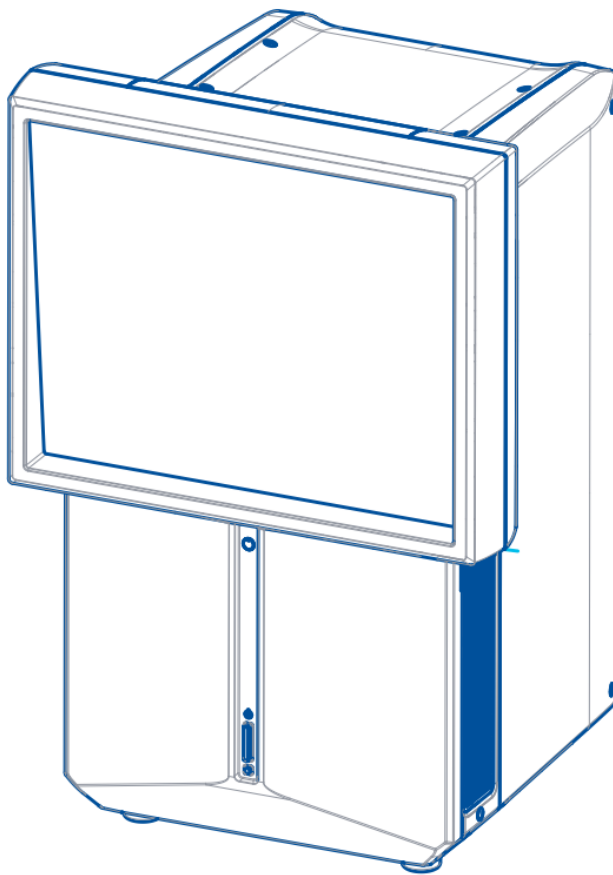


USER MANUAL

Automatic Visual Acuity Tester

CDC-1



HUVITZ
SHANGHAI

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.

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1. Introduction

1.1. Outline of Product

The Shanghai Huvitz Automatic Visual Acuity Tester (CDC-1) is a computerized chart presenting device that provides charts for refractive correction test and various functional tests such as cross cylinder, red/green, binocular balance, fusion and suppression, heterophoria, associated phoria, aniseikonia, stereopsis, and dominant eye test for heterophoria. Since the Digital Chart implements charts on the LCD panel by adopting the cutting edge digital technology, it's not only faster and quieter but also equipped with multifarious convenient functions. The contrast sensitivity and the background luminance of the chart are adjustable for environmental needs. Also the image gallery contains a dozen of image clips that the examiner could utilize during the examination. Various masking and random functions would be helpful for a punctual vision test.

The examiner may execute all the charts and functions by using the remote controller and when it is connected to Shanghai Huvitz Digital Refractor, the Operation Panel can also control this product.

1.2. Intended Use

Shanghai Huvitz Automatic Visual Acuity Tester displays optotypes or symbols on LCD for eyesight test within visible distance using electronic power.

1.3. Classification

- Classification of Product:
 - EU – Class I according to Annex VIII (Rule 13) of the Medical Device Regulation MDR
- Resistance against electric shock: Class I
- Protection against harmful ingress of water: Ordinary, IPX0
- Degree of safety in the presence of a flammable anesthetics mixture with air or with oxygen or with nitrous oxide: Not suitable for use in the presence of a flammable anesthetics mixture with air or with oxygen or with nitrous oxide
- Mode of Operation: Continuous

1.4. Patient Restriction

- Patient who cannot keep a comfortable position.

1.5. Patient Requirement

Patient tested with this device should keep concentration for several minutes and follow below items.

- Keep eyes wide open.

- During the test, understand and follow instructions.

When patient comply above conditions, would get a correct test result.

1.6. Applied Standard

- IEC/EN 60601-1: MEDICAL ELECTRICAL EQUIPMENT
 - Part 1: General requirements for safety
- IEC/EN 60601-1-2: Medical electrical equipment Part1: General requirements for safety
 - Collateral Standard: Electromagnetic Compatibility-Requirements and tests
 - ETSI EN 301 489-17: ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard for ElectroMagnetic Compatibility
- ISO15004-1: Ophthalmic instruments
 - Fundamental requirements and test methods
 - General Requirements applicable to all Ophthalmic instrument

2. Information regarding Safety

2.1. Introduction

Safety is everyone's obligation and responsibility. Safe use of this device is important for everyone involved - installers, users, operators and device managers. It is a must to study and to master this user manual individually prior to installing, using, cleaning, repairing or controlling this device and its accessories. It does not suffice to emphasize the importance of understanding the instructions found in this manual repeatedly in order to increase safety of patient or users. For this reason, the following safety warning chart is included at the adequate place on this manual in order to highlight information that requires special precaution or safety related information in particular. All the users or managers need to pay special attention in addition to mastering "WARNING" or "CAUTION" in the manual.

WARNING

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

CAUTION




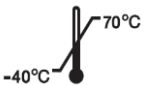


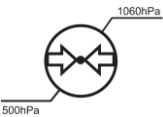
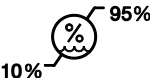
"Caution" indicates the presence for a hazard that could result in minor injury, or property damaged if ignored.













NOTE

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

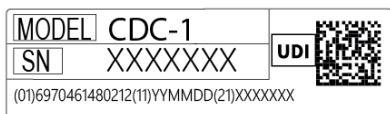
2.2. Safety Symbols

The International Electro technical Commission (IEC) announced the symbols that warn when connecting electric medical device's power or that warn against calamity that may occur. Classification and symbol are as follows.

	It indicates the year of manufacture and the manufacturer. (Il indique l'année de fabrication et le fabricant.)
	Manufacturer (Fabricant)
	CE Mark (Marque CE)
	Temperature Limitation (Limitation de température)
	Keep DRY (Garder au sec)
	<p>WEEE mark</p> <p>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. (Mise au rebut de votre ancien appareil Lorsque ce symbole de poubelle barrée est joint à un produit, cela signifie que le produit est couvert par la directive européenne 2002/96 / CE. Tous les produits électriques et électroniques doivent être éliminés séparément du flux des déchets municipaux via des installations de collecte désignées par le gouvernement ou les autorités locales. L'élimination correcte de votre ancien appareil aidera à prévenir les conséquences négatives potentielles sur l'environnement et la santé humaine. Pour plus d'informations sur l'élimination de votre ancien appareil, veuillez contacter votre mairie, le service d'élimination des déchets ou le magasin où vous avez acheté le produit.)</p>
	Atmospheric pressure limitation (Limitation de pression atmosphérique)
	Humidity limitation (Limite d'humidité)

	Stack direction (Direction de la pile)
	Fragile , handle with care (Fragile, manipuler avec soin)
	Stack layer limitation (Limiter la couche de pile)
	Use no hooks (N'utilisez aucun crochet)
	Alternating Current (Courant alternative)
	Direct Current (Courant continu)
	Consult instructions for use (Consulter les instructions d'utilisation)
	Serial Number Symbol (Symbole du numéro de série)
	Authorised Representative in the European Community (Représentant autorisé dans la Communauté européenne)
	Medical Device
	Model Name
	Unique Device Identifier

2.3. UDI Information



UDI structure: (01) Manufacturer prefix number: 697046148; (11) manufacture date;

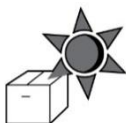
(21) S/N code

2.4. Environmenta related Matters

The environment to avoid in operation and storage.



Place where device comes directly into contact with moisture
(do not operate the device with wet hand)



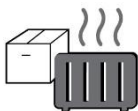
Place where device is exposed directly to sunlight.



A place where the equipment can be exposed to direct ultraviolet.



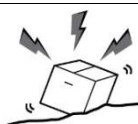
Place with severe temperature change.



Where there is a hot equipment nearby.



Where the humidity is extremely high or there is a ventilation problem.



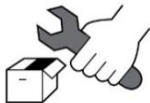
Where the machine is exposed to excessive shocks or vibrations.



Where the machine is exposed to chemical material or explosive gas.



Be cautious so that things like dust and metal do not fall inside the machine.



Don't disassemble or open the product. HUVITZ does not take responsibility for the possible problems



Be careful not to block the fan of the machine.



Don't plug the AC power cord into the outlet unless all parts of the machine are completely connected. Otherwise, it will cause severe damage on the machine.



Pull out the power cord with holding the plug, not the cord.

Please keep below environment condition.

1. Operation: Ambient Temperature 10°C ~ 40°C, Relative Humidity 30 ~ 90%, Atmosphere Pressure 800 ~ 1060hpa.
2. Transportation: Ambient Temperature -40°C ~ 70°C, Relative Humidity 10 ~ 95%, Atmosphere Pressure 500 ~ 1060hpa.
3. Storage: Ambient Temperature -10°C ~ 55°C, Relative Humidity 10 ~ 95%, Atmosphere Pressure 700 ~ 1060hpa.

Avoid environments where the equipment is exposed to excessive shocks or vibrations.

2.5. Safety Precautions

This device was developed and proven according to the domestic and international safety specs. This guarantees this device's high safety level. By law, a manufacturer is obligated to provide sufficient explanation of the matters pertaining to the device safety to device users. Likewise, compliance with the contents of this device's manual is mandatory for safety sake. Thus, read the instructions in the manual sufficiently and understand prior to turning on the power. For more information, inquire the distributor where you purchased the device.

1. This device is utilized with the accessories provided by Huvitz. If consumer wants to use other manufacturers' accessories, safety of use must be proven and confirmed by Huvitz or by the accessories' manufacturer.
2. This device should be operated by qualified personnel with sufficient training or under such personnel's supervision.
3. This device can be modified only by Huvitz's service technician or a person with comparable qualifications.
4. Device management by customer should be carried out as explained in the user or service manual. Management that requires more sophisticated skill set can be carried out only by Huvitz's service technician or a person with comparable qualifications.
5. Manufacturer assumes responsibility for this device's safety, reliability and performance only when the following conditions are satisfied: (1) When this device was installed at a viable space in accordance to this manual's regulations, and (2) when this device was used and maintained according to the procedure regulated in this manual or service manual.
6. Only a person who completed adequate training or education program can install, operate and maintain this device.
7. Store user or service manual at a place that is readily accessible by the person who manages and uses this device.
8. Please do not pull on the device's cable. Always hold the plug when disconnecting cables.
9. Always check the status of the device's exterior and it's functions before using the device.
10. Do NOT block the air vent for heat radiation.
11. Turn off the power immediately and take out the plug when there is smoke, spark, abnormal noise or smell.
12. This device should not be installed or stored in where having risk of explosion, volatile chemicals like alcohol , benzene or flammable, explosive substance.
13. The manufacturer is not liable for damages caused by unauthorized change of the device(s). Such change will forfeit any rights of warranty.
14. Before connecting the cable of DC adapter to AC power source, makes sure the AC power meets the input requirements of DC adapter.
15. The ground connection is important for safe operation. For providing power with proper voltage and frequency to the device, it needs to be from outlet with ground.
16. Using medical certified DC adapter guarantees reliable ground. Check DC adapter regularly and do not use it when damage is found.

17. Do not touch both signal input, output or other connectors, and the patient at the same time.
18. Use DC adapter and power cable supplied together to keep the reliability of the device.
19. IEC standard needs to be satisfied with in order to connect an outside device with input/output signal or other connector. (IT equipment is IEC 60950, and electric equipment for medical use is IEC 60601). Moreover, all the systems need to satisfy the safety requirement, IEC 60601-1 when it comes to the electric system for medical use. Person who connects outside device with input/output signal or other connector has the obligation to take responsibility in accordance to the IEC60601-1. Contact local technician or distributor if you have doubts.

2.6. FCC Warning

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Caution: The user is cautioned that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.

RF Exposure Statement :

This equipment complies with EU, FCC and IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

3. Characteristics

- CDC-1 has LCD panel supporting polarization which enables various kinds of polarization test.
- Through vision test can check color blindness/weakness.
- Through Contrast Test can check color ability based on frequency and brightness of contrast.
- Chart contrast can be easily adjusted by remote controller.
- By using random chart function, user can prevent patients from remembering the order of charts appearance.
- Other various images can be used in optometry or help to explain to customer.
- This device provides chart reverse. User can select white or black background color.
- This device can connect to Shanghai HUVITZ digital refractor in wired or wireless. Once they are connected, phoropter control panel can control charts and lens of phoropter conveniently.

4. Using the Device

4.1. Preparation before Use

Before using this product, please check below items and perform required actions refer to this user manual.

- The device should be installed by qualified and trained person or under the guidance of such person.
- Check any dust on the front screen, if does, clean it.
- Use DC adapter and power cable that supplied with this device.
- After connecting power by using DC adapter and power cable, perform simple device function check.
- DC adapter cable should be fixed so it doesn't shake
- Check the remote controller has battery inside and the battery life is not over.
- If environment such as room lightning were changed from its first installation, adjust chart brightness, red/green balance, etc. in setting menu before use.



WARNING



Use only DC adapter and power cable provide by Shanghai HUVITZ.

DC adapter provided by Shanghai HUVITZ is qualified for medical device.


Manufacturer is NOT liable to any problem caused by using DC adapter or power cable which are not provided by Shanghai HUVITZ.

4.2. Using the Device

Operation procedures may differ from users. Followings are the most basic operation sequence.

- Connect DC adapter to the device. Fix the adapter cable with cable tie to prevent it pulled off.
- Push  Power button on the lower part. Check device Logo on LCD.
- Wait product's initialization before C chart comes up.
- Let patients be in the test distance, instruct to watch charts.
- When necessary, adjust screen angle.
- Using remote controller select charts and proceed test.
- With programming function common used charts can be memorized in order which helps to finish test quickly.
- After some idle time, the screen goes off or a screen saver is active. Press any button on the remote controller to return to its original screen.
- To turn off the device, keep press the power button  till there is beep sounds then take the hand off. When you hear another beep sound, the power is off.

4.3. After Using the Device

- Using the power switch  turn off the power, unplug the power cable.
- When unplug a power cable, always hold a plug, not the cable. Especially care when unplug DC adapter cable connected to the device.
- Remove a power cable from an outlet when you're not using the device for a long time.
- Follow precautions of this manual for storage.
- Maintain all parts and cables clean and arranged for next use.
- Keep the device clean to not disturb using next time.
- Do not tamper or open the product. The manufacturer is not liable for damages caused by such action.
- Do not plug AC power cord to an outlet before all parts are connected completely. There is a risk of harming the device.

- Do not use organic solutions such as alcohol, thinner, benzene, etc. to clean a surface of this product. It may damage the product
- In case of not using the device for a long time, please put a dust cover on the device after plugging off.
- When move the device, always turn off the power, disconnect DC adapter cable connected to the device, and hold firmly with both hands.

5. Precautions

5.1. Precautions for Use

When using this device, please be aware of the followings.

- Avoid places where ambient temperature is too low or too high for normal operation.
- Check the overall status of the device and any abnormality in the examinee persistently.
- If any abnormality is observed, the operator is required to take appropriate measures such as stop the operation of the device and let the examinee in a safe and stable condition.
- Keep an examinee untouch the device.
- During an examination by this device, maintain the examinee in upright and correct position.
- Carefully handle the device so as not to give impact on it or make it fall down.
- Use the device under properly controlled ambient illumination. It could affect the test result.
- To connect this device with other product, contact the dealer you purchased the device.
- During the operation, if the device makes smokes, sparks, strange noises or odors, immediately turn off and unplug the power. Contact the dealer you purchased the device.

5.2. Precautions for Installation

When install this device, should be aware of the followings.

- Avoid places where the device is exposed to water vapor or moisture directly.

- Avoid places where the device could be affected by atmospheric pressure, humidity, temperature, ventilation, sunlight or by the air containing dust, salinity, sulfur and etc..
- Install the device on a place stable and leveled
- Avoid places where the device is subject to excessive shocks or vibrations.
- Avoid places where the device is exposed to chemicals or flammable gases.
- Avoid places near a heating equipment.
- Avoid places with high humidity or disturbing heat dissipation.
- Be careful for the rated voltage (or rated power) when install.
- Install the device with the proper ground connection.
- Check if overall cables are connected completely. Especially DC adapter to the device. Use a cable tie to fix the DC adapter cable to keep it from unplugging.
- Using the devices jointly could result a risk.

NOTE

Fix the cable connecting the device and DC adapter to make it stable.

**WARNING**

On a place tilted more than 10 degree, the device might fall to the side. Always install the device on flat area.

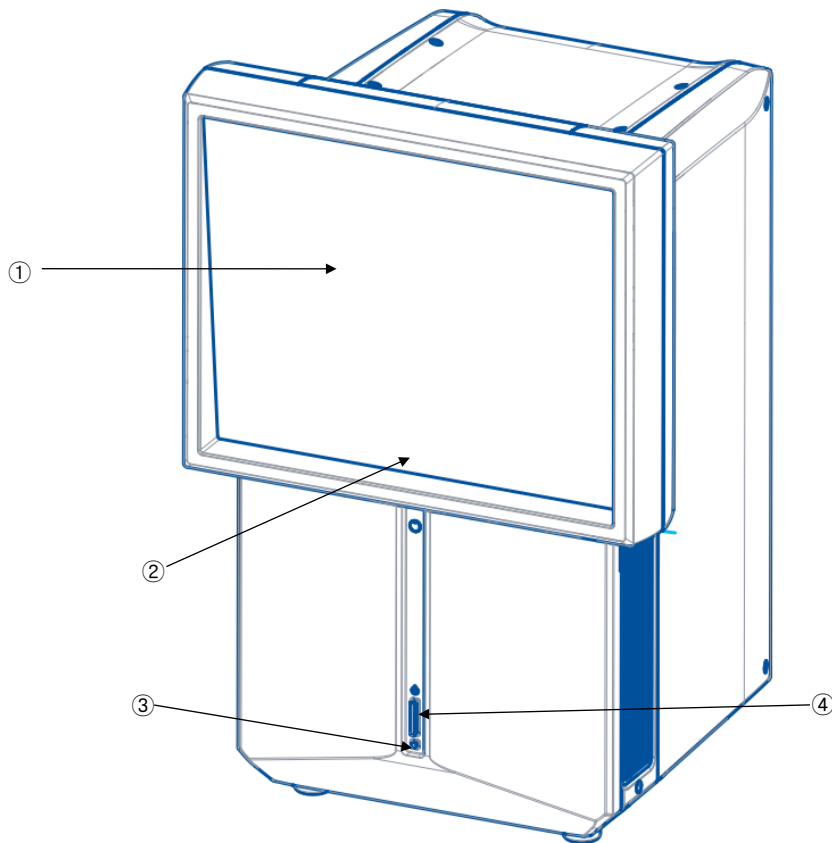
5.3. Precautions for Stroage

When sotre this device, please note the belowings.

- Avoid places where the instrument is exposed to water vapor or moisture directly.
- Avoid places where the instrument is exposed to direct sunlight.
- Avoid places where the temperature changes extremely.
- Avoid places near heating devices.
- Avoid places with high humidity or disturbing heat dissipation.
- Avoid places where the device is subject to excessive shocks or vibrations.
- Avoid places where the device is exposed to chemicals or flammable gases.
- Keep dust or metallic objects from getting into the inside.

6. Configuration

6.1. Main Body



1) LCD WINDOW

It displays charts, menu and other information.

2) IR Signal Receiver Window

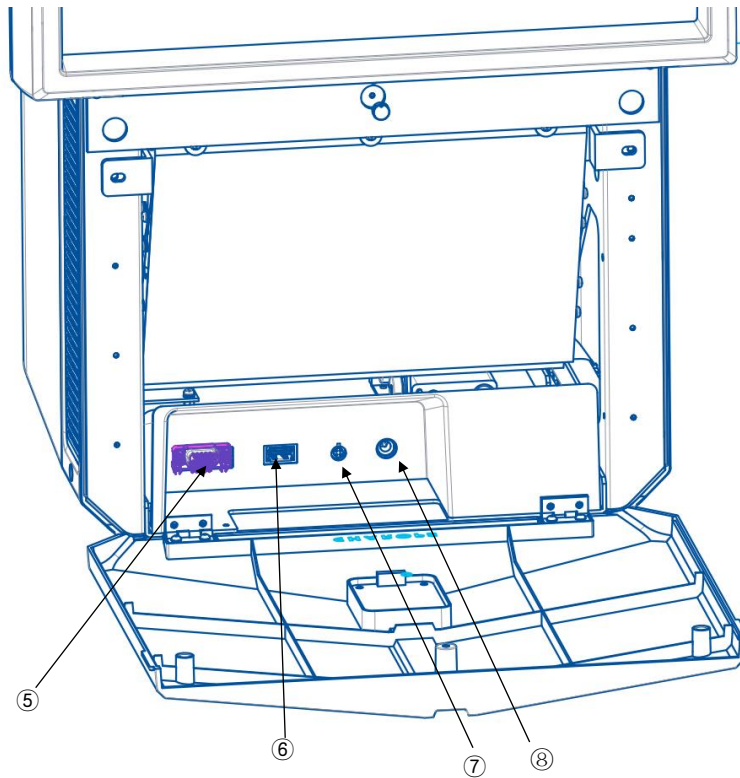
Receive remote controller signal through this window (Do not block this window. Remote signal will be affected)

3) OPERATION LED

Indicates the operating status of the device.

4) POWER SWITCH

Power ON/OFF switch.



5) EXTERNAL VGA PORT

VGA port for external screen. User can see the same screen with what patient is watching. (For polarized charts, only half of it is displayed)

6) USB PORT

Display images or video clips of USB stick inserted on this port. Maximum 396 images/Video clips are available.

7) CAN PORT

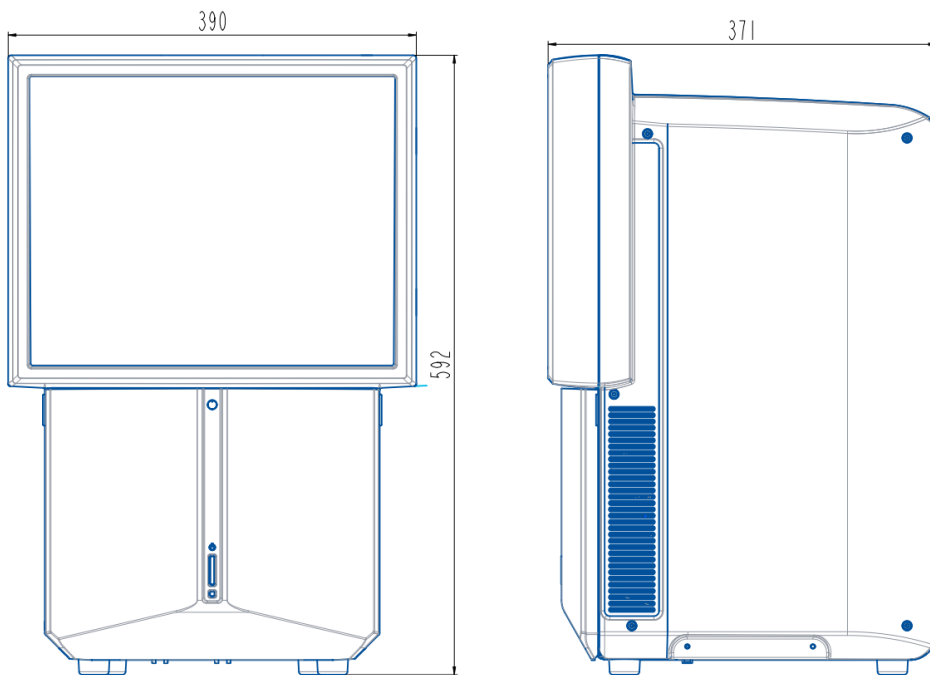
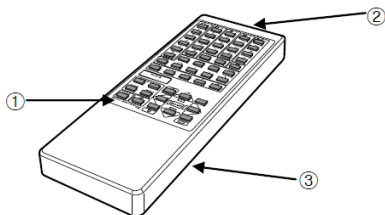
Connect other devices such as Shanghai HUVITZ auto phoropter.

8) POWER INPUT

Connect DC adaptor for main power

**WARNING**

Do not cover ventilation slits. Overheating can cause a product malfunction.

**6.2. Remote Controller****1) BUTTONS**

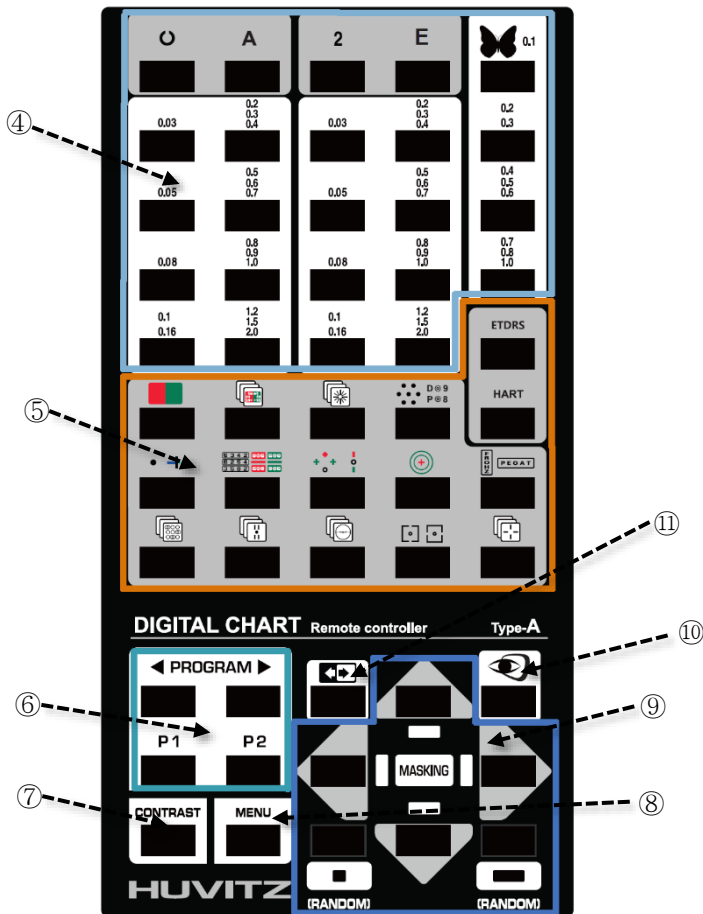
Buttons to excute chart, mask, program, menu, etc.

2) IR SIGNAL WINDOW

IR signal is transmitted through this window. (Do not block this window for normal operation)

3) BATTERY

It is in the back of the remote controller. Open the battery cover to replace battery (AA 1.5V, 2ea). After change batteries the IR channel of remote controller reset to default cahnnel 1.































4) CHART BUTTON

Display charts for visual acuity test.



BUTTON	FUNCTION
0	Randolph Ring (0.03~2.0)
A	Alphabet (0.03~2.0)
2	Numbers (0.03~2.0)
E	Snellen E (0.03~2.0)
0.1	Figures for Children (0.1~1.0)

Function Chart

Charts for polarizing test are displayed differently on the display panel depending on the chart model

BUTTON	FUNCION	LENS	CHART
	Red/Green Filter		
	Red/Green Test, Cross grid Test for distance	Polar, Cross Cylinder	
	Astigmatism Test	Polar	
	Cross cylinder Test	Cross Cylinder	
	Maddox rod Test	Maddox rod	
	Binocular balance Test	Polar	
	Worth 4 dot Test, Dominant eye Test	Red/Green	
	Phoria Test	Red/Green	
	Horizontal/Vertical phoria Test	6BU prism, 10BI prism	
	Minutes Stereo Test	Polar	
	Stereo Test	Polar	
	Stereo Test	Polar	
	Phoria and aniseikonia test	Polar	
	Phoria Test	Polar	

5) Program Button

BUTTON	FUNCTION
	Executes the previous step of executing program
	Executes the next step of executing program
P1	<ul style="list-style-type: none"> ▪ Executes the first step of the program PGM 1 ▪ Pressing the button 3 times in a row executes programming PGM1
P2	<ul style="list-style-type: none"> ▪ Executes the first step of the program PGM 2 ▪ Pressing the button 3 times in a row executes programming PGM2







6) Contrast Adjusting Button

This button adjusts the contrast sensitivity of charts. Each button pressing change contrast by one step.

7) Menu Button




Run menu mode

8) Mask Selection and Moving Button


BUTTON	FUNCTION
	<ul style="list-style-type: none"> ▪ Display a character in the first row and line ▪ In Menu Mode, it acts as selection button.
	<ul style="list-style-type: none"> ▪ Display middle line of a chart. ▪ In Menu Mode, it is cancel or exit button.
	<ul style="list-style-type: none"> ▪ Move mask to one line up. ▪ When no mask is selected, display the first line of a chart ▪ In Menu Mode, it is for increasing values.
	<ul style="list-style-type: none"> ▪ Move mask to one line down. ▪ When no mask is selected, display the last line of a chart ▪ In Menu Mode, it is for decreasing values.
	<ul style="list-style-type: none"> ▪ Move mask to one row left. ▪ When no mask is selected, display the first row of a chart ▪ In Menu Mode, it is for moving to left.
	<ul style="list-style-type: none"> ▪ Move mask to one row right. ▪ When no mask is selected, display the last row of a chart ▪ In Menu Mode, it is for moving to right.

* When you use a phoropter connected to this device, if moving buttons of a remote controller are pressed then the mask changes and it will not match with the one on the control panel.

9) Remote Controller Channel Button

BUTTON	FUNCTION
	Press this button to adjust up/down angle of the screen. Arrows appear to indicate tilting mode is activated. Use mask up/down button to move the screen. When it is aligned with a patient, press this button again to exit from the tilting mode. New screen angle is saved automatically when exit.
	<ul style="list-style-type: none"> While pressing  button, press  button changes channel of remote controller

10) Reverse Background Color Button

BUTTONS	FUNCTION
	<ul style="list-style-type: none"> Reverse background color

NOTE

When you change the background color to black, lights could be spread to the around of screen or white pixels might be appeared.

7. Installation

7.1. Preparation

Before installing this device, carefully check the followings in advance.

- Product's model name
- Accessories – refer accessory list
- Foreign material on the screen

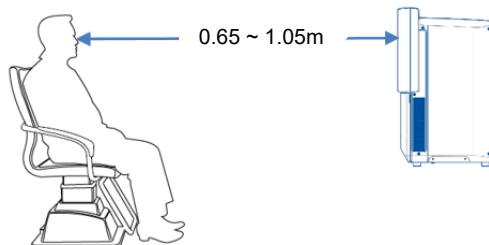
After complete checking, fully understand user manual then begin install by following procedure.

7.2. Installing the Main Body

- ① Place the device on a flat and stable area.
- ② Set the distance between patient and the device by refer below picture.
- ③ Connect DC adapter cable with the device. Then plug AC power cable in.

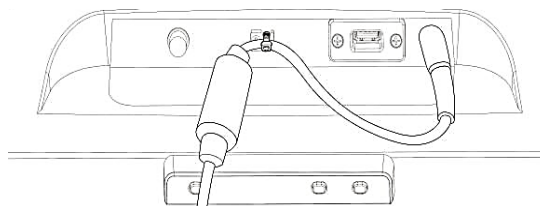
NOTE

To find the best screen angle, first select any polarized chart then find an angle showing the smallest afterimage of the chart.



NOTE

To prevent pulling out the DC adapter cable, use a cable tie fix it.



7.3. Configuration

When the installation is complete, turn on the power and set configuration.

After initialization, basic chart is shown on the screen. Press menu button and configure test environment. Detail information is in the next chapter.

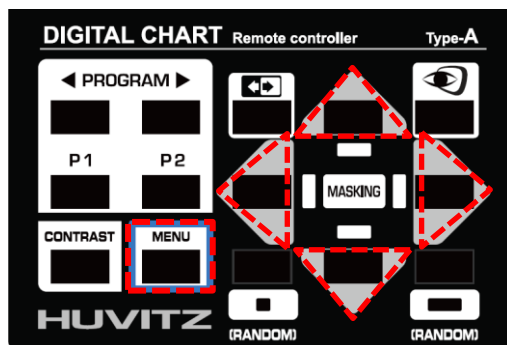
7.4. Connection with Digital Refractor

This device can be connected to Shanghai HUVITZ or HUVITZ Digital Refractor. For wired connection it supports CAN communication. For wireless connection it supports IR, WIFI and BLUE TOOTH connection. For more information refer Digital Refractor user manual.





8. Using Menu Mode and Functions

8.1. Executing and Operating the Menu Mode


In the menu mode you can change options of the device, use a vision test and play image/video files. Press MENU button on the remote controller to enter to the menu mode.




① Moving the Menu

Use     buttons to move cursor to the direction each buttons are pointing.

② Selecting the Menu

Press  button to set or select the menu item.

③ Back to the Previous Page

When there is no back button, press  button instead. It will exit the current menu or back to the previous page.

8.2. Functions in the Meun Mode

Below functions are provided in the menu mode.

- Vision Test
Color test, Contrast test
- Movie / Photo
Management for user designated image/video clips.
- Setting
Chart and device settings

8.2.1. Vision Test

Vision test is consist of Color test and Contrast test

■ Color Test

Color test adopted Hahn Pseudoisochromatic Plates which was introduced by Dr Hann.

Hahn Pseudoisochromatic Plates is composed of two tests, first test is Color Sensing Abnormality Detecting Test and the second test is Color Sensing Abnormality Grading Test. The second test is conducted only when sensing abnormality is suspected. This test is proceeded according to the patient's answer for color charts on the screen, when the test completes it shows the final result.

Color charts have 12 screening charts and 9 class&grade charts When it determines abnormal color vision, it categorizes them to the first abnormal(Weak Red) and the second abnormal(Weak Green) then shows grades.

NOTE

Color Test must be executed in the condition where you can see the screen clearly. When examinee can read a number in 3 second, and can draw a curved line in 10 second, it can be considered as correct answers.

CDC-1 Color Vision Test would not produce the same result owing to the property of LCD panel. Use CDC-1 test result as examinee's guide and if necessary consult with an eye specialist.

■ 12 Screening Charts

Below table shows how the numbers on each chart will be seen by patients having different color sensing level.


Name	Normal	1,2 Color Defective	3 Color Defective	Color Weakness / Blindness
Chart – 1	15	15	15	15
Chart – 2	5	3	5	X
Chart – 3	75	16	75	X
Chart – 4	8	5	8	X
Chart – 5	48	13	48	X
Chart – 6	6	X	6	X
Chart – 7	20	X	20	X
Chart – 8	7	X	7	X
Chart – 9	X	5	X	X
Chart – 10	66	66	X	X
Chart – 11	O	X	O	X
Chart – 12	O	X	O	X

- Screening Test

Start to find color vision abnormality. Ask a question on the screen

After the examinee answers, press  button to see a list of possible answers

Use  button to select patient's answer from the list. And press  to confirm.

Use  button to move to the next/previous chart.

If select a document shape icon, it skips the test and go to the result screen.

- 9 Class & Grade Charts

Below table shows how the numbers on each chart will be seen by patients having different color sensing level. By comparing the patient's answer with this table, you can judge the kind and seriousness of sensing abnormality.

Name	Normal	1 Strong	2 Strong	1 Mid	2 Mid	1 Weak	2 Weak
Chart – 13	52	2	5	52	52	52	52
Chart – 14	96	6	9	96	96	96	96
Chart – 15	26	X	X	6	2	26	26
Chart – 16	72	X	X	2	7	72	72
Chart – 17	65	X	X	X	X	5	6
Chart – 18	47	X	X	X	X	7	4
Chart – 19 (Curve)	Up/Down	Down	Up	Up/Down	Up/Down	Up/Down	Up/Down
Chart – 20 (Curve)	Up/Down	X	X	Up	Down	Up/Down	Up/Down
Chart – 21 (Curve)	Up/Down	X	X	X	X	Down	Up

- Class & Grade Test

Start test to find color vision abnormality grade. It classifies seriousness of Weak/Red and Weak/Green to 3 groups respectively. The order of chart showing is made that as having strong abnormal symptom as easily get wrong. So when answered wrong in the first questions you can skip other charts and go to the result screen.



■ Contrast Test

This test is designed to measure the ability of recognizing an object in surroundings having a low illumination or similar colors. Usual acuity test uses charts consist of black dark letters seen clearly against high illumination of white background. However in the real world, the contrast between objects and backgrounds are close to grey, even with good eye sight if contrast sensitivity is low there may be a problem of recognizing an object.

This test is composed of **Contrast Letter Test** which uses characters to check level of contrast that patients can sense and **Contrast Sensitivity Test** which uses bar-shape charts made of various periods of sine pattern by considering that according to resolution of object, the sensitivity of contrast is differ.

▪ Contrast Letter Test






Use  button to change the size of charts. Use  button to change its contrast by 0.1 log unit.

▪ Contrast Sensitivity Chart



It shows contrast sensitivity and cycle/degree for contrast test.

Use  button to change pages and check contrast sensitivity cycle/degree of next level.

Use  button can select BACK menu on the bottom of screen. At this button Press  or  to back to main menu.

▪ Contrast Sensitivity Test


Begin contrast test using sine patterned charts.


Ask patient which chart on bottom is similar with the one in the middle. Use  button select the chart that patient choose. Then press  to confirm.


After test is complete, contrast sensitivity and spatial frequency are shown as result.

8.2.2. Movie/Photo

In this mode you can load image/video clip from internal memory or external USB.

Use arrow buttons of remote controller select this function and press  to execute.

Use arrow buttons to select image/video file want to play and press  to select. A box will appear around the image/video to indicate that it is selected.



Use arrow buttons to select other functions such as play or next page. Press  button to execute.

NOTE

- Contents of internal memory are uneditable. Use USB stick for user image/video.
- Name of USB stick should use english
- In USB stick, only less than 2GB size of Video files are available.
- Only support **avi**, **mp4** file format.
- Depending on file size, waiting time for opening is vary. Do press remote controller button and please wait.

8.2.3. Setting

■ IR Channel

- ✓ Change IR channel
- ✓ If changed IR channel in the device, need to change the channel of remote controller too.
- ✓ To change remote controller IR channel, while pressing  button, press  button. Channel will change in 1→2→3→4→5→6→7→8→9→10→1 order for each pressing.
- ✓ When you change IR channel of remote controller, the screen displays current IR channel in "Received IR Channel" section.

■ Chart Option

- ✓ Enable/Disable color reverse function.

■ Optotypes

- ✓ Set the distance between letters
- ✓ Enable/Disable random chart

■ VA Notation

- ✓ Select diopter units shown next to charts

■ Contrast

- ✓ Set options about contrast
- ✓ By changing Level values, can determine how much contrast changes per each button pressing

■ Red/Green Adjustment

- ✓ Red/Green chart setup
- ✓ Adjust color balance and hue of red/green filter

■ Sleep Mode

NOTE

- In menu mode, the sleep mode is disabled.
- When set to use internal movie, the screen may blink at the first scene of video repeating
- Files in external USB stick cannot be used for sleep mode.
- By pressing a button of remote controller or control panel of digital refractor, it exits from sleep mode

■ Wi-Fi

Set Wi-Fi to connect to Huvitz Co. Ltd Phoropter

Press "Scan" button to find Wi-Fi supporting device around.

NOTE

- Recommend to install AP or wireless repeater in test room
- Weak AP signal may affect communication between devices.

■ TCP/IP

Set DHCP/Static mode

NOTE

- This option is only active when Wi-Fi setting is On
- Before set fixed IP, check IP bandwidth in DHCP mode.

■ Web service

In this screen set Wi-Fi connection to Huvitz Digital Refractor.

- DR Connector : Enable/Disable HDR or CDR connection

NOTE

- When connect to HDR through Wi-Fi(AP) make setting as below.

(If the setting is wrong, devices may not work)

- HDR Setting

Wi-Fi: ON

Send Wifi Chart: ON

: When it is Off, set CDC-1 off too (DR connect –Off)

Chart IP Address: Input the same address of CDC Web service - DR connect – Address

- CDC Setting

Wi-Fi: ON

DR connet: On

: When it is OFF, set HDR off too (Send Wifi Chart – Off)

■ Preference

Select Digital Refractor connected to this device

Adjust the size of polarized chart in %

NOTE

- When use CAN port to connect with Huvitz Digital Refractor, need to select correct refractor type.
- Use CAN cable provided by Shanghai HUVITZ
- For more information, please refer user manual of digital refractor.

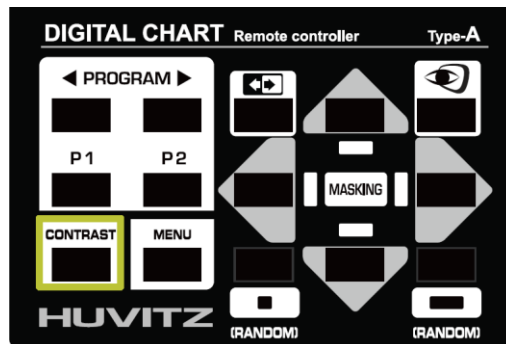
■ About

Display license information and SW version

8.3. Other functions

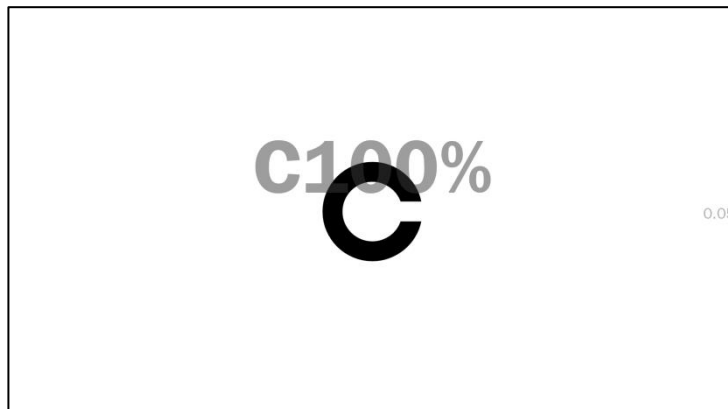
8.3.1. Adjusting Contrast Sensitivity

Charts are displayed with default contrast set in contrast menu. To change contrast during test, press CONTRAST button on remote controller



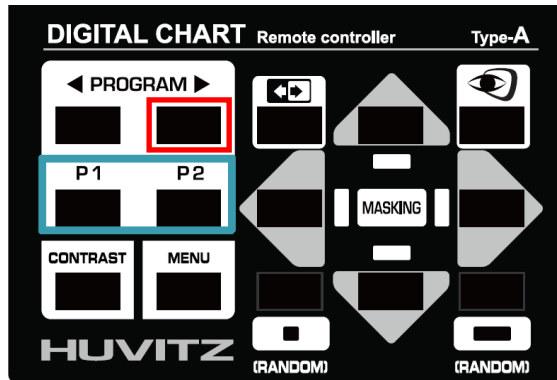
When press contrast button, new contrast value appears for a short time.

The amount of contrast changing per each button input can be set in the Level section of contrast mode setting.



8.3.2. Edit User Program

P1 and P2 buttons of remote controller execute charts in the order of previously programmed. At first P1 has a default program and P2 is empty. Both P1 and P2 can be newly programmed by user.



How to edit P2 program

- ① Press P2 button 3 times, the screen displays "Programming PGM2"
- ② Select one chart then press right side button of ◀PROGRAM▶ to save.
- ③ Select the next chart then save it in the same way with ②
- ④ By repeating above, save charts want to use
- ⑤ Finally press P2 button to exit program edit.

How to use P2 program

- ① Press P2 button one time. It will show the chart first saved.
- ② To see the 2nd saved chart, press the right side button of ◀PROGRAM▶
- ③ Each time press right button of ◀PROGRAM▶, the next chart appears.
Left side button of ◀PROGRAM▶ displays the previous chart.
- ④ During running the program, you can press any other chart that is not saved in the program. To return and continue the program, just press the right side button of ◀PROGRAM▶

8.3.3. Set Remote Controller IR Channel


Once you change IR channel in configuration menu, the remote controller used just before doesn't work anymore. It is because IR channel of the device and remote controller are not match. In this case, have to change IR channel of remote controller to the same channel of the device.

When change IR channel of remote controller, it is convenient to change the channel in IR channel menu. For details, refer IR Channel section of this manual.


If you are not in IR channel menu, it is impossible to check which IR channel the remote controller is in. In this case press any key after changing the channel of remote controller. When the device reacts to the remote signal, then it means both channels are matched.

9. Optometric Test Using the Acuity Tester


9.1. Cylinder Axis Test

Title	Content
Purpose	To determine the correcting astigmatic axis roughly.
Chart	
Aux. Lens	None
Procedure	<ol style="list-style-type: none"> ① Occlude one eye that's not to be examined. ② Add spherical lens power as much as the patient can read numbers around the chart. ③ Ask the patient if any direction is seen thicker. ④ If all the directions are seen even, there is no astigmatism exists. Otherwise thickest direction is astigmatic axis.


9.2. Cylinder Power Test

Title	Content
Purpose	To determine the correct cylinder power
Chart	
Aux. Lens	None
Procedure	<ol style="list-style-type: none"> ① Occlude one eye that's not to be examined. ② Add cylinder power until the patient sees all the directions evenly. ③ If the thickest direction changes by adding cylinder power, adjust the cylinder axis together. <ul style="list-style-type: none"> - Plus the axis if the thickest direction changes in clockwise. - Minus the axis otherwise.







9.3. Binocular Cylinder Axis Test

Title	Content
Purpose	To determine the correcting astigmatic axis roughly.
Chart	
Aux. Lens	Polarized filter
Procedure	<ol style="list-style-type: none"> ① Add spherical lens power as much as the patient can read numbers around the chart. ② Ask the patient if any direction is seen thicker. ③ If all the directions are seen even, there is no astigmatism exists. Otherwise thickest direction to get astigmatic axis.



9.4. Binocular Cylinder Power Test

Title	Content
Purpose	To determine the correcting cylinder power
Chart	
Aux. Lens	Polarized filter
Procedure	<ol style="list-style-type: none"> ① Add cylinder power until the patient sees all the directions evenly. ② If the thickest direction changes by adding cylinder power, adjust the cylinder axis together. <ul style="list-style-type: none"> - Plus the axis if the thickest direction changes in clockwise. - Minus the axis otherwise


9.5. Red/Green Test

Title	Content	
Purpose	To determine the correcting spherical power	
Chart	  	
Aux. Lens		None
		Polarized Filter
		Cross Cylinder(Fixed at 90°)
Procedure	<ol style="list-style-type: none"> ① (Occlude one eye that's not to be examined). ② Add about 0.5D for fogging if necessary. ③ Ask the patient which side looks clearer, on the green or on the red. Add plus or minus power until the patient sees the both side the same. <ul style="list-style-type: none"> - Add plus power if the letters on green side is clearer. - Add minus power if the letters on red side is clearer. ③ (Cross Cylinder) Ask the patient if the horizontal lines and the vertical lines are the same in thickness. <ul style="list-style-type: none"> - Increase the spherical power by 0.25D if the horizontal lines are thicker. - Decrease the spherical power by 0.25D if the vertical lines are thicker. 	


9.6. Cross Cylinder Test for Axis

Title	Content	
Purpose	To refine the correcting cylinder axis	
Chart	 	
Aux. Lens	Jackson Cross Cylinder (± 0.25 or ± 0.50)	
Procedure	<ol style="list-style-type: none"> ① Occlude one eye that's not to be examined. ② Place the JCC lens before the eye such that its axes straddle at 45 degrees angles the correcting cylinder axis. ③ Find the exact cylinder axis by repeating circulating the JCC lens and asking the patient which view is sharper or less blurry until the two views are the same in sharpness. <ul style="list-style-type: none"> - Plus the axis if the view before circulation is sharper. - Minus the axis if the view after circulation is sharper. 	


9.7. Cross Cylinder Test for Power

Title	Content
Purpose	To refine the correcting cylinder power
Chart	
Aux. Lens	Jackson Cross Cylinder(± 0.25 or ± 0.50)
Procedure	<ol style="list-style-type: none"> ① Occlude one eye that's not to be examined. ② Place the JCC lens before the eye such that its axes straddle at 90 degrees angles the correcting cylinder axis. ③ Find the exact cylinder power by repeating circulating the JCC lens and asking the patient which view is sharper or less blurry until the two views are the same in sharpness. <ul style="list-style-type: none"> - Decrease the cylinder power by -0.25 if the view before circulation is sharper. - Increase the cylinder power by -0.25 if the view after circulation is sharper.


9.8. Binocular Balance Test

Title	Content
Purpose	To equalize the accommodative stimulus for two eyes
Chart	
Aux. Lens	Polarized Filter
Procedure	<ol style="list-style-type: none"> ① Open the both eyes. ② Place the polarizing filters before the eyes, 135 degree on the right and 45 degree on the left. ③ Fog the both eyes by +0.5D. ④ Ask the patient if the clearness of the top line and the bottom line is equal. <ul style="list-style-type: none"> - Add +0.25D on the right if the top line is clearer - Add +0.25D on the left if the bottom line is clearer


9.9. Dominant Eye Test for Patients with Phoria

Title	Content
Purpose	To determine the dominant eye of the patient with heterophoria
Chart	
Aux. Lens	Red/Green
Procedure	<ol style="list-style-type: none"> ① Open the both eyes. ② Place the red filter before the right eye and the green filter before the left eye. ③ Ask the patient which bar is along with the central dot, red or green.


9.10. Worth 4 Dot Test

Title	Content
Purpose	To Check the fusion and suppression
Chart	
Aux. Lens	Red/Green
Procedure	<ol style="list-style-type: none"> ① Open the both eyes. ② Place the red filter before the right eye and the green filter before the left eye. ③ Ask the patient how many targets he or she is seeing.


9.11. Polarized Cross Test

Title	Content
Purpose	To measure the lateral and vertical phoria.
Chart	
Aux. Lens	Polarized Filter
Procedure	<ol style="list-style-type: none"> ① Open the both eyes. ② Place the polarizing filters before the eyes, 135 degree on the right and 45 degree on the left. ③ Add prism before the eyes until a patient sees the horizontal and vertical lines aligned.


9.12. Fixation Disparity Test

Title	Content
Purpose	To measure the fixation disparity
Chart	
Aux. Lens	Polarized Filter
Procedure	<ol style="list-style-type: none"> ① Open the both eyes. ② Place the polarizing filters before the eyes, 135 degree on the right and 45 degree on the left. ③ Add prism before the eyes until the patient sees the lines aligned




9.13. Coincidence Test

Title	Content
Purpose	To check the aniseikonia and measure the lateral and vertical phoria
Chart	
Aux. Lens	Polar
Procedure	<ol style="list-style-type: none"> ① Open the both eyes. ② Place the polarizing filters before the eyes, 135 degree on the right and 45 degree on the left. ③ Check the coincidence of right and left bracket


9.14. Schober test

Title	Content
Purpose	To measure the lateral and vertical phoria
Chart	
Aux. Lens	Red/Green
Procedure	<ol style="list-style-type: none"> ① Open the both eyes. ② Place the red filter on the right and green filter on the left. ③ Add prism before eyes until the patient sees the cross in the center of the circles

9.15. Von Graefe Test

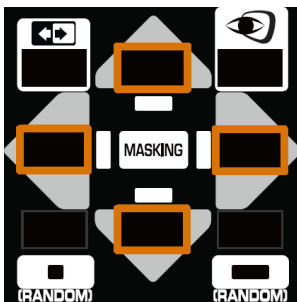
Title	Content
Purpose	To measure the phoria
Chart	
Aux. Lens	 6 BU split prism before right eye
	 10 BI split prism before left eye
Procedure	<ol style="list-style-type: none"> ① Open the both eyes ② Place the proper prism before eye. ③ Add prism before eyes until the patient sees the two bars aligned



9.16. Maddox Rod Test & Thorington Test


Title	Content	
Purpose	To measure the phoria	
Chart		
Aux. Lens	Vertical Maddox Rod Test	Vertical Maddox Rod on right
	Horizontal Maddox Rod Test	Horizontal Maddox Rod on left
Procedure	<ol style="list-style-type: none"> ① Open the both eyes. ② Place the proper lens before eye. ③ Add prism before eyes until the patient sees the dot and bar aligned 	


If you press the Maddox & Thorington  button, the LED light on the screen will be turned on.

You can control the LED light by the direction button of the remote controller as below.

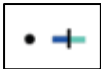


Button	Function
	Selecting between the upper LED light and the right LED light.
	Adjusting the brightness of the LED light


If pressed a button other than , LED is turned off.

Use the  button to turn on the LED again.


If you want to turn off the LED light while the chart ( ) is on, press  button.

By pressing the  button, you can turn on the LED again.

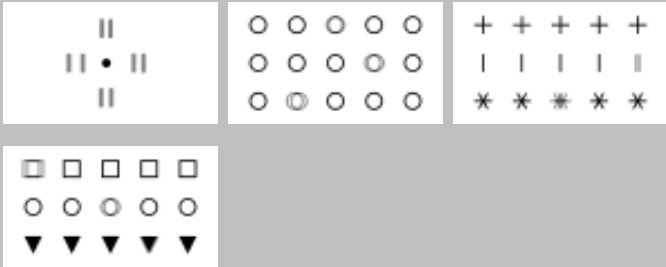
9.17. Zeiger Test

Title	Content
Purpose	To measure the phoria
Chart	
Aux. Lens	Polar
Procedure	<ol style="list-style-type: none"> ① Open the both eyes. ② Place the polarizing filters before the eyes, 135 degree on the right and 45 degree on the left. ③ Add prism before eyes until the patient sees the lines and gradations aligned.

9.18. Stereo Test

Title	Content
Purpose	To check the stereoscopic vision
Chart	
Aux. Lens	Polar
Procedure	<ol style="list-style-type: none"> ① Open the both eyes. ② Place the polarizing filters before the eyes, 135 degree on the right and 45 degree on the left. ③ Ask the patient if the patient can see the chart as stereopsis.

9.19. Minute Stereo Test

Title	Content
Purpose	To measure the fine depth perception of stereoscopic vision.
Chart	 <p>The chart displays three sets of symbols arranged in a 3x3 grid. The top row contains three groups of symbols: a central dot flanked by vertical bars, a 3x5 grid of circles, and a 3x5 grid of plus signs. The middle row contains a 3x5 grid of squares, a 3x5 grid of circles, and a 3x5 grid of asterisks. The bottom row contains a 3x5 grid of downward-pointing triangles, a 3x5 grid of circles, and a 3x5 grid of asterisks.</p>
Aux. Lens	Polar
Procedure	<ol style="list-style-type: none"> ① Open the both eyes. ② Place the polarizing filters before the eyes, 135 degree on the right and 45 degree on the left. ③ Ask the patient if the which bars(which symbols) are distinguished in depth.

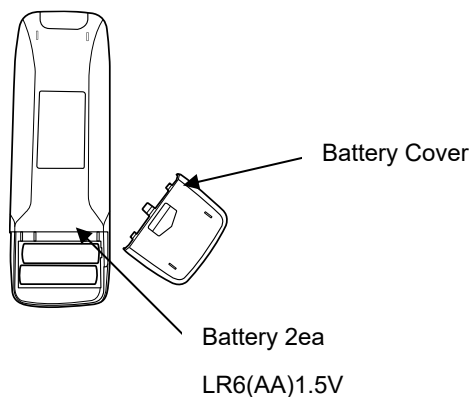
10. Maintenance

10.1. Replacement battery

- ① Slide open the battery cover of remote controller.
- ② Replace old battery to the new one and close cover.

NOTE

Please make sure the direction of (+), (-).
Use battery LR6(AA) 1.5V .



10.2. Cleaning

- ① Sweep the outer surface and front window with soft fabric material.
- ② When you do not use this device, store it with dust cover.

10.3. Disposal




CAUTION

When you dispose the device and accessory kit, Comply with related law and recycling plan.
Disposal of Lithium battery can cause the environmental pollution.
When you dispose the packing material, Comply with related law and recycling plan.

11. Trouble Shooting

11.1. Pressed power switch but the screen doesn't work

- ① Check DC adapter cable to the device. When the cable is not completely plugged in, it doesn't turn on.
- ② Check AC cable is plugged on power outlet. Check power outlet switch if it has one.
- ③ Press power switch  and check if there is product logo on the screen.
- ④ If the problem still exists, contact the local distributor you purchased this device.

11.2. Chart displayed as broken image

- ① Mainboard may be defected. Contact the local distributor for replacement parts.

11.3. Main body doesn't response to remote controller

- ① Check if the remote is installed with standard batteries. Refer to the label on the back of the remote for the size and type information of the battery.
- ② Replace batteries with new ones. Batteries could have been discharged.
- ③ Check IR channel of the remote controller. The channel should be identical with that of the main body.
 - ✓ Try each channel by changing them in the setup menu.
(Refer to the 8.3.3. section of User Manual)
- ④ If the problem persists after checking above, contact the local distributor you purchased this device.

11.4. The screen is too bright or too dark

- ① "Contrast" or "background adjust" button can be pressed not properly. Execute the menu mode and set proper settings. (Refer to a configure section in user manual)
- ② If the brightness is not suitable without changing contrast or background shade, it may be influence of surroundings. Adjust contrast for testing environment.
- ③ If the problem persists after checking the above procedure, contact the local distributor you purchased this instrument..

11.5. Visual acuity test results in overcorrection or undercorrection

- ① The test distance could be changed. Measure the test distance and adjust it to within the specification of this device.

11.6. Red/Green test is overcorrection or undercorrection

- ① When it is possible to adjust the brightness of inspection room. Adjust it properly.
- ② Check the wavelength balance of red/green chart. The ambient illumination may affect the test result. In setup menu adjust the red/green balance.

11.7. Red/Green filter is not filtering completely

- ① When Red/Green chart color doesn't match with the Red/Green filter glass, the opposite color may be seen. Please in setup menu adjust Red/Green color

11.8. Polarizer test is not working

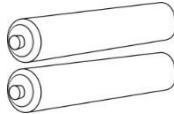
- ① If a patient is not in the front of the device or stand aside, polarized filter might be less effective. Please check patient's position

12. Accessories

①



②



③



④



⑤



①	Remote Controller	1ea
②	Batteries(AA)	2ea
③	DC Adapter and Power Cable	1ea each
④	User Manual	1ea
⑤	Dust Cover	1ea

13. Product Specification

LCD Type	Color TFT-LCD
Resolution	800x3(RGB) x 480
White Luminance	200+-20
Chart window size	178*130
DC Adapter	Input:100-250 V~, 1.5-0.75 A, 50-60 Hz Output:12V 5A
Power Consumption	12.5W Max
Size	640(L)*580(W)*780(H)
Weight	22kg
Test Distance	0.85m +- 0.2m
External Port	USB(Memory Stick), CAN, VGA
Communication	<ul style="list-style-type: none"> ▪ Wire(CAN) – HDR-7000 / HDR-9000 , CDR-7000, CDR-9000 ▪ Wireless(IR) – Remote Controller, HDR-7000 / HDR-9000 ▪ Wi-Fi (IEEE802.11b 2.4GHz) – HDR-9000 ▪ Bluetooth
RF Power	<ul style="list-style-type: none"> ▪ Wi-Fi 11b ≤15.59 dBm ▪ Wi-Fi 11g ≤11.83 dBm ▪ Wi-Fi 11n ≤10.94 dBm ▪ Bluetooth ≤6.58 dBm
Charts	<ul style="list-style-type: none"> ▪ Landolt Ring, Alphabet, Number, Tumbling E ▪ Figures for Children ▪ Functional Chart (Red/Green, Cross Cylinder, Binocular Balance, Fusion Suppression, Phoria, Aniseikonia, Streopsis)

Masking Filter	<ul style="list-style-type: none">▪ Dot, Row, Column▪ Red/Green Filter
Software version	V1.0.0
Hardware version	V100A

14. EMC information

Manufacturer announcement – electromagnetic waves trouble

Electromagnetic waves trouble	
CDC-1 should be used in the below mentioned electromagnetic wave environment. CDC-1 purchaser or user needs to confirm whether CVS is used in this type of environment.	
Trouble test	Question of appropriateness
RF emissions CISPR 11	Group 1
RF emissions CISPR 11	Class B
Harmonic emissions IEC 61000-3-2	Class A
Voltage fluctuations/flicker IEC 61000-3-3	Complies

Manufacturer announcement – electromagnetic waves tolerance

electromagnetic waves tolerance		
CVS is to be used in the below designated electromagnetic wave environment. CVS customer and user need to guarantee that the CVS will be used in this type of environment.		
Tolerance test	IEC 60601 test level	Appropriateness level
Electrostatic discharge(ESD) IEC 61000 - 4 - 2	Contact-Direct ± 8 kV Contact-Indirect ± 8 kV	Note1)* direct ± 8 kV indirect ± 8 kV
Electric rapid transients/burst IEC 61000 - 4 - 4	power supplying line ± 2 kV input/output line ± 1 kV	power supplying line ± 2 kV input/output line ± 1 kV
Surge IEC 61000 - 4 - 5	between lines ± 1 kV between line and grounding ± 2 kV	differential mode ± 1 kV common mode ± 2 kV
Voltage dip, instantaneous interruption, voltage fluctuation at the power input line IEC 61000 - 4 - 11	For 0.5 cycle $< 5\% UT(UT's > 95\% \text{ decrease})$ For 5 cycle $40\% UT(UT's 60\% \text{ decrease})$ For 25 cycle $70\% UT(UT's 30\% \text{ decrease})$ For 5 seconds $< 5\% UT(UT's > 95\% \text{ decrease})$	For 0.5 cycle $< 5\% UT(UT's > 95\% \text{ decrease})$ For 5 cycle, $40\% UT(UT's 60\% \text{ decrease})$ For 25 cycle, $70\% UT(UT's 30\% \text{ decrease})$ For 5 seconds, $< 5\% UT(UT's > 95\% \text{ decrease})$
Power frequency magnetic field (50/60 Hz) IEC 61000 - 4 - 8	30 A/m	30 A/m

Other UT is the a.c. power voltage for before approving the test level.

Note1)* ESD Test will be conducted with screw, lever, signal ports, enclosure, display, measurement button and power switch including VCP/HCP as criteria 'A'. But, criteria of connecting external monitor will be applied 'B' because flickering phenomenon of connecting external monitor during interference of electrostatic discharge doesn't affect essential requirement.

Electromagnetic waves tolerance		
CVS is to be used in the below mentioned electromagnetic wave environment. CVS purchaser or user needs to confirm whether CVS issued at this environment.		
Tolerance test	IEC 60601 test conditions	Appropriateness level
Conductivity RF electromagnetic field IEC 61000 - 4 - 6	3 Vrms 150 kHz ~ 80 MHz	3 Vrms
Radioactivity RF electromagnetic field tolerance IEC 61000 - 4 - 3	3 V/m 80 MHz ~ 2.7 GHz scope	3 V/m

15. Service Information

How to contact service: If there are any problems with the equipment, please follow the steps below:

- Refer to the section 11, according to the problem that you are encountered. And then follow the suggested sequences.
- If the problem persists, please contact the local distributor in your province or country at first.

We recommends customers to fill up the following form after purchase and retain this manual as a permanent record of purchase

Date of purchase: _____
Distributor: _____
Address: _____
Contact: _____
Model No. : _____
Serial No. : _____

Supply of parts for repair:

- Repair parts for this device will be kept for 7 years.

When couldn't reach to the distributor where you purchased the product, please contact to Shanghai Huvitz's service team directly by referring to the address and telephone numbers below.

Shanghai Huvitz Co., Ltd.

Building 1, NO. 150, Renjie Road,
Fengxian, Shanghai, 201401, China

Tel: +86-21-3630-7061

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<http://www.shhuvitz.com>

E-mail: svc@charops.com

Revision History

Date	Version	Content
2021.09	V1.0	First Issue
2022.6.28	V1.1	Adding explanation of symbols, applied standardand, EMC information, update EU Rep. address.