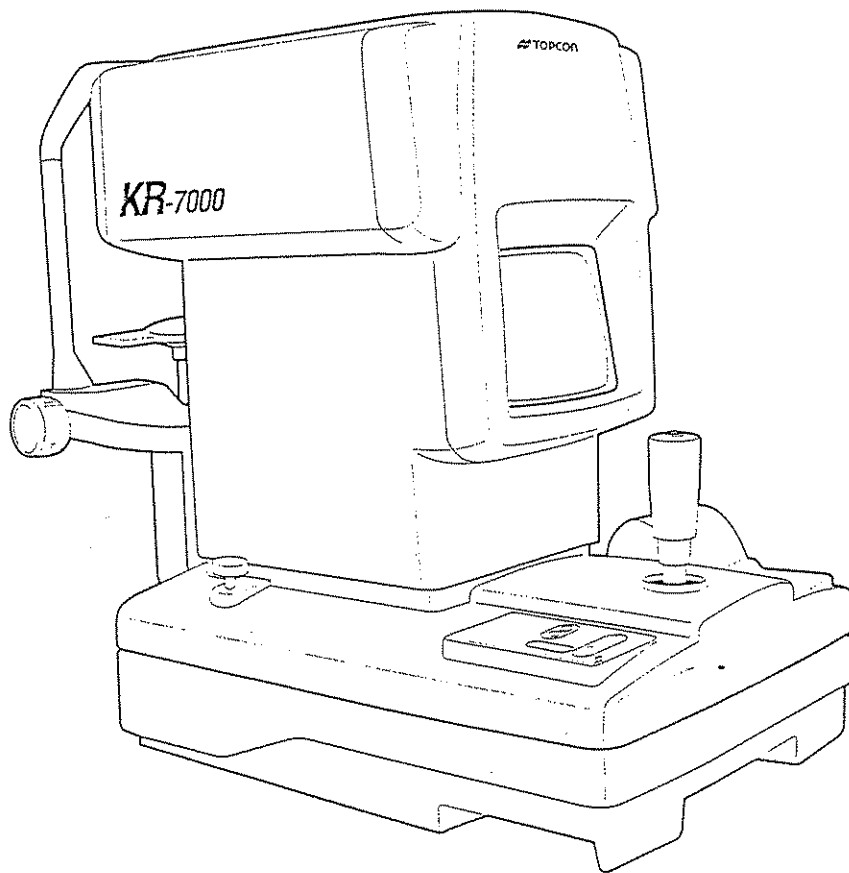


AUTO KERATO-REFRACTOMETER

KR-7000



Thank you for purchasing the TOPCON Auto Kerato-Refractometer KR-7000. To get the best results from the instrument, please read these instructions carefully and keep the manual in a convenient location for future reference.

PRECAUTIONS

1. This is a precision instrument which needs to be used and kept in places under ambient conditions including temperature and humidity. Do not expose the instrument to direct sunlight.
2. For optimal operations, install the instrument on a level floor free of vibration.
3. Connect all cords securely before operating.
4. Always keep the area where the instrument is installed clean. Turn power supply off and cover with the attached dust cover when not in use.
5. To ensure accurate measurements, take care that no fingerprints or dust gets on the examination window.
6. Topcon is not responsible for any modifications due to disassembling or adjustments made by unauthorized dealer or persons.
7. Contact your authorized dealer or TOPCON directly if any trouble occurs.

CLASS I



ADDITIONS AND CHANGES

This addendum to the original Instruction Manual contains several changes in operation based on upgrades to original software. Read this addition carefully and save with the original Instruction Manual.

Reading the Printout

In <R/K> <REF> mode

When measuring with the IOL mode, a reliability factor is printed after the "I" mark. The reliability factor consists of integers 1 to 9 in the ascending order of reliability.*

When reliability is high, no reliability factor is printed.

```

NAME
'96_03_27 PM 01:50
          NO:0003
          VD : 12.00
          CYL : (-)
<L>  S      C      A
I6 -  5.25
I2 -  5.25 -0.50  87
I2 -  5.50  **    **
* -  5.25 -0.50  87
S.E.   - 5.50
          TOPCON
    
```

Reliability factor

When reliability is too low and C and A cannot be determined, columns C and A are given ** marks.

In <KRT> mode

When reliability is low, a "*" mark is attached after the number of measurements.

Reliability mark

```

KRT. DATA
<L>  D      MM      A
H   43.75  7.71   32
V   43.87  7.69  122
AVE 43.87  7.70
          CYL -0.12  32
-----
-1-  D      MM      A
H   43.75  7.71   32
V   43.87  7.69  122
AVE 43.87  7.70
          CYL -0.12
-2-*  D      MM      A
H   42.75  7.89  172
V   43.25  7.81   82
AVE 43.00  7.85
          CYL -0.50
-3-*  D      MM      A
H   42.75  7.90   2
V   43.00  7.84   92
AVE 42.87  7.87
          CYL -0.25
    
```

Change of instruction for initial set (2nd screen)

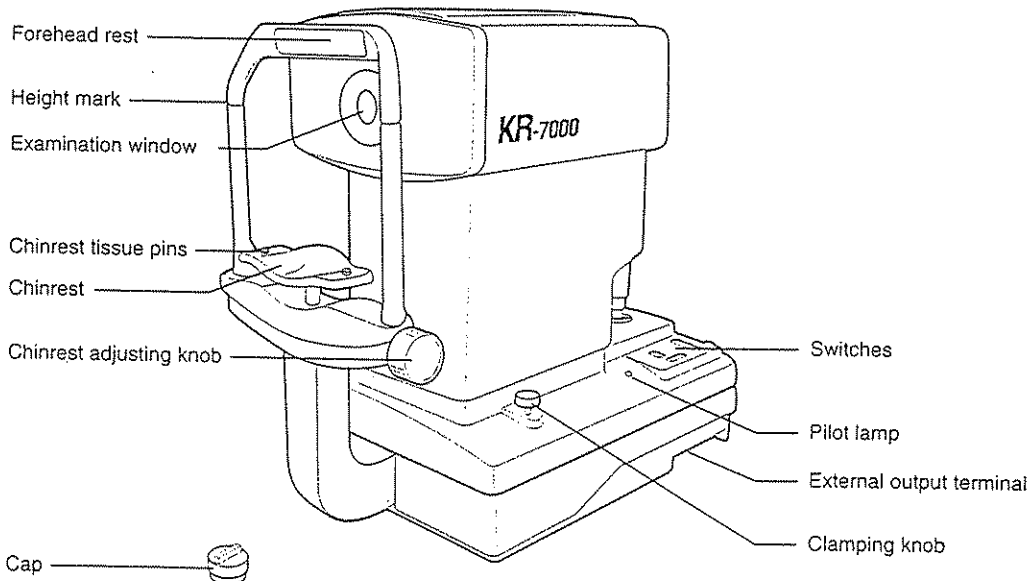
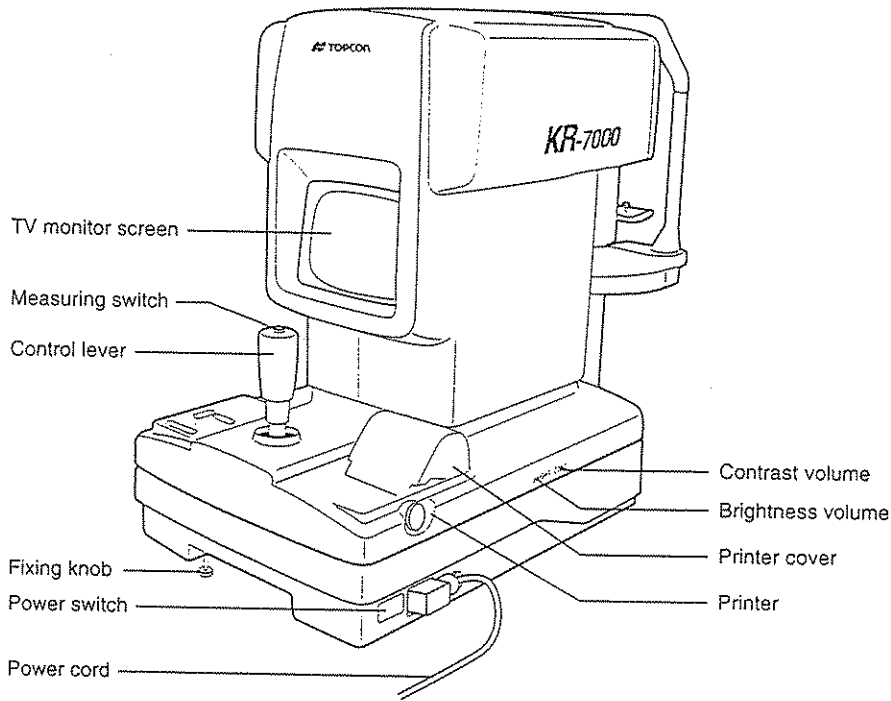
Regarding the measuring cornea diameter, the instruction in the manual shall be changed as described below:

Page	Item	Description
20	Measuring cornea for diameter with a still image	Press the PRINT switch and select <u>YES</u> . ↓ Press the PRINT switch and select either <u>NORM</u> (to set a still image the same brightness as an observation image on the monitor) or <u>HIGH</u> (brighter than an observation image on the monitor)

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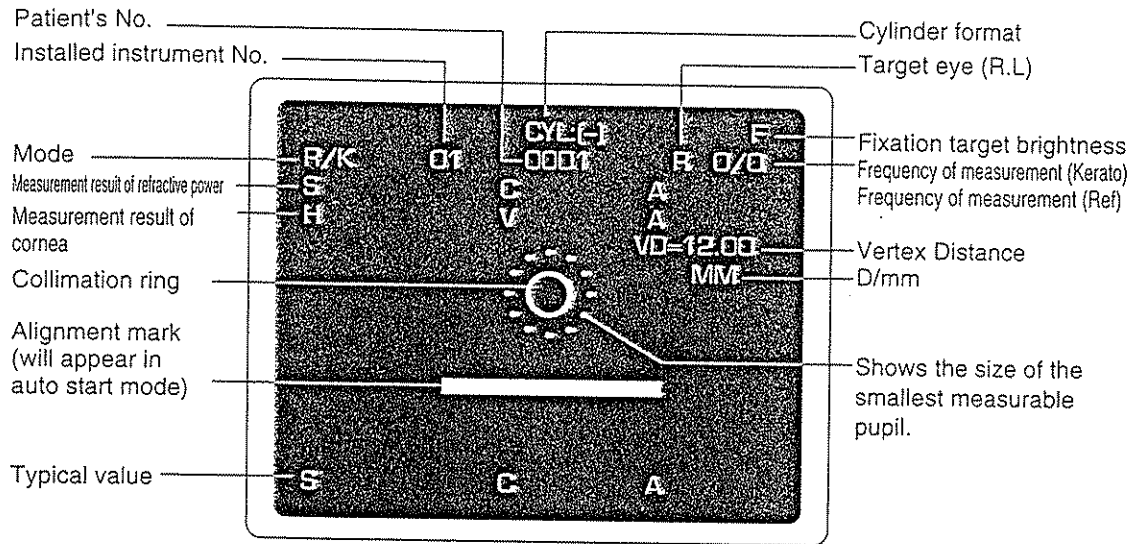
1. COMPONENTS AND THEIR FUNCTIONS



Accessories

Accessories box	1 pc.	Paper shaft	1 pc.	Screwdriver	1 pc.
Power cord	1 pc.	Chinrest tissue	1 set	Fuse	2 pcs.
Rail cover	2 pc.	Chinrest tissue pin	2 pc.	Contact lens holder	1 pc.
Test eye	1 pc.	Dust cover	1 pc.		
Printing paper	2 rolls	Silicone cloth	1 pc.		

TV MONITOR SCREEN (R/K)

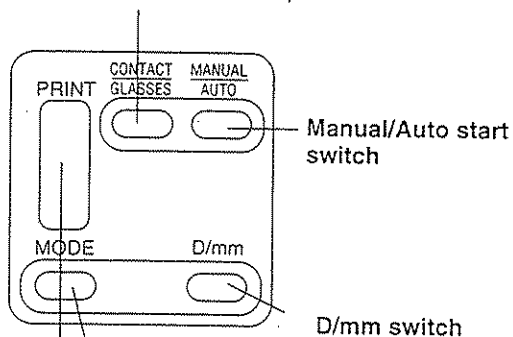


Turn on the power switch, and the pilot lamp will light, displaying the above on the TV monitor screen. (The patient's No. and instrument No. vary in display according to the status of setting.) The picture will disappear if instrument is not operated within 10 minutes. Press the measuring switch, and the instrument will be ready again.

SWITCHES

Contact/glass switch

Switches contact lens V. D. (0) and glass lens V. D. (12mm or 13.75mm).



Measurement mode switch

REF (refraction measurement)
KRT (corneal shape measurement), and
R/K (refraction/corneal shape measurement)

Print switch

Prints out the measurement result.

Select switch

IOL switch

Press the switch when an error message appears, and measurement may be possible.

(When the IOL mode is applied, an IOL mark will be displayed under the instrument sphere value.)

Ex.) S-3.00
IOL

Target image observation switch

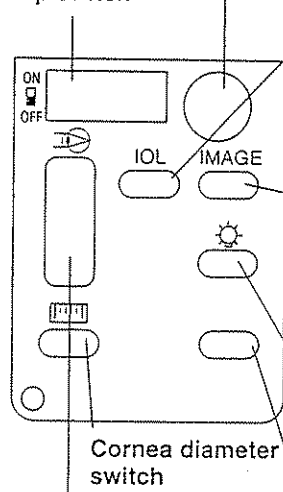
Allows the operator to observe the stored target image on the TV monitor screen.

Fixation target brightness switch

"F" will be displayed only when the target is made dimmer.

CYL display selection switch (-, +, MIX)

Dip switch

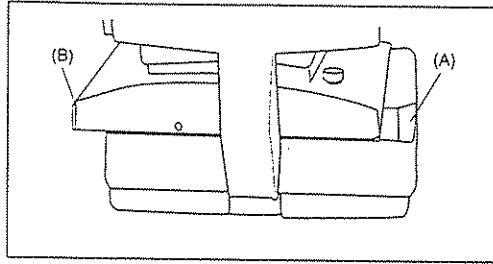


Graphic print switch

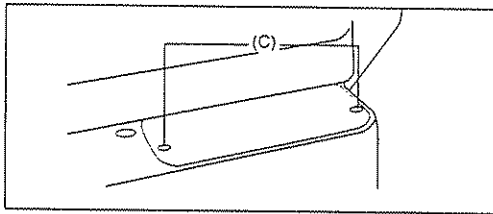
Prints out graphically the status of refraction.

2. ASSEMBLY

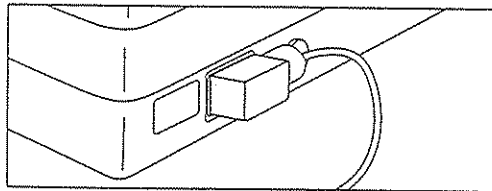
- (1) Using a screwdriver, remove the locking bracket (A) located on the right side when facing the instrument from the chinrest.
- (2) Bring the instrument head to the right and remove the locking bracket (B) on the left side.



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

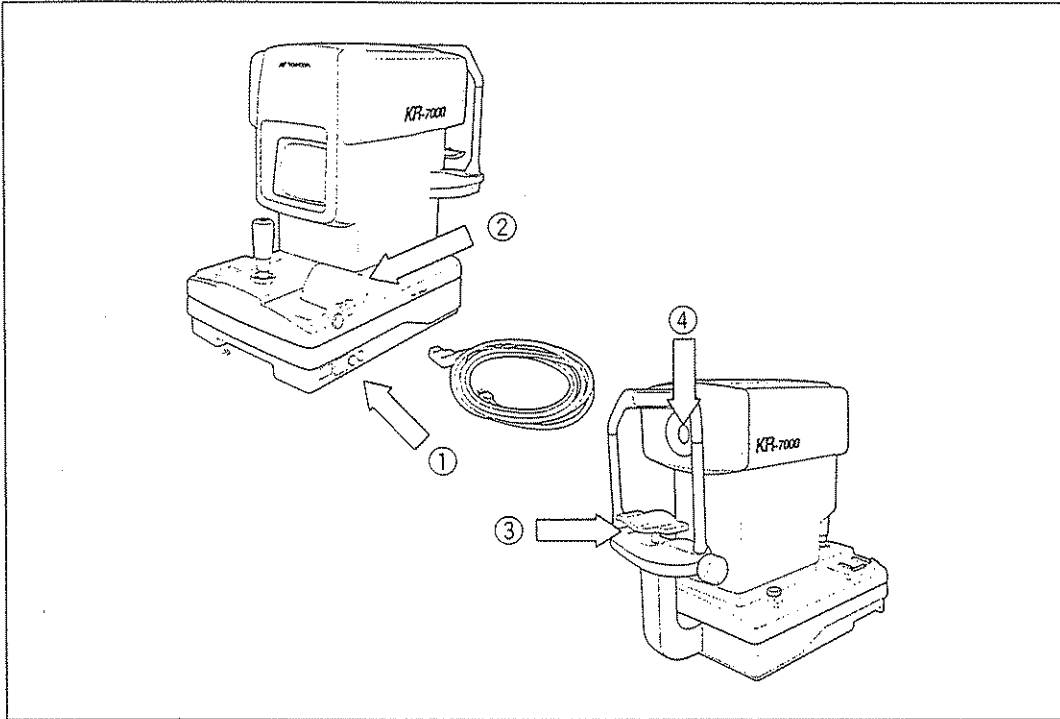


- (4) Connect power cord to outlet.



3. USING THE INSTRUMENT

3-1 Preparations (installing)



① Connect power cord.

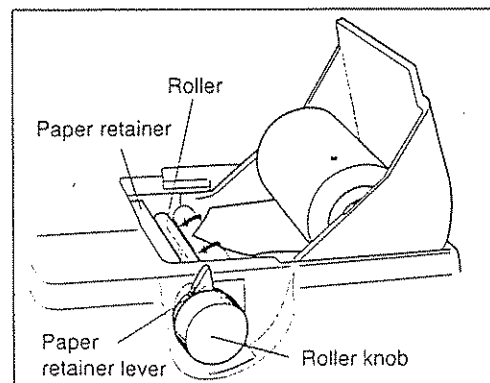
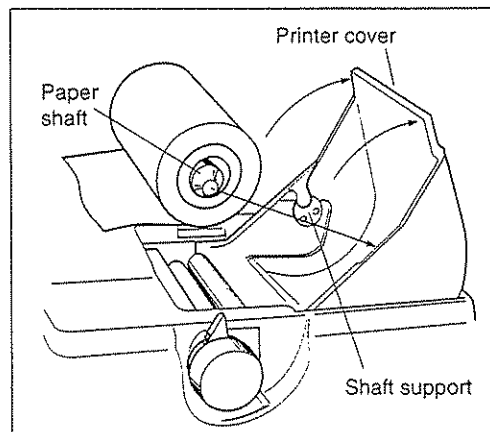
② Loading printing paper.

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

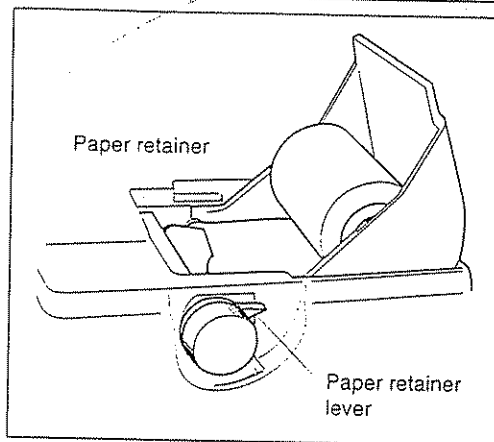
Caution

Be careful of roll direction of paper.
Use caution not to install paper upside down.

- Lift the paper retainer lever.
- Insert tip of printing paper below roller shaft until the tip comes out the over paper retainer.
Then press the paper retainer lever down.



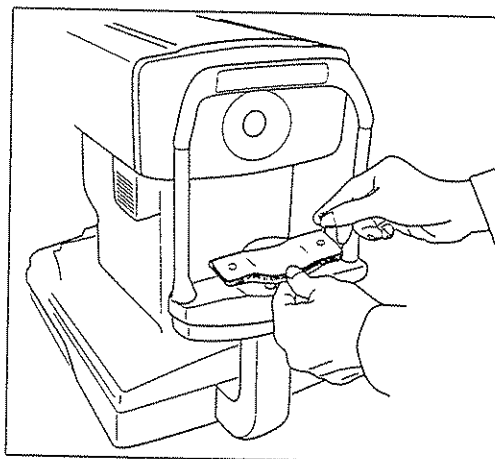
- Close the printer cover.



③ Setting chinrest tissue

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

④ Uncap the examination window lens.



Caution

- Do not install in a place, exposed to direct sunlight, high temperatures humidity, or is dusty.
- Install the instrument, taking care that no intense light reaches the examination window.
- Be sure to ground the instrument.
- Use power supply of AC100, 120, 220, 240V \pm 10% (50/60Hz).

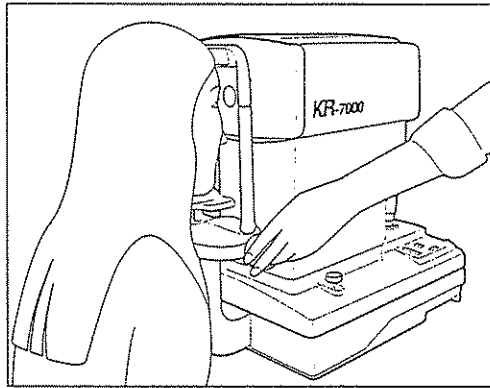
3-2 Measurement (auto start)

Making power

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

Positioning the patient

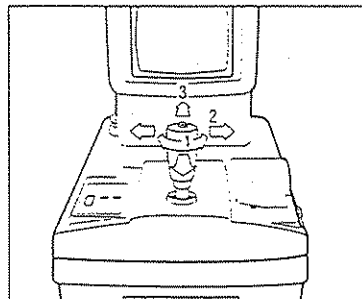
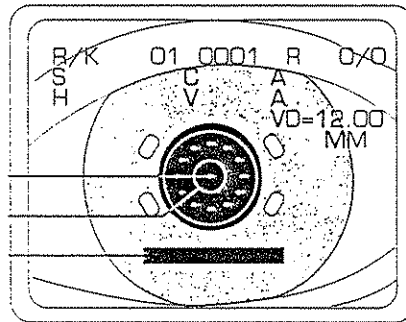
- Adjust the instrument table to enable the patient to sit on the chair comfortably.
- With the chinrest knob, roughly match the patient's eye height with the chinrest height mark.



Adjusting patient's eye to the auto refractometer




- Check that the alignment marks are displayed on the TV monitor screen.
(Press the auto start switch and select the auto start mode.)
- Press MODE switch to select R/K mode on the TV monitor screen.
R/KRef/kerato continuous measurement
KRTKerato measurement only
REFREF measurement only
- Slide the instrument toward the target eye while watching the TV monitor screen.
- Place the luminous point in the center of the collimation ring.
VerticallyTurn 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 is minimal and sharply focused.

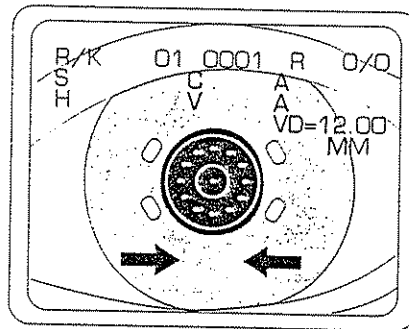
Luminous point
Collimation ring
Alignment marks



Handwritten note: "The luminous point is minimal and sharply focused."

Alignment marks

-  Move the instrument closer to the patient;
-  Move the instrument further away from the patient;
-  Collimation is not correct.



(Ex.) Move the instrument a little closer to the patient.

(Proper collimation will lead to automatic measurement.)

(After measuring an eye 3 times, the alignment marks will disappear and measurement will stop.)

Slide the instrument towards the other eye.
(The alignment marks will appear again.)
Measure the other eye in the same manner by watching the TV monitor screen.

Auto printout
(Measurement results are automatically printed out when 3 measurement results are recorded for each eye.)

3-3 Printout

In the <R/K> mode

```

NAME
'94 02 01 AM 10:00  Date
      NO:0001      Patient's No.
      01          Instrument No.

      VD : 12.00  V. D.
      CYL : (-)  Cylindrical power mark

<R>  S      C      A  Right eye measurements
      +0.00 -0.75 102
      +0.00 -0.50 102
      +0.00 -0.75 101
      +0.00 -0.75 102
      +0.00 -1.00 105
*    +0.00 -0.75 102  Typical value for the right eye (An asterisk * will appear
                        when 3-times or more measurements have been made.)
      S.E.  -0.50  Spherical equivalent power of the right eye

<L>  S      C      A  Left eye measurements
      (+0.00 -0.25 129) A ( ) mark will appear when the measurements are less
                        reliable.
      -0.25 -0.50 110
      +0.00 -0.75 97
      I -0.25 -0.75 96  A I mark will appear when the IOL mode is applied.
      +0.00 -0.75 99
*    +0.00 -0.75 99
      S.E.  -0.50

      PD = 64mm  PD value

KRT. DATA
<R>  D      MM      A
      H 45.00  7.50  32  Measurement of the corneal shape in the horizontal direction
      V 44.75  7.53 122  Measurement of the corneal shape in the vertical direction

AVE 44.87  7.52  Average

      CYL  -0.25 122  Corneal cylindrical power
CORNEA DIA : 12.00  Cornea diameter

<L>  D      MM      A
      H 44.87  7.52  4
      V 45.25  7.46 94

AVE 45.00  7.49

      CYL  -0.37  4

TOPCON
  
```

ALL mode (ex.)

In the <REF> mode

```

NAME
'94 01 10 AM 07:59
NO:0102
  01
VD : 12.00
CYL :(-)
<R> S    C    A
+0.00 -0.75 102
+0.00 -0.50 102
+0.00 -0.75 101
+0.00 -0.75 102
+0.00 -1.00 105
* +0.00 -0.75 102
<L> S    C    A
+0.00 -0.25 129
-0.25 -0.50 110
+0.00 -0.75 97
-0.25 -0.75 96
+0.00 -0.75 99
* +0.00 -0.75 99
PD=64mm
TOPCON
    
```

ALL mode (ex.)

In the <KRT> mode

```

NAME
'94 01 10 AM 07:59
NO:0100
  01
KRT. DATA
<R> D    MM  A
H 45.00 7.50 32
V 44.75 7.53 122
AVE 44.87 7.52
CYL -0.25 122
CORNEA DIA. : 12.00
-1- D    MM  A
H 45.00 7.51 32
V 44.87 7.53 122
AVE 44.87 7.52
CYL -0.12 122
-2- D    MM  A
H 45.00 7.50 35
V 44.87 7.53 125
AVE 44.87 7.52
CYL -0.12 125
-3- D    MM  A
H 45.00 7.50 29
V 44.87 7.53 119
AVE 44.87 7.52
CYL -0.12 119
-4- D    MM  A
H 44.87 7.51 37
V 44.75 7.53 127
AVE 44.87 7.52
CYL -0.12 127
-5- D    MM  A
H 45.00 7.50 23
V 44.87 7.53 113
AVE 44.87 7.51
CYL -0.15 113
<L> D    MM  A
H 44.87 7.52 100
V 45.25 7.46 94
AVE 45.00 7.49
CYL -0.37 4
CORNEA DIA. : 12.00
-1- D    MM  A
H 44.87 7.51 10
V 45.12 7.48 100
AVE 45.00 7.50
CYL -0.25 10
-2- D    MM  A
H 44.87 7.52 3
V 45.12 7.46 93
AVE 45.00 7.50
CYL -0.25 3
-3- D    MM  A
H 44.87 7.52 5
V 45.25 7.45 95
AVE 45.12 7.49
CYL -0.37 5
-4- D    MM  A
H 44.87 7.51 3
V 45.25 7.45 93
AVE 45.12 7.48
CYL -0.37 3
-5- D    MM  A
H 44.87 7.51 4
V 45.25 7.45 94
AVE 45.12 7.48
CYL -0.37 4
TOPCON
    
```

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.)

Converting to contact lens diopters

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

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

Measuring an eye in IOL mode

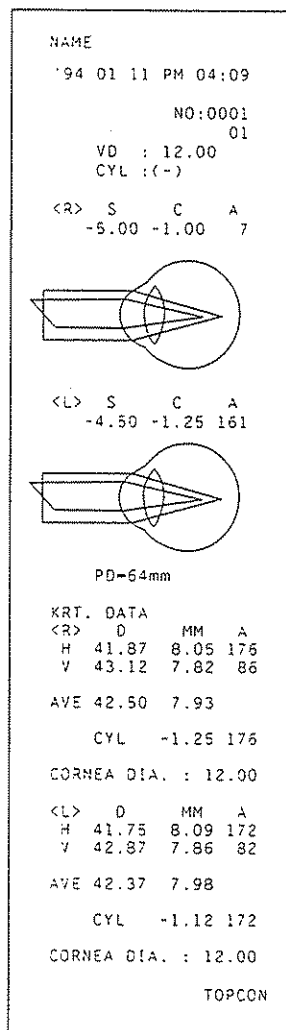
By pressing this switch when an error occurs in the measurement of an eye, measurement may be possible.

(IOL will appear under the measurement S on the TV monitor screen.)

(An I-mark will appear in front of the printed out measurement.)

Caution

- Reflection from the IOL surface or an opacity 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.



Graphic print (ex.)

Observing a target image

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

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

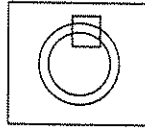
MEMO

Initializing will provide the following display:

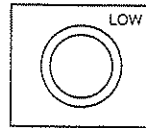
- The target image in question will be surrounded with a square when error occurs.
- LOW will be displayed when the target image is too dark and an error occurs.
- HIGH will be displayed when the target image is too bright and an error occurs.

Error messages

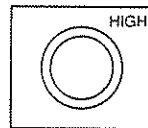
(Problem position display)



(Dark image display)



(Too bright image display)



Changing fixation target brightnesses

The brightness of the fixation target may be reduced if it causes the iris to constrict excessively when measuring.

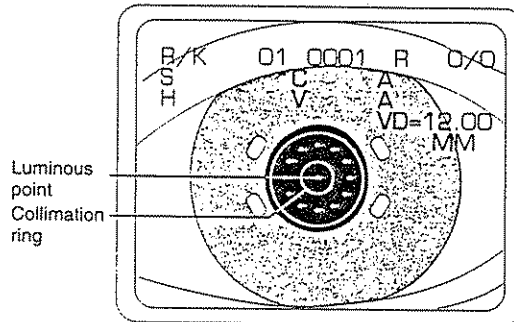
Press the fixation target brightness switch to lower the fixation target brightness.

("F" will appear at the top right of the TV monitor screen.)

Manual start

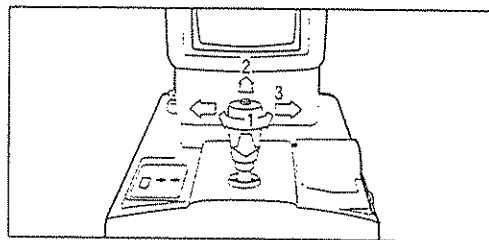
- Check to see that the alignment marks are not visible on the TV monitor screen.
(Press the auto start switch and select the manual measurement mode.)

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

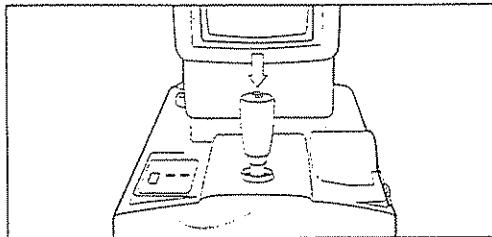


- Place the luminous point in the center of the collimation ring.
Vertical Turn the control lever.
Right and left Tilt the control lever right or left.
Back and forth Tilt the control lever back or forth.

Adjust so that the luminous point is minimal and sharply focused.

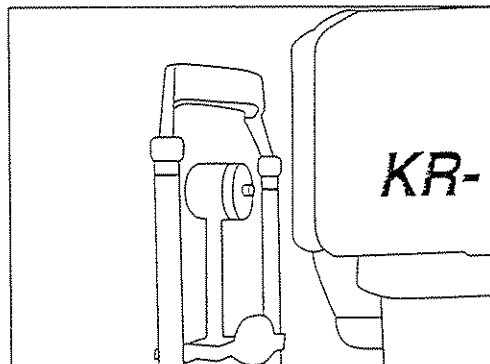
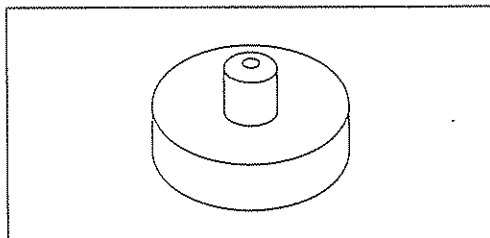


- Press the measuring switch.
(The result will be displayed on the TV monitor screen.)
(The average will be printed out when 3 or more measurements are made.)
- After measuring one eye, slide the instrument towards the other eye.
Measure the other eye in the same manner by watching the TV monitor screen.
- Press the print switch. (The result will be printed out.)



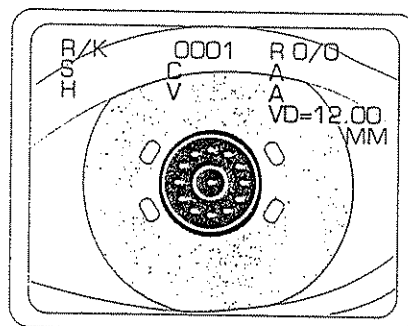
Hard contact lens measurement

- (1) Make sure that the instrument is in the corneal curvature measurement (KRT mode). Or select the mode using the measurement mode switch.
 - (2) Insert the test eye in the chinrest tissue pins.
 - (3) Fill the concave section of the contact lens holder with water, and apply the contact lens. Surface tension is adequate for adhesion of the lens.
Take care that no bubbles are between the contact lens and the holder.
Take care that the lens surface to be measured does not get wet.
 - (4) Mount the contact lens holder with the lens in the test eye.
 - (5) Follow the same procedure as corneal curvature measurement.
- * When the contact lens base curve (concave) is measured, the axial angle will be in reverse to that of corneal curvature measurement (convex).



Measuring cornea for diameter

- Align the eye on the monitor.



- Press the corneal diameter measuring switch and select the corneal diameter mode. The TV monitor screen will show positioning bars.

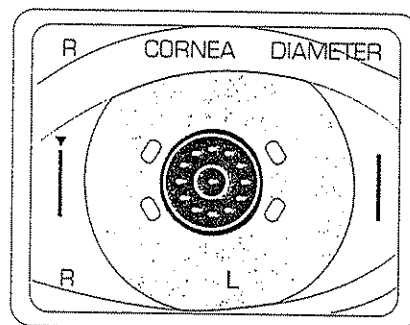
- Bring the left positioning bar to the left edge of the iris.

Press the IOL switch

The bar will move left.

Press the IMAGE switch

The bar will move right.



- Press the measuring switch to lock the positioning bar.

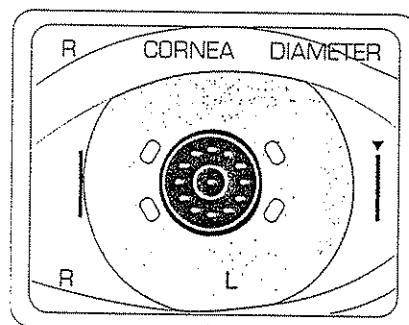
- Similarly, bring the right positioning bar to the right edge of the iris.

Press the IOL switch

The bar will move left.

Press the IMAGE switch

The bar will move right.

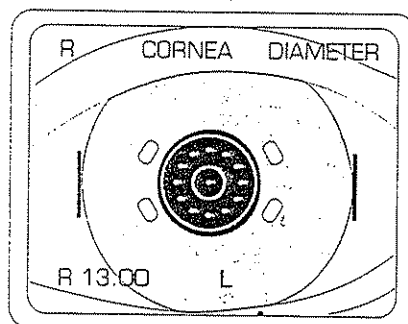


- Press the measuring switch when the bar reaches the right edge of iris. The corneal diameter will be displayed.

- Press the measuring switch to change to the left eye measuring mode.

- Measure the left eye next.

Follow the same procedure as the right eye.



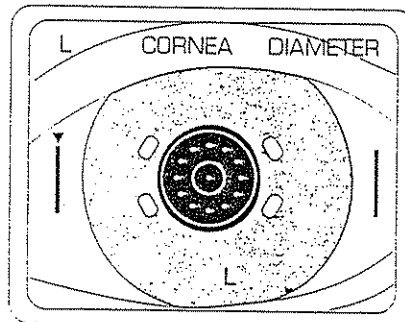
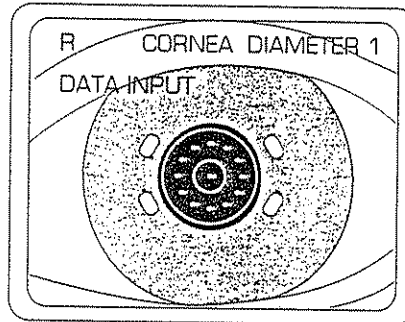
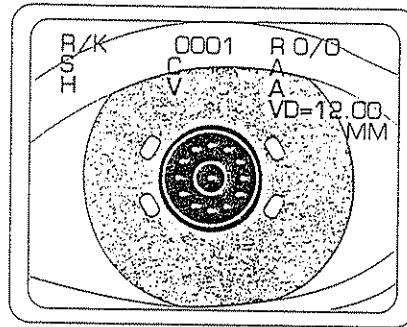
Upon displaying the measurement data on the eyes, press the measuring switch, and the TV monitor screen will be available for normal measuring.

MEMO

- To escape from the mode during measuring, press PRINT switch.
- Press PRINT switch to escape from the mode after measuring an eye when the measurement result only is needed.

Measuring cornea for diameter (still image)

- Align the eye on the monitor.
- Press the corneal diameter measuring switch and select the corneal diameter mode.
- Press measuring switch.
(The figure on the right side of CORNEA DIAMETER will change from "0" to "1", storing the right-eye in the memory. With the right eye collimated, by pressing the measuring switch, the figure remains as "1" and the latest right eye image is stored in the memory.)
- Storing the left eye image.
Follow the same procedure as storing the right eye image.
(The figure on the right side of CORNEA DIAMETER will change from "1" to "2". The left eye image will be memorized and monitoring screen for measuring cornea diameter is provided.)
- * Follow the procedure as described on the previous page for measuring cornea diameter.



MEMO

- Press the cornea diameter measuring switch after storing image of only one eye. When only one eye is stored the diagram on the right will be displayed on the monitor.
- Press the cornea diameter measuring switch, to switch the image between right/left eye. (No switching is possible when only one eye is stored.)
- See the initial setting "Measuring cornea diameter with a still image" for still setting.

4. OTHER FUNCTIONS

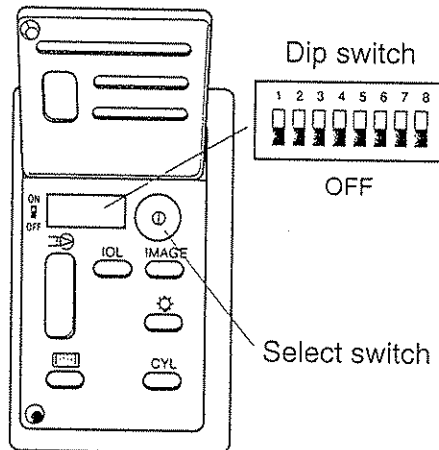
4-1

The following functions are available by changing over the dip switches:

Continuous/single measurement

Dip switch No. 1

- ON ...Mode which enables the instrument to continuously measure by holding down the measuring switch. Fogging is disabled
- OFF...Standard measurement

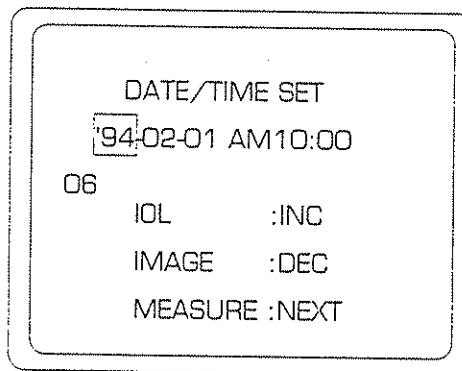


Time setting

- Displaying the time setting on the monitor.
Turn on dip switch No. 5.

(The TV monitor screen will show the time setting range. Flashing part indicates the value which will change.)
- Selecting items
Press the measuring switch to bring the cursor to the target.
(Flashing moves to the month, day, hour, and minute in turns.)
- Setting the time
Press IOL switch....Numerical values to increase
Press IMAGE switch...Numerical values to decrease
- Upon measuring,
Turn off dip switch No. 5.

Time setting picture



(The measurement image will return.)

- Time may be set during initial set up.

4-2 Initial settings

Turn on the power switch while pressing the contact/glasses switch.

Release the switch after the buzzer beeps twice. The monitor screen will change to the initial setting screen.

4-2-1 Initial mode

This mode is used to provide initial settings such as vertex distance (V. D.).

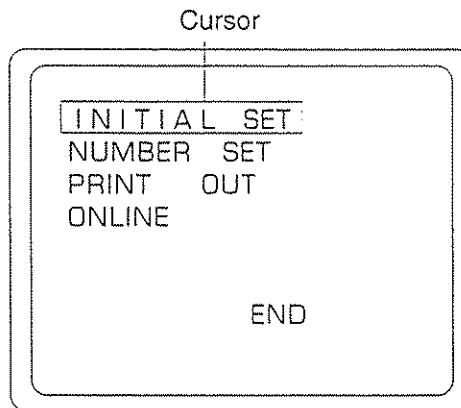
Initial set

- The following items may be initially set:
Vertex distance (V.D.), step, cylinder value, date and time, objective refraction shift, typical value on the monitor screen, error code, target image in position when an error occurs, manual start/auto start.
Cornea refraction/curvature radius display sequence, cornea diameter measurement with still image.
- Bring the cursor to INITIAL SET.
(The cursor is at INITIAL SET when the initial mode is selected.)
- Press the PRINT switch, and the screen will show items related to initial settings (three screens are available).

Number set

- The following items relating to No. may be set:
Patient No., Patient's No monitor screen display, Patient's No. print-out, Patient's No. reset, Instrument No. setting, Instrument No. monitor screen display, Instrument No. print-out.
- Press the measuring switch and bring the cursor to NUMBER SET.
- Press the PRINT switch, and the screen will show items related to No. (A single screen is available.)

Initial mode screen



MEMO

To quit initial setting:

- Bring the cursor to END.
- Press the PRINT switch.

To return to the previous item on the screen:

- Press the measuring switch while pressing the PRINT switch.

Printing results

- The following items relating to print-out may be set:
Print-out mode setting, print-out sequence setting, equivalent spherical power print-out, computer lens meter data print-out, auto print-out.
- Press the measuring switch to bring the cursor to PRINT OUT.
- Press the PRINT switch, and the screen will display items related to print-out. (A single screen is available.)

Data communications (on-line)

- The following items relating to data communications may be set:
Data reception from a computerized lens meter, Setting RS-232C communication format, Setting RS-232C communication speed, Selecting data to be output from RS-232C (ref. data/kerato data/both data)
- Press the measuring switch to bring the cursor to ON LINE.
- Press the PRINT switch, and the screen will display items related to data communications. (A single screen is available.)

4-2-2 Initial set (1st screen)

The monitor screen is the first initial-set screen.

Changing V. D.

- Press the measuring switch to 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.

Providing a 0.12D-step display

- Press the measuring switch to 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 MIX.
- Press the measuring switch, and the cursor will move to the next item.

Changing date displays

- Press the measuring switch to bring the cursor to DATE.
- Press PRINT switch to select format.
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.

First initial set screen

Cursor

VD	12.00
STEP	0.25
CYL	-
DATE	1994.08.30
DATE/TIME SET	NO
DPTR SHIFT	0.00

NEXT

MEMO

To terminate initial setting:

- End the first initial setting screen and provide the initial mode screen.
- Bring the cursor to END.
- Press the PRINT switch.

To return to the previous item on the screen:

- Press the measuring switch while pressing the PRINT switch.

Time setting

- Press the measuring switch and bring the cursor to DATE/TIME SET.
- Press the PRINT switch and select YES. (The monitor screen will change to the date/time set screen.)
- The part flashing will be set.
- Selecting an item
Press the measuring switch to bring the cursor to the item to be changed. (Flashing moves from year, month, day to hour and minute.)
- Time setting
Contact/glasses switch (CONTACT on the monitor screen)...increases the values
MANUAL/AUTO switch (AUTO on the monitor screen)...decreases the values.
- Returning to the first initial-set screen.
- Press the PRINT switch.
- Press the measuring switch, and the cursor will move to the next item.

Time setting screen

DATE/TIME SET
'94_02_01 AM10:00
06
CONTACT :INC
AUTO :DEC
MEASURE :NEXT
PRINT :END

Objective refraction shift

- Press the measuring switch to bring the cursor to DPTR SHIFT.
- Press the contact/glasses switch, and the values will be increased.
Press the MANUAL/AUTO switch, and they will be decreased.
Setting by 0.12D step may be allowed in the range of -1.00D to +1.00D.
- Press the measuring switch, and the cursor will move to the next item.

Note: Any shift assigned will affect all readings by shifted value.

Calling the next screen

- Bring the cursor to NEXT.
- Press the measuring switch, and the second initial set screen will be provided. Press the PRINT switch, and the initial mode screen will appear again.

4-2-3 Initial set (2nd screen)

The monitor screen will change to 2nd initial set screen.

Displaying typical values on the monitor screen

- Press the measuring switch to bring the cursor to AVERAGE DISP.
- Press the PRINT switch and select YES if only ave data is desired.
- Press the measuring switch, and the cursor will move to the next item.

2nd initial set screen

Cursor

AVERAGE DISP.	NO
ERROR CODE	NO
ERROR POSI.	NO
INIT AUTO	YES
DATA ORDER	D/MM
C. D MEMORY	NO
NEXT	

Displaying error code

- Only to be used by an authorized service technician.

Displaying the target image position when error occurs

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

Manual start when power established

- Press the measuring switch to bring the cursor to INIT AUTO.
- Press the PRINT switch and select No. if manual mode is desired.
- Press the measuring switch, and the cursor will move to the next item.

Changing the display order of corneal refractive power/curvature radius

- Press the measuring switch to bring the cursor to DATA ORDER.
- Press PRINT switch and select D/MM or MM/D.
- Press the measuring switch, and the cursor will move to the next item.

MEMO

To terminate initial setting:

- End 2nd initial set screen and provide the initial mode screen.
- Bring the cursor to END.
- Press the PRINT switch.

To return to the previous item on the screen:

- Press the measuring switch while pressing the PRINT switch.

Measuring cornea for diameter with a still image

- Press the measuring switch to bring the cursor to C.D. MEMORY.
- Press the PRINT switch and select YES.
- Press the measuring switch, and the cursor will move to the next item.

Calling the next screen

- Bring the cursor to NEXT.
- Press the measuring switch, and the 1st initial set screen will be provided. Press the PRINT switch, and the initial mode screen will reappear.

4-2-4 Number set

The monitor screen will change to the number set.

Setting the patient's No.

- Press the measuring switch to bring the cursor to SERIAL No. (Series No.)
- Press the CONTACT/GLASSES switch, and the numeric value will increase.
Press the MANUAL/AUTO switch, and the numeric value will decrease.
Setting 0001-9999 may be possible in 1 digit increments from the top digits.
- Press the measuring switch, and the cursor will move to the next item.

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

- Press the measuring switch to bring the cursor to SERIAL OUT TV.
- If desired 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.
- If desired 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.

Number set screen

Cursor

SERIAL NO.	0001
SERIAL OUT TV	YES
SERIAL OUT PRT	YES
SERIAL RESET	NO
RM NO.	01
RM OUT TV	NO
RM OUT PRT	NO
NEXT	

MEMO

To terminate initial setting:

- End the No. set screen, and provide the initial mode screen.
- Bring the cursor to END.
- Press the PRINT switch.

To return to the previous item on the screen:

- Press the measuring switch while pressing the PRINT switch.

Setting the instrument No.

- Press the measuring switch and bring the cursor to RM No.
- Press the CONTACT/GLASSES switch, and values will increase.
- Press the MANUAL/AUTO switch, and the values will decrease.
Digits may be set out in a range of 01 to 99, starting from the top digit.
- Press the measuring switch, and the cursor will move to the next item.

Displaying the instrument No. on the monitor screen

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

Printing out the instrument No.

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

Calling the next screen

- Bring the cursor to NEXT.
- Press the PRINT switch and the initial mode screen will be provided. Press the measuring switch, and the cursor will move to SERIAL NO. on the No. set screen.

4-2-5 Printing results

The monitor screen will change to the print out screen.

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.

Equivalent spherical power print out

- Press the measuring switch and bring the cursor to S.E. DATA.
- If desired press the PRINT switch and select YES.
- Press the measuring switch, and the cursor will move to the next item.

Computer lens meter data print out

- Press the measuring switch to bring the cursor to CL PRINT.
- If connected to a CL press the PRINT switch and select YES.
- Press the measuring switch, and the cursor will move to the next item.

Auto printing of auto-start measurement results

- Press the measuring switch to bring the cursor to AUTO PRINT.
- If desired press PRINT switch and select YES.
- Press the measuring switch, and the cursor will move to the next item.

Changing printout orders

- Press the measuring switch and bring the cursor to PRINT R/L.

Print-out screen

Cursor

PRINT TYPE	ALL
S. E. DATA	YES
CL PRINT	NO
AUTO PRINT	NO
PRINT R/L	DATA
NEXT	

MEMO

To terminate initial setting:

- End print out screen, and provide the initial mode screen.
- Bring the cursor to END.
- Press the PRINT switch.

To return to the previous item on the screen:

- Press the measuring switch while pressing the PRINT switch.

- Press PRINT switch and select DATA (objective and kerato data will be separately printed out) or R/L (right eye and the left eye data will be printed out, regardless of objective and kerato data).
- Press the measuring switch, and the cursor will move to the next item.

Calling the next screen

- Bring the cursor to NEXT.
- Press the PRINT switch, and the screen will move to the initial mode one. Press the measuring switch, and the cursor will move PRINT TYPE.

4-2-6 Data communications (on-line)

The monitor screen will change to the data communications (on-line) screen.

Data reception from computer lens meter

- Press the measuring switch to bring the cursor to CL INPUT.
- When the computer lens meter RS-232C format is OLD, press the PRINT switch and select OLD.
- When the computer lens meter RS-232C format is NEW, press the PRINT switch and select NEW.
- Press the measuring switch, and the cursor will move to the next item.

On-line screen

Cursor

CL INPUT	<input type="checkbox"/> NO
RS232C FORM	OLD
BAUD-RATE	2400
RS232C OUT TYPE	REF
NEXT	

Setting RS-232C communication format

- Press the measuring switch to bring the cursor to RS232CFORM.
- Press the PRINT switch and select from among the following as necessary:
 - OLD (old Topcon format);
 - NEW (new Topcon format);
 - ALL (tool mode);
 - CM1 (custom spec.);
 - CM2 (custom spec.);
 - CM3 (custom spec.);
 - CM4 (custom spec.);
 - CM5 (custom spec.).
- Custom formats vary from market to market. Please contact your authorized TOPCON representative for details.
- Press the measuring switch, and the cursor will move to the next item.

MEMO

To terminate initial setting:

- End on-line screen, and provide the initial mode screen.

- Bring the cursor to END.
- Press the PRINT switch.

To return to the previous item on the screen:

- Press the measuring switch while pressing the PRINT switch.

Setting RS-232C communication speed

- Press the measuring switch and bring the cursor to BAUD-RATE.
- Press the PRINT switch and select either of the following:
 - 2400 (baud rate);
 - 9600 (baud rate).Changeable only when OLD is applied.
- Press the measuring switch, and the cursor will move to the next item.

Selecting data to be outputted from RS-232C

- Press the measuring switch to bring the cursor to RS232C OUT TYPE.
- Press the PRINT switch and select either of the following as necessary:
 - REF (only refractometer data is outputted);
 - KRT (only keratometer data is outputted);
 - ALL (both refractometer and keratometer data are outputted).
- Press the measuring switch, and the cursor will move to the next item.

Calling out the next screen

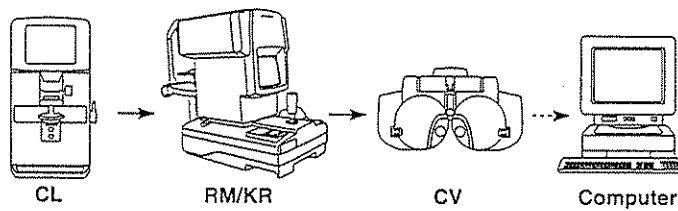
- Bring the cursor to NEXT.
- Press the PRINT switch, and the initial mode screen will be provided. Press the measuring switch, and the cursor will move to CL INPUT.

4-3 Data-Link System

Instruments can be linked together through data transmission. Detailed information is available from your dealer.

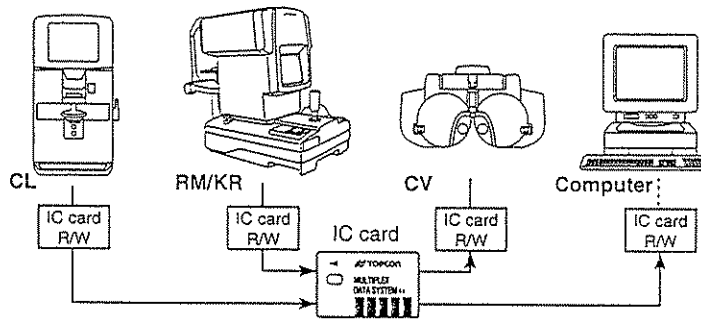
On-line system

Computerized lensmeter data can be transferred to the instruments through a RS-232C interface. Also instrument measurement data can be transferred to computerized visiontester.



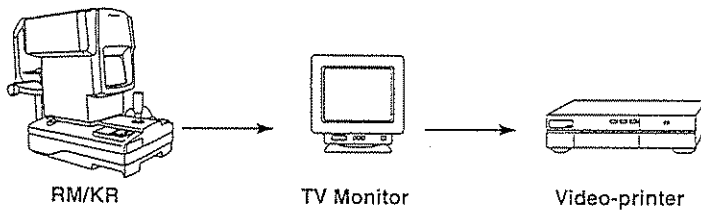
IC card system

Instrument measurement data can be linked to an IC card system.



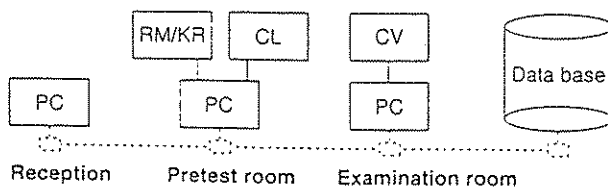
External monitoring

An external TV monitor can be connected to instruments. Measured target image can also be acquired with video-printer.



Data processing on the Network

Future possibilities can be anticipated on the network system.



5. MAINTENANCE

5-1 Daily checks

Daily checks

Turn power supply off and cover the instrument with the attached cover when it is not in use. Do not apply shock to the instrument. The examination window is the most important. Take care not to soil the window with fingerprints or let it get dirty. If the room is quickly heated in winter or in a cold region, the instrument lenses may become fogged. Wait a few moments before starting measuring to let the lenses clear naturally.

Testing of measuring precision

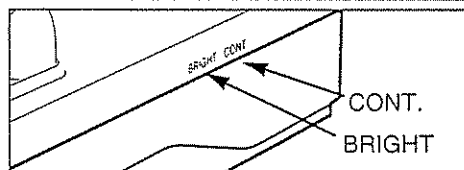
Measure the attached test eye periodically to check for precision.

Cleaning the instrument

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

Adjusting the TV monitor screen

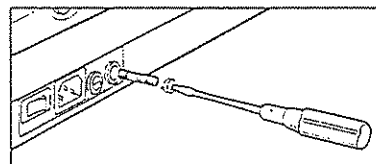
Set the attached test eye and adjust on the screen. Contrast.....the contrast adjusting volume. BrightnessUse the brightness adjusting volume.



Replacing fuses

Caution Always shut off the power supply and disconnect the power cord before replacing fuses to prevent 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 instrument performance.



Moving the instrument

Caution Always shut off the power supply and disconnect the power cord before moving the instrument.

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

6. BEFORE REQUESTING SERVICE

6-1 Messages given during measuring

"OVER-SPH"	Indicates that spherical power exceeds +22, -25D.
"OVER-CYL"	Indicates that cylindrical power exceeds $\pm 7D$.
"OVER-R"	Shows that the corneal curvature radius exceeds of 5.00 - 10.00mm.
"NO TARGET"	Indicates that there is no target (eye) to be measured or the eye image is too dark.
"AGAIN"	Indicates that there is a difference in value by 5D or more over the previous measurement.
"NO CENTER"	Indicates that no target (eye) center of the to be measured can be found.
"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

<p>The TV monitor does not work.</p> <ul style="list-style-type: none"> ● The pilot lamp does not light up. ● Fuse blows immediately after POWER switch is turned on. 	<p>Is the power cord properly plugged into the power outlet?</p> <p>Is the power cord connected with the instrument?</p> <p>Call the authorized service center immediately.</p>
<p>The TV monitor screen is difficult to see.</p> <ul style="list-style-type: none"> ● The picture is not proper in contrast. ● The picture is dark. 	<p>Use CONT volume for adjustment.</p> <p>Use BRIGHT volume for adjustment.</p>
<p>Something wrong with any moving part, including the control lever.</p>	<p>Do not force. Contact the authorized service center.</p>
<p>No printing is carried out.</p> <ul style="list-style-type: none"> ● Paper comes out with no print. ● No paper comes out. 	<p>Is the paper roll direction correct? (See Handling the printer on Page 4.)</p> <p>Replenish printing paper when "PAPER END" appears on the TV monitor screen. (See Handling the printer on Page 4.)</p>

7. SPECIFICATIONS (OPTIONAL ACCESSORIES)

7-1 Specifications

Measuring range:	Hyperopia 0 to +22D 0.25D-step display (0.12D-step display is also available.) Myopia 0 to -25D 0.25D-step display (0.12D-step display is also available.) Astigmatism 0 to 7D(+ or -) 0.25D-step display (0.12D-step display is also available.) Axis 0 to 180° 1°-step display
Minimum pupil diameter measurable	2.5mm
Target fixation	Auto fog system
Corneal curvature measurement Measuring range	Corneal curvature radius 5.00 ~ 10.00mm (0.01mm step) Corneal refraction: 67.50 ~ 33.75D (0.12D step) (Corneal refraction factor = 1.3375) Corneal astigmatism: 0 ~ 7D (+ or -) Corneal astigmatism axial angle: 0 ~ 180° (1° step)
Measurement data display	TV monitor screen
Measurement data recording	Built-in printer (Data on 10-time measurements of right and left eyes may be stored.) (At R/K mode, only the representative value will be printed.)
Collimation	Displayed on the TV monitor screen
TV monitor	5"
PD measurement	Max. measurable range 85mm, display unit 1mm
External output terminal	RS-232C
Power supply, consumption	AC100, 120, 220 and 240V, 50/60Hz, 100VA
Operating temperature range	10 to 40°C
Cross-slide travel	(back and forth): 40mm (right and left): 86mm (vertically): 30mm
Chin-rest travel	60mm
Dimensions	275(W) x 475(D) x 450(H)mm
Weight	21kg

These specifications are subject to change without notice.

7-2 Optional accessories

● Automatic instrument table AIT-20

The table itself changes height readily to facilitate measuring.

SPECIFICATIONS (BODY ONLY)

- Dimensions.....530(W) x 540(D) x 625(H)mm
- Table height635 to 875mm
- Table size.....490x490mm (optional)
- Weight.....30kg approx.
- Power consumption.....270VA(100V)

- RS-232C on-line cord
- IC card Reader/Writer
- IC card

