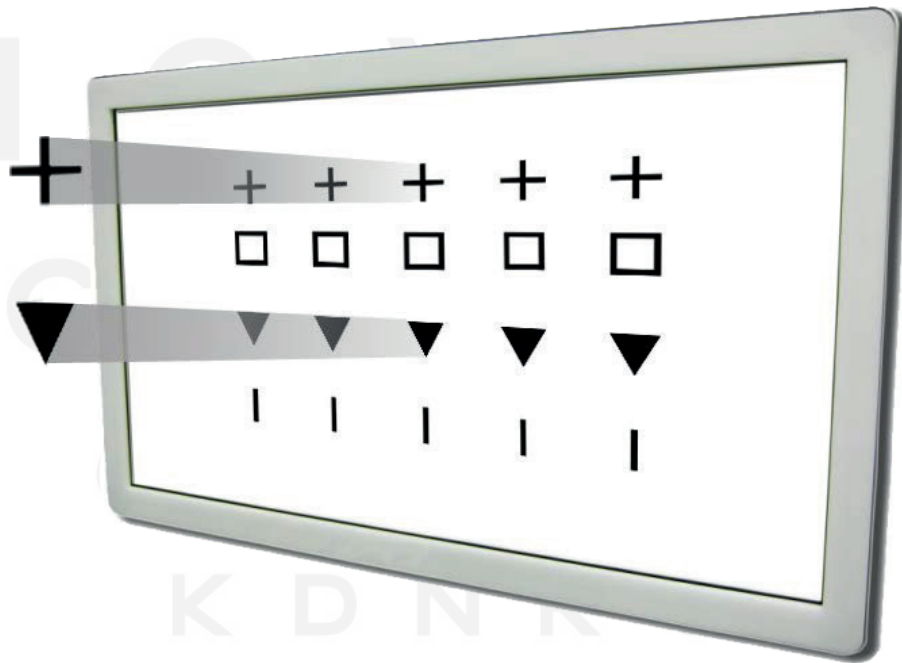


Polarized Vision Chart System

(USER MANUAL)

(Full HD 24" TYPE)



**On
Spot**
INSTRUMENTS

IMPORTANT NOTICE

Electromagnetic waves discharged from mobile phones, radiotelegraphs, wireless toys may cause malfunctioning of this equipment. Please keep any device which may affect away.

It is a compulsory obligation to learn the operation manual completely, before installing, use, repair, wash or adjust the auxiliary parts of this equipment. For user's safety, please use this equipment only after reading all the instructions included in this manual.

Pay utmost attention to the word "WARNING" or "CAUTION,"

All of information in this manual is checked out carefully. However, OnSpot instruments , takes no responsibilities of the results caused by default, omission, or mishandling.

OnSpot instruments , has right to modify the product itself or specifications of without any prior notice, as well as rights not to renew that modifications on this manual.

SAFETY INFORMATION

Accessories connected to the analog and digital interfaces must be certified according to the respective IEC/EN standards (e.g. IEC/EN 60950 for data processing equipment and IEC/EN 60601-1 for medical equipment).

All configurations shall comply with the system standard EN 60601-1-2:2001. The person who connects additional devices to the signal input part or signal output part configures a medical system, and is responsible that the system complies with the requirements of the system standard EN 60601-1-1:2001.

If it's not clear, take up with qualified technical service department or your local representative.

For EU Countries

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

Symbol	Description
	Installation part type B
	Protective earth (ground)
	An altering current
	Warning for safety (look at the attached document)
	Power off (unplug)
	Power on (plug)
	Do not throw wastes in inappropriate place away
	Manufacturer
	Date of Manufacturer
	Authorized Representative in the European community

General Safety Information

Save the safety guidance on this manual when you find below **WARNING** or **CAUTION** marks on the label. If you ignore these signals, it could cause wound or accident. An intensive reading and complete understanding of this manual are necessary before use.

Warning for Safety

 WARNING	It could lead to fatal situation if ignore this warning.
 CAUTION	If it may result hazardous situation if don't care. It could lead to a slight wound of you or others, or malfunction of this equipment.
NOTE	Significant information about installation, operation, basic safety and handling of this equipment. Please read to prevent mis-handling.
 WARNING	Use device that meets standard power requirements on the rating plate. Unless, it could end up with a fire or an electric shock.
 WARNING	Please connect or separate the electric cables only after unplugged. Don't touch this equipment with wet hands. Unless, could be damaged by electric shock that cause fatal situation or severe wounds.
 WARNING	Plug into its own individual electrical outlet. Check it out if you happen to find, Smoke, smell, or a loud noise - When you spilt a fluid on this product, or when any metal was wedged - When you dropped this product or when outside case was broken
 WARNING	You must not disassemble or reconstruct this product. It could lead to a fire or an electric shock. Be aware that high-voltage dangerous parts are installed in this equipment. Touching with these parts may cause serious wounds.
 WARNING	Please keep the temperature at 10°C~40°C and humidity at 30%~75% for normal operation. It must not be exposed to watered place or where much water are splashed. Do not put any container or product which contains liquid or gas, besides this equipment.
 CAUTION	Earthing cables are packed in this equipment. Always connect them to the earthed electrical outlet to avoid electric shock.
 CAUTION	PO-1001P main body and stand are heavy. Fix PO-1001P to robust refraction table.
 CAUTION	Be careful not to drop any metal or dust inside the equipment. Do not unplug with the cable connected.
 CAUTION	Don't weigh excessive power on each junction of cables. In case of any damage of connector or power outlet, please call the agent to repair.
 CAUTION	Do not store or install this equipment in a place where is apt to explore, or with volatile chemicals or combustibles.
 CAUTION	When put PO-1001P to the refraction table, the table should be in good condition, earthed for reduce an electric shock.

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1. Outstanding features

Using 24" FHD wide monitor with high resolution and clear charts guarantee wide and broad view for comfortable test.

- User can adjust test distance by the environment (1.5m ~ 6.5m).
May install at small place if use mirror function.
- Supported with high quality polarized filters and anti-reflective multi-coated LCD panels.
- Contrast adjustment function may be able to test contrast sensitivity test especially informative to cataract patient.
- Black-white reversal function is convenient to test patient who had Lasik surgery.
- Program upgrading is easy by USB flash memory.

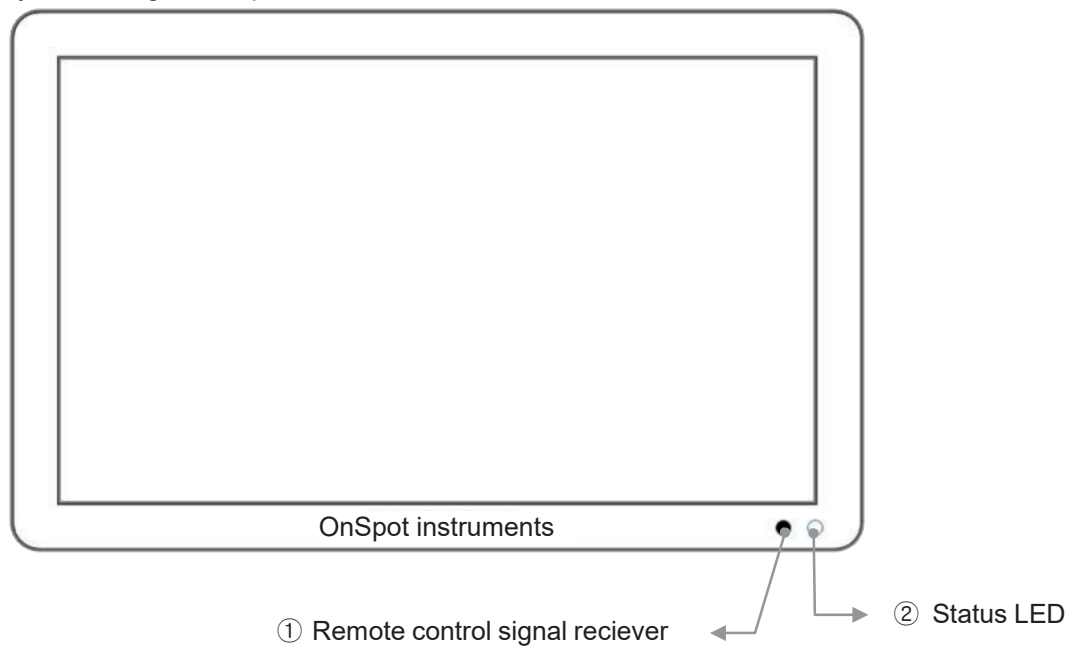
2. Instructions for Use

- Electromagnetic waves discharged from mobile phones, radiotelegraphs, wireless toys may cause malfunctioning of this product. Please keep any device away.
- All information in this manual is checked out carefully. POLAOPTO Co., Ltd., take no responsibilities of the results caused by default, omission, or misuse of it.
- OnSpot instruments , has right to modify the product itself or specifications of the product without any prior notice, as well as rights not to renew that modification on this manual.
- Users should observe user's manual or explanations on service manual. The others should be handled by qualified technician or service agent.
- Be careful not to load excessive shock or vibration on this product.
- Take up with service agent when you move this product or connect it with others.
- Outside lighting may affect test result. Use it in a proper test room.
- Keep the monitor clean always, since monitor lenses may affect test result. Please check the status of monitor before use.
- Shock may damage the inside and outside of the product. Handle with care.
- Please keep the temperature at 10°C~40°C and humidity at 30%~75% for normal operation. It must not be exposed to watery place or where much water are splashed. Do not put any container or product which contains liquid or gas around.
- When combine with refraction table, the table should be properly earthed for getting rid of electric shock.

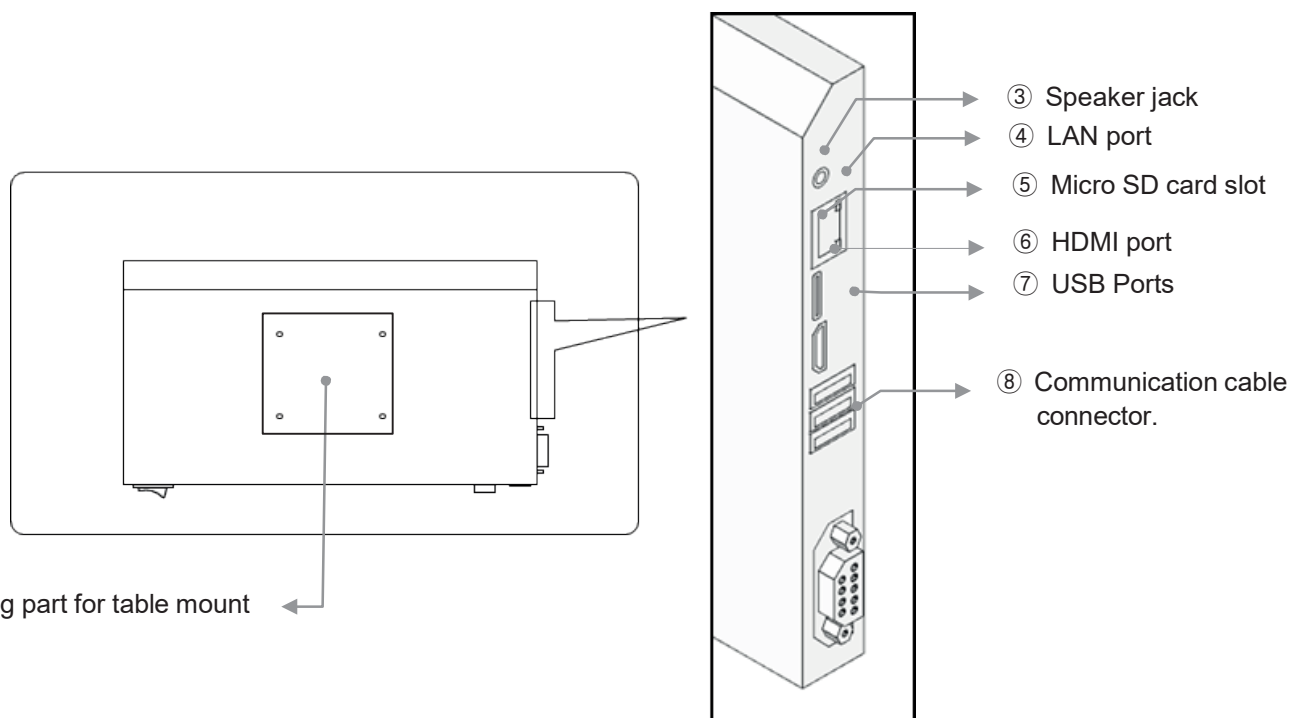
3. Functions of Each Part

3.1. Body

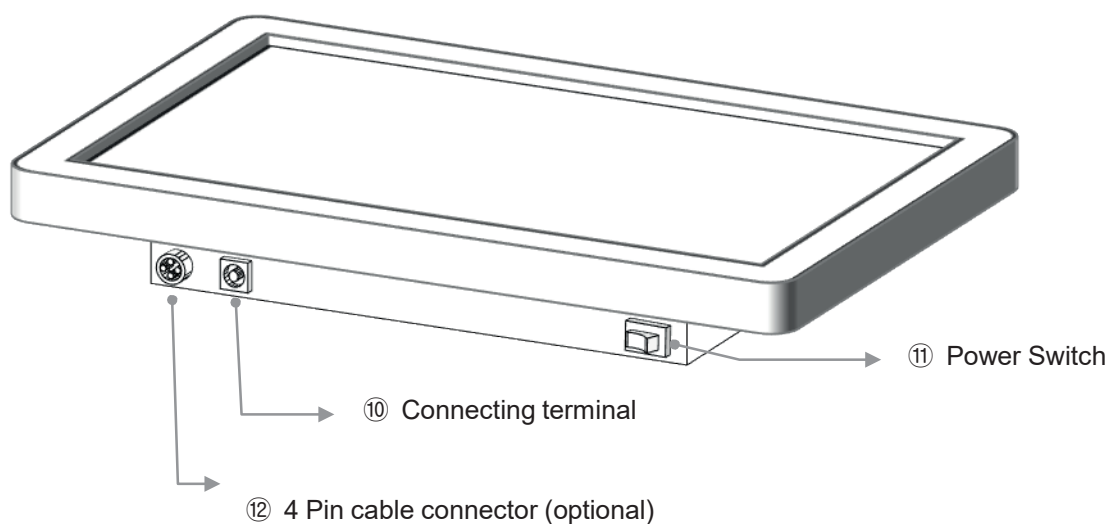
Main body is most significant part.



[Figure 3-1] Front side



[Figure 3-2] Rear side



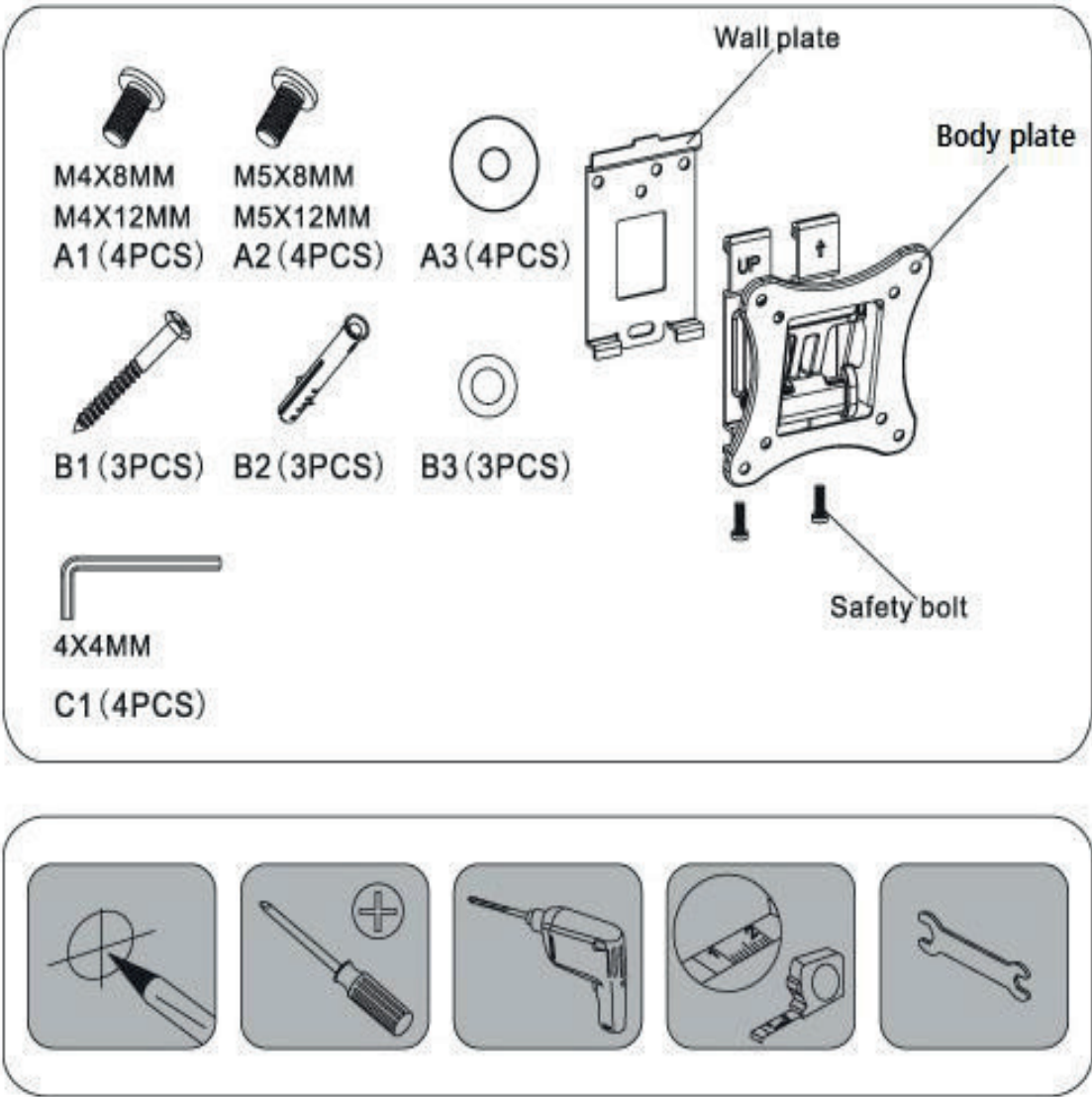
[Figure 3-3] Bottom side

Descriptions	Function
① Remote control signal receiver	Receiving signal from remote controller
② Status LED	A led lamp for check status Red: The System is OFF Green : The system is Operating
③ Speaker jack	External Speaker is available..
④ LAN port	For using online contents -Web browser
⑤ Micro SD card slot	External memory storage
⑥ HDMI port	HDMI port for debugging. (engineers only)
⑦ USB Ports	3 USB ports to connect with other equipment.
⑧ Communication cable connector	A terminal to connect with digital refractor, UDR-800.
⑨ Connecting part for wall mount	A part which connecting with wall mount. Use four bolts for connection.
⑩ Connecting terminal for adaptor	A terminal to connect electrical outlet with this equipment. Don't plug into adaptor before connecting with main body.
⑪ Power Switch	ON / OFF Switch
⑫ 4 Pin cable connector	Optional port

[Table 3-1] Main Body

3.2. Wall mount

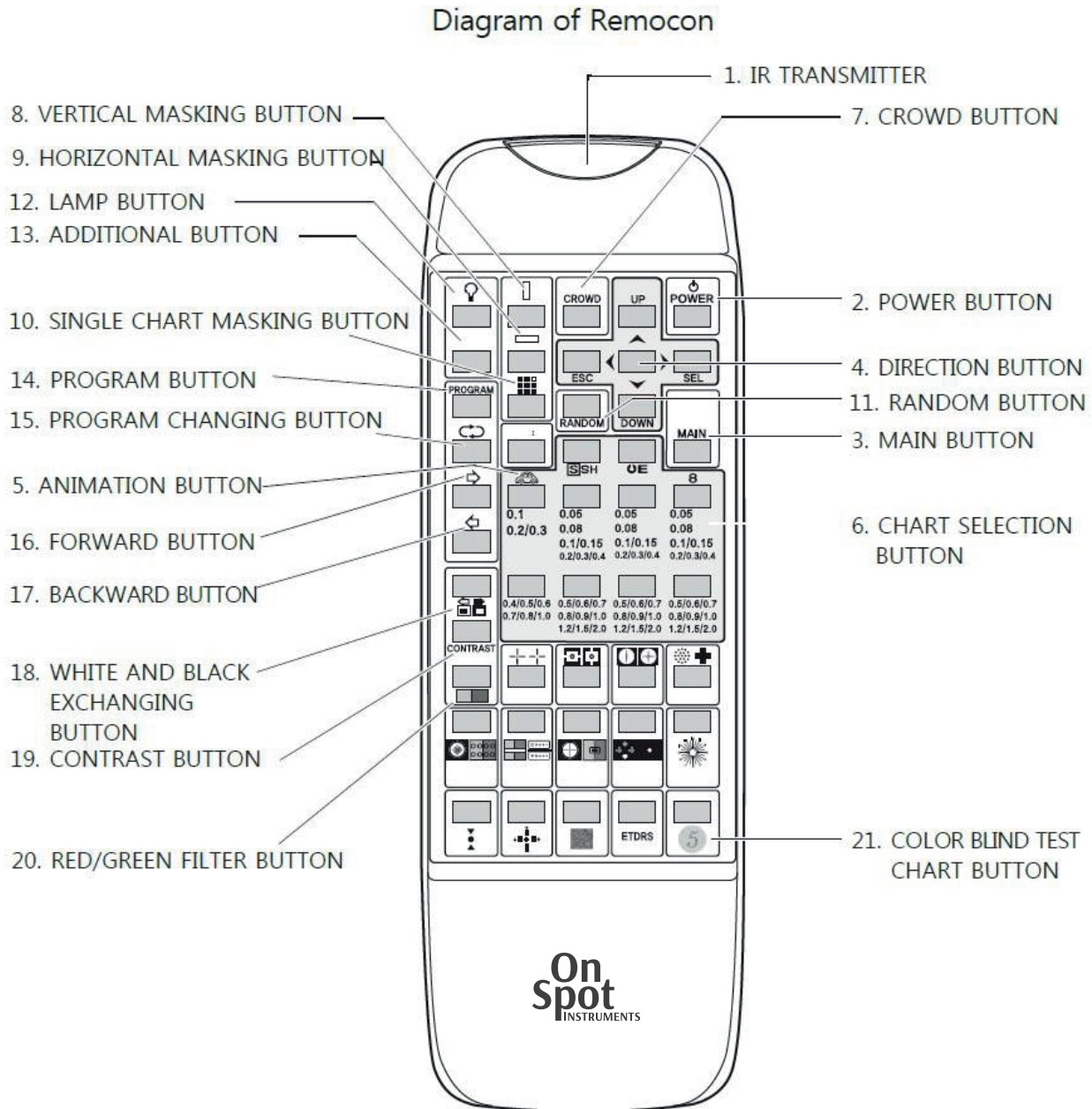
To install PO-1001P on wall, assemble wall mount and main body. Floor stand or table stand are also available to connect.



[Figure 3-4] Rear side

3.3. Remote Controller

User can turn on/off PO-1001P and switch charts with remote controller.



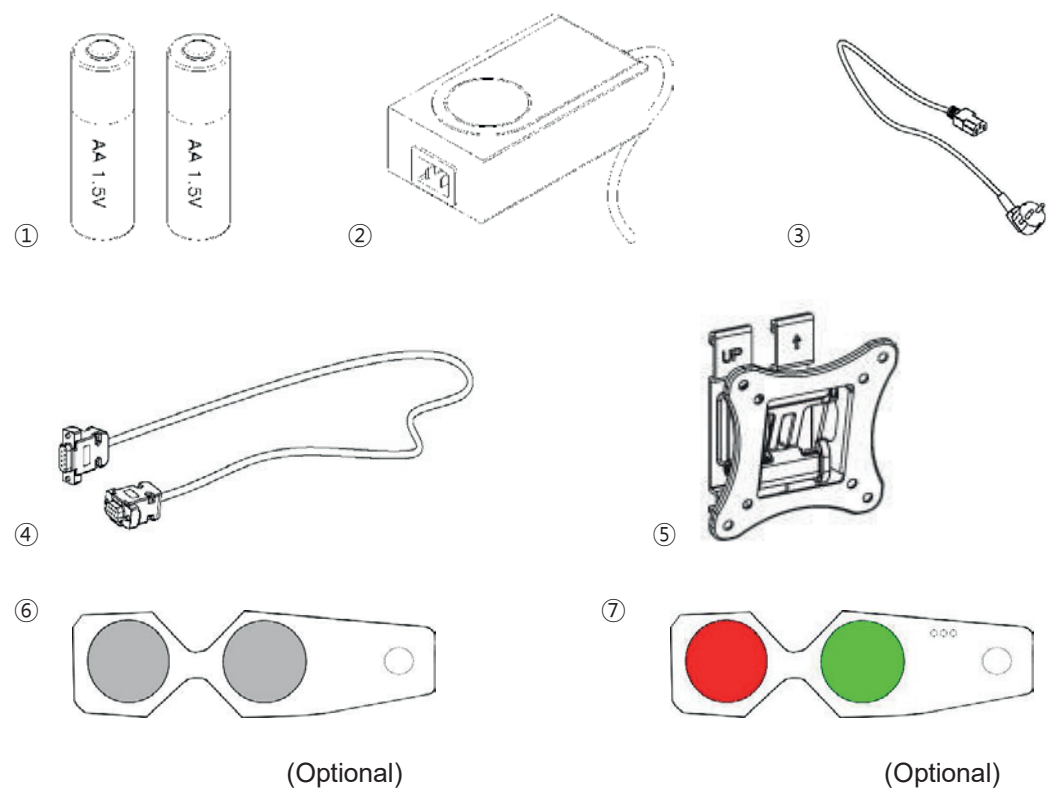
[Figure 3-5] Remote controller

Descriptions	Functions
1. IR TRANSMITTER	Transmit IR signal to the system
2. POWER button	Power on or off the monitor and remote controller
3. MAIN button	Enter into the SETUP mode
4. Direction button	UP/DOWN/RIGHT/LEFT direction key and confirm button
5. Animation button	Display moving pictures during predetermined time.
6. Chart selection button	Select various charts being displayed on the screen.
7. Crowd button	It is a option of "single chart displaying mode" with or without 4 lines around a chart to confirm whether a patient can see it or not.
8. Vertical masking button	Display only single vertical line
9. Horizontal masking button	Display only single horizontal line
10. Single Masking button	Display only single chart
11. RANDOM button	Change displaying charts randomly
12. Lamp button	Backlight of screen ON/OFF
13. Additional button	Display random dot charts
14. PROGRAM button	Display charts of programmed examination routine
15. PROGRAM changing button	Select a series of chart of a programmed examination routine continuously
16. Forward button	Go to a next chart in a programmed examination routine.
17. Back button	Go back to a previous chart in a programmed examination routine
18. White and black exchanging button	Change the color of white into black
19. CONTRAST button	Select the contrast of chart : 10%,20%,30%.....90%,100%
20. Red/green filter button.	Change the color of background from white to red and green
21. Color blind test button	Display 21 color blind test charts

[Table 3-2] Remote controller

3.4. Accessories

Red/Green, polarized glasses are optional parts.



[Figure 3-6] Accessory

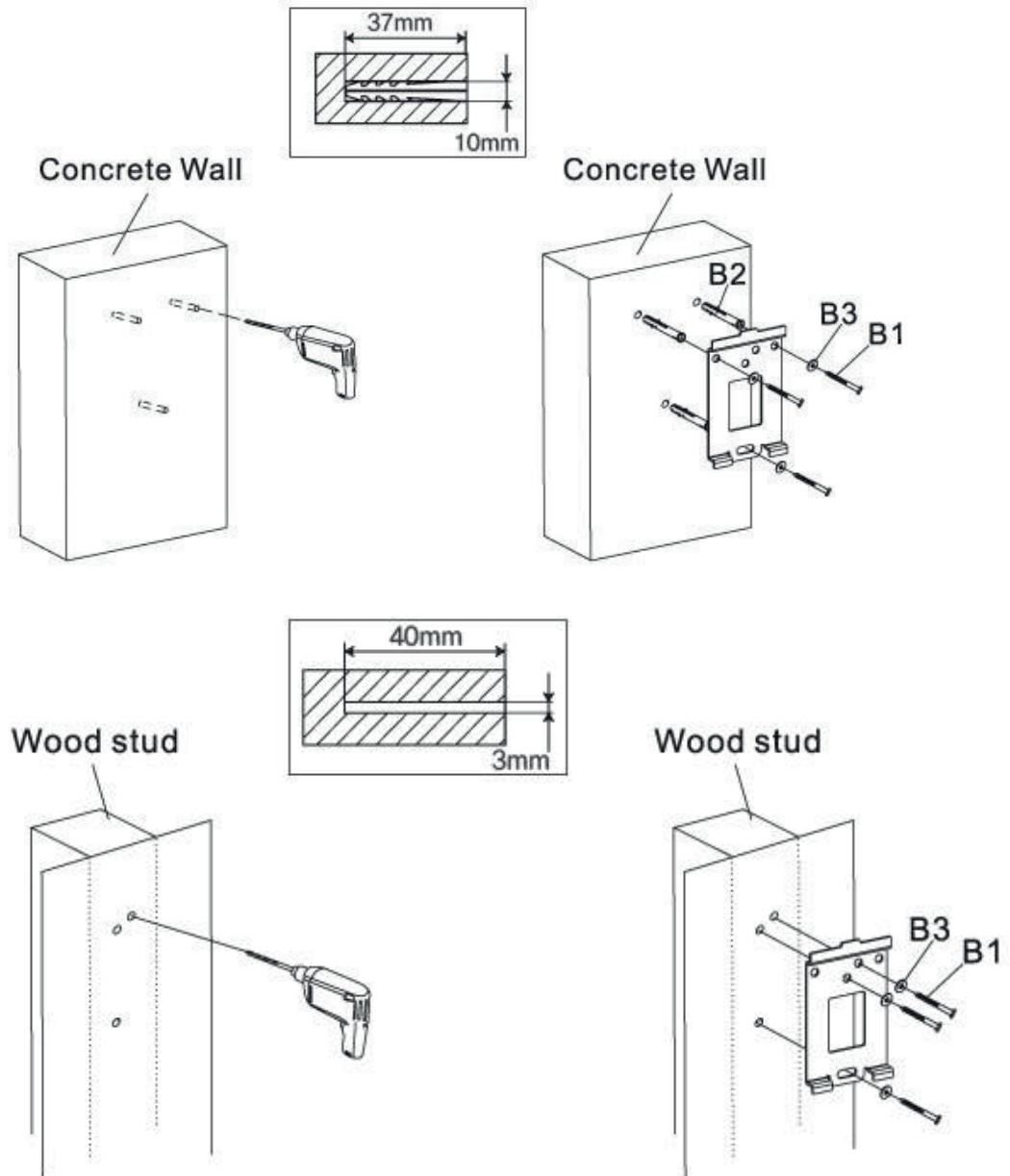
Descriptions	Functions	Q'ty
① Battery	Size: AA , 1.5V	2
② Adaptor	Supplying power to main body	1
③ Power cable	Supplying power to main body	1
④ Serial cable(Optional)	Connecting to digital refractor	1
⑤ Wall mount	A bracket for Wall mount	1
⑥ Polar glasses (Option)	A glasses for polarized chart test	1
⑦ Red/Green glasses (Option)	A glasses for Red/Green chart test	1

[Table 3-3] Accessories

4. Installation

1) Check out all components are packed.

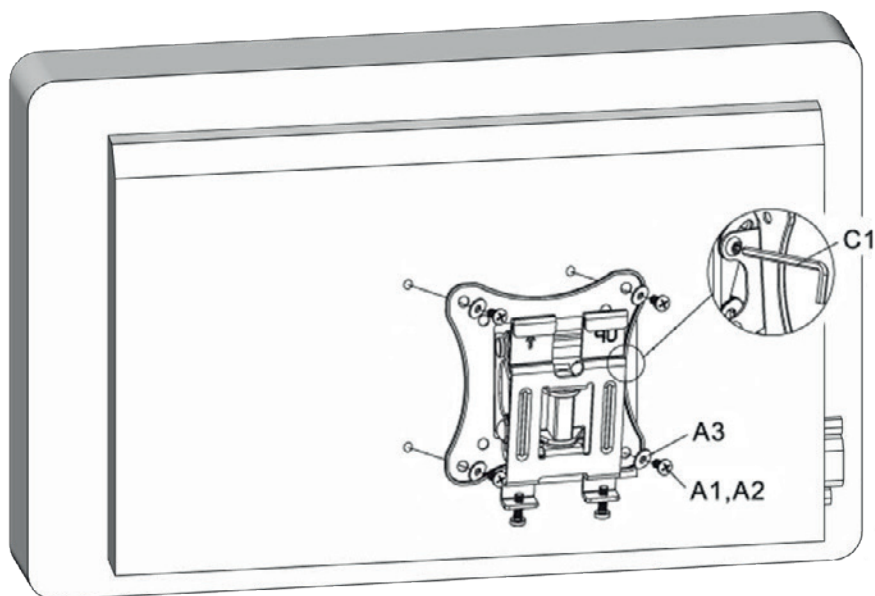
2) Setting wall plate on the wall



[Figure 4-1] Wall bracket setting

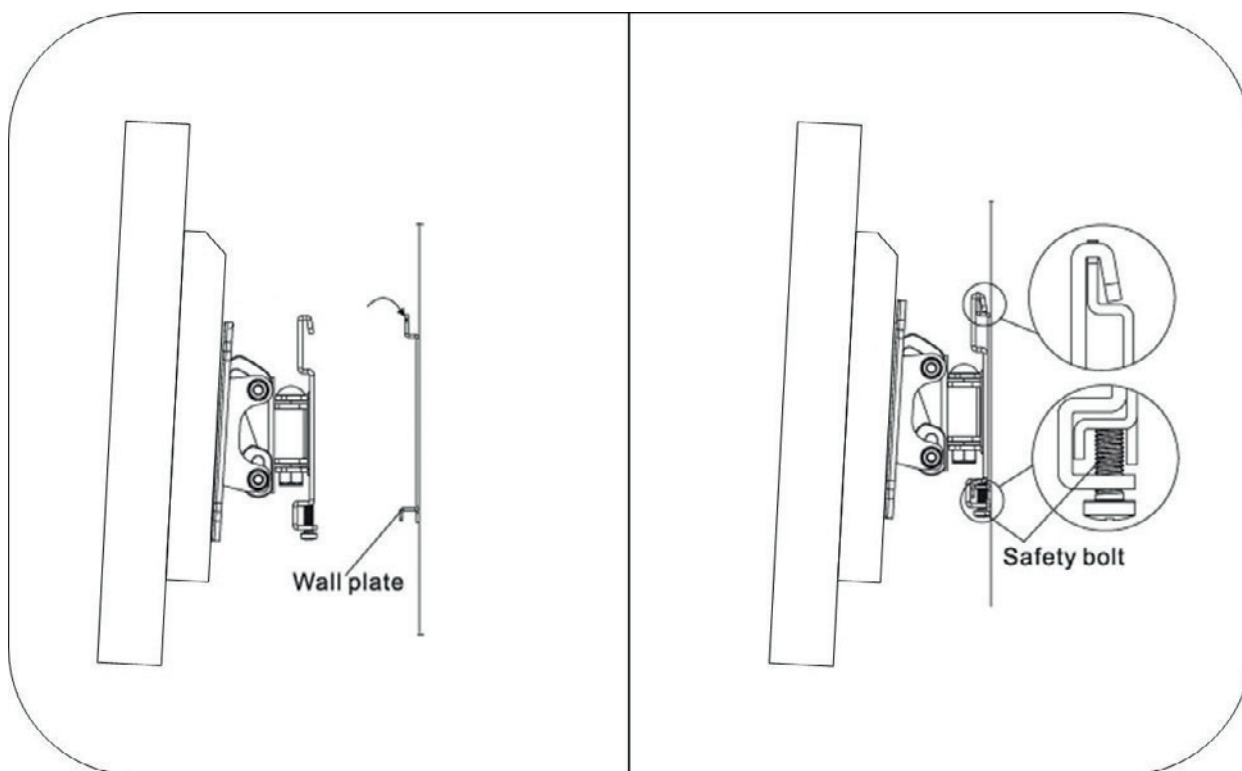
3) Clean the table to avoid damage on LCD panel, and then put main body (rear side up) on the table carefully.

- 4) Assemble main body and body plate by four bolts.



[Figure 4-2] Assemble main body and body plate

- 5) Put PO-1001P on the wall plat and assemble safety bolts.



[Figure 4-3] Assemble body plate and wall plate



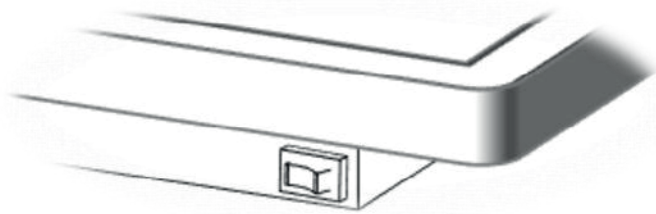
CAUTION

Please connect or separate the electric cables only after unplugged. Don't touch this equipment with wet hands. Unless, it could cause electric shock that may be accompanied by fatal or severe wounds.

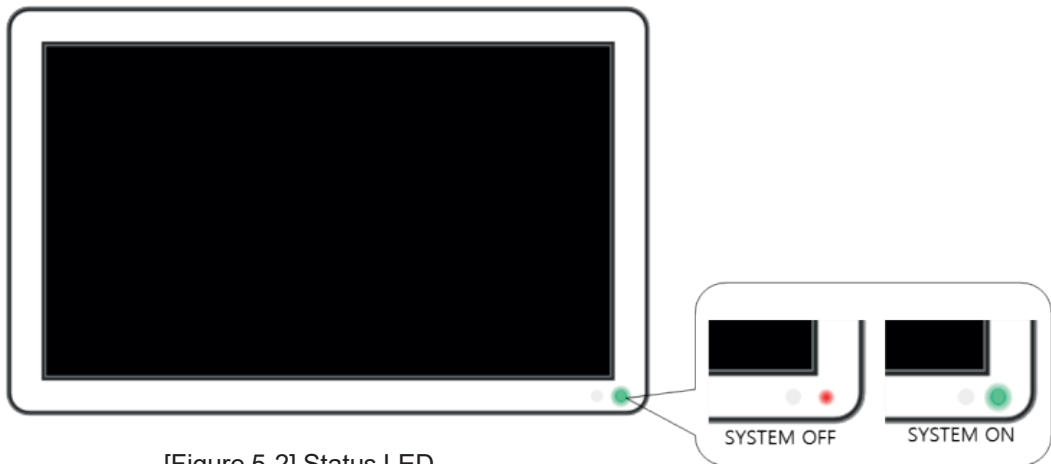
5. Operation

- System booting

- ① Connect 12v DC power plug
- ② Turn on the power switch.
Status LED's color will be changed red to green



[Figure 5-1 Power switch



[Figure 5-2] Status LED

- ③ After Booting, Digital Acuity Chart System App will be started automatically.
* You can also use other Android APP by right-clicking on the mouse.



CAUTION

Black screen could be continued until the boot.

- Power saving function
By pressing [LAMP] button, PO-1001P goes into power saving mode. To return, press [LAMP] button one more time or press any chart button on remote controller.
- SETUP mode
By pressing [MAIN] button, PO-1001P goes to SETUP mode. For more details, please refer to '6. Setup Mode'.
- Visual acuity chart
 - Visual acuity charts are composed with three categories, standard chart (Landolt ring, Snellen), and image chart (Images).
 - To select chart on standard chart & character chart category, press [Chart selection] and then press each chart button such as 0.05 or 0.08.

	Vertical masking	By pressing this button, you can display only charts in the vertical line at the center of window. Using Left/Right direction key, previous or next line can be selected.
	Horizontal masking	By pressing this button, you can display only charts in the horizontal line at the center of window. Using Up/Down direction key, upper or below line can be selected.
	Single Masking	Only first one at the right vertical line of present chart can be selected to display and other be selected by Up/Down and Right/Left direction key one by one.
	CROWD	In single chart mode, you can apply this function to a chart to make it difficult to identify without sufficient visual acuity. Other charts can be selected by pressing Right/Left direction key and different visual acuity chart by Up/Down key. Press this button again to disable this function.
	White and black exchanging	You can reverse the color of chart, black to white and white to black.
	Red/green filter button.	By pressing it, the background color of half of window becomes red and the other part green. In this mode, the number of visual acuity at the right part disappears to rearrange charts displayed to the center of window.
	RANDOM	By pressing it, you can display charts selected randomly.
	MAIN	By pressing it in any mode, you can enter into the main window
	Movie	In visual acuity measuring mode, by pressing it, you can display animation picture stored in the system. You can also stop playing the picture by pressing any chart button.

[Table 5-1] Functions

- Special charts
 - Astigmatism test chart: Testing astigmatism and axis.
 - Red/Green chart: Testing binocular balance
 - Polar separation chart: Testing strabismus and phoria
 - Polar 3D chart: Testing stereo balance
- Edit program
PO-1001P supplies two program which are edited by user. More than 30 charts can be saved on one program, and editing method is very simple.
For more details, please refer to '8. Program mode'.

6. SETUP mode

Using SETUP mode, user can adjust PO-1001P system with ease.

- Starting SETUP mode
On test mode, press [MAIN] button.
- Move to each function.
Press [UP] or [DOWN] button to move to each function on Menu mode.
- Adjusting set up
 - Press [MAIN] or [SEL] button and then values will be turned up.
 - Press [UP] or [DOWN] button to move to required value.
 - Press [MAIN] or [SEL] button to change to selected value (when pressing [ESC] button, it's returned to previous value).
- Ending Menu mode
 - Choose '17. EXIT' on menu mode, or press [ESC] button.

1.	PROGRAM MODE	: REMOCON MODE
2.	REMOCON CHANNEL	: CH 0
3.	DISTANCE	: 3.00m (9.84ft)
4.	DISTANCE UNIT	: DECIMAL
5.	OPTOTYPE MODE	: ENGLISH / KOREAN
6.	SOUND TYPE	: A TYPE
7.	RED FILTER	: 9
8.	GREEN FILTER	: 9
9.	LCD BACK LIGHT BRIGHTNESS	: 10
10.	SCREEN SAVE TYPE	: OFF
11.	SCREEN SAVE TIME	: 5 MIN
12.	SHOW TYPE	: ORIGINAL
13.	MIRROR MODE	: OFF
14.	S/W VERSION	: V1.01A
15.	POLA MODE	: POLA RG TYPE
16.	CONTRAST MODE	: Grating Contrast
17.	EXIT	

[Figure 6-1] SETUP Mode

- PROGRAM MODE
Select the operation mode, REMOCON MODE or connecting to digital refractor.
- REMOCON CHANNEL
Set channel to connect PO-1001P and external devices.

① Select channel of main body. (CH0 ~ CH7)



② Select channel remote controller

While holding  [R/G Filter] button, press each channel button as follows.



[Figure 6-2] Channel buttons

- DISTANCE
Adjust test distance. Step: 0.25m (Min 1.5m, Max 6.5m)
- OPTOTYPE MODE
Set chart categories which are shown by pressing [Chart selection #1] button.
 - NUMBER / ENGLISH
 - NUMBER / ENGLISH / KOREAN
 - ENGLISH / JAPANESE
 - ENGLISH / RUSSIAN
 - ENGLISH / HEBREW
- SOUND MODE
Set Sounds ON/OFF
- RED FILTER
Adjust red filter and red color in charts. (nine steps)
- GREEN FILTER
Adjust green filter and green color in charts. (nine steps)

- **SCREEN SAVE TYPE**
Adjust screen saving function.
 - OFF: Screen saver OFF.
 - CHART SHOW 5 SEC: Start slide show which switch the charts in every 5 seconds.
 - CHART SHOW 10 SEC: Start slide show which switch the charts in every 10 seconds.
 - CHART SHOW 30 SEC: Start slide show which switch the charts in every 30 seconds.

- **SCREEN SAVE TIME**
Set time to go screen saver. (5 Min./15Min./30Min)

- **SHOW TYPE**
Set chart position after choosing mask.
 - ORIGINAL: Show masked chart on original position.
 - CENTER: Show masked chart on center position.

- **MIRROR MODE**
Show mirror image on screen. With this function, you can operate PO-1001P in narrow place.

- **S/W VER**
Display software version of PO-1001P. Please check and inform the version to service person when you call servicing.

- **POLA MODE**
 - POLA A, POLA B: Different directions of left & right
 - RG: Red / Green

- **CONTRAST MODE**
Set Contrast types
 - Letter Contrast: Changes contrast of letters (10%, 10 steps)
 - Grating Contrast:
 - [▲ or ▼] buttons – Increase or decrease value of CS
 - [Contrast] button – Increase or decrease value of F
 - [◀ or ■ or ▶] – Set the direction (left,middle,right)

- **EXIT**
Save changed set up and exit menu mode.

*** We recommend you to adjust setup step by step after used to present system enough.**

7. Program mode

PO-1001P supports programs mode which can be edited by user. It's available to edit more than 30 charts on single program but we recommend you to use less 30 charts.

7.1. Operating edited program

- Selecting edited program
 - Operating edited program by pressing [PROGRAM] button
 - Select edited program by pressing  Button: Select program 1~5
 - Program name, current chart number and all programmed chart number are turned up on upper side of screen, refer to [Figure 7-1] (left number: current chart number, right number: total chart number).

Program 1 (A/B)

[Figure 7-1] Program mode

- Moving to next/previous step
 - By pressing [NEXT] button, go to next step of program.
 - By pressing [PRV] button, go to previous step of program.
- End of edited program
 - End edited program by pressing [PROGRAM A/B] button.

7.2. Program editing

- Starting edited program
 - Press  button to choose program which need to be edited
 - Press [MAIN] button to enter program editing mode.
 - Program name, current chart number, all programmed chart number and 'Edit Mode' are displayed on upper side of screen, refer to [Figure 13] (left number: current chart number, right number: total chart number).

Program 1-Edit mode (A/B)

[Figure 7-2] Program – Edit

- Switching chart
With remote controller, switch the charts which will be on program (mask and red/green filter are also available).
- Saving charts
By pressing [PROGRAM A/B] button, save newly selected chart on current step in program. Previous chart will be deleted automatically.
- Adding charts
By pressing [CONTRAST] button, adding selected chart to next step in program. Total number of programmed chart will be increased. If you didn't select a chart, nothing will be added even pressing [CONTRAST] button.
- Deleting charts
By pressing [WHITE/BLACK] button, delete the chart in current step. Total number of programmed chart will be decreased.
- End of program editing
End the program editing by pressing [MENU] button.



CAUTION

If you leave PO-1001P for a while, unplug.

8. Maintenance

8.1. Before calling service person,

- PO-1001P is not turned on
 - ✓ Check out connection of power cable. And check whether green light on adaptor is on. If green light on adaptor is off, please call service person.
 - ✓ Even power cable are connected well and green light on adaptor is on, but you can't turn on PO-1001P, please disassemble power cable and wait until green light on adaptor will be turn off. After that, reconnect power cable and press power button. If it's not working, please call service person.
- Remote controller is not working
 - ✓ Replace battery in remote control (2pcs, AA size, 1.5V)
 - ✓ Clean signal receiver on main body and signal sending part on remote controller
 - ✓ If it's not working even after checking above two instructions, please call service person.

8.2. Cleaning of device

- Cleaning plastic parts
 - ✓ Basically, keep this instrument clean. Never wipe with other volatile object, thinner or benzene, etc.
 - ✓ Wipe with a clean cloth lightly dampened with mild liquid dish detergent polish.
- Cleaning screen
 - ✓ Wipe screen with a dry cloth with glass cleaner. Never wipe with volatile object, thinner or benzene, etc.

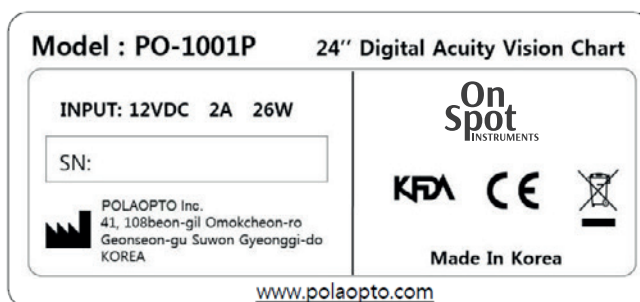
8.3. Switching place of installation.

- Turn off PO-1001P by pressing power button on main body.
- Unplug

8.4. Service information

8.4.1. Repair

- Contact servicing agent.
- Check the followings and inform.
 - Model of the instrument : PO-1001P
 - Serial Number : 7-digit or 8-digit characters indicated on the name plate
 - Phenomenon : Describe specifically



8.4.2. Disposal of the instrument

 CAUTION	Please ask a qualified waste disposal company to handle disposal or distributor.
--	---

9. Specifications

Monitor	
Type	24 Inch TFT LED Backlight
Resolution	1920(H) x 1080(V) Pixels
Display area	521.3(H) x 293.2(V) mm
Functions	
Chart	1. Landolt Ring / Snellen 2. Numbers / Letters / Korean 3. Children
Masking	1. Letter / Horizontal Line / Vertical Line 2. Normal / Center
Filter	Red and Green
Visual function	1. Red and Green, Polar separation, Polar 3D 2. Red and Green 3D, Color blindness (Slide mode)
Special function	Mirror mode / Contrast / White and Black reverse
Distance	1.5m~6.5m (Step 0.25m)
Control device	Wireless IR remote controller / Digital refractor
Screen saver function	Monitor off / Chart show (5sec, 10sec, 30sec)
Screen saver waiting time	5min / 10min / 30min
Specifications	
Body	571(W) x 347(V) x 48(D) mm / 4 kg
Remote control	64(W) x 195(V) x 20(D) mm / 160 g
Power supply	DC 12V
Power consumption	26W
Accessory	
Mount	Wall / Floor(Optional) / Table(Optional)
Glasses	Polar(Optional) / Red and Green(Optional)
Remote control	1 pc
Battery	2 pcs (AA 1.5V)
Adaptor	1 pc
Serial Cable(Optional)	1 pc
Power Cable	1 pc

**On
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