# POLAOPTO

# DIGITAL VISION ACUITY CHART

# PO-1001

# IMPORTANT NOTICE

- Electromagnetic waves discharged from mobile phones, radiotelegraphs, wireless toys may cause malfunctioning of this INSTRUMENT. Please keep any of these 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 INSTRUMENT. For user's safety, please use this INSTRUMENT only after reading all the instructions included in this manual.

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

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

- POLAOPTO Inc. 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 INSTRUMENT and IEC/EN 60601-1 for medical INSTRUMENT).

- 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.

| 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 | Manufacturer |
| MGF. Date | Date of Manufacturer |
| EC REP Authorized EC representative | 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. |
| ⚠ | WARNING | If it may result hazardous situation if don't care.<br>It could lead to a slight wound of you or others, or malfunction of this INSTRUMENT. |
| ⚠ | NOTE | Significant information about installation, operation, basic safety and handling of this INSTRUMENT.<br>Please read to prevent miss-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 INSTRUMENT 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.<br>Check it out if you happen to find, Smoke, smell, or a loud noise<br>  - When you spilt a fluid on this product, or when any metal was wedged<br>  - 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 INSTRUMENT. Touching with these parts may cause serious wounds. |
| ⚠ | WARNING | Please keep the temperature at 10℃~40℃ and humidity at 30%~75% for<br>normal operation. It must not be exposed to watered place or where much water is splashed. Do not put any container or product which contains liquid or gas, besides this INSTRUMENT. |
| ⚠ | CAUTION | Earthling cables are packed in this INSTRUMENT. Always connect them to the earthed electrical outlet to avoid electric shock. |
| ⚠ | CAUTION | THIS INSTRUMENT main body and stand are heavy. Fix THIS INSTRUMENT to robust refraction table. |
| ⚠ | CAUTION | Be careful not to drop any metal or dust inside the INSTRUMENT. 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 INSTRUMENT in a place where is apt to explore, or with volatile chemicals or combustibles. |
| ⚠ | CAUTION | When put THIS INSTRUMENT to the refraction table, the table should be in good condition, earthed for reduce an electric shock. |

# **Table of Content**

# 1. Outstanding features

- Full HD wide screen of 23″~24″ with high resolution and clear charts guarantee wide and broad view for comfortable test. (PO-1001)

- User can adjust test distance by the environment (1.0m ~ 8m). 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, radio, telegraphs, wireless toys may cause malfunctioning of this product. Please keep any of these devices away.

- All information in this manual should be checked out carefully. POLAOPTO Inc. take no responsibilities of the results caused by default, omission, or misuse of it.

- POLAOPTO Inc. 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. Otherwise this INSTRUMENT 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 other instruments.

- 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℃~40℃ and humidity at 30%~75% for normal operation. It must not be exposed to watery place or where much water is splashed. Do not put any container or product which contains liquid or gas around.

- THIS INSTRUMENT is heavy. it must be combined with robust refraction table. If not, the THIS INSTRUMENT might be damaged

- When combine with refraction table, the table should be properly earthed for getting rid of electric shock.

# 3. Functions of Each Part

This INSTRUMENT is a system of four parts, Main Body, Wall mount bracket, Remote controller, and accessories.

**3.1 Body**

Main body is the most significant part. Main body is the most significant part.

① Status LED

② Remote controller signal receiver

[Figure3-1] Front side

③ LAN port

④ USB ports * 4

⑤ Communication cable connector

⑥ DC power jack connector

⑦ Power ON/OFF switch

⑧ Connecting part for wall mount
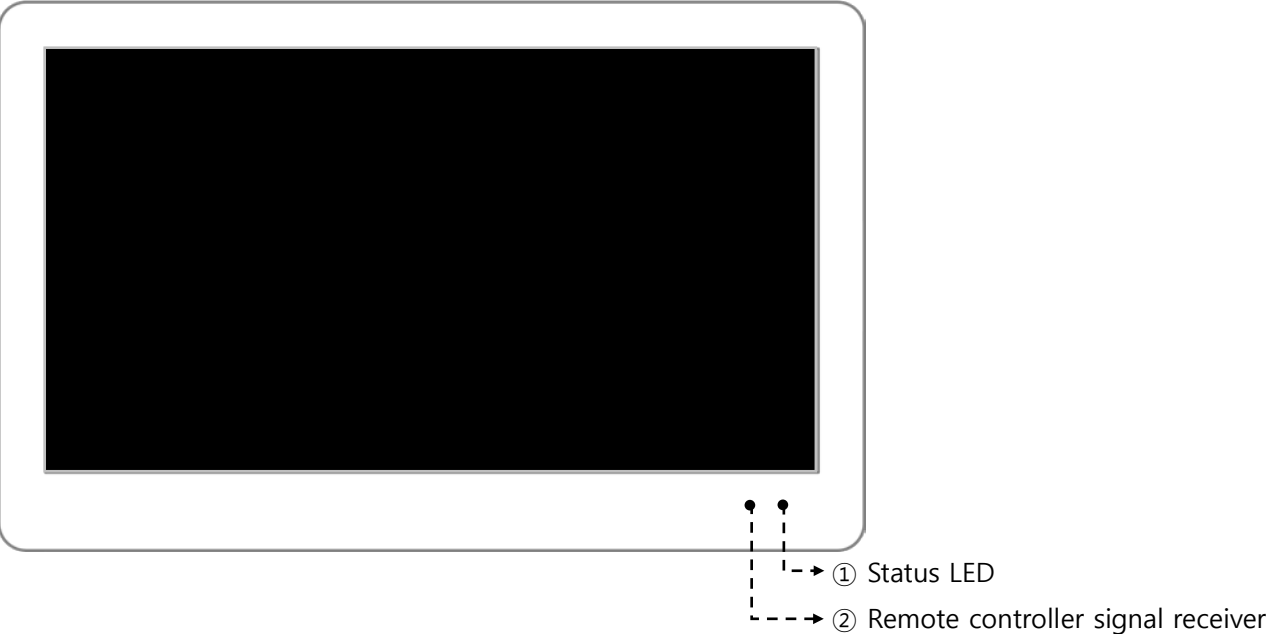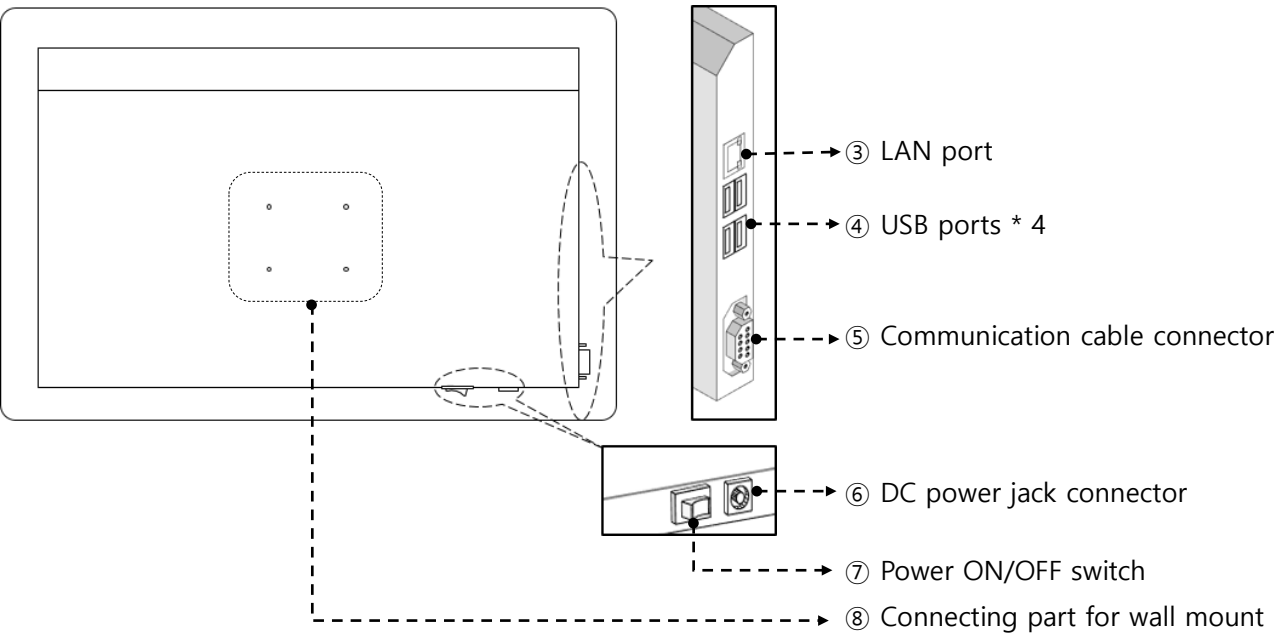
[Figure3-2] Rear side

| Descriptions | Function |
|---|---|
| ① Status LED | A LED lamp for check status<br>✓ Green ON: The system is Operating<br>✓ Red ON: The System is OFF<br>✓ Red blink : Receiving signal |
| ② Remote control signal receiver | Receiving signal from remote controller |
| ③ LAN port | For using online contents |
| ④ USB Ports | 4 USB ports to connect with other INSTRUMENT. |
| ⑤ Communication cable connector | A terminal to connect with digital refractor |
| ⑥ DC power jack connector | A terminal to connect electrical outlet with this INSTRUMENT.<br>Don't plug into adaptor before connecting with main body. |
| ⑦ Power On/Off Switch | A switch for system power ON/OFF |
| ⑧ Connecting part for wall mount | A part which connecting with wall mount. Use four bolts for connection. |

[Table 3-1] Main body

**3.2 Wall mount**

   To install this INSTRUMENT on wall, assemble wall mount and main body. Floor stand or table stand are also available to connect.

| ID | Qty | Description |
|----|-----|-------------|
| 1 | 1 | Wall plate |
| 2 | 1 | Adapter bracket |
| 3 | 2 | Safety bolt |
| A1 | 4 | M4x8mm bolt |
| | 4 | M4x12mm bolt |
| A2 | 4 | M5x8mm bolt |
| | 4 | M5x12mm bolt |
| A3 | 4 | M5 washer |
| B1 | 2 | Long bolt |
| B2 | 2 | Wall anchor |
| B3 | 2 | Long bolt washer |
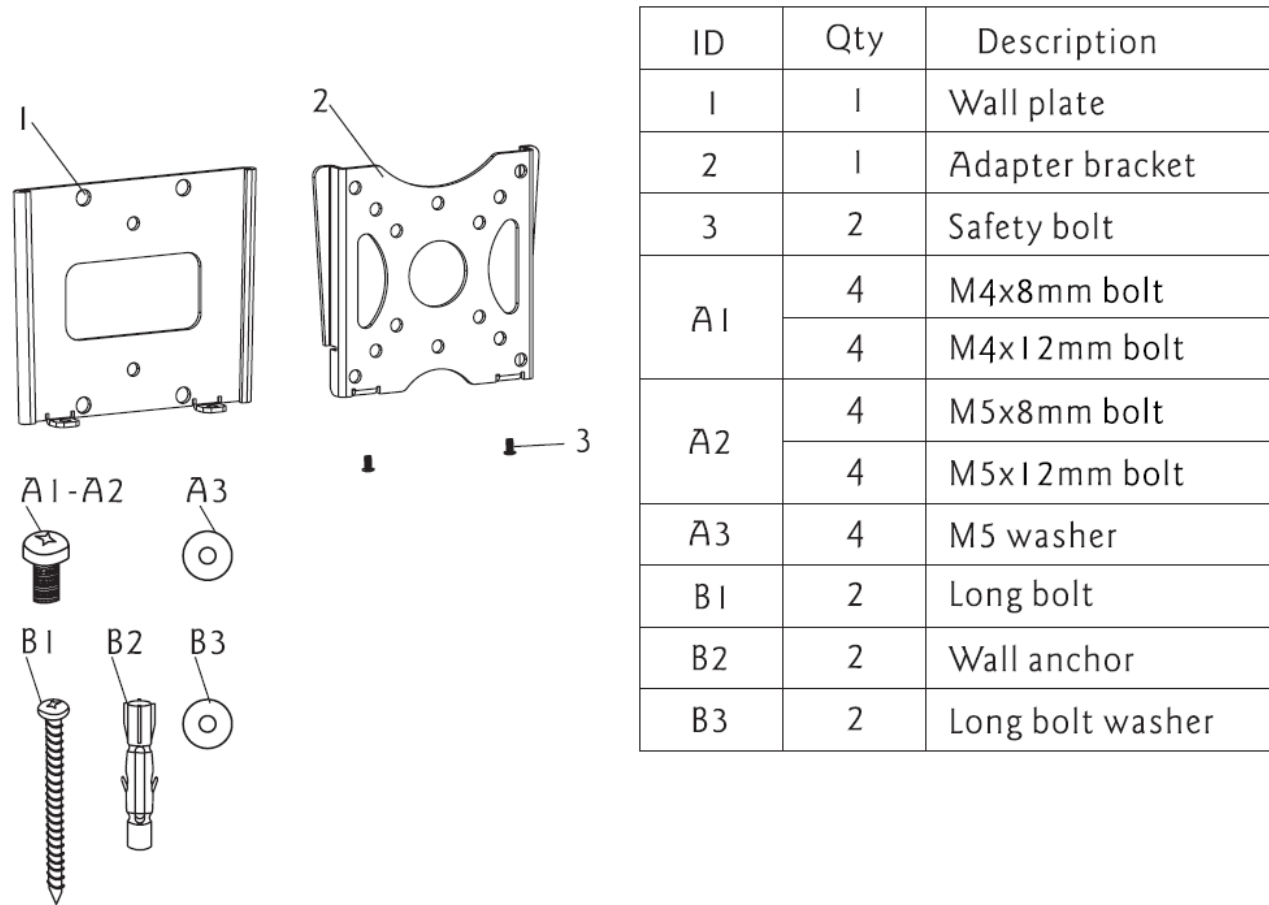
[Figure3-4] Parts list of wall mount

### 3.2.1. Installation

Part 1 a-Wood stud mounting

   Use wall plate (1) as a template make sure it is level. and mark two mounting holes along the center line of the wood stud. Drill two 1/8''(3mm) dia.    holes 60mm deep. Level wall plate (1) and attach to wall with two long bolts (B 1) and two washers(B3). Tighten screws firmly. Do not overtighten.
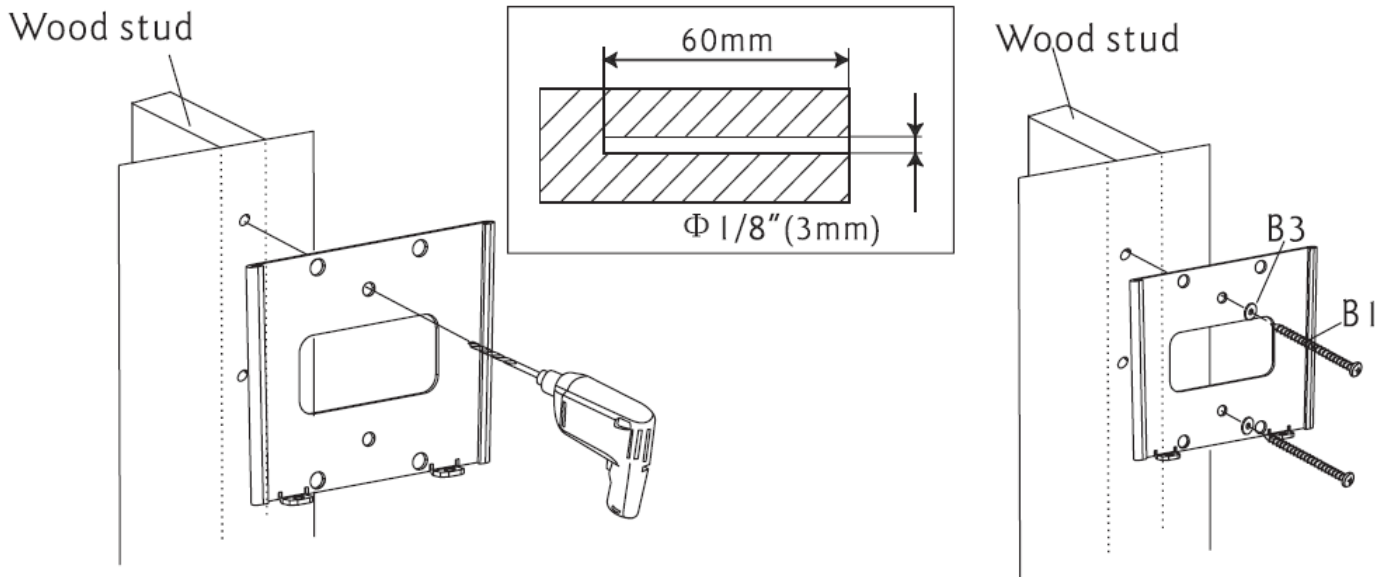


Part 1 b-Concrete wall mounting

   Level wall plate (1) and use wall as a template to mark two holes. Drill two 7/16'' (10. 5mm) dia. holes 60mm deep. Insert two anchors(B2) into holes and secure wall plate with two long bolts (B 1) and two washers(B3). Tighten screws firmly. Do not overtighten.
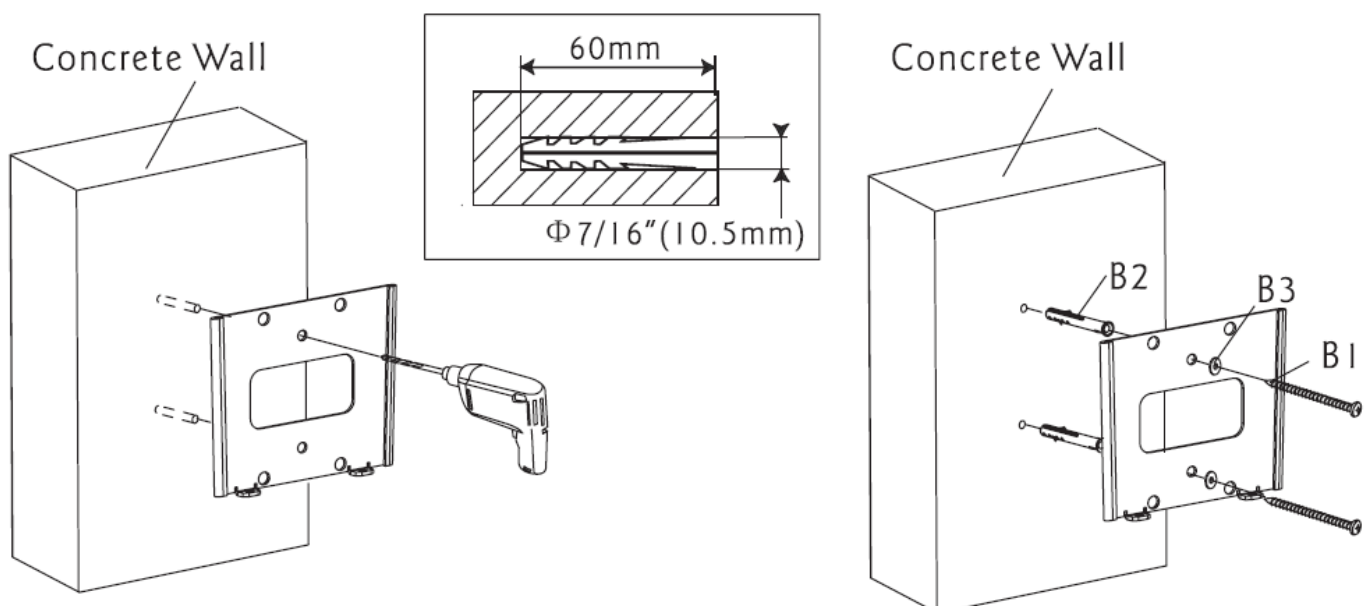
Part 2 -Attaching adapter bracket to screen

Center adapter bracket flat on back of the screen and align the four mounting holes. Select screws (A I. A2). Attach adapter bracket to screen using four selected screws and four washers(A3). Tighten screws firmly. Do not overtighten.

Part 3-Attaching adapter bracket to wall plate

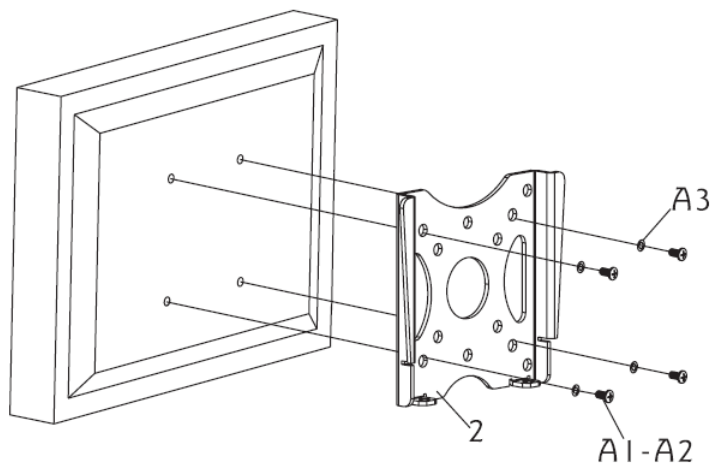Attach adapter bracket (2) to wall plate (1) by sliding flanges of adapter bracket (2) into flanges of wall plate (I). Secure with two safety screws (3). Tighten screws firmly. Do not overtighten.
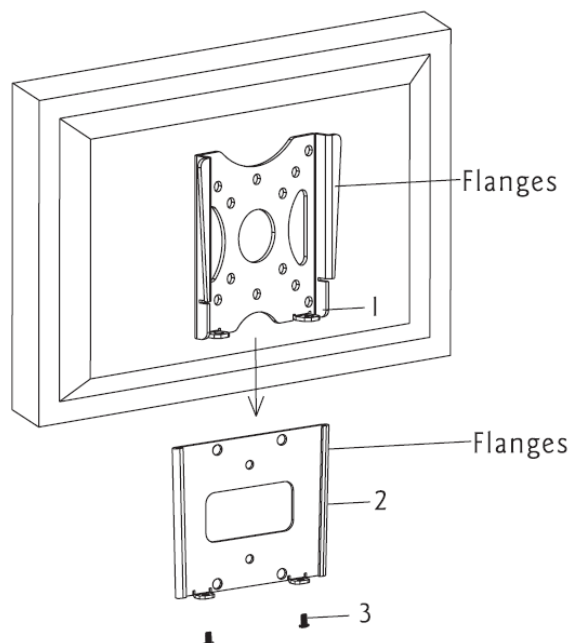
| ⚠ CAUTION | Please connect or separate the electric cables only after unplugged. Don't touch this INSTRUMENT with wet hands. Unless, it could cause electric shock that may be accompanied by fatal or severe wounds. |
|---|---|

### 3.2.2. 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



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System On　　System Off
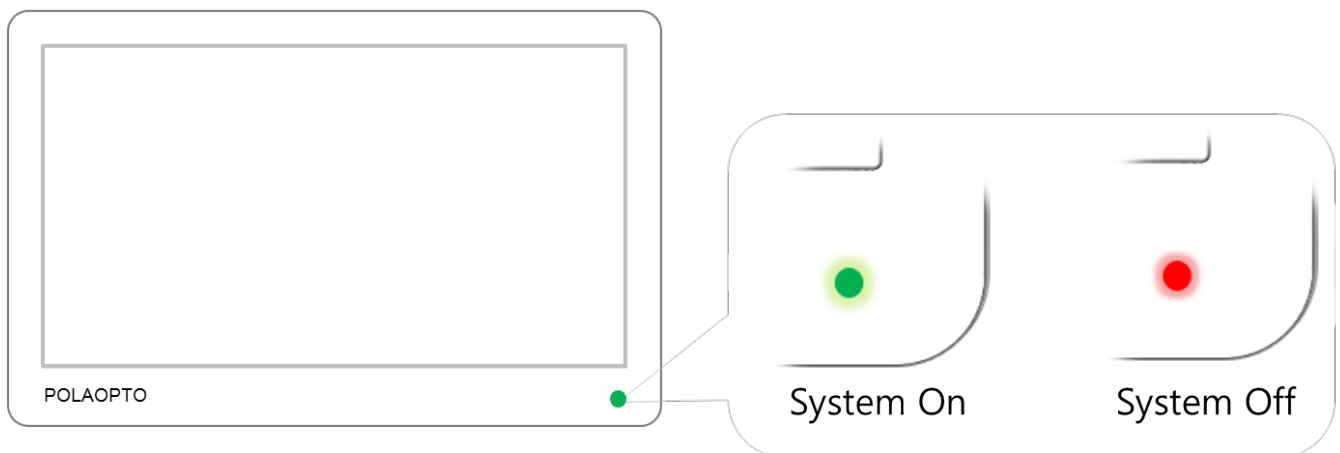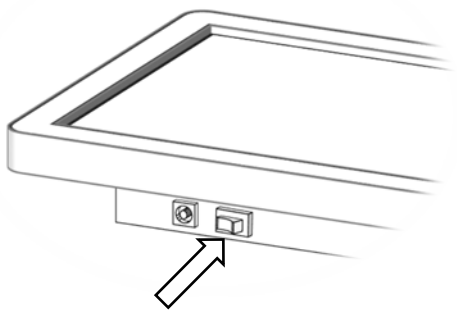
　③ After Booting, Digital Acuity Chart App s/w will be started automatically.

* You can also use other Android APP by clicking on right button of the mouse.
　(USB mouse should be connected)

| ⚠ CAUTION | Black screen could be continued until the boot. |
| --- | --- |

**3.3 Remote controller**

User can turn on/off this INSTRUMENT and switch charts with remote controller.

Diagram of Remocon



[Figure3-4] Remote controller

[ Table 3-2] Remote controller

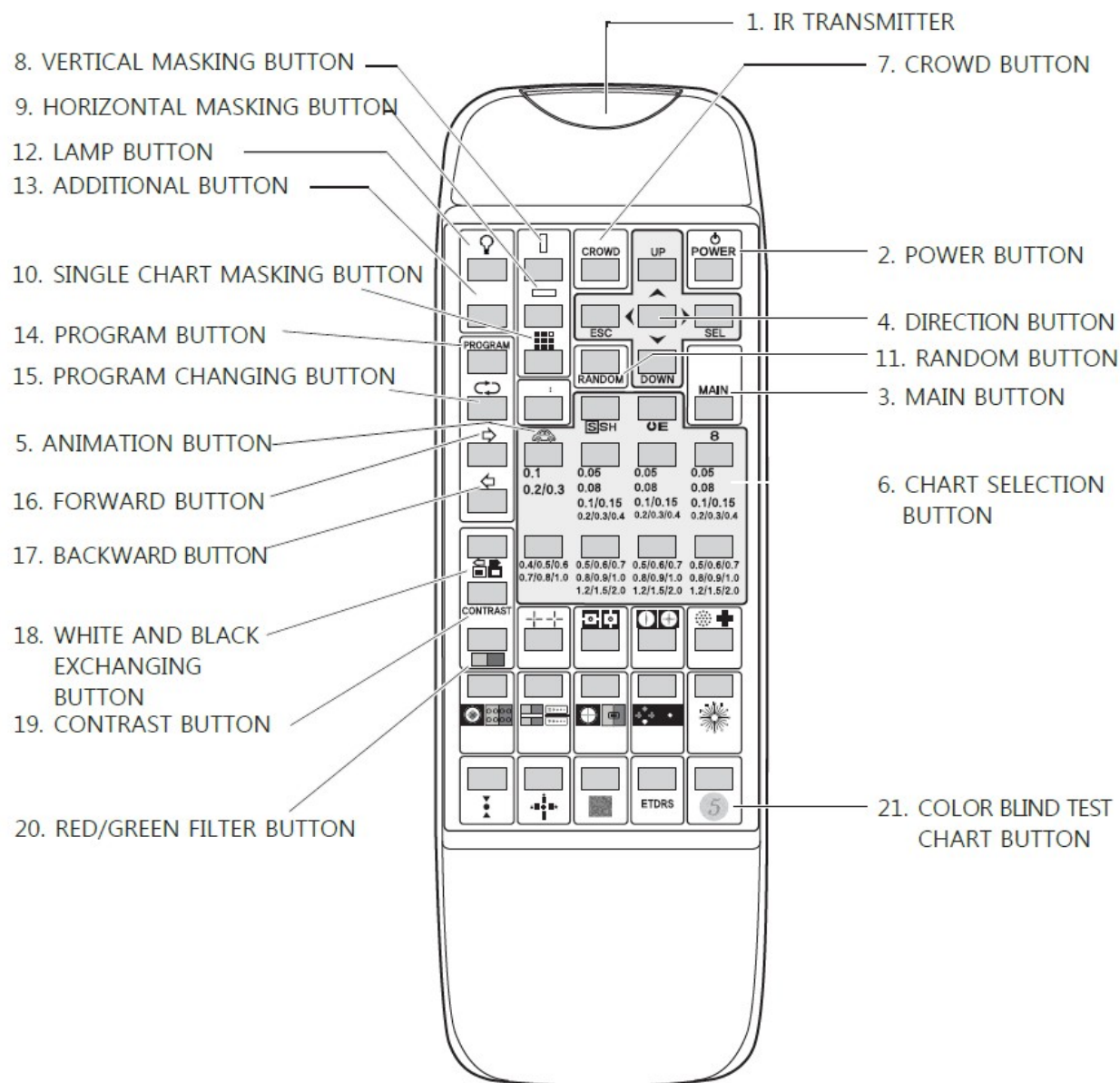| Descriptions | Functions |
|---|---|
| 1.   IR TRANSMITTER | Transmit IR signal to the system |
| 2.   POWER button | Power on or off the monitor and remote controller |
| 3.   MAIN button | Enter into the SETUP mode |
| 4.   Direction button | UP/DOWN/RIGHT/LEFT direction key and confirm button |
| 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 an 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 |

# 4. SETUP mode

Using SETUP mode, user can adjust THIS INSTRUMENT system with ease.

| | | |
|---|---|---|
| **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** | |

[Figure4-1] SETUP MENU

■ Starting SETUP mode

On test mode, press [MENU] button.

■ Move to each function.

Press [UP] or [DOWN] button to move to each function on Menu mode.

■ Adjusting set up

Press [MENU] or [SEL] button and then values will be turned up.

Press [UP] or [DOWN] button to move to required value.

Press [MENU] or [SEL] button to change to selected value

■ Quit SETUP mode

Choose '17. EXIT' on menu mode, or press [ESC] button.

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■ 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)

```
                        MENU
        1. PROGRAM MODE
        2. REMOCON CHANNEL        ALL
                                  CH 0
        3. DISTANCE UNIT          CH 1
                                  CH 2
        4. DISTANCE               CH 3
        5. OPTOTYPE MODE          CH 4
                                  CH 5
        6. CHILDTYPE MODE         CH 6
                                  CH 7
        7. SOUND TYPE
```

② Select channel remote controller

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



[ Figure 4-2] Channel buttons


■ DISTANCE

Adjust test distance. Step: 0.25m (Min 1.0m, Max 8.0m)


■ DISTANCE UNIT

▪ Choose the distance unit
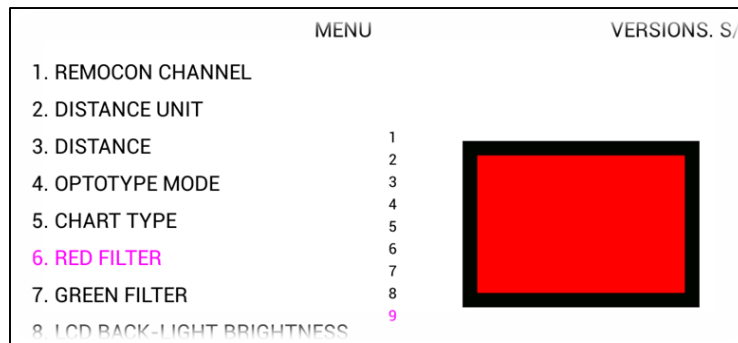: Decimal, Meter, Feet


■ OPTOTYPE MODE

▪ Set chart categories which are shown by pressing [4K] [Chart selection #1] button.

- NUMBER / ENGLISH

- NUMBER / ENGLISH / KOREAN
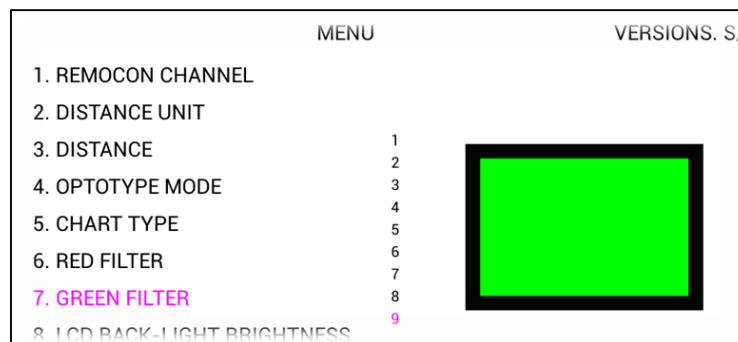
■ SOUND MODE

▪ Set Sounds ON/OFF

■ RED FILTER

▪ Adjust red filter and red color in charts. (nine steps)



[Figure4-2] Red filter level setting

■ GREEN FILTER

▪ Adjust green filter and green color in charts. (nine steps)



[Figure4-3] Green filter level setting

■ LCD BACK-LIGHT BRIGHTNESS

▪ Adjust back-light brightness. (10 steps)

■ MADDOX LED BRIGHTNESS

▪ Adjust MADDOX LED brightness. (10 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 THIS INSTRUMENT in narrow place.

■ POLA MODE

▪ Choose the pola type.

  - POLA A, POLA B: Differential 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.**

# 5. Maintenance

9.1 Before calling service person,

• THIS INSTRUMENT 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 is connected well and green light on adaptor is on, but you can't turn on THIS INSTRUMENT, 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.

9.2 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.
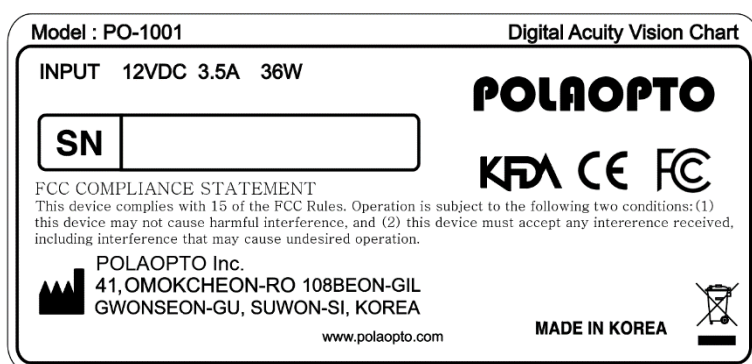
9.3  Switching place of installation.

- Turn off THIS INSTRUMENT by pressing power button on main body.
- Unplug

9.4  Service information

   9.4.1 Repair

- Contact servicing agent.
- Check the followings and inform.

   • Model of the instrument       : PO-1001
   • Serial Number       : 14-digit characters indicated on the name plate
   • Phenomenon       : Describe specifically



   9.4.2 Disposal of the instrument

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

# 6. Specifications

| Monitor | |
|---|---|
| Type | 23~24 Inch TFT LED Backlight |
| Resolution | 1920(H) x 1080(V) Pixels |
| **Functions** | |
| Chart | 1. Landolt Ring / Snellen<br>2. Numbers / Letters / Korean<br>3. Children |
| Masking | 1. Letter / Horizontal Line / Vertical Line<br>2. Normal / Center |
| Filter | Red and Green |
| Visual function | 1. Red and Green, Polar separation, Stereo<br>2. Red and Green stereo, Color blindness (Slide mode) |
| Special function | Mirror mode / Contrast / White and Black reverse |
| Distance | 1.0m~8.0m (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(Option) / Table(Option) |
| Glasses | Polar(Option) / Red and Green(Option) |
| Remote control | 1 pc |
| Battery | 2 pcs (AA 1.5V) |
| Adaptor | 1 pc |
| Serial Cable(Option) | 1 pc |
| Power Cable | 1 pc |