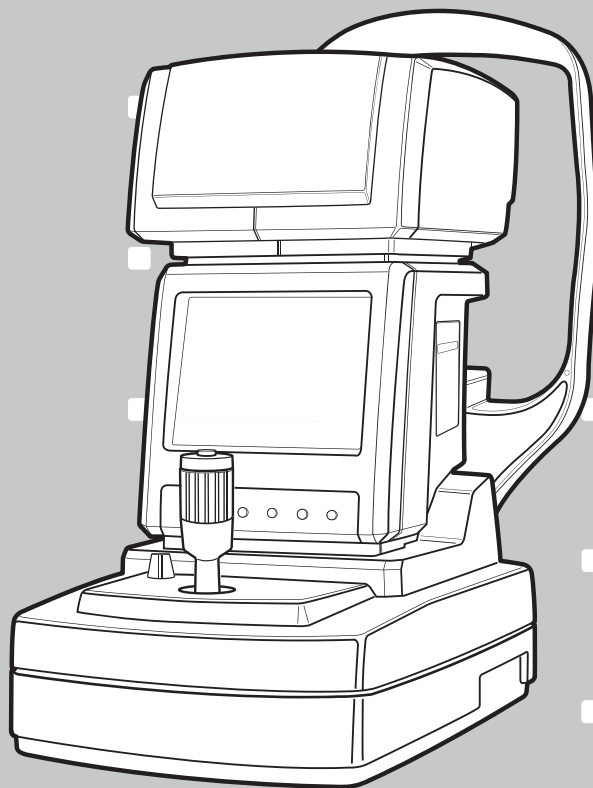


***AXIS***

# **TSRK-1000P**

***Ophthalmic Ref-Keratometer Operation Manual***



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**WARRANTY**

***Intended Use***

---

TSRK-1000P is the instrument to measure the refracting power of eye and the radius of curvature of cornea.

This instrument images the special pattern in retina and captures the image reflected in retina, cornea and crystalline lens with CCD camera.

***Important Notice***

---

Please use Ophthalmic Ref-keratometer after you read the manual carefully

It is not allowed to add the any factors which will be caused machine problems.

The device complies with ISO 10342 and ISO 10343. The dioptric powers are indicated with reference wavelength  $\lambda_d = 880\text{nm}$ .

This manual contains information necessary for correct and effective operation of Ophthalmic Ref-keratometer and provides specifications and procedures for operation and maintenance.

Please keep this manual and read it whenever necessary.

***Environmental Factors***

---

Please do not use at hot and humid place.

Normal operation temperature range is from 10 to 40°C and humidity is from 30% to 75%.

Do not use chemical detergents for cleaning the dirt on the case.

Do not give the shock and open the case without any purpose.

**Safety Information**

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Accessory equipment connected to the analog and digital interfaces must be certificated according to the respective IEC standards (e.g. IEC 950 for data processing equipment and IEC 601-1 for medical equipment). Furthermore all configuration shall comply with the system standard EN 60601-1-1:1993. Everybody who connects additional equipment to the signal input part or signal output part which configures a medical system, and is therefore responsible that the system complies with the requirements of the system standard IEC 601-1-1:1993. When in doubt, you are recommended to consult the technical service department or your local representative.

**Componet of Medical Device  
Contacting with human-body**

---

Chin , Forehead of patient



**CAUTION**

***Clean patient's contact surface(Headrest rubber and Chinrest)  
with alcohol swab before every measurement.***

**For EU countries**



The following mark, the name & address of EU Representative shows compliance of the instrument with Directive 93/42/EEC

EU Representative:  
***Argus individuell optic GmbH***  
Oedenstockacher Str. 11, D-85640 Putzbrunn, Germany

**EMC**  
**(Electromagnetic Compatibility)**

The TSRK-1000P complies with these standards as tabled below.  
Follow the guidance on the tables for use of the device in the electromagnetic environment.

EMC (EN 60601-1-2:2001/A1:2006)

**Guidance and manufacturer's declaration - electromagnetic emissions**

The TSRK-1000P is intended for use in the electromagnetic environment specified below. The customer or the user of the TSRK-1000P should assure that it is used in such an environment.

Emissions test	Compliance	Electromagnetic environment - guidance
RF emissions CISPR 11	Group 1	The TSRK-1000P 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 TSRK-1000P 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 EN 61000-3-2	*1	
Voltage fluctuations/ Flicker emissions EN 61000-3-3	*2	

\*1. For the regions where the rated voltage is 230V or greater, this instrument complies with class A. For the regions where the rated voltage is less than 230V, this standard is not applicable.












\*2. For the regions where the rated voltage is 230V or greater, this instrument complies with this standard. For the regions where the rated voltage is less than 230V, this standard is not applicable.

**EMC**  
**(Electromagnetic Compatibility)**

**Classifications**

- Type of protection against electric shock : Class I Equipment
- Degree of protection against electric shock : Type B Applied Part
- Degree of protection against the ingress of water : Ordinary
- Flammable anesthetic mixture with air or with oxygen or nitrous oxide : Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.
- Mode of operation : Continuous operation

*Symbols marked on the instrument*

	Attention, Consult Accompanying Document
	Type B Applied Parts
	Protective Earth (Ground)
	Off (Power : Disconnection from the main body)
	On (Power : Connection from the main body)
	Alternating Current
	CE mark
	Date of manufacture
	Manufacturer
	EU Representative
	Serial No



According to their own law of disposal industrial waste the waste must be disposed in the country that uses our product.

Disposal of Waste Products, Residues, etc. according National Code.



Potential Electromagnetic or other Interference.











Do not use this product in strong Magnetic fields, such as near motor.

Do not place heavy objects on the case or block the ventilation holes.

**General Safety Information**

If you see any warnings or cautions printed on the warning labels, follow the safety instruction in this manual. Ignoring such cautions or warnings while handling the product may result in injury or accident. Be sure to read and fully understand the manual before using this product. Keep this manual in easy to access place.

CAUTION SIGN	DISCRPTION
 <b>WARNING</b>	This indicates a potentially hazardous situation which could results in death or serious injury to you or others.
 <b>CAUTION</b>	This indicates hazardous situation which may result in minor injury to you or others, or may result in machine damage.
<b>NOTE</b>	This is used to emphasize essential information. Be sure to read this information to avoid incorrect operation.

CAUTION SIGN	DISCRPTION
 <b>WARNING</b>	Only operate the instrument with the power supply indicated on the rate plate. Otherwise, it may result in fire or electric shock.
 <b>WARNING</b>	Be sure to turn OFF the power switch before connecting or disconnecting the cables. Also do not handle them with wet hands. Otherwise, you may get an electric shock that may result in death or serious injury.
 <b>WARNING</b>	Never disassemble or modify this instrument because it may result in fire or electric shock. Also since this instrument incorporates high voltage parts and other hazardous parts touching them may cause death or serious injury.
 <b>WARNING</b>	Should any of the following occur, immediately turn OFF the power switch, unplug the power cable from the AC outlet, and contact the dealer or agent who/where you purchase this instrument.  -When there smoke, strange odor or abnormal sound. -When liquid has been spilled into the instrument or metal object has entered through an opening. -When the product has been dropped or its housing damaged.
 <b>WARNING</b>	Do not touch signal input, signal output or other connectors, and the patient simultaneously.
 <b>CAUTION</b>	This instrument is shipped with a grounding type power cable. To reduce the risk of electric shock, always plug the cable into a grounded power outlet.
 <b>CAUTION</b>	Ensure that the examinee has not placed his/her hand and fingers under the Chin rest. Otherwise, hand or fingers may be hurt.
 <b>CAUTION</b>	Wipe the forehead rest with ethanol or glutaraldehyde solution to disinfect it each time a different examinee uses it, in order to prevent infection.
 <b>CAUTION</b>	Change the chin rest paper each time the examinee changes in order to keep the chin rest clean.
 <b>CAUTION</b>	Do not place your hand or fingers between the stage and base. Also ensure that the examinee does not place his/her hand or fingers there either. Otherwise, hand or fingers may be hurt.



**1. General Description**

AXIS Ophthalmic Ref-keratometer consists of Main body, Model eye, Printer paper, Power cable, Dust cover, Operation manual and Fuse.

- Main body \_\_\_\_\_ 1
- Model eye \_\_\_\_\_ 1
- Printer paper \_\_\_\_\_ 2 Rolls
- Power cable \_\_\_\_\_ 1
- Dust cover \_\_\_\_\_ 1
- Fuse \_\_\_\_\_ 2
- Operation manual \_\_\_\_\_ 1

**2. Features**

■ **Various Measurements Supported**

Not only refractometry and keratometry but also base curve of contact lens and corneal diameter can be measured with this instrument.

■ **Wide measurement range**

Because **TSRK-1000P** covers from -25D to +22D in refractometry and from R5mm to R10mm in keratometry, almost of all examinee can be measured.

■ **Accurate measurement**

With the foggy method of eye fixation target making the eye comfortable, you can measure more accurately.

■ **Auto-Starting Function**

As soon as **AXIS** Ophthalmic Ref-keratometer is properly aligned to each eye, this function initiates the measurement process and generates the measurement results automatically.

■ **High Resolution Color LCD Monitor**

High Resolution Color LCD Monitor 0.3 Mega Pixel 6.4 inches Color **TFT LCD** Provides Fine and Large Iris Image with color alignment marks.

■ **Other measurements**

IOL, Pupil diameter, Ret-illum.

### *3. Notes for Using the Instrument*

---

- Do not give the shock or drop the instrument. If the instrument receives a strong shock, the function of this instrument may be damaged. Handle with care.
- Do not use this instrument in the sunlight or bright indoor light, the bright lights can influence the results of measurements.
- Do not use chemical solutions such as thinner, alcohol, benzene, etc. for cleaning the dirt on the case. It may damage the instrument.
- In the case of sudden heating of the room in cold areas, wait until the thermal shock disappears before measurement.
- Consult the dealer to connect this instrument with other equipment.
- Keep the optical parts of the examinee side clean. A fingerprint or other substances on the optical parts may cause an error or inaccurate results.
- If there is noise, smoke or strange odors while working, disconnect the power supply and consult the dealer.
- In moving this instrument, fix the stage with the clamping bolt after remove power code, and then lift the bottom of this instrument with both hands.
- When you do not use this instrument for a long period, turn off the power and take the dust off from cover on this instrument.
- Before the other instrument is connected to this instrument in RS232c port please check that the instrument to be connected has the safety certification marks. If not, the function of this instrument may be damaged.

### 3. Notes for Using the Instrument

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- This device has been tested and found to comply with the limits for medical devices to the IEC 60601-1-2:2001/am1:2004 and Medical Device Directive 93/42/EEC.

These limits are designed to provide reasonable protection against harmful interference in a standard medical installation.

This device generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to other devices in the vicinity.

However, there is no guarantee that interference will not occur in a particular installation.

If this device does cause harmful interference to other devices, which can be determined by turning the device off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

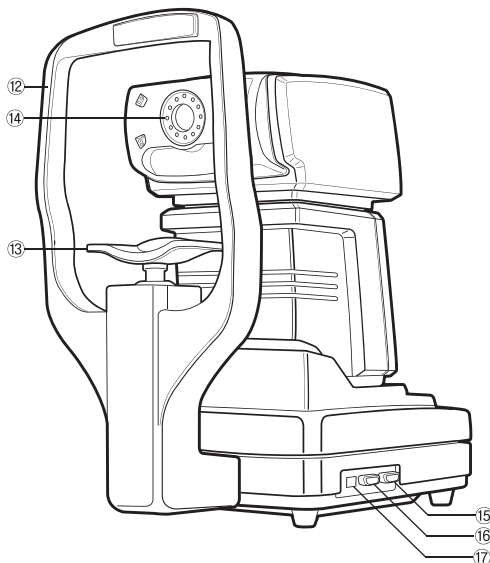
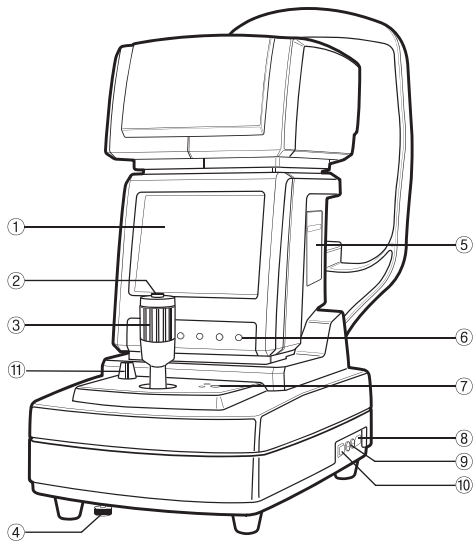
Reorient or relocate the receiving device.

Increase the separation between the devices.

Connect the device to an outlet on a circuit different from that to which the other device(s) are connected.

Consult the manufacturer or field service technician for help.

#### 4. Description of Parts



1 Monitor screen (to displays measurement results)

2 Measurement button (to start measurement)

3 Operation Stick (for alignment and focusing)

4 Clamping bolt (to lock the stage to the base)

5 Printer (to print measurement results)

6 Buttons (for auto start, IOL, size, display)

7 Buttons (for print and chinrest up/down)

8 Power supply connector (to connect to the power cable)

9 Fuse (to protect the instrument from the excess electric power & shock)

10 Power switch (to turn power on/off)

11 Clamping handle (to lock the stage to the body)

12 Headrest (to place examinee's head)

13 Chinrest (to place examinee's chin on it)

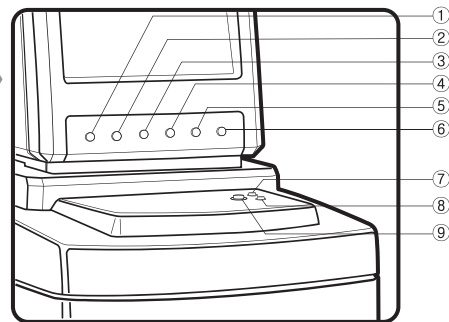
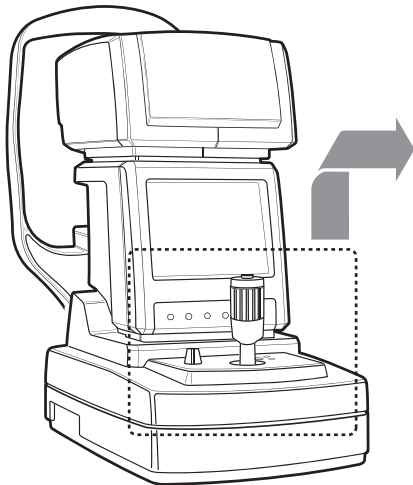
14 Measurement window (for examinee to look into the target image for measurement)

15 RS232C Interface connector (connector for other instrument)

16 VGA out connector

17 USB connector

Operation Buttons

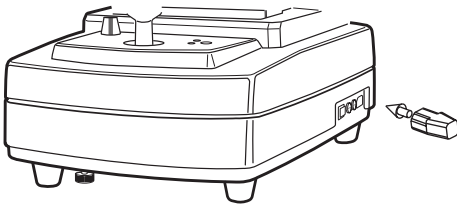


- 1 **Mode button** (to change measurement mode)
- 2 **Auto start button** (to switch automatic or manual measurement)
- 3 **IOL button** (to measure the examinee's eye with cataract or intraocula lens)
- 4 **Retro illumination button** (to check the status of the cornea, contact lens and crystalline lens by freezing image)
- 5 **Size button** (to measure the size of cornea)
- 6 **Display button** (to display the measured results)
- 7 **Chinrest up button** (to move the chinrest up)
- 8 **Chinrest down button** (to move the chinrest down)
- 9 **Print button** (to print out the measured results)

## 5. Installation

- 1 Place AXIS Ophthalmic Ref-keratometer on the table.
- 2 Turn the clamping bolt in the underneath cover under operation stick in the counterclockwise direction and release the stage lock.
- 3 Connect power cable to main unit.
- 4 After checking that the power switch is off, connect the power supply.
- 5 Turn the power switch on.
- 6 Press the DISP button and you enter the display mode.
- 7 Press the 5th button and you enter the Set-Up Mode.
- 8 Enter in advance the contents that you hope to print such as hospital name, address etc in the Set-Up Mode window.
- 9 Check the setting contents such as increment of sphere,
- 10 Press the 6th button (SAVE button) and save the set-up data.
- 11 Attach the model eye on the chin rest and insert pins.
- 12 Adjust the position of the model eye and measure it.

### AC power code connection



  
CAUTION

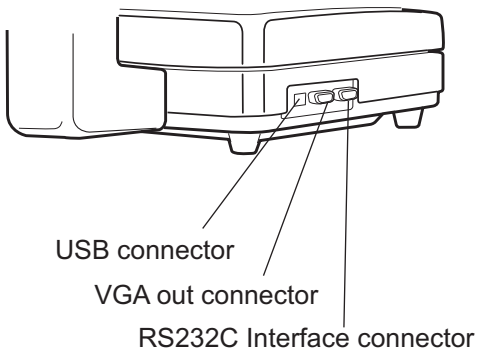
*Do not touch AC power code with wet hands.  
danger for electric shock.*

  
WARNING

*Socket for AC power code should be grounded.  
Danger for electric shock and fire hazard  
without earthing.*

- 1 Check the power switch is off
- 2 Connect AC power code to body.
- 3 Insert AC power code plug to AC socket which is grounded

### USB/RS232/VGA Terminal connection



- This machine connects to LCD monitor(Resolution 640\*480) by VGA output terminal.
  - DATA OUT : Connecting PC with RS232 or USB. connecting LCD monitor with VGA code.
  - DATA IN : Uploading data to PC through RS232 or USB
- 1 Connect one side of RS232, USB or VGA code to proper place of product body for use.
  - 2 Connect the other side of code to PC or other device.

**NOTE**

*Contact to sales agent regarding connection of each output(input) method.*

## 6. Measurement

---

- Turn on the power switch.
- Adjust the height of the instrument table to make the patient comfortable.
- Roughly match the patient's eye height with the chin rest up/down buttons.



### CAUTION

*Ensure the examinee has not placed the hand or fingers under the chin rest, if not, the hand or fingers may be hurt.  
Wipe the chin rest and the head rest with ethanol to disinfect it each time a different examinee uses it.*

## Manual start

---

- Adjust the position and focus the patient's eye .
- Please make a request to look at the picture comfortably and tranquilly during optometry.



### CAUTION

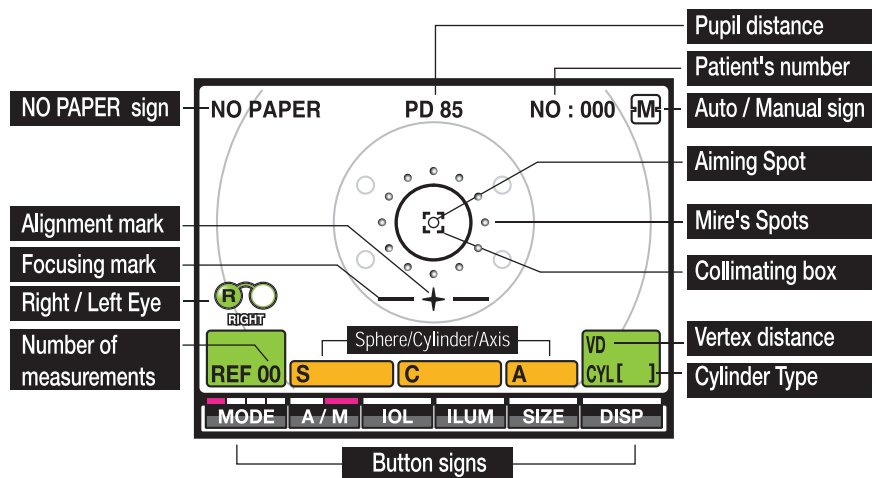
*Do not place the hand or fingers between the stage and base, if not, the hand or fingers may be hurt.*

- Press the measurement button. Measured data are displayed in the monitor screen.
- If you are not satisfied with the measured value, measure again in the same way.

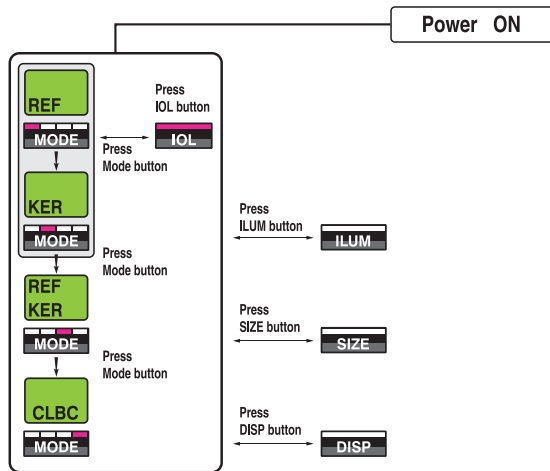


## Auto Start

- Press the **A/M** button under the monitor screen to measure automatically, then Manual sign (**M**) to be displayed in the upper side of the monitor screen will be changed to AUTO sign (**A**).
- Adjust the position and focus the patient's eye with the operation stick. As soon as the patient's eye is aligned properly, measurement starts automatically.
- If you want manual start again, press **A/M** button under the monitor screen one more time. Auto start and Manual start are toggled by the **A/M** button.
- Adjusting the patient's eye to the instrument.
- During the adjustment of the position and focus the patient's eye, the alignment marks are displayed on the monitor screen.
- Place the center mark in the center of the collimating box
  - Right and left : slide the operation stick right or left
  - Back and forth : slide the operation stick back or forth
  - Vertical : turn the operation stick
- Adjust so that the Alignment mark "+" is appeared.
- Press the measurement button.



Detailed flow chart for the measurement modes



Measuring process

- Make sure that the instrument is in the mode to be wanted. If not, press mode button until the mode to be wanted appears on the monitor screen.
- Perform focusing and alignment using the operation stick.
- When the CEN and FOC Signs are displayed OK on the monitor screen, press measurement button. If in auto start mode, measurement is performed automatically without pressing measurement button.
- After measuring an eye 3 times, the alignment mark will disappear. (If you want more measurement, press measurement button.)
- Slide the instrument towards the other eye and the alignment mark will appear again.
- Measure the other eye in the same manner.
- After measuring, press print button and the measured data are printed out.

*Messages given during the measurement* \_\_\_\_\_

<i>Refractometry</i>	<i>+OVER</i>	Spherical power exceeds +25D
	<i>-OVER</i>	Spherical power exceeds -22D
	<i>C OUT</i>	Cylindrical power exceeds $\pm 10D$


<i>Keratometry</i>	<i>+OVER</i>	Radius of curvature exceeds +10mm
	<i>-OVER</i>	Radius of curvature exceeds +5mm
	<i>C OUT</i>	Astigmatism exceeds $\pm 10D$

Confidence level of measured result is low.


*TRY AGAIN* During the measurement, target eye moves.  
 There is a different value by 5D or more over the previous measurement.  
 Alignment is not proper.  
 Refractometry is too dark with intraocular lens etc. In this case change the mode to the IOL mode.  
 Pupil diameter is less than 2.0mm. In this case, measurement is impossible basically but sometimes more correct alignment makes the measurement possible.

*ERROR* During the measurement the patient blinks or something may be wrong.  
 If this message appears when proper measurement is performed with the model eye, contact the service man.


### 6-1. Simultaneous Keratometry and Refractometry Mode (K/R mode)

- Press  button until K/R mark appears on the monitor screen.
- Perform measurement following the measuring process.
- In this mode, Keratometry is automatically performed before refractometry.
- If you want print the measured data, press print button.

### 6-2 . Refractometry Mode (REF mode)

- Press  button until REF mark appears on the monitor screen.
- Perform measurement following the measuring process.
- In this mode, you can perform only refractometry.
- If you want print the measured data, press print button.

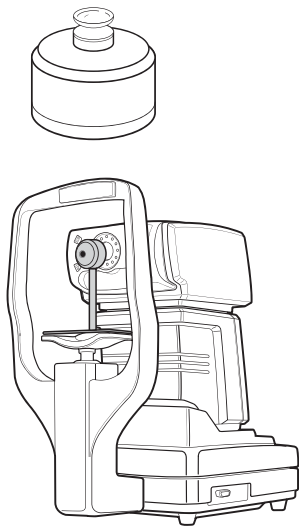
### 6-3 . Keratometry Mode (KER mode)

- Press  button until KER mark appears on the monitor screen.
- Perform measurement following the measuring process.
- In this mode, you can perform only keratometry.
- If you want print the measured data, press print button.

#### NOTE

***You would be hard to get the measured value of REF if a patient has some disease concerned with his / her eyes. In that case, you should check the condition of patient's eyes with reference, RET. ILLUM mode(page 14). If you checked, move the focus to the position with no problem and measure.***

6-4. Contact Lens Base Curve Measurement Mode (CLBC mode)



■ Press **MODE** button until CLBC mark appears on the monitor screen.

■ Attach contact lens to the holder.

Fill water in the concave part of contact lens holder and attach contact lens to the holder with the concave side upward.

Take care that the contact lens is not inclined and bubbles are not allowed in.

■ Attach the contact lens holder to the chin rest.

Remove the chin rest paper.

Insert the contact lens holder into the chinrest pins to place the contact lens to face the measurement window.

■ Perform measurement following the measuring process.

■ If you want print the measured data, press print button.

7. Printed Data

Date & Time	TSRK-1000P 2007-01-01 AM 00:00	[KER DATA] Index: 1.3375	Keractometry Data Index to be applied
Patient Name	NAME : _____	<R> R1 R2 AX	Right Eye mark
Refractometry Data	[REF DATA]	7.85 7.81 10	3 measured data of the right eye
Vertex Distance / Cylindrical Form	VD: 12.00 CL: [-]	7.84 7.81 12	
Right Eye mark	<R> SPH CYL AX	7.86 7.82 12	
3 measured data of the right eye	0.25 0.00	AVE 7.85 7.81 11	Averaged data of the right eye
[I] : IOL mode applied	I 0.00 0.00	CYL -0.25	Corneal Cylinder (Diopter)
Averaged data of the right eye	AVE 0.00 0.00	<L> R1 R2 AX	Left Eye mark
Left Eye mark	<L> SPH CYL AX	7.75 7.70 120	3 measured data of the left eye
3 measured data of the left eye	-1.25 -0.50 35	7.74 7.69 122	
Averaged data of the left eye	AVE -1.25 -0.50 33	7.76 7.71 122	
	-1.50 -0.25 36	AVE 7.75 7.70 121	Averaged data of the left eye
	AVE -1.25 -0.50 36	CYL -1.00	Corneal Cylinder (Diopter)
		PD = 63mm	Pupil Distance
		SCIENCETERA CO., LTD.	

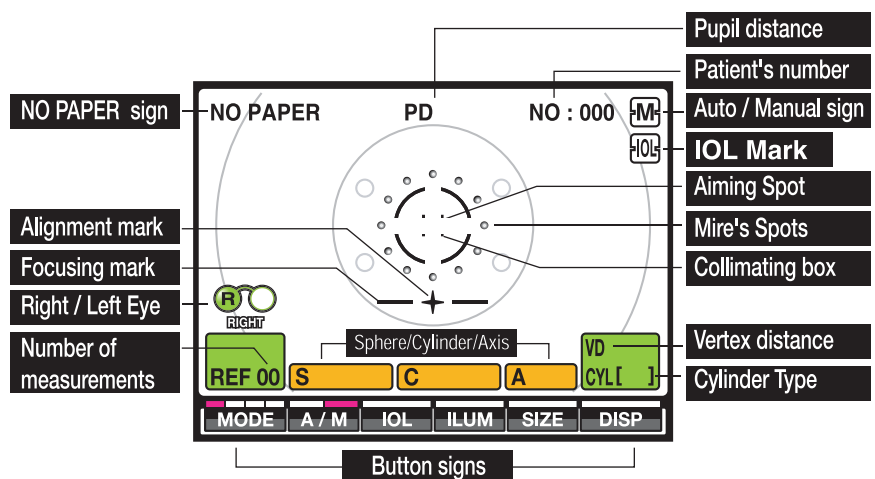
## 8. Other modes

### Measurement in IOL Mode (Intraocular Lens Measurement)

When errors easily occur in measurement of an eye with IOL, unclear crystal lens or small pupil etc., the measurement may be possible by pressing IOL switch.

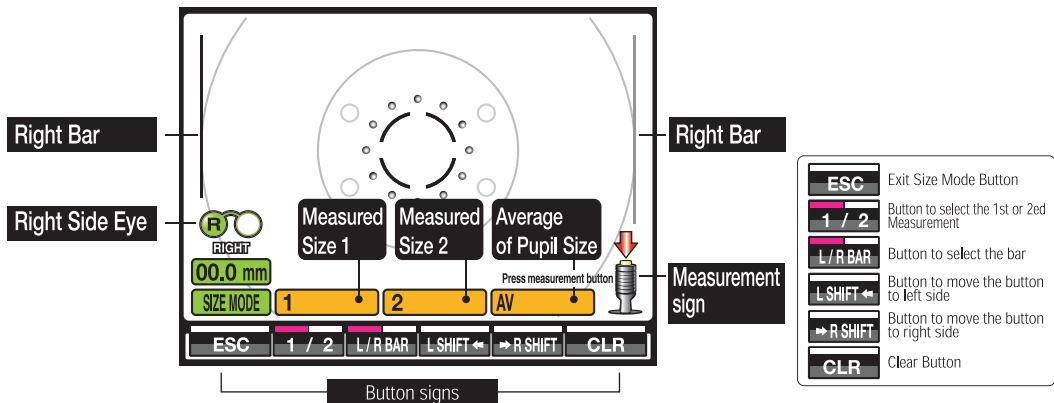
Measurement process in the IOL mode is following.

- Makes measurement following the measuring process to be mentioned in chapter 6 measurement.
- If errors easily occur in measurement of an eye or low confidence level mark (\*) is displayed on the monitor screen with measurement results, Press **IOL** button and **IOL** mark will appear under mode sign on the monitor screen.
- Make a measurement.



**Measurement in Size Mode (Cornea Diameter Size Measurement)**

- In this mode, diameter of cornea can be measured for prescribing contact lens.
  - 1 Press the **SIZE** button in the measurement mode.
  - 2 Control operation stick to align the pupil in the two
  - 3 Press the measurement button to freeze the window.
  - 4 Press **L/R BAR** button to select the bar you want to move.
  - 5 Press **L SHIFT ←** button or **→ R SHIFT** button to move the selected bar. The measured value will be displayed on the monitor screen.
  - 6 Press **L/R BAR** button to select the other bar you want
  - 7 Press **L SHIFT ←** button or **→ R SHIFT** button to move the selected bar. The measured value will be displayed on the monitor screen.
  - 8 Press Measurement button and freed window is released and 2 will be selected.
  - 9 Repeat procedures (2) ~ (7).
- Slide the stage with the operation stick to the other side and measure the other eye in the same way.
- Press PRINT button and the result of cornea diameter will be printed as the item of "<CORNEA SIZE>".



**Measurement in Ret. ILLUM Mode (Retro Illumination Measurement)**

You can observe the condition of scratch or cataract on the eye on the monitor in this mode.

Press **ILUM** button in the measurement mode.

Ask the examinee to look at the red spot of the eye fixation target.

Adjust the amount of light of each light source(REF/ILM/TAG) for the fine image.

**Amount of light**

Light source: REF 00 ILM 00 TAG 80 SN 000

Light for retro-illumination

Light for eye front

Right/left eye: RIGHT

SUB number: SUBJECT

Mode sign: CAPTURE, CAPTURE REF, IOL

Buttons: ESC, MODE, DISP, SHIFT, +1, -1

Patient number: SN 000

Pupil

Measurement sign

Press measurement button

Legend:

- CAPTURE**: only capture
- CAPTURE REF**: capture & measure
- IOL**: capture & measure (IOL)

Function Legend:

- ESC**: ESC button to go out this mode
- MODE**: Button to change the capturing mode
- DISP**: Button to display the captured images
- SHIFT**: Select light source
- +1**: Button to change the amount of light
- 1**: Button to change the amount of light

- Press measurement button and the image is captured.
- Press measurement button again and the image is stored into memory.
- Press other button and the image is unfrozent.

Right/left eye: RIGHT

Mode sign: CAPTURE, CAPTURE REF, IOL

Measurement sign

Press measurement button

Time: PM 06:45

Patient & Sub number: SN 003-1

Measured data: S -4.00, C -0.50, A 30

Buttons: [ Press measurement button ] SAVE, [ Press Other button ] CANCEL

Legend:

- [ Press measurement button ] SAVE**: Press measurement button to save the image into memory.
- [ Press Other button ] CANCEL**: Press other button to unfreeze.



- Press **DISP** button in retro-illumination display. Images in memory will be displayed.

The main display interface includes a large central image area, a data panel on the right, and a row of four small image thumbnails at the bottom. The data panel contains the following information:

- DATE '06-01-01
- TIME PM 6:40
- SN 003-1
- CAPTURE REF IOL
- RIGHT (with a green 'R' in a circle)

Below the main image area is a control bar with buttons: ESC, REAL SIZE, NEXT, and CLR.

- Date
- Time
- Patient & Sub number
- Mode sign
- Right / left eye

<b>ESC</b>	Escape
<b>REAL SIZE</b>	Button to magnify the selected image to real size
<b>NEXT</b>	Button to move the cursor
<b>CLR</b>	Clear the image to be selected

■ REAL SIZE

In REAL SIZE mode, the central image is magnified. The control bar at the bottom contains buttons: ESC, DISP, DOUBLE SIZE, NEXT, and CLR.

<b>DOUBLE SIZE</b>	Button to magnify the selected image to double size
<b>NEXT</b>	Move the cursor

■ DOUBLE SIZE

In DOUBLE SIZE mode, the central image is further magnified. The control bar at the bottom contains buttons: ESC, DISP, REAL SIZE, NEXT, and CLR.

<b>REAL SIZE</b>	Button to magnify the selected image to real size
<b>NEXT</b>	Move the cursor

**Display Mode ( Display Measured data )**

The stored data in memory can be displayed up to 10 data for each eye in this mode.

DISPLAY MODE - REF 1						
	RIGHT			LEFT		
	SHP	CYL	AX	SHP	CYL	AX
1	-5.25	-1.00	120	-5.00	-1.00	130
2	-5.25	-1.00	120	-5.00	-1.00	130
3	-5.25	-1.00	120	-5.00	-1.00	130
4						
5						
6						
7						
8						
9						
10						
AV	-5.25	-1.00	120	-5.00	-1.00	130

ESC NEXT CLR PD 61 VD 12.5

DISPLAY MODE - KER 2						
	RIGHT			LEFT		
	R1	R2	AX	R1	R2	AX
1	7.86	7.84	87	7.82	7.81	130
2	7.86	7.84	87	7.82	7.81	130
3	7.86	7.84	87	7.82	7.81	130
4						
5						
6						
7						
8						
9						
10						
AV	7.86	7.84	87	7.82	7.81	130

ESC NEXT CLR PD 61 INDEX 1.3375

DISPLAY MODE - CLBC 3			
	R1	R2	AX
1	7.80	7.80	
2	7.80	7.80	
3	7.80	7.80	
4			
5			
6			
7			
8			
9			
10			
AV	7.80	7.80	

ESC NEXT CLR

- 1 Press **DISP** button in the measurement mode to enter the display mode and the measured refractometry
- 2 Press **NEXT** button in the display mode to display the refractometry data, The page will be changed to the 2nd page and the measured keratometry data will be displayed.
- 4 Press **NEXT** button in the display mode to display the keratometry data, The page will be changed to the 3rd page and the measured CLBC (contact lens base curve) data will be displayed.
- 5 Press **NEXT** button in the display mode to display the CLBC data, The page will be changed to the 1st page again.
- 6 If you want to clear all the measured data, press **CLR** button.
- 7 If you want to change the set-up data, press SETUP button. Setup mode will be explained in the Cp.9 Note: SET UP button is hidden as the 5th button.
- 8 Press **ESC** button in any page of the display mode to go out this mode.

## 9. User Setup

You can change all the settings about measurements, printouts etc. in this set-up mode.

Press **DISP** button in measurement mode and enter the display mode.

Press Set-up button (Hidden button of the 5th button) and

### [ How to change the page ]

Press **NEXT** button

### [ How to change the item ]

Press **CHANGE** button

### [ How to select the item ]

Press **SHIFT** button

### [ How to change the contents ]

Press **▲/▼** button (Chin rest up/down button)

### [ How to save data ]

Press **SAVE** button

### [ How to enter the measurement mode ]

Press **ESC** button

### 1st page : Displaying & printing format 1

SETUP MODE				1
COUNT	ON	OFF		UP / DOWN
[ NO. ]	001			
DATE TYPE	YMD	MDY	DMY	
DATE & TIME	2006-01-01 PM 6:40			
BEEP	ON	OFF		
REF-PRINT	ALL DATA	AVERAGE	OFF	
KER-PRINT	ALL DATA	AVERAGE	OFF	
EYE	ON	OFF		
PRINTING ORDER	REF/KER	RIGHT/LEFT		
AUTO / MANUAL	AUTO	MANUAL		
AUTO COUNT	3			
POWER SAVE	4 Min			

Chin rest button

▲ UP  
▼ DOWN

### Page No.

**COUNT** Patient's No. on / off.

**[ NO. ]** Patient's No.

**EYE** Eye image print on / off

### AUTO COUNT

No. of measurement in Auto start mode

### NOTE

*CLR button is used to initialize the patient's number only.*

Store the edited data

2nd page : Displaying & printing format 2

SETUP MODE					2
VD	0.0	12.0	13.5	15.0	UP / DOWN
CYL	-	+	MIX		▲ UP Chin rest button DOWN ▼
STEP REF	0.125	0.250			
STEP KER	0.05	0.12	0.25		
mm/D	mm	D	AVERAGE		
AUTO FOCUS	30				
RS 232C	115200				
INDEX	1.3375	1.3320	1.3360		
PRINT	PRINT & RS 232C	RS 232C			
MODE	1	2	3	4	
	REF	KER	REF/KER	CLBC	

Page No.

VD	Vertex distance
CYL	Cylinder type
STEP-REF	Increment of sphere & cylinder
STEP-KER	Increment of diopter (Ker.)
AUTO FOCUS	Displaying form of keratometry
RS 232C	RS 232C Speed
INDEX	Applied index (Ker.)
MODE	Measurement mode order

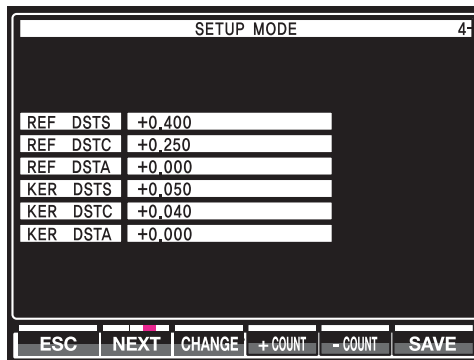
3rd page : Message for internal printer

SETUP MODE					3
PRINTER LABEL				UP / DOWN	▲ UP Chin rest button DOWN ▼
TERASCIENCE. CO., LTD. +82-31-603-6043					
ESC	NEXT	→	←	DEL	
SAVE					

Page No.

→	Move editing cursor
←	Move editing cursor
DEL	Delete character
UP	Edit character
DOWN	Edit character (chinrest up/down button)

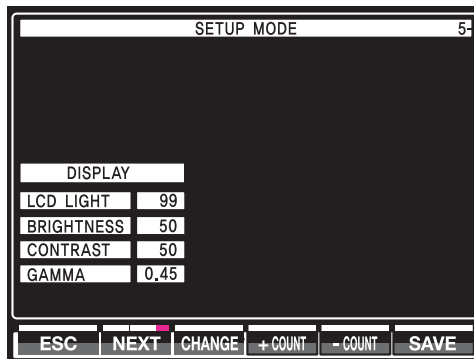
4th page : Correction of measured data



Page No.

REF DSTS	Sphere correction (D)
REF DSTC	Cylinder correction (D)
REF DSTA	Angle correction (degree)
KER DSTS	Sphere correction (mm)
KER DSTC	Cylinder correction (mm)
KER DSTA	Angle correction (degree)
COU+	Button to Change the contents(+/-) of selected item
COU-	

5th page : Display



Page No.

LCD LIGHT	Only LCD LIGHT
BRIGHTNESS	Only BRIGHTNESS
CONTRAST	Only CONTRAST
GAMMA	Only GAMMA

10. Inspection and Maintenance

**Before Calling a Service man**

Warning messages will be displayed on the monitor if some problems occur.

It might be operation errors or problems of the machine. In this case, refer the following instructions. If the function is still not salvaged or recovered, Please disconnect the power supply and consult the dealer. If the message appears again and again, consult the dealer.

Message	Cause	Remedy
System Error	Internal error	Turn OFF the power switch and turn on again after 10 seconds.
EEPROM Data Error		
EEPROM Error		
Motor Error		
Printer Error		
+ OVER	Sphere of eye is over +22D Radius of curvature is over 10mm	Impossible to measure
- OVER	Sphere of eye is over -25D Radius of curvature is over 5mm	
C OUT	Astigmatism is over 10D Corneal astigmatism is over 15D	
TRY AGAIN	Alignment is not proper	See "Messages given during the measurement" in section 6
NO PAPER	No printer paper	Load printer paper

## Replacement of printer paper

- 1 Open the printer cover.
- 2 Remove the roll of paper.
- 3 Insert the new roll.
- 4 Pull out the end edge of paper from the printer cover slot with aligning the paper.
- 5 Close the printer cover.

## Fuse exchange

- 1 Disconnect AC power code from the body after power off.
- 2 Gently push and turn the fuse holder to the counter clockwise direction with a flat head driver. (fuse holder falls out)
- 3 Exchange fuse with new one.
- 4 Gently push and turn the fuse holder to the clockwise direction. (fuse holder settles)



**WARNING**

**AC Power Code must be disconnected during exchange of fuse.  
Do not connect AC Power Code to power source without Fuse Holder.  
Danger for electric shock.  
Use provided fuse(250V, 2A) for exchange.  
Use standard Fuse to avoid danger of fire hazard in case of product trouble.**

### **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 heavy 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.

### **Cleaning the instrument**

---

■ Dust has got on the examination window

- Use a blower to blow off dust.

■ Fingerprints of 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 silicon cloth or a dry soft cloth to wipe off. Do not use benzene, thinner or a chemical-contained dustcloth.

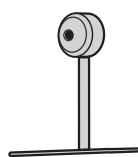


**11. Standard parts**

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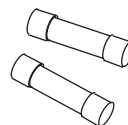
Power cable 1EA



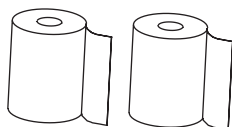
Model eye 1EA



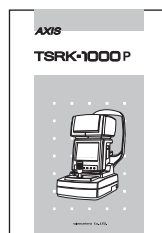
Dust cover 1EA



Fuse 2EA



Printer paper 2EA



Operation Manual 1EA

## 12. Specifications

### *Refractometer mode*

Sphere	-25D ~ +22D
Cylinder	0 ~ +/-10D
Axis	1 ~ 180°

### *Keratometer mode*

Corneal curvature	R5.0mm ~ R10mm
Corneal refraction	67.5D ~ 33.7D
Corneal astigmatism	0 ~ +/-10D
Axis angle	1 ~ 180°

### *Other measurement mode*

Pupil distance	10 ~ 85 mm
Pupil diameter	2 ~ 12mm
CLBC	R5.0mm ~ R10mm
IOL	OK
Ret-illum	OK

### *Environmental Requirements*

Operation	temperature	10°C to 40°C
	humidity	30% to 75%
	Automospheric pressure	700hpa to 1060hpa
Transport	temperature	-40°C to 70°C
	humidity	10% to 95%
	Automospheric pressure	500hpa to 1060hpa
Storage	temperature	-10°C to 55°C
	humidity	35% to 75%
	Automospheric pressure	700hpa to 1060hpa

### *Others*

Measuring start	Auto / Manual
Display	6.4 inches 0.3M TFT color LCD
Alignment	Color display
Printer	Built in printer
Output	RS232C
Power supply	AC100-240Vac, 50/60Hz, 100VA
Dimension	242(w) x 467(d) x 465(h)
Weight	13.6 Kgs

**WARRANTY**

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sciencetera Co., Ltd. warrant this product against defects in materials and Workmanship for a period of ONE(1) YEAR from the date of original retail purchase.

***Purchase Information***

Model Number

**TSRK-1000P**

---

Serial Number

---

Purchase Date

---

Sciencetera Co., Ltd.

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E-mail: city@cityopt.com

**SERVICE INFORMATION**

(1) Repair

- If problem cannot solved even after taking the measures indicated in section 10, contact Terascience representative or distributor for repair.

Please refer to the name plate and let us have the following information.

Name of the instrument : TSRK-1000P

Serial Number : 9-digit characters indicated on the name plate


Phenomenon : In detail



(2) Limit for supplying performance parts for repair

- Performance parts(required to maintain the functioning of the product) of this product will be stocked for eight years after discontinuation of product, to allow for repair.

(3) Disposal of the instrument



**CAUTION**

***This instrument incorporates a lithium battery, which may pollute the environment if the instrument is abandoned. Please ask a professional waste disposal company to handle disposal, or contact Terascience representative or distributor before disposing of the instrument.***

The publication date : 28 October 2010

*So small & yet so big.*

*So ultra-compact in its size,  
yet so enormous in its performance.*

