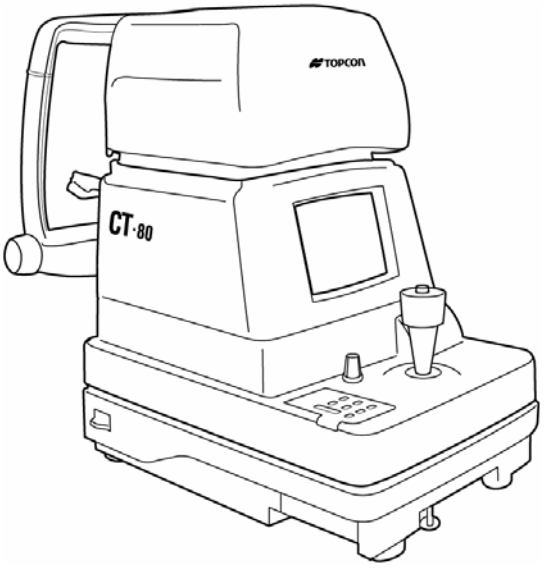
TOPCON



INSTRUCTION MANUAL
COMPUTERIZED TONOMETER

CT-80

This symbol is applicable for EU member countries only.
To avoid potential negative consequences for 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.

INTRODUCTION

Thank you for purchasing the TOPCON Computerized Tonometer CT-80.

(To get the best use from the instrument, please carefully read these instructions and keep this Instruction Manual in a convenient location for future reference.)

This instrument features the following:

- An exact, non-contact intraocular pressure measurement that can be done by air ejection.
- An alignment bar that enables easy operation.

This text outlines the Computerized Tonometer CT-80 and describes basic operations, troubleshooting, checking, maintenance and cleaning.
To encourage the safe, efficient use of this instrument and prevent danger to the operator and others, we suggest you carefully read the “Displays for Safe Use” and the “Safety Cautions”.
Again, please keep this Instruction Manual in a convenient location for future reference.

Precautions

- This machine is a precision instrument; install it in a place set to the following conditions: temperature (10~40°C), humidity (30~85%) and atmospheric pressure (70~106KPa). Avoid direct exposure to sunlight.
- To ensure smooth operation, install the instrument on a level place free of vibrations. Also, do not place any objects on the instrument.
- Before using the instrument, connect all cables correctly.
- Use the specified source voltage.
- When not in use, turn the power off and put the measuring window cap and dust cover on.
- To ensure a correct reading, do not soil the measuring window with finger prints, dust, etc. Also, do not touch the measuring nozzle except when cleaning.

DISPLAY FOR SAFE USE

In order to encourage the safe use of the product and prevent any danger to the operator and others or damage to properties, important warnings are placed on the product and inserted in the instruction manual.
We suggest that everyone understand the meaning of the following displays and icons before reading the “Safety Cautions” and text.

DISPLAY	MEANING
WARNING	**Ignoring or disregarding this display may lead to death or serious injury.**
CAUTION	**Ignoring or disregarding this display may lead to personal injury or physical damage.**

- Injury refers to cuts, bruises, sprains, fractures, burn, electric shock, etc.
- Physical damage refers to extensive damage to buildings or equipment and furniture.

ICONS	MEANING
	**This icon indicates Prohibition.** **Specific content is expressed with words or an icon either inserted in the icon itself or located next to the icon.**
	**This icon indicates Mandatory Action.** **Specific content is expressed with words or an icon either inserted in the icon itself or located next to the icon.**
	**This icon indicates Hazard Alerting (Warning).** **Prohibition.** **Specific content is expressed with words or an icon either inserted in the icon itself or located next to the icon.**

SAFETY CAUTIONS

⚠ WARNING

Icons	Prevention item	Page
	Do not measure the patient's eye wearing a contact lens. It may damage the patient's cornea and other areas. Tell the patient to remove the contact lens.	***30***
	To avoid electrical shock, do not open the instrument. Refer all servicing to qualified personnel.	***45***
	To avoid electric shocks, do not remove the covers from the bottom and top surfaces, TV monitor, measuring unit, etc.	***45***
	To prevent shock hazard, do not allow water or other foreign matter to enter into the instrument.	**—**
	To avoid fire and electric shocks in case of tumbling, do not place a cup or vessel containing water/fluid on the instrument.	**—**
	To avoid electric shocks, do not insert objects or metals through the vent holes or gaps or contain them inside the machine body.	**—**
	To avoid electrical shock and fire, unplug the power cable before removing the fuse cover. Additionally, be sure to replace the fuse cover before plugging in the power cable.	***59***
	Use only the attached fuses. Using other fuses may cause a fire.	***59***
	Should any anomaly, such as smoke, occur, immediately switch OFF the power source and unplug the power cable. Continued use ignoring the condition may cause fire. Contact your dealer for repair.	**—**

SAFETY CAUTIONS

⚠ CAUTION

Icon	Prevention item	Page
	To avoid potential injury, hold the instrument in the proper position.	***13***
	To avoid electrical shock, do not handle the power plug with wet fingers.	***14***
	Never insert your fingers under the chinrest. ∗ Inform the patient of this, too. Careless insertion of fingers may cause injury by pinching.	***30***
	Never insert your fingers under the measuring head. ∗ Inform the patient of this, too. Careless insertion of fingers may cause injury by pinching.	***34***
	Do not use or apply any spray-typed cleaner near the instrument. If a drop of cleaner remains inside the measuring nozzle, the patient's eye may be injured during measurement.	***60***
	Before carrying the instrument, be sure to affix it firmly by turning the fixing screw at the base. If the instrument is moved with the screw loosened, it may result in damage to the instrument.	***13***
	When moving the instrument, be sure to hold it at the bottom surface with two people. Carrying by one person may cause back injury or injury by falling parts. Also, holding areas other than the bottom surface may cause pinching fingers between parts and injury by falling parts as well as damage to the instrument.	***13***
	Before measuring, check if there is any foreign matter on and around the measuring nozzle. If any, it may enter and damage the patient's eye during the measurement.	***29***
	Before measuring, set the safety stopper. If the safety stopper is not set, it may cause injury to the eye that comes in contact with the measuring window glass. Set the safety stopper separately for the right and left eyes.	***31***
	When setting the safety stopper, do it from the instrument side (safety stopper knob side). Setting from another position does not easily allow you to check the positions of the measuring window glass and the patient's eye and may cause injury to the eye that comes in contact with the measuring window glass.	***31***
	To clean the measuring window glass, measuring nozzle and the window glass inside the measuring nozzle, use ethanol. Using other chemicals may cause damage to the patient's eye during measurement.	***56*** ***57***

USAGE AND MAINTENANCE

PURPOSE

This tonometer “CT-80” is a precision electrical device for medical use that must be used under the instruction of a doctor.

USER MAINTENANCE

To maintain the safety and performance of the equipment, never attempt to do maintenance on your own. Ask our serviceman for repair except for the items specified here which can be maintained by the user. For details, follow the instructions.

Fuse replacement

The primary fuses for the main body may be replaced by a non-trained service technician. For details, refer to “Replacing the Fuse” on page 59.

Cleaning of measuring window

Cleaning of the measuring window glass is possible. For details, refer to the instructions in “Cleaning the Measuring Window Glass” on page 56.

Cleaning of the nozzle and window inside the nozzle

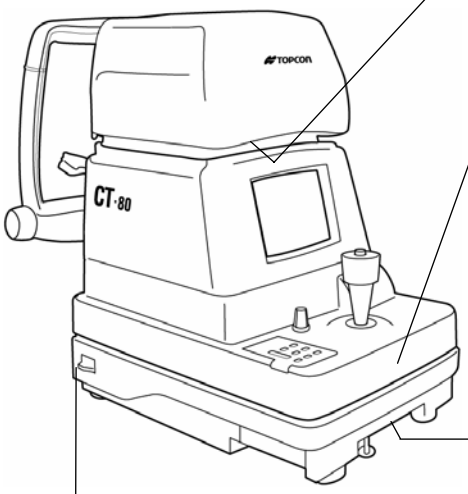
Cleaning of the nozzle and the window inside the nozzle is possible by following the instruction in “Cleaning the Nozzle and the Window Glass inside the Nozzle” on page 57.

ESCAPE CLAUSE

- TOPCON shall not take any responsibility for damage due to fire, earthquakes, actions by a third party or other accidents, or the negligence and misuse of the user and use under unusual conditions.
- TOPCON shall not take any responsibility for damage derived from the inability to use this equipment, such as a loss of business profit and suspension of business.
- TOPCON shall not take any responsibility for damage caused by operations other than those described in this Instruction Manual.
- Diagnoses shall be made on the responsibility of pertaining doctors and TOPCON shall not take any responsibility for the results of such diagnoses.

WARNING INDICATIONS AND POSITIONS

To ensure the safe usage of this equipment, precaution indications are provided. Abide by the following warning instructions. If any of the following labels are missing, please contact us at the address printed on the back cover of this manual.



WARNING

- To avoid electrical shock, do not open the instrument. Refer all servicing to qualified personnel.

CAUTION

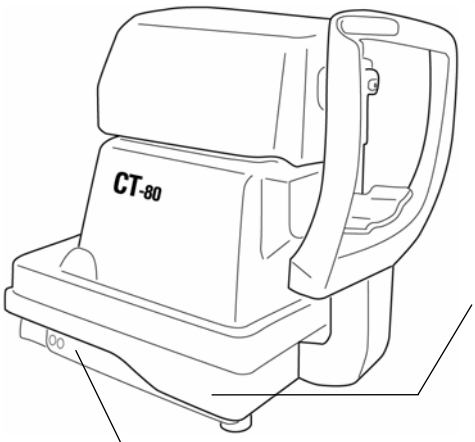
- To avoid potential injury during operation, do not touch the patient's eyes or nose with the instrument.

WARNING

- To avoid electrical shock, do not open the instrument. Refer all servicing to qualified personnel.

CAUTION

- To avoid potential injury, insure that the safety stopper knob is engaged prior to use.



- Degree of protection against electric shock:

  TYPE B EQUIPMENT

WARNING

- Electrical shock may cause burns or possible fire. Turn the main power OFF and UNPLUG the power cord before replacing the fuses. Replace only with fuses of the correct rating.

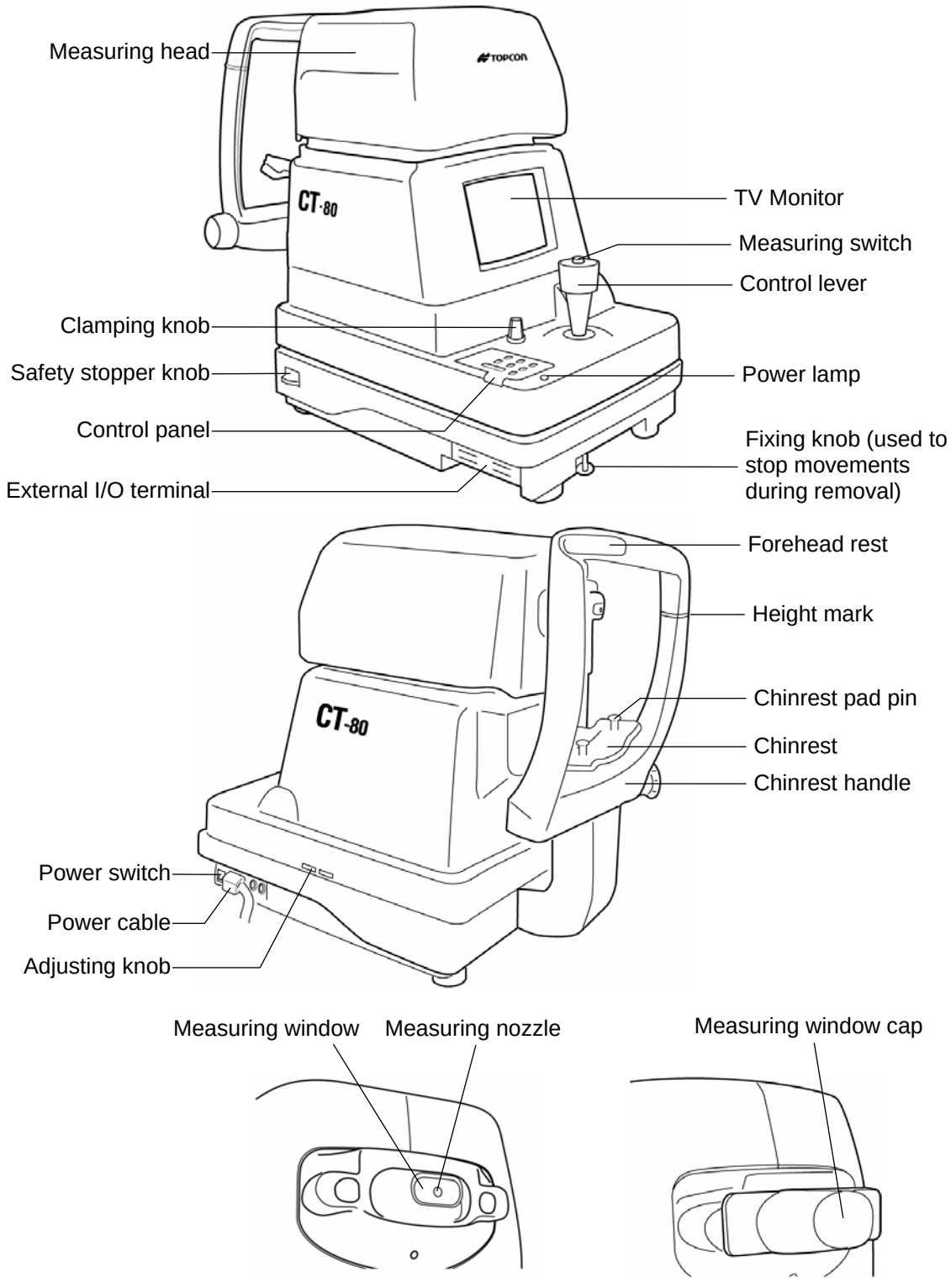
The following labels are located inside the instrument. Only authorized service personnel should remove the covers: no user serviceable parts are inside the instrument.

: Protective earth : Functional earth : Dangerous voltage

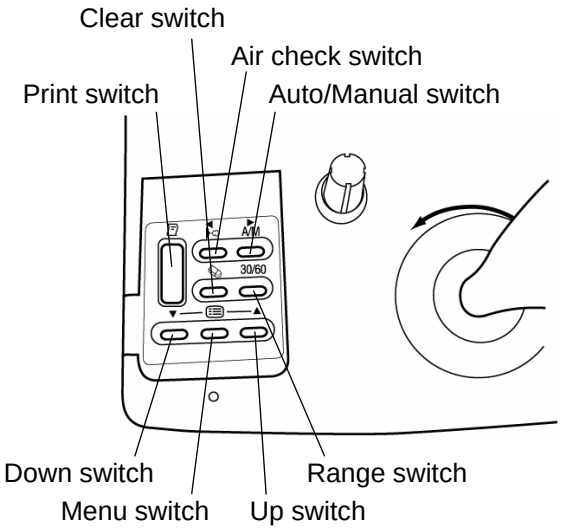
CONTENT

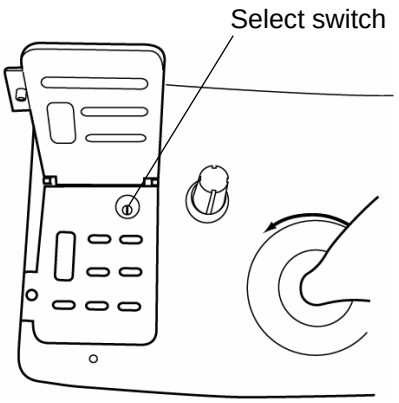
COMPONENTS

MAIN BODY COMPONENTS



CONTROL PANEL COMPONENTS

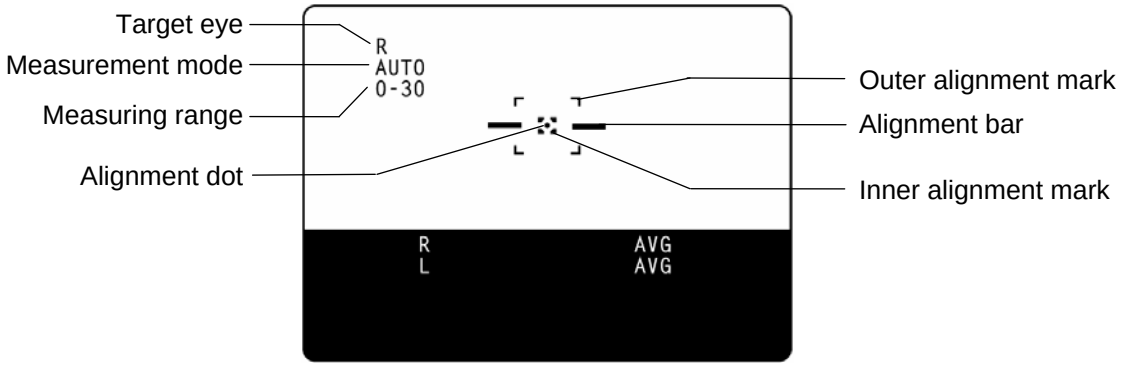




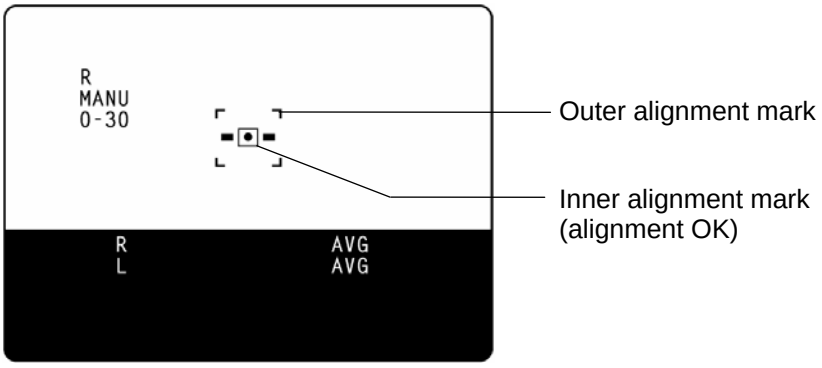
Print switch ..... Prints out the screen readings. When there is no reading, holding the switch down feeds the paper.
Range switch ..... Switches the range between 0-30 and 0-60.
Clear switch ..... Deletes all the measurement values from the screen.
Menu switch..... Displays the Menu screen.
Auto/Manual switch..... Switches the mode between auto and manual. Also, when selecting menu software, it moves the cursor right (▶).
Air check switch ..... Performs an air check. Also, when selecting menu software, it moves the cursor left (◀).
Down switch ..... When selecting menu software, it moves the cursor down (▼).
Up switch..... When selecting menu software, it moves the cursor up (▲).
Select switch..... Enables correcting the readings.

MONITOR SCREEN COMPONENTS

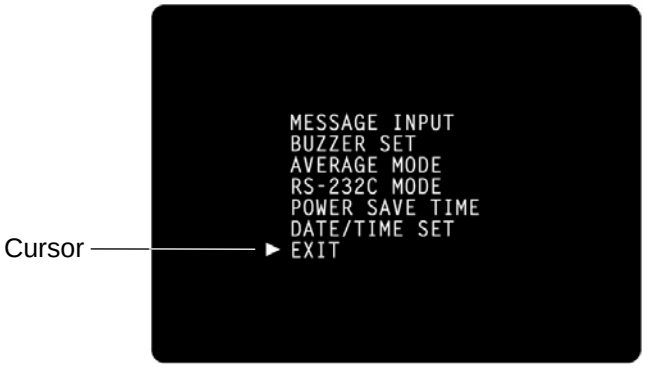
Measurement Screen (Auto mode, alignment)



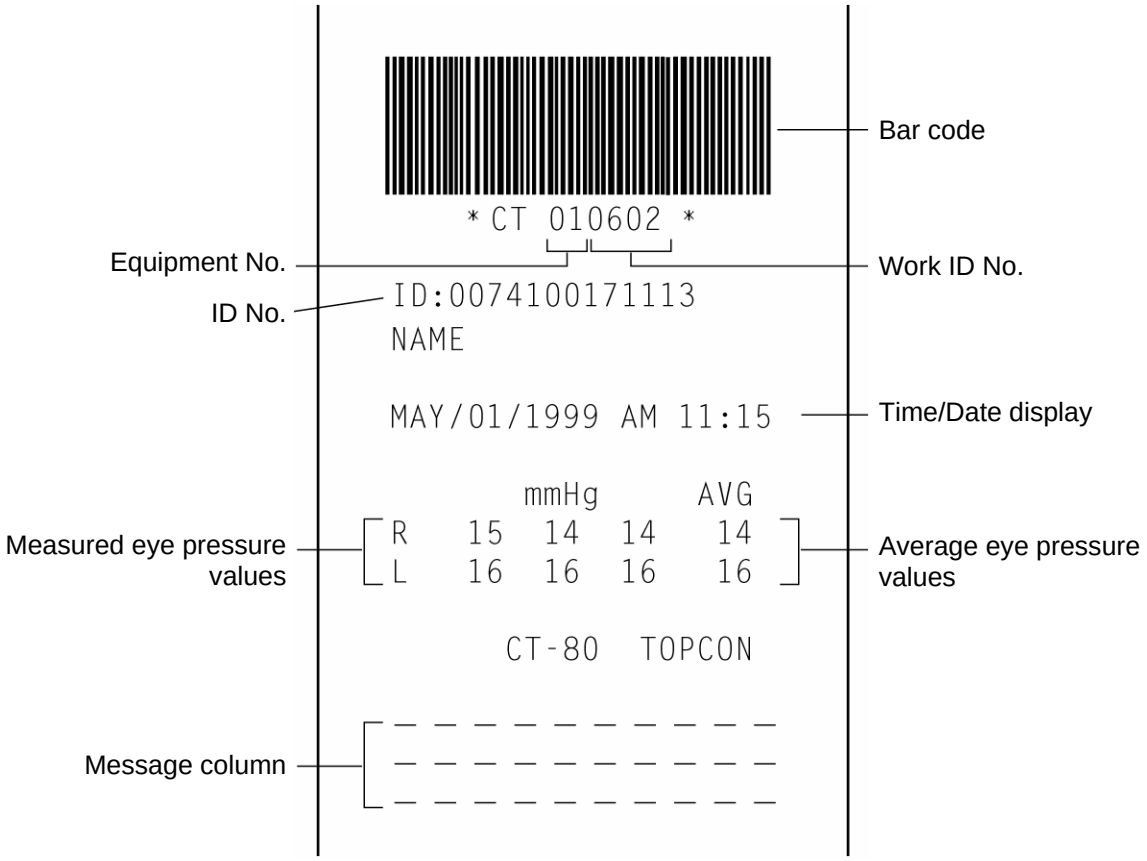
Measurement Screen (Manual mode, alignment OK)



Menu Screen

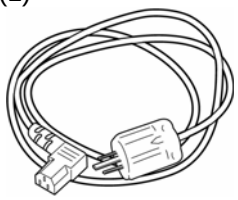
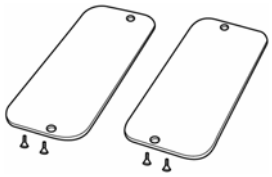
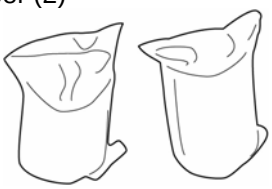
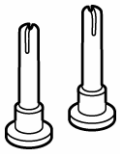
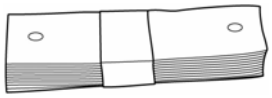
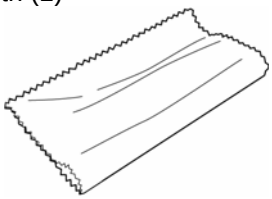
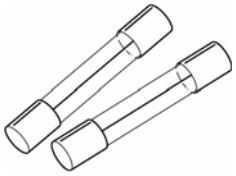
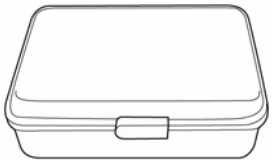
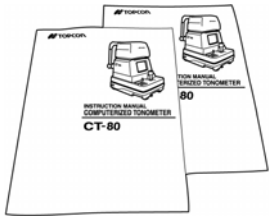
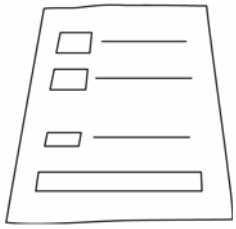


CONTENTS OF PRINTER OUTPUT



STANDARD ACCESSORIES

The following are the standard accessories. The figures in parentheses are the quantities. Please check to see that all accessories are contained.

Power cable (1) 	Rail cover (2) 
Printing paper (2) 	Chinrest pin (2) 
Chinrest pad (1) 	Silicone cloth (1) 
Fuse (2) * Different by destinations 	Dust cover (1) 
Cleaning kit (1) 	Instruction Manual, Unpacking and Assembly (1 each) 
	Window glass cleaning procedure (1) 

PREPARATIONS

HOW TO INSTALL THE INSTRUMENT

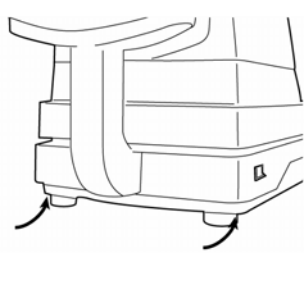
⚠ CAUTION	Before carrying the instrument, be sure to affix it firmly by turning the fixing screw at the base. If the instrument is moved with the screw loosened, it may result in damage to the instrument.

⚠ CAUTION	When moving the instrument, be sure to hold it at the bottom surface with two people. Carrying by one person may cause back injury or injury by falling parts. Also, holding areas other than the bottom surface may cause pinching fingers between parts and injury by falling parts as well as damage to the instrument.

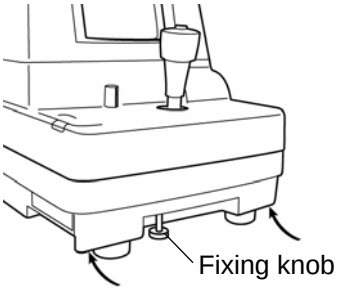
⚠ CAUTION	To avoid potential injury, hold the instrument in the proper position.

1 Fasten the clamping knob.

2 Hold the instrument body firmly at the specified positions and place it on the automatic instrument table.
For the automatic instrument table, see “OPTIONAL ACCESSORIES” on page 46.



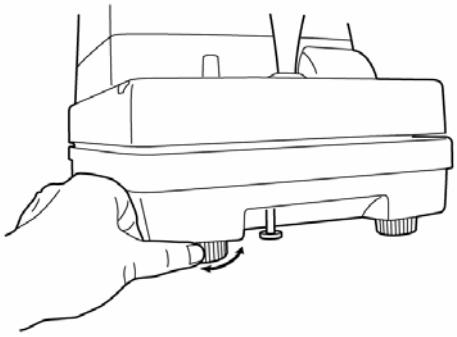
Specified holding positions



Holding the instrument

3 After installing the instrument, loosen the fixing knob.
Now the body components can be moved.

4 If the machine body is slightly off level, properly turn the adjusters at the four corners for fine adjustment.
Do not unscrew the adjusters more than 1cm.

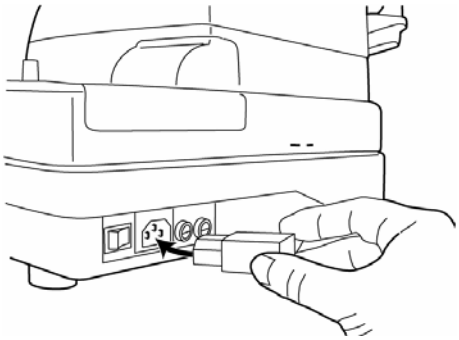


HOW TO CONNECT THE POWER CABLE

CAUTION	To avoid electrical shock, do not handle the power plug with wet fingers.

1 Make sure the POWER SWITCH is OFF.

2 Attach the power cable to the machine body.



3 Plug the power cable into the 3-pin AC receptacle with grounding.

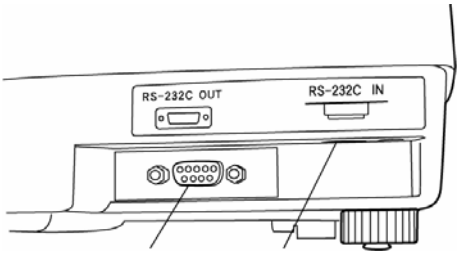
HOW TO CONNECT EXTERNAL I/O TERMINALS

RS-232C OUT

This machine can be connected to another device, including a personal computer via the RS-232C OUT terminal.

1 Connect the cable to the RS-232C OUT terminal of this machine.

2 Connect the other cable end to another device.



RS-232C IN Output terminal Input terminal

This machine can be connected to another device, including a bar code reader via the RS-232C IN terminal.

1 Connect the cable to the RS-232C IN terminal of this machine.

2 Connect the other cable end to the external device.

INITIAL SETTINGS

During the initial setting, date, time, operating time of the power save function, RS-232C, mode of average value, buzzer and message can be set.

Preparations

1 Make sure the power cable is connected.
For connection, see “HOW TO CONNECT THE POWER CABLE” on page 14.

2 Check the no-patient condition of the instrument and turn the [POWER SWITCH] ON.

MEMO	• When the machine is moved from a cold room to a warm room or when the room temperature suddenly rises, it may cause dewing inside the machine and disable measurement. In this case, leave the machine alone for about 30min until it reaches room temperature.

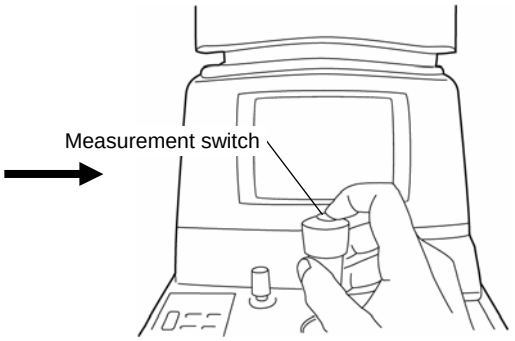
Displaying The Menu Screen

1 Make sure that the Measurement screen is displayed.

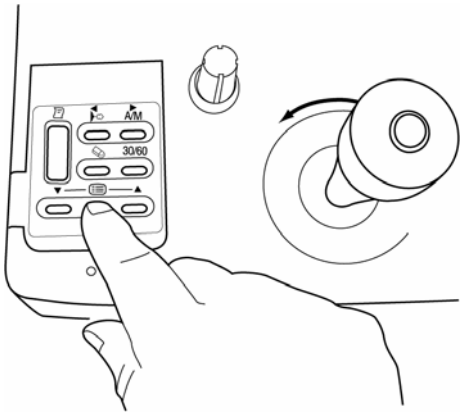
2 Press [☰] on the control panel.
The Menu screen is displayed.

Returning To The Measurement Screen

1 Press [△], [▽] on the control panel, move the cursor to “EXIT” and press [MEASUREMENT SWITCH].



Or, press [☰] on the control panel. The Measurement screen returns.



Time/Date Setting

Example of operation: Illustrations show time setting.

1 Press [≡] on the control panel to get the Menu screen.

2 Press [△], [▽] on the control panel, move the cursor to “DATE/TIME SET” and press [MEASUREMENT SWITCH].

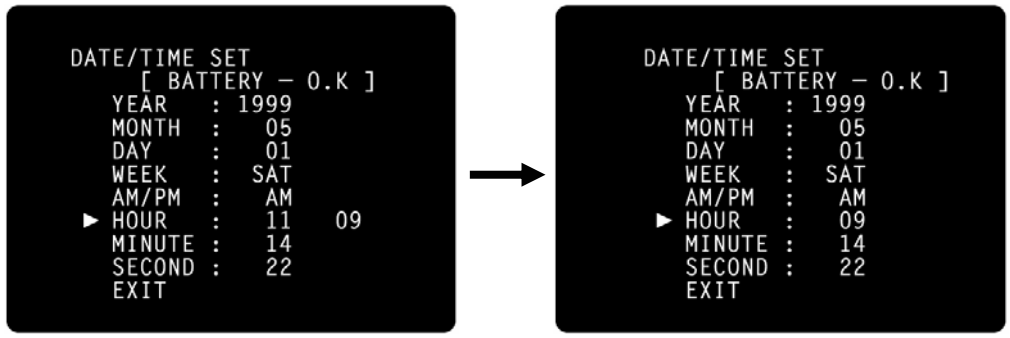
The Date/Time setting screen is displayed.

3 Make sure that the display “BATTERY → O.K.” appears.

MEMO If the display is “BATTERY → N.G.”, the built-in clock battery is used up. Contact your dealer. Additionally, when the battery becomes exhausted, time and date items are not printed and “DATE” is displayed instead.

4 Press [△], [▽] on the control panel, move the cursor to “HOUR” and press [MEASUREMENT SWITCH].

5 Press △ , ▽ of the control panel, renew figures and press MEASUREMENT SWITCH . The renewed figures are inputted.



6 Press △ , ▽ of the control panel, move the cursor to “EXIT” and press MEASUREMENT SWITCH .

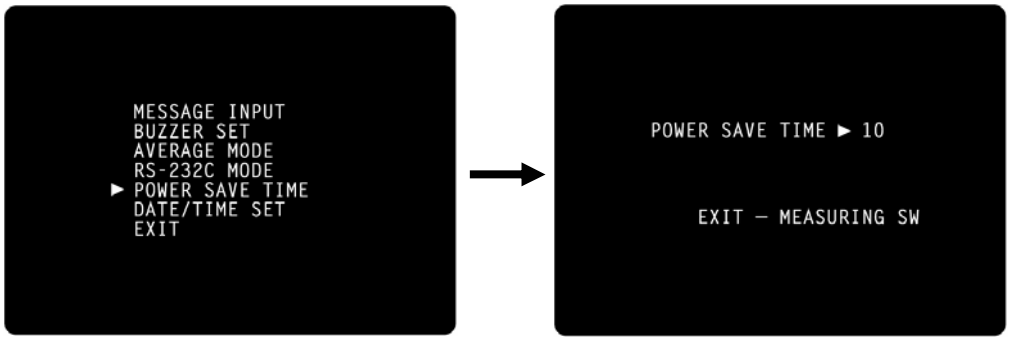
MEMO Date and other items can also be renewed at the same time.

Setting The Power Save Time

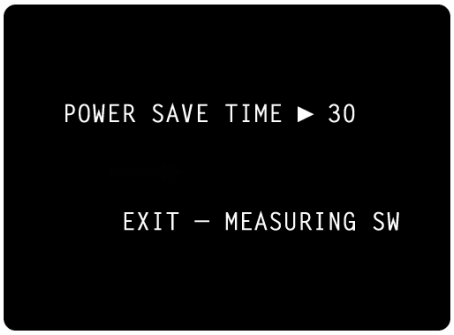
A time for the power save function to achvale can be selected from 10, 20, 30 or 60min. For shipment, 10min. is set.

1 Return to the Menu screen.

2 Press △ , ▽ on the control panel, move the cursor to “POWER SAVE TIME” and press MEASUREMENT SWITCH . The Power Save Time Setting screen is displayed.



3 Press △ , ▽ on the control panel and change the power save time.



MEMO

► 5 ⌦ 10 ⌦ 20 ⌦ 30 ⌦ ◄

4 Press [MEASUREMENT SWITCH]. The Menu screen is displayed.

RS-232C INPUT/OUTPUT Settings

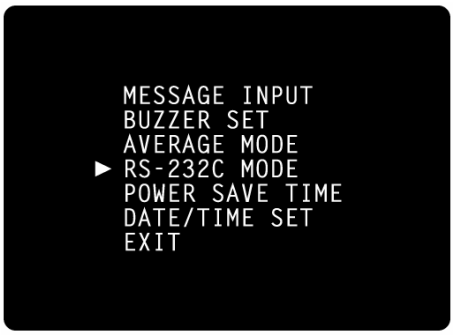
For shipment, settings are EQUIPMENT (Equipment No.) No.1, FORMAT (communication mode) OFF, and SPEED (communication speed) 2400

Each time [△] [▽] is pressed, the display changes as follows:

Example: Setting the equipment No.

1 Return to the Menu screen.

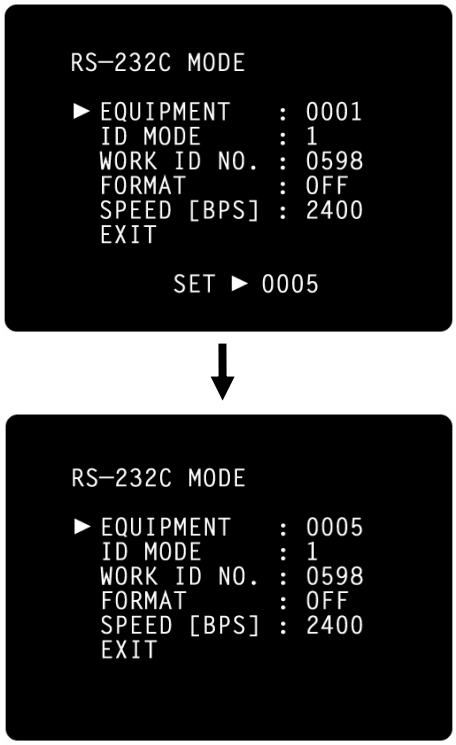
2 Press [△] , [▽] of the control panel, move the cursor to “RS-232C MODE” and press [MEASUREMENT SWITCH] .



The RS-232C Mode is displayed.

3 Press △ , ▽ on the control panel, move the cursor to “EQUIPMENT” and press MEASUREMENT SWITCH.

4 Press △ , ▽ on the control panel, change the equipment No. and press MEASUREMENT SWITCH.



MEMO The equipment No.(EQUIPMENT) can be selected from 0000 to 0099. Each time △ , ▽ is pressed, the display changes as follows:

→ OFF ⌦ MODE1 ⌦ MODE2 ⌦ MODE3 ⌦ MODE4 ⌦ MODE5 ⌦ STD1 ⌦ ←

* Certain models may not export data of MODE5 & STD2. It indicates settings as OFF→MODE1→MODE2→MODE3→MODE4→STD1→OFF.

When setting the speed, the display changes from 2400-9600 each time △ , ▽ is pressed.

→ 2400 ⌦ ←

MEMO “EQUIPMENT” and “WORK ID NO.” can be reset by pressing ⌫ .

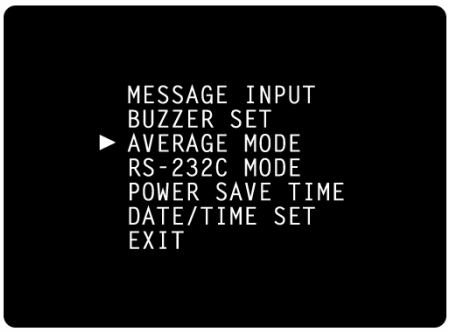
5 Press △ , ▽ on the control panel, move the cursor to “EXIT” and press MEASUREMENT SWITCH. The Menu screen returns.

Setting The Average Value Mode

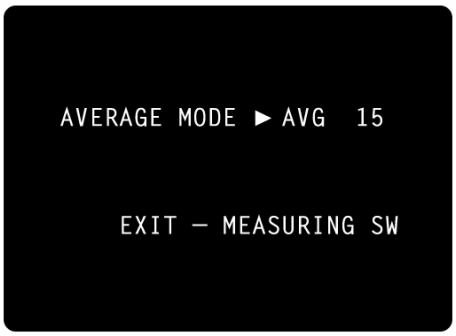
The average value display of the measurement values can be selected from integer and decimal displays. For shipment, the integer display is set.

1 Return to the Menu screen.

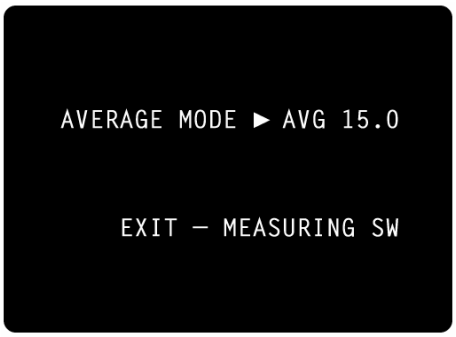
2 Press △, ▽ on the control panel, move the cursor to “AVERAGE MODE” and press MEASUREMENT SWITCH.



The Average Value Mode screen is displayed.



3 Press △, ▽ on the control panel to change the mode.



MEMO

15 : The average value is displayed as an integer (by rounding fractions to the nearest whole number).

15.0 : The average value is displayed up to one decimal (by rounding fractions to the nearest tenth).

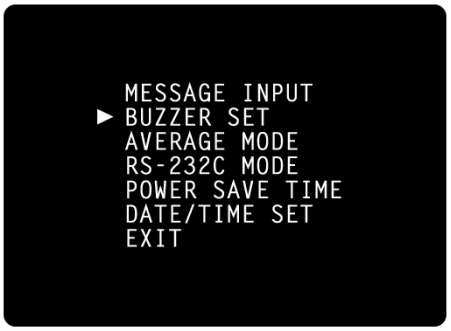
4 Press [MEASUREMENT SWITCH]. The Menu screen returns.

Setting The Buzzer

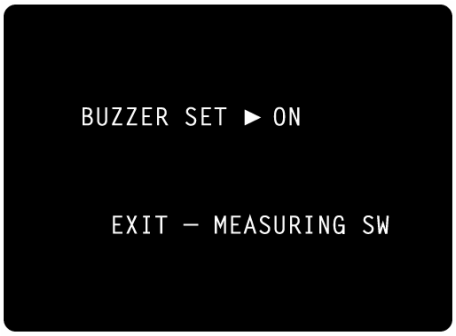
The buzzer can be turned ON/OFF by pressing the switches on the control panel.

1 Return to the Menu screen.

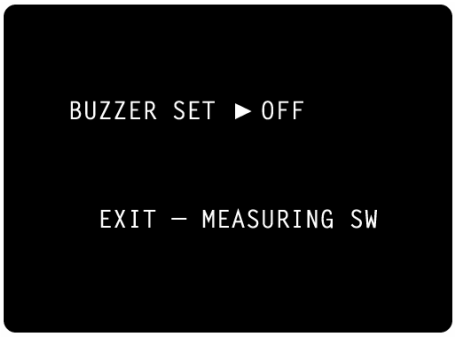
2 Press [△], [▽] on the control panel, move the cursor to “BUZZER SET” and press [MEASUREMENT SWITCH].



The Buzzer Setting screen is displayed.



3 Press [△], [▽] on the control panel to select ON/OFF.



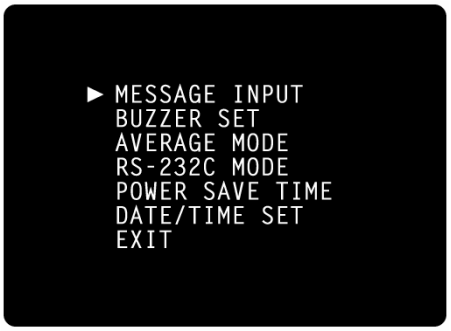
4 Press MEASUREMENT SWITCH.
The Menu screen returns.

Message Input

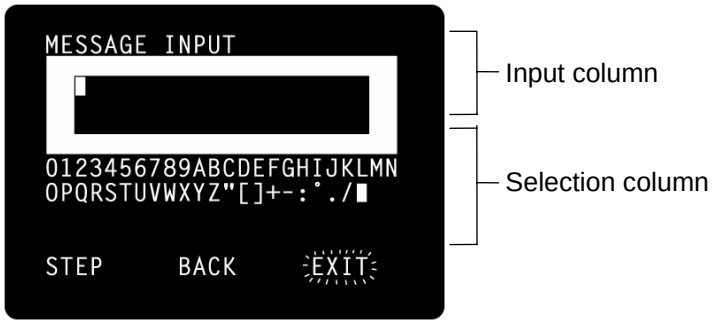
You can add a brief message to the printout.

1 Return to the Menu screen.

2 Press △, ▽ on the control panel, move the cursor to “MESSAGE INPUT” and press MEASUREMENT SWITCH.



The Message Input screen is displayed.



3 Press △, ▽, ▷, ◁ on the control panel to move the blinking icon to a character in the selection column for input.

MEMO

■ : A space for 1 character (Use this to delete a character, too.)
STEP : The blinking icon of the input column moves right.
BACK : The blinking icon of the input column moves left.

4 Press MEASUREMENT SWITCH.
The character selected by the blinking icon is inputted.

MEMO

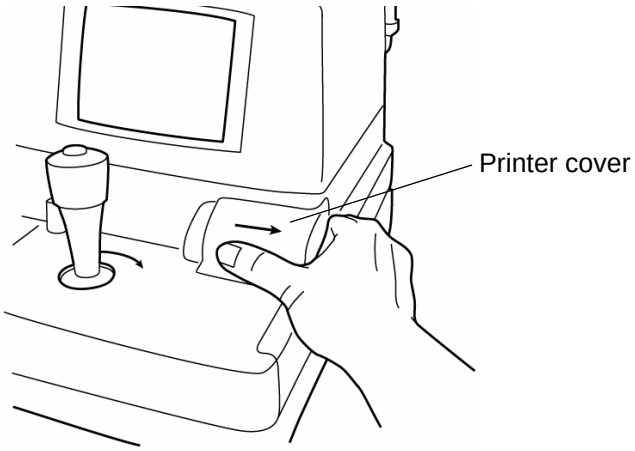
When the right/left end is reached, the blinking icon goes down to the next line.
A message can contain up to 3 lines, 20 characters per line.

5 Press △, ▽, ▷, ◁ on the control panel, move the blinking icon in the selection column to “EXIT” and press MEASUREMENT SWITCH.
The Menu screen is displayed.

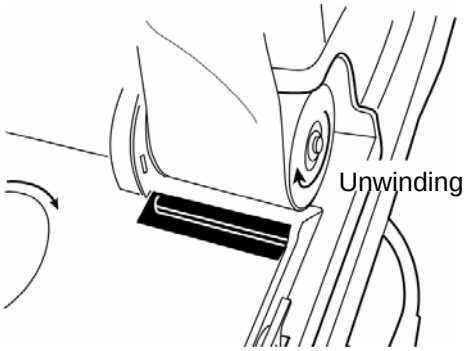
HOW TO SET PRINTER PAPER

Auto Setting

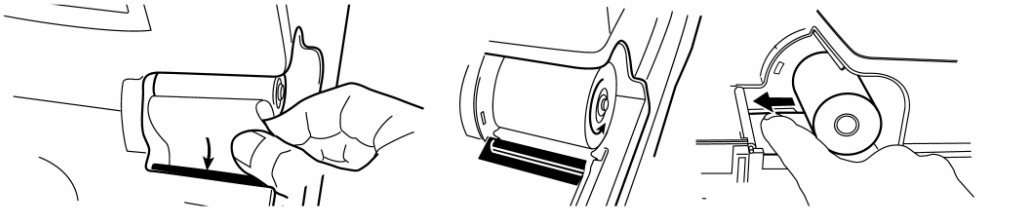
1 Press the printer cover with your thumb, slide it aside and remove.



2 Slide the paper roll onto the paper shaft, paying attention to the direction of unwinding, and pull out the top of the paper 7-8cm.

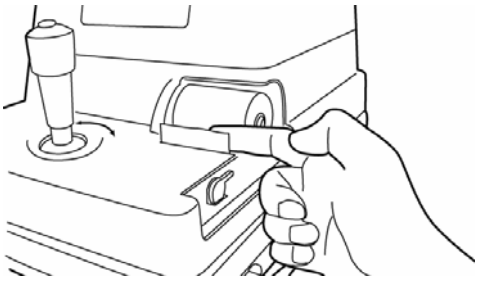


3 Insert the paper straight into the printer along the paper guide.
Turn the paper roll backward to remove any sag. Feed the paper with your finger.

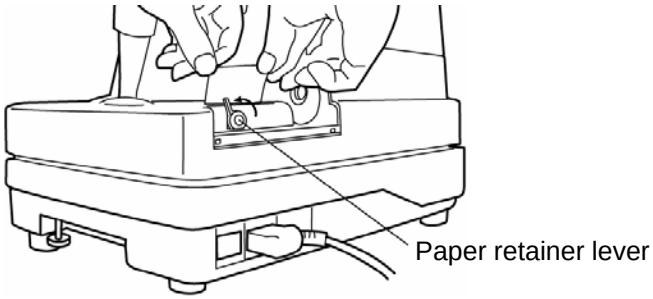


4 When the top of the paper stops inside the printer, press [F] to further insert the paper into the printer.
Paper feeding starts when the top of the paper reaches a certain depth inside the printer.

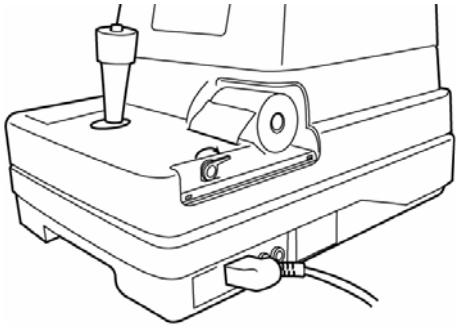
5 When the top of the paper comes out 1cm or so from the outlet, release [F].
At this moment, hold the top of the paper firmly so that it is not rolled back.



6 Turn the paper retainer lever to the illustrated position, and pull out the paper 2-3cm so that it comes out straight from the outlet.

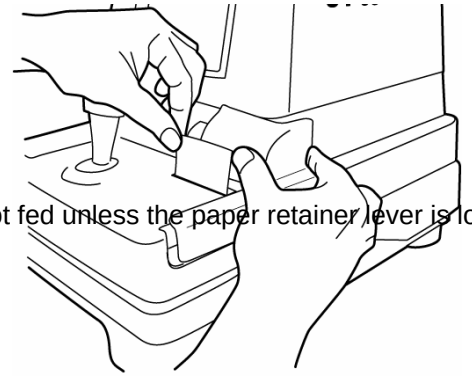


7 Return the paper retainer lever back to its original position.



MEMO

8 Reset the printer cover, holding the top of the paper outside.



The paper is not fed unless the paper retainer lever is lowered.

MEMO

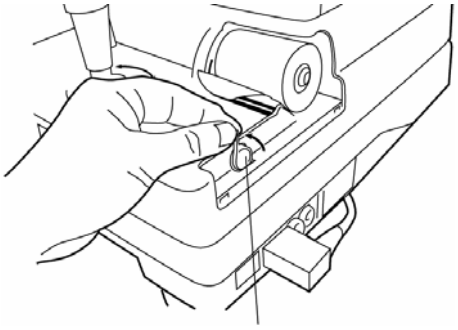
Use the following 58mm wide printer paper:
TF50KS-E2C
Using another paper may cause a printing noise or thin prints.

Manual Setting

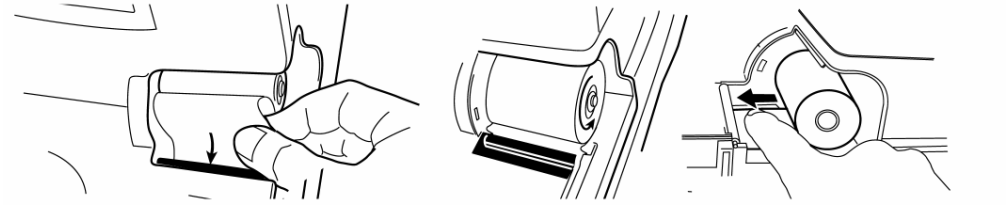
1 Press the printer cover with your thumb, slide it aside and remove.

2 Slide the paper roll onto the paper shaft, paying attention to the direction of unwinding, and pull out the top of the paper 7~8cm.

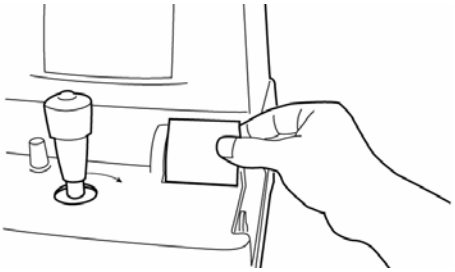
3 Turn the paper retainer lever in the arrow direction.



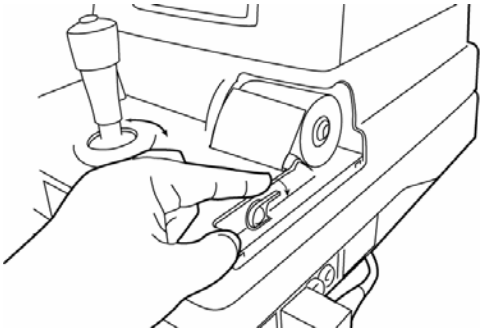
4 Insert the paper straight into the printer along the paper guide.
Turn the paper roll backward to remove any sag. Feed the paper with your finger.



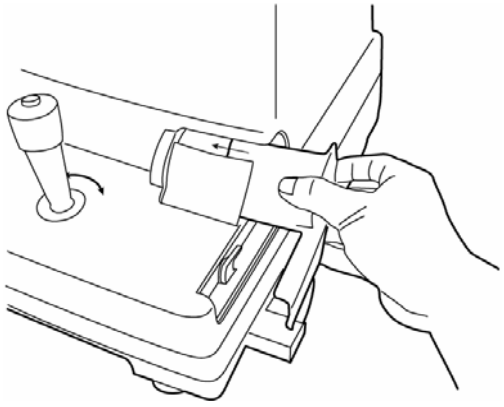
5 Insert the paper further until the paper top comes out from the outlet.



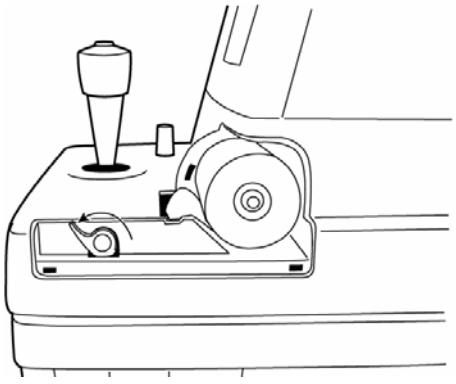
6 Align the paper so that it comes out straight and then lower the paper retainer lever to the level position.



7 Set the printer cover, holding the top of the paper outside.



MEMO If the paper is jammed, turn the paper retainer lever to the illustrated position, and take out the jammed paper from the printer.



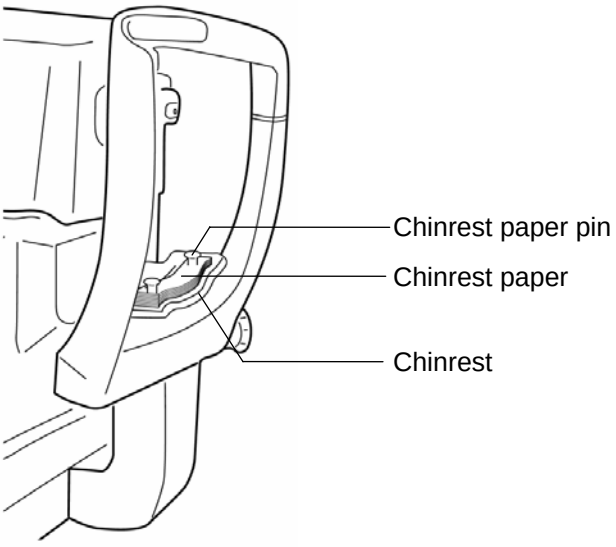
HOW TO INSTALL THE CHINREST PAPER

1 Pull out the chinrest paper pins from the chinrest.

2 Insert the two pins through the holes in the chinrest paper.

3 Replace the chinrest pins and paper on the chinrest.

4 As required, the soiled paper can be torn off in individual sheets.



HOW TO RESET FROM POWER SAVE STATUS

This machine employs a power save function. If the machine is not used during a set time, the power save function stops supplying power to the monitor and CCD camera. Under the power save status, the POWER lamp of the control panel flashes.

1 Press [MEASUREMENT SWITCH].
The Monitor screen is displayed in a few seconds, when the measurements become available.

BASIC OPERATIONS

PREPARATIONS BEFORE MEASUREMENT

Turn ON the Power

1. Make sure the power cable is connected.
   For connection, see “HOW TO CONNECT THE POWER CABLE” on page 14.
2. Make sure the instrument is in the no-patient condition and turn ON the POWER SWITCH.
3. The Title screen is displayed, and then the Measurement screen is displayed.

Checking the Measuring Nozzle

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

1. Remove the measuring window cap.
2. Check if there is any foreign matter on and around the measuring nozzle. If any, turn OFF the POWER SWITCH, clean it off and then turn ON the POWER SWITCH.
   For cleaning, see “Cleaning the Nozzle and the Window Glass inside the nozzle” on page 57.

Air Check

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

1. Remove the measuring window cap.
2. Press on the control panel.
   Air is ejected from the measuring nozzle and checking is done automatically.
3. Make sure “OK” is displayed on the monitor screen. The Menu screen should be displayed a few seconds afterwards.

Normal operation screen

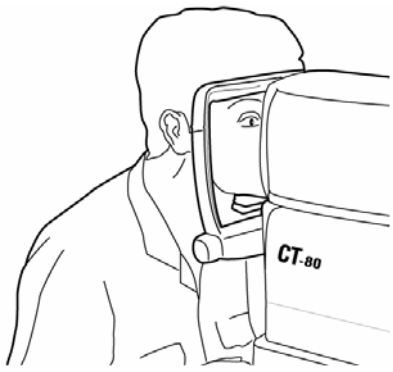
MEMO If “NG (+)” or “NG (-)” is displayed, an anomaly has occurred. Turn OFF the POWER SWITCH, Please check again if there is any foreign matter on and around the measuring nozzle. If any, turn OFF the POWER SWITCH, clean it off and then turn ON the POWER SWITCH.
Press and perform the checking procedure again.
For cleaning, see “Cleaning the Nozzle and the Window Glass inside the nozzle” on page 57.
If no object is there, a problem has occurred. Turn OFF the POWER SWITCH, unplug the power cable, and call your dealer.

Setting the Patient

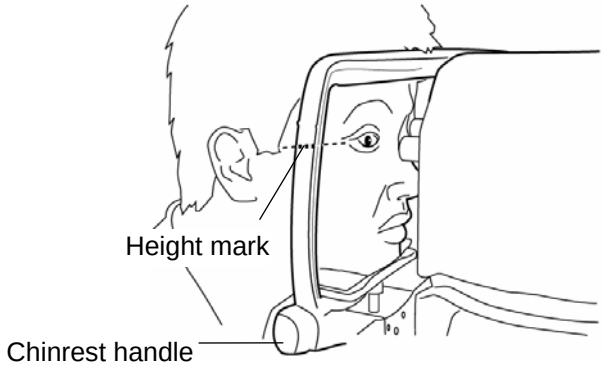
WARNING	Do not measure the patient’s eye wearing a contact lens. It may damage the patient’s cornea and other areas. Tell the patient to remove the contact lens.
CAUTION	Never insert your fingers under the chinrest. ∗ Inform the patient of this, too. Careless insertion of fingers may cause injury by pinching.

Abnormal operation screen

1. Return to the Measurement screen.
2. Ask the patient to sit in front of the instrument.
3. Adjust the automatic instrument table or the chair for height so that the patient can put his or her chin on the chinrest in a comfortable position.
4. The patient places his or her chin on the chinrest and stops his or her forehead at the forehead rest.



5 Adjust the height of the chinrest, by operating the chinrest handle, so that the tail of the patient's eye becomes level with the height mark of the chinrest post.



Setting the Safety Stopper

⚠ CAUTION	Before measuring, set the safety stopper. If the safety stopper is not set, it may cause injury to the eye that comes in contact with the measuring window glass. Set the safety stopper separately for the right and left eyes.

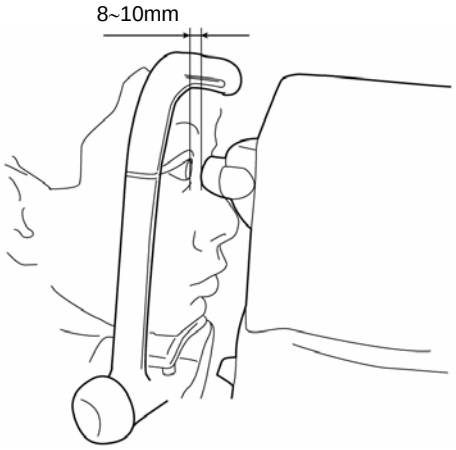
⚠ CAUTION	When setting the safety stopper, do it from the instrument side (safety stopper knob side). Setting from another position does not easily allow you to check the positions of the measuring window glass and the patient's eye and may cause injury to the eye that comes in contact with the measuring window glass.

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

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

3 While holding the safety stopper knob in a pressed position, hold the control lever and slowly push out the machine body.

4 When the measuring nozzle reaches a position 8~10mm from the cornea, release the safety stopper knob.



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.

MEASUREMENT UNDER AUTO MODE

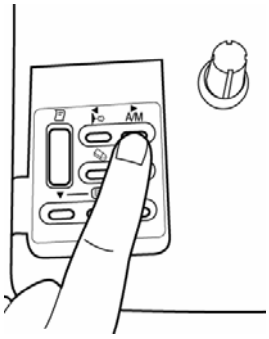
MEMO	• Adjust the height of the automatic instrument table so that correct measurement values can be obtained by allowing the patient to undergo measurements in a comfortable position. • Make the patient relaxed so as to secure correct measurement values; make sure the patient does not hold his breath or remain tense.

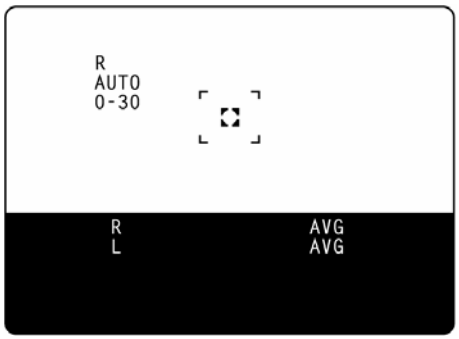
Setting the Measurement Mode

The initial status of the measurement mode is AUTO, upon turning the power ON.

1 Return to the Measurement screen.

2 Press A/M on the control panel and change the measurement mode display to AUTO.



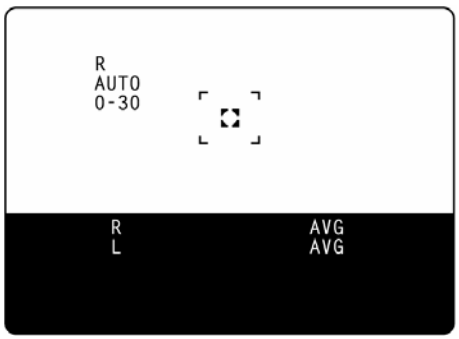


Setting the Measuring Range

In this machine, the measuring range can be switched between 0-30 and 0-60.
Normally, the 0-30 range is used, but if the patient's intraocular pressure is high, switch it to 0-60. The initial status of the measuring range is 0-30, upon turning the power ON.

1 Return to the Measurement screen.

2 Press 30/60 on the control panel and make the measuring range display 0-30.



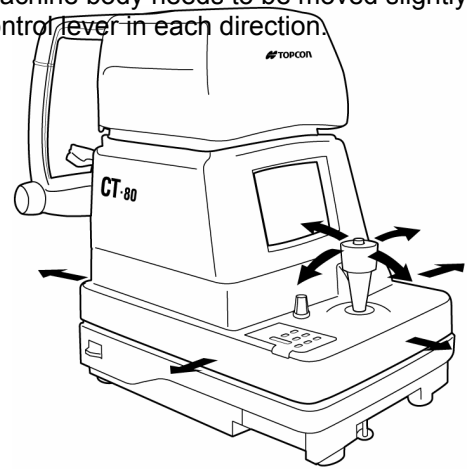
MEMO	It is recommended that you do intraocular pressure measurements several times. Since the intraocular pressure varies by heart beats and tears, often it is not possible to obtain exact measurement values by measuring only once or twice.

The alignment operation can be performed with the control lever.

MEMO

Moving the machine body by the control lever

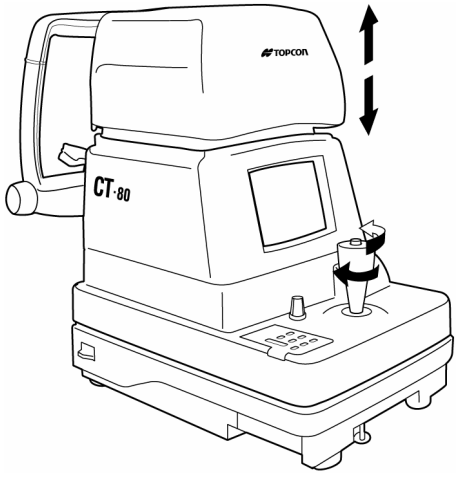
- When the machine body needs to be moved slightly back and forth or right and left, move the control lever in each direction.



Operating the control lever (back and forth, right and left)

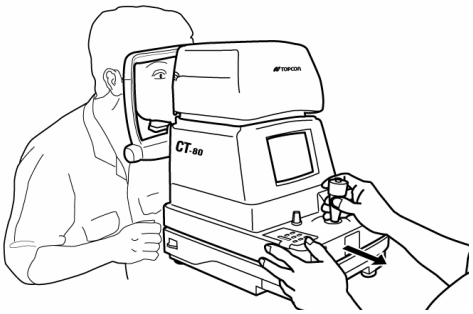
⚠ CAUTION	Never insert your fingers under the measuring head. ∗ Inform the patient of this, too. Careless insertion of fingers may cause injury by pinching.

- To move the measuring head vertically, turn the control lever right for raising and left for lowering.

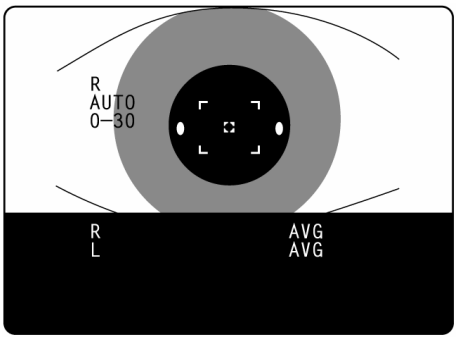


Operating the control lever (up and down)

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

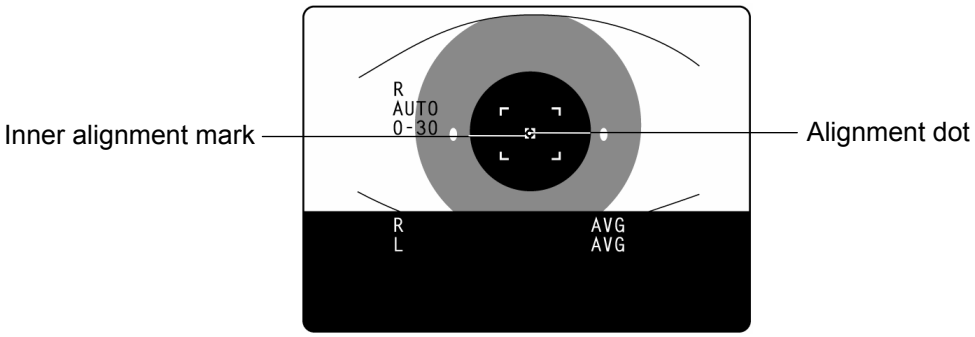


2 Move the control lever in directions as needed and bring the patient's eye to the center of the monitor screen.



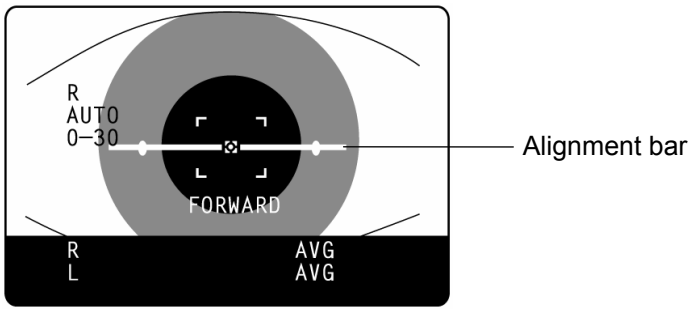
3 Tell the patient to gaze at the yellow-green light.

4 Move the machine body toward the patient and focus the target eye. A vague alignment dot becomes seen reflected in the cornea.



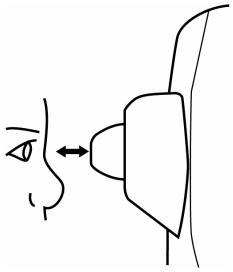
5 Move the machine body in directions as needed in order to get the alignment dot within the inner alignment mark on the monitor screen.

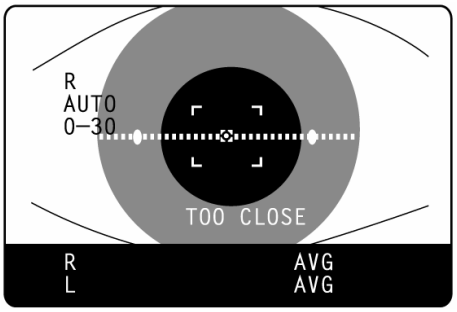
6 Holding the alignment dot within the inner alignment mark, slightly push the machine body toward the patient.
When the machine body approaches the target eye, the alignment bar and “FORWARD” display appear on the monitor screen.

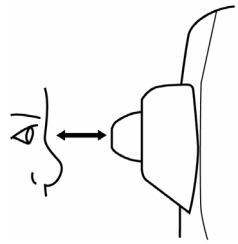


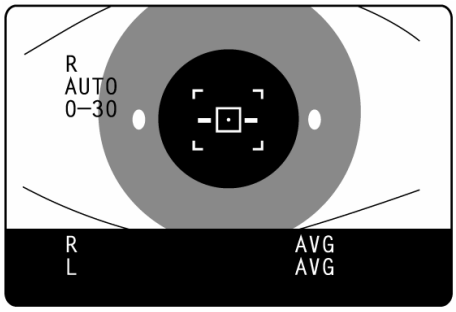
MEMO At this moment, be careful not to catch eyelashes and eyelids within the outer alignment mark so as to ensure correct measurements.

MEMO If the instrument is too close to the target eye, with regard to the alignment reference position, “TOO CLOSE” is displayed on the monitor screen, and if it is too far, “FORWARD” is displayed.
The alignment bar is displayed as a broken line when the instrument is close to the target eye and as a solid line when it is far. Also, the alignment bar is shortened accordingly as it approaches the alignment reference position.
These factors are displayed only when the alignment dot is near the inner alignment mark.

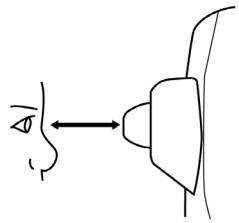


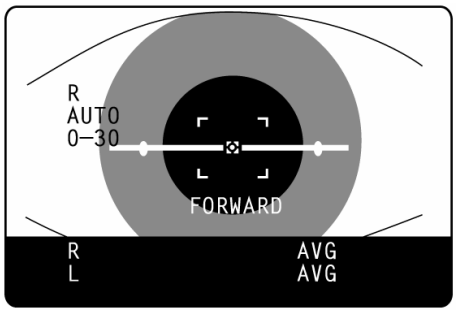




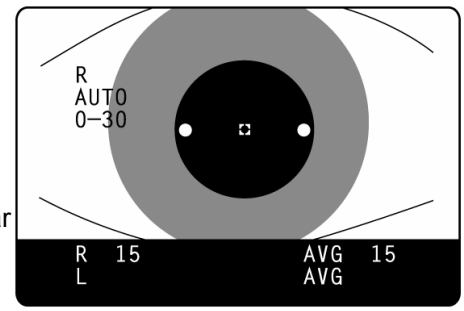


Reference position





7 After the alignment bar is displayed, push the machine body out a little bit more. When the alignment is adjusted, measurement is done automatically and the measurement value is displayed on the monitor screen.



Too far

After measurement

MEMO When the outer alignment mark is not displayed, measurement is not possible. Measurement can be done when the outer alignment mark is displayed after a few seconds.

MEMO	• If measurement is not possible under the Auto mode, use the Manual mode. Sometimes Auto mode is not available if the condition of the cornea is unfavorable.

Display of Measurement Values

Measurement values are displayed on the monitor screen for up to three measurements. From the fourth measurement on, values of earlier measurements are deleted in order.

Figure only	: Correct measurement
Figure in ( )	: Low in reliability
ERR	: Incorrect measurement
OVER	: Measurement value exceeding the measuring range

MEMO

If the result is a figure in parentheses or ERR, do the measurement again, making sure the patient does not blink and eyelashes do not get in the outer alignment mark. If OVER is displayed, switch the measuring range to 0-60 and do the measurement again.

MEASUREMENT UNDER MANUAL MODE

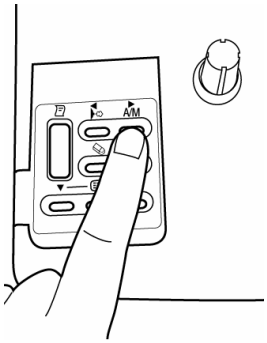
MEMO	
	• Adjust the height of the automatic instrument table so that correct measurement values can be obtained by allowing the patient to undergo measurements in a comfortable position. • Make the patient relaxed so as to secure correct measurement values; make sure the patient does not hold his breath or remain tense.

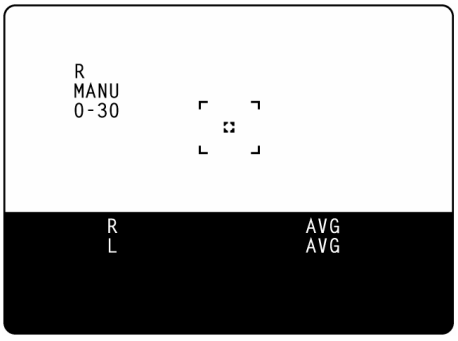
Setting the Measurement Mode

The initial status of the measurement mode is AUTO, upon turning the power ON.

1 Return to the Measurement screen.

2 Press A/M on the control panel and change the measurement mode display to "MANU".





Setting the Measuring Range

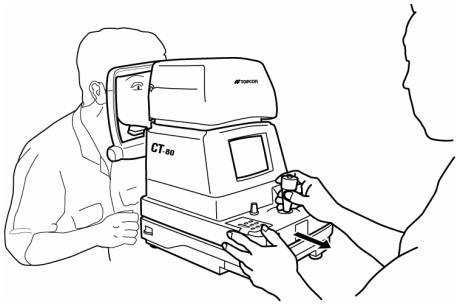
See page 33.

Alignment and Measurement

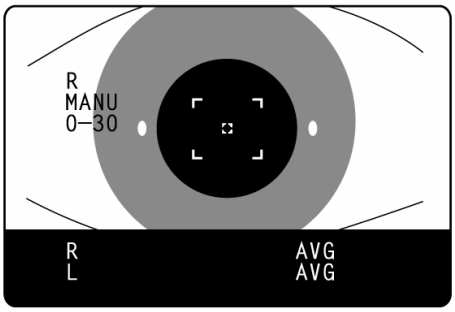
The alignment operation is controlled through the control lever.

For details about the adjustment of the machine body using the control lever, see "Memo" on page 34.

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



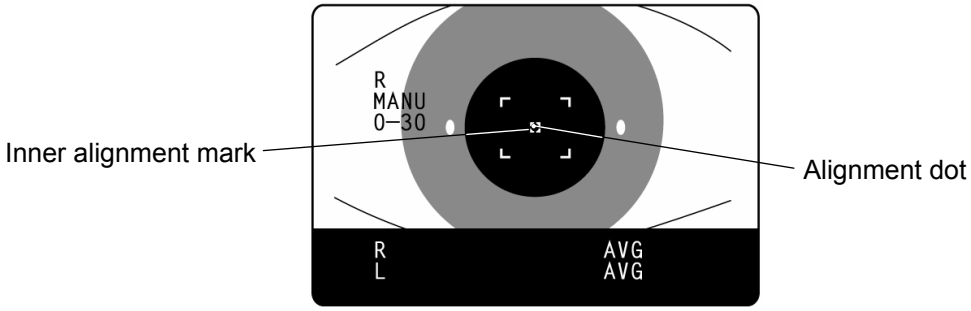
2 Move the control lever in directions as needed in order to bring the patient's eye to the center of the monitor screen.



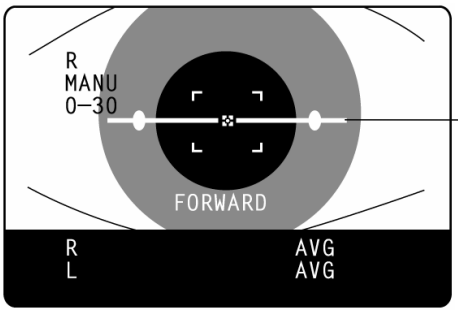
3 Tell the patient to gaze at the yellow-green light.

4 Move the machine body toward the patient and focus the target eye.
A vague alignment dot becomes seen reflected in the cornea.

5 Move the machine body in directions as needed in order to get the alignment dot within the inner alignment mark on the monitor screen.

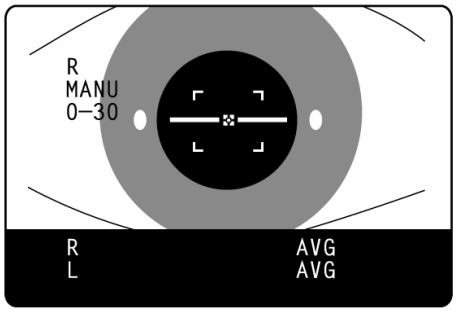


6 Holding the alignment dot within the inner alignment mark, slightly push the machine body toward the patient.
When the machine body approaches the target eye, the alignment bar and the "FORWARD" display appear on the monitor screen.

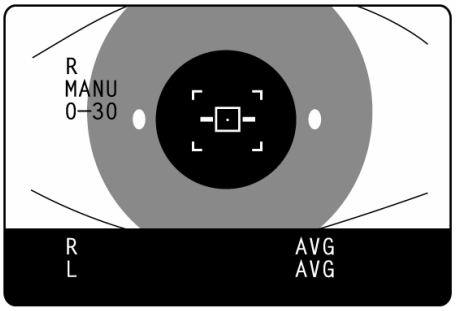


MEMO At this moment, be careful not to catch eyelashes and eyelids within the outer alignment mark so as to ensure correct measurements.
See descriptions about the alignment bar, "FORWARD" and "TOO CLOSE" on page 36.

7 Move the machine body back and forth, with the alignment bar as a reference, while holding the alignment dot within the inner alignment mark.
When the alignment is adjusted, the shape of the inner alignment mark changes to a □.



Alignment is not adjusted



Alignment is adjusted

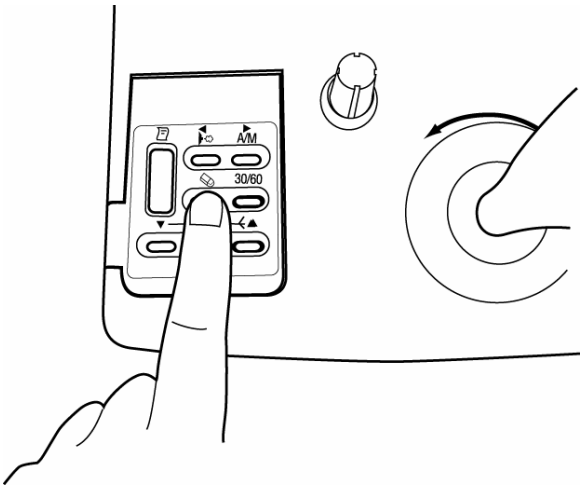
8 After the alignment is adjusted, press MEASUREMENT SWITCH .
Air is ejected for measurement, and the measurement value is displayed.

MEMO In Manual mode, measurement is done by pressing MEASUREMENT SWITCH even if the alignment is not adjusted correctly. To ensure high-precision measurements, make sure the alignment is adjusted correctly.

MEMO	• If the shape of the inner alignment mark does not change to a □ even after correctly adjusting the alignment, check again to see if the alignment is adjusted correctly. Sometimes the shape of the inner alignment mark does not change to a □ if the condition of the cornea is unfavorable.

DELETING MEASUREMENT VALUES

1 Press [ ] on the control panel.
All the measurement values of the right and left eyes are deleted and the instrument settings return to their status upon turning the power ON.



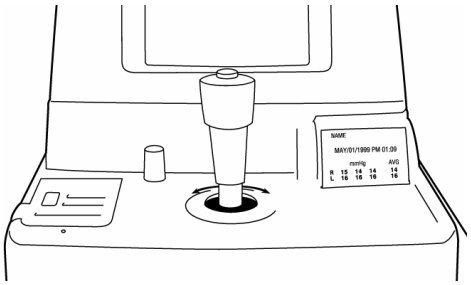
HOW TO PRINT OUT MEASUREMENT VALUES

MEMO	• To avoid printer problems due to paper jams, do not feed paper if it is torn or creased. • To avoid discoloring, particularly of the recording part, do not store the printer paper in holders made of materials containing plasticizers (ex., vinyl chloride). • To avoid coloring in the white part and discoloring in the recording part, do not use bonds containing solvents. Use water bonds. • The printer paper is heat sensitive and cannot keep records for long periods of time. Copy the records to other paper for storage.

This machine can print out measurement values with the built-in printer.

1 Return to the Measurement screen.

2 Press [F] on the control panel.
Measurement values of the monitor screen are printed out.
Upon printing, the measured values are deleted automatically from the screen.

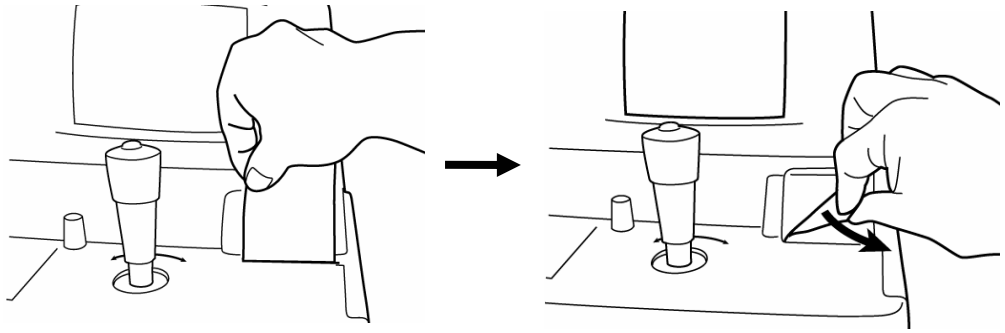


MEMO

MEMO

The ERR display is not printed. Also, printing can not be done when no measurement values exist. When a red line appears in the printer paper, replace it. For details about the replacement of paper, see “HOW TO SET PRINTER PAPER” on page 23. Again, use the 58mm wide TF50KS-E2C (Japan) paper for the printer.

3 Hold the paper and pull it diagonally to cut.



MEMO	• To avoid paper jams, cut the paper carefully and evenly.

HOW TO CORRECT MEASUREMENT VALUES

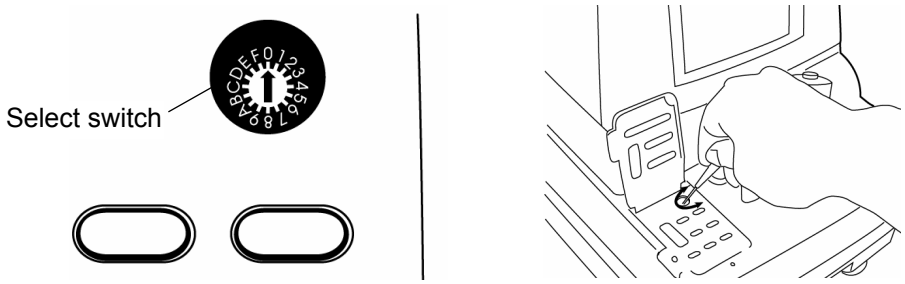
MEMO	Never set the select switch for more than eight points to avoid malfunctions.

Though the machine is adjusted for displaying optimal measurement values, the values can be corrected within a -4 ~ +3mmHg range.

1 Make sure the power is OFF.

2 Open the control panel lid.

3 Using a screwdriver, turn the "⇧" of the select switch.



Settings:
0: Base setting	For shipment, the switch is set here.
1: +1mmHg	Base setting + 1mmHg
2: +2mmHg	Base setting + 2mmHg
3: +3mmHg	Base setting + 3mmHg
F: -1mmHg	Base setting - 1mmHg
E: -2mmHg	Base setting - 2mmHg
D: -3mmHg	Base setting - 3mmHg
C: -4mmHg	Base setting - 4mmHg

4 Turn the [POWER SWITCH] ON.
The measurement procedure is exactly the same as with the correction.

INPUT/OUTPUT VIA RS-232C

Output via RS-232C

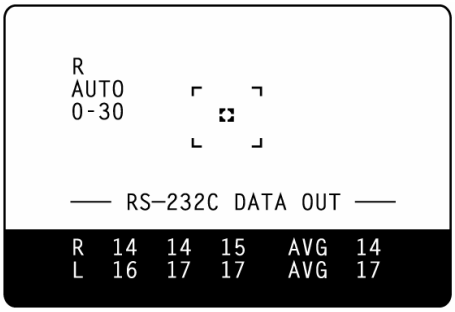
This machine can output data via the RS-232C interface to a personal computer or similar device.

1 Make sure the RS-232C OUT is connected.
For connection, see “HOW TO CONNECT EXTERNAL I/O TERMINALS” on page 14.

2 Check the settings for data communication.
For data communication, see “RS-232C Input/Output Settings” on page 18.

3 Obtain the measurements.

4 Press [F] on the control panel.
“RS-232C DATA OUT” is displayed on the screen and the data output is completed.



Input via RS-232C

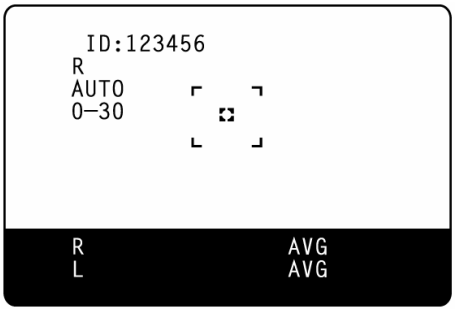
This machine can input data from a bar code reader and the like via the RS-232C interface.

1 Make sure the RS-232C OUT is connected.
For connection, see “HOW TO CONNECT EXTERNAL I/O TERMINALS” on page 14.

2 Check the settings for data communication.
For data communication, see “RS-232C Input/Output Settings” on page 18.

3 Return to the Measurement screen.

4 Input the ID No. from the external device.
The inputted “ID No.” is displayed.



BEFORE REQUESTING SERVICE

CHECKING OPERATIONS

Air Check

If a problem is suspected, do an air check.
If the result is “NG (+)” or “NG (-),” call your dealer.
For instructions on how to perform an air check, see “Air Check” on page 29.

Checking Operations

⚠ **WARNING**	To avoid electric shocks, do not open the instrument. Refer all servicing to qualified personnel.

⚠ **WARNING**	To avoid electric shocks, do not remove the covers from the bottom and top surfaces, TV monitor, measuring unit, etc.

If a problem is suspected, perform checks following the Check List shown below. If the condition is not improved by the suggested remedy or if it is not described in the list, call your dealer.

CHECK LIST

Problem:	Check point:	Remedy:	Page:
Monitor screen does not work.	Power cable is not plugged into receptacle.	Secure plug in power cable.	P.14
	Power cable is not plugged into machine body.	Plug power cable into machine body.	P.14
	Power save function is on.	Return to normal status.	P.28
	Fuse is burned.	Replace fuse.	P.59
Monitor screen display is not clear.	Monitor screen needs to be readjusted.	Adjust monitor screen.	P.58
Auto mode measurement is not possible.	Measuring window needs to be cleaned.	Clean measuring window.	P.56
	Nozzle and window in nozzle need to be cleaned.	Cleaning the nozzle and window glass inside the nozzle.	P.57
	Condition of patient's eye is unfavorable.	Measure under Manual mode.	P.38
	Manual mode is on.	Set Auto mode.	P.33
Measurement values have ( ) or ERRs are displayed.	Nozzle and window in nozzle need to be cleaned.	Cleaning the nozzle and window glass inside the nozzle.	P.57
Paper comes out unprinted.	Printer paper winding is reversed.	Set printer paper correctly.	P.23, 26
Paper does not come out.	Printer paper is used up.	Supply printer paper.	P.23, 26
	Paper is jammed.	Remove jammed paper.	P.59
Machine body does not move.	Clamping knob/fixing knob is fastened.	Loosen up clamping knob/fixing knob.	P.8

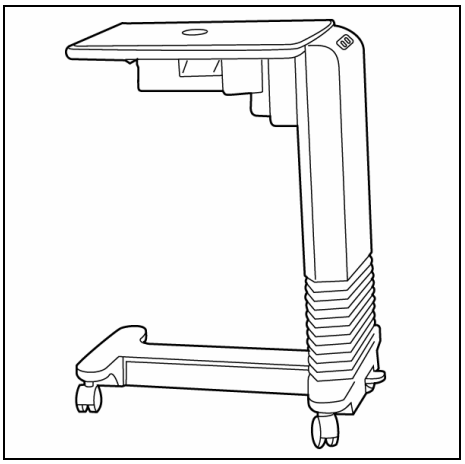
REFERENCE

OPTIONAL ACCESSORIES

Automatic instrument table AIT-20 and Table Board

Driven by electric power, it can change the height of the instrument as desired so as to enable the patient to undergo measurement in a comfortable position.

Size .....586(W) × 520(D)mm
Table height .....675-865mm (differs by destination)
Table size .....450(W)x500(D)mm



SPECIFICATIONS & PERFORMANCE

Measuring range	0~60mmHg
Working distance	11mm
Measurement display	Monitor screen (with average value)
Measurement recording	Built-in printer (with average value)
Alignment display	Monitor screen
Monitor screen	5in.
Power saving	Power save system
External I/O terminal	RS232C
Power supply	AC 100, 120, 220, 230 and 240V; 50/60Hz
Power consumption	80VA
Operating temperature	10~40°C
Body movement, back & forth	44mm
Body movement, right & left	88mm
Body movement, up & down	28mm
Chinrest adjustment	68mm
Dimensions	272(W)×505(D)×430~458(H)mm
Weight	18kg

* For product improvements, specifications and appearance may be changed without prior notice.

ELECTROMAGNETIC COMPATIBILITY

This product conforms to the EMC Standard(IEC 60601-1-2:2001).

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	Model No.	Length(m)
RS-232C CROSSING CABLE (shielded)	-	-	3.5

Guidance and manufacturer's declaration - electromagnetic emissions		
The CT-80 is intended for use in the electromagnetic environment specified below. The customer or the user of the CT-80 should assure that it is used in such an environment.		
Emissions test	**Compliance**	**Electromagnetic environment - guidance**
RF emissions CISPR 11	Group 1	The CT-80 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 A	The CT-80 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	Class A	
Voltage fluctuations/ flicker emissions IEC61000-3-3	Complies	

Guidance and manufacturer's declaration - electromagnetic immunity			
The CT-80 is intended for use in the electromagnetic environment specified below. The customer or the user of the CT-80 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 differential mode ±2 kV common mode	±1 kV differential mode ±2 kV common mode	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-80 requires continued operation during power mains interruptions, it is recommended that the CT-80 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-80 is intended for use in the electromagnetic environment specified below.
The customer or the user of the CT-80 should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment-guidance
			Portable and mobile RF communications equipment should be used no closer to any part of the CT-80, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance** $d = 1.2\sqrt{P}$
Conducted RF IEC 61000-4-6	3 Vrms 150kHz to 80MHz	3 V	$d = 1.2\sqrt{P}$ 80MHz to 800MHz
Radiated RF IEC 61000-4-3	3 V/m 80MHz to 2.5GHz	3 V/m	$d = 2.3\sqrt{P}$ 800MHz to 2.5GHz where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, [a] should be less than the compliance level in each frequency range. [b] Interference may occur in the vicinity of equipment marked with the following symbol: 

NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.
NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile 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-80 is used exceeds the applicable RF compliance level above, the CT-80 should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the CT-80.

[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-80

The CT-80 is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the CT-80 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the CT-80 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.

RS-232C COMMUNICATION SPECIFICATIONS

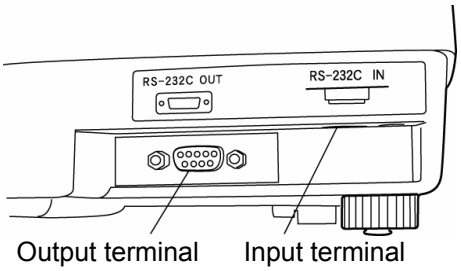
Connector Types

Input terminal: DIN 8-pin (TSC0838-01-2051, Hoshiden)
Output terminal: DSUB 9-pin (DE-9S-N, JAE)

I/O Terminal Pin Arrangement

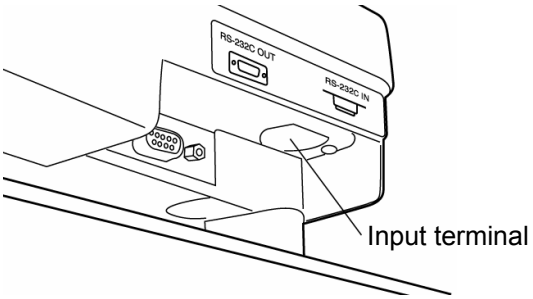
· Output terminal: DSUB 9-pin (Pin Nos.1 and 9 are not used.)

Pin No.	Code	Description	I/O
2	RD (RXD)	Data receiving	I
3	SD (TXD)	Data transmission	O
4	ER (DTR)	Data terminal ready	O
5	SG (GND)	Signal ground	I/O
6	DR (DSR)	Data set ready	I
7	RS (RTS)	Request transmission	O
8	CS (CTS)	Transmission ready	I



· Input terminal DIN 8-pin (Pin No.1 is not used.)

Pin No.	Code	Code Description	I/O
2	SD (TXD)	Data transmission	I
3	RD (RXD)	Data receiving	O
4	RS (RTS)	Request transmission	O
5	CS (CTS)	Transmission ready	I
6	DR (DSR)	Data set ready	I
7	SG (GND)	Signal ground	I/O
8	ER (DTR)	Data terminal ready	I



Transmission Formula

Mode 1, 2, 3

Synchronization	Non-synchronous
Communication speed	2400/9600 bps
Start bit	1 bit
Stop bit	2 bit
Data length	8 bit
Parity	None
Operating code	ASCI code

Mode 4, STD1 mode

Synchronization	Non-synchronous
Communication speed	2400/9600 bps
Start bit	1 bit
Stop bit	1 bit
Data length	8 bit
Parity	None
Operating code	ASCI code

Contents of Data Transmission

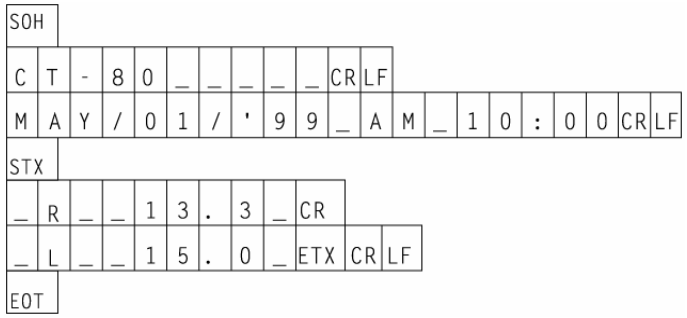
Communication format Mode 1, 3:

Model name, Type No. 10 byte
Time/Date 19 byte
R (right eye) average data 9 byte
L (left eye) average data 9 byte

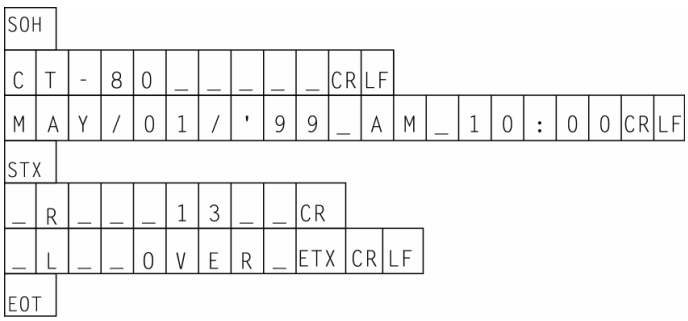
* When the content is data with parentheses only, the average value is sent; when it is OVER data only, OVER is sent; and when there is no data or ERRs only, a space is sent.

(Example)

- Average Value Displayed in Decimal Format



- Average Value Displayed in Integer Format

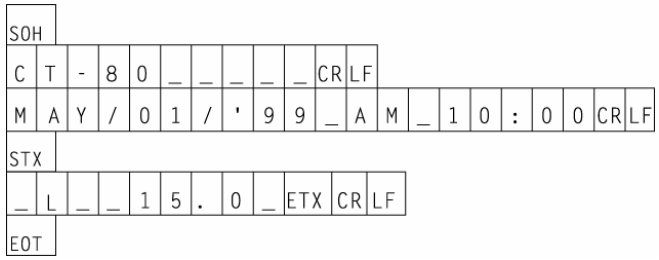


Communication format Mode 2:

Model name, Type No. 10 byte
Time/Date 19 byte
Measurement value (right or left eye) average data 9 byte
∗ If ERRs only, transmission is not done.

(Example)

- Average Value Displayed in Decimal Format



- Average Value Displayed in Integer Format
  For the Decimal Format, the “measurement value” points are similar to those in “Communication Format Mode 1, 3”.

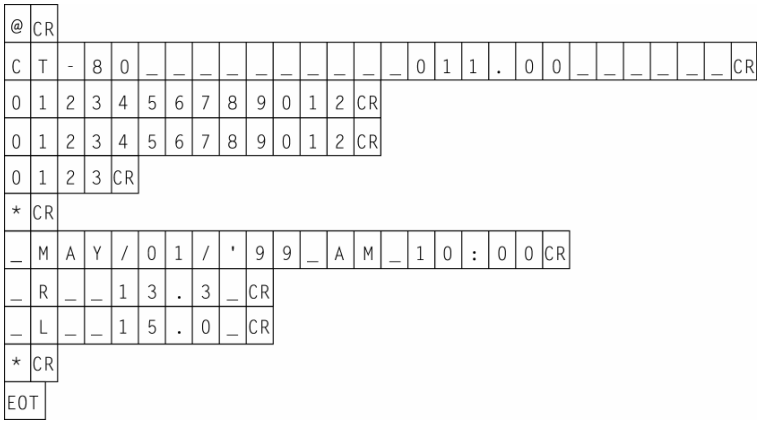
Communication format Mode 4, STD 1:

- Data Transmission

Model name, Type No.	15 byte
Machine No.	2 byte
ROM version	10 byte
ID No.	13 byte
Work ID No.	13 byte
Machine work ID No.	4 byte
Time/Date	20 byte
R (right eye) average data	9 byte
L (left eye) average data	9 byte

(Example)

- Average Value Displayed in Decimal Format



- Average Value Displayed in Integer Format
  For the Decimal Format, the “measurement value” points are similar to those in “Communication Format Mode 1, 3”.

Communication format Mode 5, STD 2:

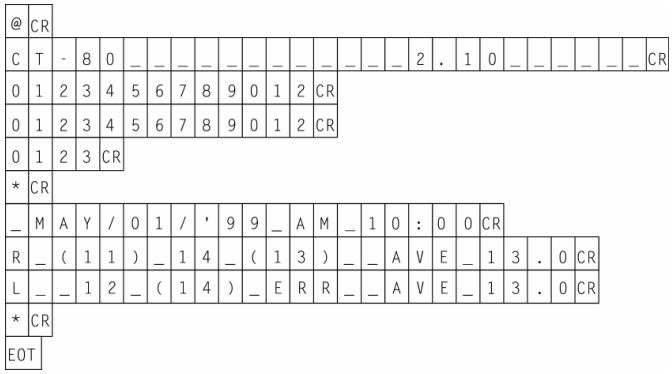
- Data Transmission

Model name, Type No.	15 byte
Machine No.	2 byte
ROM version	10 byte
ID No.	13 byte
Work ID No.	13 byte
Machine work ID No.	4 byte
Time/Date	20 byte

R (right eye) measurement data (3 times) and average value 24 byte
L (left eye) measurement data (3 times) and average value 24 byte

(Example)

- Average Value Displayed in Decimal Format

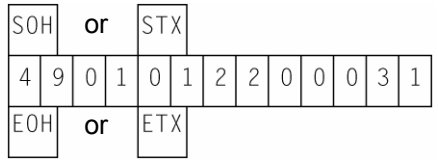


- Average Value Displayed in Integer Format
  For the Decimal Format, the “measurement value” points are similar to those in “Communication Format Mode 1, 3”.

Contents of Data Receving

- Data Receiving
  Patient ID data 13 byte

(Example)



Setting RS-232C Communication Conditions

In the Menu screen, move the cursor using the △, ▽ keys on the control panel, and press MEASUREMENT SWITCH. Further, move the cursor to an item to be changed on the screen shown below, and press MEASUREMENT SWITCH. [SET→****] is displayed at the bottom of the screen. Change the setting using △, ▽. After changing, the setting is registered by pressing MEASUREMENT SWITCH. After setting, move the cursor to EXIT and press MEASUREMENT SWITCH to return to the Menu screen. For further details, see “RS-232C Input/Output Settings” on page 18.

Items of setting (5 items)

· Machine No. (EQUIPMENT) Set value: 0~99. (For shipment, “1” is set.)
When more then one unit of inspection equipment is installed in the same hospital, for example, data can be controlled using these Machine Nos.

· Input ID mode (ID MODE) Set value: 1 or 2 (For shipment, “1” is set.)
1. For inputting patients' ID numbers.
2. For inputting the temporary ID numbers of new patients.

· Work ID No. (WORK ID NO.) Set value: 0~9999 (For shipment, “0” is set.)
Desired serial numbers can be attached to measurement results. The number is automatically added (1 at a time) each time the printing of data communication is performed.

· Communication format (FORMAT) Format: OFF, MODE 1, MODE 2, MODE 3, MODE 4, MODE 5, STD 1, STD 2 (For shipment, “OFF” is set.)

MODE 1: When [F] is pressed, communication is done after printing.
MODE 2: Data communication is done every measurement.
MODE 3: When [F] is pressed, communication is done without printing.
MODE 4, MODE 5: When [F] is pressed, communication is done without printing.
STD 1, STD 2: When [F] is pressed, communication is done after printing.

* Certain models may not export data of MODE5 & STD2. It indicates settings as OFF→MODE1→MODE2→MODE3→MODE4→STD1→OFF.

MEMO When Mode 1, 2 or 3 is set, data is transmitted automatically without confirmation from the receiver side. When Mode 4, Mode 5, STD 1, STD 2 is set, communication is controlled by RTS-CTS.

MEMO Under the RTS-CTS control, if no CS (CTS) signal is returned from the receiver side, transmission can be canceled by pressing [F]. Also, if no DR (DSR) signal is returned, it is recognized as a communication failure and FAIL is displayed on the monitor screen.

· Communication speed (SPEED) Baud rate: 2400, 9600 (bps) (For shipment, 2400bps is set.)

MAINTENANCE AND CHECKING

ACCURACY MAINTENANCE

Cleaning the Measuring Window Glass

- 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 monitor screen.

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

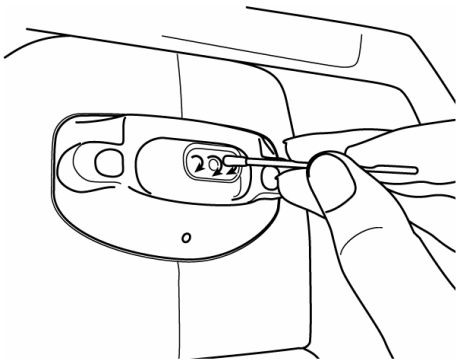
MEMO	• Do not use tissues, as they may make the stain more noticeable. • Do not use tweezers or gauze, as these may scratch the lens and glass surfaces.

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.

MEMO To ensure thorough removal of grease from the window glass, be sure to replace the applicator and use a new one for each of these repeated wiping operations.

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

MEMO When the measuring window glass becomes stained "CLEAN THE MEASURING WINDOW GLASS" is displayed on the monitor screen.

Cleaning the Nozzle and Window Glass inside the Nozzle

- If there is any foreign matter on and around the measuring nozzle, it may enter and damage the patient's eye during the measurement. If any, clean the nozzle.
- When the window glass inside the 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 window glass inside the nozzle.
- Clean the glass when "CLEAN THE CHAMBER GLASS" is displayed on the monitor screen.

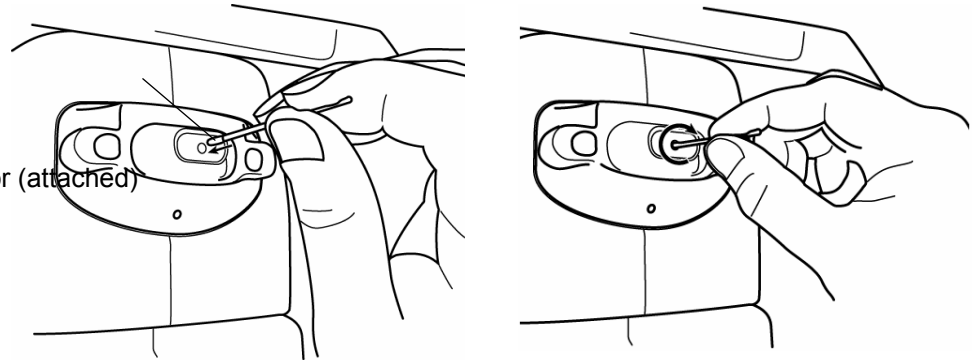
⚠ CAUTION	To clean the measuring window glass, measuring nozzle and the window glass inside the measuring nozzle, use ethanol. Using other chemicals may cause damage to the patient's eye during measurement.

MEMO	• 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 Moisten the applicator with ethanol.

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



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

MEMO 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 Cleaning is completed when the grease is thoroughly removed.
If stains cannot be removed easily, call your dealer. Press [ ] for a air check to confirm normal operation.

MEMO When the window glass inside the nozzle becomes stained, it makes the fixation target unclear and "CLEAN THE CHAMBER GLASS" is displayed on the monitor screen.

Daily Maintenance

- This machine must be kept free of dust; apply the measuring window cap and dust cover when not in use.
- When not in use, turn the POWER SWITCH OFF.

Ordering Consumable Supplies

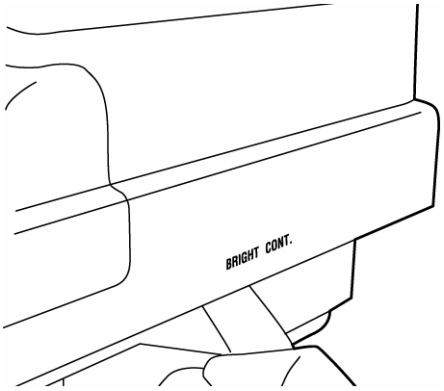
- When placing an order for consumable supplies, tell your dealer the product name, part code and quantity.

Name	Code
Chinrest pad	40310 4082
Silicone cloth	31087 2007
Dust cover	42360 9002
Chinrest pad pin	42364 4021

Name	Code
Applicator	41601 8606
Printer paper	44800 4001
Fuse 125V-3A-M	41801 5012
Fuse 250V-1.5A-M	42364 5313

Adjusting the Monitor Screen

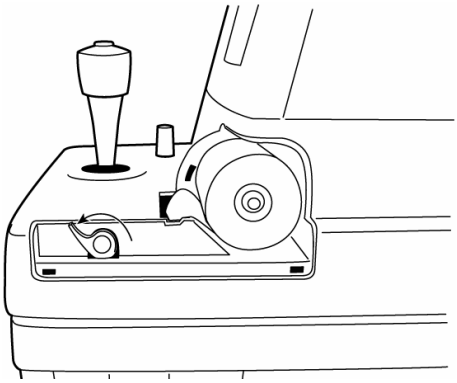
- Although the machine is adjusted for optimal screen conditions before shipment, a screen readjustment may be required due to vibrations during transportation.
- To adjust the contrast and brightness, move the BRIGHT/CONT. knobs after turning them all the way to the right, as viewed from the operator.



Paper Jam in Printer

MEMO	• If paper is jammed inside the printer, printing is not complete. Attempts to forcibly use the printer may lead to problems.

- Remove the printer cover, release the paper retainer lever and remove the jammed paper.



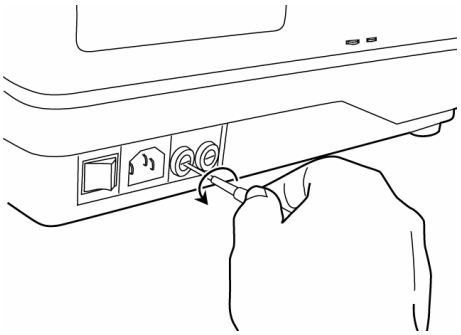
Replacing the Fuse

⚠ WARNING	To avoid electrical shock and fire, unplug the power cable before removing the fuse cover. Additionally, be sure to replace the fuse cover before plugging in the power cable.

⚠ WARNING	Use only the attached fuses. Using other fuses may cause a fire.

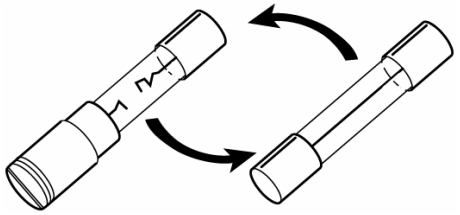
1 Make sure the power is OFF and the power cables are unplugged.

2 Press the fuse holder with a screwdriver and turn it counterclockwise. The fuse holder can be taken out.



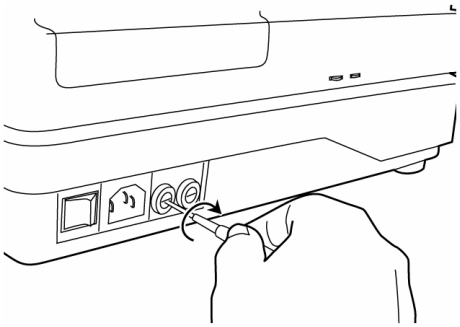
Removing the Fuse Holder

3 Replace the fuse with the attached fuse.



Replacing the Fuse

4 Press the fuse holder with a screwdriver and turn it clockwise.
The fuse holder is now reset.



Setting the Fuse Holder

SPECIAL NOTES ON CLEANING

Cleaning the Outer Cover

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

MEMO	To avoid discoloring/deterioration of the plastic components, do not use volatile solvents (benzine, thinner, gasoline, etc.).

- The outside covers and operation panel should be cleaned with a soft cloth at least once every three months. If a stain is extreme, use a solution of a neutral tableware detergent and warm water. Dip the soft cloth in the solution, squeeze out the excess water and then wipe off the stain.

When calling please give us the following information about your unit:

- Machine type: CT-80
- Manufacturing No. (Shown on the rating plate on the right side of the base.)
- Period of Usage (Please give us the date of purchase).
- Description of Problem (as detailed as possible).

COMPUTERIZED TONOMETER (CT-80)

INSTRUCTION MANUAL

Version of 2007 (2007.08-100LW6)

Date of issue: 1st, August, 2007

Published by TOPCON

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COMPUTERIZED TONOMETER

CT-80

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4161591037
Printed in Japan 2007.02-100LW7