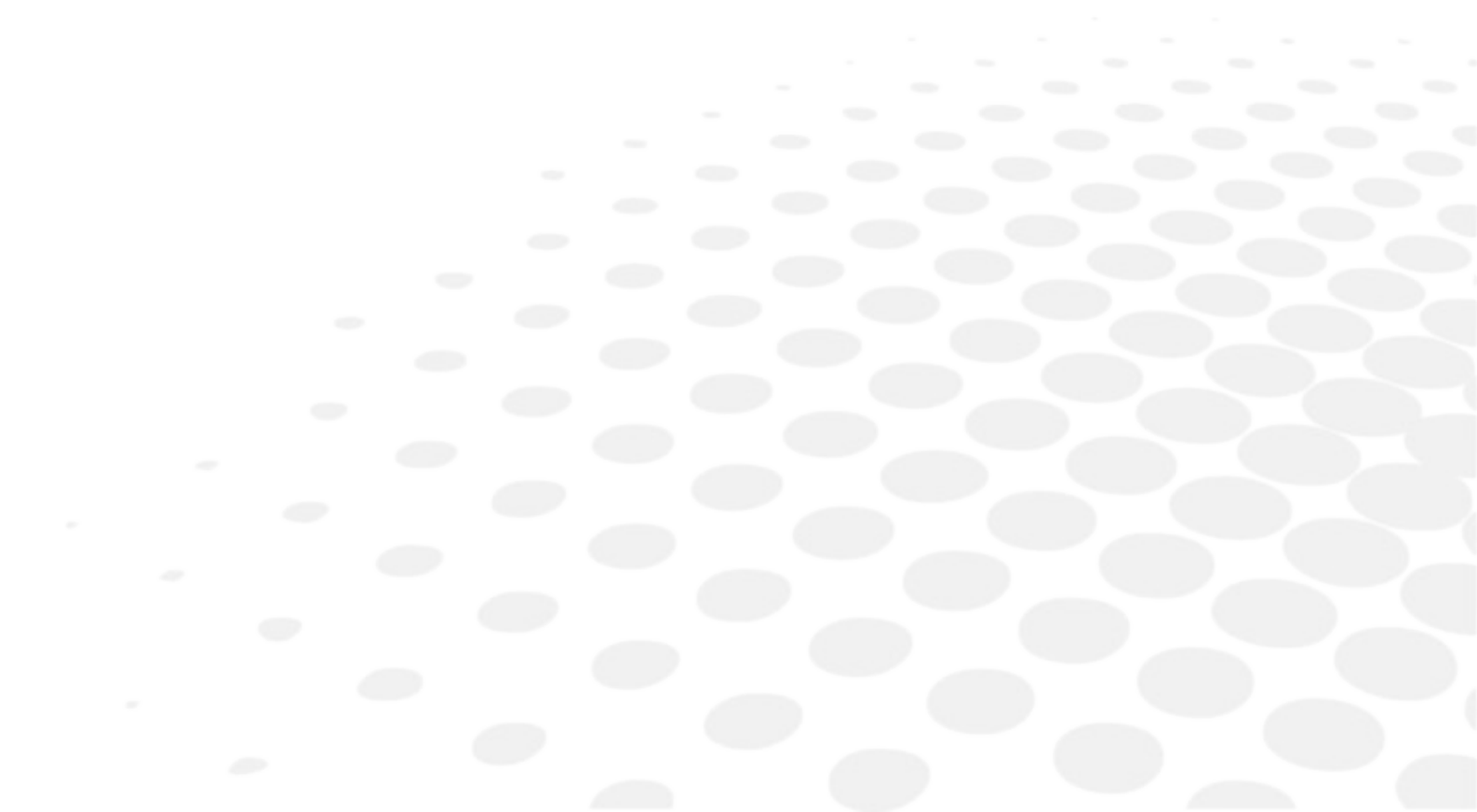


## User Manual

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# I. INTRODUCTION



## 1. OUTLINE OF PRODUCT

CS550 is an automatic visual acuity system, stand-alone type, which displays broad range of charts, based on LCD panel, including red /green for the eye optometry.

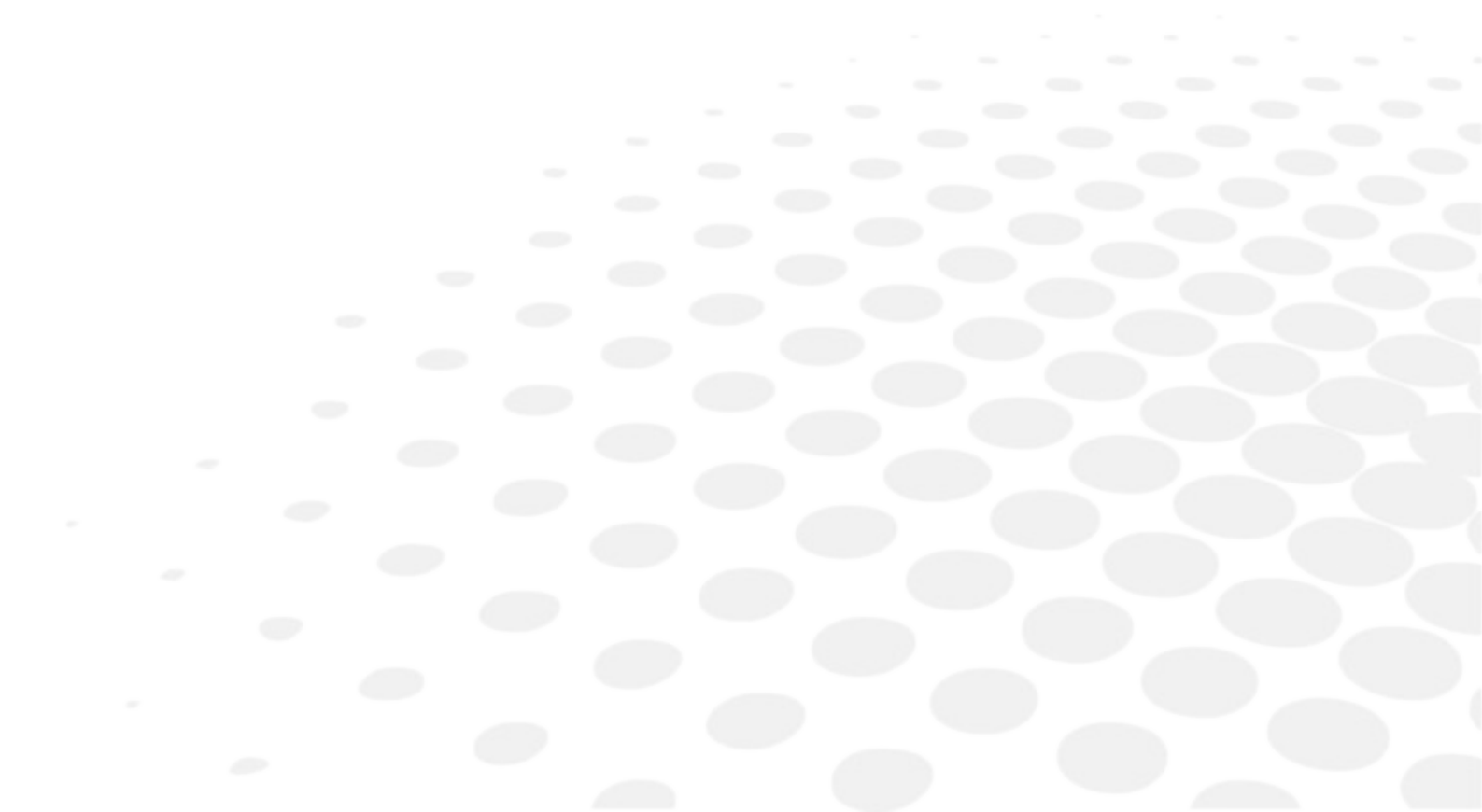
The chart rotation for CS550 can be performed by either wired or wireless remote control or by external devices by control box of Digital Phoropter.

Unlike existing chart projector, CS550 is able to provide wider range of charts (more than 100 kinds of general and special charts) on LCD panel and the product can be adjusted at the level of the patients for precise examination.

## 2. CLASSIFICATIONS

- Classification of equipment: Class I
- Applied part of equipment: no applied part
- Protection against electric shock: Class I
- Protection against harmful ingress of water: ordinary (IPX0)
- Method of sterilization: not applicable
- Stability of use in an oxygen rich environment: not suitable
- Mode of operation: continuous operation

## II. SAFETY INFORMATION



## 1. INTRODUCTION

Safety is everyone's responsibility. The safe use of this equipment is largely dependent upon the installer, user, operator, and maintainer. It is imperative that personnel study and become familiar with this entire manual before attempting to install, use, clean, service or adjust this equipment and any associated accessories. It is paramount that the instructions contained in this manual are fully understood and followed to enhance safety to the patient and the user/operator. It is for this reason that the following safety notices have been placed appropriately within the text of this manual to highlight safety related information or information requiring special emphasis. All users, operators, and maintainers must be familiar with and pay particular attention to all Warnings and Cautions incorporated herein.

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.




"Warning" indicates the presence of a hazard that could result in severe personal injury, death or substantial property damage if ignored.



"Note" describes information for the installation, operation, or maintenance of which is important but hazard related if ignored.



"Caution" indicates the presence of a hazard that could result in minor injury, or property damaged if ignored.

This device is compliant with  marking.

Date of first marking: October 2015.









## 2. INDICATIONS FOR USE

The indications for use include the visual acuity for determining patient objective refraction.

### 3. SAFETY SYMBOLS













The International Electro-technical Commission (IEC) has established a set of symbols for medical electronic equipment which classify a connection or warn of any potential hazards.

The classifications and symbol are shown below.

I O	I and O on power switch represent ON and OFF respectively
	Attention, consult ACCOMPANYING DOCUMENTS
	Alternating current
	Direct current
	Identifies the point where the system safety ground is fastened to the chassis. Protective earth connected to conductive parts of Class I equipment for safety purposes.
	Manufacturer
CE	This device is compliant with CE marking (Directive 93/42/CE). It is a class I according to rule 12 from Appendix I. Date of first marking Oct 2015.
 or 	Follow operating instructions
	<p>Disposal of your old appliance</p> <ul style="list-style-type: none"> <li>• When this crossed-out wheeled bin symbol is attached to a product it means the product is covered by the European Directive 2012/19/EU.</li> <li>• 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.</li> <li>• The correct disposal of your old appliance will help prevent potential negative consequences for the environment and human health.</li> <li>• 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</li> </ul>

## 4. ENVIRONMENTAL FACTORS

Avoid the following environments for operation or storage.

	Where the equipment is exposed to water vapor. Don't operate an equipment with a wet hand.
	Where the equipment is exposed to direct sunlight.
	Where the temperature changes extremely. Normal operating temperature range is from 10°C to 40°C, humidity is from 30% to 75%.
	Where it is near the heat equipment.
	Where the humidity is extremely high or there is a ventilation problem.
	Where the equipment is subject to excessive shocks or vibrations.
	Where equipment is exposed to chemical material or explosive gas.
	Be careful not to be inserted dust, especially, metal.
	Don't disassemble the product or open. The warranty is void.
	Be careful not to close the fan located on the lateral or back side of the equipment.
	Don't plug the AC power cord into the outlet before the connection between devices of the equipment is completed. This can generate the defect.
	Pull out the power cord with holding the plug, not the cord.



To avoid the risk of electric shock, this equipment must only be connected to supply mains with protective earth.



CS550 shall be connected to the separate power supply as supplied by ESSILOR with Adapter Technology Co., Ltd, type ATM065-P120 Identified.



Do not position the equipment to make it difficult to operate the disconnection device. (Appliance coupler or separable plug).



Ahead of going into the discard, ask way to do it or consult with selling agency.



This device incorporates a lithium battery (BAT1) on the main board, incorrect replacement of which would result in an unacceptable RISK. Therefore, replacement by inadequately trained personnel could result in a HAZARD (such as excessive temperatures, fire or explosion).





Do not place the multiple socket-outlet for CS550 system on the floor in order to prevent liquid penetration and damage to the product.



CS550 system shall not be connected with additional multiple socket-outlets or extension cords in addition to a designated single multiple socket-outlet.



Maximum permissible load of each socket-outlet used for the CS550 system, shall not be less than 60VA.



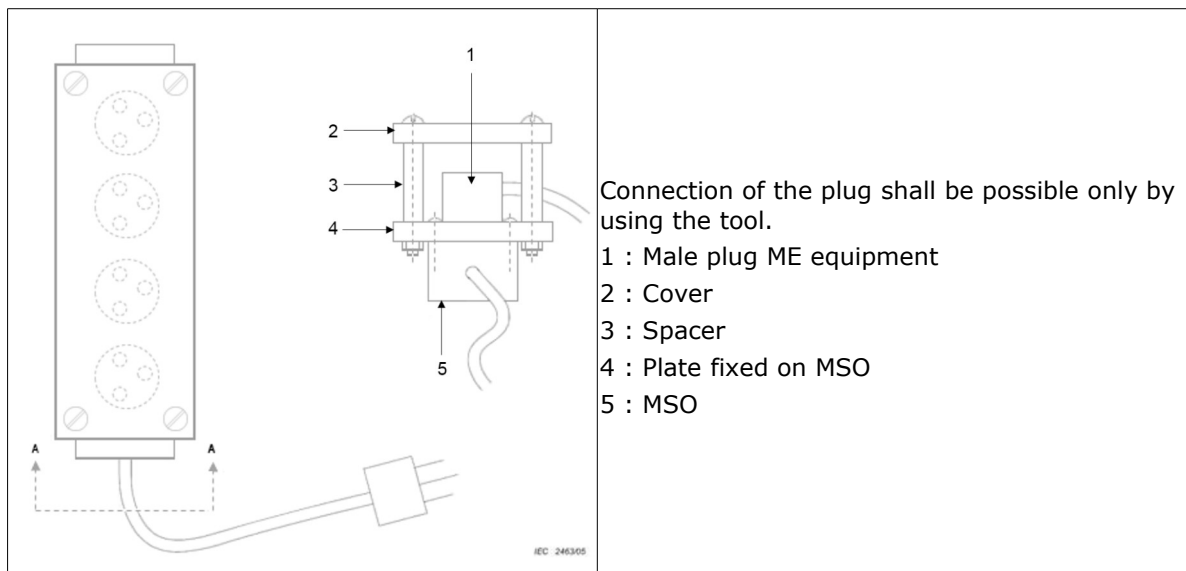
Do not connect the device which is not a supplement of CS550 with the multiple socket-outlet of CS550.



Multiple socket-outlet should be a grounding-type and comply with IEC 60884-1.



#### View from A-A (male plug connected)



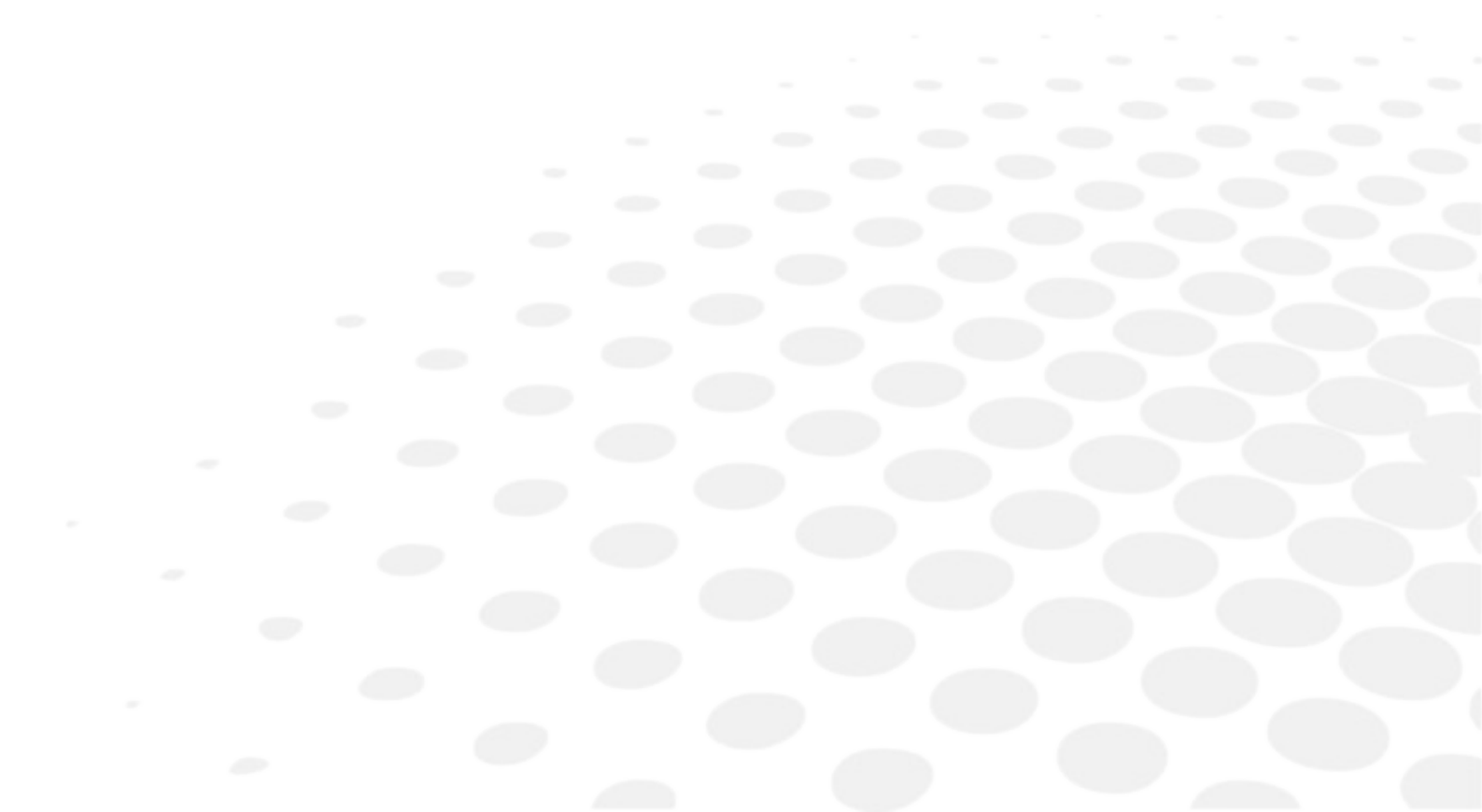
Avoid places where the ambient temperature falls below 10°C or exceeds 40°C for normal operation, or below -10°C or exceeds 55°C (14°C-131°C) for transportation and storage. Humidity should be maintained between 30 and 85% (Atmospheric pressure: 70 to 106 kPa) for normal operation, or between 10 and 95% (Atmospheric pressure: 50 to 106kPa) for transportation and storage. Avoid environments where the equipment is exposed to excessive shocks or vibrations.

## 5. SAFETY PRECAUTIONS

This equipment has been developed and tested according to safety standards as well as national and international standards. This guarantees a very high degree of safety for this device. The legislator expects us to inform the user expressively about the safety aspects in dealing with the device. The correct handling of this equipment is imperative for its safe operation. Therefore, please read carefully all instructions before switching on this device. For more detailed information, please contact our Customer Service Department or one of our authorized representatives.

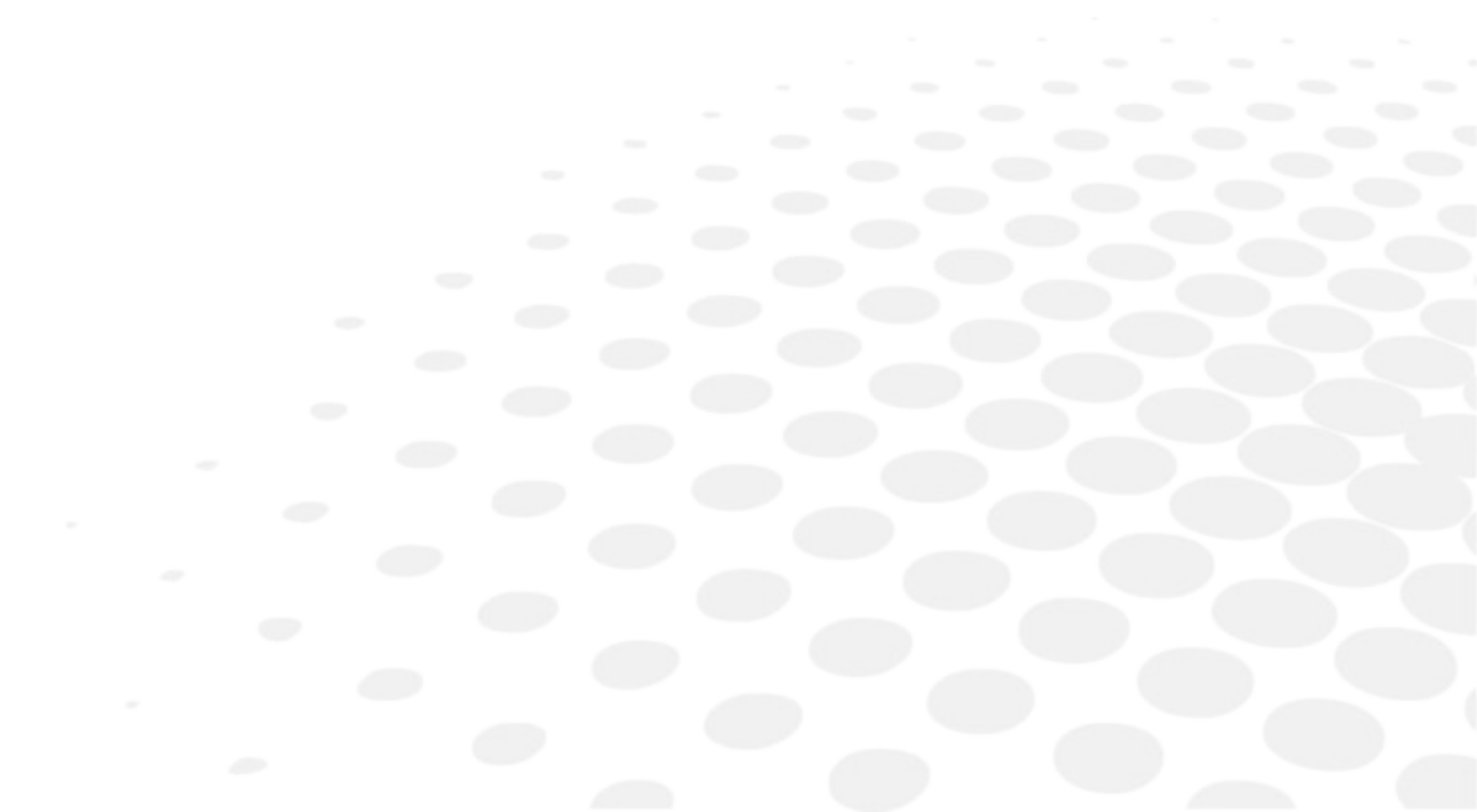
1. This equipment must not be used (a) in an area that is in danger of explosions and (b) in the presence of flammable, explosive, or volatile solvent such as alcohol, benzene or similar chemicals.
2. Do not put or use this device in humid rooms. Humidity should be maintained between 30 and 75% for normal operation. Do not expose the device to water splashes, dripping water, or sprayed water. Do not place containers containing fluids, liquids, or gases on top of any electrical equipment or devices.
3. The equipment must be operated only by, or under direct supervision of a properly trained and qualified person.
4. Modifications of this equipment may only be carried out by trained service technicians or other authorized persons.
5. Customer maintenance of this equipment may only be performed as stated in the user's manual and service manual. Any additional maintenance may only be performed by trained service technicians or other authorized persons.
6. The manufacturer is only responsible for effects on safety, reliability, and performance of this equipment when the following requirements are fulfilled: (1) The electrical installation in the respective room corresponds to the specifications stated in this manual and (2) This equipment is used, operated, and maintained according to this manual and service manual.
7. The manufacturer is not liable for damage caused by unauthorized tampering with the device(s). Such tampering will forfeit any rights to claim under warranty.
8. Interconnected equipment to this equipment shall be complied with the applicable international standards, e.g. IEC/EN 60950-1 for I.T equipment.
9. Only persons who have undergone proper training and instructions are authorized to install, use, operate, and maintain this equipment.
10. Keep the user's manual and service manual in a place easily accessible at all times for persons operating and maintaining the equipment.
11. Do not force cable connections. If a cable does not connect easily, be sure that the connector (plug) is appropriate for the receptacle (socket). If you cause any damage to a cable connector(s) or receptacle(s), let the damage(s) be repaired by an authorized service technician.
12. Please do not pull on any cable. Always hold on to the plug when disconnecting cables.
13. This equipment may be used for the international application related to (\*Usages of Device) according to this manual.
14. Before each operation, visually check the equipment for exterior mechanical damage(s) and for proper function.
15. Do not cover any ventilation grids or slits.
16. Immediately turn off and unplug any equipment that gives off smoke, sparks, strange noises or odors.

### III. FEATURES



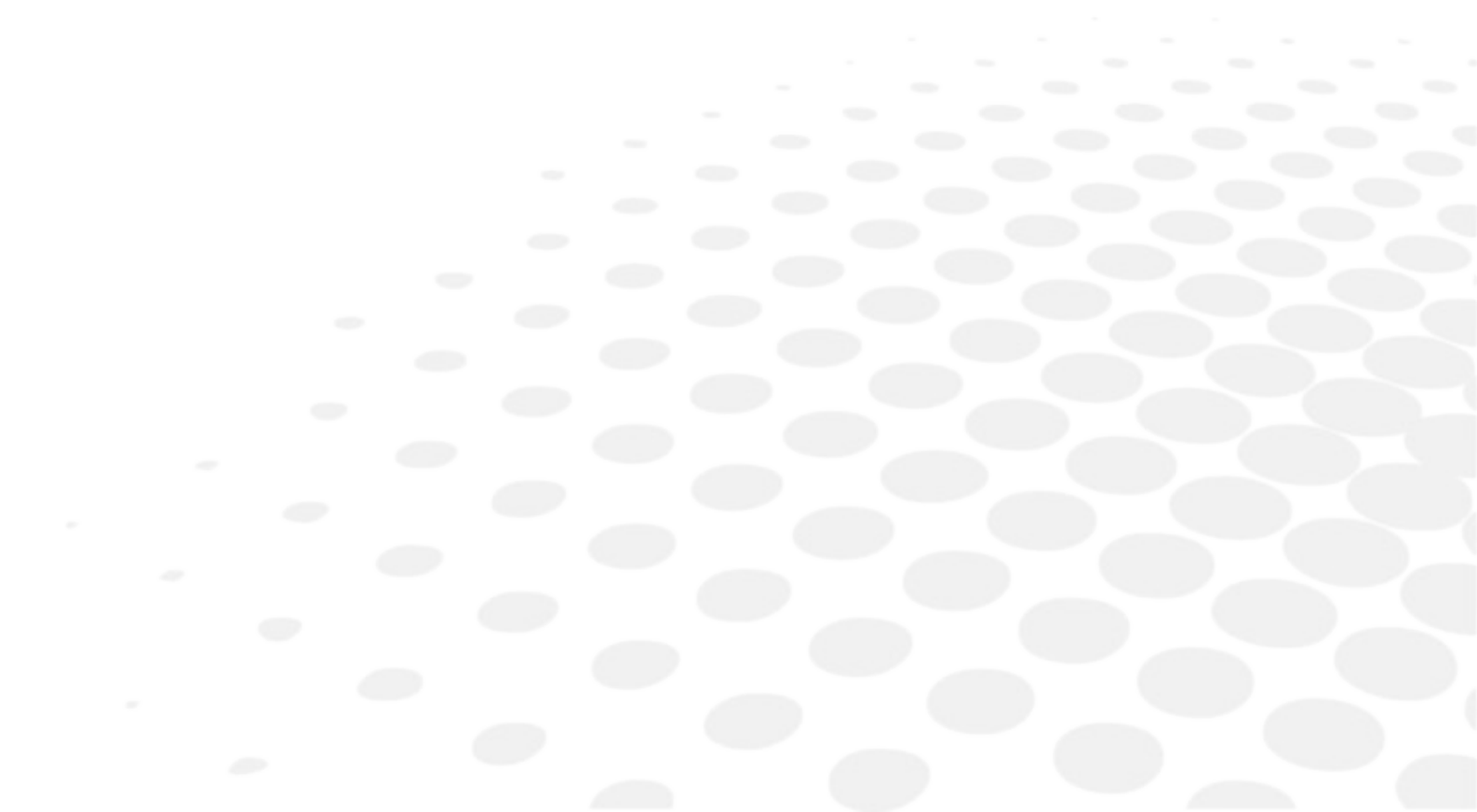
Red & Green reverse	CS550 system enables a user to reverse all kinds of Red/Green chart by using Black & White reverse button on the remote control.
Animation function	CS550 system has a Animation function for making a child concentrated on the chart during the test and it easy to examine.
Contrast adjustment	CS550 can decrease the contrast level in order to examine eye-sight under low contrast condition. CS550 system enables a user to select contrast sensitivity (75%, 50%, 40%, 30%, 20%, 10%, 7.5%, 5%, 3%, and 1.5%) on a screen and also each strength of the contrast sensitivity can be shown on the screen of remote control that is used during a vision test with a cataract surgery patient by adjusting opto-type contrast sensitivity.
Black & White reverse	CS550 system enables a user to test conveniently by using Black & White function which lasik & cataract patients can recognize in bright & dark places.
Random function	Random function of CS550 system is designed to stop a visual test error, when an examinee memorizes specific test types and directions. A user can test conveniently by freely changing "Numbers, English, Korean, Landolt, Snellen, Children". Some charts such as Landolt, Number can be rotated by remote control.
Red/Green filter for color depth adjustment	CS550 system enables a user to adjust to Red/Green filter concentration from the 0 to the 31 steps. It applies to all kinds of Red/Green chart.
Mirror function	The Mirror function is added in CS550 system to let it installed at less than 1.5m of narrow space and a user can easily select the function at his convenience.
Clock dial rotating	7 kinds of clock dials are rotating step by step by using Up/Down button on the remote control. It also reverses the Black & White by using the Black & White reverse button on the remote control.

## IV. NOTES FOR USING THE INSTRUMENT

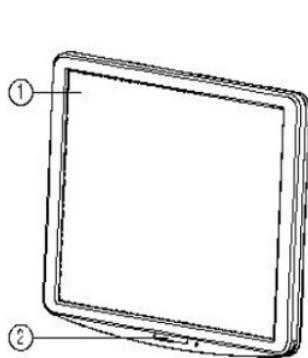


1. Do not hit or drop the instrument. The instrument may be damaged if it receives a strong impact. The impact can damage the function of this product. Handle it with care.
2. Keep this product from vibration.
3. Exposure of direct sunlight or very bright indoor lights can affect the result of measurements.
4. Don't use organic solution such as alcohol, thinner, benzene, etc. to clean the surface of this instrument. It may damage the product.
5. Disconnect the power supply and consult the dealer when there is smoke, strange odors, or noise while working.

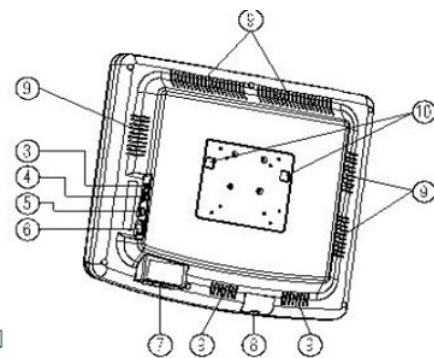
## V. CONFIGURATION



CS550 is mainly consists of the components as below.



[ Fig. 1 ]



[ Fig. 2 ]

Name	Function
1: LCD display monitor	Displayed the chart for test by using the graphic-processing function on computer
2: IR receive window	Display chart to receive the infrared windows from remote controller
3: AC power inlet	A part of the power supply cables and connections
4: RS-232 port (USB Type)	Serial port for communicating with external devices
5: APH500 port	Connector for data communication with APH500
6: Power On/Off switch	Power On/Off switch
7: Function button	Set parameter on the screen
8: SD card cover	Slot cover of chart data or image storage SD card

If you want to connect the input / output signal ports and other devices that must meet IEC standards (IEC60950 IT equipment, IEC60601 medical equipment).

If any doubt please contact your local technical support or your authorized distributor.



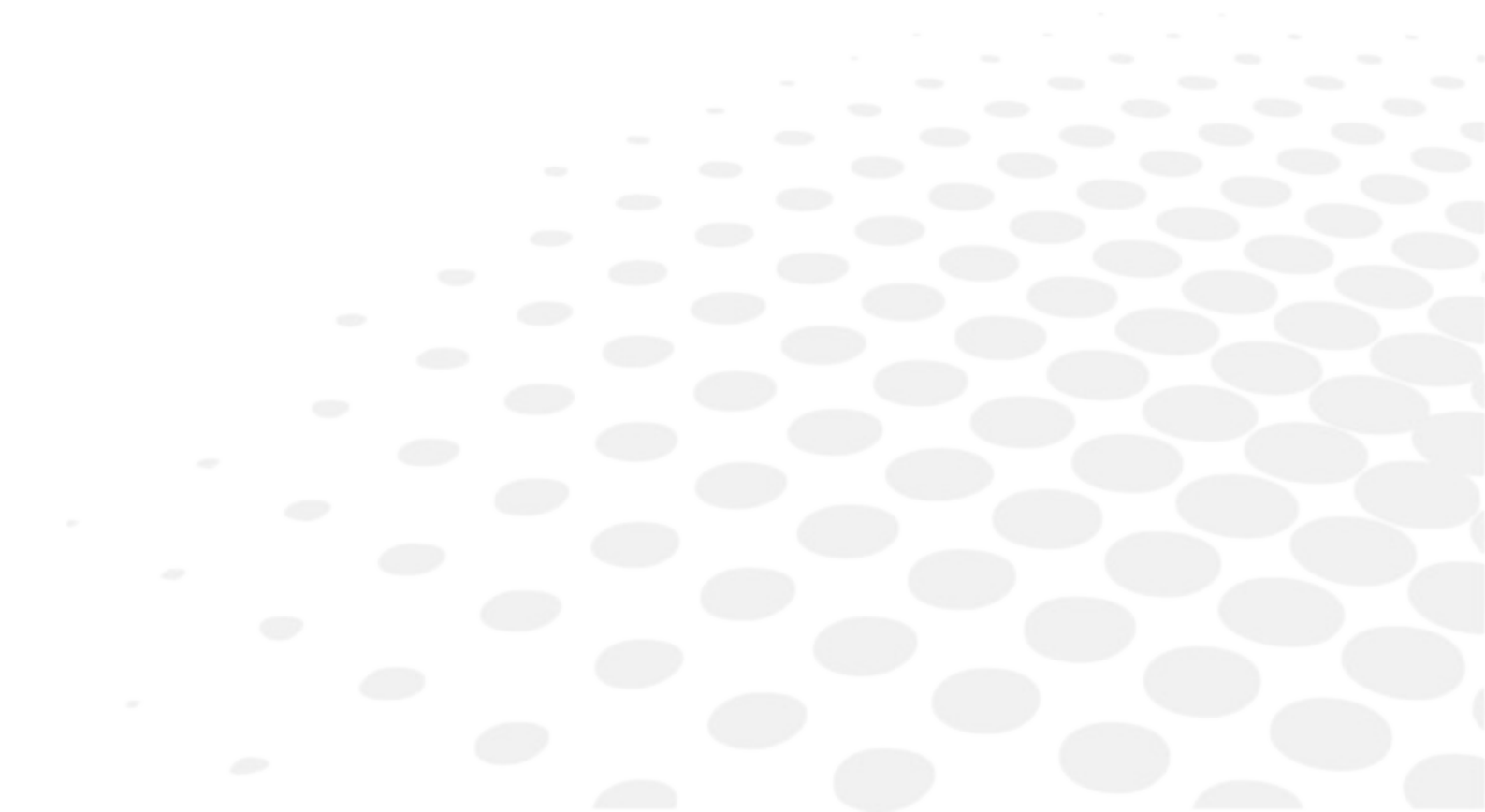


1	IR communication window (sending signal to CS550)
2	LCD screen: display charts (optotype)
3	Power button: power On/Off
4	Chart changing button: change the chart on LCD
5	Masking button (Horizontal): display charts horizontally
6	Masking button (Vertical): display charts vertically
7	Move button (left and right): display the chart showing on LCD with moving toward left or right
8	Single masking button: display a chart symbol one by one
9	Up/Down button: change the chart on LCD by pressing Up/Down button
10	Optotype select button: select one among Number, Snellen, English, Korean
11	Contrast button: adjusting the contrast level
12	Slide button: select one among color blindness test, contrast test and other images
13	Black/White reverse button: chart on LCD can be reversed with Black and White
14	Random button: change the array of optotype
15	Program A/B button: program can be changed with following sequence (A > B > General > Reverse)
16	Program sending button: display the programmed chart in sequence during operation
17	Program reverse sending button: display the programmed chart right ahead
18	Red/Green filter button: display the special chart adapted with Red/Green filter

19	Mini USB socket: for operating CS550 and for charging the remote control battery
20	LED: indicating the status of electric charge
21	Loop part: connect the string with this part
22	Battery housing
22-1	J6 connector removes
22-2	Cable assy unplug



## VI. INSTALLATION



## 1. INSTRUCTION FOR WALL MOUNTING



Unsecured product could be dislodged and fall which causes injury to either patient or examiner.



All cables related to the product shall be handled with care for preventing the examiner or the patient from any kinds of dangers.



Be sure that the position you choose to mount the product shall be within the reach of a power outlet.

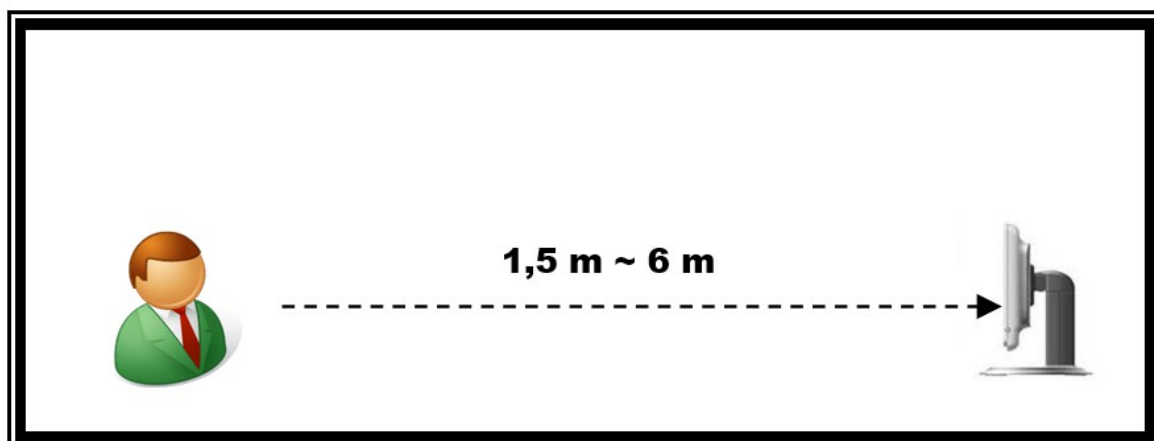
- Find an appropriate point on the wall which will support the product, which will hang from the wall-mount bracket attached to the wall.
- Make sure that the refraction distance meets the requirements for either direct-view or mirror arrangement.
- Level the supplied wall mount bracket with the metal tabs facing up and out on your wall and mark the holes on the installation.
- Place the wall mount bracket on the wall, and screw or tap the screws (nail) into the holes. Hang the product by lining up the holes on the back of unit with the metal tabs of the wall mount bracket and hang the unit on these tabs.



Do not overdrive the inserts into the wall.

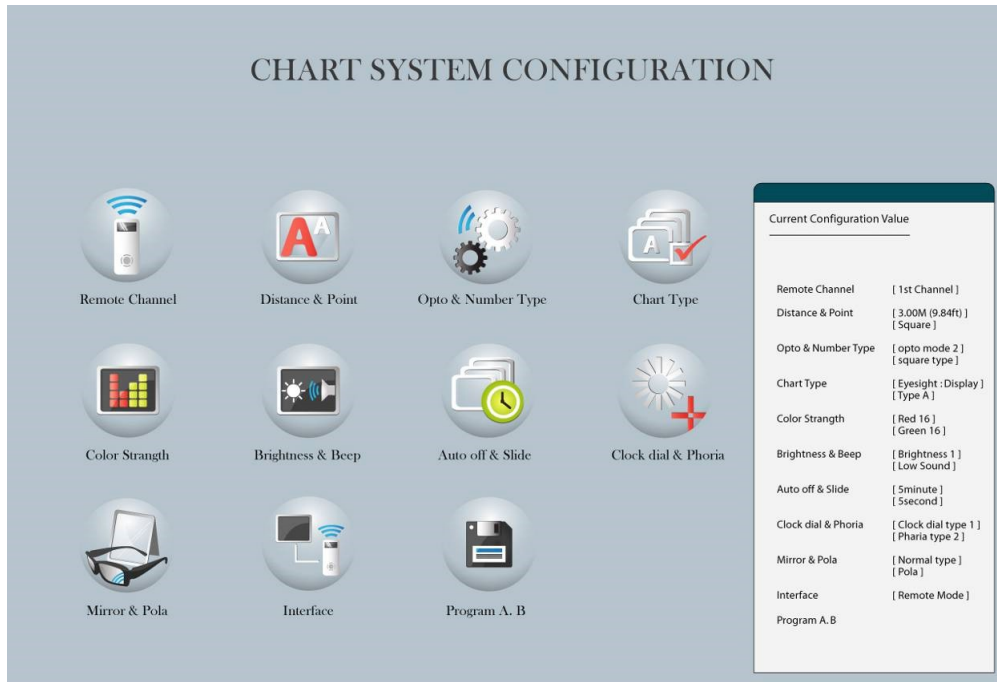
## 2. VIEWING DISTANCE (LCD DISPLAY POSITION)

- As operation by remote control is available, an operator can examine the patient checking the proper change of the charts.
- Please put the product so that the center of the LCD screen is at the level of patient's eyes as this product is not affected by illumination.



### 3. FEATURE SET

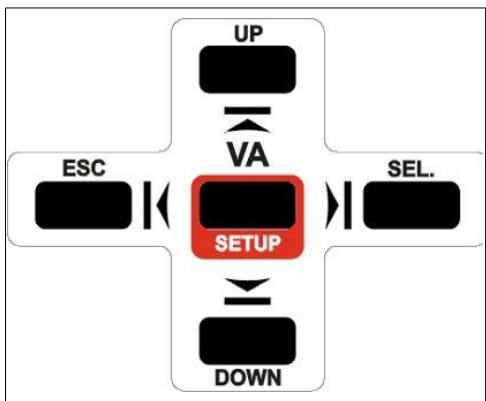
#### a. Feature set mode menu



#### b. Feature set mode setting method



1. Like the picture above, connect the USB cable to remote control bottom side and body right side.
2. Like the 3rd picture, push the set-up button, after 3 seconds it will change to feature set mode.
3. However, use the cable only for selection of "Remotely channel" or "Program A-B", the other settings can be selected on the remote control without connecting cable.



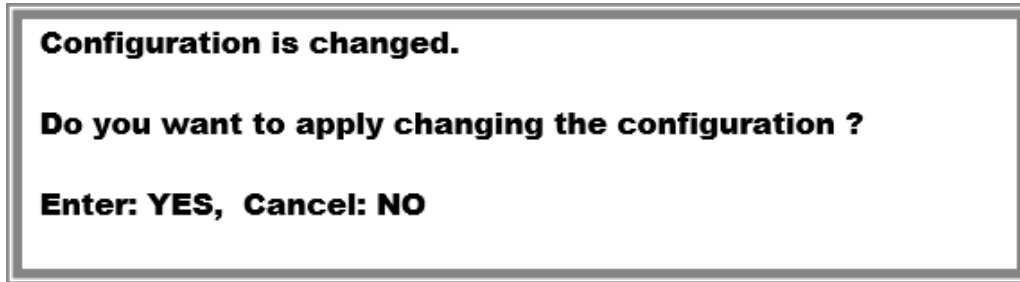
Remote control key instruction

- UP: select this button, can move the key top or left.
- DOWN: select this button, can move the key bottom or right.
- ESC: go to selected features used in the previous step.
- SEL (ENTER): feature of selecting and saving selected feature.

### c. Feature set mode disable

1. Select the feature
2. Push the SEL (ENTER) key and ESC key
3. It will show the initial mode
4. Push the ESC key again and the following screen will show configuration is changed

Do you want to change the configuration? Enter: YES, Cancel: NO



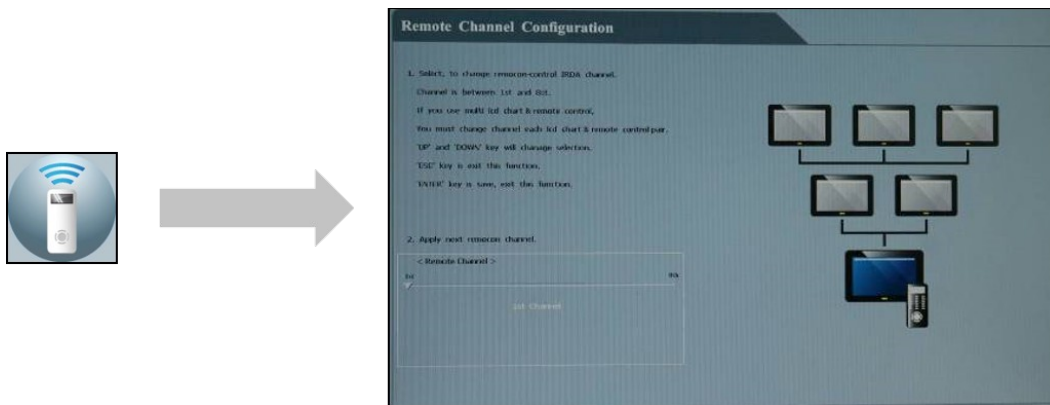
- Yes (SEL key): If this key is selected, it saves set-point with system booting and even changes initialized.
- No (ESC key): Users can select this key to return to "feature select" initialized mode.

If operator doesn't choose the new set-point in the feature selecting mode but doesn't show the above message, push the ESC key again to go back to initial mode.

If operator has completed the feature setting by remote control like above, operator has to press the power key (off then on).

### d. Function set overview

#### Remote channel

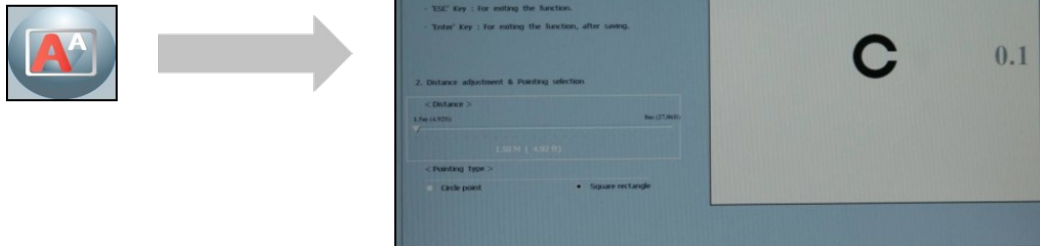


If several LCD and remote control are installed at the same place, they have to match remote control and channel to prevent communication error.

Operator can choose each channel, which was saved by remote control.

- Connect the wire to the remote control then push setup button and it will go to engineer mode.
- Push the SEL key after selecting the "remote control channel" Bar.
- The picture will appear like above, then operator can choose the channel through up or down.
- If the ESC key is selected two times, the save message will pop up.
- If operator wants to save he has to push the SEL key and then change the initialized screen.

## Distance and point



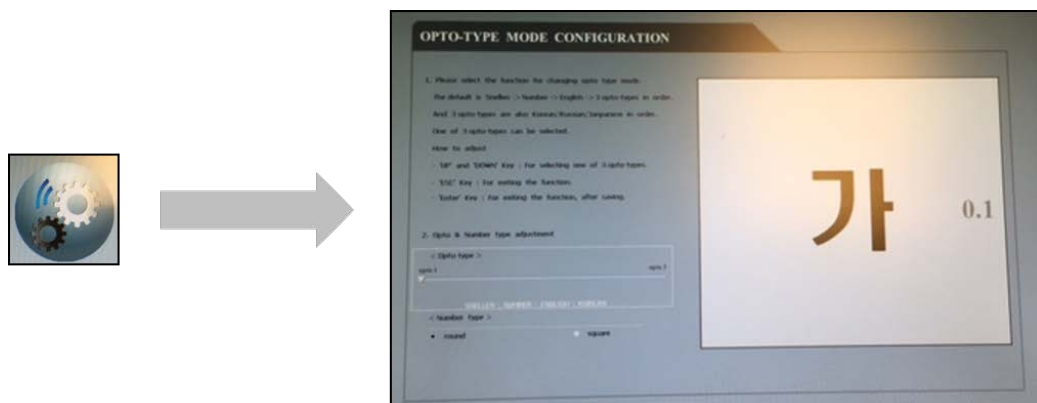
It is easy to fine-tune the distance depending on autophoropter location.

RANGE: 1.5M ~ 6M (0.25m STEP)

Point type: circle or Square type

- Push the SEL key after selecting Distance & Point Bar on the set mode screen.
- Like the picture shown, you can choose the feature via up & down key on the environment setting screen.
- If the ESC key is pressed two times, the save message will pop up.
- If the operator wants to save he has to push the SEL key and then change the initialized screen.

## Opto and number type



For user convenience, this mode can select the chart type like above.

### OPTO type mode

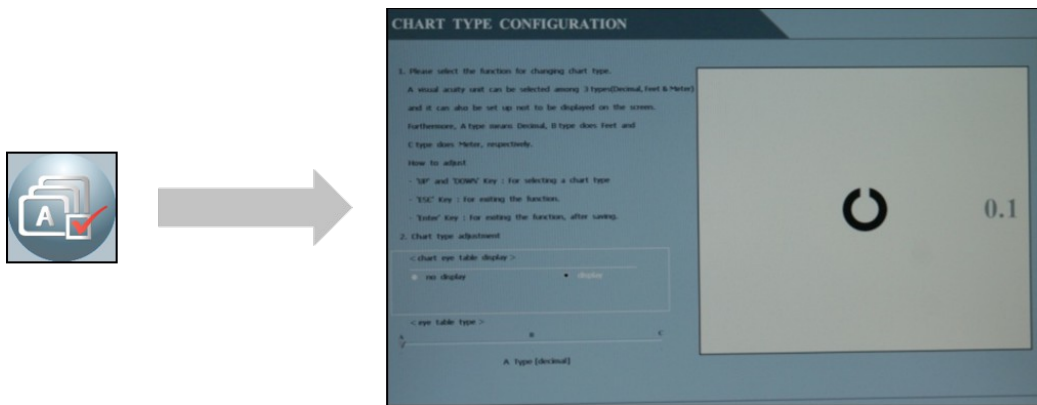
- MODE1: Numeral / Snellen / English / Korean
- MODE2: Numeral / Snellen / English / Russian
- MODE3: Numeral / Snellen / English / Japanese

### NUMBER type

Can select the round or square type of numeral

- Select the OPTO & NUMBER type Bar and then push the SEL key on the set mode.
- Like the picture shown, you can choose the feature via up & down key on the environment setting screen.
- If the ESC key is pressed two times, the save message will pop up.
- If the operator wants to save he has to push the SEL key and then change the initialized screen.

## Chart type



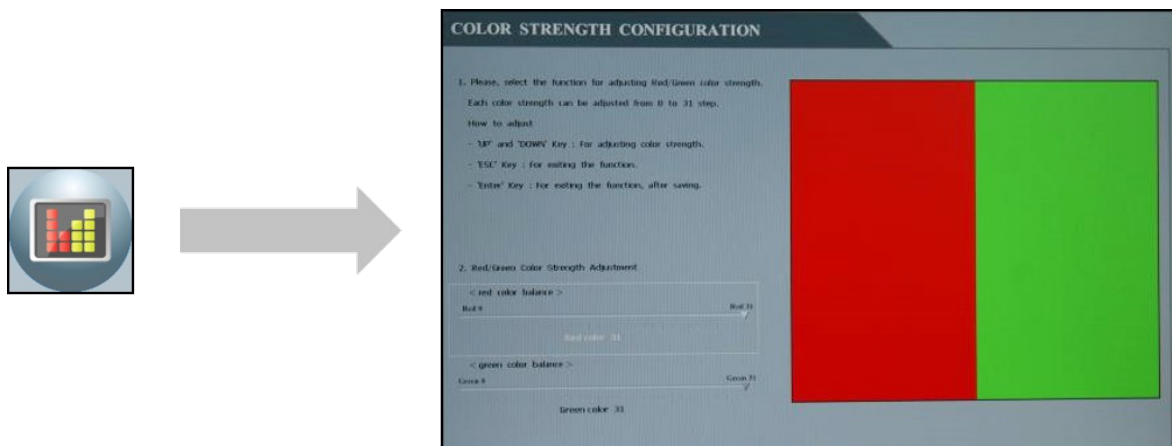
For Zone (Country), this mode can choose the chart type like above.

### CHART TYPE: A, C, D TYPE

Chart sight unit notation: Non display or Display

- Select the chart type Bar and then push the SEL key on the set mode.
- Like the picture shown, you can choose the feature via up & down key on the environment setting screen.
- If the ESC key is pressed two times, the save message will pop up.
- If the operator wants to save he has to push the SEL key and then change the initialized screen.

## Color strength



### R/G filter adjustment function

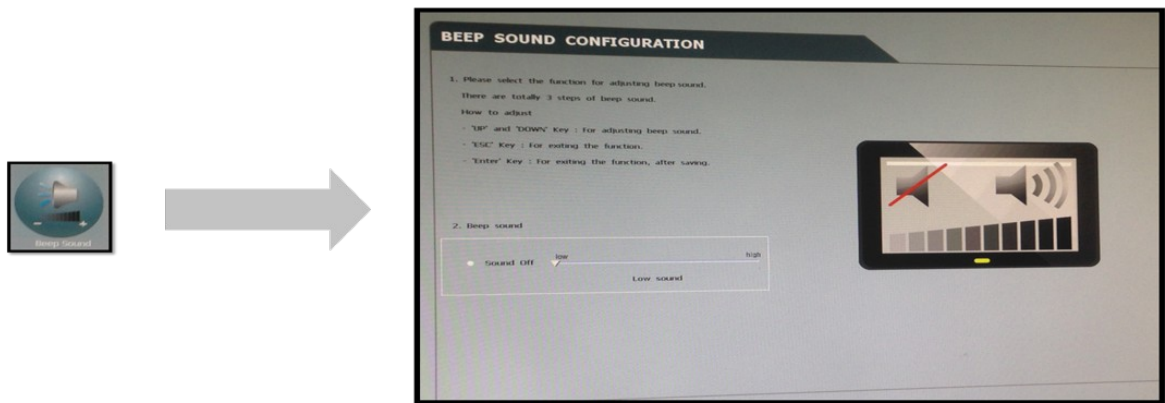
CS550 chart system provides 31steps of R/G filter density that can be used in accordance with test circumstances.

All of Red/Green chart color charts can be reversed.

- Select the COLOR STRENGTH Bar and then push the SEL key on the set mode.
- Like the picture shown, you can choose the feature via up & down key on the environment setting screen.
- If the ESC key is pressed two times, the save message will pop up.
- If the operator wants to save he has to push the SEL key and then change the initialized screen.



## Beep sound



User can turn off the alarm or adjust the volume.

- Select the BEEP SOUND Bar and then push the SEL key on the set mode.
- Like the picture shown, you can choose the feature via up & down key on the environment setting screen.
- If the ESC key is pressed two times, the save message will pop up.
- If operator want to save he has to push the SEL key and then change the initialized screen.

## Auto off and slide



**AUTO OFF:** It is changed to Light-Off mode when the system doesn't operate for specific time period and the mode is changing back to System-On when the remote starts working again.

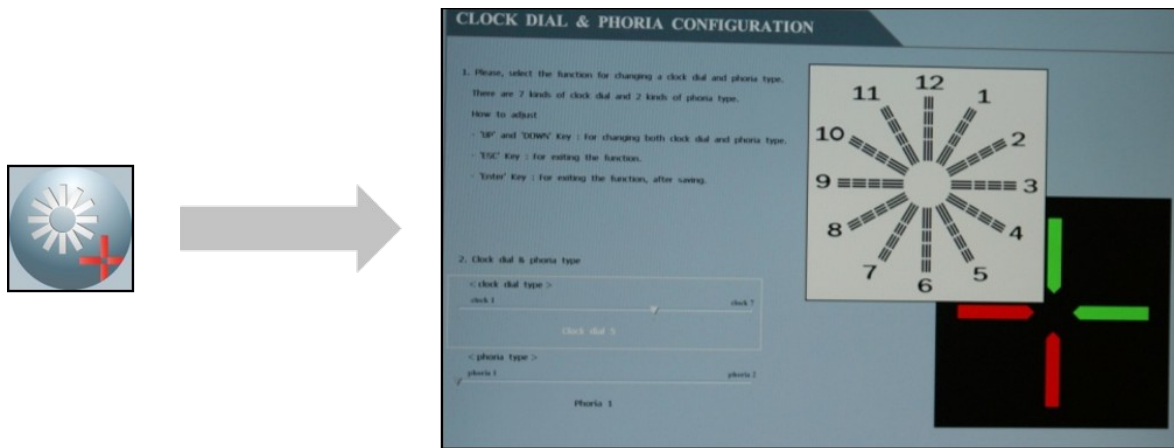
**TIME MODE:** The system can be set to be off by every 5-minute, 10-minute and 15-minute.

**SLIDE:** When the system keeps silence without any use for specific time period, it is changing to Light Off or Auto Image Slide Show mode.

**SLIDE MODE:** The system can be set to be off by every 5-minute, 10-minute and 15-minute with following instruction.

- After selecting the Auto off & Slide bar on the setting mode, press SEL button on the remote.
- Select the preferred function(s) by pressing the Up (move left) or Down (move right) when the setting mode as right side appears on the screen.
- When ESC button is pressed after the specific function is selected, the screen shall be moving back to the initial setting mode. One more pressing the ESC button will show the short message asking whether the changes shall be saved or not.
- For saving the new setting, press the SEL key and the screen is going to be changed to the initial setting mode.

## Clock dial and phoria

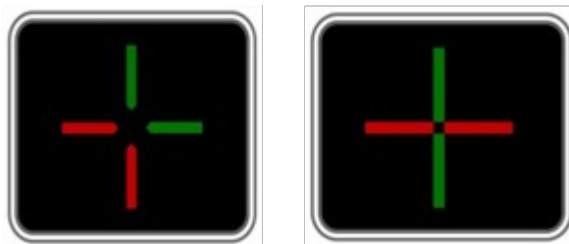


**Clock Dial:** Is a mode showing various visual charts depending on user's preference, the 3rd radiation chart is set as a default.

7 kinds of clock charts as following are selectable.



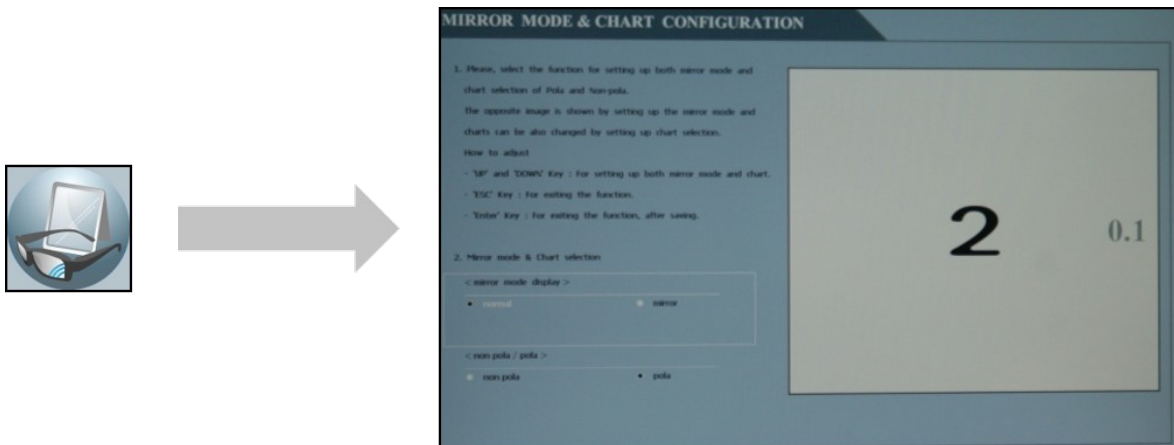
**Phoria:** There are 2 kinds of cross phoria charts which are selectable and No. 1 cross phoria chart is set as a default.



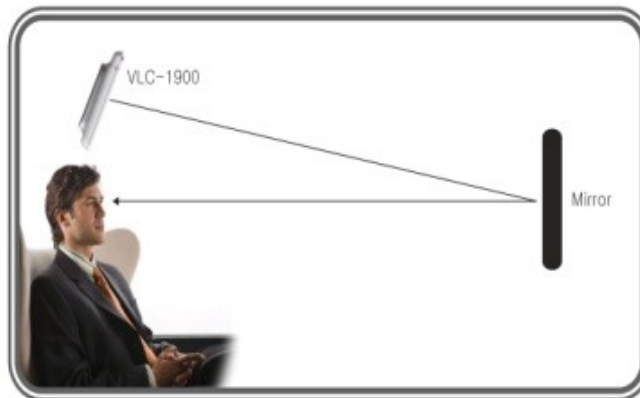
**Setting Mode:** Either of the above cross phoria charts can be selectable and the new chart is set with No. 1 cross phoria chart as a default. Following is the setting instruction.

- Press the SEL button of the remote after selecting Clock Dial & Phoria bar on the setting mode.
- Select the preferred function(s) by pressing the Up (move left) or Down (move right) of the remote when the setting mode as right side appears on the screen.
- When ESC button is pressed after the specific function is selected, the screen shall be moving back to the initial setting mode. One more pressing the ESC button will show the short message asking whether the changes shall be saved or not.
- For saving the new setting, press the SEL key and the screen is going to be changed to the initial setting mode.

## Mirror

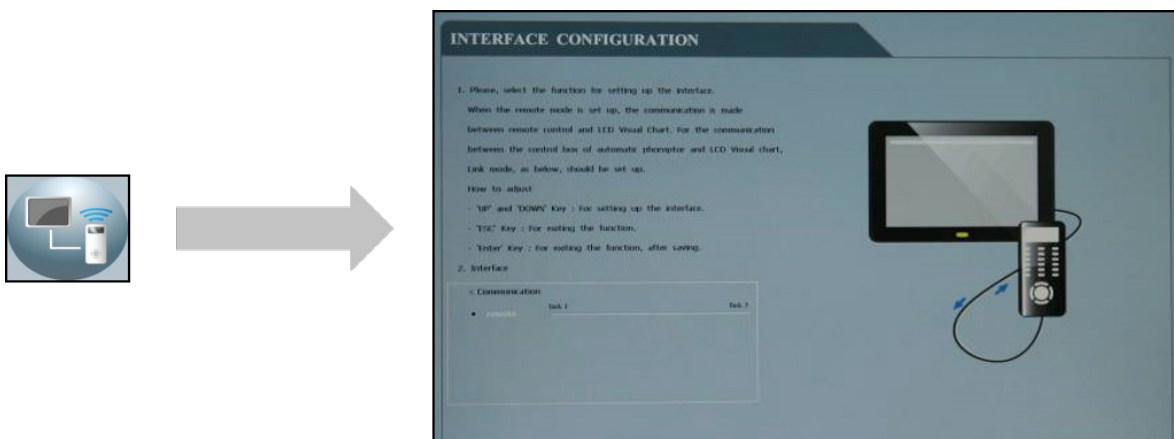


**Mirror:** Is the special mode supporting to set the distance by using a mirror for a specific visual acuity checking environment and On or Off are available for setting.



In the case the LCD visual chart is installed in limited space which is less than 1.5 meters for minimum acuity checking distance, this mirror mode shall be set on and the specific mirror shall be placed on the half distance as left image.

## Interface



**Interface:** It is the mode for selecting the communication for system operation. Remote mode is set as a default.

## Program A/B

Program A-B: Program A or Program B can save the specific visual acuity charts which user prefers in advance and show the visual charts in sequence by pressing the specific button.

Following is the instruction.

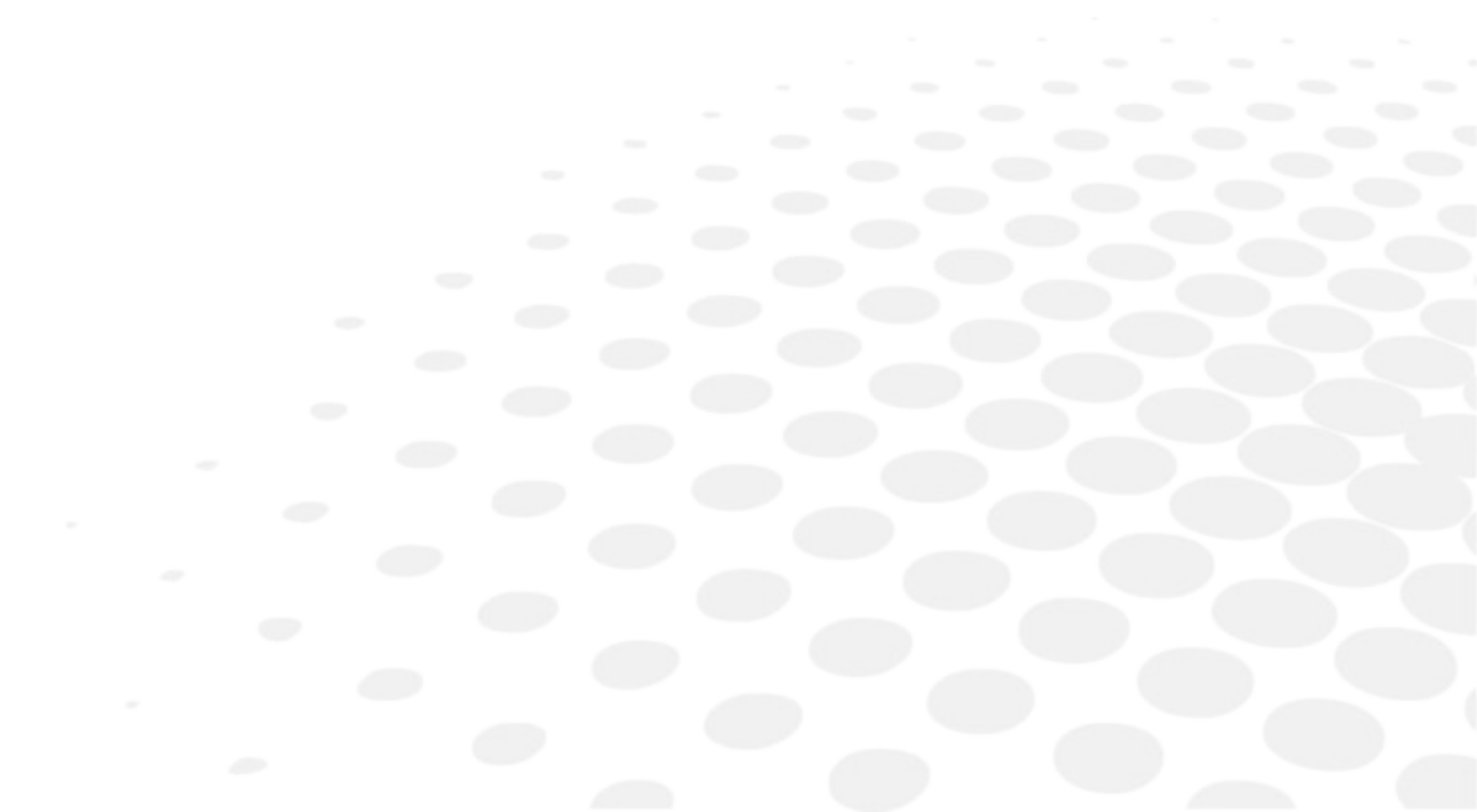
- Insert the wire cable connector to the remote and enter the engineering mode by pressing the 'setup' button of remote for a few seconds.
- Press SEL button of the remote after selecting the Program A-B bar.
- When the setting mode shown right appears, select the Program A by pressing SEL button.
- When Box cursor shows in Program A, press SEL button and press the button for specific visual acuity chart shown on the remote, then the selected visual acuity chart appears in the box cursor. If other visual acuity chart is preferred, it can be selected with the same procedure.
- All available visual acuity charts can be selected by moving the box cursor with Up (move left) or Down (move right). Each Program can save maximum 8 charts.
- When the Program A saves full charts (max 8 charts), press the SEL button then the box cursor moves to Program B.

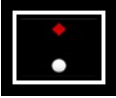



When Program B can save maximum 8 visual acuity charts with the same procedure, press ESC button which will lead to initial setting mode. One more pressing the ESC button will show the short message asking whether the changes shall be saved or not.

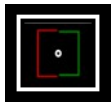

For saving the new setting, press the SEL key and the screen is going to be changed to the initial setting mode.










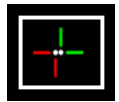



- When going back to the default screen for acuity chart, press Program A and press the arrow button ( $\Rightarrow$ ,  $\Leftarrow$ ), then the visual acuity charts which are saved in Program A shows in sequence. It is the same procedure for showing charts saved in Program B.

## VII. TEST METHOD




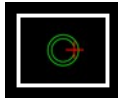
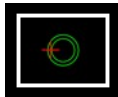

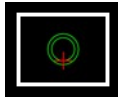


Division	Description	Test method
Orthoptic test - (Binocular balance)	The test is for synchronizing the visual function with both left and right eye by using Red/Green filter.	<ol style="list-style-type: none"> <li>1. Show binocular test types to a patient.</li> <li>2. Let a patient wear Red/Green glasses (right eye = red filter, left eye = green filter).</li> <li>3. Ask a patient which line of both above and below lines is shown much clearer. If above line is clearer +0.25D as much should be added at a right eye. On the contrary, if below line is clearer +0.25D as much should be added at a left eye.</li> </ol>
Orthoptic test - (Red/Green binocular balance)	The test is for adjusting to the balance of both right and left eye by using prism glasses.	<ol style="list-style-type: none"> <li>1. Show Red/Green binocular balance test type to a patient.</li> <li>2. Let the patient wear prism glasses in a left eye (left = Down, right = Up).</li> <li>3. Ask a patient which one is clearer of green circle and red circle on Red/Green test type. If the patient saw the red circle clearer, +0.25D should be added in a left eye until he can see that Red/Green circles are just alike. But if the green circle was shown clearer, +0.25D should be added in a left eye, until the circles are equally shown.</li> </ol>
Orthoptic test - (Worth 4 dots)	The test is for measuring which eye is better shown of left & right eyes, by using Red/Green filter.	<ol style="list-style-type: none"> <li>1. Show Worth 4 dots test type.</li> <li>2. Let a patient wear Red/Green glasses (right eye = red filter, left eye = green filter).</li> </ol> <p>The patient sees ③ mark in a right eye and ④ mark in a left eye on Worth 4 dots test type. The binocular condition would be ideal, if the patient could see ⑤ mark.</p> <ol style="list-style-type: none"> <li>3. Judge a patient's binocular function as below, while asking him how the type is seen.</li> </ol>
		 <p>③ Left eye's suppression &gt; Left eye would be suppressed, if a patient saw only 2 red lights.</p>
		 <p>④ Right eye's suppression &gt; Right eye would be suppressed, if a patient saw only 3 green lights.</p>
		 <p>⑤ Blending &gt; If a patient saw 4 dots, binocular function would be normal.</p>
		 <p>⑥ Diplopia &gt; If a patient saw 5 dots, he/she would have diplopia.</p>

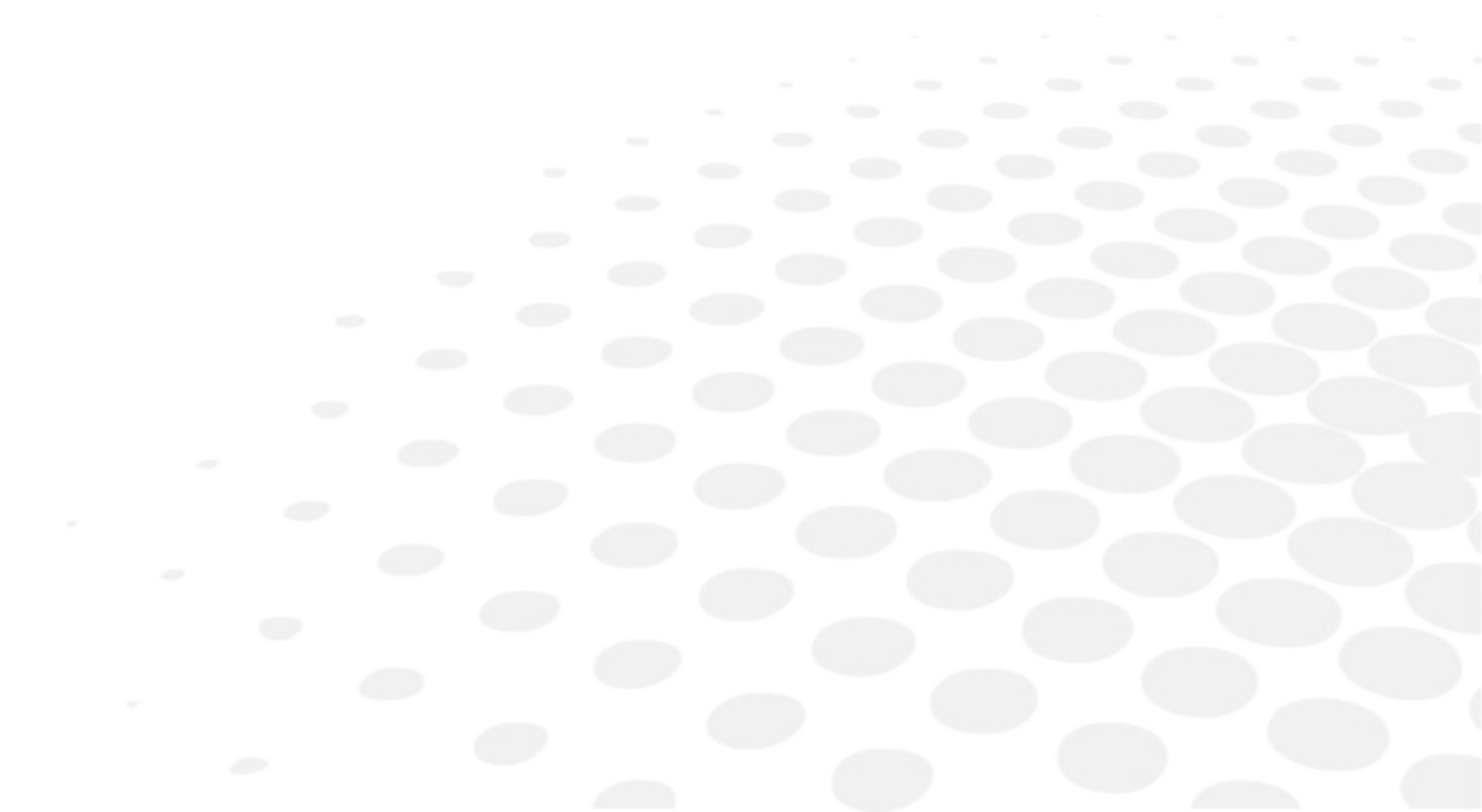
Division	Description	Test method	
Aniseikonia test	The test is for checking aniseikonia of right or left eye using Red/Green filter.	1. Show aniseikonia test type. 2. Let a patient wear Red/Green glasses (right eye = red filter, left eye = green filter). The patient sees fixation target and "J" in a right eye and fixation target and "L" in a left eye. 3. Ask a patient if he can see borders that have in between interval. Also asking if a left and a right border are alike or which one is shown smaller than the other.	
			Ⓐ The patient's binocular condition is left > right and right eye < left eye.
			Ⓑ The patient's binocular condition is left < right and right eye > left eye.
		4. The reason of aniseikonia is heteropsia (when diopter's difference of both a right and a left eye is too big). And if the result were an axial heteropsia, glasses would be prescribed and if a refractive heteropsia, contact lenses prescribed.	

Division	Description	Test method		
Phoria test - (Cross phoria)	This test is for testing horizontal/vertical phoria of right or left eye by using Red/Green filter.	1. Show cross phoria test type to a patient. 2. Let a patient wear Red/Green glasses (right eye = red filter, left eye = green filter). The patient sees «  » mark in a right eye and «  » mark in a left eye on cross phoria test type. The binocular condition would be ideal, if the patient could see «  » mark.		
		Patient's visual status	Phoria	Method
			Ⓐ Esophoria	Add B.O prism until a vertical line can come to the center of a horizontal line.
			Ⓑ Exophoria	Add B.I prism until a vertical line can come to the center of a horizontal line.
			Ⓒ Left eye's hyperphoria	Add B.U in a right eye and B.D in a left eye until a horizontal line can come to the center of a vertical line.
Phoria test - (Fixation point of cross phoria)	The test is for measuring vertical/horizontal fixation disparity of right or left eye by using Red/Green filter.	1. Show cross phoria test type to a patient. 2. Let a patient wear Red/Green glasses (right eye = red filter, left eye = green filter). The patient sees «  » mark in a right and «  » mark in a left eye on cross phoria test type. The binocular condition would be ideal, if the patient could see «  » mark. 3. Judge a patient's binocular function as below, while asking him how the type is seen.		
		Patient's visual status	Fixation disparity	Method
			Ⓐ Esodisparity	Add B.O prism until being no deviation.
			Ⓑ Exodisparity	Add B.I prism until being no deviation.
			Ⓒ Left eye's hyperdisparity	Add B.U in a right eye and B.D in a left eye until being no deviation.
			Ⓓ Right eye's hyperdisparity	Add B.U in a left eye and B.D prism in a right eye until being no deviation.

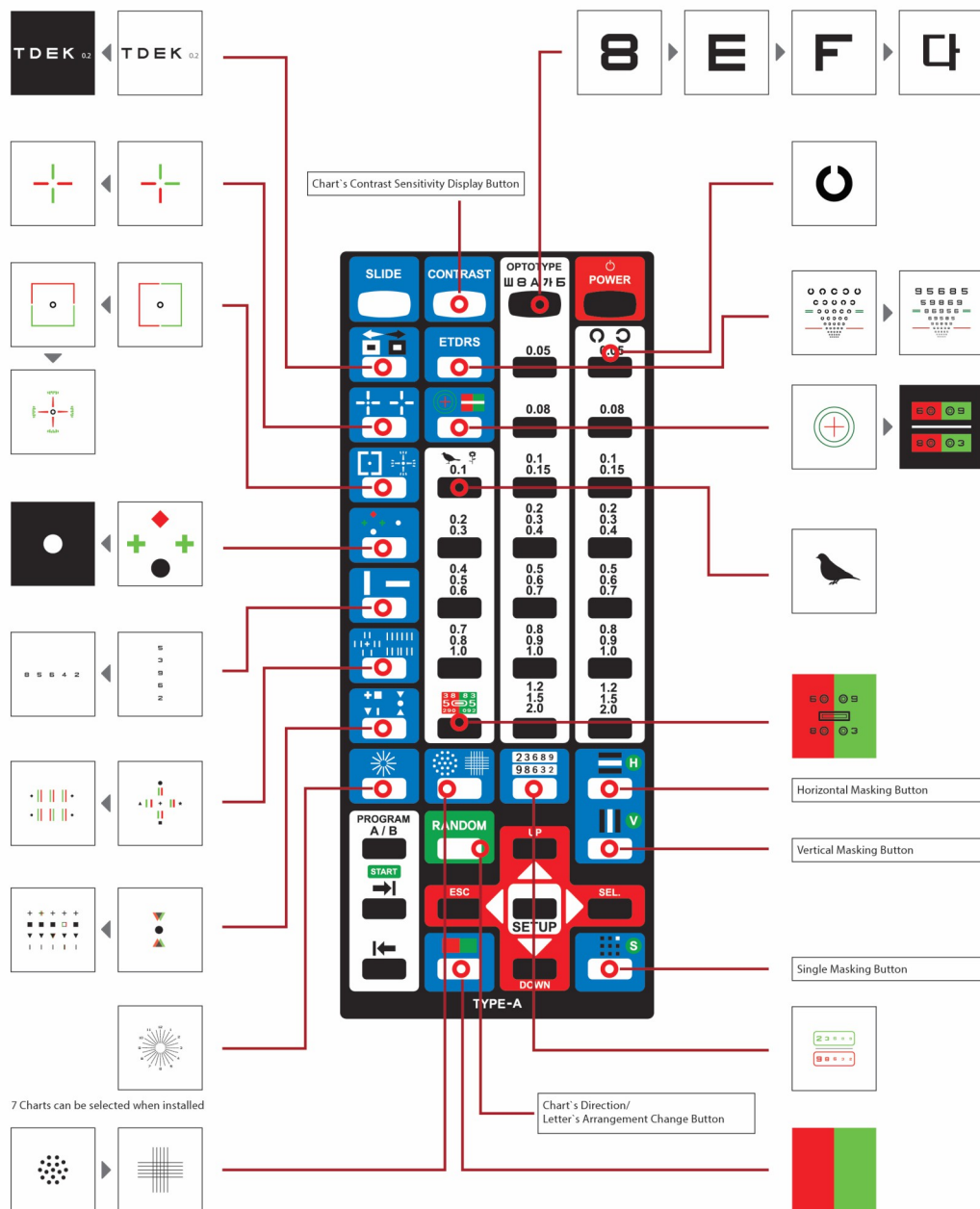


Division	Description	Test method		
Schober's test - (Decussation circle)	The test is for measuring vertical/horizontal phoria of right or left eye by using Red/Green filter.	<p>1. Show Schober's test type to a patient.</p> <p>2. Let a patient wear Red/Green glasses (right eye = red filter, left eye = green filter). The patient sees «  » mark in a right eye and «  » mark in a left eye on Schober's test type. The binocular condition would be ideal, if the patient could see «  » mark.</p> <p>3. Judge a patient's binocular function as below, while asking him how the type is seen.</p>		
		Patient's visual status	Fixation disparity	Method
			Ⓐ Esophoria	Add B.O prism until being no deviation.
			Ⓑ Exophoria	Add B.I prism until being no deviation.
			Ⓒ Right eye's hypophoria / Left eye's hyperphoria	Add B.U in a right eye and B.D in a left eye until being no deviation.
			Ⓓ Right eye's hyperphoria / Left eye's hypophoria	Add B.U in a left eye and B.D prism in a right eye until being no deviation.

## VIII. REMOTE CONTROL FUNCTION



## 1. GENERAL FUNCTION

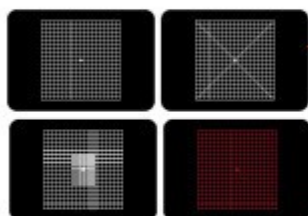


## 2. SLIDE FUNCTION

- Select the function after push the slide button



- Eye movement : You can change the movement speed for 3 level



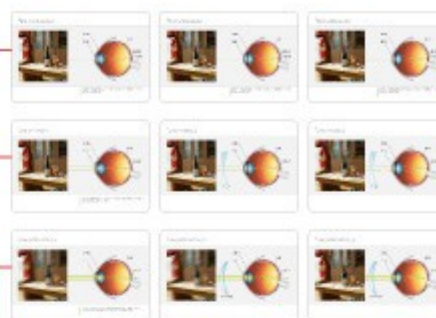
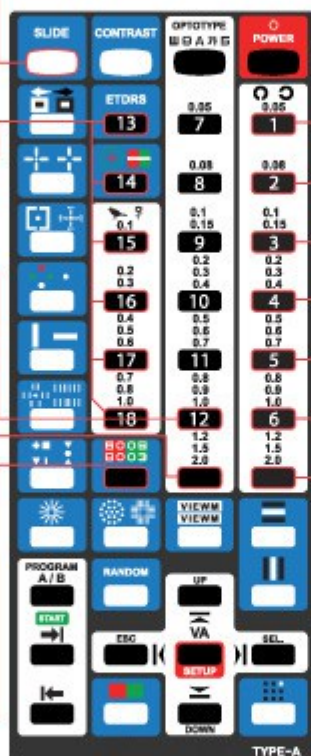
- You can display Amsler grid chart step by step



- You can display Contrast adjustment function for 10 steps



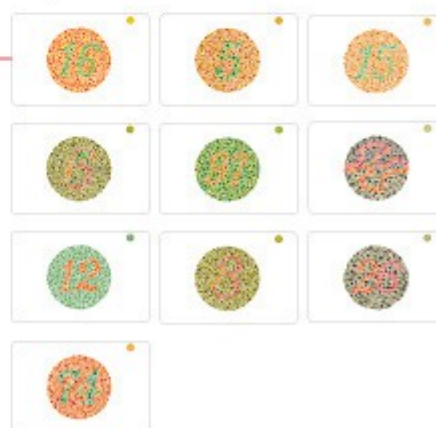
- Animation : When you push the button you can display following Image step by step



- When you push the slide button chart display a No. 1 key Image. Following Images are  
Key 1 : EMMETROPIA  
Key 2 : MYOPIA  
Key 3 : HYPEROPIA



- Key 4 : ASTIGMATISM  
Key 5 : CATARACT - GLAUCOMA - LASIK  
Key 6 : Red/Green Stereo chart

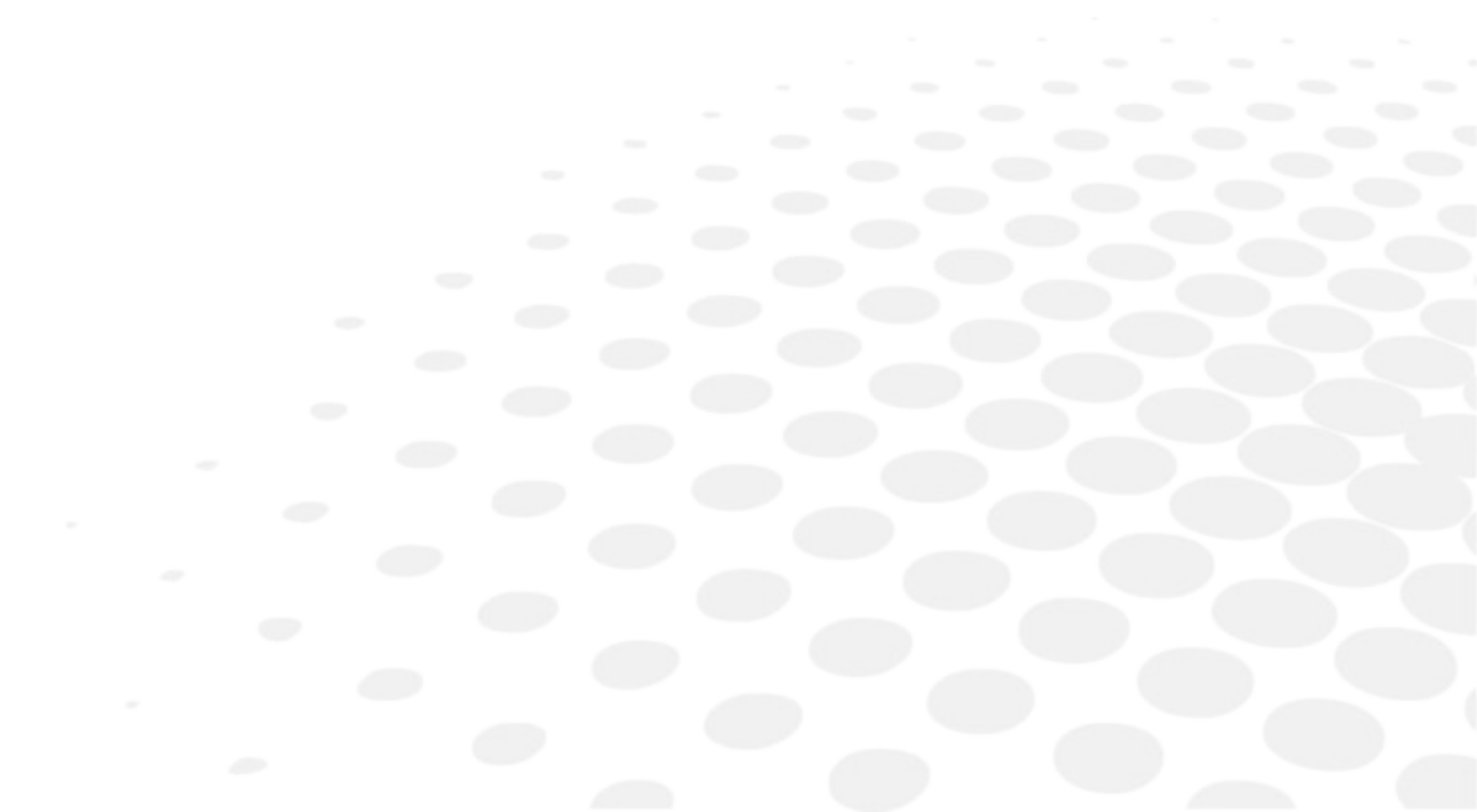


- There are 10 kinds of color blindness chart. when you push the button it can be changes step by step



1. Additional function can be selected after slide button press.
2. Charts can be changed for quality improvement without notice.

## IX. HOW TO RECHARGE A REMOTE CONTROL



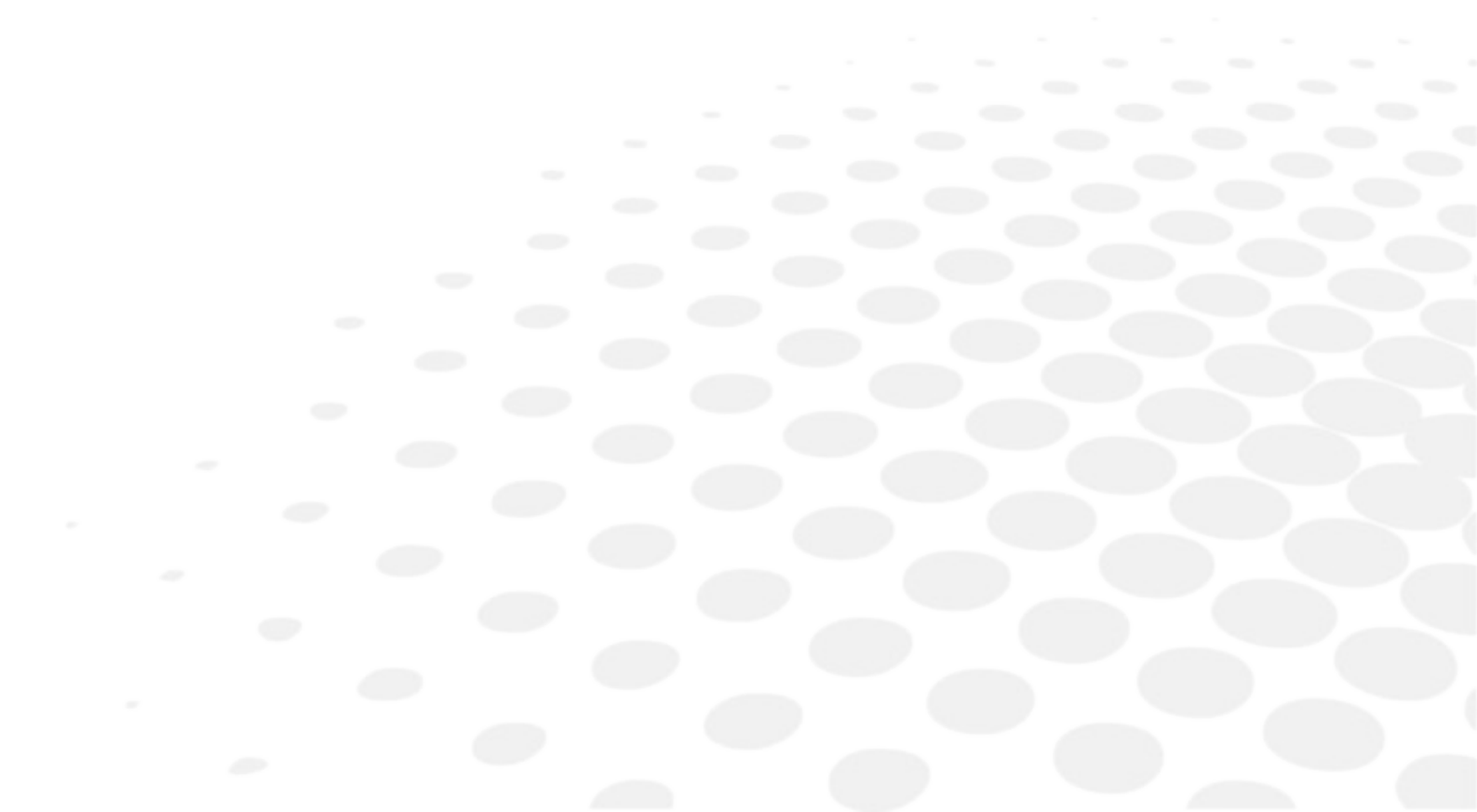


Remote control can be rechargeable by the USB adapter.



Remote control can be also rechargeable by USB cable, connecting with laptop or desktop.

## X. CLEANING THE PRODUCT



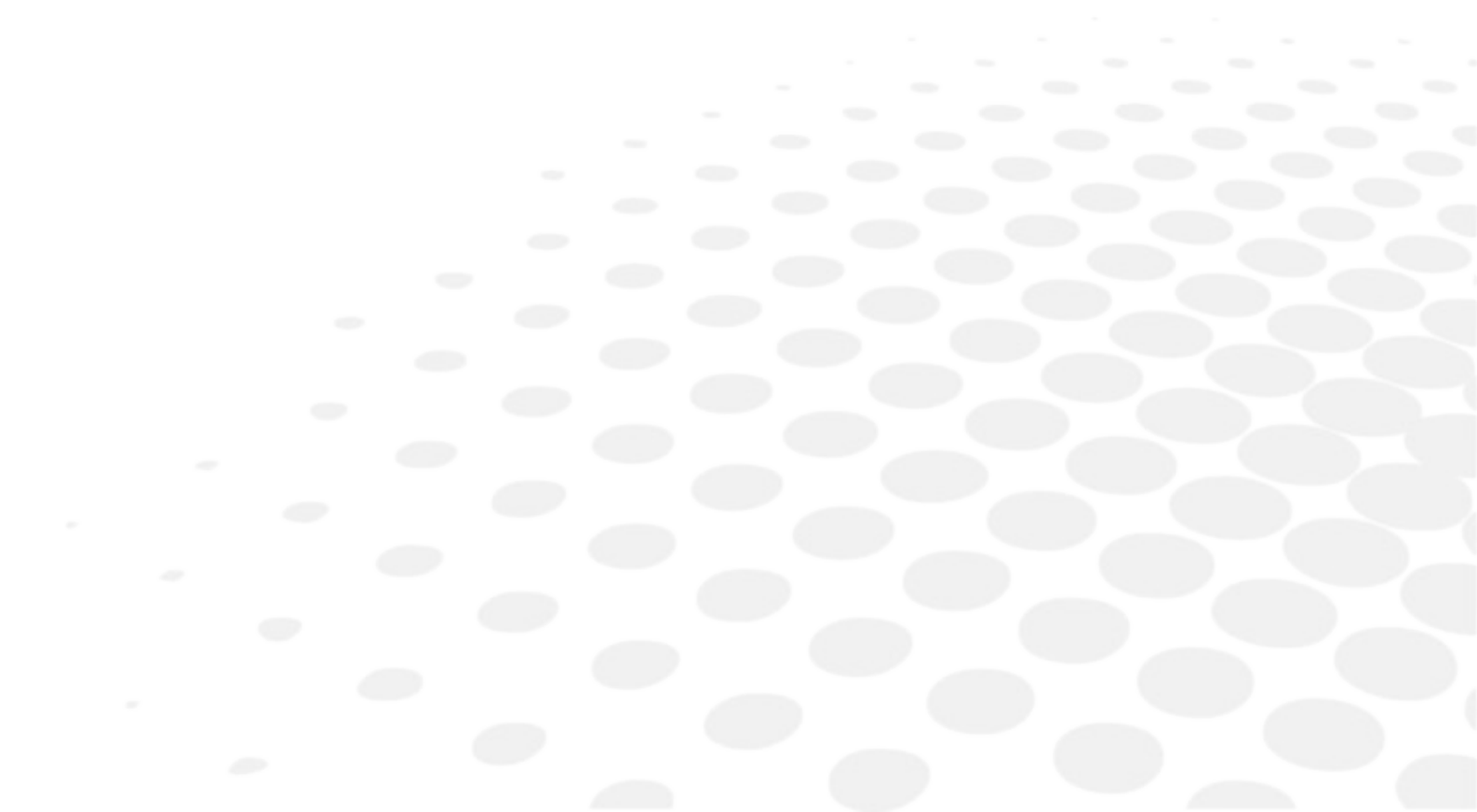
Use a soft cloth with 90% Isopropyl Alcohol to clean the product's screen and the unit.  
Cleaning of the product should be performed when its screen is contaminated or dust level is bad in visual.



Do not use paper towels.



## XI. TROUBLESHOOTING GUIDE

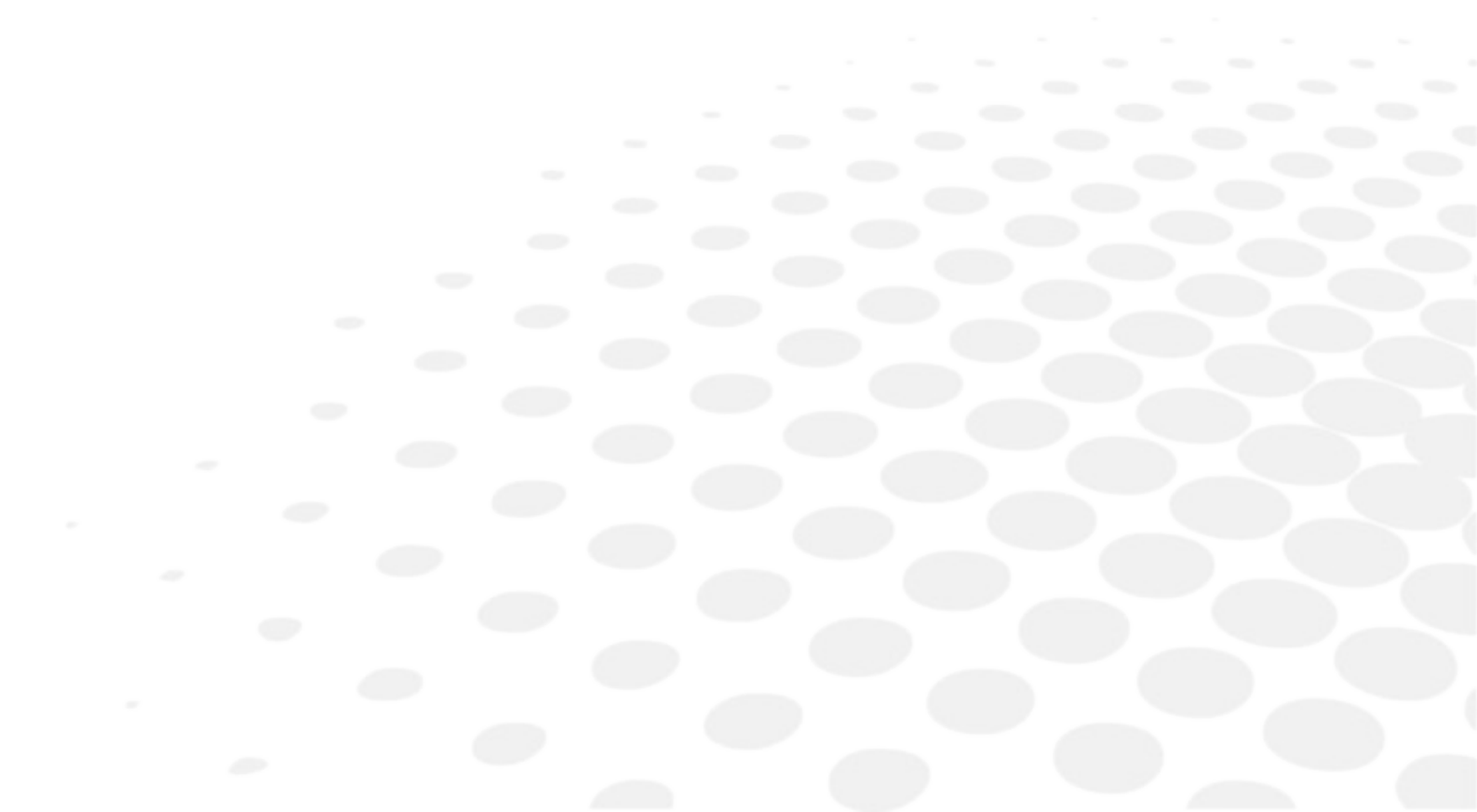


Followings are the common errors with the product and how to resolve them.

The product may need the professional technical servicing unless the problems are not solved with following guide.

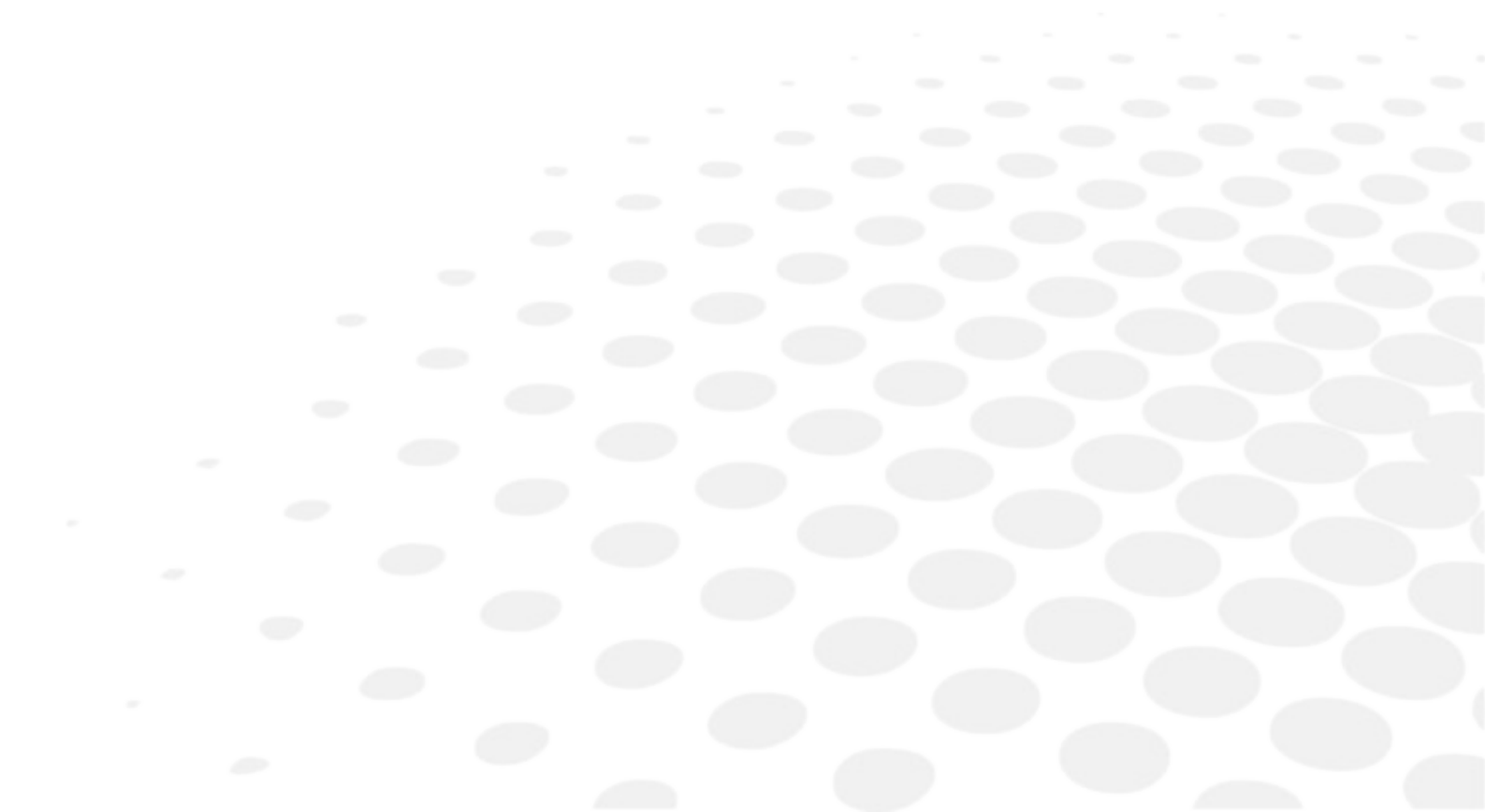
Problem	Estimated cause	Recommended solution
Product doesn't turn on.	Power cable not plugged in.	Plug shall be into power outlet.
Product will not respond to remote control.	IR detector is dirty.	Clean the IR detector.
	Batteries in remote are dead.	Replace the batteries in the remote.

## XII. ENVIRONMENTAL CONDITIONS



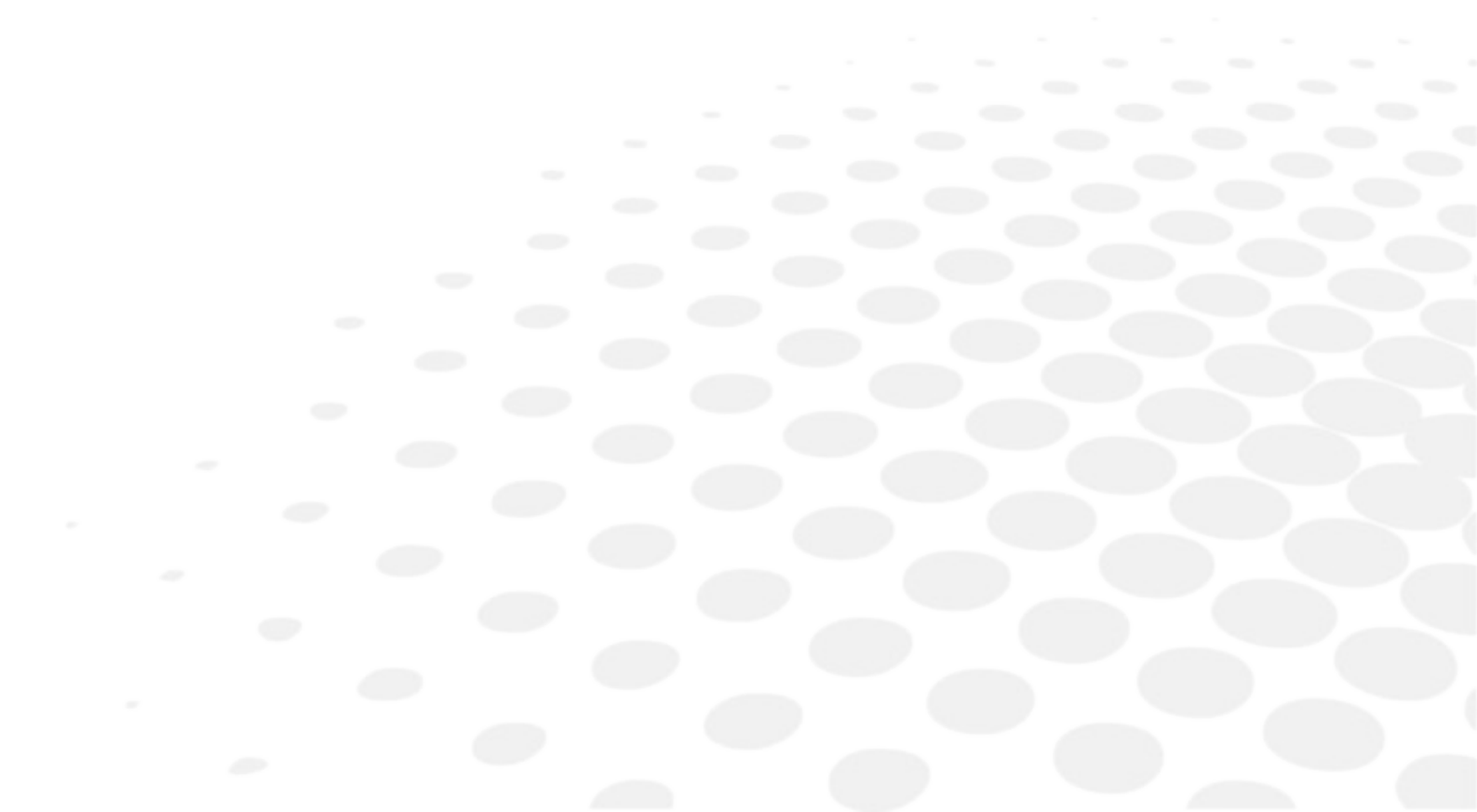
Operation	Temperature	+10°C ~ +40°C
	Humidity	30 à 85 %
	Atmospheric pressure	70 à 106 kPa
Transportation and storage	Temperature	-10°C ~ +55°C
	Humidity	10 à 95 %
	Atmospheric pressure	50 à 106 kPa

## XIII. SPECIFICATIONS



LCD type	19 Inch (SXGA) TFT LCD
Resolution	1280 x 1024 pixels
Chart window size	(H) 300 X (W) 375 mm
Brightness	80 ~ 320 cd / m (10 level variable)
Test	Snellen, Landolt, English, Korean, Russian, Japanese, Numeral, Children, Mask (Horizontal, Vertical, Single Optotype), Special charts (Separate Red/Green), Amsler grid, Color Blindness, Red/Green 3D, Animation, and so on
View distance	1,5 à 6 m (0.25 step adjustment)
Memory card	SD card (2GB)
Power source	DC +12V 5.0A (Power Adaptor)
Power consumption	40 W
Communication	<ul style="list-style-type: none"> <li>• Wire: RS 232 Communication</li> <li>• Wireless: IR Communication</li> </ul>
Dimension / Weight	(W) 436 X (H) 362 X (P) 59,55 mm / 5,5 Kg
Dimension / Weight (Remote control)	(W) 69,5 X (H) 235,5 X (P) 26 mm / 200 g
Standard accessories	Mini USB cable for recharging the remote control, power adapter, power cable, wall mounting bracket, user manual
Optional accessories	Floor Stand, Red/Green Glasses, Digital Refractor Cable, Desk-top Stand

## XIV. COMPONENTS LIST



## 1. STANDARD ACCESSORIES

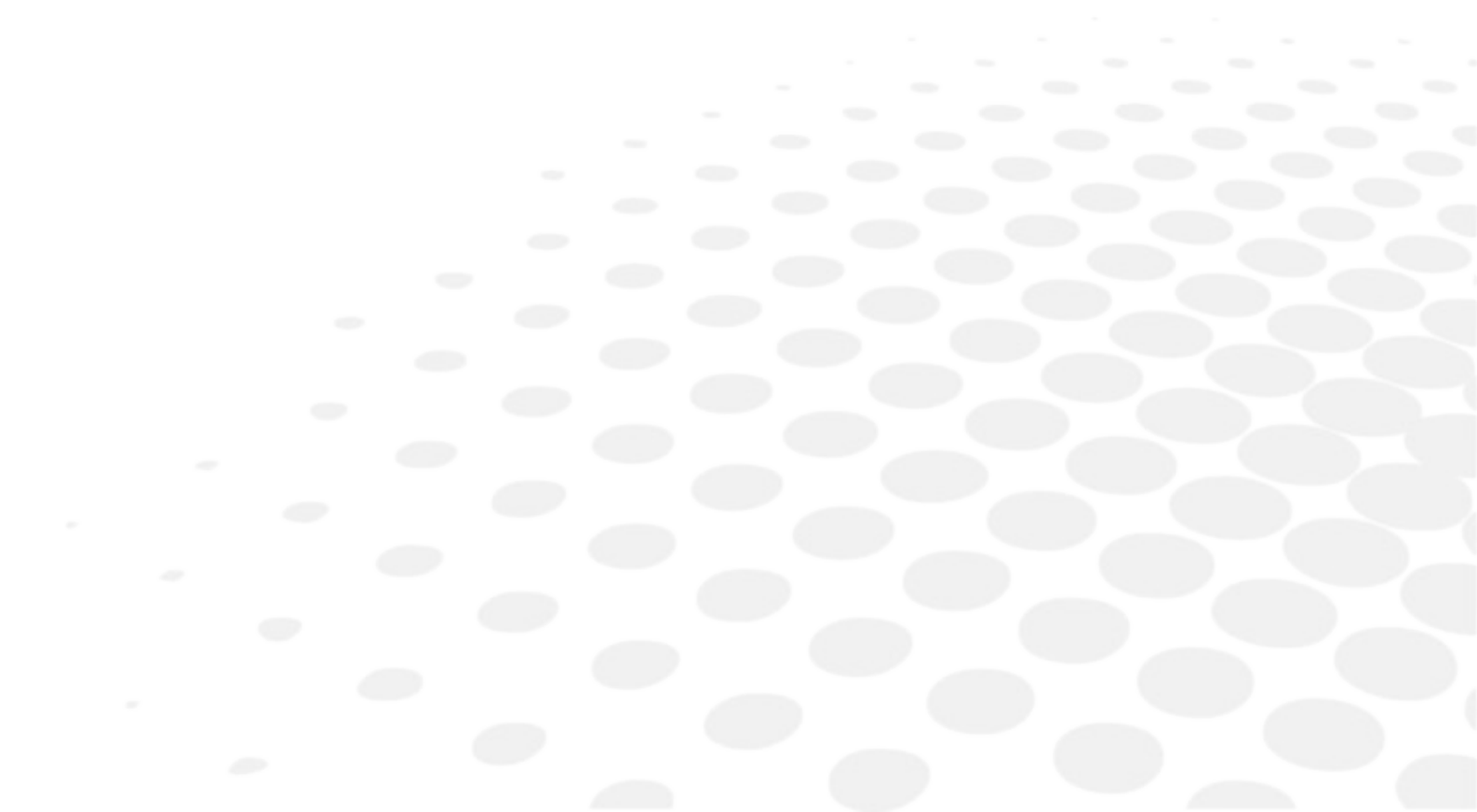
Mini USB cable for recharging the remote control, power adapter, power cable, wall mounting bracket, user manual.

## 2. OPTIONAL ACCESSORIES

Floor stand, Red/Green glasses, digital refractor cable, desktop stand.



## XV. SERVICE INFORMATION



If there are any problems with the product, please follow the below steps.

1. Turn off the power.
2. Remove the power cable connected to the equipment.
3. Remove SD card from the slot and install again.  
Remark: Put SD card in right position when connect the slot.
4. Connect power adapter to the equipment and turn on the power.
5. Check if the equipment operates properly with remote control.
6. If the equipment does not operate properly, you are recommended to do as below.
  - Check model name and serial number of the equipment and contact the distributor who you purchased the equipment.
  - If you can not contact the distributor, please contact as described below.

This product may malfunction due to the electromagnetic waves caused by cell phones, transceivers, radio-controlled toys, etc.

Be sure to avoid having objects such as, which affect this product brought near product.

## 1. REPAIR

If problem cannot be solved even after taking the measures indicated in section 15, contact your local representative or distributor for repair.

Please refer to the name plate and let us have the following information:

- Name of the instrument: CS550
- Serial number: characters indicated on the name plate
- Detailed defects



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