
• If the machine is moved before measurement values are displayed, it might cause an incorrect measurement.</td></tr>
</table>

DISPLAYING MEASUREMENT VALUES

With regard to TONO measurement values, 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.
ERROR:	Measurement was not done correctly.
OVER:	When the measurement range is exceeded.

📝**NOTE**	• In TONO average value display, low-reliability numerical data with [ ] are not added to the average value calculation. However, if all measurement data are numerical data with [ ], the average value calculation is done using these data. • For explanation of the messages on the control panel screen, refer to "MESSAGE LIST" on page 62. • When data is printed out, the "M" mark is printed on the value measured in auto shoot mode off.

Data of 2 times ago

Data of 1 time ago

Latest data

PRINTOUT OF MEASUREMENT VALUES

NOTE	• To avoid a paper jam in the printer, do not feed the paper if it is partly cut or wrinkled. • To avoid discoloring of the printer paper (particularly the recording area) during storage, use a polypropylene bag and not one containing plasticizer (PVC, etc.). • To avoid discoloring of the printer paper (particularly the recording area) after pasting, use water-soluble glue and not one containing solvent. • 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 Tap the ⬭ PRINT ⬭ button on the control panel.

Measurement values on the control panel are printed out.
• When measurement values are printed out, the values are cleared and the displayed values disappear on the control panel.
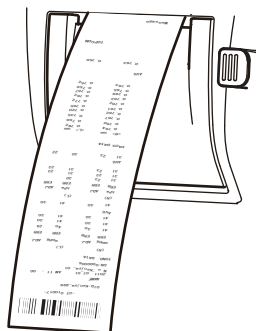
NOTE	• When a red line is printed at the edge of the printer paper, replace it with a new one. For details about the replacement of the printer paper, see "PRINTER PAPER SETTING" on page 22. 58mm wide printer paper (example: TP-50KJ-R, Nippon Paper) is recommended. • "Close printer cover." indicates that the printer cover is left opened, ensure that the printer cover is completely closed. • If the print button is tapped again after printing of measurement value is carried out and all measurement value is cleared, the last measurement data is printed out.

2 If printing out of the measurement values is not required, be sure to clear the measurement values for a next patient. (Refer to "CLEARING MEASUREMENT VALUES" on page 37.)

CLEARING MEASUREMENT VALUES

If printing out of the measurement values is not required, be sure to clear the measurement values for a next patient.

1 Tap the ⟨ ALL CLEAR ⟩ button on the control panel.

All measurement values of both eyes are cleared.
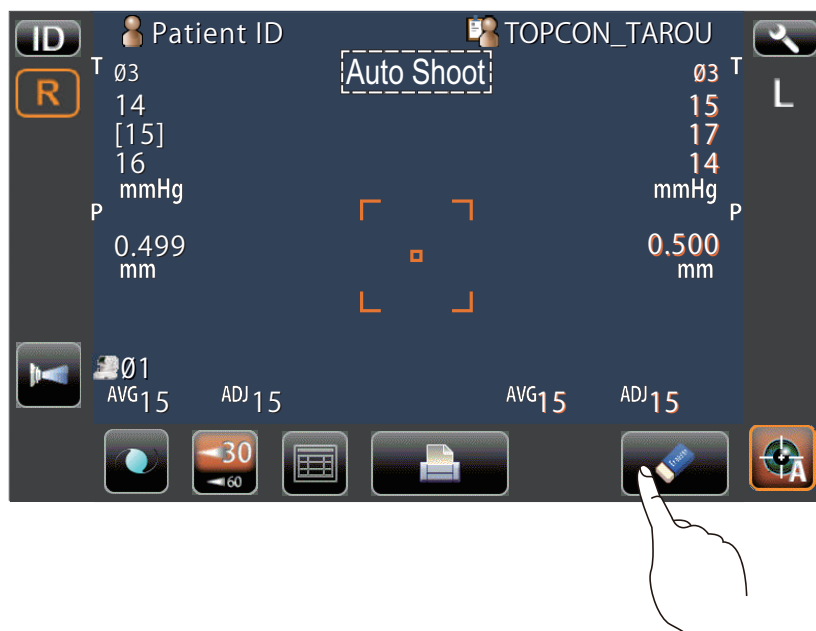
DISPLAYING ALL MEASUREMENT DATA

Normally the latest measurement is displayed, but it is possible to display and confirm all measurement data.

1 Tap the (ALL DATA DISPLAY) button.
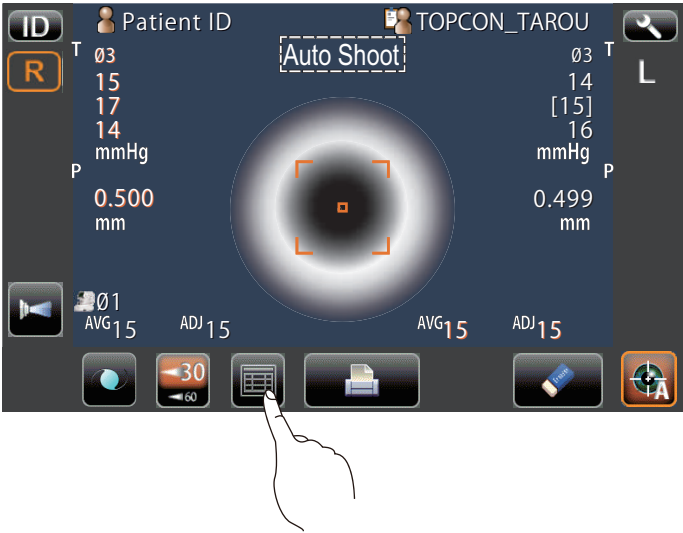
2 The Data Display screen is displayed.

The display unit is varied according to the Settings of setup.

Setup item: Display unit in intraocular pressure measurement "mmHg"
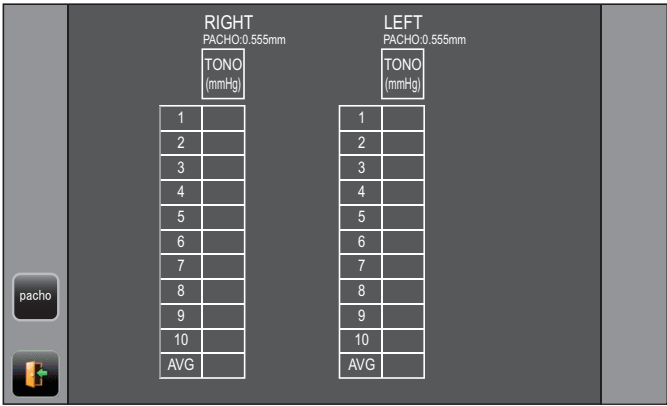
Setup item: Display unit in intraocular pressure measurement "hPa"
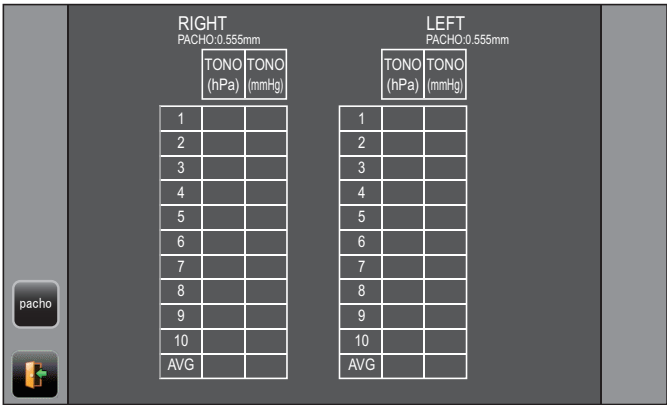
Setup setting: Display unit in intraocular pressure measurement "mmHg," IOP adjustment "ON"

RIGHT
PACHO:0.555mm

	TONO (mmHg)	ADJ (mmHg)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
AVG		

LEFT
PACHO:0.555mm

	TONO (mmHg)	ADJ (mmHg)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
AVG		

pacho

Setup setting: Display unit in intraocular pressure measurement "hPa," intraocular pressure adjustment "ON"

RIGHT
PACHO:0.555mm

	TONO (hPa)	ADJ (hPa)	TONO (mmHg)	ADJ (mmHg)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
AVE				

LEFT
PACHO:0.555mm

	TONO (hPa)	ADJ (hPa)	TONO (mmHg)	ADJ (mmHg)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
AVE				

pacho

NOTE

For the value measured by auto shoot mode off and the value measured by using the measurement switch in auto shoot mode, the color of a character turns to yellow.

3 To exit the data display and return to the Measurement screen, tap the (EXIT) button.

RIGHT
PACHO:0.555mm

	TONO (hPa)	ADJ (hPa)	TONO (mmHg)	ADJ (mmHg)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
AVG				

LEFT
PACHO:0.555mm

	TONO (hPa)	ADJ (hPa)	TONO (mmHg)	ADJ (mmHg)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
AVG				

pacho

WHEN CORNEA THICKNESS IS REFLECTED ON MEASUREMENT DATA

Measurement data calculated including cornea thickness can be displayed by inputting a PACHO (cornea thickness) data.

When carrying out this setup, it is required to select ON at "Show Adj value" of "Initial".

1 Tap the ⟨PACHO⟩ button on the Data Display screen.

2 The PACHO data input screen appears. Select enter window of "R" (right eye) or "L" (left eye) by tapping, and enter the cornea thickness value using ten key.

$$ADJ = IOP - (CCT - 0.520) \times 12.0$$

Input CCT R or L.

R   0.57 — Enter window

L   0.57

Ten-key
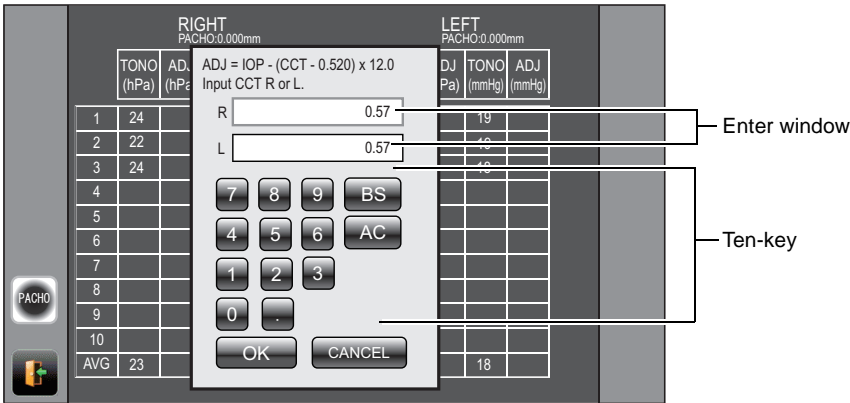
3 Tap the ⟨OK⟩ button and fix the input value. The entered cornea thickness value is displayed on the Data display screen and is reflected to the measurement data.

Cornea thickness
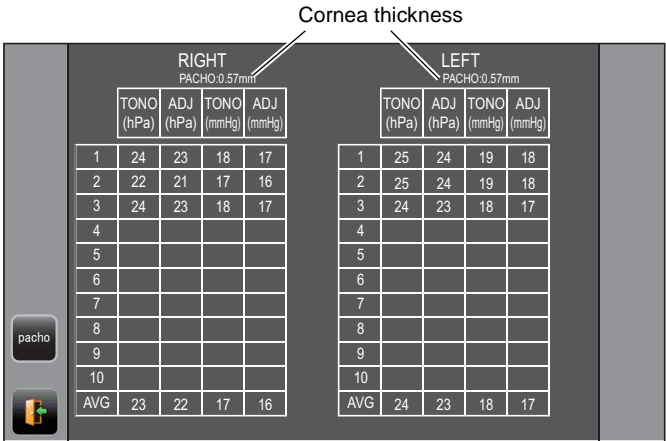
OPERATION OF AFTER USE

1 Use the base stopper to fix the main body.

2 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 power switch is provided.)

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

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

4 Fit the nozzle cap to the measuring nozzle.
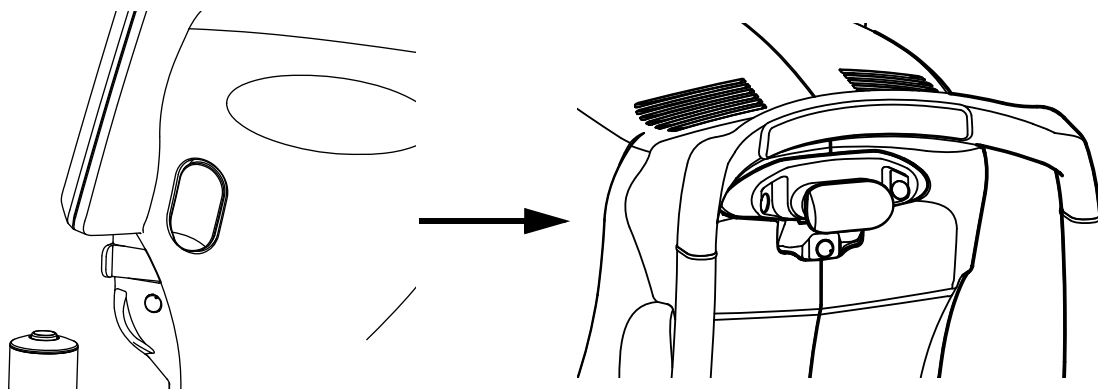
OPTIONAL OPERATIONS

MEASUREMENT IN AUTO SHOOT MODE OFF

📝 **NOTE**	• Adjust the height of the instrument table so that the patient can sit comfortably. Otherwise, correct measurement values may not be obtained. • Do not perform measurement if the patient stops breathing or is nervous. Otherwise, correct measurement values may not be obtained. • If the machine is moved before measurement values are displayed, it may cause incorrect measurement results.

SETTING OFF IN AUTO SHOOT MODE

1 If the ⬭ Auto Shoot ⬭ button of the measurement screen is not framed in orange, it is in Auto Shoot mode off.

2 If ⬭ Auto Shoot ⬭ button is framed in orange, it is in Auto Shoot mode. In this case, tap the ⬭ Auto Shoot ⬭ button to change to Auto Shoot mode off.
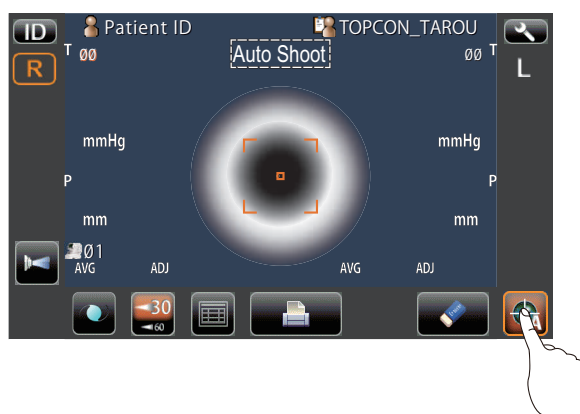
SETTING THE MEASURING RANGE

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 Tap the ⬭ 30/60 ⬭ button of the measurement screen and set the measuring range.
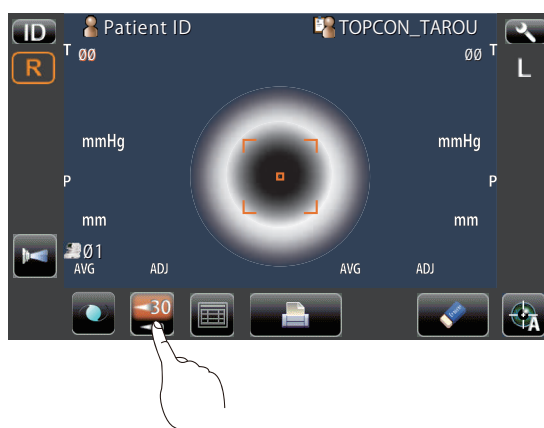
ALIGNMENT AND MEASUREMENT

Alignment is operated on the control panel.
For the adjustment of main body using the control lever, refer to page 31.

1 Use the base stopper to release the main body.

2 Hold the control lever and move the main body to the operator side.
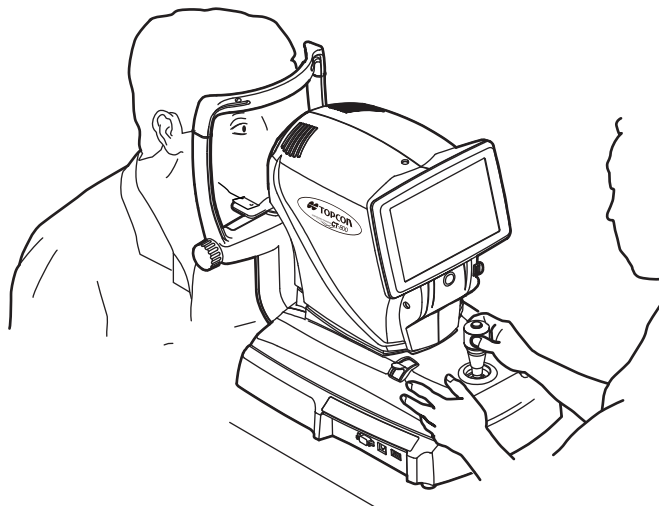
3 Operate the control lever laterally and vertically to obtain the target eye in the center of control panel.

📝 **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) • When the measuring head is at the limit of movement in the forward direction, "TOO CLOSE" is displayed and when it is at the limit of movement in the backward direction, "TOO FAR" is displayed. Using the ⬚Control lever, move the measuring head to a position where aligning is possible. Limit of movement in the backward direction Limit of movement in the forward direction • As the main body approaches the patient, focus of measurement screen changes.
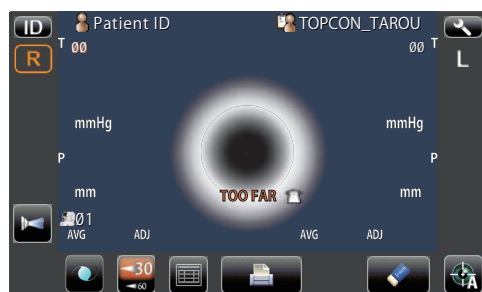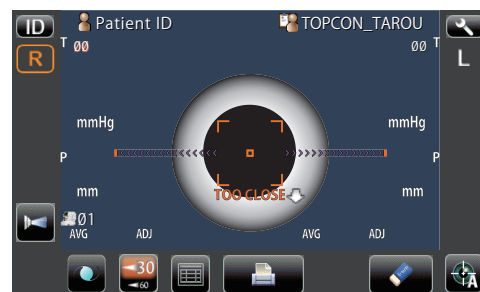
4 While moving the main body toward the patient, focus the target eye.

A vague, reflected alignment dot appears on the cornea.

Alignment dot — — Outer alignment mark

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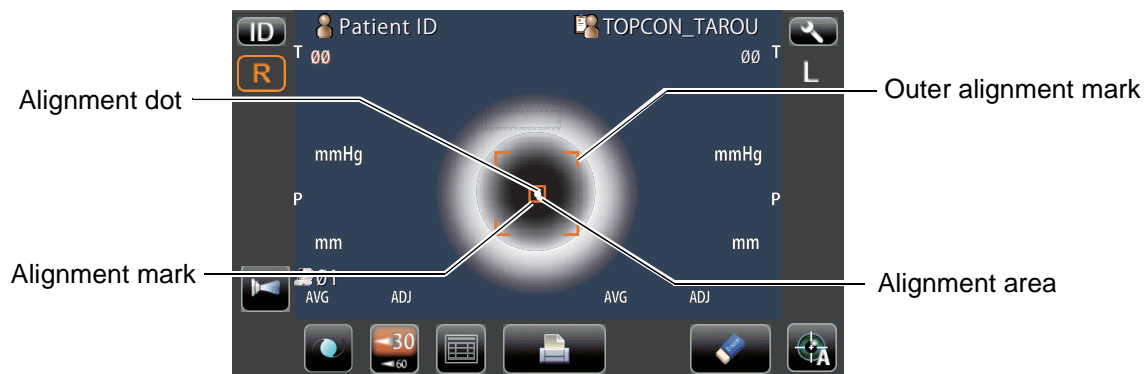
5 When the main body is brought closer to the patient's eye, Z alignment arrows appear on the control panel screen.

Outer alignment mark
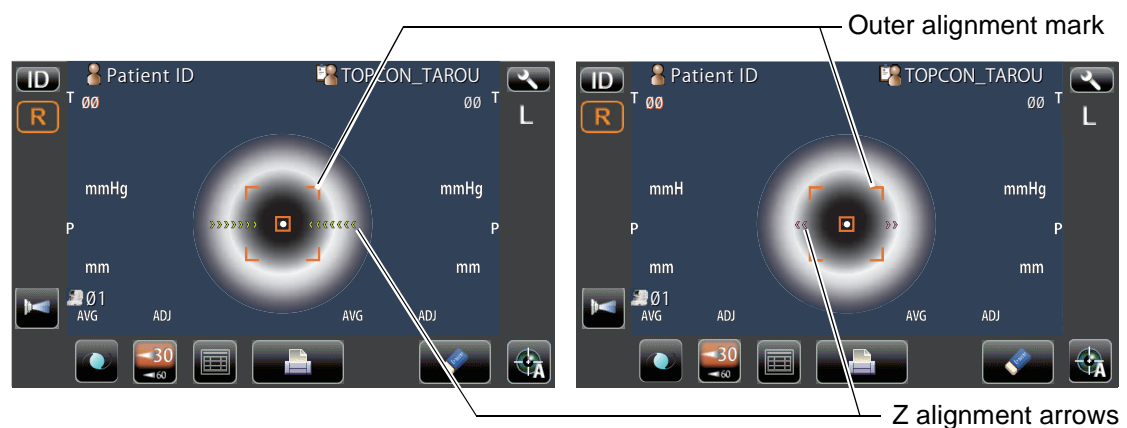
Z alignment arrows

NOTE	• Do not allow the eyelash and eyelid to cover the outer alignment mark to ensure stable measurement. • 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.
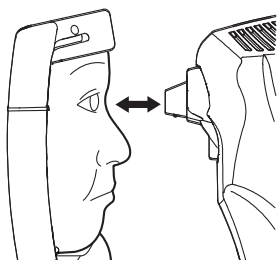
Too close
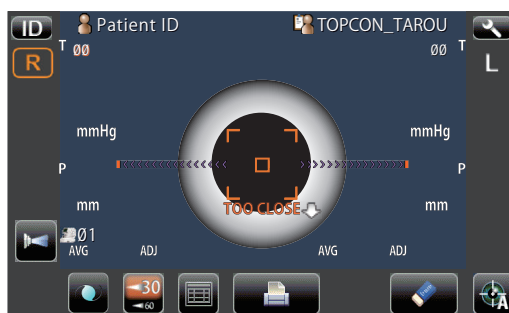
Outward Z alignment arrows (purple)
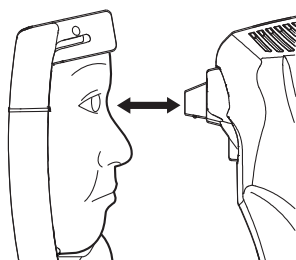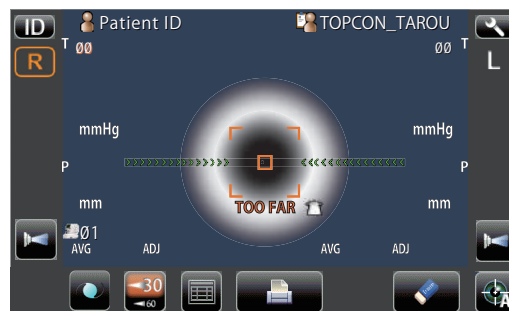
Too far

Inward Z alignment arrows (Green)
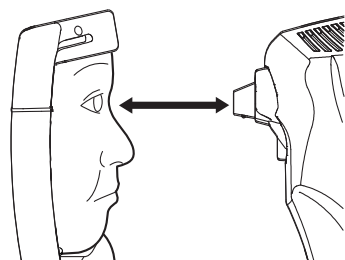
Positioning is incorrect at all.
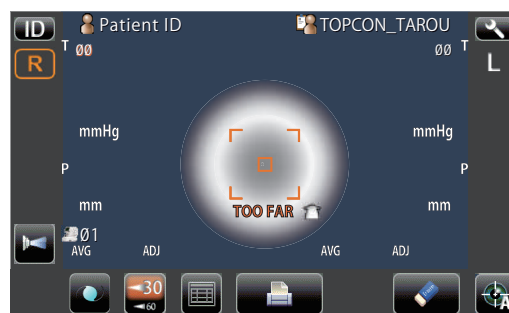
Z alignment arrows are not appeared.

6 Align to make the Z alignment arrows short, and press the (MEASUREMENT switch) when the Z alignment arrows reach minimum.

7 Measurement is carried out, and the measurement value is displayed on the control panel.
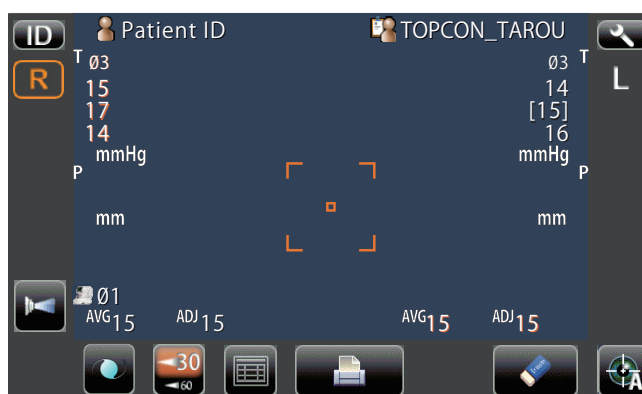
8 Hold the control lever and pull the main body to the operator side, then switch R or L and repeat the same procedure from "SETTING THE SAFETY STOPPER" on page 29 to previous item for the next eye measurement.

NOTE	• Even if an alignment is not correct under auto shoot mode off, the measurement can be performed by pressing the MEASUREMENT switch. To ensure correct measurement with high accuracy, try to get correct alignment. • Even if you seem to get correct alignment, the alignment mark does not become □. In this case, please carry out a measurement after confirming surely that the alignment is performed correctly. • The alignment mark may not become □ according to patient's cornea condition.

DISPLAYING MEASUREMENT VALUES

With regard to TONO measurement values, 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.
ERROR:	Measurement was not done correctly.
OVER:	When the measurement range is exceeded.

NOTE	• In TONO average value display, low-reliability numerical data with [ ] are not added to the average value calculation. However, if all measurement data are numerical data with [ ], the average value calculation is done using these data. • When data is printed out, the "M" mark is printed on the value measured in auto shoot mode off. • For explanation of the messages on the control panel screen, refer to "MESSAGE LIST" on page 62.

Data of 2 times ago
Data of 1 time ago
Latest data

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. • Patient No. reset condition can be selected such that the patient No. is reset upon power on or not, in the initial setting of setup screen.

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 21.

2 Set up of data communication settings.
For details, refer to "DATA COMMUNICATION (COMM)" on page 55.

3 Perform measurements.

4 Tap the (PRINT OUT) button of 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 21.

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 21.

2 Set up of LAN connection settings.
For details, refer to "LAN CONNECTION (LAN)" on page 55.

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 62.

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 20.

2 Turn ON the (POWER) switch.

3 Tap the (SETTINGS) button on the control panel.

The SETUP screen is displayed.
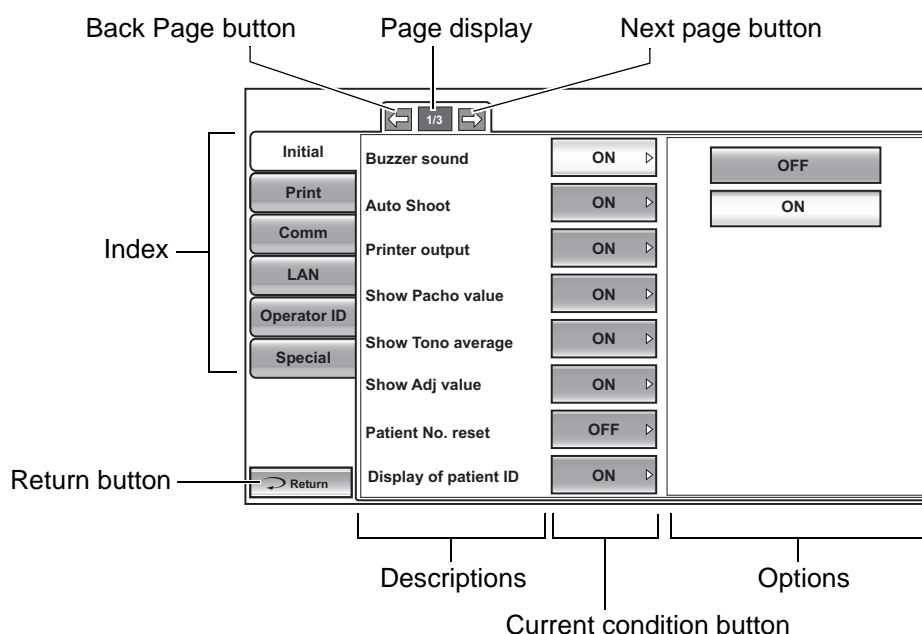
OUTLINE OF SETUP SCREEN OPERATIONS

1 Tap (INDEX) and select the subject of setting.
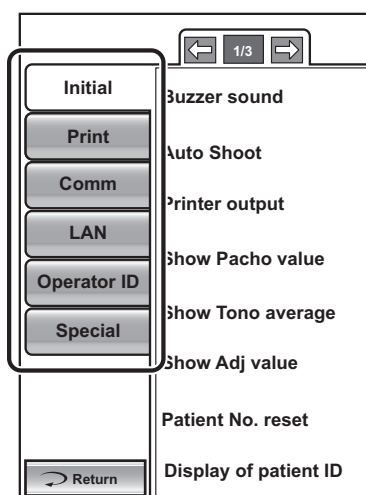
2 Operate the (NEXT PAGE) button or (BACK PAGE) button, as necessary, and display the page to confirm/change.
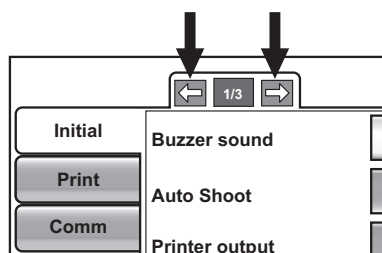
3 Tap the (CURRENT CONDITION) button of the item to be changed and find the (OPTIONS) button.
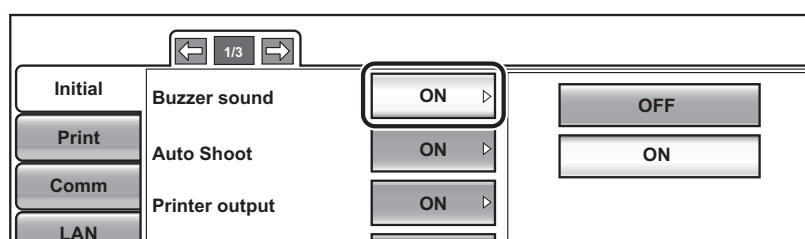
4 Tap the (OPTIONS) button and change the setting.
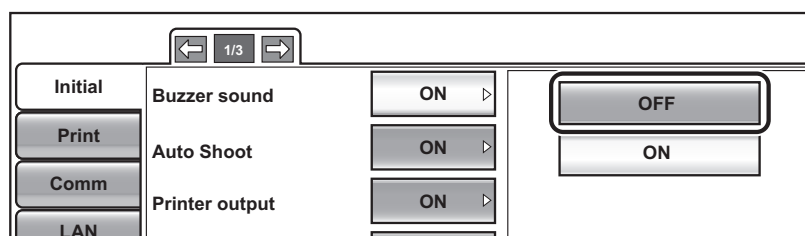
• Instead of the (OPTIONS) button, up/down buttons and ten-key would be displayed.

UP/DOWN BUTTON:
Tap the up or down button on the screen to change the setting.

Initial	IOP Adjustment	OFF ▷	28(%) △ ▽
Print	Center CCT Base	545 ▷	
Comm	Adjustment Coefficient	500 ▷	
LAN	R/L or OD/OS	R/L ▷	
OperatorID	Control panel brightness	LEVEL 4 ▷	
Special	Shaded character	ON ▷	
	Meas. data recording way	Data on cre... ▷	
⟲ Return	IOL LED Brightness	28 ▷	

Up/Down buttons

TEN-KEY:
Tap ten-key on the screen and enter the figure. If there are several windows to enter, tap the window to enter the figure by ten-key. Tap (OK) and fix the input value.

Initial	LAN connection	OFF ▷
Print	Shared Folder Setting	NULL ▷
Comm	IP Address Setting	FIX ▷
LAN	IP Address	0.0.0.0 ▷
Operator ID	Subnet Mask	0.0.0.0 ▷
Special	Default Gateway	0.0.0.0 ▷
	Primary DNS Server	0.0.0.0 ▷
⟲ Return	Secondary DNS Server	0.0.0.0 ▷

192.168.0.1 — Enter window

7 8 9 BS
4 5 6 AC
1 2 3
0 .
OK CANCEL

KEYBOARD:
Tap keyboard on the screen and enter characters. If there are several windows to enter, tap the window to enter the figure by keyboard. Tap (OK) and fix the input value.

Shared folder (32)   Sample
User Name (32)   topcon
Password (16)   *****

Enter window

1 2 3 4 5 6 7 8 9 0 BS ← →
q w e r t y u i o p Del
a s d f g h j k l _ -
z x c v b n m space . \
Caps   Reset   OK   Cancel

📝 **NOTE** | The set value is updated when an (Options) button is tapped.

RETURNING TO THE MEASUREMENT SCREEN

1 Tap the ⟨ Return ⟩ button.

Special	Show Tono average	
	Show Adj value	
	Patient No. reset	
⟲ Return	Display of patient ID	
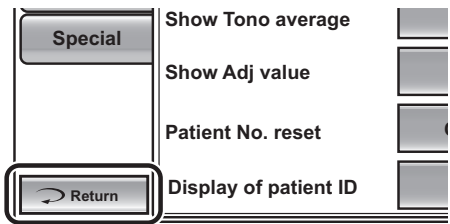
2 The Measurement screen is displayed.
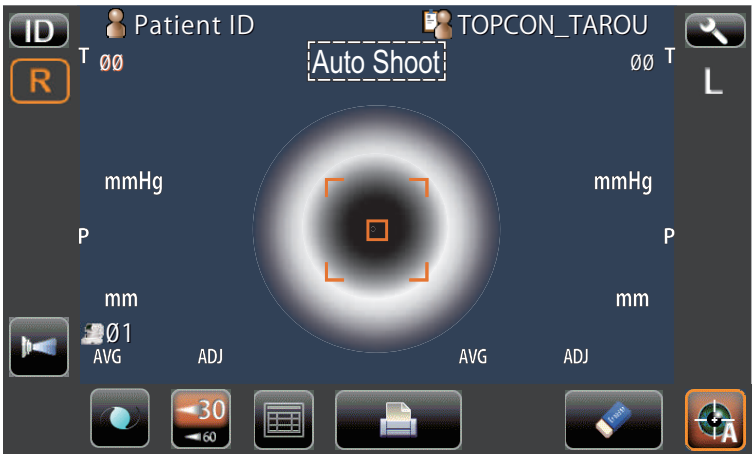
LIST OF SETUP ITEMS

Setup items are categorized into 6 large indexes.

"Initial Settings" ....items related to the initial status after power on
"Internal Printer" ....items related to output from the internal print
"Comm" ....items related to data output with the external device
"Network Settings"....................items related to output using the LAN
"Operator Settings"...................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.

Descriptions	Options	Details	Initial value
Buzzer sound	OFF	Buzzer does not sound.	ON
	ON	Buzzer sounds.	
Auto Shoot	OFF	Default measurement mode is Auto shoot off.	ON
	ON	Default measurement mode is Auto Shoot.	
Printer output	OFF	Internal printer is disabled.	ON
	ON	Internal printer is active.	
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.	
Patient No. reset	OFF	Patient No. is not reset upon power on.	OFF
	ON	Patient No. is reset upon power on.	
Display of patient ID	OFF	Patient ID is not displayed.	ON
	ON	Patient ID is displayed.	
Patient ID (Mandatory)	OFF	Patient ID is not required.	OFF
	ON	Patient ID is required.	
Device ID number	1-99 Set by ten-key display	Sets the Device ID number.	1
Display of Device ID num.	OFF	Device ID is not displayed.	OFF
	ON	Device ID is displayed.	
Start time of sleep mode	OFF	Power save function is not used.	10 min
	1 min	Power save status in 1min after last operation.	
	5 min	Power save status in 5min after last operation.	
	10 min	Power save status in 10min after last operation.	
	20 min	Power save status in 20min after last operation.	
	30 min	Power save status in 30min after last operation.	
	60 min	Power save status in 60min after last operation.	
Date/Time	Set by ten-key display	Sets year, month, day, time (24hrs), minute and second	Installation date/time
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 Set by ten-key display	Sets the central cornea thickness base value. (Used when IOP adjustment is "ON.") A : Center CCT Base	545
Adjustment Coefficient	0-9999 Set by ten-key display	Sets the adjustment coefficient. (Used when IOP adjustment is "ON.") B : Adjustment Coefficient	500
R/L or OD/OS	R/L	Right/left eyes is displayed by R/L.	R/L
	OD/OS	Right/left eyes is displayed by OD/OS.	
Control panel brightness (Setup of the brightness of control panel)	LEVEL 1 (dark)	The brightness of control panel is set up.	LEVEL 4
	LEVEL 2		
	LEVEL 3		
	LEVEL 4 (bright)		
Shaded character	OFF	Font style of measurement values is not shaded.	ON
	ON	Font style of measurement values is shaded.	
Meas. data recording way	Data on credibility	Measurement data is displayed in the order from low to high reliability.	Data on credibility
	Data without error	The measurement data without error is displayed.	
	Data with error	All the measurement data (including data with error) is displayed.	
IOL LED Brightness	-10 - +35 Set by up/down button	Sets brightness of alignment dot in IOL mode.	28(%)

* The adjusted IOP can be determined by the equation below:

When display unit of input value of cornea thickness is set to "μm"

Adjusted IOP[*1] = Measured IOP - (Measured CCT - A) x (B/10000) [*2]

A: Center CCT BASE [μm]

B: Adjustment Coefficient

IOP: Intraocular pressure [mmHg]

input value of cornea thickness :CCT [μm]

When display unit of input value of cornea thickness is set to "mm"

Adjusted IOP[*1] = Measured IOP - (Measured CCT - A/1000) x (B/10) [*2]

A: Center CCT BASE [μm]

B: Adjustment Coefficient

IOP: Intraocular pressure [mmHg]

input value of cornea thickness: CCT [mm]

*1: The adjusted IOP that is calculated on A and B is just a reference value.

*2: A correction factor inputs a value integrally

INTERNAL PRINTER

Print contains settings related to output from the internal printer.

Descriptions	Options	Details	Initial value
Barcode	OFF	Barcode is not printed.	OFF
	ON	Barcode is printed.	
Operator ID	OFF	Operator ID is not printed.	OFF
	ON	Operator ID is printed.	
Name	OFF	"Name" space is not available.	ON
	ON	"Name" space is available.	
Date	OFF	Date is not printed.	ON
	ON	Date is printed.	
Date style	YMD	Print in Year/Month/Day format.	MDY
	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	OFF	Device ID number is not printed.	OFF
	ON	Device ID number is printed.	
Serial number	OFF	Serial No. is not printed.	ON
	ON	Serial No. is printed.	
TOPCON logo	OFF	TOPCON logo is not printed.	ON
	ON	TOPCON logo is printed.	
Message print	OFF	Message is not printed.	OFF
	ON	Message is not printed.	
Input message	Set by keyboard display	String of up to 72 characters.	NULL
Line space	Set by keyboard 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.	
Print Layout	R/L	TONO measurement value and PACHO measurement value are separately printed.	SIMPLE
	DATA	The order is right eye and left eye regardless of the TONO measurement value and PACHO measurement value.	
	SIMPLE	Print in the SIMPLE format. • Under SIMPLE format the measurement data up to the 3 latest times are printed. • Under SIMPLE format display unit of CCT is printed at "µm" even if selecting "mm".	
mmHg Display on hPa	OFF	mmHg is not printed on hPa.	ON
	ON	mmHg is printed on hPa.	
Measure correction	OFF	Corrected measurement value is not printed.	ON
	ON	Corrected measurement value is printed.	
IOP ADJ Formula	OFF	Center CCT Base and Adjustment Coefficient for IOP ADJ formula are not printed.	ON
	ON	Center CCT Base and Adjustment Coefficient for IOP ADJ formula are printed.	

DATA COMMUNICATION (COMM)

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

Descriptions	Options	Details	Initial value
Communication Format	MODE1	Average value output format	MODE1
	MODE2	Latest value output format	
	STD1	TOPCON STD1 format	
	STD2	TOPCON STD2 format	
	STD5	TOPCON STD5 format	
Use of Output port	OFF	Output port is disabled.	OFF
	ON	Output port is enabled.	
Baudrate setting	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.	
Shared Folder Setting	Shared folder: string up to 32+1 characters including terminated null char. User name: string up to 32+1 characters including terminated null char. Pass word: string up to 16+1 characters including terminated null char. Set by keyboard display	Path and permission to the shared folder is set.	NULL
IP Address Setting	FIX	Assign IP address manually.	FIX
	AUTO	Assign IP address automatically.	
IP Address	0. 0. 0. 0 Set by ten-key display	IP address of PC to output data.	0.0.0.0
Subnet Mask	0. 0. 0. 0 Set by ten-key display	Subnet mask address of CT-1P/CT-1.	0.0.0.0
Default Gateway	0. 0. 0. 0 Set by ten-key display	Default gateway address of CT-1P/CT-1.	0.0.0.0
Primary DNS Server	0. 0. 0. 0 Set by ten-key display	Primary DNS Server number.	0.0.0.0
Secondary DNS Server	0. 0. 0. 0 Set by ten-key display	Secondary DNS Server number.	0.0.0.0

OPERATOR SETTINGS

OPERATOR contains settings related to Operator ID.

Descriptions	Options	Details	Initial value
Use of 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	ASCIIZ string up to 3+1 characters including terminated null char.	The Prefix of Operator ID can be registered.	NULL
Operator ID (Mandatory)	OFF	Operator ID is not required.	OFF
	ON	Operator ID is required.	
Fixed Ope. ID setting	OFF	Operator ID is not fixed.	OFF
	ON	Operator ID is fixed.	
Fixed Ope. ID entry	ASCIIZ string up to 13 characters including terminated null char.	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 intraocular pressure measuring window....

  Blow off dust with a blower.
- Fingerprints and oil spots on intraocular pressure measuring window ....

  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 INTRAOCULAR PRESSURE MEASURING WINDOW

- To secure auto alignment and correct measurement values, clean the 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 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. • To avoid problems, do not leave the cotton fibers inside. • 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.
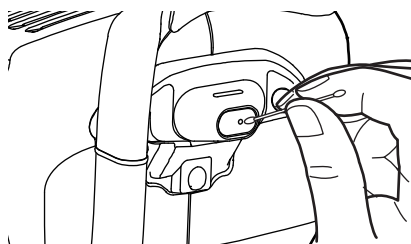
Wiping the glass surface

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 intraocular pressure measuring window, 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 intraocular pressure measuring window 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 intraocular pressure measuring window, 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. • To avoid problems, do not leave the cotton fibers inside. • 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.

Applicator (attached)
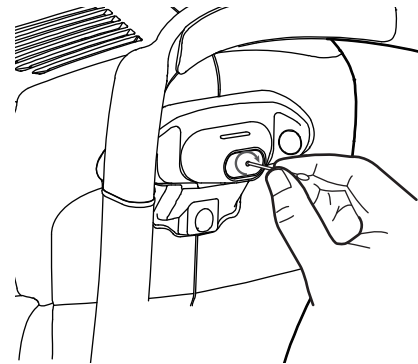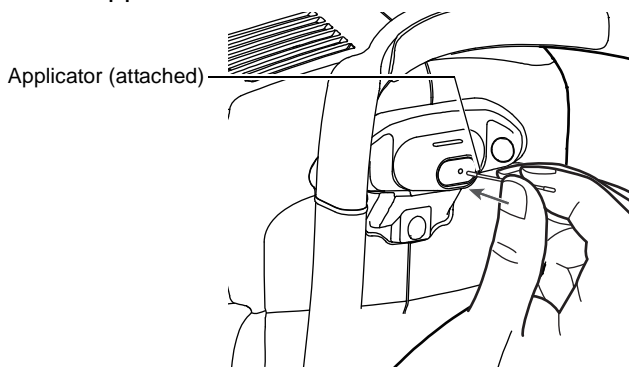
4 Use a new applicator and wipe the glass surface in a similar manner; repeat this a few times.

📝 **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 nozzle cap and dust cover.
- When not in use, turn off the POWER switch.

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
Applicator	41601 8606
Printer paper	44800 4001

USER MAINTENANCE ITEM

Item	Inspection time	Contents
Inspection	Before using	• The instrument works properly. • The objective lens must be free of stains and/or flaws. • Confirm whether the foreign object is attached to the measuring nozzle and the area around the measuring nozzle. • Air check • 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 • External cover, control panel, etc.
Replacement	As required	• Printer form

MANUFACTURER MAINTENANCE ITEMS

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

PRINTER PAPER JAM

⚠ CAUTION	• When setting a printer paper, keep a patient's face away from the instrument. Some part of the instrument may touch the patient's lip or nose if the printer button is pressed. • To avoid potential injury in case of malfunction, including a paper jam, be sure to shut off the power before attempting to repair it. • 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.
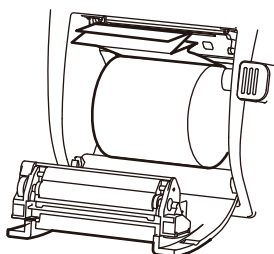
📝 **NOTE**	After shutting off the power and removing the jammed printer paper, tap the (PRINT OUT) button to print out a blank sheet.

REPLACING THE CHINREST TISSUE PAPER

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

Chinrest pins

Chinrest tissue paper
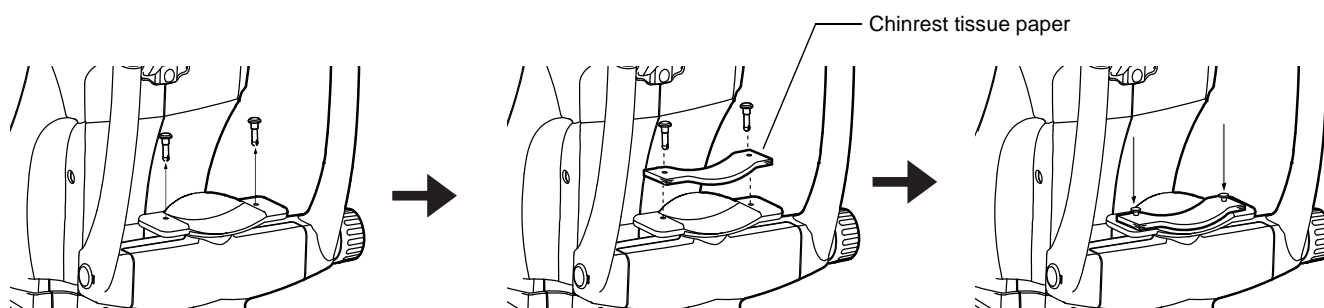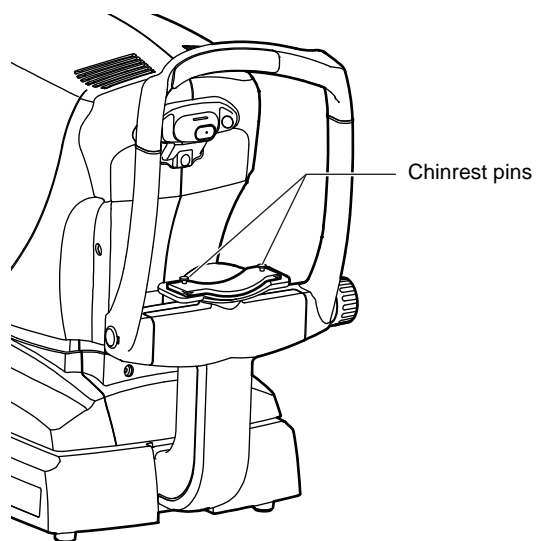
MAINTENANCE

CLEANING THE EXTERNAL 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 external cover, control panel, etc. get soiled, wipe the surface clean with a dry cloth.

2 If the external 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. • 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

"ERROR"	Displayed when the measurement is an error.
"OVER"	Displayed when the measurement is over.
"Finished"	Displayed when normal measurements are completed for the set measurement count.
"CLEAN INSIDE NOZZLE/GLASS"	Displayed when a blot is detected on the measuring window during TONO measurement. Clean the measuring window by referring to "CLEANING THE INTRAOCULAR PRESSURE MEASURING WINDOW" on page 56.
"CLEAN THE MEASURING WINDOW 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 57.
"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.
"Patient ID is required. Please set patient ID."	Displayed when the output operation is requested when the setting "Patient ID (Mandatory)" is ON 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 when the setting "Operator ID request" is ON but the operator ID is not inputted. Enter the operator ID and then request the output operation.
"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 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).
"LAN create error"	Failed to create the file. Confirm that write permission to the share folder is set correctly.
"LAN write error"	Failed to write to the file. Check the free space capacity at the save location.
"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.
"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.
"IP address conflict"	Displayed when the IP address is duplicated.
"Previous measurements are left. Please press the Clear button."	Displayed when the output of all output-set data fails.
"Output not set"	Displayed when all output settings are OFF.
"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.

"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.
"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.
"Perform air check?"	Displayed to confirm whether to perform air check.
"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.
"First Octet is 1 - 223 Range"	Displayed when the first octet of IP address, default gateway, primary DNS server or secondary DNS server is set to a value out of the specified input range.
"Value is irregular. Input valid value"	Displayed when the octet is set to a value out of the specified input range. Enter a value within the input range.
"The IP address is 0 - 255 Range"	Displayed when the subnet mask is set to a value off the input rule. Enter a value within the input rule.
"At least 3 characters are required for operator ID prefix."	Displayed when the input examiner ID prefix is less than 3 characters. Enter a prefix with 3 characters.
"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 26.

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 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?	20
		Is power cable connected to the instrument?	20
Control panel is not clear.	The image is dark.	Adjust the brightness by "Control panel Brightness Adjust".	53
Any trouble is found in a movable part.	———	Do not move it forcibly but call our service engineer.	25
Printing is not done.	Paper comes out without printing.	Confirm the direction of paper winding. If the direction is incorrect, reset paper to the proper direction.	22
	Paper does not come out.	If "PAPER END" displayed on control panel, replenish printer paper.	22

SPECIFICATIONS AND PERFORMANCE

SPECIFICATIONS AND PERFORMANCE

Ocular pressure measurement	Measuring range: 1 to 60mmHg (Display unit: 1mmHg step display, Average value: 1mmHg/0.1mmHg step display)
	Measuring range: 1 to 30/1 to 60mmHg , 2 step display
External I/O terminal	USB (for Import), RS-232C (for Export), LAN (for Export)

	Essential performance
NOTE	• Measurement must be performed correctly.
	• 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 Computerized Tonometer CT-800 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: 30-70VA

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 : 317~341mm(W) × 521~538mm(D) × 437~467mm(H)

Weight   : 14.0kg

OPERATION PRINCIPLE

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. Detecting the applanation of cornea is performed, irradiating the cornea by near infrared light from a IOP measurement optical system (XY LED) and receiving the reflected beam by an applanation sensor.

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 57.

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.

Item	Article code	Cable Shielded	Ferrite Core	Length (m)
AC power cord for (AC230V)	424122090	NO	NO	3.0
LAN Cable	–	YES	YES	3.0
Serial Cable	–	YES	NO	5.0
AC power code for (PC)	–	NO	NO	1.8
Keyboard cable	–	NO	NO	1.8
Mouse cable	–	NO	NO	1.8
RGB cable	–	YES	YES	1.8
AC power code for (Display)	–	NO	NO	1.8
USB Cable	–	YES	NO	1.5

Guidance and manufacturer's declaration - electromagnetic emissions		
The CT-800 is intended for use in the electromagnetic environment specified below. The customer or the user of the CT-800 should assure that it is used in such an environment.		
Emissions test	**Compliance**	**Electromagnetic environment - guidance**
RF emissions CISPR 11	Group 1	The CT-800 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.
RF emissions CISPR 11	Class B	The CT-800 is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC61000-3-2	Complies	
Voltage fluctuations/ flicker emissions IEC61000-3-3	Complies	

Guidance and manufacturer's declaration - electromagnetic immunity			
The CT-800 is intended for use in the electromagnetic environment specified below. The customer or the user of the CT-800 should assure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment - guidance**
Electrostatic discharge(ESD) IEC 61000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for input/output lines	± 2 kV for power supply lines ± 1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	± 1 kV line(s) to line(s) ± 2 kV line(s) to earth	± 1 kV line(s) to line(s) ± 2 kV 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 IEC 61000-4-11	<5% U_t (>95% dip in U_t) for 0, 5 cycle 40% U_t (60% dip in U_t) for 5 cycles 70% U_t (30% dip in U_t) for 25 cycles <5% U_t (>95% dip in U_t) for 5 sec.	<5% U_t (>95% dip in U_t) for 0, 5 cycle 40% U_t (60% dip in U_t) for 5 cycles 70% U_t (30% dip in U_t) for 25 cycles <5% U_t (>95% dip in U_t) for 5 sec.	Mains power quality should be that of a typical commercial or hospital environment. If the user or the CT-800 requires continued operation during power mains interruptions, it is recommended that the CT-800 be powered from an uninterruptible power supply or battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE U_t is the a.c. mains voltage prior to application of the test level.			

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

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

In the patient's environment, use the device 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 the power strip in the patient's environment. Connect the power supply of the device to the commercial power supply.

Radius 1.5m

Devices applicable to the patient's environment
• Barcode reader (Note 1)

2.5m

1.5m   1.5m
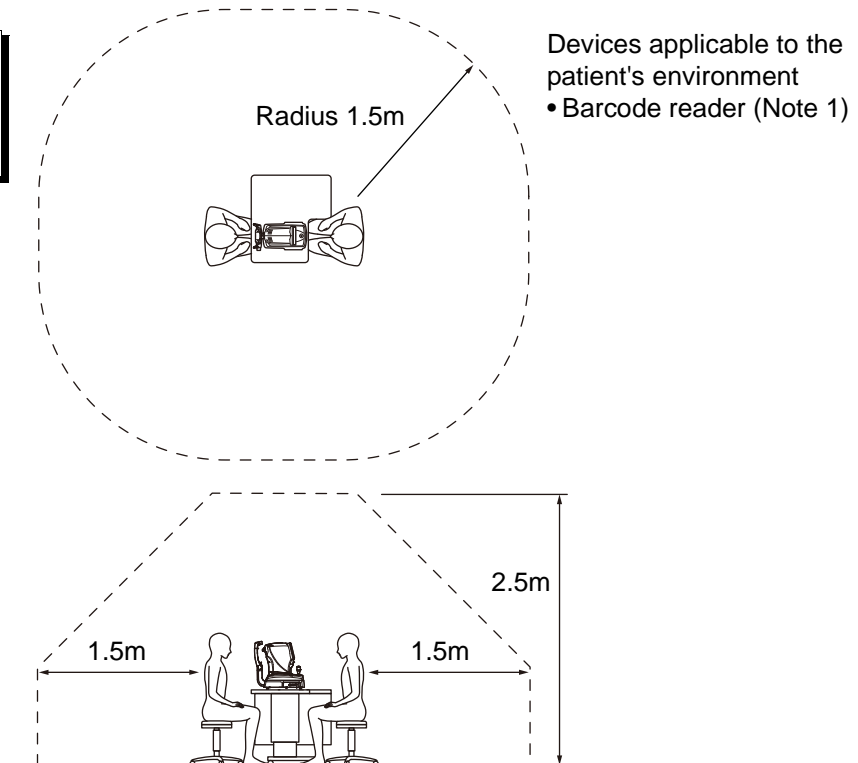
Note 1: Use the device conforming to IEC60950-1.

⚠ **CAUTION**	• Don't connect an additional power strip or an extension cord to the system. • Don't connect the device which is not recognized as one component of the system.

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)
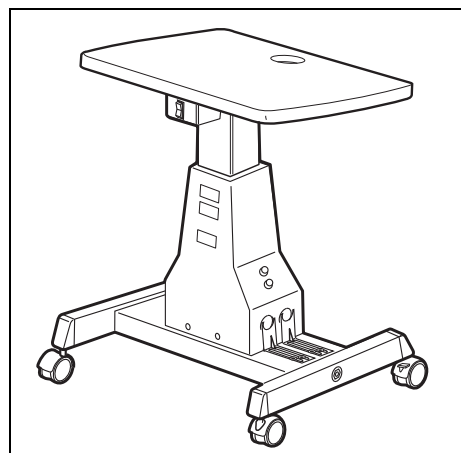
SHAPE OF PLUG

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) Type H (Infrequently)
Chile	220V/60Hz	Type A
Colombia	110V/50Hz	Type C
Brazil	220V/60Hz 127V/60Hz	Type A 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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   > (a) a copy of the Derived Program; and
   > (b) any additional file created by the font developing program in the course of creating the Derived Program that can be used for further modification of the Derived Program, if any.
   (2) It is required to also Redistribute means to enable recipients of the Derived Program to replace the Derived Program with the Licensed Program first released under this License (the "Original Program"). Such means may be to provide a difference file from the Original Program, or instructions setting out a method to replace the Derived Program with the Original Program.
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   (4) No one may use or include the name of the Licensed Program as a program name, font name or file name of the Derived Program.
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COMPUTERIZED TONOMETER CT-800

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