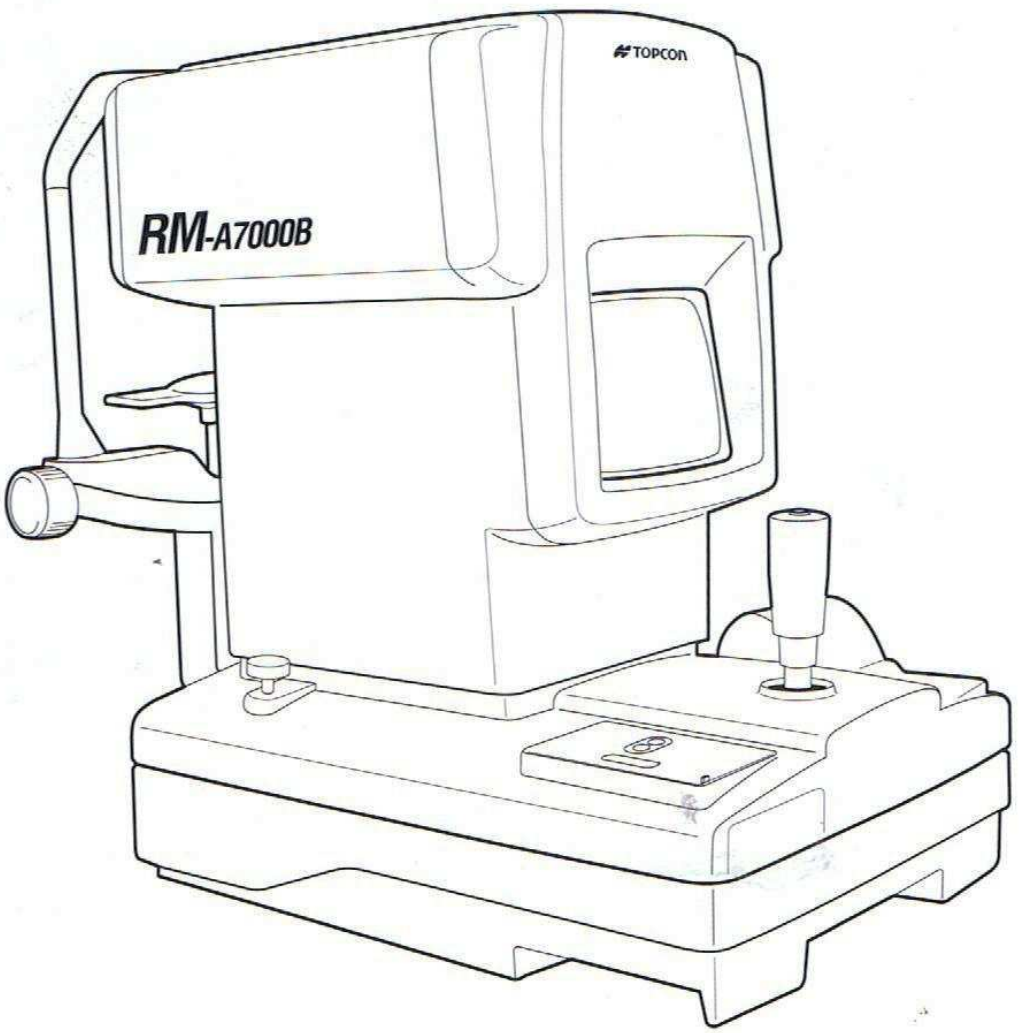
TOPCON

INSTRUCTION MANUAL

# AUTO REFRACTOMETER

# RM-A7000B



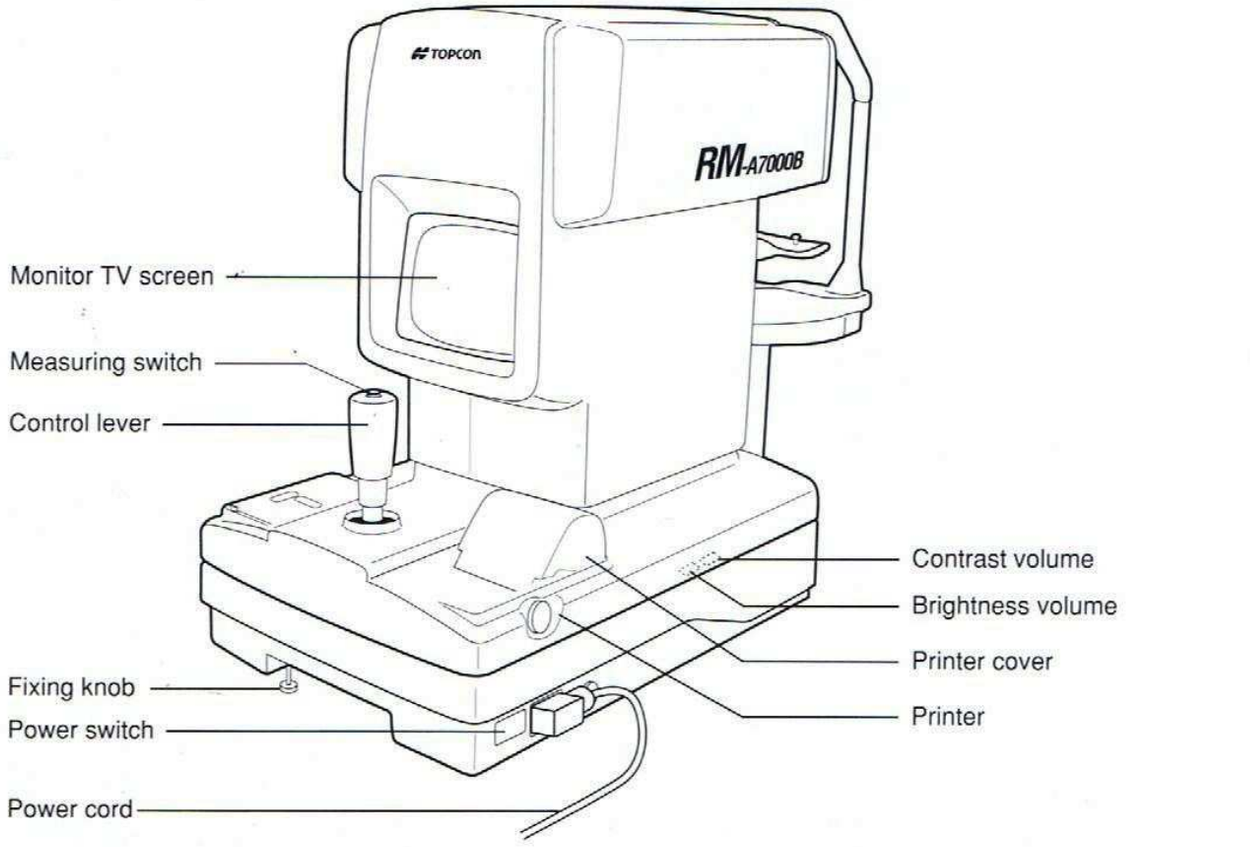
Thank you for purchasing the TOPCON Auto Refractometer RM-A7000B.
To get the best use from the instrument, please carefully read these instructions and place it in a convenient location for future reference.

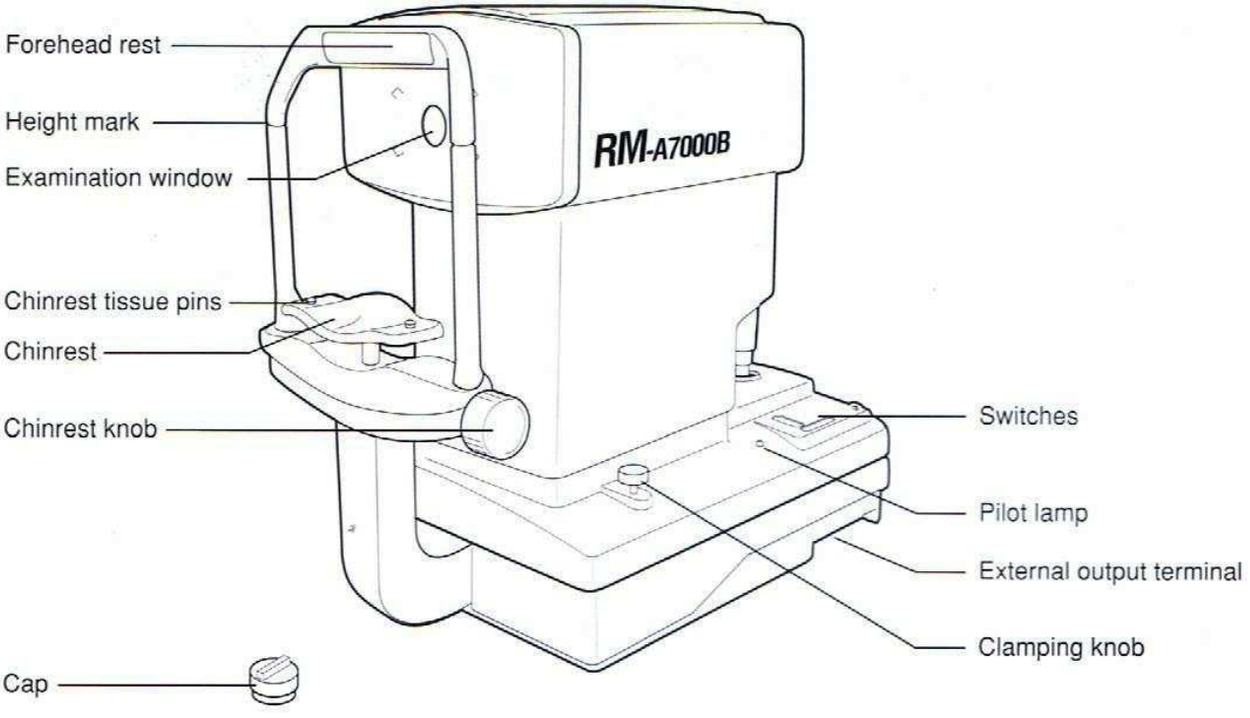
## PRECAUTIONS

1. This is a precision instrument which needs to be used and kept in places under normal life conditions including temperature and humidity. Do not expose the instrument to direct rays of the sun.
2. To operate well, install the instrument on a level floor free from any vibration.
3. Connect all the cords properly before putting the instrument into operation.
4. Always keep clean where the instrument is installed. Turn off power supply and cover the instrument with the attached dust cover when it is not in use.
5. To assure accurate measurements, take care that no fingerprints or dust gets on the examination window.
6. Topcon is not responsible for any modification caused by disassembling or adjustments made by unauthorized dealer or persons.
7. Contact your authorized dealer or TOPCON directly if any trouble occurs.

# CONTENTS

# 1. COMPONENTS AND THEIR FUNCTIONS

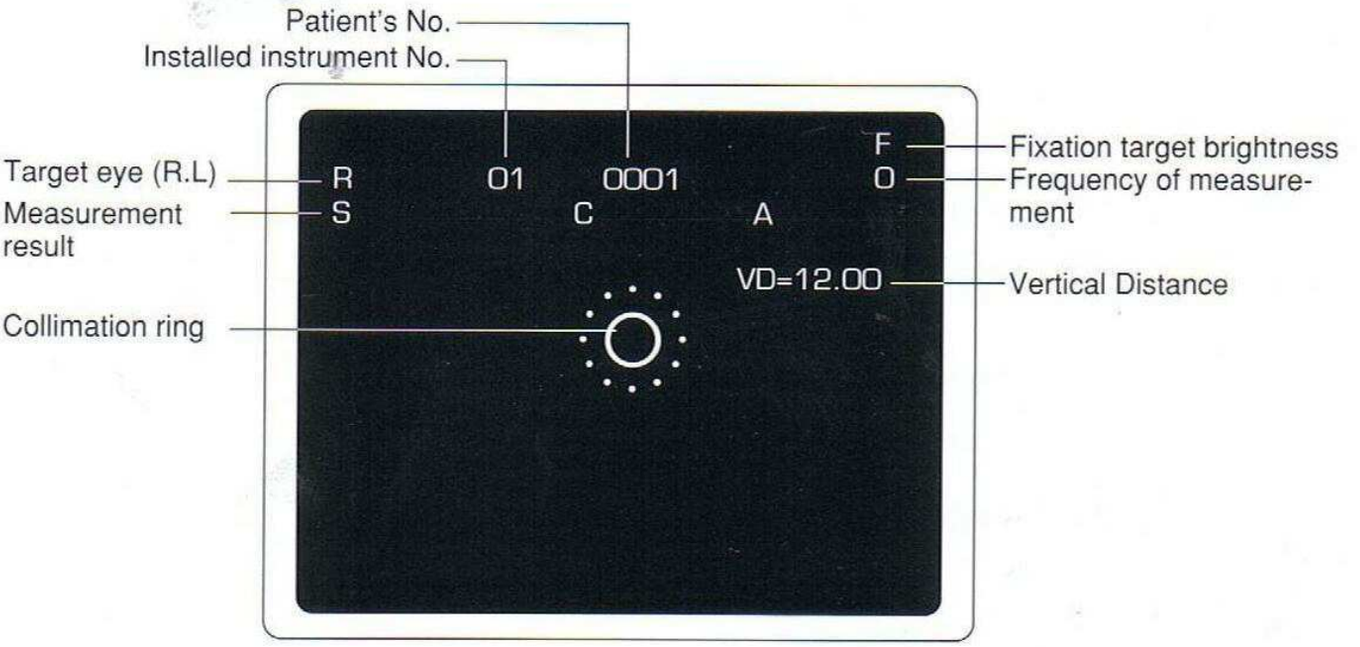



## Accessories

Power cord .....1 pc.
Rail cover .....1 pc.
Printing paper .....2 rolls
Paper shaft.....1 pc.
Chinrest tissue.....1 set
Chinrest tissue pin.....2 pc.
Dust cover .....1 pc.
Silicone cloth .....1 pc.
Screwdriver .....1 pc.
Fuse.....2 pcs.

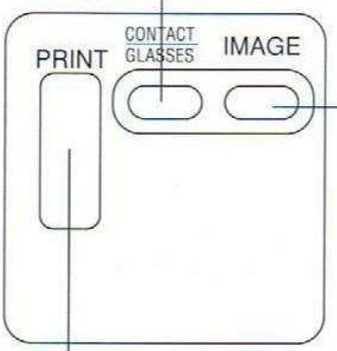
## MONITOR TV SCREEN (REF)




Turn on the power switch, and it will light the pilot lamp, showing the above on the monitor TV screen. (The patient's No. and instrument No. vary in display according to the status of setting.)
The picture will disappear if no operation is carried out for 10 minutes. Press the measuring switch, and the instrument will be ready again.

## SWITCHES

**Contact/glasses switch**
Switches contact lens V. D. (0) and glass lens V. D. (12mm or 13.75mm).



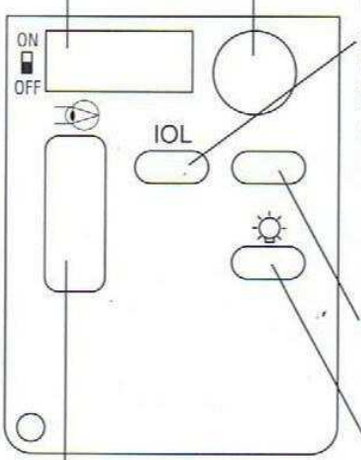

**Target image observation switch**
Allows the operator to observe the stored target image on the monitor TV screen.

**Print switch**
Prints out the measurement result.

**IOL switch**
Press the switch when an error happens easily to the eye with an IOL, and measurement may be possible. (When the IOL mode is applied, an IOL mark will be displayed under the instrument S.)
Ex.) S-3.00
IOL

**Select switch**

**Dip switch**



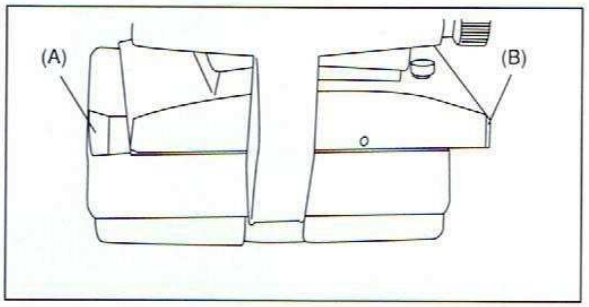

**Spare switch**

**Fixation target brightness switch**
"F" will be displayed only when the target is made less bright.

**Graphic print switch**
Prints out graphically the status of refraction.

# 2. ASSEMBLY

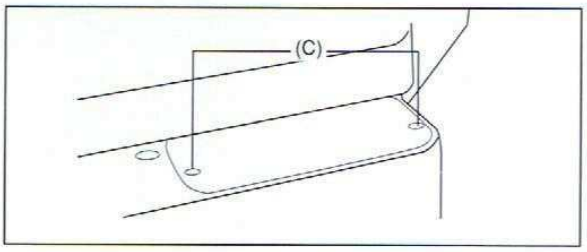
(1) Using a screwdriver, remove the locking bracket (A) placed at the left side when facing to the instrument from chinrest.



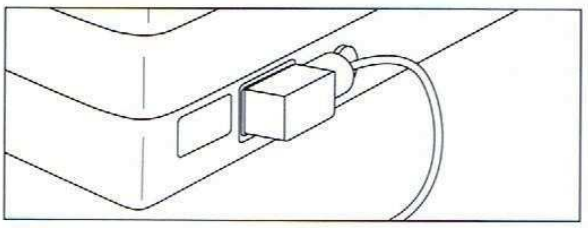

(2) Bring the instrument head to the left and remove the locking bracket (B) at the right side.

* As these brackets are provided only for transportation, it is not necessary to keep them.

(3) Use small screws (C) to attach rail covers.

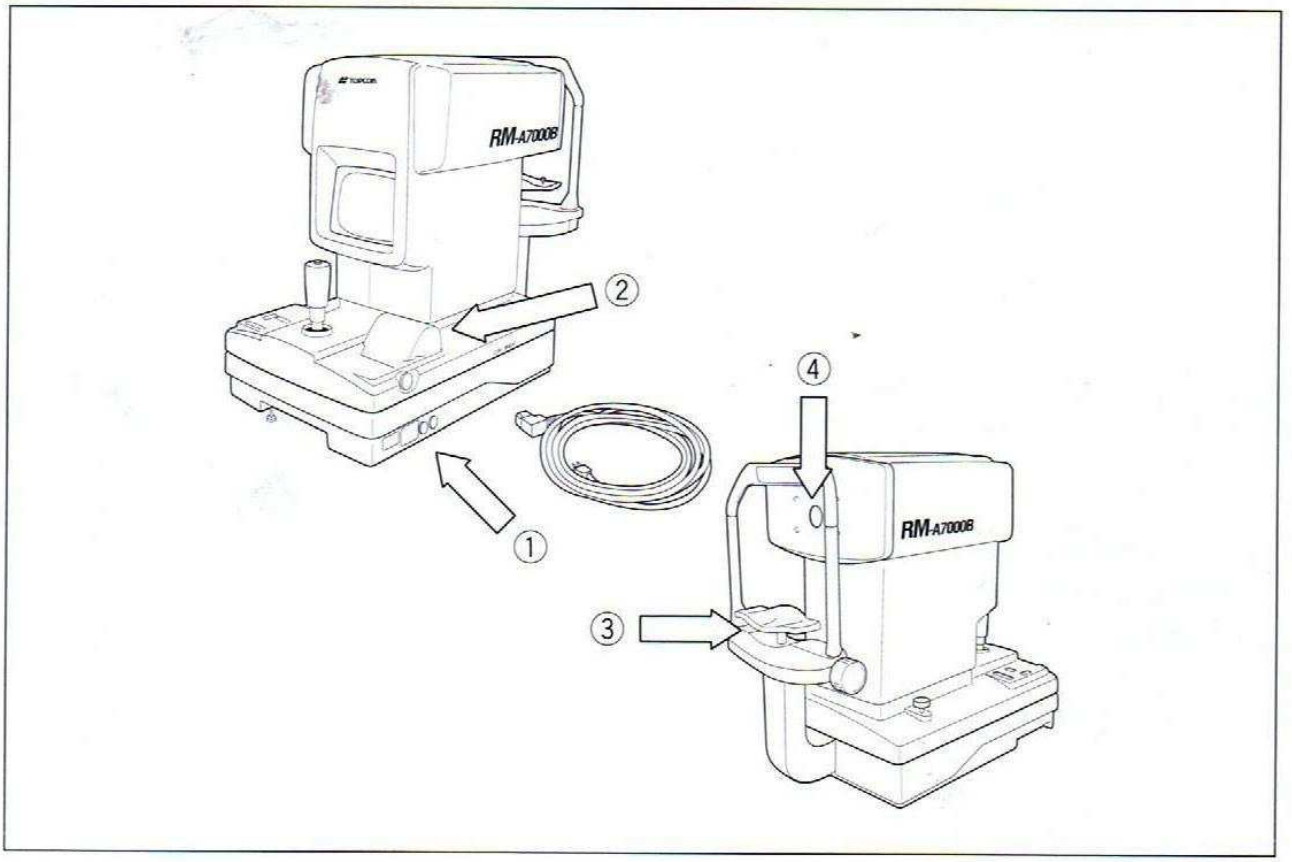



(4) Connect the power cord to the outlet.



# 3. USING THE INSTRUMENT

## 3-1 Preparations (installing)



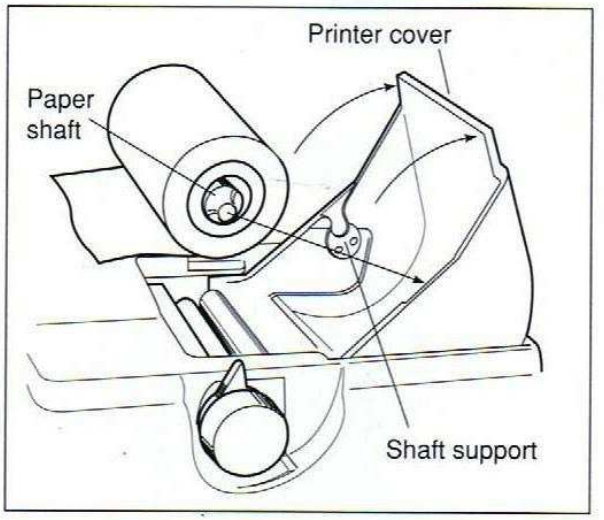

① Connect the power cord.

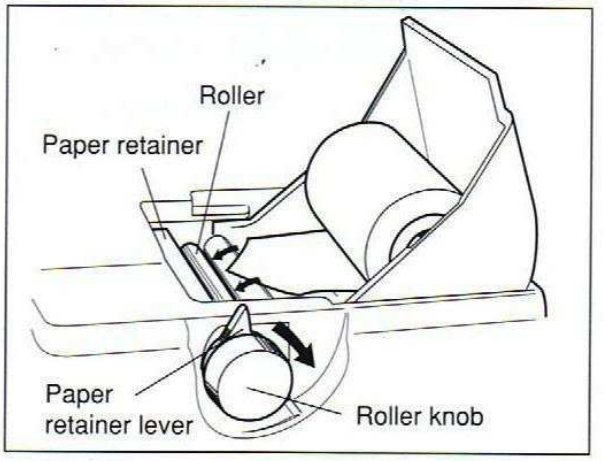
② Loading printing paper.

- Open the printer cover.
- Pass the paper shaft in the printing paper roll, and set the paper onto the shaft support.

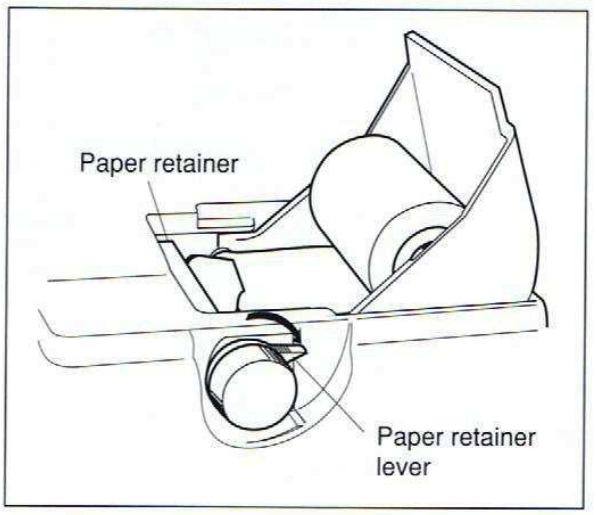
> **Caution**
> Take care of the roll direction of paper.

- Up the paper retainer lever.
- Insert the lead of paper under the roller a little, and turn the roller knob in the arrow direction.



- Down the paper retainer lever when the lead has come out of the paper retainer a little.
- Close the printer cover.

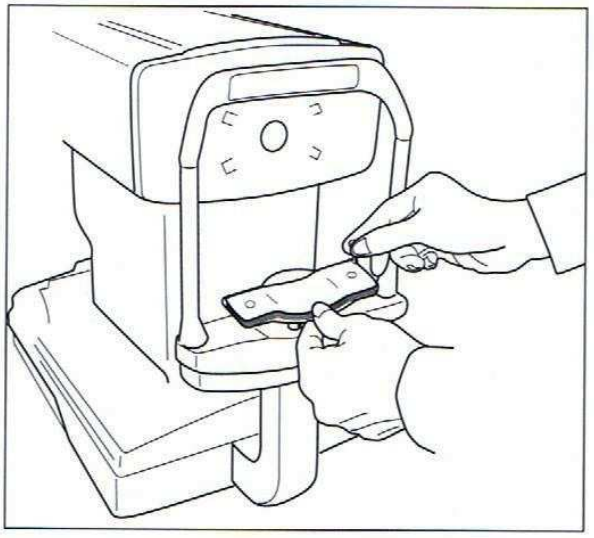



③ Setting chinrest tissue

Place chinrest tissue on the chinrest, and insert two pins from top.

④ Uncap the examination window lens.

For connecting with any other instrument, contact Topcon's agent.



**Caution**

- Do not install the instrument in a place which is exposed to direct rays of the sun, high in temperature and humidity or dusty.
- Install the instrument, taking care that no intense light may reach the examination window.
- Be sure to ground the instrument.
- Use a power supply of AC100, 120, 220, 240V/±10% (50/60Hz).

# 3-2 Measurement

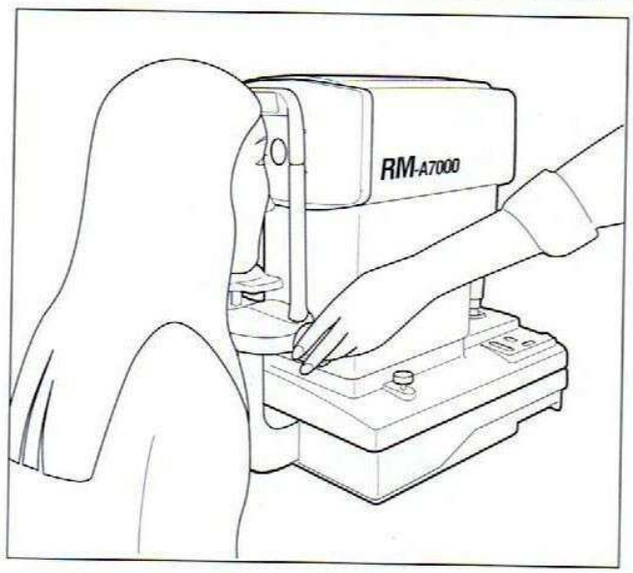
## Making power

- Turn on the power switch.
  (The pilot lamp will light up, displaying the measurement picture.)

## Positioning the patient

- Adjust the automatic instrument table to enable the patient to sit on the chair comfortably.

- With the chinrest knob, roughly match the patient's eye height with the chinrest height mark.



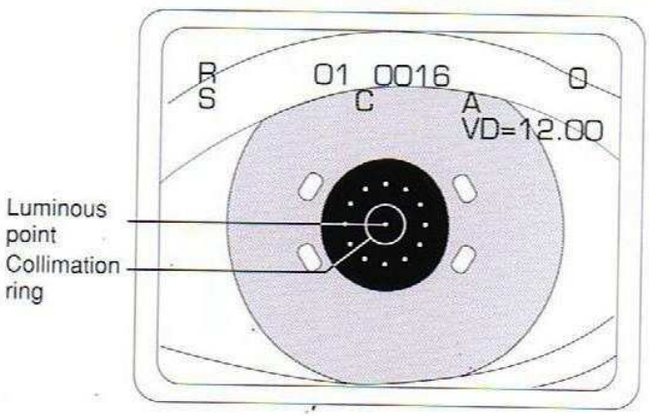

## Positioning the patient

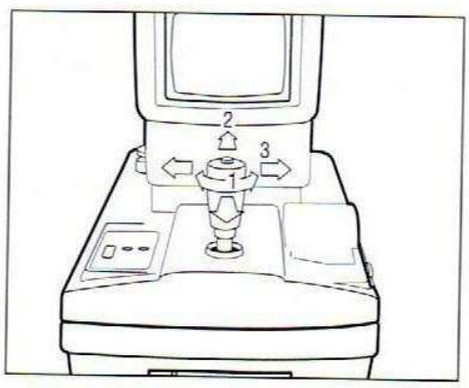
- Slide the instrument toward the target eye while watching the monitor TV screen.

- Place the luminous point in the center of the collimation ring.

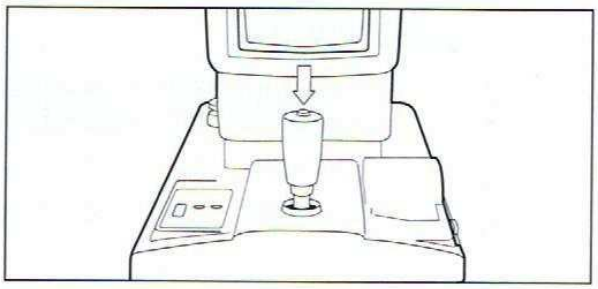
| | |
|---|---|
| Vertically | Turn the control lever. |
| Right and left | Tilt the control lever right or left. |
| Back and forth | Tilt the control lever back or forth. |

Adjust so that the luminous point may be minimum.



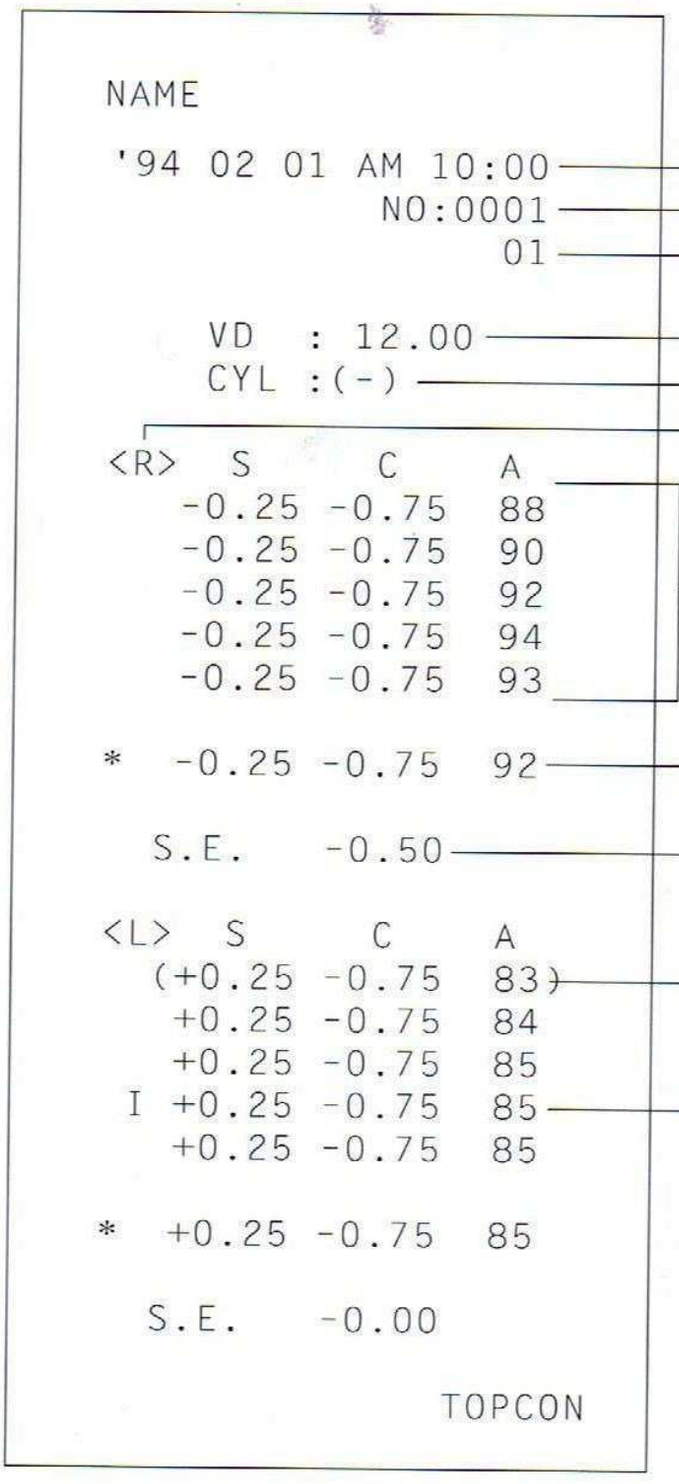
- Press the measuring switch.
  (The result will be displayed on the monitor TV screen.)
  (The average will be printed out when 3-times or more measurements are made.)



- After measuring an eye, slide the instrument toward the other eye.
  Measure the other eye in the same manner by watching the monitor TV screen.

- Press the print switch. (The result will be printed out.)

# 3-3 Printouts




Date

Patient's No.

Instrument No.

V. D.

Cylindrical power mark

Measurements of the right eye

5-time measurements of the right eye
(Up to 10-time measurements may be recorded.)

Average of the right eye (As asterisk * will appear when 3-times or more measurements are made.)

Spherical equivalent power of the right eye

A ( ) mark will appear when the measurements are less reliable.

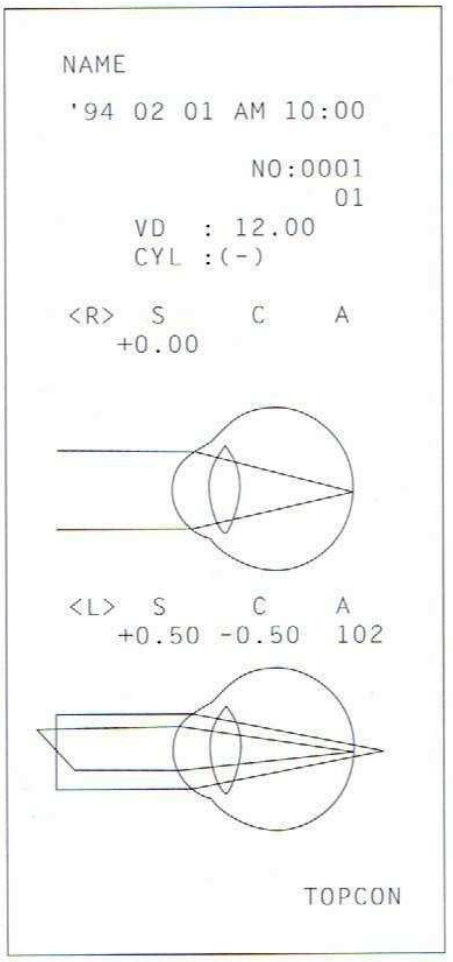
A I mark will appear when the IOL mode is applied.

ALL mode (ex.)

# 3-4 Measurement (applied)

## Producing a graphic print

• After measuring, press the graphic print switch. (The average and the status of refraction will be graphically printed out.)




Graphic print (ex.)

## Converting to contact lens diopters

The diopter of a glass lens (V.D. 12mm or 13.75mm) may be converted to that of a contact lens (V.D. 0mm).

• Press the contact/glass switch. (The VD display will be changed on the right side of the monitor TV screen.)

## Measuring an eye with an IOL

Press the switch when an error happens easily to the measurement of an eye with an IOL, and measurement may be possible.
(IOL will appear under the measurement S on the monitor TV screen.)
(An I-mark will appear front the printed out measurement.)

**Caution**

- Reflection from the IOL surface may interfere with measuring when measuring an eye with an IOL.
- Measuring may be possible in the IOL mode although measurement results are less reliable.

## Observing a target image

The image of a target on the retina may be observed in the event that the measurements end in an error.

- Press the target image observation switch.
  (The store image of either eye measured last will be displayed on the monitor TV screen.)
- Press the measuring switch.
  (The monitor TV screen will be available for measuring.)

## Changing fixation target brightnesses

The brightness of the fixation target may be reduced when measuring light dazzles the patient's eye.
Press the fixation target brightness switch, the fixation target will be less bright.
("F" will appear at the right top of the monitor TV screen.)

# 4. OTHER FUNCTIONS

## 4-1

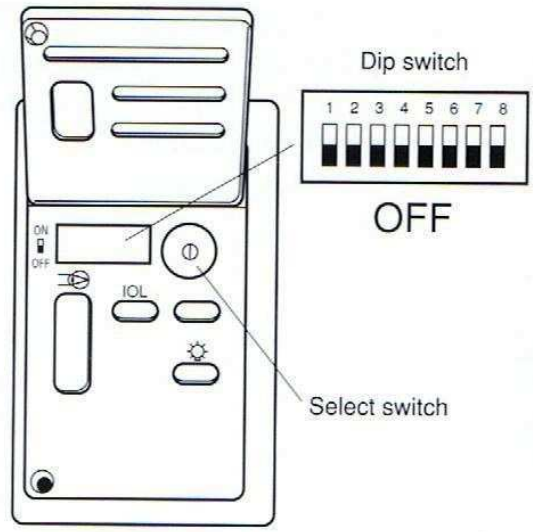
The following functions will be available by changing over the dip switches:

### Continuous/ordinary measurement

Dip switch No. 1

ON ...Mode which enables the instrument to continuously measure by keeping pressing the measuring switch.

OFF...Ordinary measurement




### Setting the time

• Turn on the dip switch No. 5.

(The monitor TV screen will show the time setting picture. Flickering shows where to set.)

• Selecting items

Press the measuring switch and bring the cursor to the target item.

(Flickering moves to the month, day, hour, and minute in turns.)

• Setting the time

Press IOL switch....Numerical values to increment

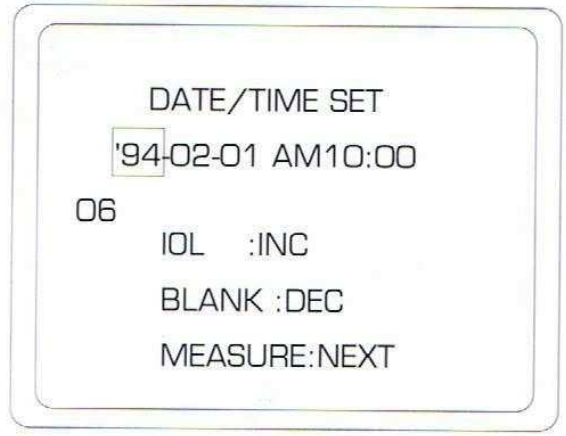
Press BLANK switch...Numerical values to decrement

• Upon measuring,

Turn off the dip switch No. 5.

(The measurement picture will return.)

Time setting picture



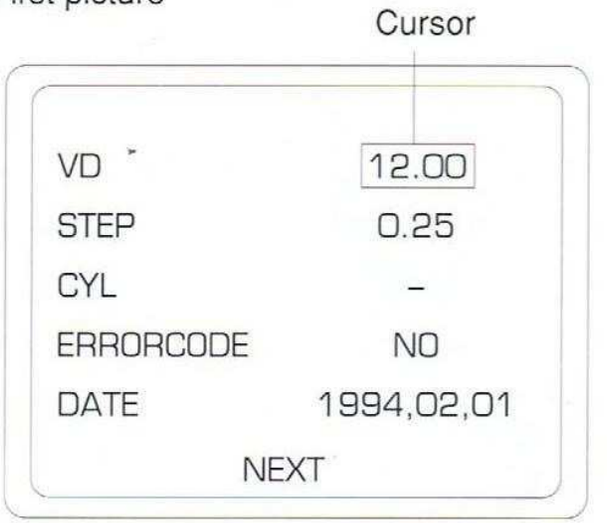
## 4-2

Press POWER switch while pressing the contact/glass switch, and the monitor TV screen will show the picture for initializing. Finger off the switch when a pee sound is heard.

## Changing V. D.

- Press the measuring switch and bring the cursor to VD.
- Press PRINT switch and select 12.00mm or 13.75mm.
- Press the measuring switch, and the cursor will move to the next item.

First picture




## Providing a 0.12D-step display

- Press the measuring switch and bring the cursor to STEP.
- Press PRINT switch and select 0.25D or 0.12D.
- Press the measuring switch, and the cursor will move to the next item.

## Changing cylindrical power symbols

- Press the measuring switch to bring the cursor to CYL.
- Press PRINT switch and select –, ± or +.
- Press the measuring switch, and the cursor will move to the next item.

**MEMO**

To quit the picture,
bring the cursor to NEXT, and press PRINT switch.

- END OK will be displayed.
- Press PRINT switch again.
- The measurement screen will return and the set item will be printed out.

## Displaying an error code

- Service man mode
- Allow him to operate.

## Changing date displays

- Press the measuring switch to bring the cursor to DATE.
- Press PRINT switch and select
  1994.02.01 ('94.02.01 will be printed out)
  FEB.01.1994 or
  01.FEB.1994
- Press the measuring switch, and the cursor will move to the next item.

## Calling the next picture

- Bring the cursor to NEXT.
- Press the measuring switch and the screen will provide the second picture for initializing.

# 4-3

The monitor TV screen shows the second picture.

## Setting the patient's No.

- Press the measuring switch to bring the cursor to SERIAL No.
- Press the CONTACT/GLASSES switch, and the numeric value will increment.
  Press the IMAGE switch, and the numeric value will decrement.
  Setting 0001-9999 may be possible by 1 digit from the upper digits.
- Press the measuring switch, and the cursor will move to the next item.

## Displaying the patient's No. on the monitor TV screen

- Press the measuring switch to bring the cursor to SERIAL OUT TV.
- Press PRINT switch and select YES.
- Press the measuring switch, and the cursor will move to the next item.

## Printing out the patient's No.

- Press the measuring switch to bring the cursor to SERIAL OUT PRT.
- Press PRINT switch and select YES.
- Press the measuring switch, and the cursor will move to the next item.

## Resetting the patient's No.

- Press the measuring switch to bring the cursor to SERIAL RESET.
- Press PRINT switch and select YES.
- Press the measuring switch, and the cursor will move to the next item.

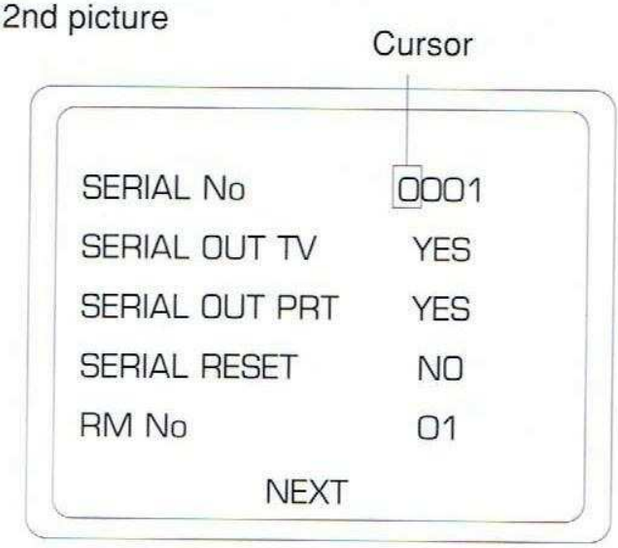
## Setting the instrument No.

- Service man mode
- Allow him to operate.

## Calling the next picture

- Bring the cursor to NEXT.
- Press the measuring switch, and the monitor TV screen will show the 3rd picture for initializing.

2nd picture




**MEMO**

To quit the picture,
bring the cursor to NEXT, and press PRINT switch.

- END OK will be displayed.
- Press PRINT switch again.
- The measurement screen will return and the set item will be printed out.

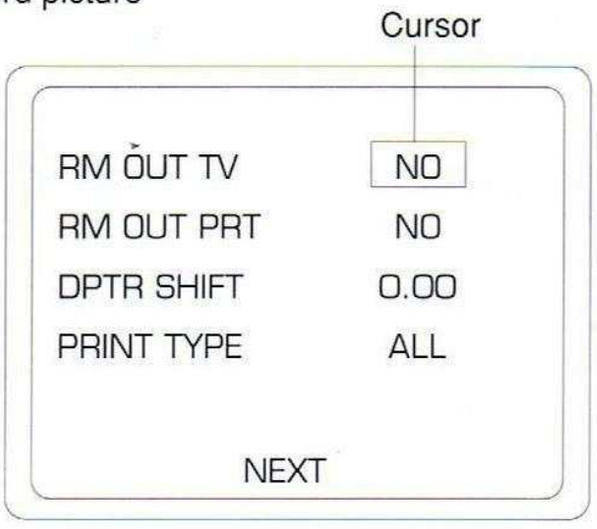
## 4-4

The monitor TV screen shows the 3rd picture.

### Displaying the instrument No. on the monitor TV screen

- Service man mode
- Allow him to operate.

3rd picture




### Printing out the instrument No.

- Service man mode
- Allow him to operate.

### Shifting objective refractive diopters

- Service man mode
- Allow him to operate.

### Changing printing types

- Press the measuring switch to bring the cursor to PRINT TYPE.
- Press PRINT switch, and select
  - ALL (all data to be printed out),
  - AVE (date, and average setting and refractive diopter to be printed), or
  - SIM (average only to be printed).
- Press the measuring switch, and the cursor will move to the next item.

### Calling the next picture

- Bring the cursor to NEXT.
- Press the measuring switch, and the monitor TV screen will show the fourth picture for initializing.

***MEMO***

To quit the picture,
bring the cursor to NEXT, and press PRINT switch.

- END OK will be displayed.
- Press PRINT switch again.
- The measurement screen will return and the set item will be printed out.

## 4-5

The monitor TV screen shows the fourth picture.

### Receiving data from a computer lens meter

- Service man mode
- Allow him to operate.

### Printing out spherical equivalent power

- Service man mode
- Allow him to operate.

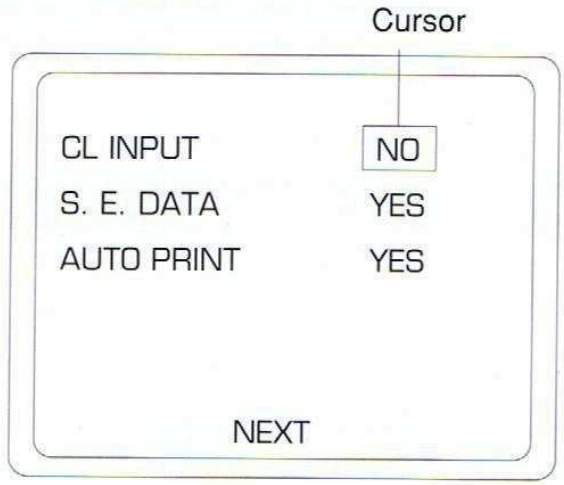
### Auto printing of auto-start measurement results

- Service man mode
- Allow him to operate.

### Calling the next picture

- Bring the cursor to NEXT.
- Press the measuring switch, and the monitor TV screen will show the fifth picture for initializing.

Fourth picture




**MEMO**

To quit the picture,
bring the cursor to NEXT, and press PRINT switch.

- END OK will be displayed.
- Press PRINT switch again.
- The measurement screen will return and the set item will be printed out.

## 4-6

The monitor TV screen shows the fifth picture.

### Printing out data from the computer lens meter

- Service man mode
- Allow him to operate.

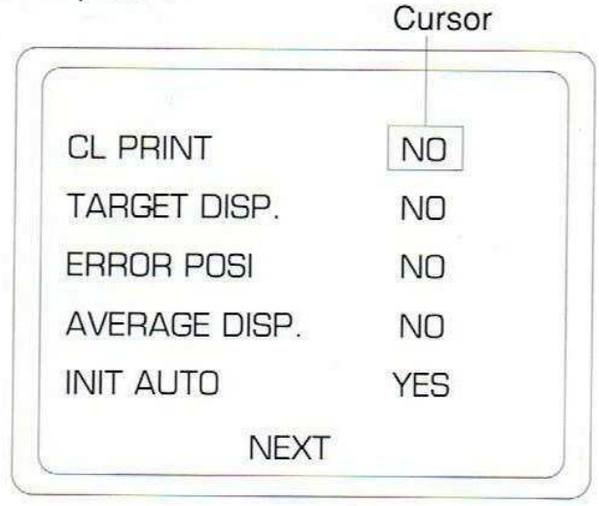
### Displaying automatically the target image when an error happened

- Service man mode
- Allow him to operate.

### Displaying where the target image is wrong when an error happened

- Service man mode
- Allow him to operate.

Fifth picture




***MEMO***

To quit the picture,
bring the cursor to NEXT, and press PRINT switch.

- END OK will be displayed.
- Press PRINT switch again.
- The measurement screen will return and the set item will be printed out.

### Displaying the average on the monitor TV screen

- Service man mode
- Allow him to operate.

### Giving a manual start to the instrument when power is made

- Service man mode
- Allow him to operate.

### Calling the next picture

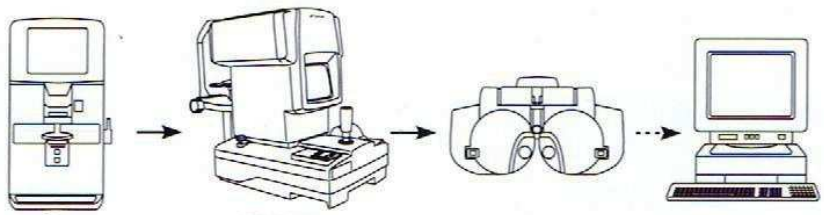
- Bring the cursor to NEXT.
- Press the measuring switch, and the monitor TV screen will return to the first picture for initializing.

# 4-7 Data-Link System

The instrument can be linked to others with data transmitting.
The detailed information will be acquired through your dealers.

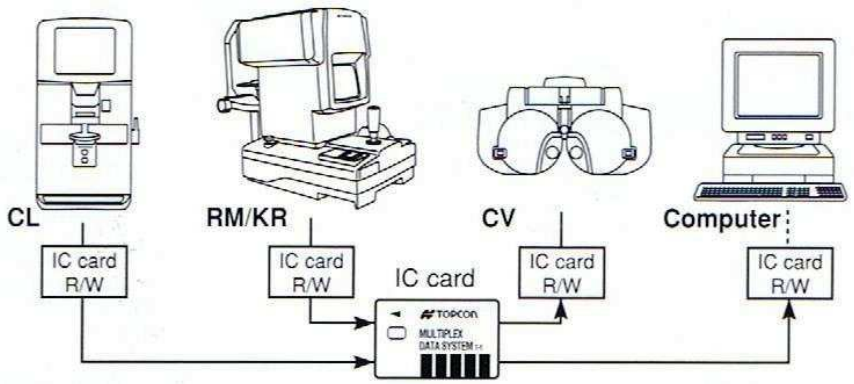
## On-line system

The data of computerized lensmeter can be transfered to the instruments through RS-232C interface, and also measuring data of the instruments can be transfered to computerized visiontester.



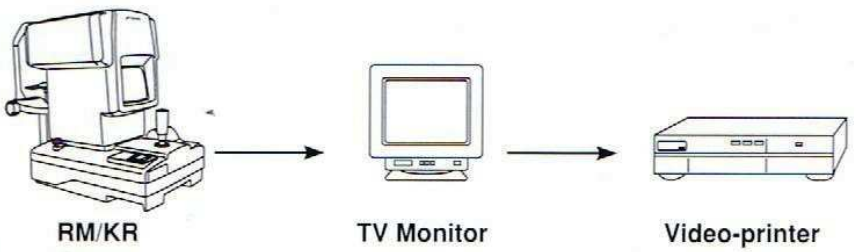

## IC card system

The measuring data of each instruments can be linked through IC card system.



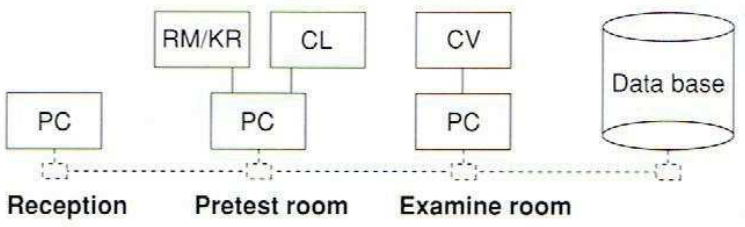

## External monitoring

An external TV monitor can be connected to the instruments, and/or measured target image is to be acquired with video-printer.




## Data processing on the Network

Future possibilities can be expected on the network system.



# 5. MAINTENANCE

## 5-1 Daily checkup

### Daily checkup

The instrument is least resistant to dust. Turn off power supply and cover the instrument with the attached cover when it is not in use.
Do not give any heave shock to the instrument.
The examination window is the most important. Use good care not to contaminate the window with fingerprints or get dirty.
If the room is quickly heated in winter or in a cold region, the instrument lenses may get cloudy. Take time before starting measuring till the lenses get clear naturally.

### Checkup of measuring precision

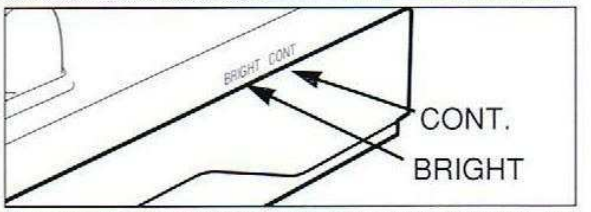
Measure the attached test eye periodically to check it for precision.

### Cleaning the instrument

Dust has got on the examination window.....Use a blower to blow off dust.
Fingerprints or oil has got on the examination window.....Use a blower to blow off dust, and a clean gauze with a little camera lens cleaner to lightly wipe off.
When the instrument cover has got dirty.....Use the attached silicone cloth or a dry soft cloth to wipe off. Do not use benzine, thinner or a chemical-contained dustcloth.

### Adjusting the monitor TV screen

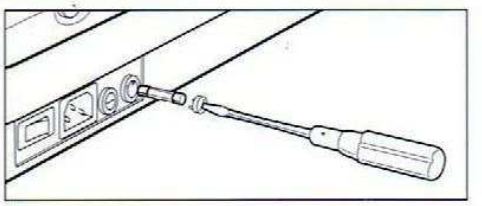
Set the attached test eye and adjust while watching the screen.
Contrast.....the contrast adjusting volume.
Brightness ....Use the brightness adjusting volume.




### Renewal of fuses

> **Caution** Never fail to shut off power supply and disconnect the power cord before renewing fuses to prevent any danger.

Use a screwdriver to remove the fuse holder and take out the fuse.
Put a new fuse in the fuse holder and set as before.
Do not use any other fuse than specified to maintain the instrument performance.



### Moving the instrument

> **Caution** Never fail to shut off power supply and disconnect the power cord before renewing fuses to prevent any danger.

Be sure to secure the instrument body with the fixing knob and hold the bottom, back and forth, to move the instrument.

# 6. BEFORE REQUESTING SERVICE

## 6-1 Message given during measuring

| | |
|---|---|
| "OVER-SPH" | Indicates that spherical power exceeds +22, 25D. |
| "OVER-CYL" | Indicates that cylindrical power exceeds ±7D. |
| "NO TARGET" | Indicates that there is no target (eye) to be measured or the image of eye is too dark. |
| "AGAIN" | Indicates that there is a difference in value by 5D or more over the previous measurement. |
| "NO CENTER" | Indicates that there is found no center of the target (eye) to be measured. |
| "PAPER END" | Indicates that paper is out in the printer. |
| "PRINTER HEAD UP" | Indicates that [PRINT] switch was pressed with the printing paper retainer lever inclined upward. |
| "PRINT" | Shows that printing is under way. The message will be displayed till data transmission is over for on-line communications |
| "ERROR" | Displayed when the patient blinks or his eye moves. If this appears when proper measurement is performed with the test eye, something may be wrong with the instrument. Contact the serviceman. |
| "PLEASE SET A CARD" | Displayed when an IC card (optional) in use is not properly inserted. |

## 6-2 Check Items

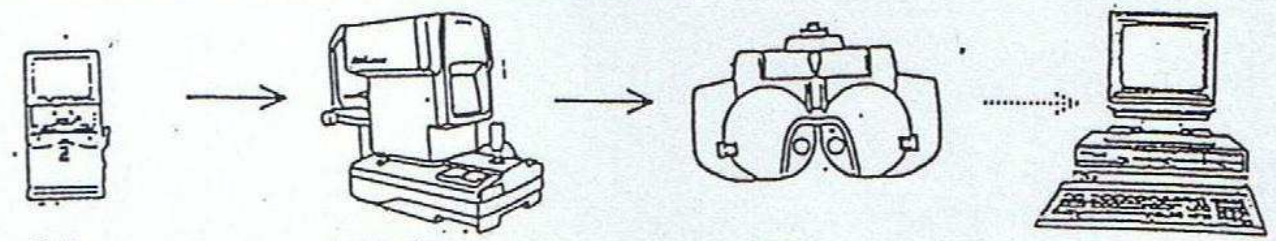
| | |
|---|---|
| The monitor TV does not work.<br>● The pilot lamp does not light up.<br>● Fuse blows off immediately after POWER switch is turned on. | Is the power cord properly plugged in the outlet?<br>Is the power cord connected with the instrument?<br>Call the serviceman immediately. |
| The monitor TV screen is difficult to watch.<br>● The picture is not proper in contrast.<br>● The picture is dark. | Use CONT volume for adjustment.<br>Use BRIGHT volume for adjustment. |
| Something wrong is felt with any mobile part, including the control lever. | Do not force. Contact the serviceman. |
| No printing is carried out.<br>● Paper comes out with no prints.<br>● No paper comes out. | Is the paper roll direction proper? (See Handling the printer on Page 4.)<br>Replenish printing paper when "PAPER END" appears on the monitor TV screen. (See Handling the printer on Page 4.) |

# Data-Link System

The instrument can be linked to others with data transmitting.
The detailed information will be acquired through your dealers.

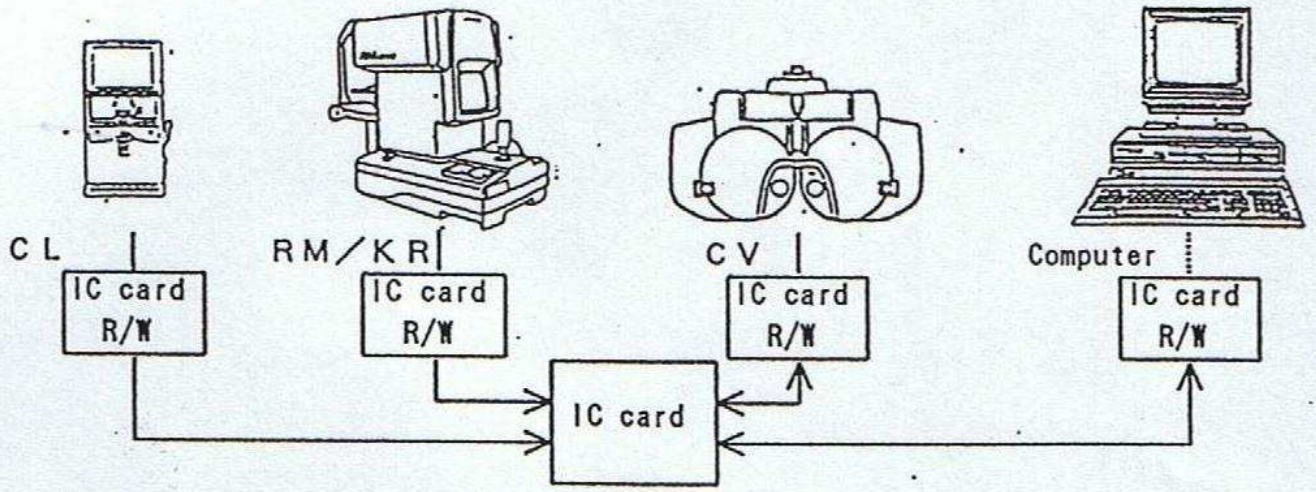
## *On-line system

The data of computerized lensmeter is to be transfered to the instruments through RS-232C interface, and also measuring data of the instruments is to be tranfered to computerized visiontester.



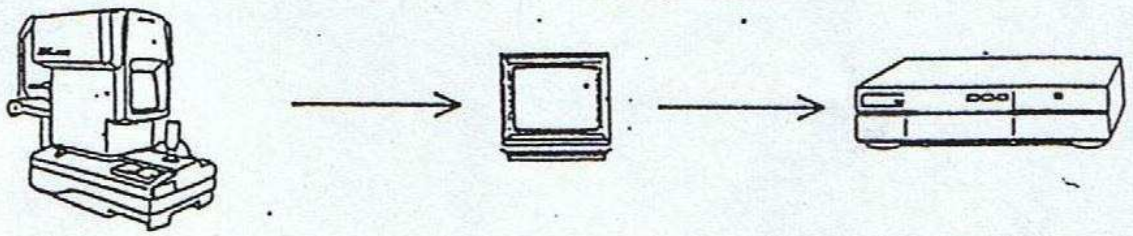

## *IC card system

The measuring data of each instruments is to be linked with IC card system.




## *External monitoring

TV monitor can be connected to the instruments externally, and/or the ocular fundus image is to be acquired with video-printer.




## *Data processing on the Network

Futuer possibilities can be expected on the network system.