Auto Ref/keratometer operation manual

ARK-700
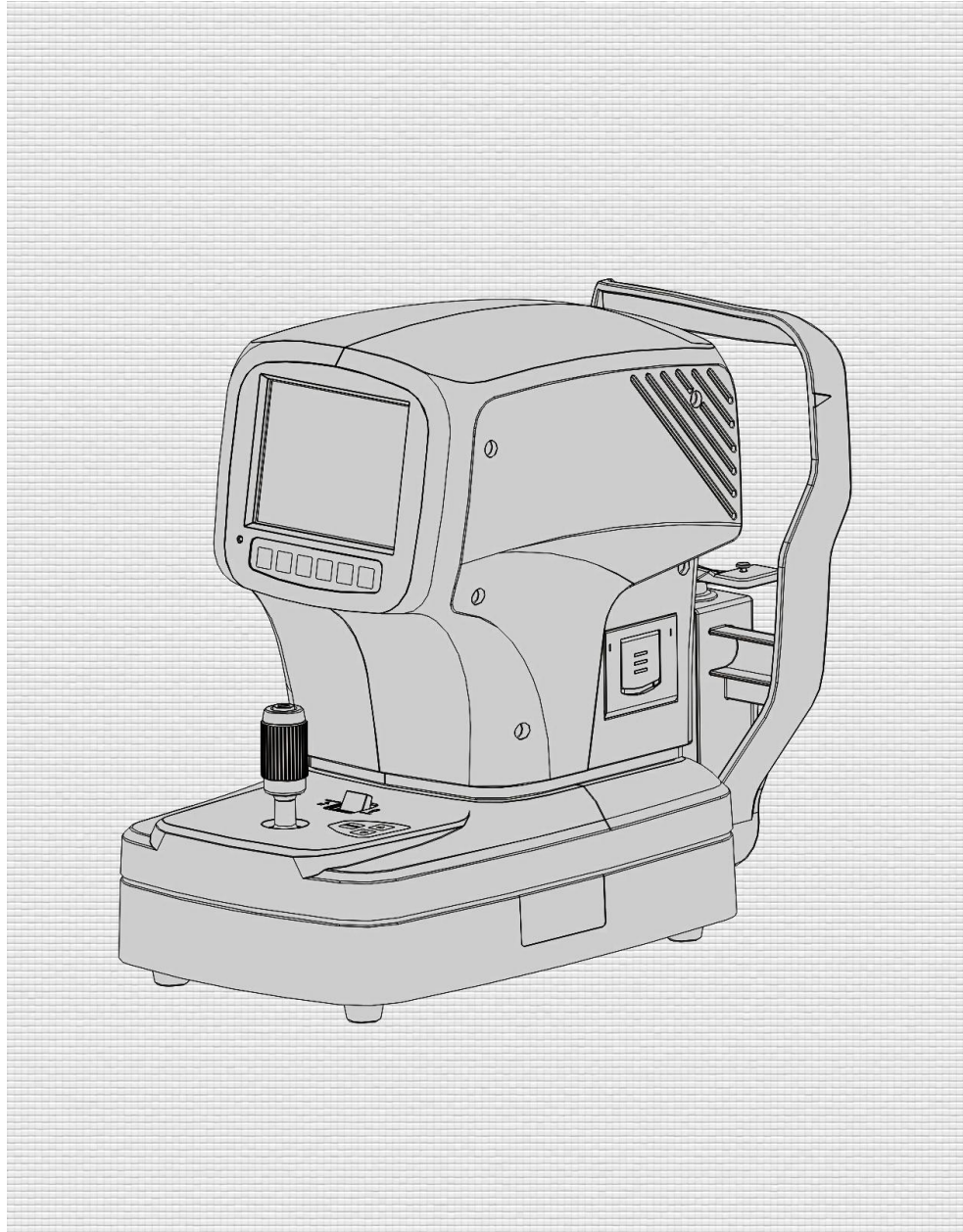
Contents

WARRANTY

Please use Auto Ref-keratometer after you read the manual carefully.

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

This manual contains information necessory for correct and effective operation of Auto Ref-keratometer and provides specifications and procedures for operation and maintenance。

Please keep this manual and read if whenever necessory.

Environmental Factors

Please do not use at hot and humid place.

Normal operation temperature range is from 10 to 40℃ 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.

General Safety information：

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

Caution sign	DESCRIPTION
Warning	This indicates a potentially hazardous situation which could result in death or serious injury to you or others.
CAUTION	This indicates hazardous situation which may result in minor injury to you or others, or may result in machine damage.
Note	This is used to emphasize essential inforamtion. Be sure to read this information to avoid incorrect operation.

Caution sign	DESCRIPTION
WARNING	Only operate the instrument with the power supply indicated on the stick. Otherwise, it may result in fire or electric shock.
WARNING	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.
WARNING	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.
WARNING	Should any of the following occur,immediately turn OFF the power swith,, unplug the power cable from the AC outlet and contact the dealer or agent who/where you purchase this instrument： 1、 When there smoke, strange odor or abnormal sound； 2、 When liquid has been spilled into the instrument or metal object has entered through opening； 3、 When the product has been dropped or its housing damaged.
CAUTION	This instrument is shipped with a groungding type power cable. To reduce the risk of electric shock, always plug the cable into a grounded power outlet.
CAUTION	Ensure that the examinee has not place his/her hand and fingers under the chin rest.Otherwise,hand or fingers may be hurt.
CAUTION	Wipe the forehead rest with ethanol or glutaraldehyde solution to disinfect it each other a different examinee uses it, in order to prevent infection.
CAUTION	Change the chin rest paper each time when the examinee changes in order to keep the chin rest clean.
CAUTION	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

ARK-700 auto ref/keratometer consists of main body,model eye, printer paper,power cable,Dust cover, Operation manual and Fuse.

[1]Main body:1 ,   [5]Dust cover:1,

[2] Model eye:1,   [6]Fuse:2,

[3]Printer paper:2,   [7]Operation manual:1。

[4]power cable:1,

2、Features

◆ Various Measurements Supported

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

◆ Wide measurement range

Because ARK-700 covers from -30Dto +25D in refractometry and from R5mmto R10mm in keratometry, almost of all examinee can be measured.

◆ Accurate mesurement

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

◆ Auto-Starting Function

As soon as auto ref/keratometer is properly aligned to each eye, this function initiates the measurement process and generates the measurement reslus automatically.

◆ High Resolution Color LCD Monitor

High Resolution Color LCD monitor 0.3 Mega Pixel 7 inchs Color TFT LCD Provides Fine and Large Lris Image with color alignment marks.

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 lightm the bright lights can influence the result of measurements.

◆ Do not use chemical solution 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,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 maybe damaged.

4、 Description of Parts
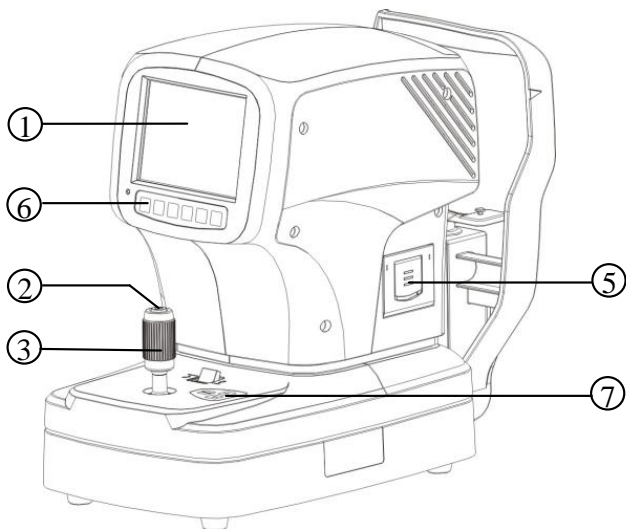
1.Monitor screen（to displays measurement results）
2.Measurement（to start measurement）
3.Operation Stick（for alignment and focusing）
4.Button（for printing）
5.Printer（to print measurement results）
6.Lock switch（for stop the body moving）
7.Power switch（to turn power on/off）
8.Power supply connector（to connect to the power cable）
9.Clamping bolt(to lock the stage to the base)
10.Fuse（to protect the instrument from the excess electric power& shock）
11.RS232C Interface connector（connector for other instrument）
12.RS232C Interface connector（connector for other instrument）Chinrest（to place examinee's chin on it）
13.Measurement window（for examinee to look into the target image for measurement）
14.Chinrest（to place examinee's chin on it）
15.Knob（chinrest manual up/down）
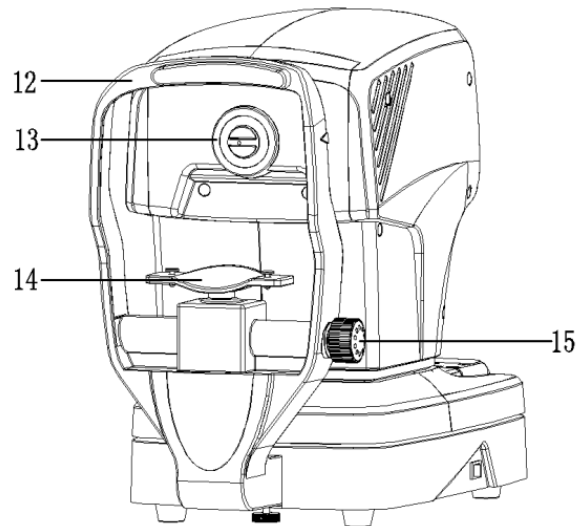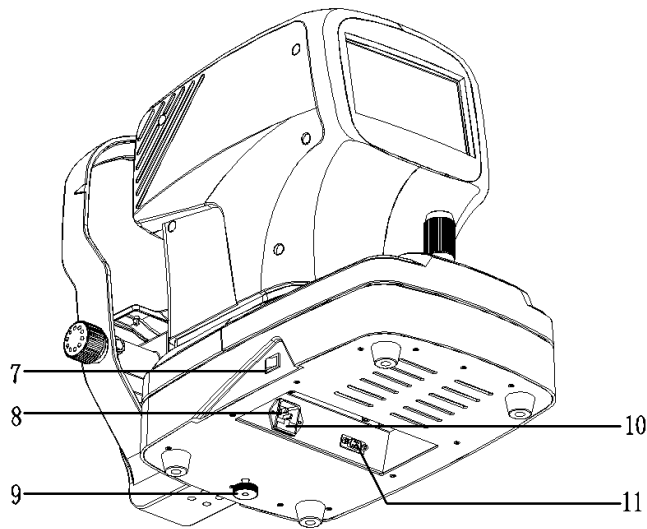
● **Operation Buttons**

① Print button（to print out the measured results）

② Indicator lamp（indicate the power on/off and the printer paper exist/no）

③ Paper perforating key(press the key to print out the measurement result)

④ Up and down chinrest(Adjust the height of the chinrest)

Marks: For the point ③and ④, haven not add these function now. The button keeps for next new model.

5、Screen display
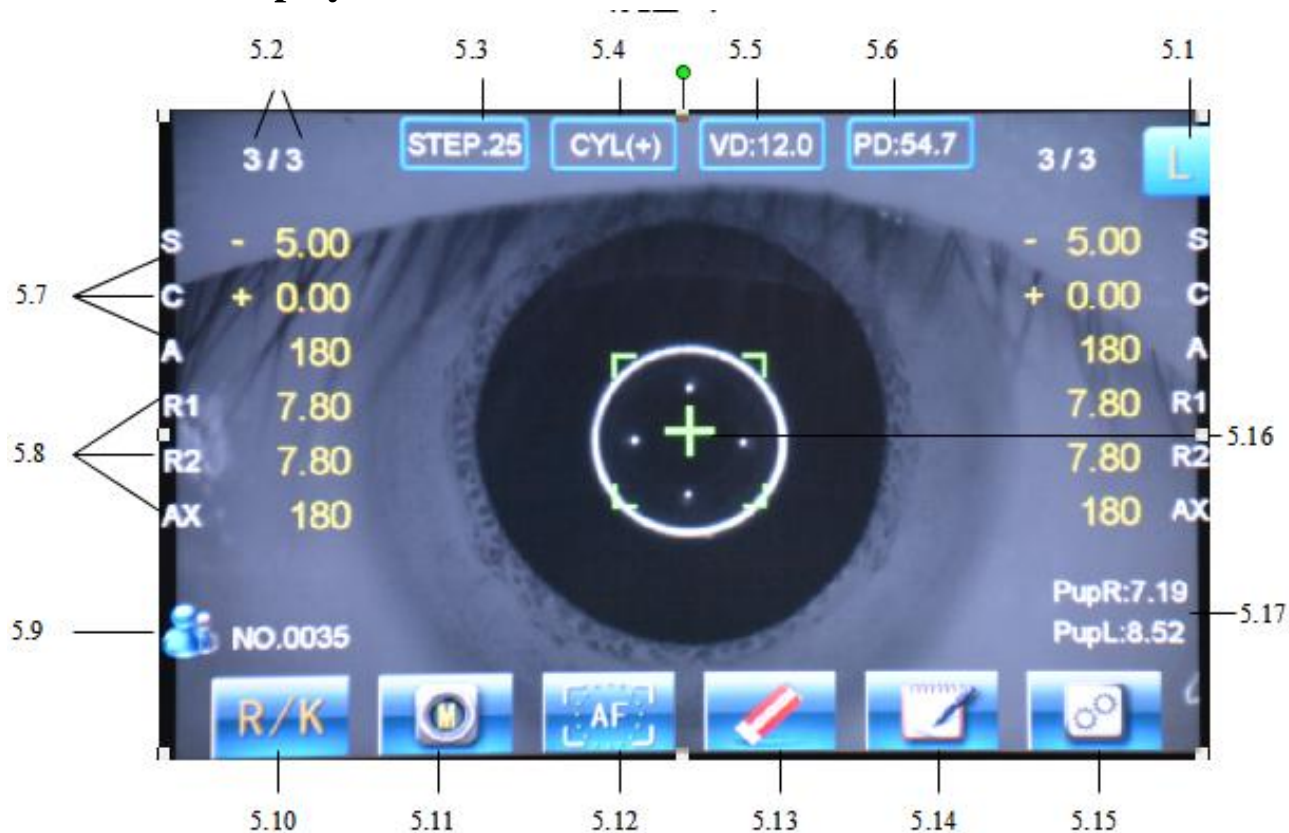
（Figure 1）

5.1 L/R Sign: Flashing sign indicates the current measured eye

5.2 The number of power/corneal parameters measured

5.3 Step selection (shortcut key)

5.4 Astigmatism symbol selection (shortcut key)

5.5 VD selection (shortcut key)

5.6 PD value display

5.7 Power display

5.8 Corneal value display

5.9 Adult//child mode selection

5.10 Measurement mode selection

5.11 Auto/manual measurement selection (partial model)

5.12 Auto/manual tracking and focusing selection (partial model)

5.13 Data clear key

5.14 Data record check

5.15 Menu set

5.16 Pupil alignment target

5.17 Left/right eye pupil diameter

6、Menu
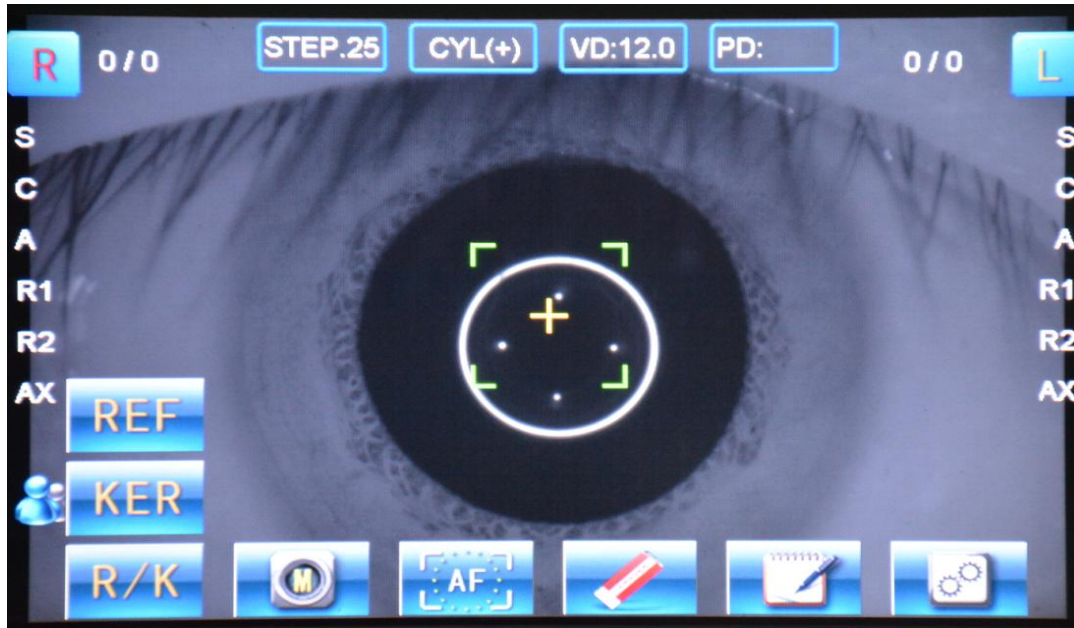
（Figure 2）

6.1 Measurement Mode Selection

Touch this key to pop up three measurement mode menu (as shown in Figure 2), the user can choose to touch any measurement mode menu under need (KER for Keratometry mode, R/K for RefracKeratometry mode, REF for Refractometry mode)

5.2 Auto/Manual Measurement Selection (partial model)

Touch this key to select auto measurement mode (A) or manual measurement mode (M)

5.3 Auto/Manual Tracking and Focusing Selection (this model do not have this function)

Touch this key to select auto tracking and focusing mode (AF) or manual tracking and focusing mode (MF)

5.4 Data Clear Key

Touch this key to clear the measurement data

5.5 Data Record Check

Touch this key to check the measurement data (directly print out the data, the measurement data won't be recorded)(Figure 3)

（Figure 3）

Left/right eyes data can be recorded max.10 items separately. Touch REF to display the recorded refractometry data only, touch KER to display the recorded keratometry data only, touch CLEAR key to clear the recorded data, touch RETURN key to return to the measurement interface.

6.6 Menu Set

Touch menu set key to enter the subsidiary menu setting (Current selection for blue)
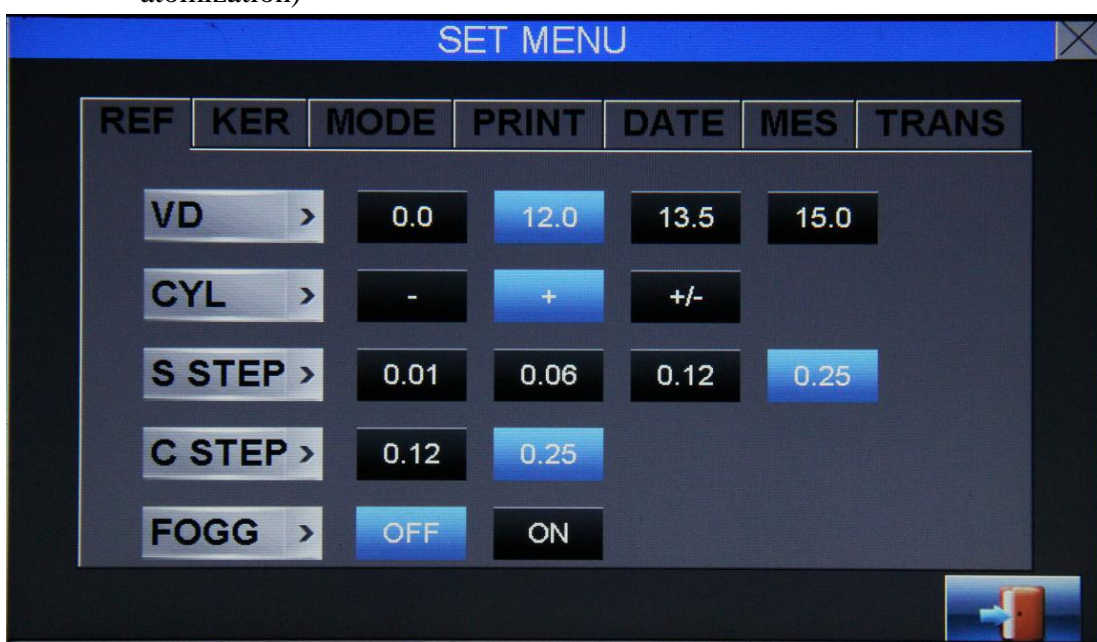
6.6.1 Refractometry parameters setting (Figure 12)

VD: Distance between corneal and back top focus of lens, 0.0mm (contact lens), 12.0mm (Asian), 13.5mm (Middle East), 15.0mm (European)

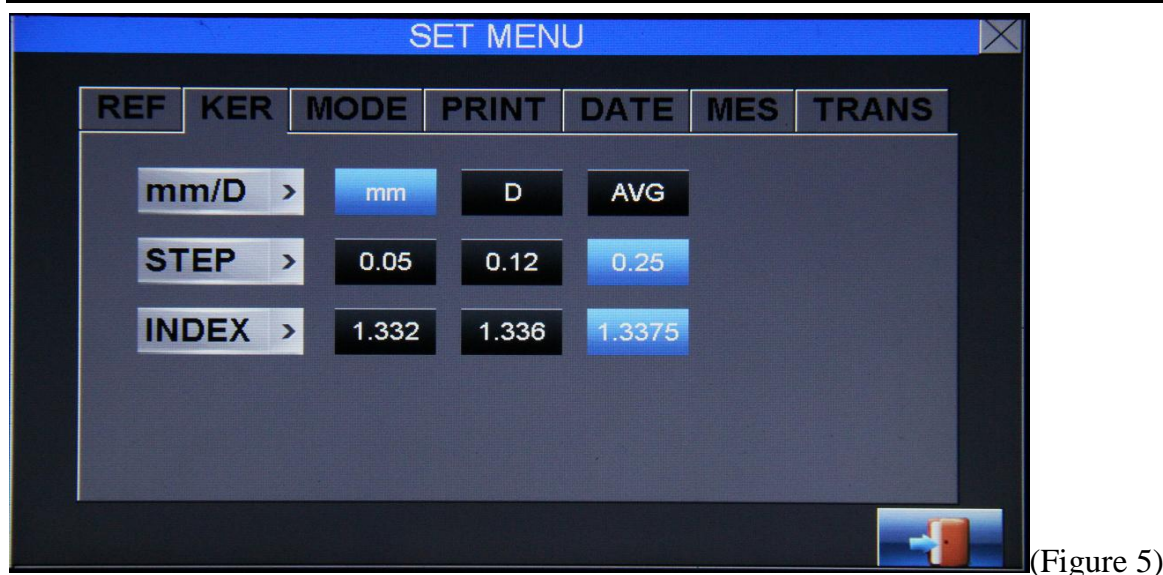CYL: Astigmatism symbol selection, $-$、$+$、$\pm$(Mix)

STEP：Measurement data precision selection

FOGG: Visual guide target atomization function switch (position of guiding target atomization)

(Figure 4)

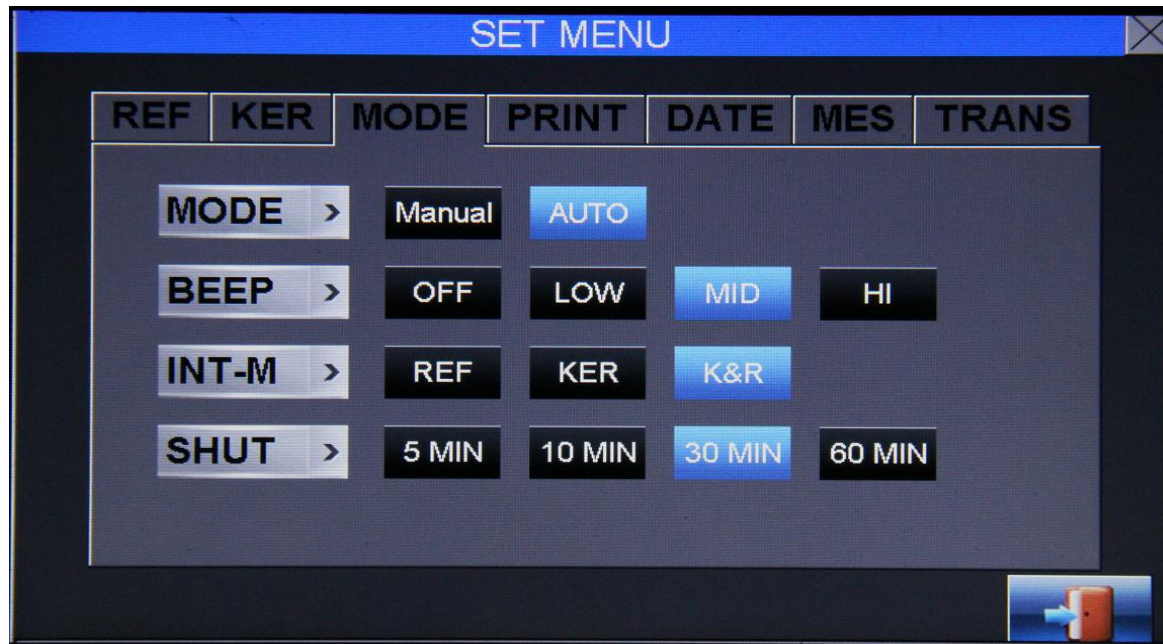6.6.2 Keratometry parameters setting (Figure 5)

(Figure 5)

MODE：Keratometry radius measurement (mm), keratometry power measurement (D) and
average value display (AVG) optional
STEP：Keratometry power precision display
REFRACTIVE INDEX：Factory defaults to 1.3375

6.6.3 Mode setting (Figure 6)

(Figure 6)

MODE: Manual measurement mode and auto measurement mode optional (Auto
measurement icon for grey said this model without this feature)
BEEP: Sound prompt when operating. If set off, operation will keep silent
INT-M: Measurement mode selection (same as the main interface function), default startup mode
for each starting

STAND BY: Instrument standby time setting (5 minutes, 10 minutes, 30 minutes and 60 minutes optical) (touch any key to wake up)

6.6.4 Printing setting and printing paper replacement (Figure 7)

(Figure 7)

AUTO: When ON selected, the measurement results will be printed out automatically after the both eyes measurement finished (in this case, the data is cleared automatically) When OFF selected, press the print key on panel to print out the measurement results.

REFRACTOMETRY: When OFF selected, the refractometry power won't be printed out. When STD selected, all refractometry power will be printed out. When AVG selected, only print the average value of the refractometry power.

KERATOMETRY: When OFF selected, the keratometry power won't be printed out. When STD selected, all keratometry power will be printed out. When AVG selected, only print the average value of the keratometry power.

EYE: When ON or OFF selected, the refractometry state diagram will be printed or not.

CONCENTRATION: Set the appropriate print concentration according to different thermal printing paper.

PUPIL: When ON or OFF selected, the pupil diameter will be printed or not.

SE: When ON or OFF selected, SE data (the approximate value of cylinder power converted into sphere power) will be printed or not.
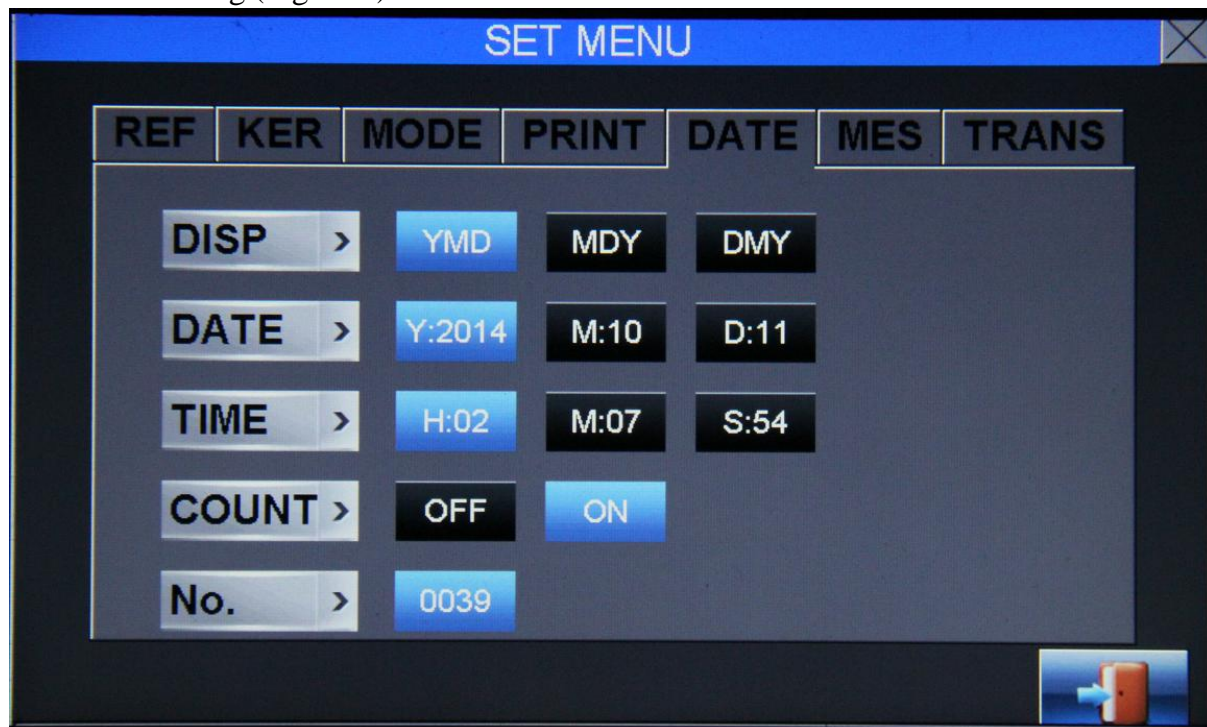
BC: When ON or OFF selected, BC(base curve of corneal contact lens) will be printed or not.

When the printing paper is missing, the panel indicator lights flashing red, you need to replace the printing paper (Figure8)

(Figure 8)

8.6.5 Data setting (Figure 9)
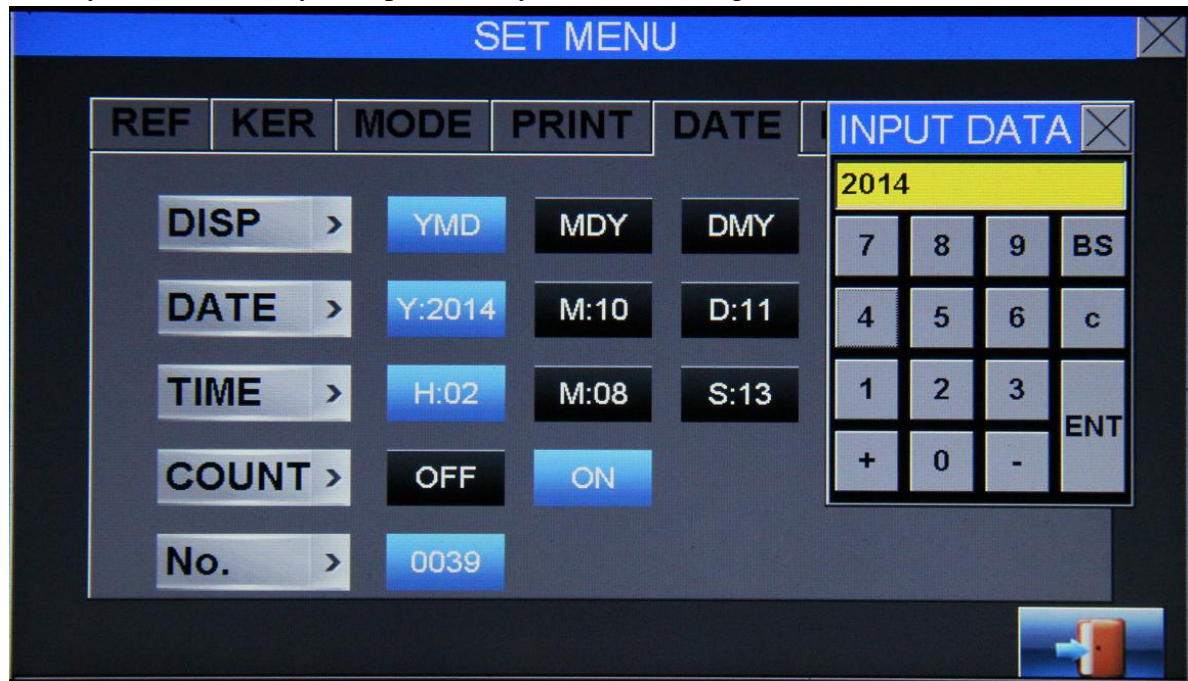

(Figure 9)

DISP: Date, month and year display mode

DATE: Edit or modify the exact time of date and month and year

TIME: Edit or modify the exact time of second and minute and hour

COUNT: When ON or OFF selected, recording the number of patients in main interface will
        be refreshed or not

No.: Patient number setting, patient measuring number setting.

Touch DATE, TIME and NUMBER options, enter the sub menu as shown below, select the appropriate number, press ENT key to confirm and preserve, press RETURN key to quit. Press BS key to delete one by one, press C key to clear all. (Figure 10)
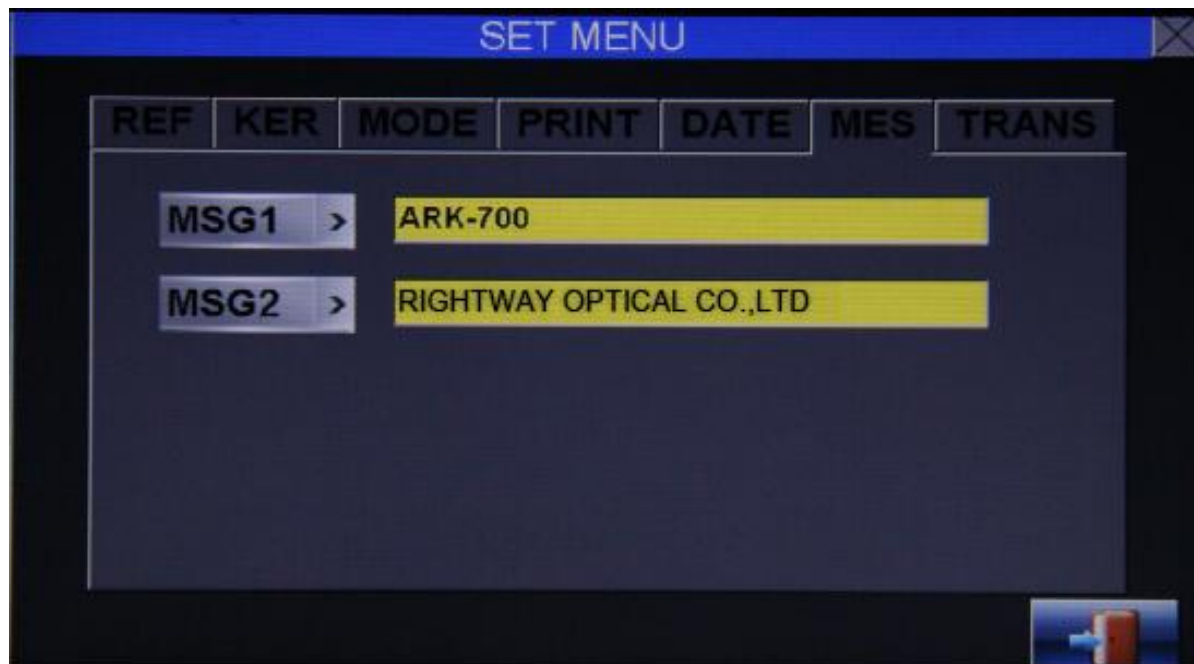

(Figure 10)

6.6.6 Printing message setting (Figure 11)

MSG1 for company name or product model number setting
MSG2 for company address or brand name setting. Users can edit this information freely according to the exact requires. After setting, press ENTER key to preserve and quit.

(Figure 11)

Touch the yellow blank space to enter the message editing menu (Figure 12)

ENTER key for confirming and preserving

A/a for capital/small letter conversion

BS for deleting single letter

SPA key for space bar

CRL key for clearing all letters

6.6.7 Data transfer setting (Figure 13)

(Figure 13)

According to the requires of the connected devices, customers choose the corresponding baud rate, and open the auto option, the measurement data will be automatically transferred to the connected devices, meanwhile the refractometer data will be automatically cleared.

7. MEASUREMENT

Suitable crowd and contraindication

Target patients for adults and children, and crowd of eye power range (-20 m^{-1} ~ +20 m^{-1}). This product is not suitable for newborn eye measurement.

7.1 Preparations before Measurement

7.1.1 Place the device on the specified instrument table, loose the stage fixing lever and keep the device in free sliding state, adjust the four rubber feet to keep the device in horizontal.

7.1.2 Fix and install the specified chinrest paper and printing paper separately

7.1.3 Connect the spare power line to the instrument socket tightly (ensure the local voltage fit to the instrument specification)

7.1.4 Turn on the left side power switch (green indicator light show right in electricity connection), the instrument goes into self-check procedures. After self-check over, it automatically switches to main interface for measurement.

7.2 Notes for Operator and Patient

7.2.1 Adjust the chair height and screen angle in right position

7.2.2 Ensure the patient in comfortable and relaxed posture before measurement

7.2.3 By adjusting the instrument tabletop, keep the instrument height same to the patient natural sitting posture

7.2.4 Settle patient's chin touch the chinrest front and forehead touch the rubber forehead rest in level (keep face parallel with the measurement window)

7.2.5 By observing the patient eyes position and height adjustment mark, press the chinrest up/down key on panel to adjust the patient's eyes same height to the measurement window

7.2.6 By the operation lever, move the sliding body left and right to move the patient's eyes in the measurement range (if the distance of two sides asymmetrical, adjust it by fixing the patient's head deviation)

7.3 Measurement

The measurement alignment method of this device for pupil and center measurement cross target in coincidence

7.3.1 Manual focusing and measurement (7.11 and 7.12 key for M)

Hold the operation lever, quickly shift the sliding body to left side, keeping the measurement window roughly aligning with the patient's right eye socket. Now a yellow ring which is equal size of the patient's eye pupil appears on the screen (the size of the yellow ring changes with the patient's eye pupil) (Figure 24)
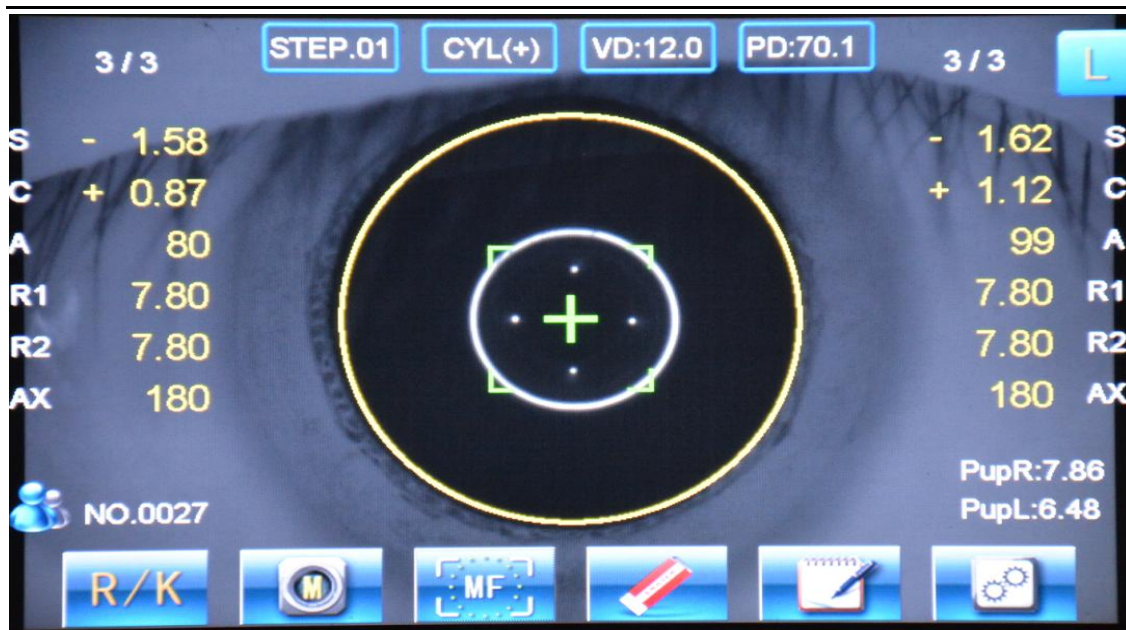

(Figure 14)

Observing the patient's eye location on screen, rotate the operation lever (up and down adjustment), meanwhile swing the operation lever left and right, till the yellow ring covers the patient's eye pupil edge, then shift the operation lever front and back, till the patient's eye is clearly focused in the center measurement socket (the accuracy of focusing can be confirmed by observing the iris clarity or the four bright spots clarity) (Figure 15)

Prompt the patient to open eyes wide (eyelid and eyelash covering eyeball will affect the measurement accuracy), both eyes look right ahead.

Slightly adjust the operation lever, till the yellow cross measurement target becomes thick and green, press the measurement button, when the measuring light flashing (the screen refreshed in black in moment), it shows the measurement over (the patient no need to see clearly the object-image during measuring, the measurement result same accuracy). The measurement result will be displayed on screen.

(Figure 15)

Shift the sliding body to right side, repeat the above steps, measure the patient's left eye.

Both eyes measurement over, pupil distance will be displayed automatically on the corresponding position. Choose whether or not to print the measurement results according to settings (auto printing or data output transmission over, the data on screen will be automatically cleared).

7.3.2 Child measurement mode

To measure children or the patients with pupil fibrillation, select child mode (Touch 5.9 key, the right small humanoid icon becomes green). Measurement method with reference to 7.3.1 and 7.3.2. (Figure 16)

(Figure 16)
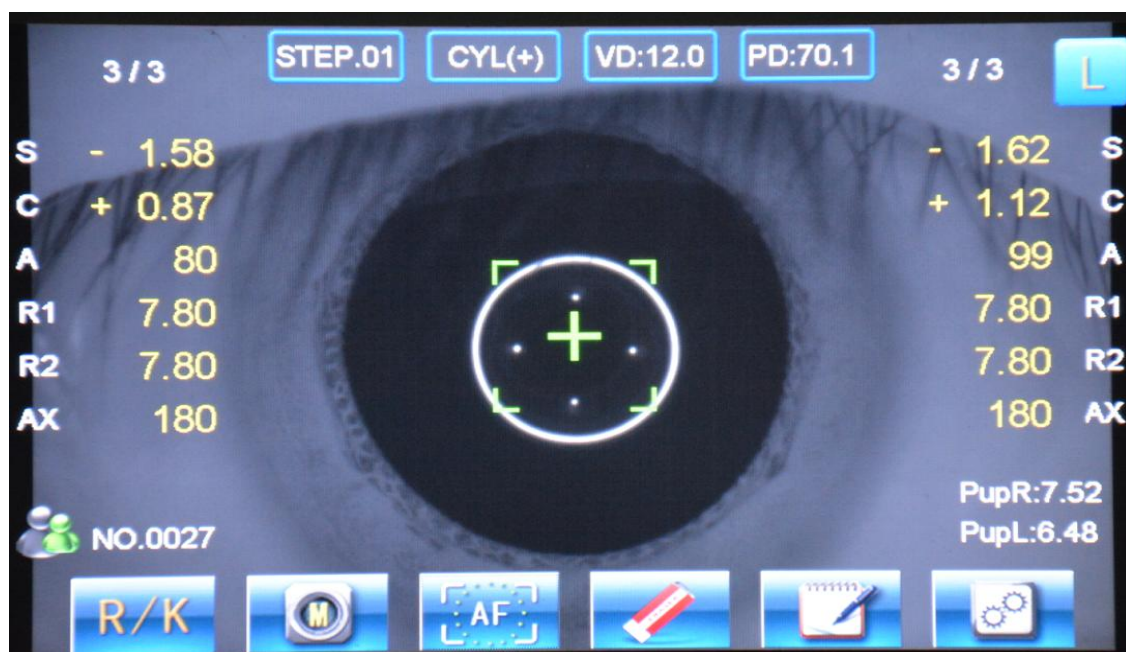
7.3.3 Measurement error prompt

During measurement, if the patients found having eyelid ptosis, eyelash disturbance, cataract, microcoria, keratopathy, corneal vertex and pupil center noncoincidence, the error prompt will appear on screen when the instrument can't measure normally, please select the manual measurement mode or force measurement mode (long press the measurement button). (Figure 17).

(Figure 17)

8. COMMON TROUBLE SHOOTING

8.1 Power indicator light not work
Check and confirm whether the local power fits to the instrument, whether the power plug loose, or whether the fuse damaged (in case this happen, please replace the same specified fuse)

8.2 Chinrest not lift

8.3 Printer can't work regularly
Check whether the printing paper is finished (in case this happen, red indicator light on panel will flash). Or whether the print setting is correct, and whether there is the measurement data (no data, not print)

8.4 Sliding body not flexible
Check whether the stage fixing lever placed at right position, or whether other sundries go into the slide slot

8.5 Press measurement button, but no data appear
Check whether the patient pupil smaller than 2mm, whether the eye position seriously incorrect, whether the cross measurement target aligns with the patient pupil (the target becomes thick and green), or whether the patient eyeground seriously deseased

8.6 Measurement light not work
When the measurement over, the measurement light will automatically turn off. Sway the sliding body, it will turn on automatically

8.7 If other problems appear, please contact the local agent or original manufacturer
●If the fault phenomenon listed in the common trouble shooting can't be resolved, please

contact the original manufacturer or local agent to repair.

●Please provide us with the following information:

Instrument name and model number

Instrument serial number

Fault phenomenon (detailed as possible)

(1.) Accessory maintenance limitation

Providing maintenance accessories to maintain the instrument functions during the instrument lifetime

(2.) Processing of instrument

●To be disposed carelessly of the instrument and accessories will pollute the environment

●Please contact the professional waste disposal company or local dealer before disposing this instrument

9. MAIN TECHNICAL INDEXES

9.1 Measurement Performance Parameters

9.1.1 Corneal Vertical Distance(VD): 0.00mm、12mm、13.75mm、15mm

9.1.2 SPH: -20.00 m^{-1} ~ +20.00 m^{-1}(VD=12mm，0.01 m^{-1}、0.06 m^{-1}、0.12 m^{-1}、0.25 m^{-1} unit), deep myopia measurement available

9.1.3 CYL: 0.00 m^{-1} ~ ±6.00 m^{-1} (0.25 m^{-1} unit)

9.1.4 Cylinder Form: －、＋、±

9.1.5 Axis(AX): 1°~ 180°(1°unit)

9.1.6 Pupil Distance(PD): 10mm ~ 85mm(0.1mm unit)

9.1.7 Radius of Corneal Curvature: 5.0 ~ 10.0mm (0.01mm unit)

9.1.8 Corneal Power: 33.00 m^{-1} ~ 67.00 m^{-1} (in case that the corneal equivalent refractive power is 1.3375)

9.1.9 Corneal Astigmatism: 0.00 m^{-1} ~ 15.00 m^{-1} (0.06 m^{-1}/0.12 m^{-1}/0.25 m^{-1} unit)

9.2 Other Performance Parameters

9.2.1 7″TFT touch screen (angle adjustable)

9.2.2 Printer: 57mm thermal printer, auto paper cutting

9.2.3 Measuring Light Energy: ＜30uW (prevent injury to eyes during measuring)

9.2.4 Measuring Time: ＜0.5s

9.2.5 Minimum 2.0mm pupil can be measured. The application of cloud and mist chart technology allows the patients' eyes to look at the internal targets in a natural and comfortable situation and make the measurement more accurate

9.2.6 Auto tracking, auto focusing and auto measuring of end of measurement (partial model)

9.2.7 Electrical Power: AC100 ~ 250V, 50/60Hz

9.2.8 Consumption: 60AV

9.2.9 N.W.: 24kgs

9.2.10 G.W.: 26.5kgs

9.2.11 Dimensions: L532mm×W267mm×H460mm

9.2.12 The refractometer service life for 6 years, to ensure accurate measurement, please make the metrological verification every year

10. ENVIRONMENTAL PROTECTION

The instruments that have be scrapped, should be strictly deposed in accordance with the requirements of local laws and regulations