REV: 1.1

The Pupilometer

The Pupilometer

Operating Instruction

In order that you can use this product more safely and get full play to its functions and features, please read the operating instructions carefully before using this unit and keep it properly.

Instruction

Thanks for purchasing and using our pupilometer.

Before using our instrument, please read this manual carefully. We sincerely hope that it will provide you with enough information.

Providing products with more refined quality, complete function and characteristics to customers is our target. We regret any inconvenience caused by not notifying you the differences of products from those advertised on promotional and packaging materials resulted by product performance enhancement. Meanwhile we reserve the right of constantly updating products and materials.

If there is any problem during use, please contact authorized distributor.

Your satisfaction is the cornerstone of our progress!

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1. Brief instruction

Being a major professional manufacturer and export enterprise producing optical and ophthalmic instruments, we focus on developing, manufacturing, sales and service of ophthalmic instruments mainly including focimeter, pupilometer, vision tester, slit-lamp series, auto refractor and so on.

2. Uses

Pupilometer is a digital precision optical instrument used to measure distance between human pupils in the process of optometry for fitting spectacles.

3. Characteristics

This device is designed in a scientific and reasonable way, integrating technologies on mechanical hairspring orientation measurement system, optical system, ESS and microcomputer into a whole.

* Using mechanical hairspring to level at the reflecting point of human cornea to realize the consecutive measurement. It features directness of point-sampling and high accuracy of orientation.

* Adopting line-shaped sensors of high definition, advanced intellectualized electronic systems and digital display which allow the testing results more visible, legible and accurate.

* LED lamp-house and a design of low-power consumption ensure the prolonged service life of batteries.

* PD and VD measurement is available.

* It offers the $+2.00m^{-1}$ compensation for the degree of eyesight.

* The brightness of LED lamp-house is adjustable.

4. Main technical indexes

4.1 Effective range of measurement

Binocular pupillary distance: 45mm ~ 82 mm

Left or right pupillary distance: 22.5mm ~41 mm

4.2 Indication error: ≤ 0.5mm

4.3 Asymetrical error: ≤ 0.5mm

4.4 Rounding error: ≤ 0.5mm

4.5 Distance of target: 30cm ~ ∞

4.6 Power source: Voltage: DC 3V

Specification: 5# AA battery

Quantity: 2 pieces

4.7 Time for automatic shut-off:

About 1 minute after stopping operation

4.8 Size: 221mm(L) × 166mm(W) × 63mm(H)

4.9 Weight: 0.64 kg

5. Description of the structure

5.1 Description of the front panel (as shown in Fig.1)

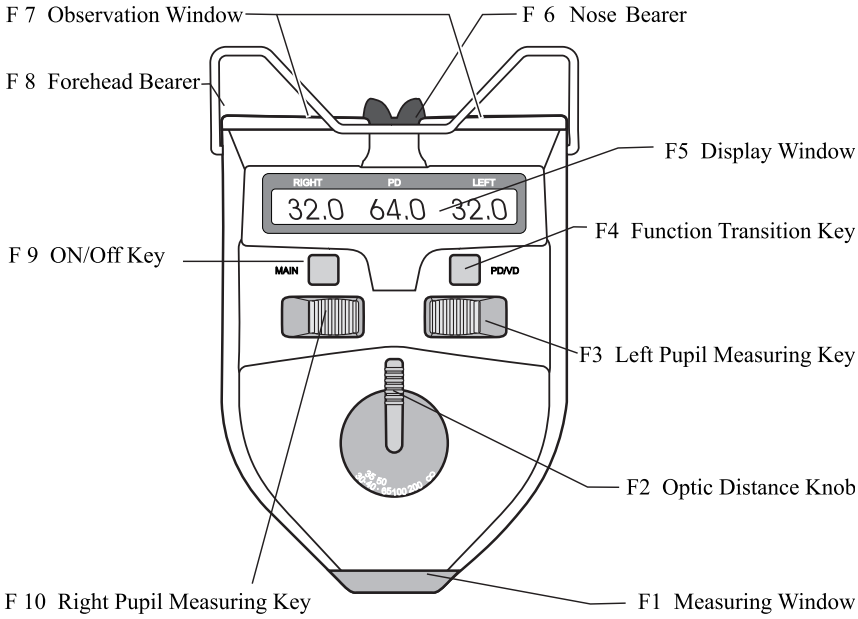

Fig.1

F1. Measuring Window

The working window of the testing personnel.

F2. Optic Distance Knob

It is used to conduct conversion of measured value of pupillary distance at different optic distances of 30cm ~ ∞ .

F3. Left Pupil Measuring Key

It is used to measure left pupillary distance. Sliding the key to the outer side will make pupillary distance pointer move in opposite direction of the nose bearer. At this time, the left eye pupillary distance and binocular pupillary distance rise in numerical value. Sliding the key to the inner side will make the

pupillary distance pointer move towards the direction of the nose bearer. Now numerical value of the pupillary distance decreases.

F4. Function Transition Key

PD and VD measurement mode can be switched by pressing Function Transition key. Besides, it can be used to set LED brightness, automatic power-off time and measurement precision.

F5. Display Window (as shown in Fig.2)

It displays the measured numerical value of PD or VD, and some other relevant information.

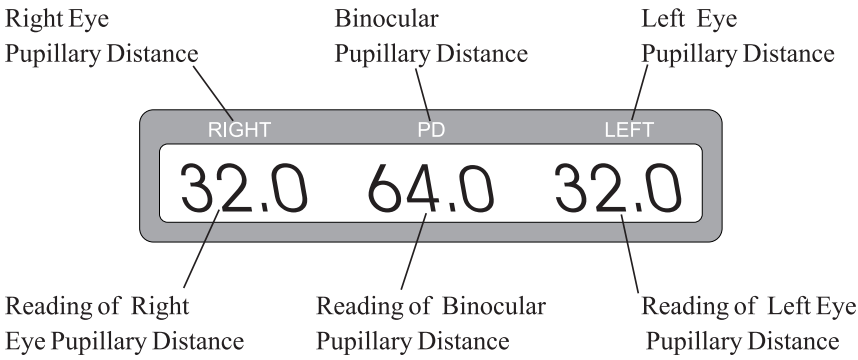

Fig.2

When reading information on the display window, the Right value denotes the distance between center of nose bridge and right eye pupillary distance or VD of the right eye, and the Left value denotes the distance between center of nose bridge and left eye pupillary distance VD of the left eye. PD value stands for the distance between left eye pupil and right eye pupil. The unit is mm.

F6. Nose Bearer

The testee's bridge rests on the nose bearer so that the position of the testee's pupils is fixed.

F7. Observation Window

Two windows provided for a testee to stare at the target with

his (her) eyes.

F8. Forehead bearer

The testee's forehead rests on the forehead bearer so that the position of his pupils is fixed.

F9. ON/Off Key

Press this key once to turn on the device, and press it again to turn off.

F10. Right Pupil Measuring Key

It is used to measure right pupillary distance. Sliding the key to the outer side will make pupillary distance pointer move in opposite direction of the nose bearer. At this time, the right eye pupillary distance and binocular pupillary distance increase in numerical value.Sliding the key to the inner side will make the pupillary distance pointer move towards the direction of the nose bearer. Now numerical value of the pupillary distance decreases.

5.2 Description of rear panel (as shown in Fig.3)

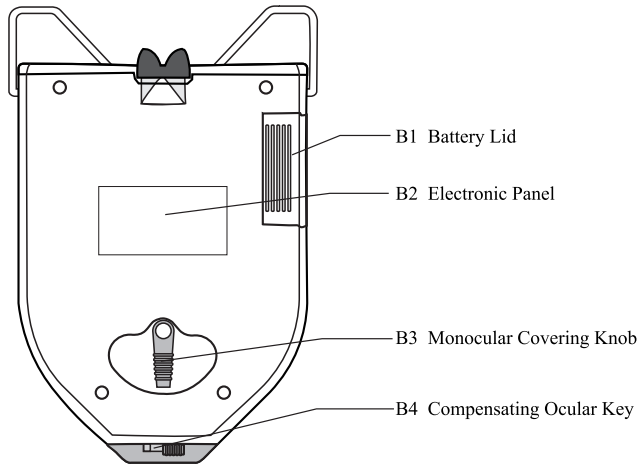

Fig.3

B1. Battery Lid

Move the lid parallel to change batteries.

B2. Electronic Panel

B3. Monocular Covering Knob

The covering of the testee's right or left eye will be realized by turning the knob.

B4. Compensating Ocular Key

Sliding the key can make a +2.00m^{-1} compensation for the diopter of eyes.

5.3 Viewed from the Measuring Window (as shown in Fig.4)

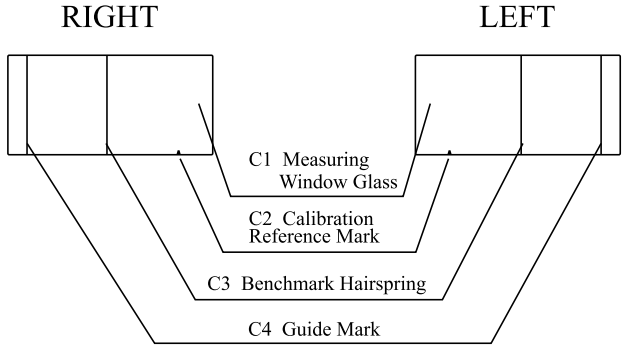

Fig.4

C1. Measuring Window Glass

Testee sees through it to the green target.

C2. Calibration Reference Mark

It is used to check measurement accuracy.

C3. Benchmark Hairspring

When the optometrists use the device, they can slide the key and make the benchmark hairspring level at the reflecting light spot of the testee's pupils.

C4. Guide Mark

Guide Mark is used to target at the top of cornea of the testee during the process of VD measurement.

5.4 Viewed from the Observation Window (as shown in Fig.5)

Target to be stared at In the center of the device's inner visual field, an eyeball-shaped circle can be seen. It is a green target image surrounded with a bright ring. A testee should stare at the target with both eyes when measuring. To adapt to the favor of people's eyes, the device sets the adjustable function of LED brightness. (Details shown on Page 11)

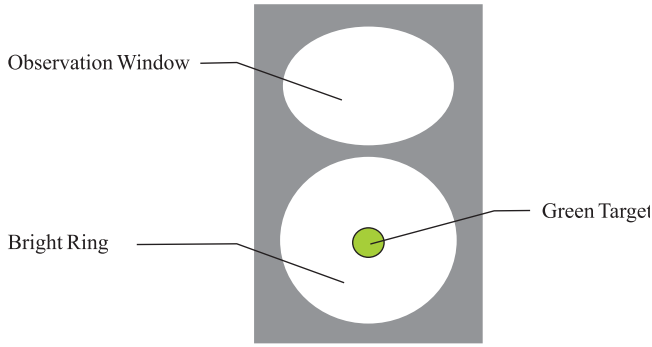

Fig. 5

6. Operational Instructions

This is a high-tech intelligent instrument, which is very easy to operate. Please operate it according to the following procedures, thus you can get measured data easily and rapidly.

6.1 About Battery

Before using the device, please put 2 pieces of 5# AA batteries into its battery box.When it is not used, please take them out to save electric energy.

Only high energy alkali battery is applicable, and please do not use common acidic one so as to avoid leak age of battery liquid which may cause damage to the device.

Be care about the polarity of the battery when replacing it.

Properly dispose of the used battery to avoid environmental pollution.

6.2 Start-up (as shown in Fig.7)

Press ON/OFF key to make the start-up of the device initialized.The microprocessor in the device gets the position of pupillary distance pointers and then the data display on the corresponding LCD window. Now you are able to conduct measurement.

6.3 Measurement of Binocular Pupillary Distance

a. Start-up. The initialized setting of the device is just the binocular pupillary distance for measuring ∞ optic distance.

b. Put the forehead bearer lightly on the testees's forehead, and nose bearer lightly on testee's nose bridge, then keep the device in a horizontal state(as shown in Fig.5).

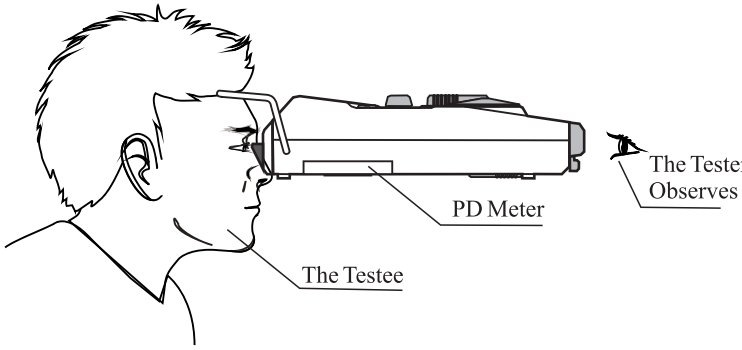

Fig. 6

c. Let the testee stare at the green target of the device.

d. The tester observes the reflecting light spot on the testee's pupil through measuring window. Slide the Left and Right Pupils Measuring Keys, the left and right pupillary distance pointers will coincide with the reflecting light spots of the testee's left and right

pupils, respectively(as shown in Fig.7a and Fig.7b). The data shown in the display window are the measured pupillary distance.

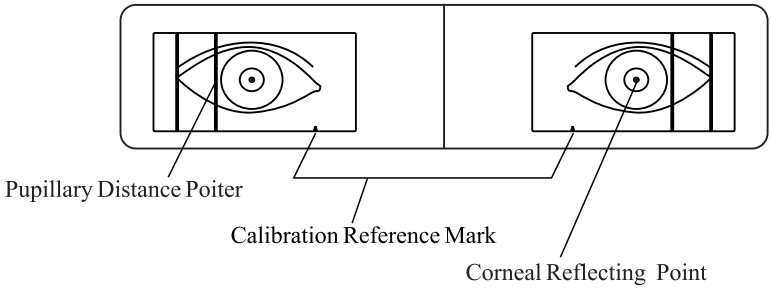

Fig. 7a (The sight the tester observes through measuring window)

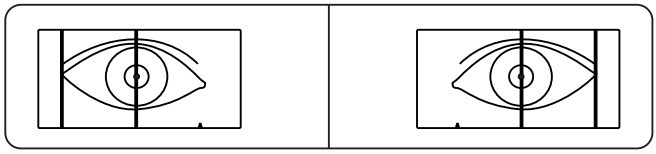

Fig.7b (The left and right pointers coincide with the reflecting bright dots)

e. In order to measure the pupillary distance at different optic distances, please turn the Optic Distance Knob(as shown in Fig.1 NO.2) to your optic distances first and then make your measurement. This device sets some different optic distance locations such as 30cm, 35cm, 40cm, 50cm, 65cm, 1m, 2m and ∞ .

In the process of measurement (and the measurement of monocular pupillary distance described in the following section), to achieve precise data of measurement and make process of measurement easily and quickly, the tester should remind the testee to always stare at the green target in a level state, without moving his (her) eyeballs.

6.4 Measurement of Monocular Pupillary Distance (as shown in Fig.8a and 8b)

a. When needing to measure the left or right pupillary

distance, please turn the Monocular Covering Knob (as shown in Fig.3 NO.2) which can cover the other eye completely(as shown in Fig.8a and Fig.8b)

Fig.8a (Measuring right pupillary distance)

Fig.8b (Measuring left pupillary distance)

b. The tester observes the reflecting bright dot on the testee's pupil through measuring window. Slide the Left and Right Pupils Measuring Keys, the left or right pupillary distance pointers will coincide with the reflecting bright dots of the testee's left or right pupils, respectively. The datum shown in the display window is just the measured pupillary distance.

6.5 Measurement of the VD

a. Press F4 Function Transition key (PD/VD) to enter into VD measurement mode.

b. The optician makes inspection standing by the side of the testee, and the latter is preferably situated against the light. Place the instrument in the horizontal level (see Fig.9a), and target the guide mark at the top of cornea of the testee.

c. After targeting is finished. Optician slides left/right pupi1 Measuring key to coincide the Benchmark spring with the top of the lens (Fig.9b). The distance from the top of the cornea to the mounted lens can be obtained by deducting the thickness of the lens from the value digitally displayed at that time.

6.6 LED and automatic power-off settings

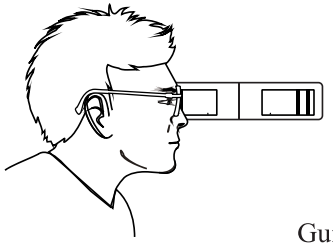

Fig. 9a

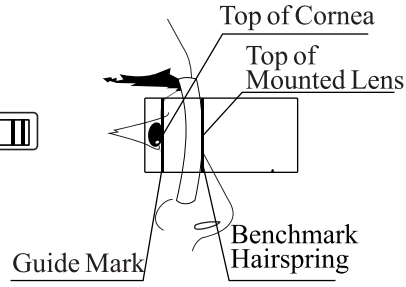

Fig. 9b

a. Put F3 left pupil measuring keys to the left end and F10 right key to the left end and keep them there, then press F4 (Function Transition Key) continuously 5 times till the screen shows image of "------". After this, move F10 right measuring key to the right end and press Function Transition Key again, then we get in the LED brightness and automatic power-off setting mode.

b. In such mode, moving F3 left measuring key is to adjust automatic power-off time, which will be shown on the screen (time range: 0.5-3 minutes with the 0.5-minute interval)

c. Moving F10 right measuring key is to adjust LED brightness and the corresponding LED current value (the bigger the LED current value, the brighter the LED lamp shines) is shown on the screen. (current value range: 0.5-5 mA with the interval of 0.5 mA)

d. When the two above are well set, another pressing of the Function Transition Key can save the set values and the device is again into the measuring mode.

6.7 Setting of Measurement precision

a. Under PD or VD measurement mode, Slide F3 left pupil measuring key to left end, and slide F10 right pupil measuring key

to left end, then press F4 Function Transition key continuously 5 times till the screen shows image of "------" Slide F3 left pupil measuring key to the right end, press F4 Function Transition key to set the precision.

b. Under this mode, sliding Left Pupil Measuring Key can set display precision to be 0.1, 0.2 or 0.5 for PD being set from 47 to 80mm and 0.5mm for others. When the precision is set, press Function Transition Key again to save, then the machine returns to the measurement mode.

6.8 Usage of Calibration Reference Mark

Before using PD meter, we recommend you check whether the display value is normal and to perform "the inside check of PD 46mm" .

Slide C3 Benchmark hairspring and make it coincide with C2 Calibration reference mark, if the PD is 46mm with left and right PD being 23mm respectively, it is normal.

7. Maintenance

1. It has been precisely adjusted before delivery. Please do not dismantle it so as to keep it precise.

2. It shall be stored and used in an indoor well-conditioned dry place.

3. As a high-tech product, the device shall be prevented from vibration or impact.

4. Keep it clean and do not touch surface of its window glass.

5. Any corrosive chemical is forbidden for cleaning it.

6. Fingerprint, dust or stain should be cleaned with absorbent cotton dipped with mixed solution of alcohol and ether.

7. In case of malfunction, do not dismantle it by yourself. Please contact the local sales agent or the manufacturer for help.

8. Provided there is no display on the display window after start-up, please check the polarity of the battery to see if it is well placed and electrified.