Dear Users:

Thank you very much for choosing EPR-2600 automatic computer perimeter manufactured by us.

For your security and benefit, please read the "Operation Instruction" as well as all the datum of the instrument carefully before using it.

If you do not operate the instrument according to the "Operation Instruction", we shall not take any responsibility.

About <Operation Instruction> of this Instrument

The copyright of the operation instruction belongs to us;
The content of the operation instruction is written according to the EPR-2600;
If you can not understand some of the content or clause, or if you meet technical assistance when using it, please do not hesitate to contact us,
Telephone : +1(888)881-1122
Fax: 786-621-1842

We have the right of interpreting and revising this operation instruction at given anytime.
Content

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Chapter 1 Summary

1. Introduction

Projection perimeter; adopt the advantage of international advanced model, projection working mode, with wide testing range 0-90°. It has the characteristics of full-function, high precision and speed. Besides the above characteristics, the whole system also has the characteristic of high dependability and steady performance. Software support Windows XP, WIN7 and Win 8 system with easy operation interface. Kinds test program and strategy, standard test report and analysis software, Provide auxiliary diagnosis for vision damage related diseases.

2. Notice for use

2.1 For your security and benefit, please read the "Operation Instruction" as well as all the datum of the instrument carefully before using it. If you do not operate the instrument according to the Operation Instruction, we shall not take any responsibility.

2.2 Use it in a darkroom and it can only be operated by those who have been trained.

2.3 The stimulus and PC system can be used in patient environment, printer should be used outside of patient environment.

2.4 The voltage must be up to the given standard. If the voltage is not steady, please install a Constant Voltage Regulator. We will not take responsibility for the damage caused by the voltage.

2.5 Do not use this instrument in the inflammable, hot and dusty environment and pay attention to keep it clean and dry; To avoid being damaged by the environment (Damp, Dusty, Liquid, under the sun and so on).

2.6 Do not let the liquid or any other small objects run into the instrument, otherwise these objects may make the inner parts of the instrument short-circuit, and even make the users get an electric shock or even cause a fire hazard.

2.7 Without our permission, do not open the box of the instrument or we will not take the consequences.
2.8 If you need to restart the instrument, you can open the perimeter after 5 seconds and open the computer after 15 seconds after turning off.

2.9 Environmental protection clause: It will pollute the environment if you discard the equipment and the accessories which is breakdown, recall or disposal according to the local laws and regulations.

2.10 Rated operating loaded and safe working load of chin rest is 5kgs.

About the instruction:

1. If it breaks down, please read the guide to fix the breakdown. If it does not work yet, please contact us.

2. We have the right of interpreting and revising this operation instruction.

3. Structure components

a) Hardware: It’s mainly structure by computer system, perimeter stimulus, printer, and socket

b) Software: The patient information input module, Image processing modules, Document management modules, output & print module:

4. Applicability

This instrument is used for examining the change of visual field which may be hurt by glaucoma, visual disease, disease of brain surgery and disease of retina.

5. Notes

To avoid being damaged by the environment (Damp, Dusty, Liquid, under the sun and so on), the instrument should be putted at the dry place.

Do not let the liquid or any other small objects run into the instrument, otherwise these objects may make the inner parts of the instrument short-circuit, and even make the users get an electric shock or even cause a fire hazard.


Effective for model:  EPR-2600
7. **Product features**

Fusing parts: T2AL 250V Security type: It belongs to B type instrument The instrument is intermittent working form Symbolic interpretation:

- **Notes!** Look through the manual

- **Power on**

- **Power off**

- **Earth wire**

- **B type instrument**

- **Alternating current**

- **Connected (Responder)**

- **Disconnected (Responder)**

- **USB Port**

8. **Label**
Chapter 2 Technical Parameter

2.1 Technical Index

2.1.1 Background light
   a) Background light: white, intensity 10 cd/m².
   b) Background light: yellow, adopt OG530 lens, intensity 100cd/m².

2.1.2 Stimulus testing, the allowance under limitation listed in Table 1.

<table>
<thead>
<tr>
<th>S/N</th>
<th>Content</th>
<th>Allowance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Background light, $L_B$</td>
<td>$+25%$, $-20%$</td>
</tr>
<tr>
<td>2</td>
<td>Contrast, $\Delta L/L_B$</td>
<td>$+25%$, $-20%$</td>
</tr>
<tr>
<td>3</td>
<td>Stimulus location</td>
<td>0°~10°: $\leq0.5°$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10°~30°: $\leq1°$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$&gt;30°$: $\leq2°$</td>
</tr>
<tr>
<td>4</td>
<td>Stimulus size</td>
<td>Conversion to solid angle: $+20%$, $-15%$</td>
</tr>
<tr>
<td>5</td>
<td>Stimulus duration</td>
<td>$\pm20%$</td>
</tr>
</tbody>
</table>

Table 2 Stimulus Size Parameter

<table>
<thead>
<tr>
<th>Azimuth $\theta$</th>
<th>eccentric angle $\Phi$</th>
<th>b/a</th>
<th>solid angle $\Omega$</th>
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</thead>
<tbody>
<tr>
<td>0°</td>
<td>15°</td>
<td>&gt;0.7</td>
<td>6.66E-05</td>
</tr>
<tr>
<td></td>
<td>40°</td>
<td>&gt;0.6</td>
<td>1.00E-04</td>
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<tr>
<td>45°</td>
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<td></td>
<td>I</td>
<td>&gt;0.7</td>
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<td>V</td>
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<td>6.50E-04</td>
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<td>15°</td>
<td>&gt;0.7</td>
<td>8.44E-05</td>
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<tr>
<td></td>
<td>40°</td>
<td>&gt;0.6</td>
<td>1.10E-04</td>
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<td>Angle</td>
<td>Stimulus Intensity $L_s - L_B$</td>
<td>Luminance $L_s$</td>
<td>Contrast</td>
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<tr>
<td>-------</td>
<td>-------------------------------</td>
<td>----------------</td>
<td>----------</td>
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<tr>
<td>225°</td>
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<tr>
<td>270°</td>
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<tr>
<td>315°</td>
<td>&gt;0.7</td>
<td>6.50E-05</td>
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</tr>
<tr>
<td>dB</td>
<td>Stimulus Intensity $L_s - L_B$</td>
<td>Luminance $L_s$</td>
<td>Contrast</td>
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<td>557.33</td>
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<td>436.74</td>
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Table 3-1 Stimulus contrast ratio (White stimulus-White background)
<table>
<thead>
<tr>
<th>dB</th>
<th>Stimulus Intensity $L_s - L_B$</th>
<th>Luminance $L_s$</th>
<th>Contrast $L_s/L_B$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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<td>0.6534</td>
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<td>6.34</td>
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<td>0.0512</td>
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<td>0.0151</td>
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<td>0.52</td>
<td>100.52</td>
<td>0.0052</td>
</tr>
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</table>

Table 3-2 Stimulus contrast ratio (Blue stimulus-Yellow background)

Table 3-3 Stimulus contrast ratio (Red stimulus-White background)
<table>
<thead>
<tr>
<th>dB</th>
<th>Stimulus Intensity $L_s - L_d$</th>
<th>Luminance $L_s$</th>
<th>Contrast</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>545.00</td>
<td>555.00</td>
<td>54.500</td>
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<td>1</td>
<td>386.83</td>
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<td>2</td>
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<td>155.42</td>
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<td>126.92</td>
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<td>13.55</td>
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<td>10.51</td>
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</table>

2.1.3 Spectral distribution of Background light and stimulus (white, red, blue)

2.1.3.1 White background spectrum, white stimulus spectrum
White background spectrum, white stimulus spectrum

2.1.3.2 Yellow background spectrum (OG530)

Yellow background spectrum

2.1.3.3 Red stimulus spectrum (RG610 filter)
2.1.3.4 Blue stimulus spectrum (GG400)

2.1.4 Stimulus range: full field 90°, testing stimulus minus eccentric angle conform to the requirement in table 4.

<table>
<thead>
<tr>
<th>Content</th>
<th>minus eccentric angle $\phi$</th>
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<tbody>
<tr>
<td>Nasal</td>
<td>45°</td>
</tr>
<tr>
<td>Bitamporal</td>
<td>70°</td>
</tr>
<tr>
<td>Upper</td>
<td>45°</td>
</tr>
</tbody>
</table>
While testing, nasal testing should be proceeded under Nasal step screening test mode. Botamporal testing should be proceeded under FF135 Screening test mode. Upper and Under should be proceeded under 60-4 threshold test mode.

2.1.5 Stimulus location amount and stimulation time:

a) Stimulus location amount: cannot less than the requirement listed in table 5

<table>
<thead>
<tr>
<th>Eccentric angle $\phi$</th>
<th>Minimum amount</th>
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<td>$0^\circ \sim 25^\circ$</td>
<td>60</td>
</tr>
<tr>
<td>$&gt;25^\circ \sim 50^\circ$</td>
<td>30</td>
</tr>
<tr>
<td>$&gt;50^\circ \sim 70^\circ$</td>
<td>15</td>
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<tr>
<td>Sum</td>
<td>105</td>
</tr>
</tbody>
</table>

b) Stimulus time of duration: Kinetic: Movement speed: $1^\circ$/sec-9$^\circ$/sec adjustable Move mode: Straight line

Sample:
Static: Stimulus time of duration
200ms Stimulus interval:
1) If no response from patient, stimulus interval default as 100~200 ms;
2) If patient response, the system will adjust the stimulus interval according to the weighted average of last 5 patient respond speed, if patient respond slow then the stimulus interval will be automatically prolong. If patient respond fast then the stimulus interval will shorten automatically.

2.1.6 The distance between patient eye and the fixation: 300 mm±10 mm.

2.1.7 The instrument have head location device, and configure movable chinrest and forehead rest, their travel distance from left-right $\geq$30 mm, and the chin rest of chinrest from up-down $\geq$50 mm.
2.1.8 This equipment configure auto calibration function for stimulus intensity, device will calibrate the background intensity and stimulus intensity automatically while operator power on the equipment.

2.1.9 Input power: 300VA.

2.2 Flowchart

2.3 Working principle

The working principle of the perimeter is to examining the sensitivity of the human eye to light stimulus which enable to check the lesions of optic nerve, retina, visual pathway etc. The ambient light enter into retina by refraction system, then the retinal generate the photochemical reactions which produce the bioelectrical which transmitted through the visual pathway to visual cortex, so that the brain could generate the vision through a comprehensive analysis. Any part of the distribution and the trend of the nerve fibers from the retina to the visual cortex could indicate the lesions which happened on the visual pathway. The lesion part, the characteristic and prognosis can be all analyzed by applying the clinic test results according to its visual transform.
Chapter 3 Installation

1. Hardware

EPR-2600 projection perimeter have already been inspected and tested before leaving factory. Please check if all accessories listed on list provided or not, any question, please contact us immediate.

Please check accessories on list.

▲ Main Spare-Parts

- Touch screen
- Forehead Rest
- Chin Rest
- Touch screen power
- Respond device
- Responder
- Power wire
- USB Wire
- Wireless keyboard and mouse
2. Working Environment

Environment temperature: 5°C-40°C
Relative humidity: ≤85%
Atmospheric pressure range: 760 hPa～1060 hPa
Power: a.c.100~240V; Frequency: 50Hz
Inputting power: 300VA

3. Installation environment

3.1 The instrument must be installed in the flat ground with no slope;
3.2 The instrument must be installed in the clean, quiet and dry room;
3.3 The instrument must be installed in the dark room where nothing can be seen within one meter.
3.4 The instrument must be installed with special ground wire;
3.5 The instrument require the exclusive ground wire.

4. Hardware setup

4.1 Connect the Power of the Perimeter.
4.2 Take out the fixed foam inside the Perimeter. Fix the Responder into the connector.

5.Printer Installation

5.1 Click “POWER OFF”→“Quit”.

5.2 Click “background maintenance”, input password “1219”→“OK”
5.3 Insert U disk, click "my computer", open U disk.

5.4 Copy the printer driver into D disk.

5.5 Double-click to open the software
5.6 Click "RUN"

5.7 Click OK
5.8 Insert printer USB, switch on the printer.

5.9 Click OK
6. Install Doro PDF Writer

Needs:
PDF printer driver
U disk

6.1 Install the PDF printer driver
6.1.1 Copy the Doro PDF printer driver in U disk
6.1.2 Copy the PDF printer driver into D disk in perimeter
6.1.3 Double click to start the installation. According to the system prompt, click it in turn until install successfully.
Setup - Doro

Select Destination Location
Where should Doro be installed?

Setup will install Doro into the following folder.

To continue, click Next. If you would like to select a different folder, click Browse.

At least 15.5 MB of free disk space is required.

< Back Next > Cancel

Setup - Doro

Completing the Doro Setup Wizard

Setup has finished installing Doro on your computer.

Start any application and simply print to the 'Doro PDF Writer' printer...

Finish
6.2 Printer Setup

6.2.1 Enter the background maintenance, after inputting the password, choose “control”

6.2.2 Enter “Control Panel”, choose “Hardware and Sound”
6.2.3 Choose installed printer, click the right-hand button to choose “Set as default printer”

6.3. Print Setup
6.3.1 Click “print”, pop-up window as following:
6.3.2 Set the default location as c:\Users

Can change the name of saving document (according to doctors’ needs)

6.3.3 Click “Save” so that you can save PDF in this file. As following:

6.4. Shared displays Setup
6.4.1 Make the perimeter in the same LAN with computer that need to be shared.
6.4.2 Open the control panel of perimeter, choose “View network status and tasks”
6.4.3 Change the type of network into the “Home network” or “work network”

6.4.4 In the control panel, choose “choose home group and sharing options” → then click ”change advanced sharing settings” → then click “Home and work(current profile)”, as following:
6.4.5 If you want the computer also do it, the same step as 4.2 4.3 4.4
6.5 Check Shared files
6.5.1 check the computer name on perimeter
Open the “computer” in perimeter and click the "System properties" to check the computer name, as following picture:
6.5.2 Open the “computer” in the computer that need to be shared, choose “network”

6.5.3 Choose the computer that need to be shared
6.5.4 To view Shared documents
Chapter 4 Software Function

1. Main function of software:

(1) Visual Checking
The main functions of this module are for: visual checking, statistic analysis of the checking result, storing the data and printing;

(2) File Management
The main functions are: file searching, report comparison and printing, document deleting;

2. Start and close software
Power on the machine: press the button to power on the touch screen, then the system will be starting running automatically. The auto calibration time will be around 5 minutes. After the auto calibration, you can enter the system and starting testing.

Power off the machine, on the upper-right corner of software, there is an icon of [ power off], click it and there will be system prompt pop up, click [Power off] and wait the touch screen power off ( to be completely black), then shut down the power at the back of perimeter.

3. Introduction of the Operation System
There are five interface of software.

3.1 Home interface-Patient data: Mainly for register new patient information, test record recall, import and export database. Image as followed:
3.2 Testing interface: Mainly for testing monitoring, program selection, testing strategy selection, save test report etc. See followed the image.

[NEW] Auto pupil monitoring – The system will adjust the chinrest automatically according to pupil monitoring. Doctors do not need to monitor the whole testing after starting the test. 【M】 for manual control, 【A】 for automatically control. Press the letter for changing the mode.

Start test

Stop the test

Save the test result

Setting the parameter

Select test program

Test another eye

Diagnosis inputting
3.3 Testing program customize:

3.3.1 Firstly please click the bottom left in the interface to set up a new programme, then input the programme name, and click to save the defined programme as following

3.3.2 There are four method to choose the dot position for user defined programme
3.3.2.1 Stationing the test dots as with circular, Click to input the inner circle and external circle scope and the space between dots, the unit will be the centrifugal degree, after input all these information, the dots will be generated automatically. Find followed the image.
3.3.2.2 Stationing the test dots with rectangle, Click to input the coordinate degree of opposite angles of the rectangle, and the space between dots, the unit will be the centrifugal degree, after input all these information, the dots will be generated automatically as following:

3.3.2.3 Input the coordinate degree inside of the X and Y coordinate bar directly, the unit will be the centrifugal degree, after input the coordinate degree click as following:

3.3.2.4 Click setting “test scope” first and then the centrifugal degree of “test scope”
And then click the testing dots you want to choose directly as shown below:

3.4 Printing interface
The operator can choose the test report mode as their needed. There are Single, 3in1, and Overview test report optional.
In the test report interface, you can choose the function of JEG export, then save the test report as an JPEG format to your removeable disk.

3.5 System setting
This is mainly for system setting such as language setting, hospital name setting, double name, Gaze tracking and head tracking setting.
Double Name: For EU, USA and AUS, etc. market which need the first name and family name inputting.

Gaze Tracking/EyeMove: Tick on for activating the gaze tracking function which will generate gaze tracking curve and Auto pupil measurement function.

4. Operation Step

4.1 The patient’s preparation

4.2 The doctor’s Preparation

4.3 Patient’s examination

4.4 Treating after examination

4.5 Print report

5. Doctor’s Preparation

5.1 Power on the perimeter and Enter into the perimeter system as the way in 5.2;

Notes:

After powering on the perimeter, it will take 3~4 minutes for a self-checking by running the stimulus lights automatically. This will guarantee the test accuracy. Do not treat it as an system error and do not enter into testing procedure while self-checking in processing, the system will not run correctly. Enter the testing only after self-checking finished.

5.2 Input the patient’s information;

5.3 Operator should inform patient the examination process before the examination:

1) The patient should be familiar with the responder: demonstrate him the right way of responding, the way of clicking the responder, and make him relax as soon as possible.

2) Demonstration him the fixing sight

3) Cover the patient’s eye which will not be tested with an eye shroud.

4) Put the patient’s jaw on the right side of the chin rest when examining the left eye; put the patient’s jaw on the left of the chin rest when examining the right eye. If the patient testing Esterman binocular program, patient can either put their chin on left or right chinrest, but doctor need to adjust the cross in monitoring window aimed at center of patient’s nose
5) Put his forehead on the ribbon of the forehead bracket slightly.
6) The eyeball shall stare at the center fixation light, and cannot move, only glance to perceive the stimulus light and respond to it by pressing the responder

6. Starting Checking

6.1 Before you start the test, you should Click the [Registe] icon on the main interface to setup the patient profile and input the info of patient, a patient profile will be saved automatically after you clicking [OK].

```
6.1.1 Operator must input the information of Patient ID, Name, Birthdate, Gender, and eye. Other information filling is optional for system, not a must. Patient with myopia, hyperopia and astigmatism will need to correct their diopter before starting the testing, Sunkingdom perimeter set trial lens holder for this function. Click on the icon of [Auto Calculating] and inputting patient’s real refractive diopter, then click on the [Auto Calc] to get the corrected lens you need to put on perimeter trial lens holder. For example, if we inputting -5.0D under Sphere of Right eye, click on Auto Calc, the system will generate the corrected lens need to adapt for patient is -1.75D. Doctor should test the patient with a -1.75D corrected lens.

6.1.2 After finishing the information inputting and click [OK], the system will automatically transfer into testing interface.

6.2 Adjust the eye position
According to the patient eye position, operator can adjust the eye position by:
6.2.1 Function button under perimeter touch screen to control chin rest up-down-left-right
6.2.2 Function icon in software
```
Click the direction arrow by touch screen or mouse, and change the mode of 【M】 or 【A】

6.3 The default testing program is 24-2, and strategy is Auto threshold, if you want to change to other program, click at the , select the program you want to use as following image.

There are 6 series of test program: Threshold testing, Screening testing, Specialty program, customize, kinetic testing, and kinetic customize program

If operator wish to set another test program as default program, enter into the upper interface, click at [set to the default ], you will enter into a new interface, choose the program operator wish to set to default.

If operator want to change the strategy, click at and choose as below
Notes: The program and strategy will automatically resume to default value once currently testing finished. System will not memory your last strategy setting. Operator need to proceed this process if default value needed to be changed.

6.4 After operator setting all the parameter, click to start testing. During the testing, doctor can use the function of [Auto Puil] monitoring so that do not need to monitor the whole process personally. The system will adjust the chinrest the headrest automatically.

6.4 [Pause] and [Stop] testing
During testing, operator can Pause and Stop testing by clicking icon locate at right side of testing interface.

6.5 After testing, you should save the test result by clicking at , and then you can input diagnosis opinion in the main interface. Also if you wish to test another eye for same patient, click [test another eye], and do the test for same patient again.

6.6 Click at , choose the test report you need and preview. There are Single, 3in1, and Overview test report optional, and print it.

6.7 If your patient have come to you and test for several times, you should use the Overview report to see the progressing of patient.
For doing more than one test with a same patient, you should click to proceed.
For GPA analysis, at least 3 reports of (24-2 or 30-2) of same client shall be generated before running this function.

6.8 Patient List
Through this section, you can delete a patient profile, and find/recall a patient profile by clicking the icon of [Search] after you inputting the keywords.

6.9 Test report reliability
Number of testing dots means the total number of testing dots of the perimeter

(1). False Negative Errors (False NEG Errors):
False Negative errors occur when the patient does not respond to a suprathreshold stimulus in an area where the threshold has already been measured. The interpretation of false-negative errors is not as clear as that of false-positive ones, because they can be produced by a variety of sources. Visual field test results of patients whose false negative errors exceed 20% are not considered reliable. With the severe visual defect patient, even they cooperate with the test very well, their False Negative errors can be higher than 50%, so for the abnormal visual field, the application value of the false
negative rate is limited.

(2). **False Positive Errors (False POS Errors):**

False positive errors occur if patients respond when no stimulus is presented. For the purposes of this study, we define a false positive response as randomly occurring, independent of stimulus presentation, and hence independent of any monitored response window. The system will count it and if it’s over 15%, the test report will be treated as unreliable.

(3). **Fixation Loss**

Fixation losses occur when the patient’s eye wanders from the fixation target. Visual field test results of patients whose fixation losses exceed 20% are not considered reliable.

(4). **Percentage(Expressed as Letter P)**

- Less than 5 people within 100 people have this kind of visual situation
- Less than 2 people within 100 people have this kind of visual situation
- Less than 1 people within 100 people have this kind of visual situation
- Less than 0.5 people within 100 people have this kind of visual situation

(5). **Total deviation**

The difference between a patient’s threshold sensitivity and the age-corrected normal sensitivity from the perimeter’s internal normative database at each tested location of the visual field.

(6). **Pattern deviation (PD)**

The localized loss at each tested point, after the removal of the effects of any generalized loss; pattern deviation decibel (dB) values are the total deviation values minus the general value

(7). **Pattern standard deviation (PSD)**

It is a measurement of the degree which the shape of the patient's measured field or hill of vision departs from the "NORMAL" age-corrected reference field model. The value is expressed in decibels and any value of 2dB or greater will have a (P) value next to it indicating the significance of the deviation

(8). **Glaucoma Hemifield Test (GHT):**

It is for automated evaluation of single static threshold visual field test results in glaucoma. It is also constructed to detect field loss that is symmetric around the horizontal meridian.

- Outside normal limits. The GHT is described as “outside normal limits” when differences between a matched pair of corresponding zones exceeds the difference found in 99% of the normal population, or when both members of a pair of zones are more abnormal than 99.5% of the individuals with the normative population.
Borderline. The GHT is described as borderline when matched pairs of zones are abnormal at the 97th percentile within the normative database.

General reduction of sensitivity. Visual Fields (VF) are described to have generalized reduction of sensitivity when both conditions for “outside normal limits” are not met, and the best region of the VF is depressed to a level at the 99.5th percentile within individuals of the normative database.

Abnormally high sensitivity. The GHT is described as having abnormally high sensitivity when the overall sensitivity in the affected region of the VF is better than 99.5% of individuals within the normative population.

Within normal limits. VFs are described as being within normal limits when none of the above conditions are met.

(9). Mean Defects: (MD):
The average of the examination value of all spots minus normal value, it shows the condition of the patient’s vision sensitivity comparing with those of the same age.

(10). Short Floating (SF):
It shows the light sensitivity deviation appearing in one perimeter examination process; it shows the reaction consistency in the course of examining. The bigger the value is, the worse the cooperation the patient shows. The short wave will become height in the scope of abnormal visual field. When more scope in the visual field become abnormal or the degree of abnormal increases, the whole wave will become higher.

(11). Decibel (dB)
In perimetry, the intensity of a stimulus expressed as 0.1 log-unit of attenuation of the maximal available stimulus; the higher the dB, the dimmer the stimulus intensity.

(12). Fixation monitoring
Assessing the ability of the patient to maintain gaze by the experimenter’s observation.
6.10 Introduction of test parameter

6.10.1. Threshold test program:

(1) 30-2 (recommend)
Main applications: Common test, glaucoma, optic nerve disease, retinal disease
Test Range: 0° ~ 30°
Test points: 76 dots

(2) 24-2
Main applications: Common test, glaucoma, optic nerve disease
Test Range: 0° ~ 24°
Test points: 54 dots
(3) 10-2
Main applications: Macular disease, retinal disease, optic nerve disease, advanced glaucoma
Test Range: 0°~10°
Test points: 68 dots

(4) 60-4
Main applications: Retinal disease, glaucoma
Test Range: 30°~60°
Test points: 60 dots
(5) Macula program:
Main applications: Macular disease
Test Range: 0° ~ 5°
Test points: 16 dots

(6) Nasal step program:
Main applications: Glaucoma
Test Range: 30° ~ 50°
Test points: 14 dots
6.10.2. Screening test program

(1) C-40
Main applications: Common test
Test Range: $0^\circ \sim 30^\circ$
Test points: 40 dots

(2) C-76
Main applications: Common test, glaucoma, optic nerve disease
Test Range: $0^\circ \sim 30^\circ$
Test points: 76 dots
(3) FF-81
Main applications: Full-field screening test, retinal disease, glaucoma, optic nerve disease
Test Range: 0° ~ 60°
Test points: 81 dots

(4) FF-120
Main applications: Full-field screening test, retinal disease, glaucoma, optic nerve disease
Test Range: 0° ~ 60°
Test points: 120 dots
(5) FF-135
Main applications: Full-field screening test
Test Range: 0° ~ 55°, Temporal side 87°
Test points: 135 dots

6.10.3. Specialty test program
(1) Esterman monocular
Main applications: Driver test for single eye
Test Range: 0° ~ 60°,
Temporal side 75°
Test points: 100 dots
(2) Esterman binocular
Main applications: Driver test for double eyes
Test Range: Double temporal side 150°
Test points: 120 dots

(3) Superior 36
Main applications: Screening upper visual field
Main applications: upper visual field 60°
Test points: 36 dots
6.11 Test Strategy

1. Threshold Strategy
   (1) **Full Threshold Strategy**: It adopt 4-2 as standard for response
   (2) **Auto Threshold Strategy (recommend)**: Calculate and correct the stimulate value in the whole process of testing. Based on the response
   (3) **Fast Auto Threshold Strategy**: Calculate and correct the stimulate value in the whole process of testing, variation range will be 50% faster than auto threshold strategy. Based on the response

2. **Screening Strategy**
   (4) **Zone 2**: Stimulate with superior threshold value, Responded treat as normally
   (5) **Zone 3**: Stimulate with superior threshold value, Responded treat as normally. If the patient do not response, it will stimulate with the brightest light, If the patient responded, it will be recorded as relatively scotoma, if still without response, it will be recorded as definite scotoma
   (6) **Single Stimulate**: Stimulate with stationary brightness

6.12 Perimeter Academic Discourse

**Different Light Threshold**: Under the circumstance of stationary lighting, if the stimulate spot visibility is 50%, then this spot stimulate intensity will be different light threshold

**Vision Island**: The altitude means light sensitivity, the area means the islands scope, image the visual field as an island in the sea, every spots of the retina will corresponding a position on the island. The spots fixation spot which is the macular area with highest sensitivity, constitute the peak of the island, and the around area the sensitivity will be lower, which constitute the circum area of the vision island.

**Visual Isopter**: The vertical height of the spot on vision island means the visual acuity, the lines on the same vertical height is the isoheight, in visual field the name is isopter.

**Physiological Blind Spot**: The optic nerve which without photoreceptor cell is located at 15degree bitamporal of the visual fixation point, there area can not see things, that is the physiological blind spot, in the visual island its shown as a vertical deep hole.

**Tubular visual filed(Center visual island)**: The visual field shrink to centrality extremely. Only remaining the visual field about 5-10degree

**Sector-shaped Depression (Wedge-shaped Defect)**: The board line of the visual field defect will move along two ways of the visual field, the defect will look like a sector, the tip is point to the physiologic blind spot. Its meanly appeared in the bitamporal defect
**Tetarfanopia Depression**: Its also named quadrantanopia, the two board line of the defect is one vertical diameter line and one horizontal diameter line, the defect area occupied a whole quadrant

**Hemoanopia**: There are vertical and horizontal hemoanopia two types. For vertical, the board line is central vertical, for horizontal the board line is horizontal diameter line

**Macular Sparing**: Its mainly appeared in the vertical hempanopia, which will retain about 5degree visual at the center area, the macular sparing is remind the defect location is at visual pay-off

**Scotoma**: Means the abnormal visual field reduce area or vision disappear area, that is the sensitivity of this area is lower than other area around, all the scotomas except the blind spot and verse shadow are abnormal

**Centralcecal Scotoma**: The scotoma which covered the fixation point, accompany with hypopsia, that means the sickness have been influenced the retina or the fibre bundle of the optic nerve

**Blind Area Scotoma**: The center scotoma which covered the bind spot, which is remind the damage of macular fibre

**Paracentral Scotoma**: It means the visual defect in the area of center5-25degree, the diameter is bigger than 5degree, the depth is bigger than 5dB

**Arcuate Scotoma**: The arcuate shaped scotoma which connected the area which around fixation point upper and lower and the blind spot. The nasal side will wider than bitamporal, and suddenly disappear at horizontal meridian line

**Ring Scotoma**: The connected the horizontal joint of upper and lower arcuate scotoma surround nasal side of central fixation area

**Relative Scotoma**: When the stimulate light get stronger, the scotoma will disappear

**Absolute Scotoma**: When the stimulate light adjusted to the most brightness the patient cannot see it still, the physiologic scotoma is a topical absolute scotoma

**Junctional Scotoma**: Caused by the damage of the junction area of one side optic nerve and optic chiasma. Shown as hemianopsia at ipsilateral central scotoma and contralateral bitamporal upper quadrant

**Nasal Step**: The threshold value of up and down side of nasal vision horizontal meridian are entirely different

**Localized Depression**: The light sensitivity reduce at locality, but not form to scotoma, its named
localized depression, its shown as visual isopter localized depression which is different to scotoma, the scotoma are surrounded by relatively normal vision field, but at least one direction of the localized depression without clearly board line(Normally its telecentric direction). Nasal step, bitamporal visual isopter and wedge-shape depression are the typical localized depression

**Generalized Depression:** Light sensitivity of entire visual field consistency decline. When use kinetic checking it shows all visual isopter shrink centripetalism, when use static checking it shows the dB value decline consistency, the threshold value is generally higher

### 6.13 Data Recover and Backup

1. **Medical record(Test report) backup**

   The software will be default installed in C:\Perimeter, and the data will be stored in C:\perimeter\dbfs. For most of time, the system is safe and reliable

   But as the report is very important, to avoid lose data because of virus or computer failure, we advice to backup the the report data weekly or monthly

   Backup method: Quit from the perimeter software, copy the whole folder of C:\perimeter\dbfs and paste it to the target folder, we suggest to discs data and label the date on it

2. **Medical record(Test report ) recover**

   Normally you don’t have to recover the data, But sometimes the computer may broken because of virus and system failure, you have to format folder C which will lead to data lose while reinstall the system, after fixed the computer you have to reinstall the system and recover the data from the back up folder.

   Firstly select the one you want to recover from the back up, copy and paste them to the same folder of C:\perimeter
Chapter 5 Maintenance

In order to obtain better use effect and longer life, environment without interference and correct maintenance method is very necessary.

5.1 Equipment interference sources

Please to avoid or be away from the following sources or to take isolation measures during the machine operation and production:

5.1.1 The large power electrical facilities, high power wireless transceiver equipment such as big transformer and communication station;

5.1.2 Moving Vehicle, airplane and big mechanical equipment will interfere with equipment;

5.1.3 Other medical instruments, especially the radio equipments;

5.1.4 Other human or natural electromagnetic interference which can’t be avoid, such as solar activity and cosmic radiation.

5.2 Common Problems

<table>
<thead>
<tr>
<th>Breakdown</th>
<th>Cause</th>
<th>Treating methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can’t start system or system doesn’t work</td>
<td>Failed to setup USB device</td>
<td>Re-set USB device</td>
</tr>
<tr>
<td></td>
<td>Voltage isn’t enough or too high</td>
<td>Replace power</td>
</tr>
<tr>
<td></td>
<td>Memory lost or damaged</td>
<td>Insert again or replace the computer memory card</td>
</tr>
<tr>
<td></td>
<td>Infect virus</td>
<td>Use anti-virus software to scan virus</td>
</tr>
<tr>
<td></td>
<td>Crashes while working or show that the program is wrong.</td>
<td>Open too many application programs, re-start the computer</td>
</tr>
<tr>
<td></td>
<td>Hard disk is damaged</td>
<td>Replace the hard disk</td>
</tr>
<tr>
<td>Nothing in the screen when opening it</td>
<td>LCD monitor doesn’t display any image</td>
<td>Properly connect the wire, switch on power</td>
</tr>
<tr>
<td>The responder does not work</td>
<td>Connection wire is damaged</td>
<td>Replace the Connection wire</td>
</tr>
<tr>
<td></td>
<td>Pressing button is damaged</td>
<td>Replace the pressing key</td>
</tr>
<tr>
<td></td>
<td>The controlling card in the stimulator does not work</td>
<td>Replace or maintain the controlling card</td>
</tr>
</tbody>
</table>

5.3 Maintenance
5.2.1 You should firstly turn on the power switch of the monitor and then turn on the power switch of the main frame when opening the machine. When closing it, you should firstly log out, and then turn off the power supply of the monitor and the main frame.

5.2.2 Scan disk and arrange pieces in a certain period.

5.2.3 Keep air clean, dry; use air-conditioner if possible

5.2.4 If the instrument has not been used for a long time, you should supply power for the main frame at intervals. (Usually three times a week, four hours one time)

5.2.5 If there is something wrong with the instrument, please contact us immediately or ask the special maintainers to maintain.

5.2.6 Clean and Disinfection

5.2.6.1 Cleaning the perimeter bowl
   Use clean gauze, clean the perimeter hemisphere by clean water

5.2.6.2 Disinfection of chin rest, headrest and respond device
   Use absorbent cotton, clean and disinfection the chin rest, headrest and respond device by ethanol

5.3 Fusing Parts:

   **Model of fuse:** φ5×20mm, T2A L250V

   **Replace the fuse:** Screw off the cover of fuse, replace it with a new good fuse, then cover again (see the picture of the perimeter)
Chapter 6 Transportation and Storage

6.1 The packaged perimeter can be transported by ordinary vehicle, please pay attention to moisture, heavy load, and avoid severe vibration during transportation.

6.2 Should be stored in room where the temperature is between 0 ℃ ~ 55 ℃, the relative humidity is less than 85%, the atmospheric pressure is between 700 hPa ~ 1060 hPa, non-corrosive gases and well-ventilated.

6.3 If the installed equipment needs to be moved or be transported in a short distance, all the cable between the equipment must be removed before the transportation. If the instrument must be transported in a long distance, re-pack it into its package for transporting
Chapter 7 Declarations

We can provide you with the information of those parts need maintained.

1. We will provide maintenance and support.
2. We will maintain the machine for free for one year since the date of purchasing if the machine is operated according to the operation instruction.
3. During the maintenance, we will charge fee for the maintenance under the following conditions
   - Do not use, maintain, store the instruments according to operation instruction;
   - Take apart or amend the instruments without the permission of US Ophthalmic LLC, which cause damage;
   - Damages is caused by accidents, use wrongly or caused by other major nature factors.
   - Please forgive us for not informing you if the design or the assigned type changes.

Name: US Ophthalmic LLC

Address: 9990 NW 14 ST STE 105
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