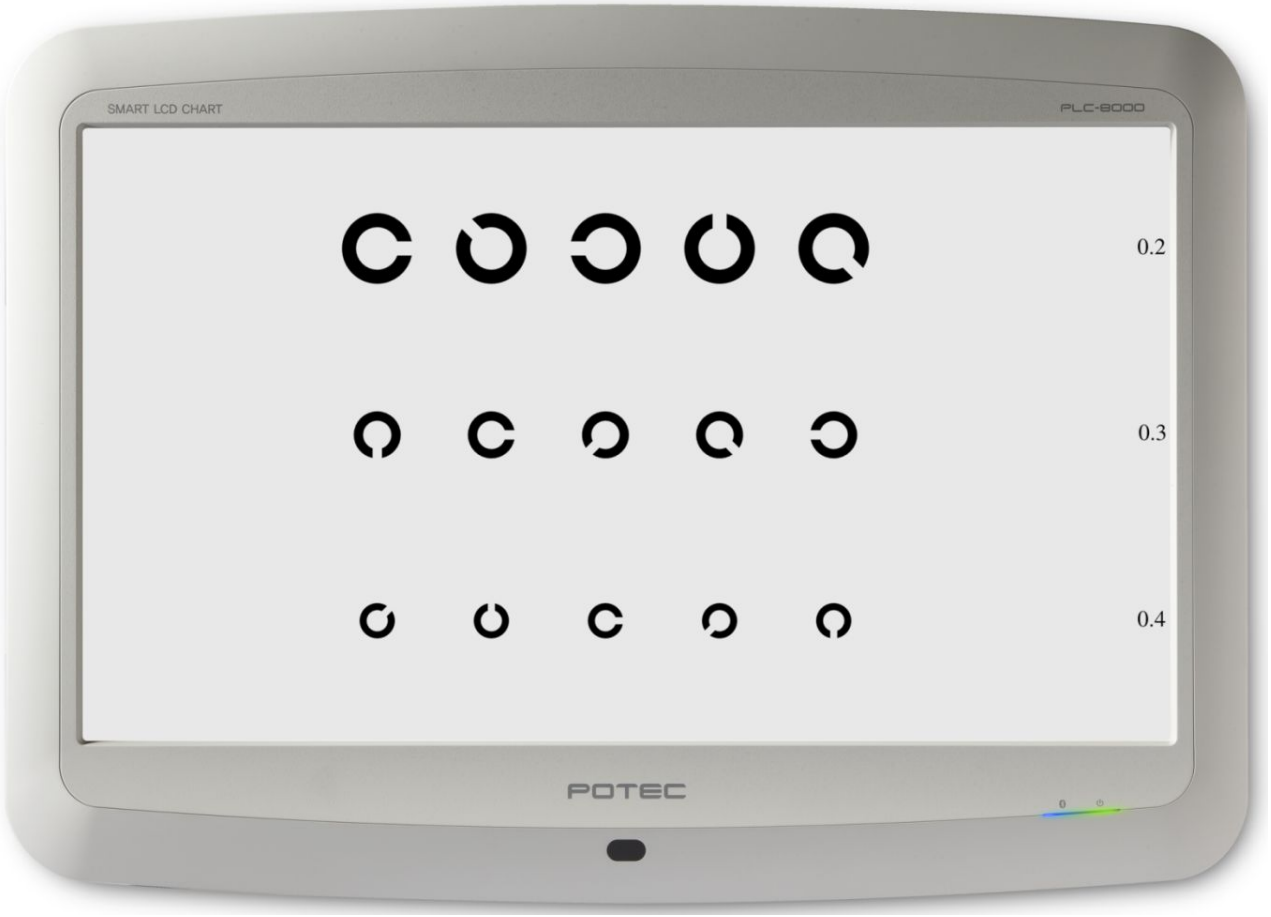
Operation Manual

LCD Chart PLC-8000(pola)



Revision 1.0b **www.potec.biz**

Before use, read this manual carefully

IMPORTANT NOTICE

This product may malfunction due to electromagnetic waves caused by portable personal telephones, transceivers, radio-controlled toys, etc. Be sure to avoid having objects such as, which affect this product, brought near the product.

The information in this publication has been carefully checked and is believed to be entirely accurate at the time of publication. POTEC assumes no responsibility, however, for possible errors or omissions, or for any consequences resulting from the use of the information contained herein.

POTEC reserves the right to make changes in its products or product specifications at any time and without prior notice, and is not required to update this documentation to reflect such changes.

For EU Countries

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

CE

Authorized Representative:
Medical Device Safety Service GmbH
graben 41, D-30175
Hannover, Germany

© 2016 POTEC Co., Ltd.
40-4, Techno 2-ro, Yuseong-gu, Daejeon, 34015, KOREA
All rights are reserved.
Under copyright laws, this manual may not be copied, in whole or in part, without the prior written consent of POTEC Co., Ltd.

SAFETY INFORMATION

Symbols marked on the Instrument

Symbol	Description
~	Alternating current
	Protective earth (ground)
	Refer to operating instructions
	I and **O** on the power switch represent ON and OFF respectively
	Manufacturer
	Manufacturer Date
EC REP	Authorised Representative in the European Community
	Disposal of your old appliance ● When this crossed-out wheeled bin symbol is attached to a product it means the product is covered by the European Directive 2002/96/EC. ● All electrical and electronic products should be disposed of separately from the municipal waste stream via designated collection facilities appointed by the government or the local authorities. ● The correct disposal of your old appliance will help prevent potential negative consequences for the environment and human health. ● For more detailed information about disposal of your old appliance, please contact your city office, waste disposal service or the shop where you purchased the product

General Safety Information

Follow the safety instructions in this manual and all warnings and cautions printed on the warning labels. Ignoring such cautions or warnings while handling the product may result in injury or accident. Be sure to read and fully understand the manual before using this product. Keep this manual for future reference.

Caution Sign	Description
WARNING	This indicates a potentially hazardous situation which, if not heeded, could result in death or serious injury to you or others.
CAUTION	This indicates hazardous situations which, if not heeded, may result in minor or moderate injury to you or others, or may result in machine damage.
NOTE	This is used to emphasize essential information. Be sure to read this information to avoid incorrect operation.

CONTENTS

IMPORTANT NOTICE i
SAFETY INFORMATION ii

1. Features 1
2. Classification 1
3. Notes for Using the Instrument 2
4. Configurations 4
4.1 Main Unit 4
4.2 Remote Controller 6
5. Installation 8
6. Input and Use of Program 9
6.1 How to input user's program 9
6.2 How to use your stored programs 9
7. Change the channel of remote controller 10
8. Types of Chart 11
8.1 PLC-8000 11
8.2 PLC-8000pola 13
9. Setting of the instrument 15
10. ETDRS Chart Function 17
11. Mirror Function 18
12. CTRS Chart Function 18
13. Black/White Reverse Chart Function 19
14. Schober Chart Function 20
15. Astigmatism Chart Function 21
16. Fan & Block Chart Function 23
17. Reticle Chart Function 24

18. Aniseikonia(Vertical) Chart Function ····· 25
19. Mask Function ····· 26
19.1 Vertical Mask ····· 26
19.2 Horizontal Mask ····· 27
19.3 Single Mask ····· 28
20. Red/Green Chart Function ····· 29
21. Polarizing Chart Function <*PLC-8000pola Only* > ····· 31
22. Maddox Test Function ····· 32
23. Von Graefe Chart Function ····· 33
24. Slide Function ····· 36
25. Video Play Function ····· 38
25.1 Video Play Specifications ····· 38
25.2 Using the Video Play function ····· 38
25.3 Remote control function to Video Play ····· 39
25.4 PR(Promotion) Video play function ····· 40
25.5 Note of video play function ····· 40
26. Bluetooth Function (optional) ····· 41
26.1 Recommended specifications for Bluetooth ····· 41
26.2 Check the PDR-7000 version ····· 41
26.3 PDR-7000 Version 3 Bluetooth connection ····· 41
26.4 PDR-7000 Version 4 Bluetooth connection ····· 46
27. Maintenance and Repair ····· 48
27.1 Replacement the Battery of Remote Controller ····· 48
27.2 Cleaning ····· 48
27.3 Service Information ····· 48

28. Specifications ····· 49
29. Components ····· 50

1. Features

- Can measure, Astigmatism, Binocular balance tests, Fixation disparity tests, Fusion tests, stereo test with only one equipment
- Can make efficient eyesight measurement without changing position of handler.
- LCD monitor features associated with the use of the computer graphics processing of Specific chart (Chart) Table of 2m ~ 6m in front of video a patient displayed on the LCD screen is installed.
- It is efficiently operated in an eyesight test even though the tester doesn't move.
- It is possible to connect with external devices by RS-232 terminal connection
- PLC-8000(pola) is LCD module to apply, a special chart to display the red and green.

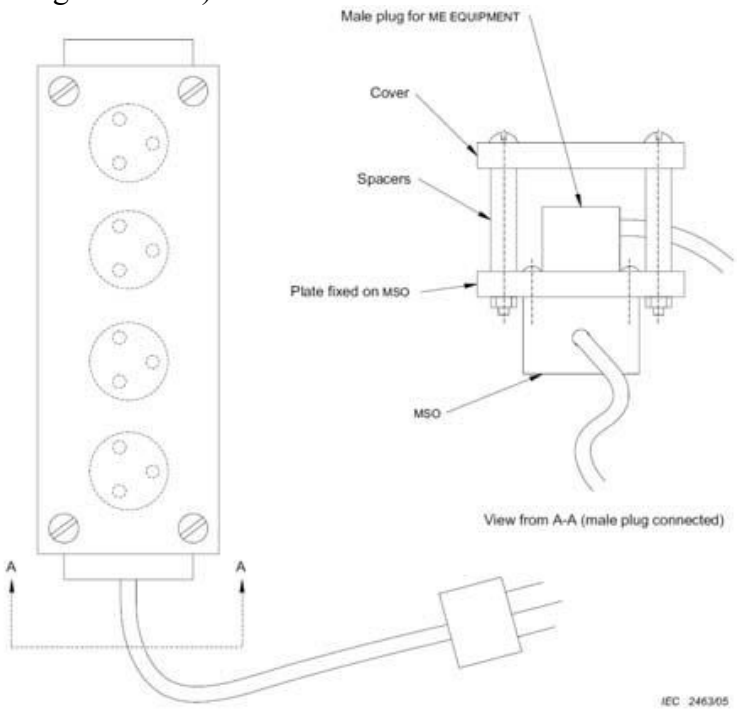
2. Classification

- Type of protection against electric shock: Class I Equipment
- Degree of protection against electric shock: None
- Degree of protection against ingress of water as detailed in the current edition of IEC 529: IP20
- Method of sterilization or disinfection recommended by the manufacturer: None
- Degree of safety or application in the presence of a flammable anesthetics mixture with air or with oxygen or nitrous oxide: Equipment not suitable for use in the presence of a flammable anesthetics mixture with air or with oxygen or nitrous oxide
- Mode of operation: Continuous operation

3. Notes for Using the Instrument

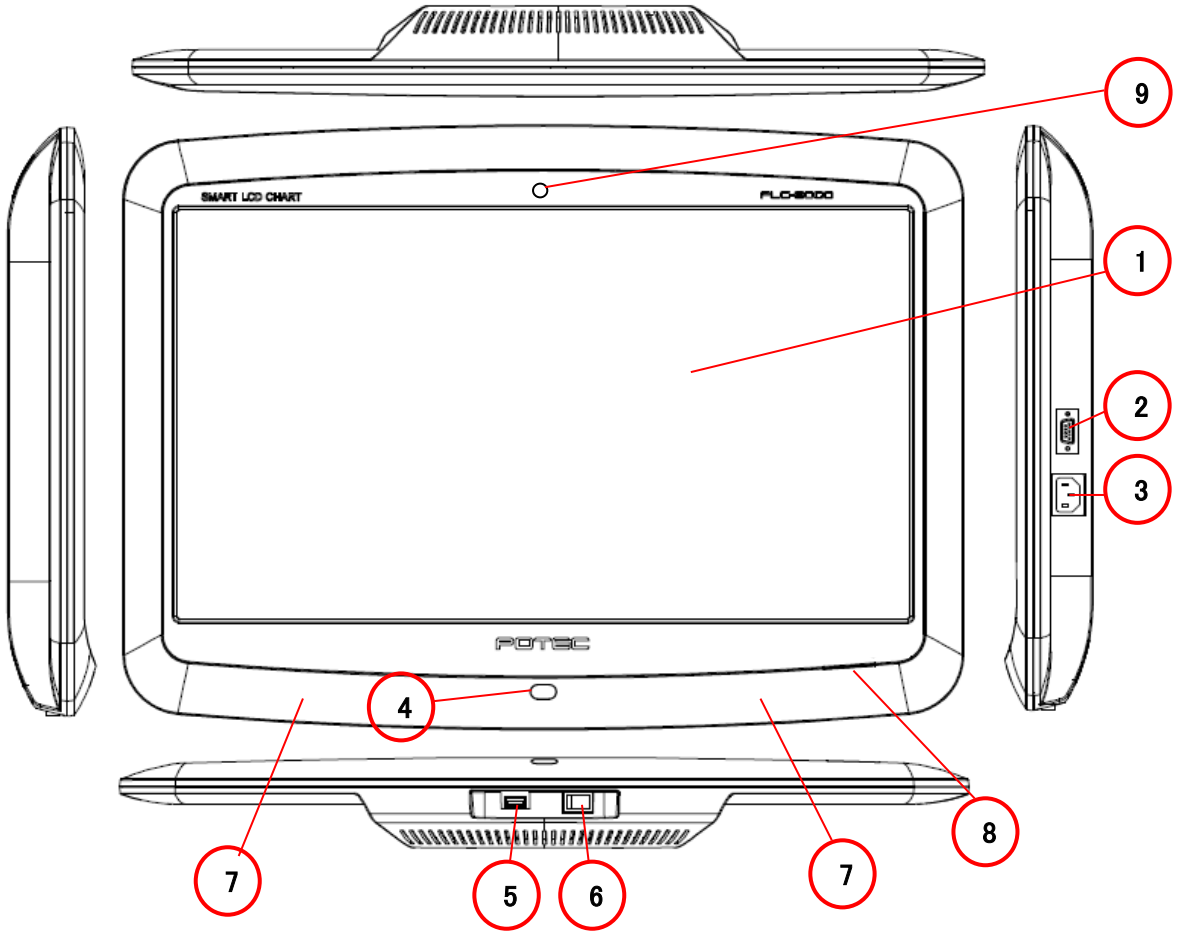
- Do not hit or drop the instrument. The instrument may be damaged if it receives a strong impact. The impact can damage the function of this instrument. Handle it with care.
- Exposure to direct sunlight or very bright indoor lights can influence the results of measurements.
- Sudden heating of the room in cold areas will cause condensation of vapor on the protective glass in the measurement window and on optical parts inside the instrument. In this case, wait until the condensation disappears before performing measurements.
- Disconnect the power supply and consult the dealer when there is smoke, strange smell, or noise while working.
- If you want to connect this with other equipment, consult the dealer.
- Don't use organic solution such as alcohol, thinner, benzene, etc. to clean the surface of this instrument. It may damage the instrument.
- If you leave the PLC-8000(pola) without using it for long periods, disconnect the power supply and protect the unit with dust cover.

WARNING	To avoid risk of electric shock, this equipment must only be connected to a mains supply with protective earth.
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	Do not modify this equipment without authorization of the manufacture.
WARNING	Only operate the instrument with the power supply indicated on the rating plate. Otherwise, it may result in fire or electric shock.
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 switch, unplug the power cable from the AC outlet, and contact the dealer or the agent who/where you purchase this instrument. ● When there is smoke, strange odor or abnormal sound. ● When liquid has been spilled into the instrument or a metal object has entered through an opening. ● When the product has been dropped or its housing damaged.
CAUTION	This instrument is shipped with a grounding type power cable. To reduce the risk of electric shock, always plug the cable into a grounded power outlet.
CAUTION	Wipe the forehead rest with ethanol or glutaraldehyde solution to disinfect it each time a different examinee uses it, in order to prevent infection.
CAUTION	Do not use the device near, on, or under other electronic equipment to avoid electromagnetic interference with the operation of the device.
CAUTION	Do not use the device in the same room with other equipment such as life-support equipment, other equipment that has major affects on the life of patient an results of treatment, or other measurement or treatment equipment that involve small electric current.

CAUTION	Do not use the device simultaneously with portable and mobile radio frequency communication systems because it may have an adverse effect on operation of the device.
CAUTION	Do not use cables and accessories that are not specified for the device because that may increase the emission of electromagnetic waves from the device or the system and decrease the immunity of the device to electromagnetic disturbance.
CAUTION	Do not position the equipment to make it difficult to operate the disconnection device. (Appliance coupler or separable plug)
CAUTION	Do not placed the multiple socket-outlet for PLC-8000(pola) system on the floor in order to prevent liquid penetration and damage to the product.
CAUTION	PLC-8000(pola) system shall not be connected with additional multiple socket-outlets or extension cords in addition to a designated single multiple socket-outlet.
CAUTION	Maximum permissible load of each socket-outlet used for the PLC-8000(pola) system, shall not be less than 100VA.
CAUTION	If non-medical electrical equipments (e.g. Video monitor, IT equipment, etc.) that are connected with the PLC-8000(pola) are, directly connected to the wall socket-outlets, high touch current may flow since the earth continuity is not ensured.
CAUTION	Multiple socket-outlet should be a grounding-type and complied with IEC 60884-1.
CAUTION	Connection of the plug shall be possible only by using the tool. (Refer to the figure below.) 

4. Configurations

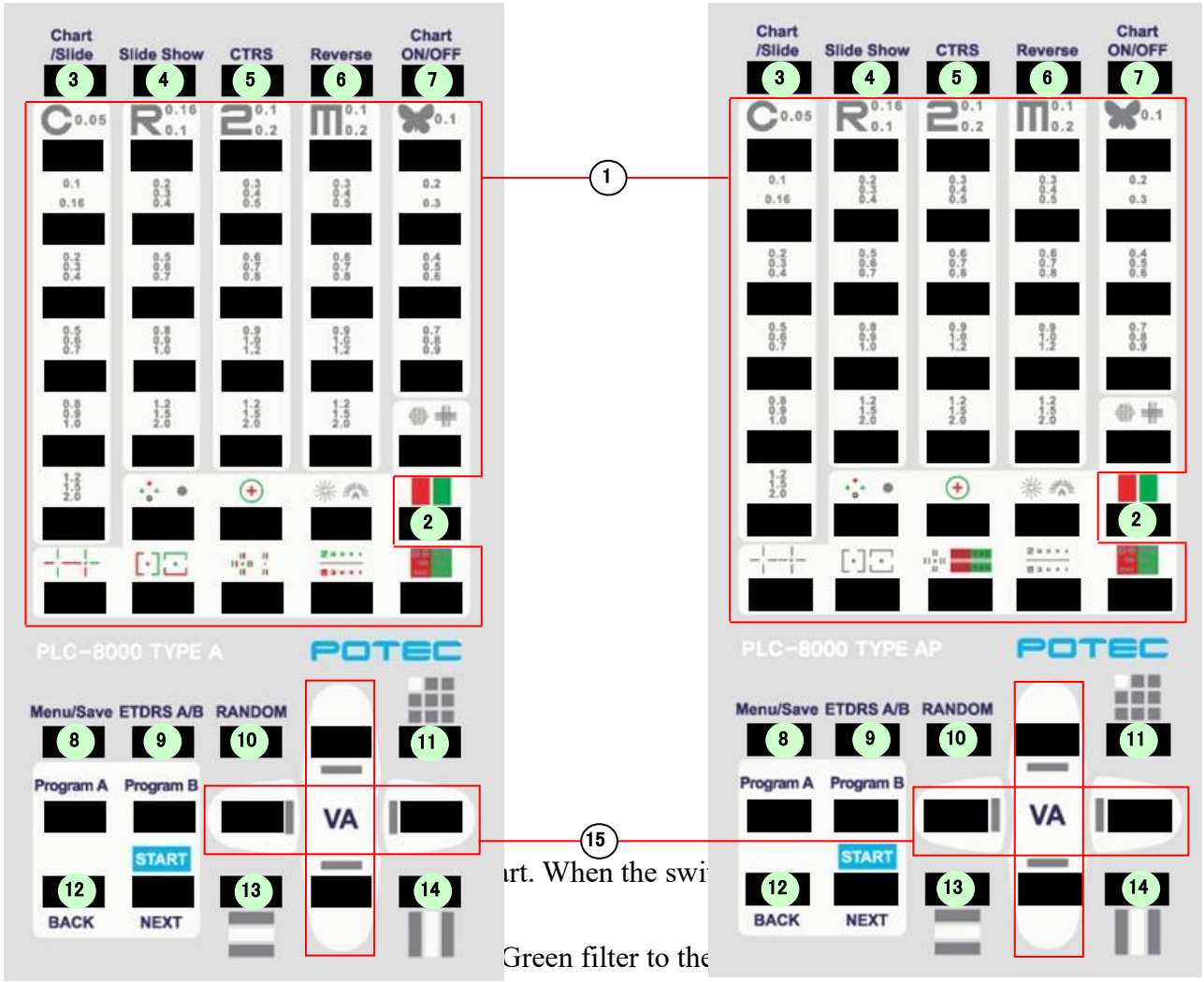
4.1 Main Unit



NAME	FUNCTION
1 LCD Display Monitor	Displayed the chart for test by using the graphic-processing function on computer
2 RS-232	Serial port for communicating with external devices
3 AC Power Inlet	A part of the power supply cables and connections
4 IR Receive window	Display chart to receive the infrared windows from remote controller
5 USB	Port for the USB flash drive.
6 Power On/Off Switch	Power on/off Switch
7 Speaker	Release the sound in need for the application program
8 LED	Power LED
9 Fixation Target Lamp	Maddox Test LED

WARNING	SAFETY INFORMATION - Accessory equipment connected to the analog and digital interfaces must be certificated according to the respective IEC standards (e.g. IEC 60950-1 for data processing equipment and IEC 60601-1 for medical equipment). Furthermore all configurations shall comply with the system standard EN 60601-1:2006, Clause 16. Everybody who connects additional equipment to the signal input part or signal output part configures a medical system, and is therefore responsible that the system complies with the requirements of the system standard IEC 60601-1:2005, Clause 16. If in doubt, consult the technical service department or your local representative.

4.2 Remote controller



rt. When the swi

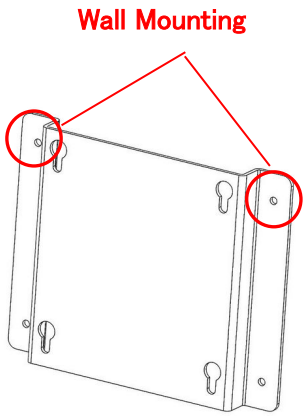
Green filter to the

3 Chart/Slide button: Chart-Slide-Movie condition of the chart
4 Slide Show button: Displays the slide show of the image
5 CTRS button: Selects the contrast of charts.
6 Reverse button: Reverses the black-and-white condition of the chart.
7 Chart On/Off button: Turns the monitor on or off
8 Chart Menu/Save button: Chart type, Distance, Beep sound, Mirror, Auto light off, Slide Show, Brightness, Auxiliary Chart Type, Background Gray Color Screen, Video Progressive Bar Display, Filter Red/Green, BackGround Gray, Image update, Reset of setting button
9 ETDRS A/B button: Display ETDRS A, ETDRS B button
10 RANDOM button: Used to arrange the targets at random and present them.
11 Single Mask button: Pressing the button toggles between entire chart and single line display
12 BACK button: It used to cancel in Menu function.
13 Horizontal Mask button: Pressing the button toggles between entire chart and horizontal line display
14 Horizontal Mask button: Pressing the button toggles between entire chart and horizontal line display

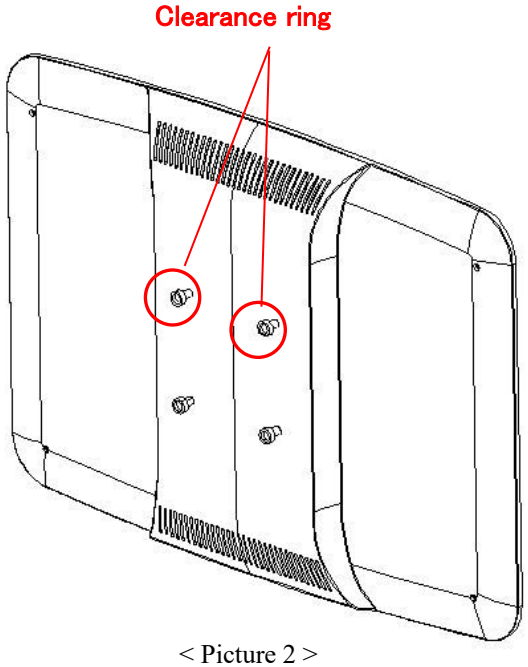
15 Mask button: Moves the display to a higher or lower VA value when a single mask, vertical line, or horizontal line is isolated on the VA chart.

5. Installation

- Use the provided “Tapping Screw” when you fix the product with “Wall Mount Bracket”.
- Fix the Wall Mount Bracket to the wall after choosing the location of the chart.
  (Reference, Wall Mount Bracket’s signed location of picture 1)



< Picture 1 >



< Picture 2 >

6. Input and Use of Program

6.1 How to input user's program

How to input user's program A

- If you hold the button “Program A” for more than 3seconds, the whole LED of the front part flickers twice and display the chart “C”
- Select the chart that you want and press the button “NEXT”, then the whole LED of front flickers once.
- You can repeat above process as many as you want to. (40 programs can be input in total)
- In case you want to check the previous program while you’re inputting a new one, you can check the previous one when you press “NEXT”.
- If you press the button “Program A” once, the whole LED of the front part flickers twice and the new program is saved.

WARNING	If you do not press the "Program A" button, the program will not be saved (If you turn off and turn on, a program will be deleted.).
NOTE	On the time of delivery, the chart is input on user program A in accordance with the chart of remote control.

How to input user's program B

- “How to input user’s program A” in the “Program A” button instead of “Program B” button is used.

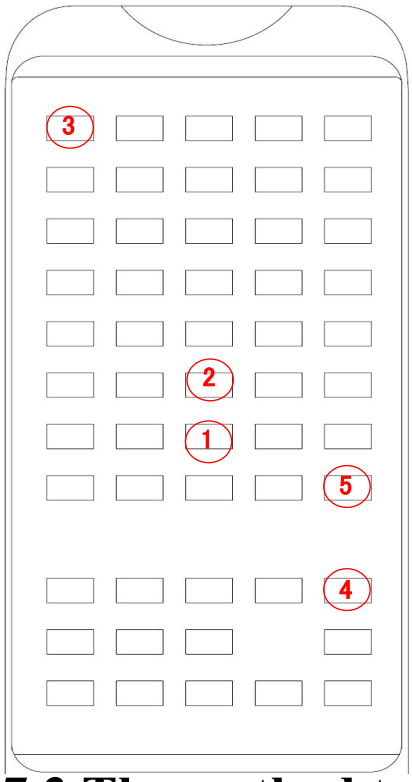
NOTE	On the time of delivery, there is no program on “User program B”

6.2 How to use your stored programs

- When you press “Program A” or “Program B”, the first chart of chosen program appears.
- When you press “Next” button, you may move to a next chart.
- When you press “Back”, you may move to a previous chart.
- When you chose your preference, “User program call” is finished.

NOTE	If “PC Communication” in user menu Setting, cannot “Program A” or “Program B”. Used only PC Communication button.

7. Change the channel of remote controller



7.1 Basic Setup

- There is “A~E” channels on the remote control and on the time of delivery, the entire channel is set on channel “A”

7.2 The method to check a channel between the remote control and a machine

- (Regardless of a channel which is set on remote control or a machine) if a machine recognizes a signal of “①” which a user presses 3 times continually, a machine let a user know the channel of remote control showing blinking LED on the each side. (A=1, B=2, C=3, D=4, E=5)
- (Regardless of a channel which is set on remote control or a machine) if a machine recognizes a signal of “②” which a user presses 3 times continually, a machine let a user know the channel of a machine showing blinking LED on the each side. (A=1, B=2, C=3, D=4, E=5)

7.3 The method to change a channel of remote control and channel of a machine at the same time

- For your reference, in case a channel of a remote control and a machine is connected, you can follow this step.
- You need to turn off all of the chart projector except a machine which you want to change a channel.
- Push the “③” button while pushing the “④” button. Then release ③, ④ button. again, press “④” button, a remote control transmits data of a new channel a machine let a user know the channel of a machine showing blinking LED on the each side.
  (A=1, B=2, C=3, D=4, E=5)
- A user needs to repeat above process till a new channel appears.
- When a user presses “⑤” button, a machine let a user know showing blinking LED two times on the each side.

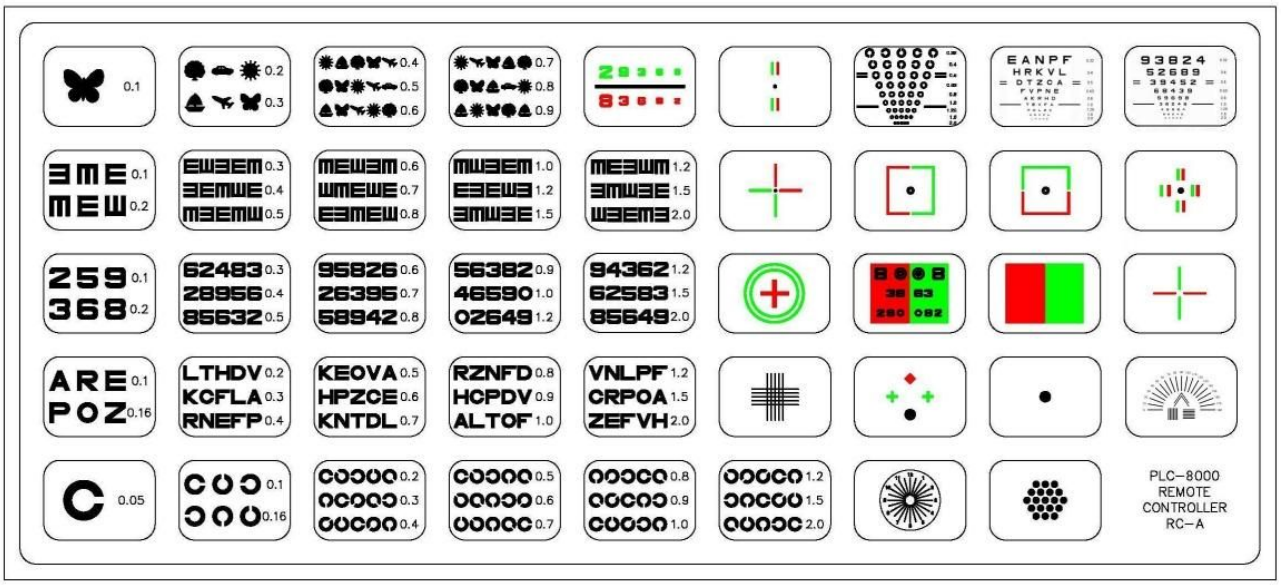
7.4 The method of adjusting a channel of a machine to the one of remote control unconditionally

- (In case of a channel of the machine and remote control is different) When a user presses “③” button, a remote control transmits data of a setting channel a machine let a user know the channel of a machine showing blinking LED on the each side. (A=1, B=2, C=3, D=4, E=5)
- When a user presses “⑤” button, a machine let a user know showing blinking LED two times on the each side.

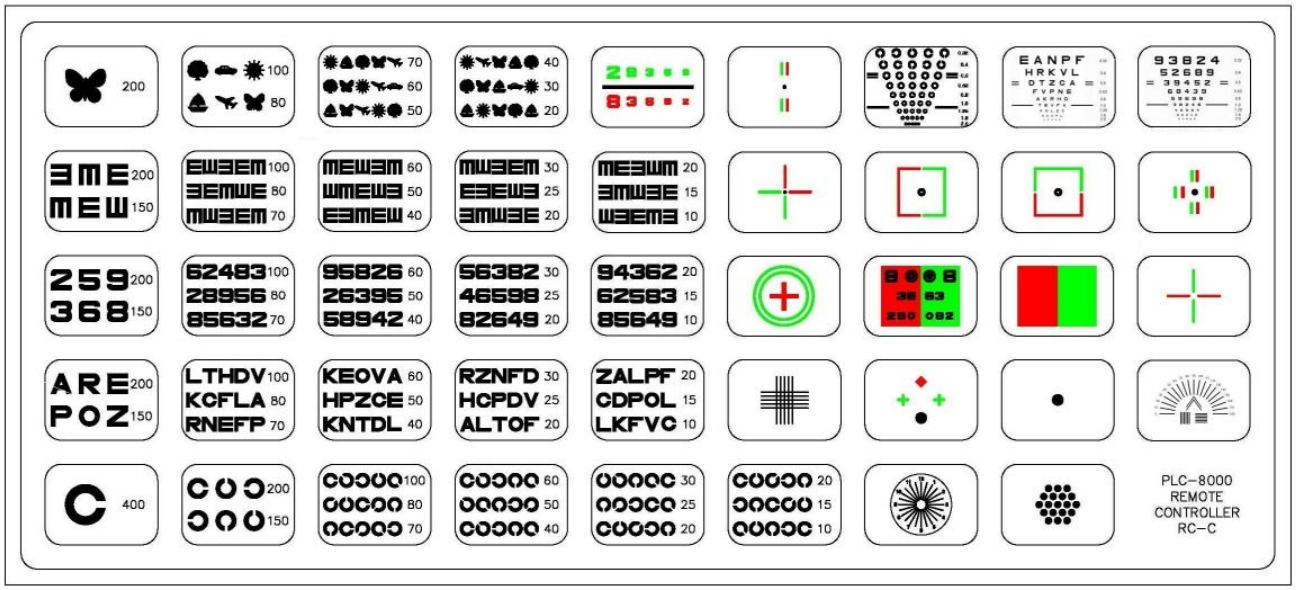
8. Types of Chart

8.1 PLC-8000

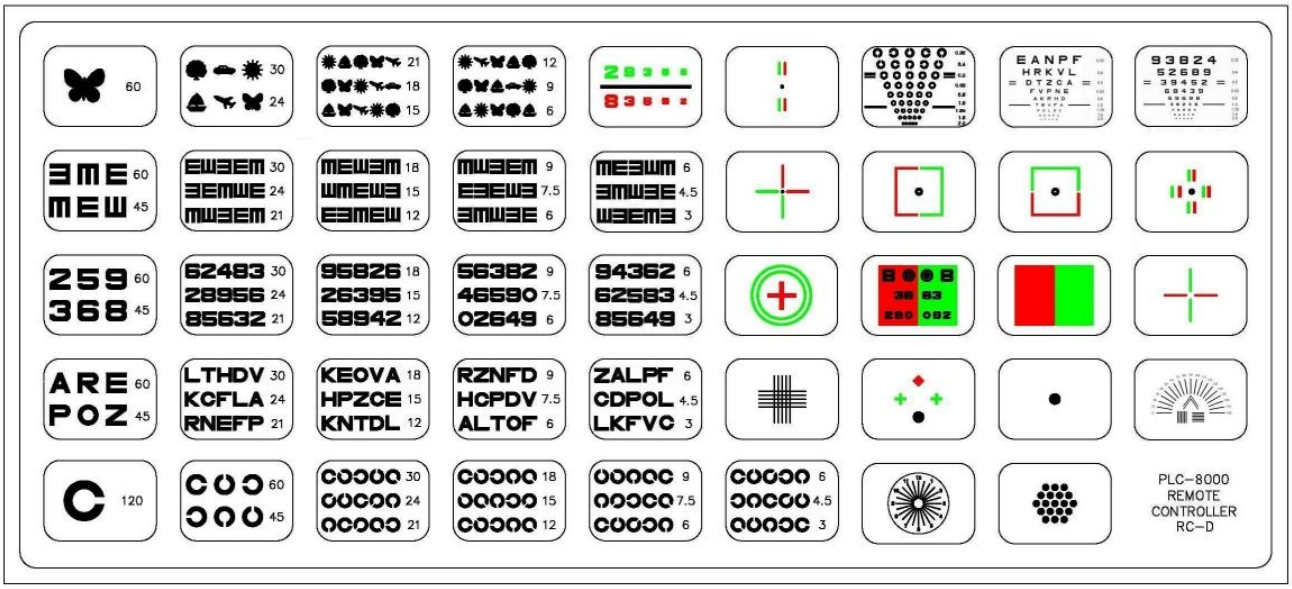
A Type



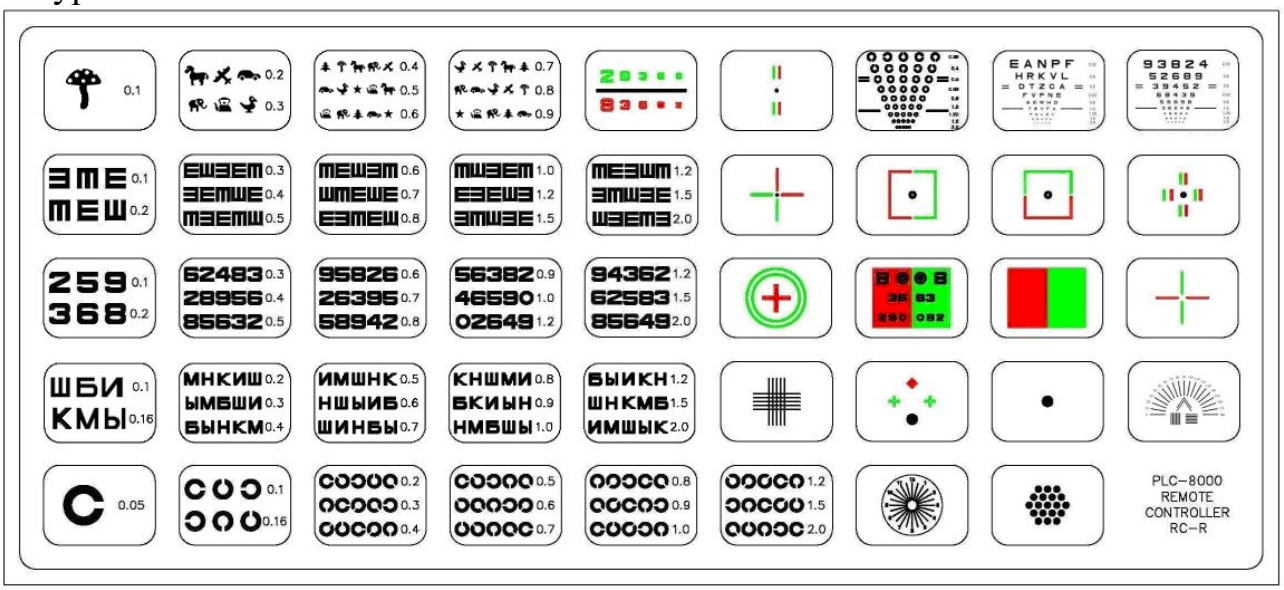
C Type



D Type

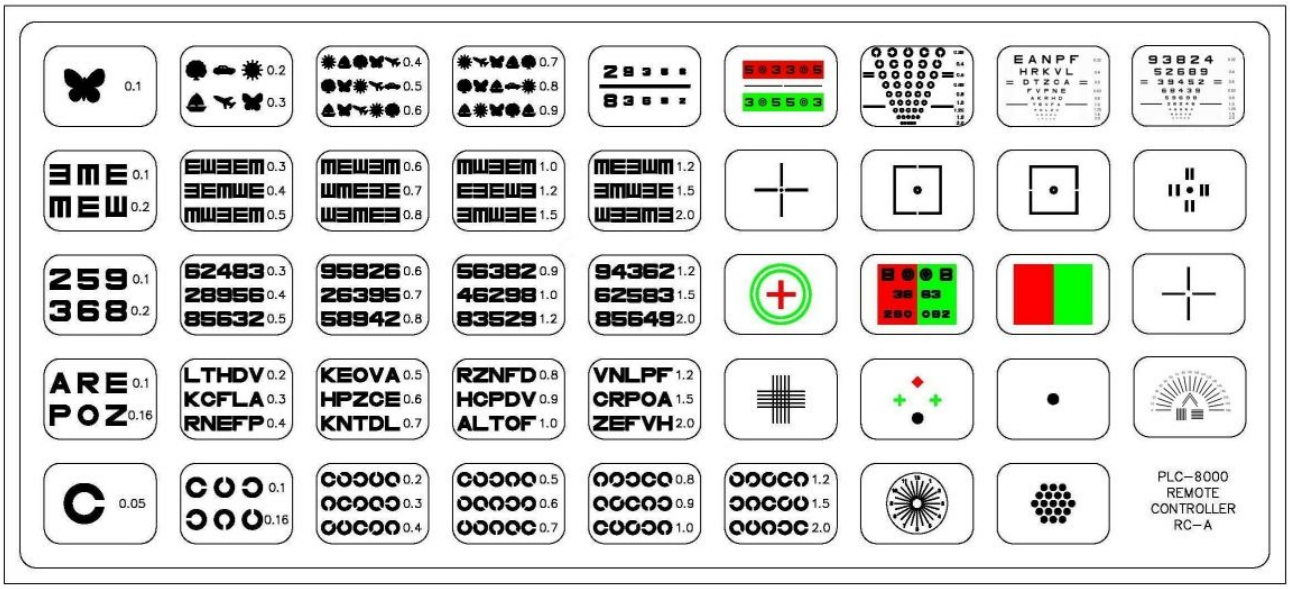

PLC–8000
REMOTE
CONTROLLER
RC–D

R Type

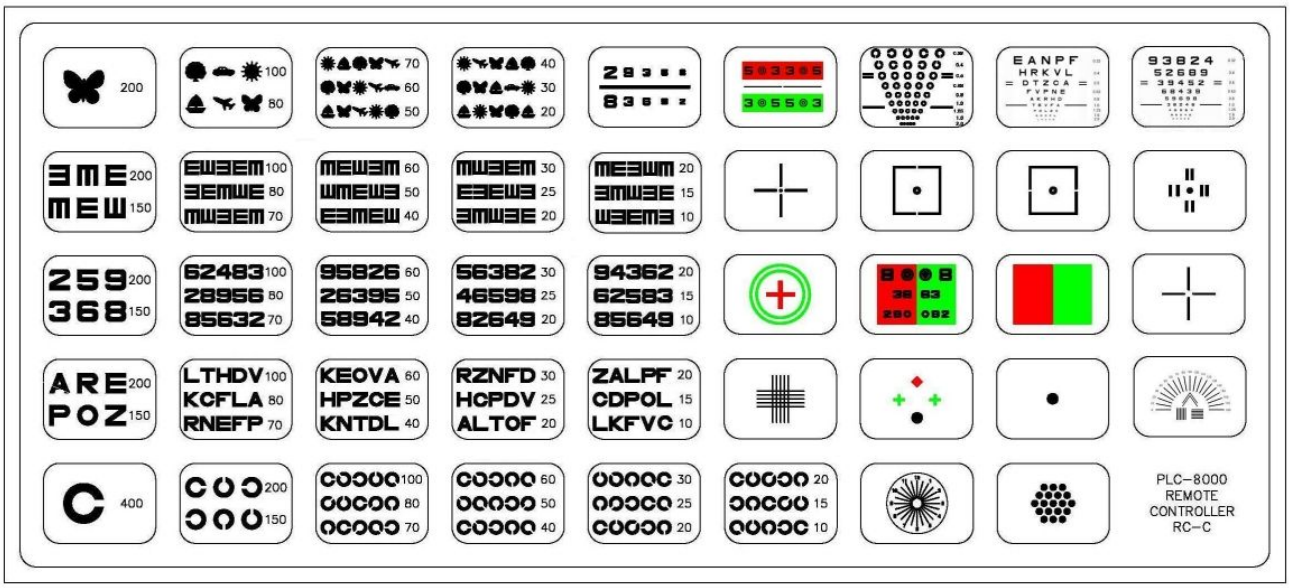

PLC–8000
REMOTE
CONTROLLER
RC–R

8.2 PLC-8000pola

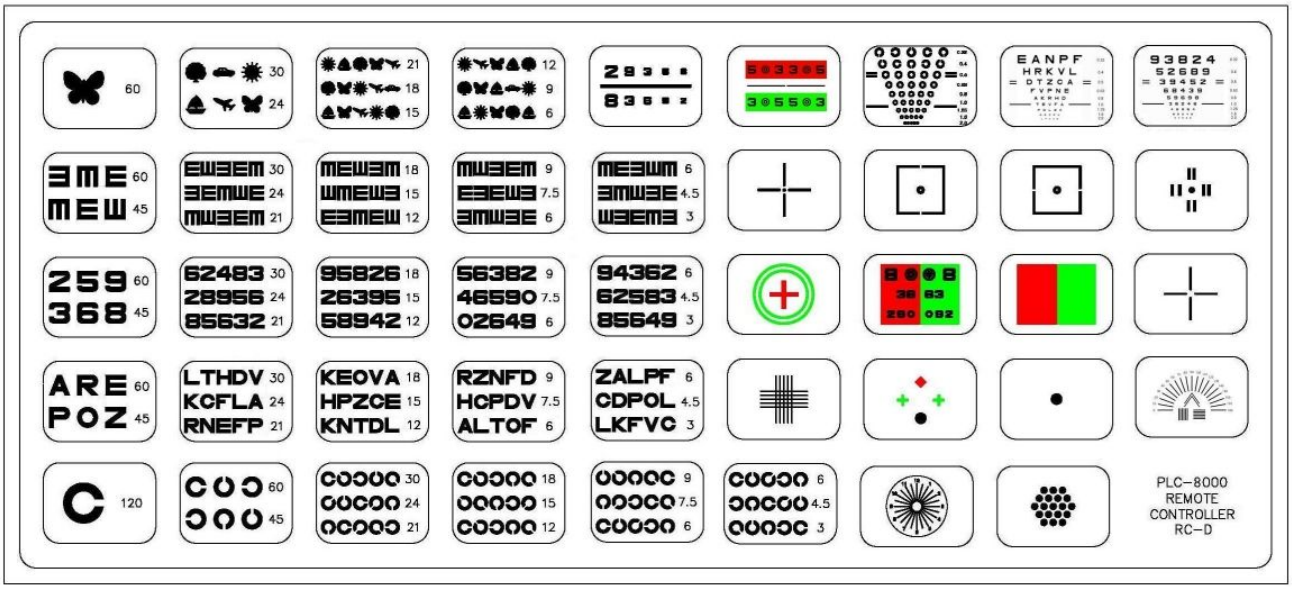
A Type



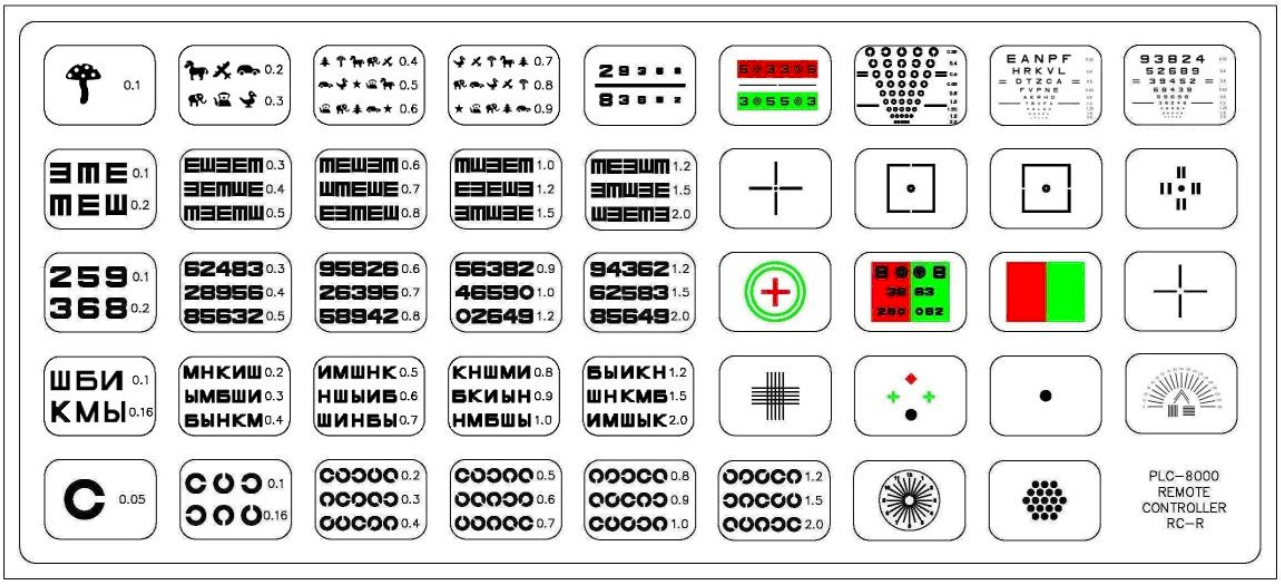
C Type



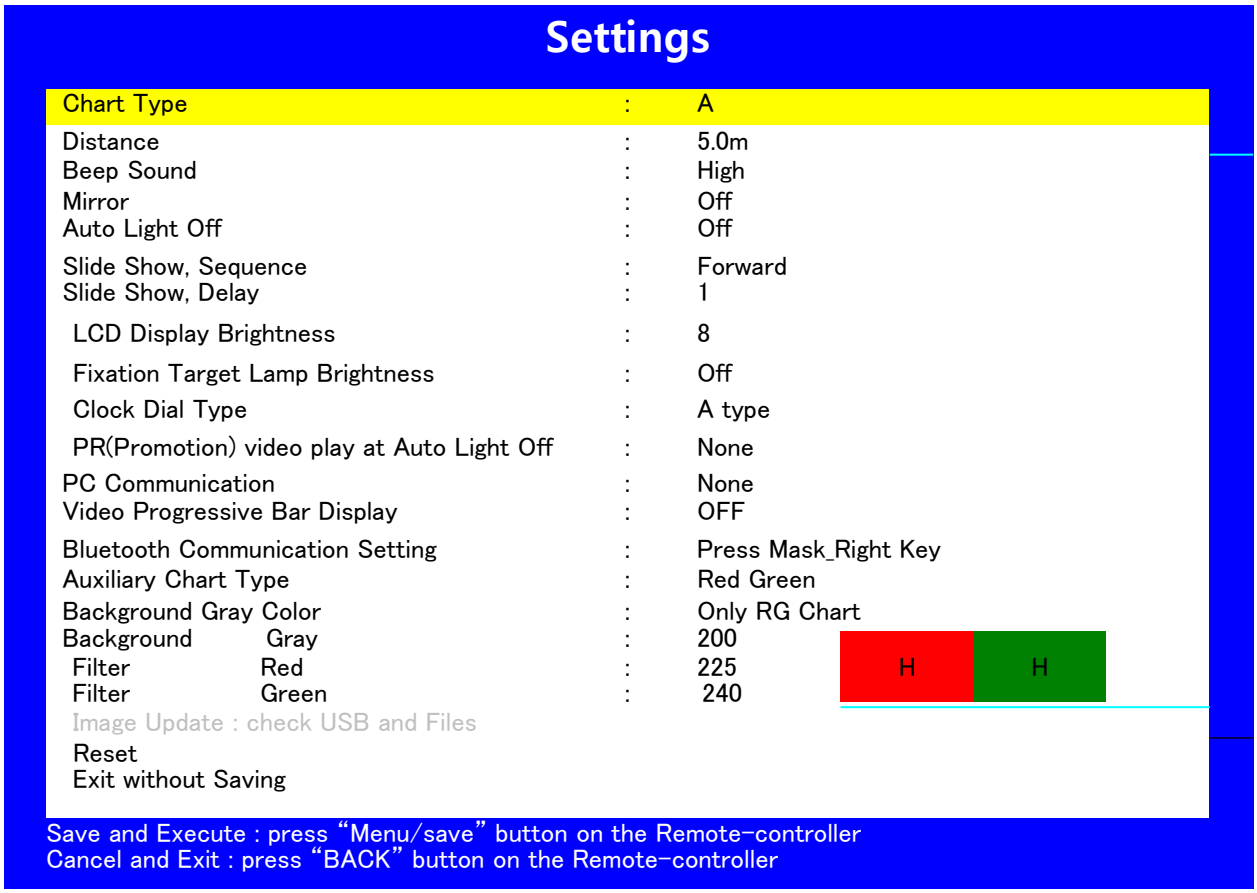
D Type


PLC–8000
REMOTE
CONTROLLER
RC–D

R Type


PLC–8000
REMOTE
CONTROLLER
RC–R

9. Setting of the instrument



Parameters Setting Item

- Chart type: A, C, D, R, Slide Show
- Distance: 1.0m~6.0m(unit 0.1m)
- Beep Sound: Off, Low, Mid, High
- Mirror: Off, On
- Auto Light Off: None, 5Min, 15Min, 30Min
- Slide Show, Sequence: Forward, Reverse, Random
- Slide Show, Delay: 1, 2, 3, 4, 5
- LCD Display Brightness: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
- Clock Dial Type: A, B, C, D, E, F, G Type
- PR(Promotion) video play at Auto Light Off: None, Yes
- PC Communication: None, Yes
- Video Progressive Bar Display: None, Yes
- Bluetooth Communication Setting: Press Mask_Right Key
- Auxiliary Chart Type: Red Green, Pola
  (Only "Red Green" at PLC-8000)
- Background Gray Color: None, Only RG Chart, ALL Chart
- Filter Red: 160 ~ 255
- Filter Green: 160 ~ 255
- Background Gray: 160 ~ 255
- Image Update

- Reset
- Exit Without Saving

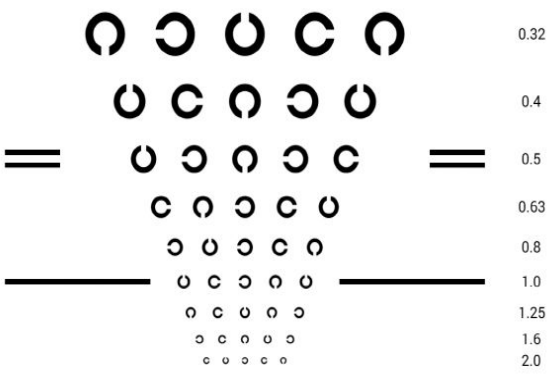
Parameters Setting Method

- Menu/Save button on the Remote controller: Parameters setting context menu display and
  Parameters setting information save
- Mask_Up or Mask_Down button on the Remote controller: Select parameter move up and down
- Mask_Left or Mask_Right button on the Remote controller: Select parameter change
  (Bluetooth Communication Setting = only Mask_Right button)
- BACK button on the Remote controller: Cancel and exit

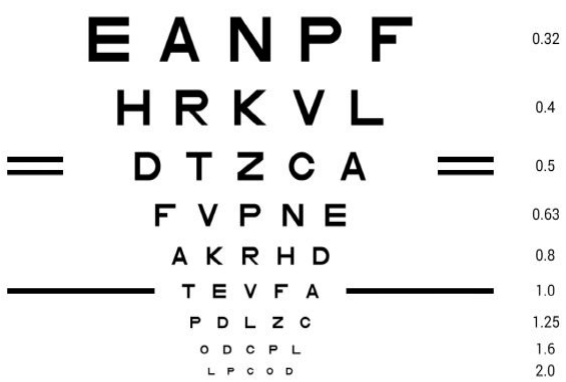
10. ETDRS Chart Function

- The instrument indicates the ETDRS chart where the visual acuity is changed in turn from the upper column. While the ETDRS chart is indicated, press the ETDRS button of the remote controller. Different ETDRS charts are indicated alternately.

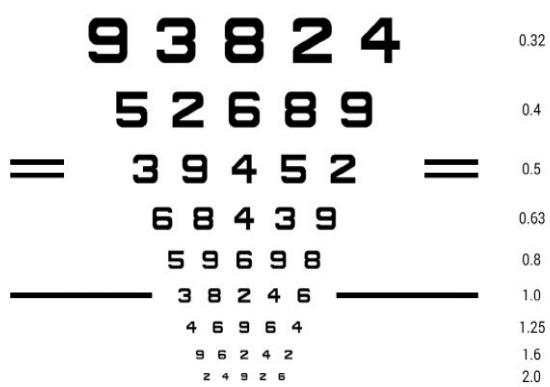
ETDRS A



ETDRS B

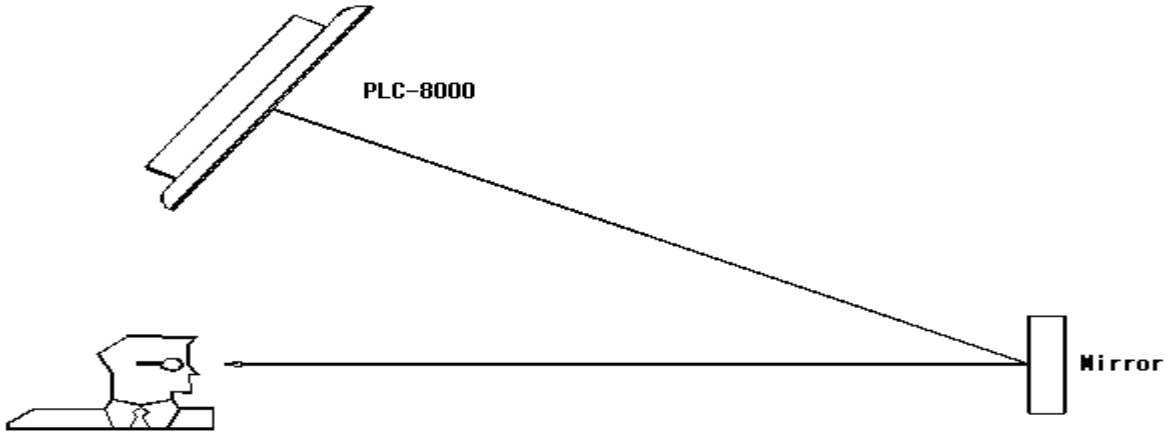


ETDRS C



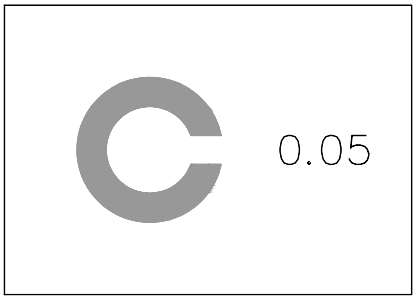
11. Mirror Function

- You can select whether the right-and-left mirror reverse of chart should be done. Use this item when the chart is set by folding with a mirror. Picture and animation are not reversed.

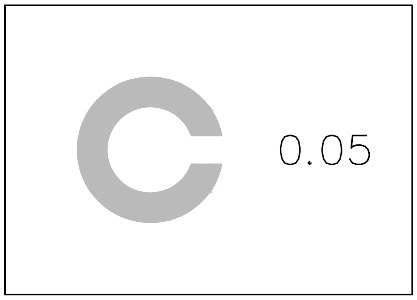


12. CTRS Chart Function

- It is possible to indicate the whole chart in the single contrast ratio. When this function is in use, the brightness and background of the liquid crystal display are fixed at the shipment setting even if it is changed.
- Press the CTRS button once. The chart is indicated with the contrast reduced to 25%
- Press the CTRS button twice. The chart is indicated with the contrast reduced to 12.5%
- Press the CTRS button three times. The chart is indicated with the contrast reduced to 6%



Picture 3

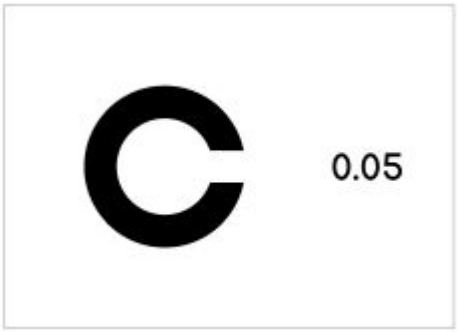


Picture 4

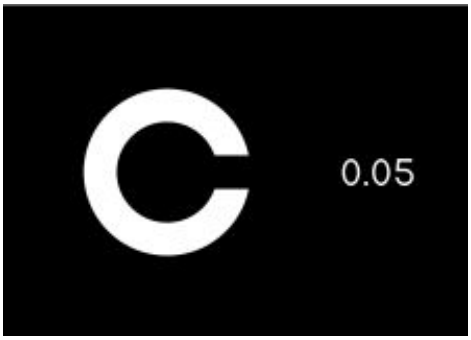
Picture 5

13. Black/White Reverse Chart Function

- While the visual acuity chart is indicated, press the Reverse button. The Black-and- White condition of the chart being indicated is reversed.



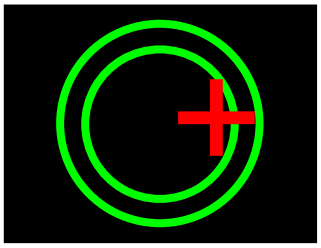
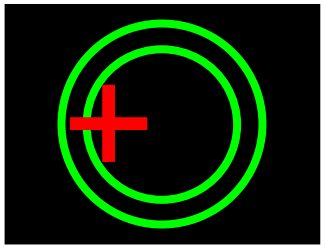
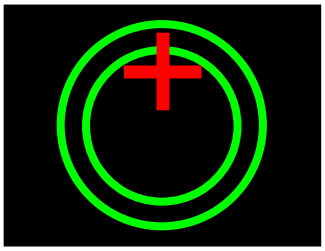
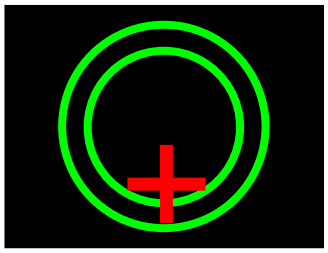
Picture 6



picture 7

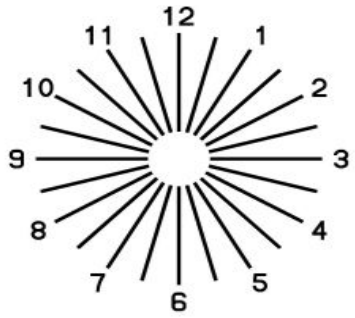
14. Schober Chart Function

- Auxiliary lens: Red filter on the right eye, green filter on the left eye

Subject's vision	Button	Correction
	Mask_ Right	Add the BO prism powers until the cross comes to the center of the circle
	Mask_Left	Add the BI prism powers until the cross comes to the center of the circle
	Mask_Up	Add the BU prism power to the right eye and BD prism power to the left eye until the cross comes to the center of the circle
	Mask_Down	Add the BD prism power to the right eye and BU prism power to the left eye until the cross comes to the center of the circle

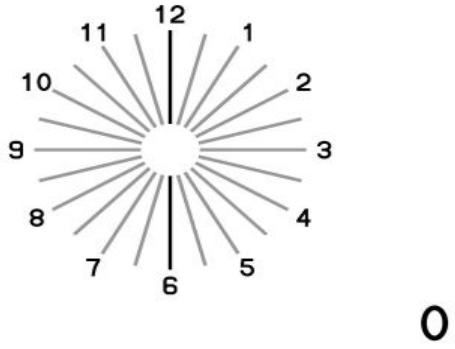
15. Astigmatism Chart Function

- For the astigmatism chart of this instrument, more types of radiation can be selected by setting. Moreover, there is the function to indicate the astigmatic axis more accurately. When the active chart is operating, the background of the liquid crystal display is fixed at the shipment setting even if it is changed.
- Select the astigmatism chart from the remote controller and indicate it on the liquid crystal display. You can execute the normal astigmatism test in this condition.



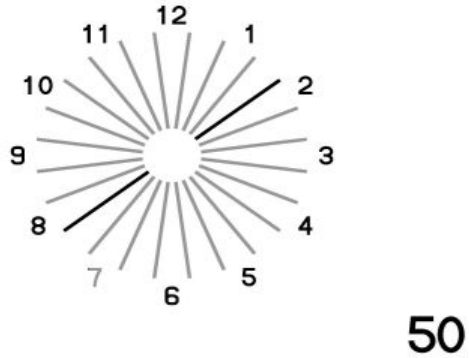
Picture 8

- Select the Mask Up and Mask Down button of the remote controller again. The color of the radiation except “12-6 o’clock” fades.



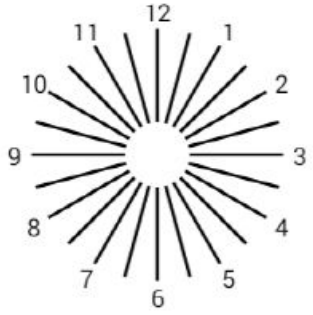
Picture 9

- Press the Mask Up and Mask Down button of the remote controller, and the deep color line can be rotated by 5°. Rotate the deep color line with the Mask Up and Mask Down button until it is seen most clearly.
  Press the Mask Up button, and the astigmatic axis is changed in the positive direction.
  Press the Mask Down button, and the astigmatic axis is changed in the negative direction.

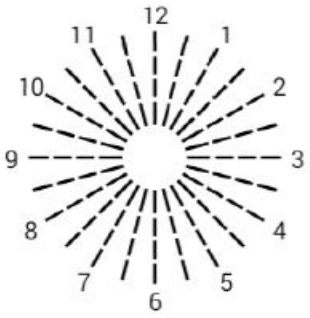


Picture 10

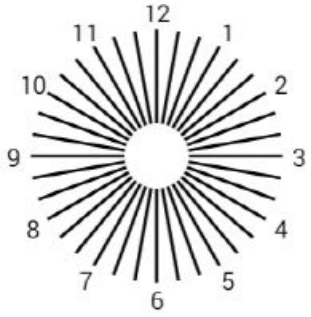
- PLC-8000(pola), Kind of Astigmatism type is A~G Type. It want Chart to test can select in menu



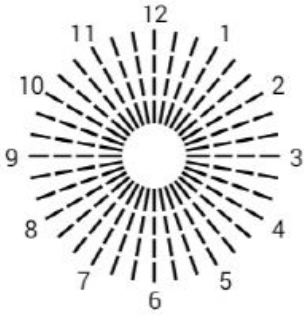
A Type



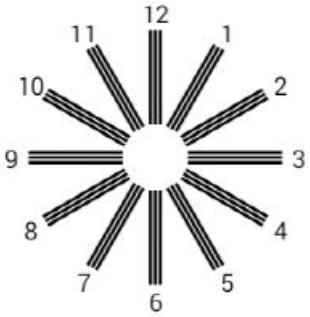
B Type



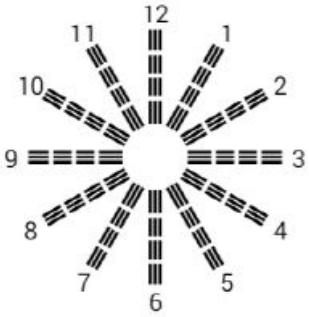
C Type



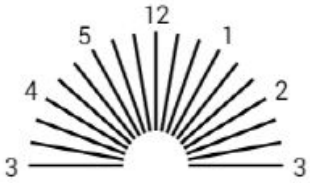
D Type



E Type



F Type



G Type

16. Fan & Block Chart Function

- It will be shown in figure 11 when you press astigmatism chart button in twice.
- Figure. 11 is a normal astigmatism test chart and apart from that it can be used as an additional test chart.
- Press Mask_up button to display the chart from 0 to 180 degree clockwise by the interval of 10 degree and for anti-clockwise display press Mask-down button. (figure no. 11)
- If the patient has astigmatism, the chart will be shown as figure no.12.
- Arrow mark will be adjusted until it appears clear. (See Figure no. 13)
- Adjust astigmatism axis as the arrow indicates using phoropter or PDR-7000 so that the patient could see Figure 14.

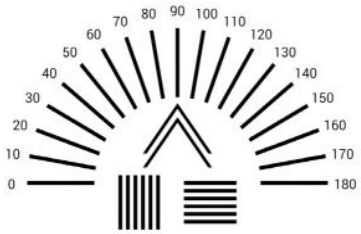
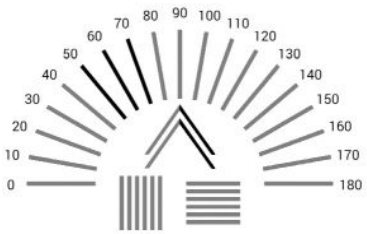


Figure 11



90

Figure 12

60

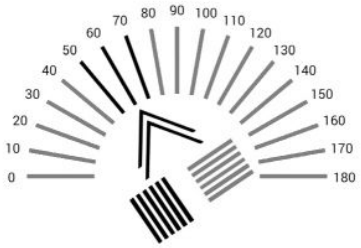


Figure 13

60

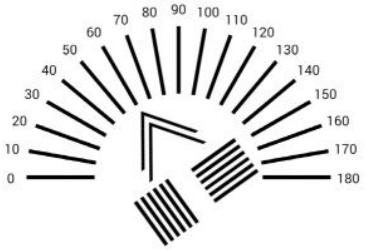
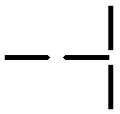
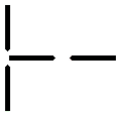
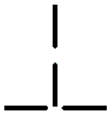


Figure 14

60

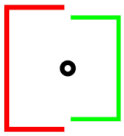
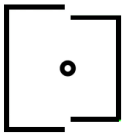
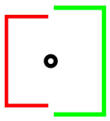
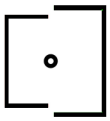
17. Reticle Chart Function

- Auxiliary lens: Red/Green Glasses(PLC-8000), Polarizing Glasses(PLC-8000pola)
- Right eye see the vertical bar and left eye see the horizontal bar.
- Basically, the two bars are moved symmetrically from the center coordinates of the LCD.
- Displayed by moving 0.5cm increments based on Distance 5m.
- When you pressed Single Mask button once: Unit and number are not displayed on the lower right.
- When you pressed Single Mask button twice: Unit and number are displayed on the lower right.

Subject's vision		**Button**	**Correction**
PLC-8000	**PLC-8000 pola**		
		Mask_Right	Add the BO prism powers until a cross is formed.
		Mask_Left	Add the BI prism powers until a cross is formed.
		Mask_Up	Add the BD prism power to the right eye and BU prism power to the left eye until a cross is formed.
		Mask_Down	Add the BU prism power to the right eye and BD prism power to the left eye until a cross is formed.

18. Aniseikonia(Vertical) Chart Function

- Auxiliary lens: Red : Red/Green Glasses(PLC-8000), Polarizing Glasses(PLC-8000pola)
- Right eye see the right frame and left eye see the left frame.

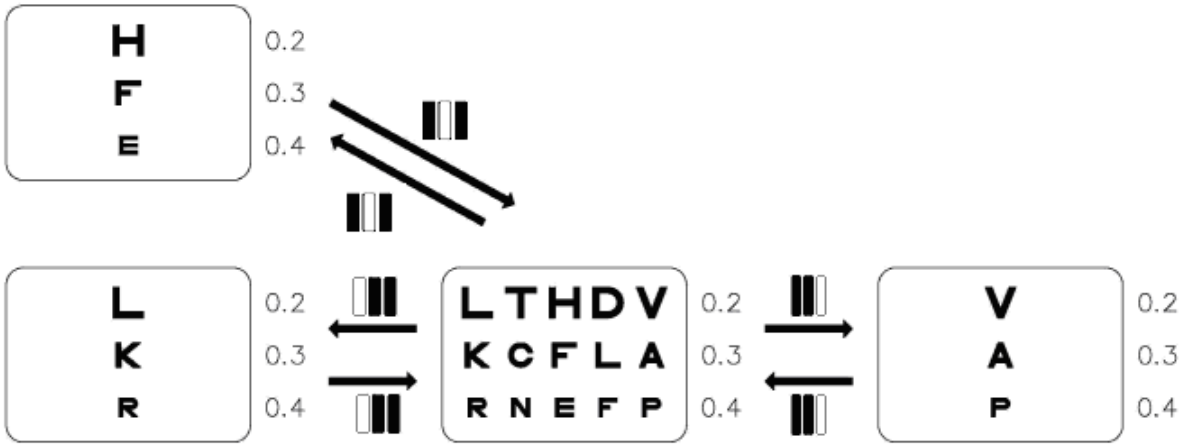
Subject's vision		**Button**	**Correction**
PLC-8000	**PLC-8000 pola**		
		Mask_Up	Enlarge only the left part of the chart displayed on the LCD.
		Mask_Down	Reduce only the left part of the CHART displayed on the LCD.

19. Mask Function

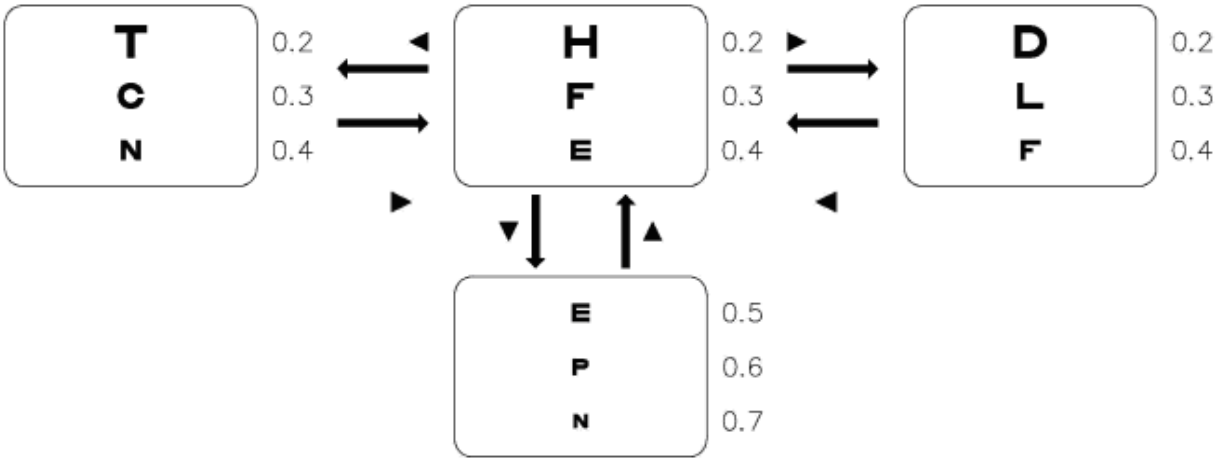
19.1 Vertical Mask

- Mask_Right button: To move to the right column
- Mask_Left button: To move to the left column
- Mask_Up button: To move to the up column
- Mask_Down button: To move to the down column
- Vertical Mask button: Return to the original chart

Ex1)



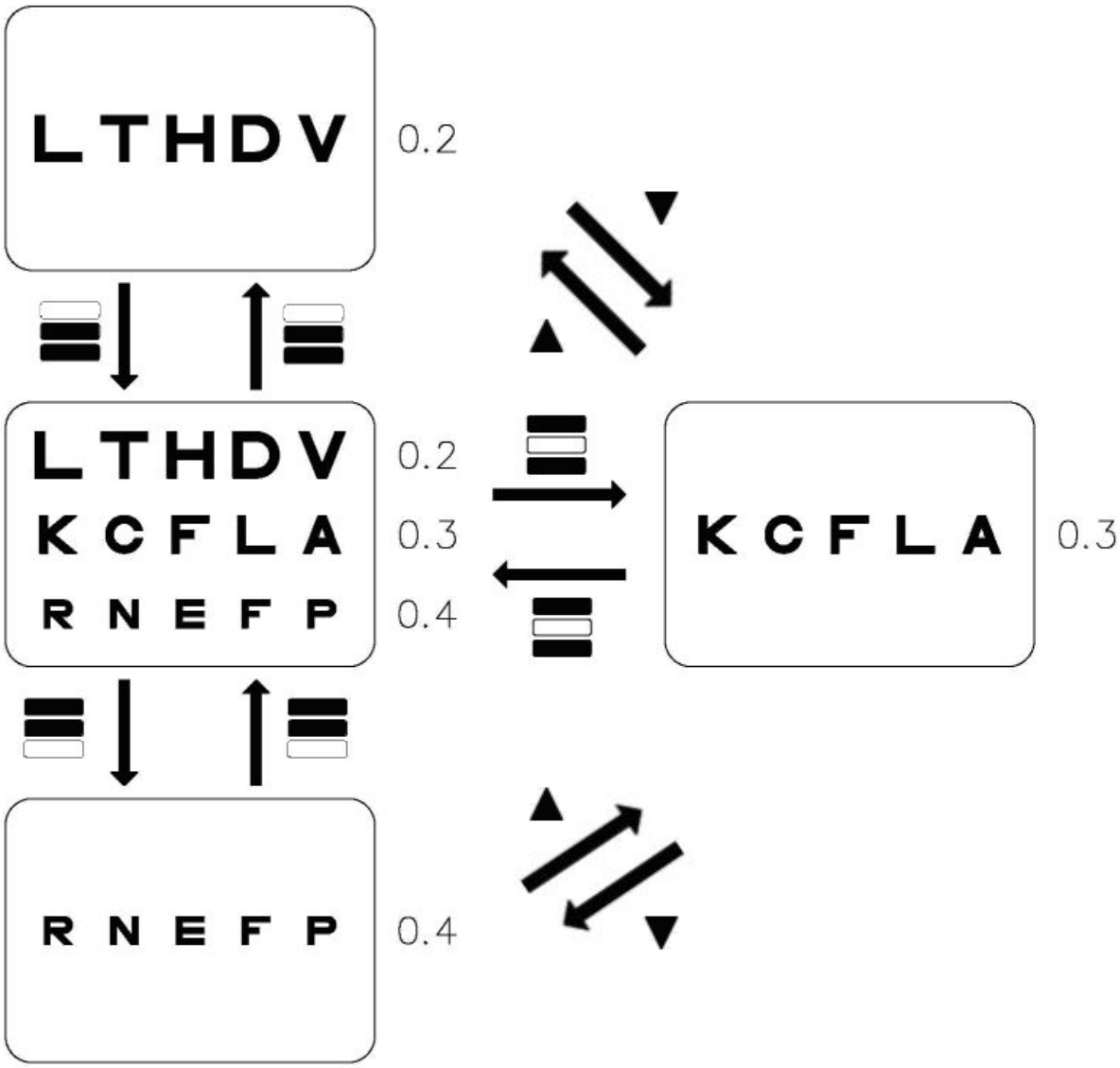
Ex2)



19.2 Horizontal Mask

- Mask_Right button: To move to the right row
- Mask_Left button: To move to the left row
- Mask_Up button: To move to the up row
- Mask_Down button: To move to the down row
- Horizontal Mask button: Return to the original chart

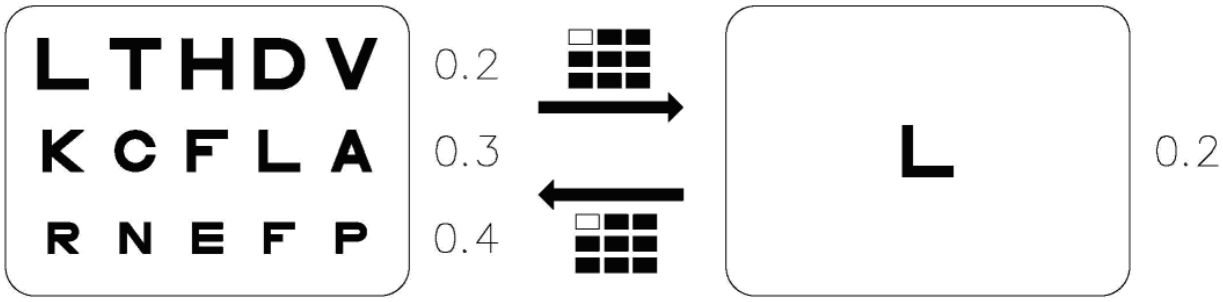
Ex1)



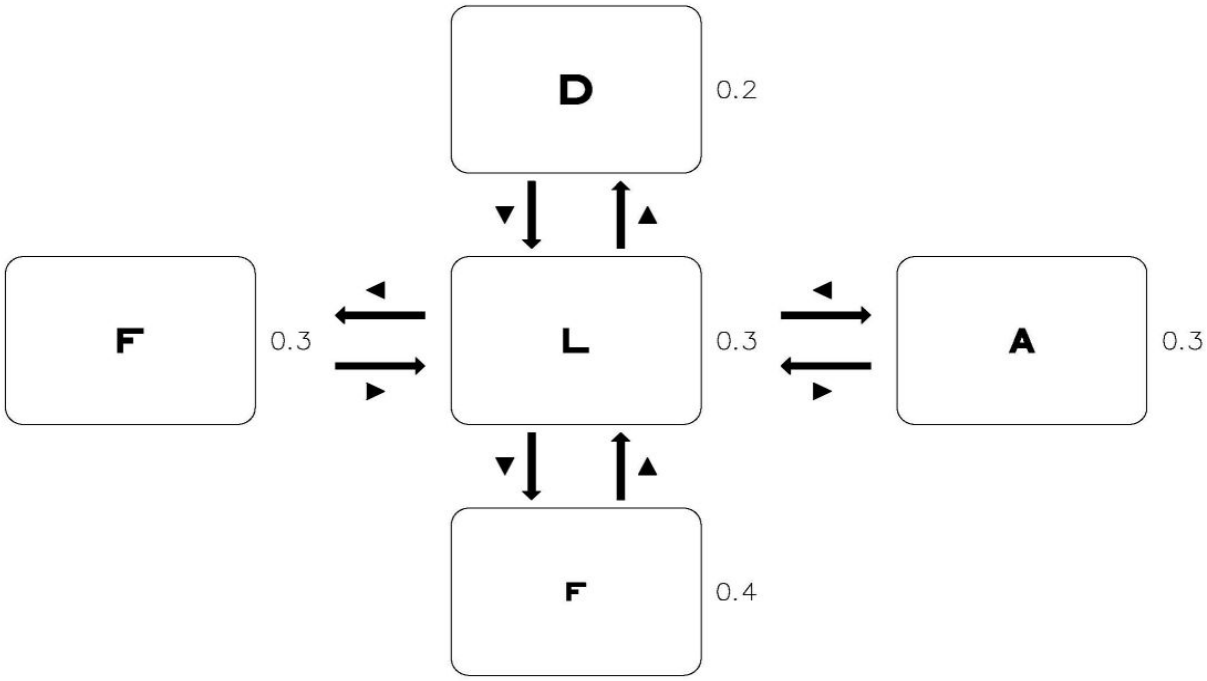
19.3 Single Mask

- Mask_Right button: To move to the right column
- Mask_Left button: To move to the left column
- Mask_Up button: To move to the up column
- Mask_Down button: To move to the down column
- Single Mask button: Return to the original chart

Ex1)

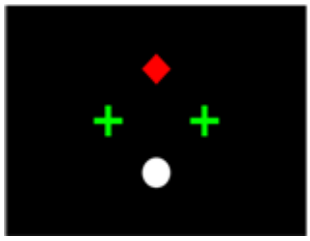
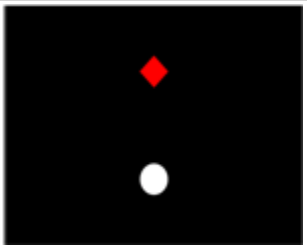
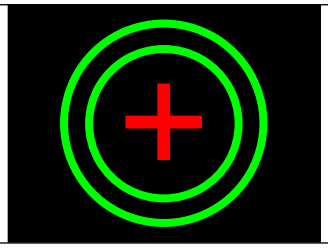
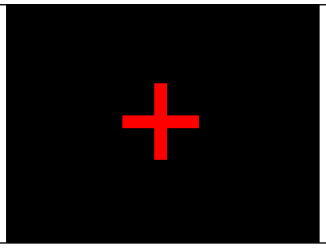


Ex2)



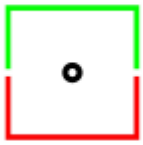
20. Red/Green Chart Function

Common charts

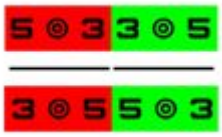
Chart	Red	Green
Worth		
Schober		

PLC-8000 Only charts

Chart	Red	Green
Stereoscopic vision		
Binocular balance		
Phoria		
Phoria with fixation		
Stereo		

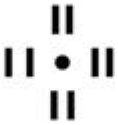
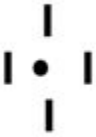
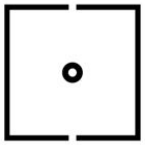
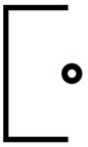
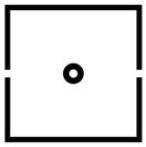
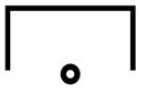
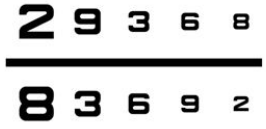
Vertical coincidence			
Horizontal coincidence			

PLC-8000pola Only chart

Chart		Red	Green
Duochrome balance			

21. Polarizing Chart Function

PLC-8000pola Only

Chart		45°	135°
Phoria			
Phoria with fixation			
Stereo			
Vertical coincidence			
Horizontal coincidence			
Duochrome balance			
Binocular balance			

22. Maddox Test Function

- PLC-8000 (pola) allows you to test by either light from LED or white spot illuminant in the center of LCD chart. According to LED light or white spot of PLC-8000's screen, you can process the testing.
- If you select "off" for Fixation Target Lamp from the menu, the spot will be shown in the center of LCD chart and LED light brightness of LCD chart can be controlled from one to ten power.
- The screen will be shown as only black screen if you select 1~10 of fixation target lamp in the menu.

23. Von Graefe Chart Function

- When you press Red/Green Chart(figure 3) button twice on the remote control, the LCD will display as shown in figure 1.
- Figure 1 is a chart showing the characters in a horizontal arrangement.
- And then if you press Red/Green Chart(figure 3) button on the remote control once more, the LCD will display as shown in figure 2.
- Figure 2 is a chart showing the characters in a vertical arrangement.
- If you press Red/Green Chart(figure 3) button on the remote control once more, the LCD displays as shown in figure 3 and returns to the initial screen.

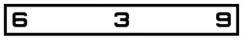


figure 1

figure 2

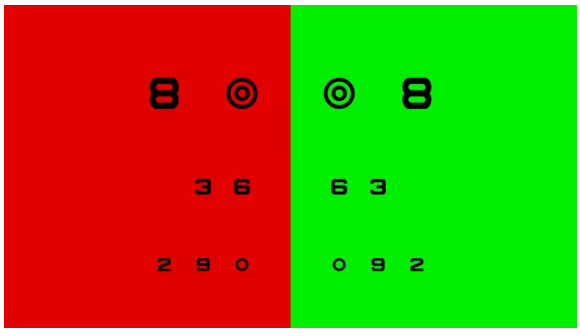


figure 3

● Horizontal line

- Use : To detect vertical phoria(Von Graefe test)
- Auxiliary lens : 10△BI to the right eye
- Ideal appearance :

Right eye	Left eye	Binocular ideal
6 3 9	6 3 9	6 3 9 6 3 9

● When the two rows are not in line, see the table below to reduce the amount of shift

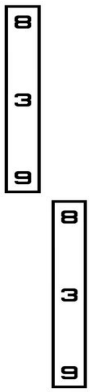
Subject`s vision	Phoria	Correction
<1> The left row is higher 6 3 9 6 3 9	Right eye hyperphoria	Add the BD prism power to the right eye until the rows line up.
<2> The right row is higher. 6 3 9 6 3 9	Left eye hyperphoria	Add the BU prism power to the right eye until the rows line up.

● Vertical line

- Use : To detect horizontal phoria(Von Graefe test)
- Auxiliary lens : 6△BU to the right eye
- Ideal appearance :

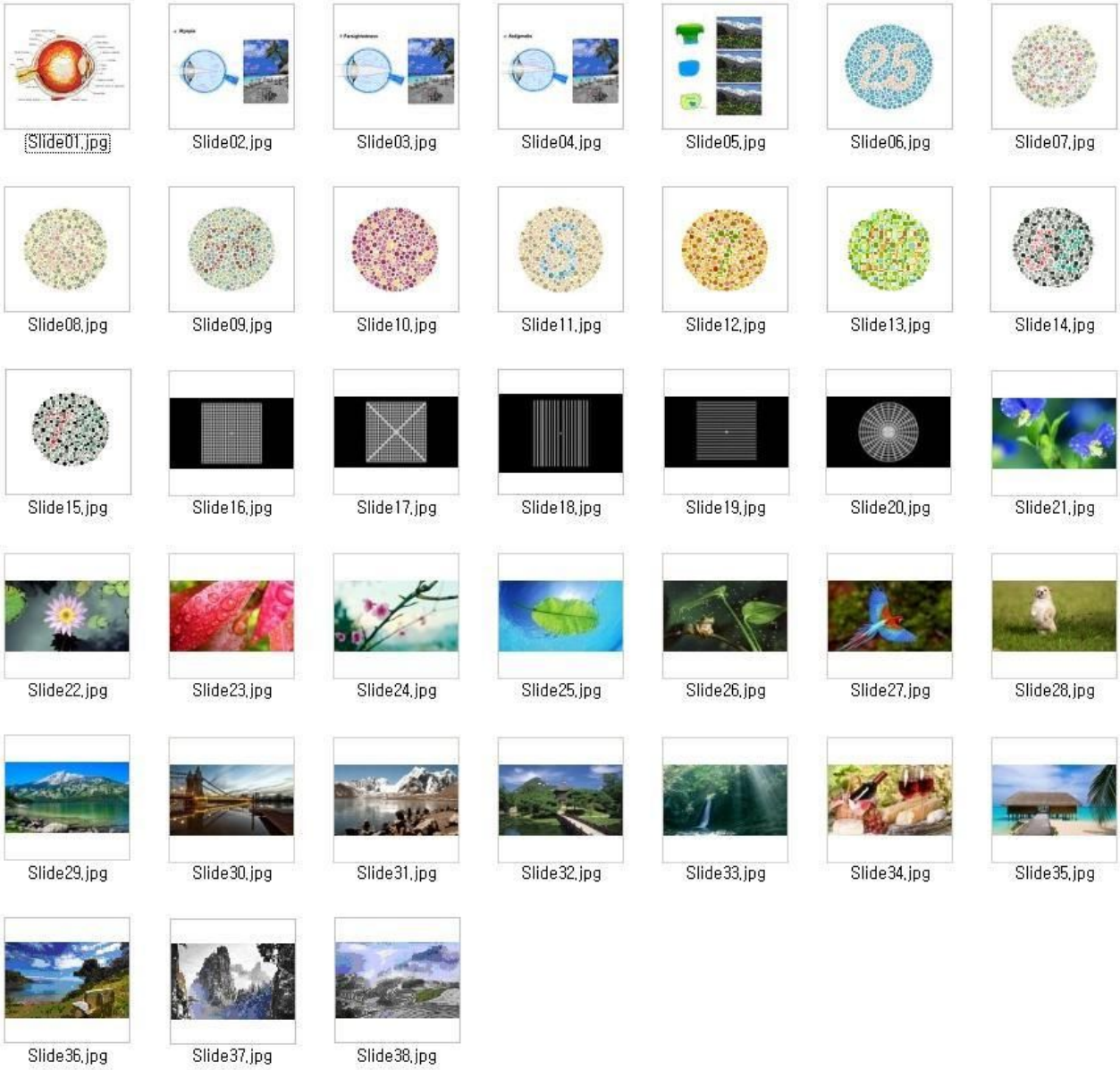
Right eye	Left eye	Binocular ideal
8 3 9	8 3 9	8 3 9 8 3 9

● When the two column are not is line, see the table below to reduce the amount of shift.

Subject`s vision	Phoria	Correction
<1> The upper column is on the left.  	Esophoria	Add the BO prism power to the left eye until the two columns line up.
<2> The upper column is on the right. 	Exophoria	Add the BI prism power to the left eye until the columns line up.

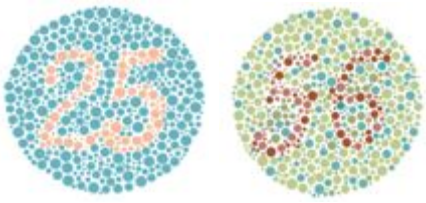
24. Slide Function

- PLC-8000(pola) has a image of each button. Show the image on Slide condition when press the button.



Picture 15 Embedded images

- It is shown the image of each button of 5 seconds by the Slide Show button.
- Images includes color blindness test charts, color blindness test is possible.



Picture 16 Picture 17

How to change the images of PLC-8000(pola) built on

- Users can change the images of PLC-8000(pola) built on (USB flash drive is required)
- Create a “image” folder in USB flash drive.
- Insert to change images in “image” folder.
  - ✓ Images must be the name of “Slide+NUMBER(1~38).jpg”
    Ex) Slide01.jpg, Slide13.jpg
  - ✓ Logo image must be the name of “PLC-8000 Logo.jpg” (Case of Pola Type, must be the name of “PLC-8000pola Logo.jpg”)
- Put USB flash drive in PLC-8000(pola) after Boot up that. Select "Images Update" on Menu setting, change the image.
- It seems Full-HD Image when Image resolution is 1920x1080 Image.

25. Video Play Function

- PLC-8000(pola) can play video for announce of Ophthalmology or optician's shop and concentration of child

25.1 Video Play Specifications

- USB Class: Class 2 or more
- File Format: AVI, MPEG, MP4, MKV

25.2 Using the Video Play function

- Make the “VIDEO” folder in USB flash
- Insert to files in “VIDEO” folder of USB flash
- Insert USB into the USB port at PLC-8000(pola) like as figs. 1 and 2.

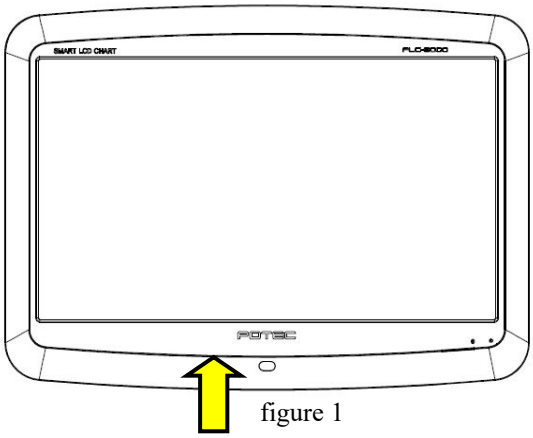


figure 1

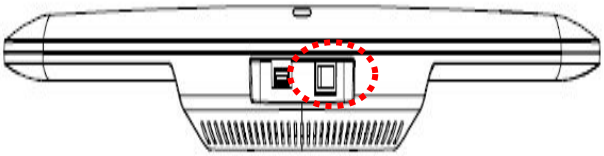


figure 2

- After connected to USB port, waiting about 2~4 seconds to be recognized the USB flash at PLC-8000(pola). If movie size is bigger than 1.3GByte or a number of movie is many, the USB flash loading time will take 1~2minite.
- Press the Chart/Side button two times of remote control. And then you can see the Video Select Screen (Figure 3).

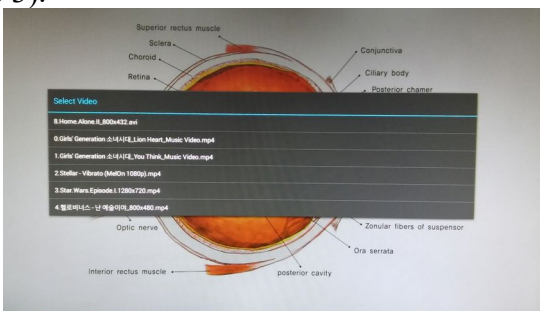
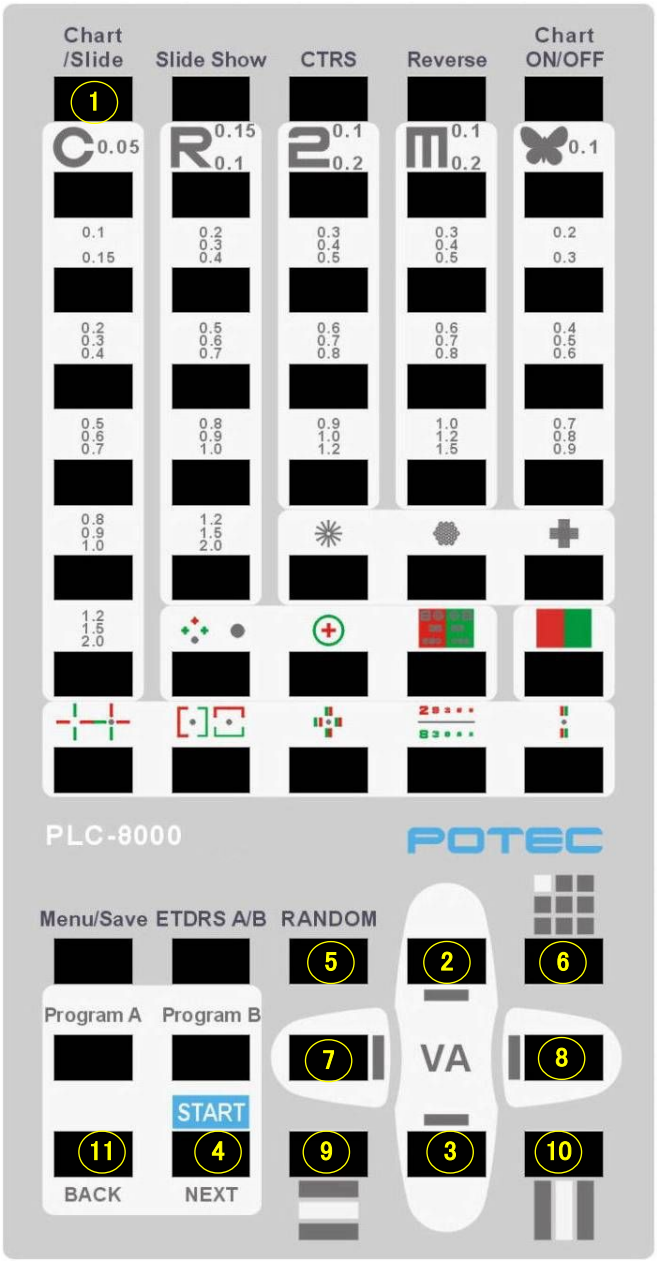


figure 3

- You can select movie for up/down button of remote control, and then press START button for play.
- If you want back to the Chart screen, press Chart/Slide or BACK button.

25.3 Remote control function to Video Play



① USB recognize popup / comeback chart screen

② Select upper movie / Increase volume

③ Select downer movie / Decrease volume

④ Start video play

⑤ Stop video

⑥ Pause video play

⑦ Backward 10 seconds

⑧ Forward 10 seconds

⑨ Select previous file to play

⑩ Select next file to play

⑪ Comeback to chart screen

25.4 PR(Promotion) Video Play function

- If sleep mode is not turn on after 5 min, 15min and 30 minutes later sleep mode will be active automatically. In that mode you can play your video advertisement.
- Please follow the steps to play video advertisement.
  - ✓ Make a folder named ‘PR’ in USB.
  - ✓ Store your video file inside the ‘PR’ folder.
  - ✓ From menu, set the time for ‘Auto Light off’.
  - ✓ Set ‘Yes’ for PR(Promotion) video play at Auto Light Off.
  - ✓ Insert the USB drive to PLC-8000. (Photo 1.2)
- At the time of playing video file, remote control function will followed by clause 24.3.
- Sub-tittle is not compatible in PLC-8000

25.5 Note of video play function

- Depending on the video, "⑦ Backward 10 seconds" function can not be synchronized temporarily.
- Subtitles are not supported.

26. Bluetooth Function (optional)

PLC-8000(pola) and PDR-7000, can be connected by wireless communication with Bluetooth Dongle. The wireless communication among other products except PLC-8000(pola) and PDR-7000 is not possible yet. (Communication may fail in heavy signal traffic)

26.1 Recommended specification for Bluetooth

- Version: Bluetooth 4.0 or more
- Class: class 2 or more
- Data Rates: Up to 3Mbps
- Distance of Use: Up to 20M

26.2 Check the PDR-7000 version

Before connecting to Bluetooth, you need to check the version of PDR-7000. If there is a power button( ) on the PDR-7000 chart selection screen, it is version 3. If there is no power button, it is version 4.

PDR-7000 Version 3	PDR-7000 Version 4

26.3 PDR-7000 Version 3 Bluetooth connection

- Initial pairing with PDR-7000 require the following items.
  - ✓ USB HUB
  - ✓ USB Mouse
  - ✓ Bluetooth Dongle: 2 EA

- Switch off PDR-7000 to insert Bluetooth dongle into USB in the back of control box (Figure 1, 2).

Figure 1

Figure 2

- Turn on power of PDR-7000. When the PDR-7000 has finished booting, press the Menu button on the right side of the control panel keyboard to go to the Setting menu (Figure 3).

- Touch the Select Chart to go to the Select Chart menu (Figure 4).

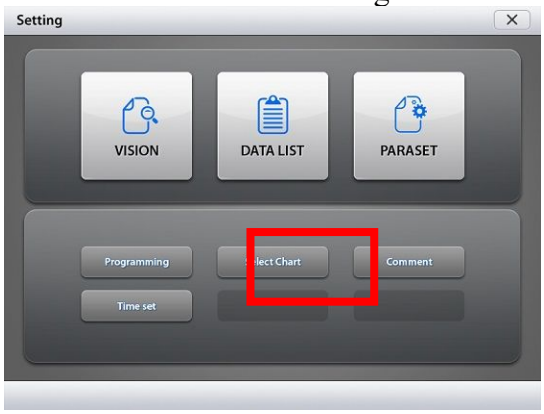


Figure 3

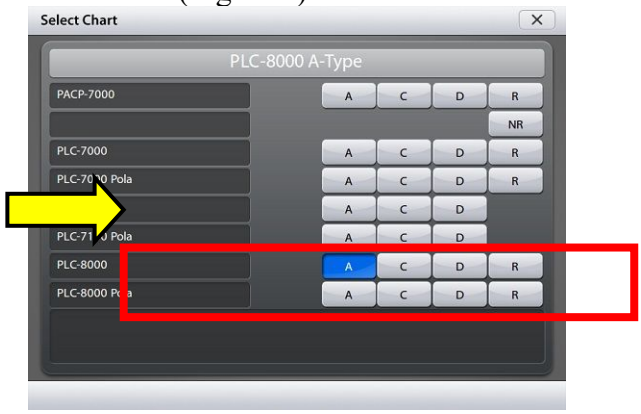


Figure 4

- Select PLC-8000, PLC-8000 Pola and chart type (A, C, D, R) according to the product you are using.(Figure 4) and touch 'X' then PDR-7000 will restart the program to apply the setting.
- Make sure that the Bluetooth menu ( ) is displayed at the top of the PDR-7000 screen (Figure 5).

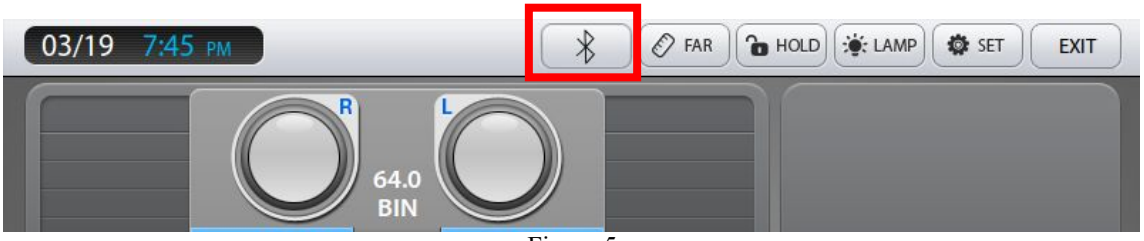


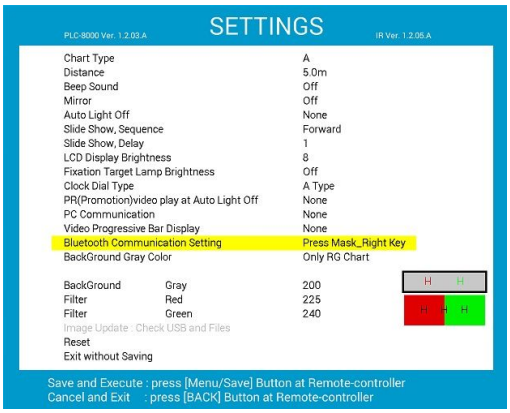
Figure 5

- Settings for PLC-8000(pola) are the following.

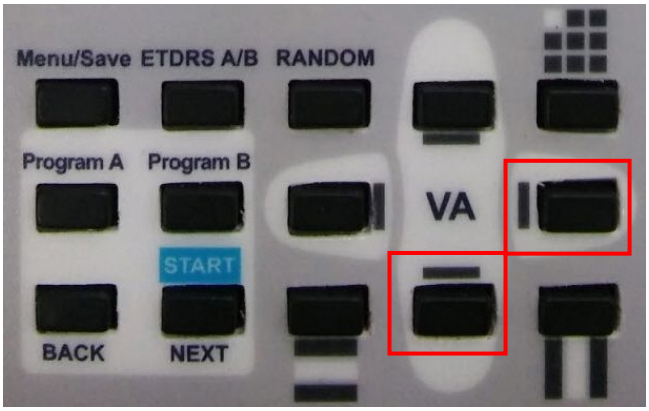
(1) Insert Bluetooth dongle into USB hub at the bottom of PLC8000 to pair with wireless Mouse and turn on power.

(2) Press “on/off button” of remote controller on start-up screen.

(3) Press menu button to access settings.

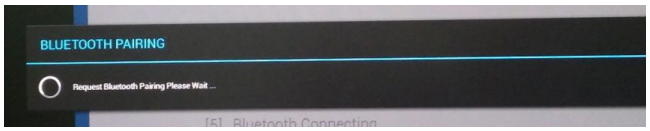


(4) Press downward button to move the cursor to “Bluetooth Communication Setting” and press the right button to change settings. (Unable to change without dongle)

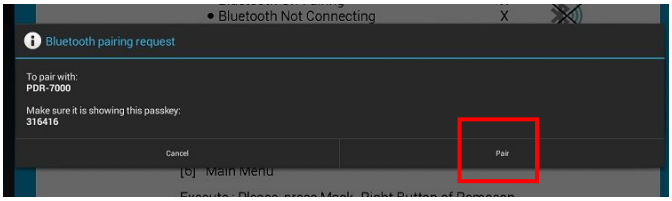


(5) [BLUETOOTH SETTING] press the right button to choose [3] Bluetooth pairing.

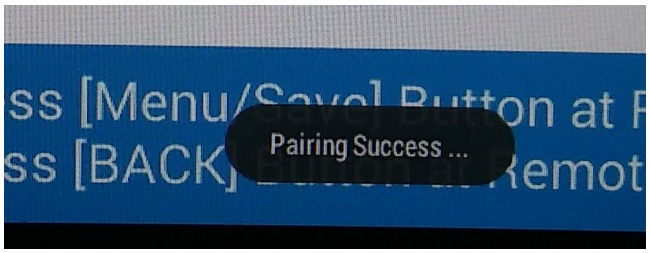
(6) PLC-8000(pola) attempt pairing with PDR-7000.



(7) Pairing request message pops up on the screen when it senses PDR-7000. Click the 'Pair' button by using the mouth connected to USB hub to pair devices.



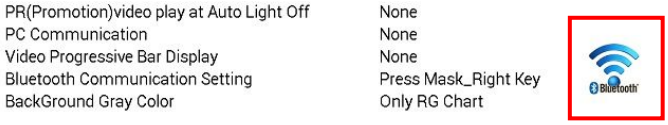
(8) When pairing is completed “Pairing Success…” message appears for 3 seconds and disappears.



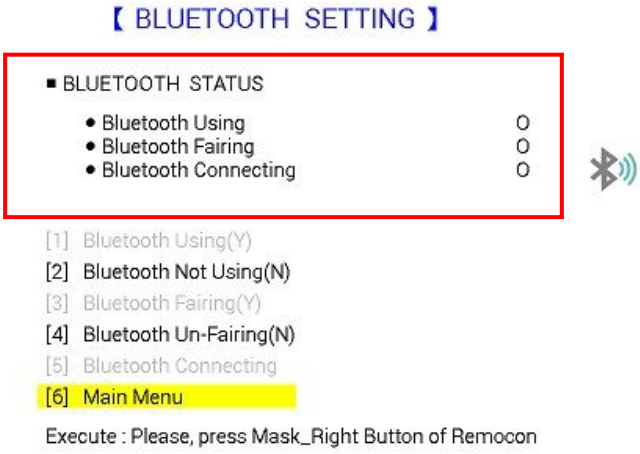
(9) [BLUETOOTH SETTING] Press the right button to choose [1] Bluetooth Using (y).

(10) After paring devices is completed, it exit to Landolt Ring with a message 'Bluetooth Connection Success…'

(11) Press menu button to access user settings to make sure Bluetooth is functioning properly. The icon in the right picture indicates that pairing is successfully done.



(12) For more information, refer the “Bluetooth Communication Setting”.

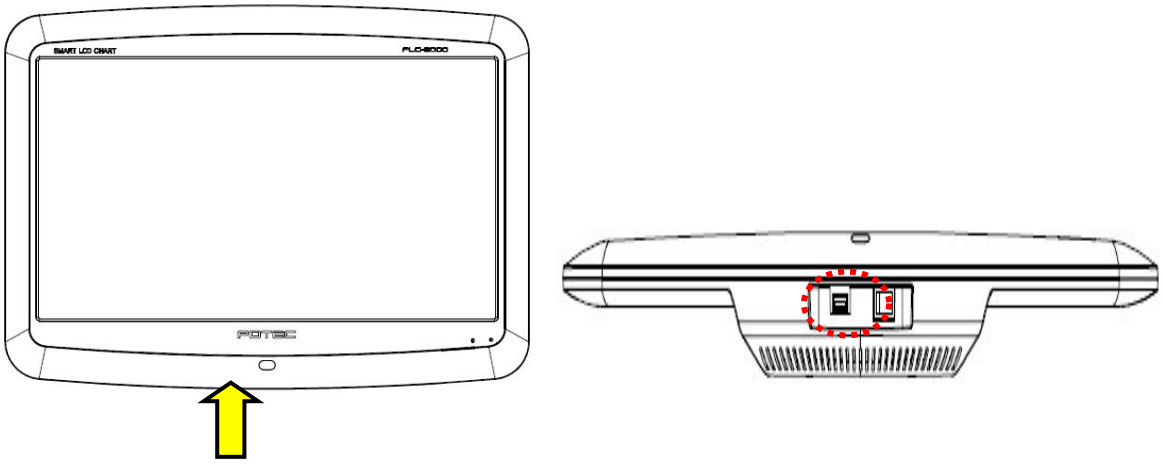


- The Bluetooth icon on the screen of PDR-7000 control box turn blue when wireless function is working properly. (Figure 6)

Figure 6

- If not working properly, press [4]Bluetooth Un-Fairing, switch off and on power of PDR-7000, PLC-8000 together. Boot processing of PDR-7000 has to be completed prior to PLC-8000. If both are switched on at the same time, PDR-7000 completes boot processing first. Then, repeat 5 on the page 37.

- Turn off PLC-8000 when Bluetooth pairing is successful.
- Unplug Bluetooth dongle from USB Hub to insert it at USB port of PLC-8000(pola).



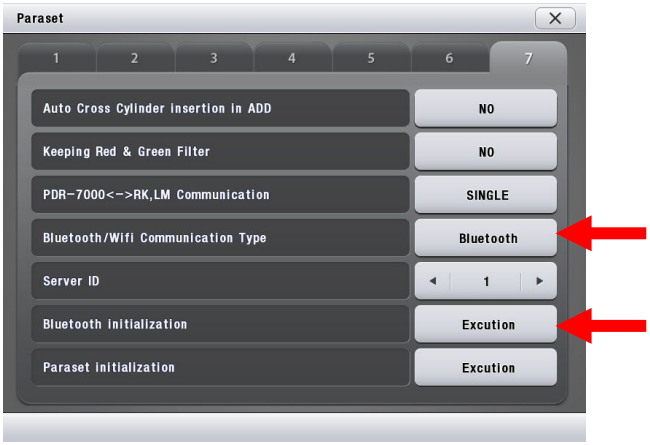
- Turn on power of PLC-8000 to activate Bluetooth function allowing wireless communication with PDR-7000. Make sure to turn on PDR-7000 first to complete boot processing prior to PLC-8000.

26.4 PDR-7000 Version 4 Bluetooth connection

NOTE	If there are several Bluetooth devices (smart phone, etc.) during Bluetooth connection operation of PDR-7000 and PLC-8000 chart, communication may be interrupted. In the Bluetooth Pairing step, it is safe to turn on only the Bluetooth device of the set 1 device to be connected.

1) Initializing PDR-7000 Bluetooth Settings

(1) On the PDR-7000's Paraset page 7, set the 'Bluetooth / Wifi Communication Type' item to "Bluetooth".
(2) Bluetooth Initialization ➔ Execution.
(Bluetooth initialization is required before proceeding with Bluetooth pairing.)



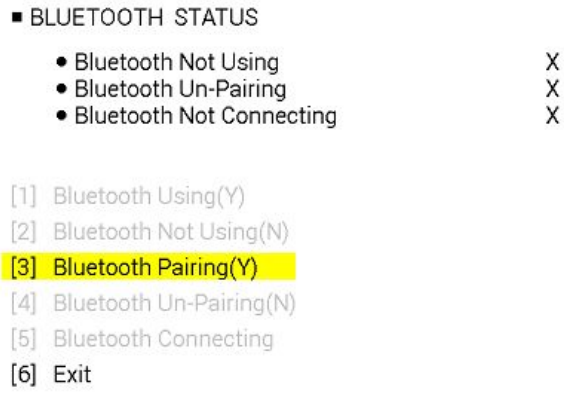
(3) The Select PLC-8000(pola) from the 'Select Chart' menu.
※ When using PLC-8000 R type, check the version of PLC-8000. Version of the PLC-8000 can be checked from the top left of the screen after pressing the PLC-8000 Remote Control Menu. Select "R" type when the PLC-8000 version is lower than 1.2.10 (1.2.00 to 1.2.09), or "NR" type when it is higher than 1.2.10.

(4) Reboot PDR-7000.

2) PLC-8000(pola) Bluetooth communication connection

(1) Turn on the PLC-8000(pola).
(2) When the PLC-8000(pola) logo screen, press the SETUP button on the remote control to go to the SETUP menu.
(3) Use the up and down buttons to move to the Bluetooth item, select(right button).

(4) Select '[3] Bluetooth Pairing (Y).' (Right button)
(5) When pairing is completed, 'Pairing Success' message will be output..



(6) After completing pairing, select [1] Bluetooth Using (right button). Wait a few seconds and the message 'Bluetooth Connection Success' will be displayed.
(7) In 'Bluetooth using (Y)' step, the Bluetooth communication status is unstable and connection may fail.
In this case
■ PDR-7000: Go to Paraset page 7. Bluetooth Initialization ➔ Execution.
■ PLC-8000(pola): Select '[4] Bluetooth Un-Pairing (N)' ➔ '[2] Bluetooth Not Using(N)'
After resetting the settings in order, need to reboot the device and start again from Step 1.
(8) Select chart with PDR-7000 to check communication. Bluetooth connection completed.

27. Maintenance and Repair

27.1 Replacement the Battery of Remote Controller

- Remove the battery cover of the remote controller
- Replace the batteries and the battery cover to the remote controller

WARNING	Be sure to observe the polarity marks (plus + & minus -) inside the battery compartment. Remove these batteries if equipment is not likely to be used for some time. Follow local governing ordinances and recycling plans regarding disposal or recycling of device components.

27.2 Cleaning

- Wipe the cover and the screen with a dry soft cloth when they get dirty.

27.3 Service Information

- You cannot solve the problem device sales representative to request a consultation. Show product labels and distributors to use the information below, please let us know.

  Model Name: PLC-8000 or PLC-8000pola

  Product Number: Display products on the label says the 8-digit character

  Symptoms: A detailed technical

- If you can't contact with your local distributor, you can directly get in touch with the service department of the POTEC using the phone number and the address written in the below table.

  Manufacturer: POTEC Co., Ltd.

  Address: 40-4, Techno 2-ro, Yuseong-gu, Daejeon, 34015, KOREA

  Tel: +82-42-632-3536

  Fax: +82-42-632-3537

- Disposal of equipment

WARNING	This equipment has battery that can cause environment pollution when be left. Ahead of going into the discard, ask way to do it or consult with selling agency
WARNING	Upon request, circuit diagrams, component part lists, descriptions, calibration instructions, or other information will be provided to assist service personnel to repair parts of the equipment that are designated by POTEC as repairable by service personnel.

28. Specifications

Distance of projection	1.0~6.0m (0.1 step adjustment)	
Charts	Landolt, English, Russian, Numeral, Snellen, Children, Mask(Horizontal. Vertical, Single Optotype), Special charts(Separate Red/Green at PLC-8000, Red/Green and Polarization at PLC-8000pola), Color Blindness	
Program	2 programs with a maximum of 40 charts each	
External input/output port	USB(USB 2.0), RS-232	
Communication	RS-232 at Wired connection Bluetooth at Wireless connection	
LCD	23-inch Full-HD (1920 x 1080 pixels) at PLC-8000 24-inch Full-HD (1920 x 1080 pixels) at PLC-8000pola	
Operating System	Android 4.4.2	
Memory Card	microSDHC Class10, 8GB or more size	
Speaker	1.5W x 2	
Power Supply	AC100-240V, 50/60Hz	
Power Consumption	PLC-8000:	45-55VA
	PLC-8000pola:	35-45VA
Dimension	Body:	583(W) × 55(D) × 423(H) mm
	Remote controller:	64(W) × 196(D) × 20(H) mm
Weight	Body:	about 6 kg
	Wall Mount Bracket:	370 g
	Remote controller:	160 g (Battery included)
Environment conditions		
(In use)	Temperature:	+10℃ ~ +40℃
	Humidity:	30%RH ~ 85%RH
	Pressure:	700hPA ~ 1060hPA
(In transport/storage)	Temperature:	-10℃ ~ +55℃
	Humidity:	10%RH ~ 90%RH
	Pressure:	600hPA ~ 1060hPA

29. Components.

Product Body : PLC-8000(pola) 1
Wall Mount Bracket 1
Remote Controller 1
Dust Cover 1
Power Cable (with Ferrite Core ZCAT3035-1330) 1
Battery 2

Optional accessories

Red/Green Glasses 1
Polarizing Glasses ..... *<PLC-8000pola Only>* 1