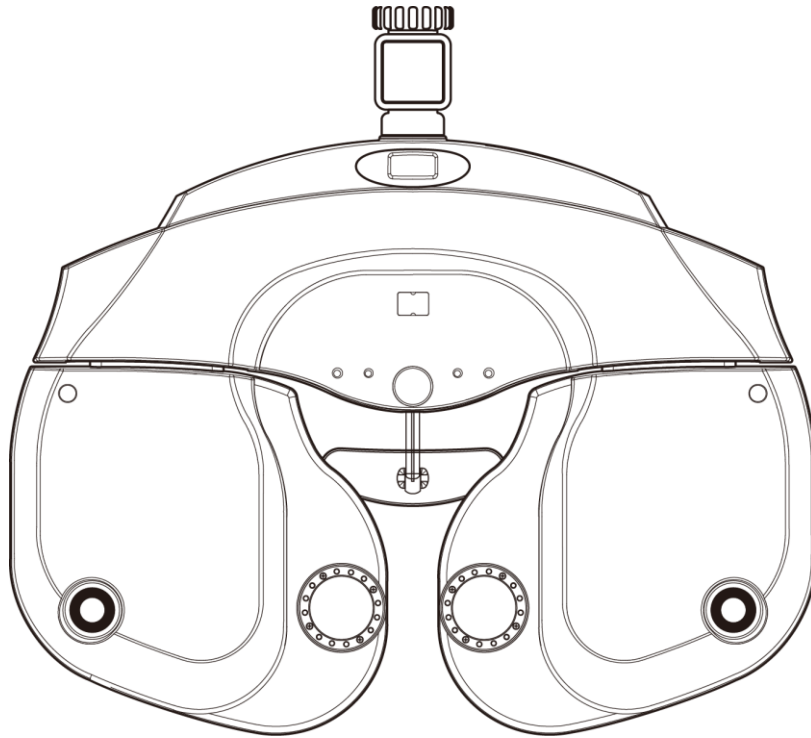


# Operation Manual

Digital Refractor UDR-800P





## IMPORTANT NOTICE

### **[Classification under the provision of (EU) 2017/745(MDR)] Class I**

The UDR-800P is classified as Class I device

### **[Form of protection against electric shock] Class I**

The UDR-800P is classified as Class I.

This product is always protected when you connect the power supply must be connected to ground included. Class I is a product in which the protection against electric shock does not rely on basic insulation only, but which includes an additional safety precaution in such a way that means are provided for the connection of the product to the protective (ground) conductor in the fixed wiring of the installation in such a way that accessible metal parts cannot become live in the event of a failure in the basic insulation. Use a power outlet which is equipped with a grounding terminal.

### **[Degree of protection against electric shock] Type B Applied Part**

The UDR-800P is classified as a device with a Type B Applied Part

### **[Degree of protection against ingress of liquids] IPX0**

The UDR-800P is classified as IPX0

### **[Degree of protection against flammability]**

The UDR-800P is classified as a device not suitable to be used in a potentially flammable environment. Do not use near flammable materials

### **[Method(s) of sterilization or disinfection recommended by the manufacturer]**

The forehead rest and chinrest should be wiped using a cloth dampened with soapy water as necessary

### **[Mode of operation]**

Classification of UDR-800P : continuous operation

Electromagnetic waves discharged from mobile phones, radiotelegraphs, wireless toys can cause malfunction of this product. Please keep away any device that can influence this digital Refractor.

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

Pay a special attention to the word "WARNING" or "CAUTION," which are on all manuals for users and managers.

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## SAFETY INFORMATION

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

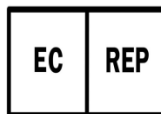
Furthermore all configurations shall comply with the system standard IEC 60601-1-2:2014+AMD1:2020.

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 60601-1:2010+AMD2:2020.

If in doubt, consult the technical service department or your local representative.
























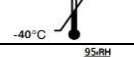

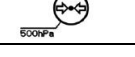
### For EU Countries

- The following mark, the name & address of the EU Representative shows compliance of the instrument with Directive Regulation (EU) 2017/745 of the European Parliament and of the Council of 5 April 2017 concerning medical devices.



CMC Medical Devices & Drugs S.L.  
C/ Horacio Lengo N° 18, CP 29006,  
Málaga, Spain.

## SYMBOLS

Symbol	Descriptions
	TYPE B EQUIPMENT
	Protective earth (ground)
	Alternating current
	Off (power: disconnect to the mains)
	On (power: connection to the mains)
	Do not throw away the waste to inappropriate place
	Risk of electric shock
	Crushing hazard sign
	Hand hazard sign
	Instruction for user manual
	General mandatory action sign
	General prohibition sign
	General warning, caution sign
	Keep dry symbol
	DO NOT Hand Hooks symbol
	Fragile symbol
	Recycling symbol
	Handle with care symbol
	Do not build up more than 2 boxes
	Manufacture
	Europe Representative
	Manufacture Date
	Only one unit in the box
	Temperature between - 40°C ~ 70°C
	Humidity between 10%RH ~ 95%RH
	Air pressure between 500hPa ~ 1060hPa

## Shape Of Plug




Country	Voltage/frequency	Shape of plug
Mexico	110V/50Hz	Type C&E
Argentina	220V/60Hz	Type A
Peru	220V/60Hz	Type A
Venezuela	110V/50Hz	Type C&E
Bolivia & Paraguay	220V/60Hz	Type A(Most common) / Type H(Infrequently)
Chile	220V/60Hz	Type A
Colombia	110V/50Hz	Type C
Brazil	220V/60Hz 127V/60Hz	Type A Type C
Ecuador	110V/50Hz	Type C&E
USA	120V/60Hz	Type A(Hospital Grade)
Canada	120V/60Hz	Type A(Hospital Grade)

## General Safety Information

Safety is the obligation responsibility of human. Safe use of this device is related with everyone ; installer, user, operator and device manager. It's enforced to read and understand this manual before installing, using, cleaning and repairing this unit and accessories. Please be well acquainted with the label regarding safety in special. If not follow the safety instruction in this manual, it may cause injury or accident while operate it.

Please do use this unit after reading this well and understanding enough  
Keep at the place easy to find this.

### Warning for safety


“CAUTION, WARNING” is to inform of the disaster which may cause a private severe injury or great loss of property in case of carelessness

“MANDATORY ACTION SIGN” is to inform of the compulsory obligation which should follow before use

Prohibition Sign” is to show the general prohibited matters related with installation, operation and management. It may cause a human/physical loss in case of carelessness.
<b>NOTE</b>
“Note” is to explain the important information related with installation, operation and management. It may be linked with disaster in case of carelessness.

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# 1. Characteristics

- All the machines such as CP, RK, LM and PCs could be connected with using RS-485 network method.
- By maximizing compatibility among Unicos products, you can deal with the information about Visual Acuity Test easily. S/C/A information tested by UDR-800P and URK series automatically comes out, and you can save this information in Digital Refractor body, only by pressing [LOAD] button.
- Android OS-based Tablet PC improves data recognitions, so that allowing more accurate visual test possible.
- Lens operation is speedy, and consecutive operation of jog shuttle does not skip any data, allowing more accurate and prompt vision test possible.
- To minimize interruption for control power, an auto-shielding function works, when a lens more than  $\pm 0.5D$  operates.
- You can run complicated functions easily with SHIFT keys, and it is convenient to execute various options for test.
- It supports short distance PD (45 ~ 75mm) and short distance work (35 ~ 70cm) to make a reliable near-distance Convergence Test.
- Help files and real-time guide help a fast and easy unit-test.
- By installing a printer in the operation panel, you can print the test result promptly.
- It inputs eye-test information without lens operation, and offers PRESET function that put in the lenses at once.
- New programs are always available through easy and fast update of the programs with USB and P/C.

## 2. Notice for Use

	<ol style="list-style-type: none"> <li>1. To avoid a danger by electric shock, this device must be connected to the power supply with a protection ground.(Class I)</li> <li>2. It's recommended to install this onto unit table with a proper ground to reduce a shock. If install this with unit table without a proper ground, do separate a junction box and converter box from exterior case and then install</li> <li>3. Be cautious not to give an excessive shock or vibration to the unit. Shock may cause a damage</li> <li>4. Do use this unit within power specification indicated on name plate. Otherwise, may cause a fire or an electric shock.</li> <li>5. Please never disassemble or modify. Otherwise, may cause a fire or an electric shock.</li> <li>6. When smog, odor or noise happen in use, please unplug and then consult the maker Please contact the maker or the distributor in case exchange</li> <li>7. parts (Battery, Fuse and others)</li> </ol>
	<ol style="list-style-type: none"> <li>1. It could affect the precise measurement if the unit is exposed to a direct sunray or the bright indoor illumination. It's recommended to use under the proper optometry room.</li> <li>2. It may gather dew on lens for a patient or optic parts if heat indoor suddenly in a cold region. If it's so, please wait until it disappear and then use the unit.</li> <li>3. Do use the unit only when lenses are clean. It may affect a measurement if lenses are dirty. Before use, please make sure if lenses are clean.</li> <li>4. Please consult the distributor when move the unit or connect with other devices. Install the unit on a flat space not to be inclined.</li> <li>5. Do keep the following for a normal operation             <ul style="list-style-type: none"> <li>- Operating circumstance Temperature:+10℃ ~ +40℃, Humidity:30% ~ 80% Atmosphere pressure : 70 ~ 106 kpa</li> <li>- Storage and movement circumstance Temperature:-10℃ ~ +55℃, Humidity:10% ~ 90% Atmosphere pressure : 70 ~ 106 kpa</li> </ul> </li> </ol>

	<ol style="list-style-type: none"> <li>1. Don't clean the surface with organic solvent such as alcohol, thinner and benzene so that it may damage</li> <li>2. Do not keep or install at the place which there is risk of explosion or at the place which there are flammable substances such as alcohol, thinner and other chemicals</li> <li>3. Don't switch off until the unit runs completely to avoid Motor error.</li> <li>4. It's designed to use only indoor. Please don't use the unit outdoor.</li> <li>5. Don't use at a place with high humidity or many dust</li> <li>6. Don't disassemble or modify at one pleases</li> <li>7. Do let only a skilled one use the unit.</li> <li>8. Must connect or disconnect power cable only after switching off</li> <li>9. Don't operate the unit with wet hands. Otherwise, may cause an electric shock.</li> <li>10. Do turn off the power when not in use for a long time.</li> <li>11. Electromagnetic waves discharged from mobile phones, radiotelegraphs, wireless toys may cause malfunction of the unit. Please keep away any device that could influence the unit.</li> </ol>
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At the time of publishing, the information in this manual is carefully checked and has been judged to be correct. However, we, at UNICOS CO., LTD. are not responsible for mistakes, omissions and the results occurred by using information in this manual.

## General Purpose Use

It may judge the abnormal condition of the eye and may give specific figures for prescriptions that subjective refractometry may not be able to offer for example, it is not sure to check red/green charts by the patient and he may not say what specific base-in prisms are given for his spectacles etc.

## 3. Prerequisite for safety

It's compulsory to use the device according to manual for safety.

**Please read and understand the instructions of the manual fully before powering on**

For more information regarding the unit please contact your dealer.

### 3.1 Preparation before use

- Do not use the device under the direct sunlight or under bright indoor lighting.
- Do not place inflammables such as paint thinner and other chemicals, etc. near the device.
- Check if a printing paper is enough.
- Check if there is dust near Lens and then remove dust

### 3.2 Precautions for use

- Install the device at a flat place not to be inclined.
- Do not put any object on top of this equipment.
- Do not disassemble or modify as one likes.
- In case the device is kept at lower temperatures, please and then use the device after waiting about 40 minutes after power on
- Do not let use the device besides a skilled people
- Make sure to turn off the unit if do not use for a long time.
- Do not turn off the device before the device runs fully.( Prohibiting power off on loading)

### 3.3 How to store and handle after use

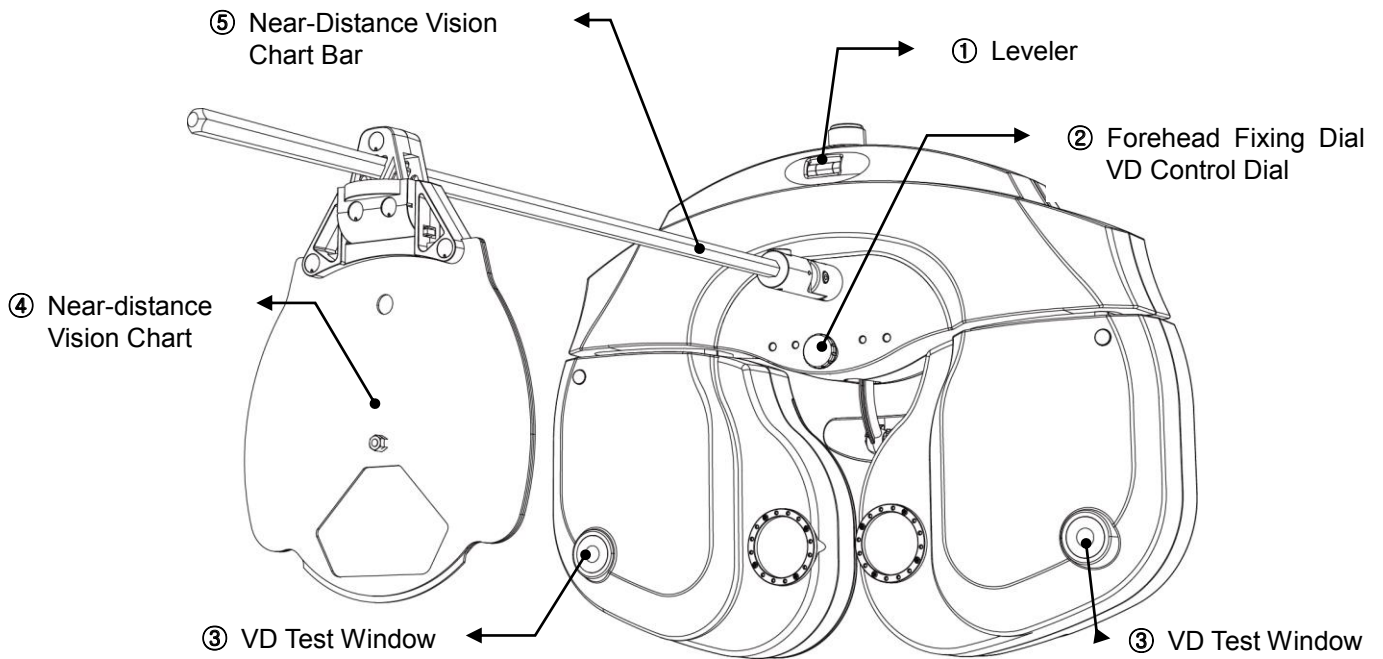
- This device is designed to be used only indoors. Do not use outdoors.
- Disconnect the power and keep the dust cover to store if do not use for a long time.
- If cleaning is required, wet a soft cloth with a little soapy water, squeeze it and then wipe out
- When clean Lens or Glass, remove dirt or other ingredient on the surface of lens with compressed air and then wipe out with a soft dry cloth.
- Please be cautious when store the device
  - a. Store where there is no moisture
  - b. Store where the water do not reach
  - c. Store where there is not much dust and where there is not any bad influence due to dirty air containing salt or sulfur
  - d. Store at a flat space not to be inclined.
  - e. Store where there is no risk of vibration or shock
  - f. Avoid a storage space for chemicals and avoid a space where gas arise
  - g. Store where there is no direct sunlight
- Arrange accessories and cables clean not to affect the following use.

## 4. Designations and Functions of Each Parts

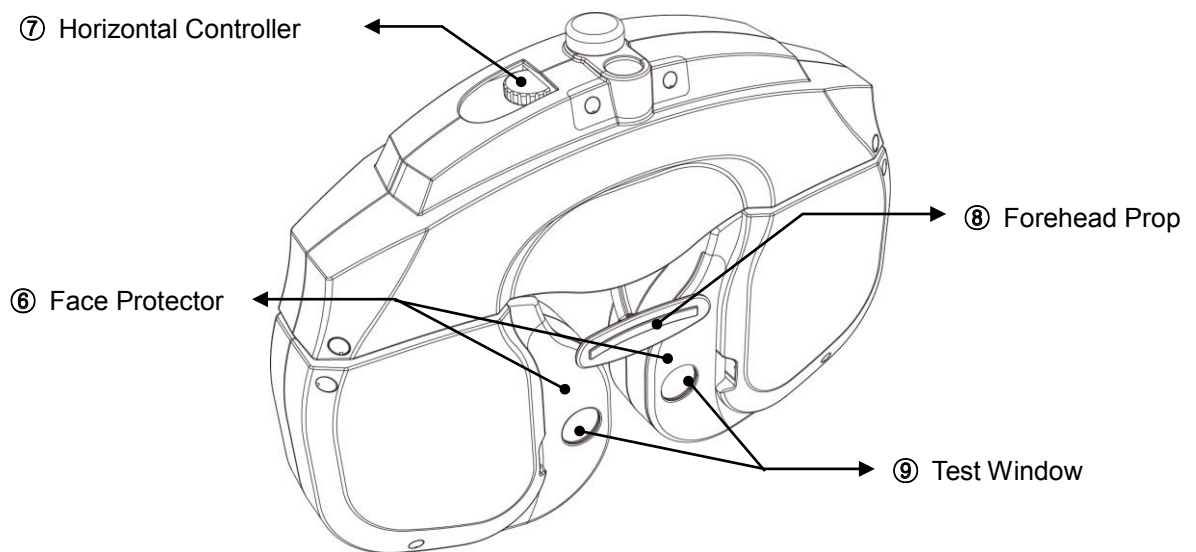
Basic components of UDR-800P are 4 parts, Ref.Body, Junction box, Operation Panel, and Converter box TABLET PC. Explanation about each components and functions are as followings here.

### 4.1 Body of UDR-800P (Ref.Body)

UDR-800P body is the most important part of the Digital Refractor, and is installed in the unit table.



[Figure 4-1] Digital Refractor Ref. Body (For Tester)



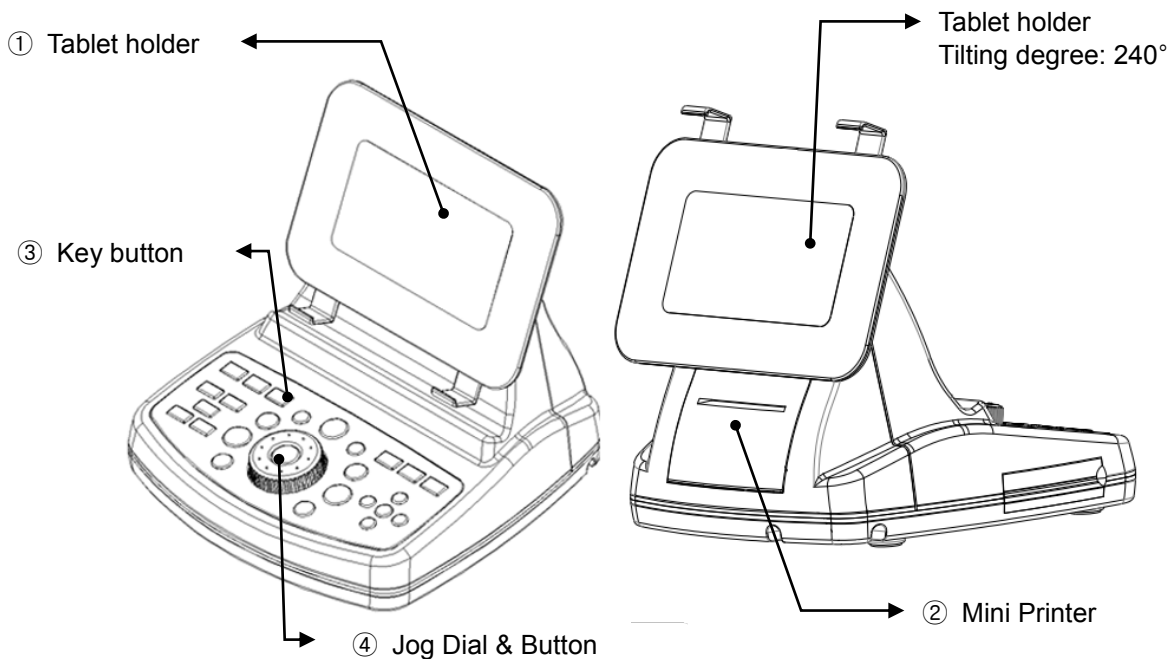
[Figure 4-2] Digital Refractor Ref.Body (For Patient)

Nomination	Function
① Leveler	Inform if UDR-800P may maintain level
② Forehead Fixing Dial VD Control Dial	Fasten your forehead to forehead rest, You can adjust VD with dial.
③ VD Test Window	Confirm the patient's VD (Distance: 1mm, Baseline: 12.0mm, Range: 11.0mm~15.0mm)
④ Near Vision Chart	A table for near vision test.
⑤ Near-distance vision chart Bar	A bar used to fix near- distance vision chart.
⑥ Face Protector	Treated softly for a human face. It could be detachable
⑦ Horizontal Controller	Level out the equipment by rotating the dial.
⑧ Forehead Prop	A plate to prop patient's forehead.
⑨ Test Window	The patient can view the chart through the lens.

[Table 4-1] Ref. Body

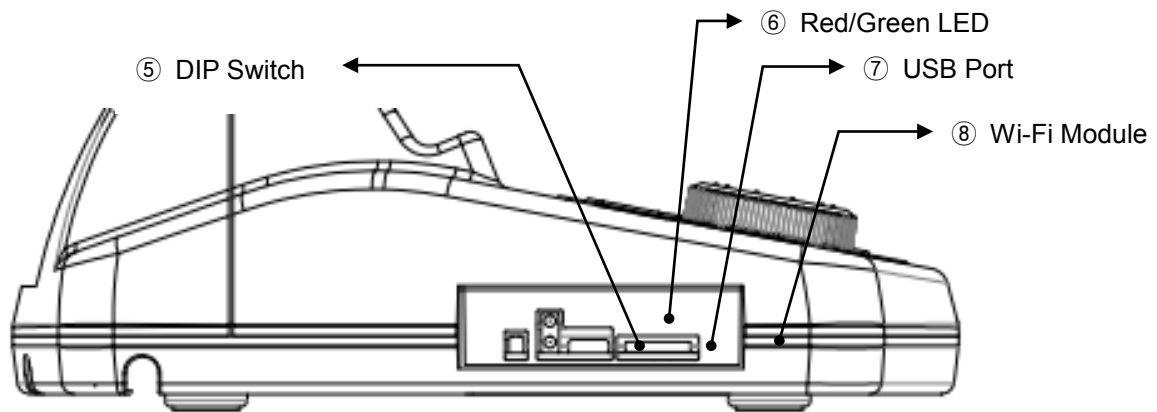
## 4.2 Operation Panel

It controls the products such as ACP series, URK series

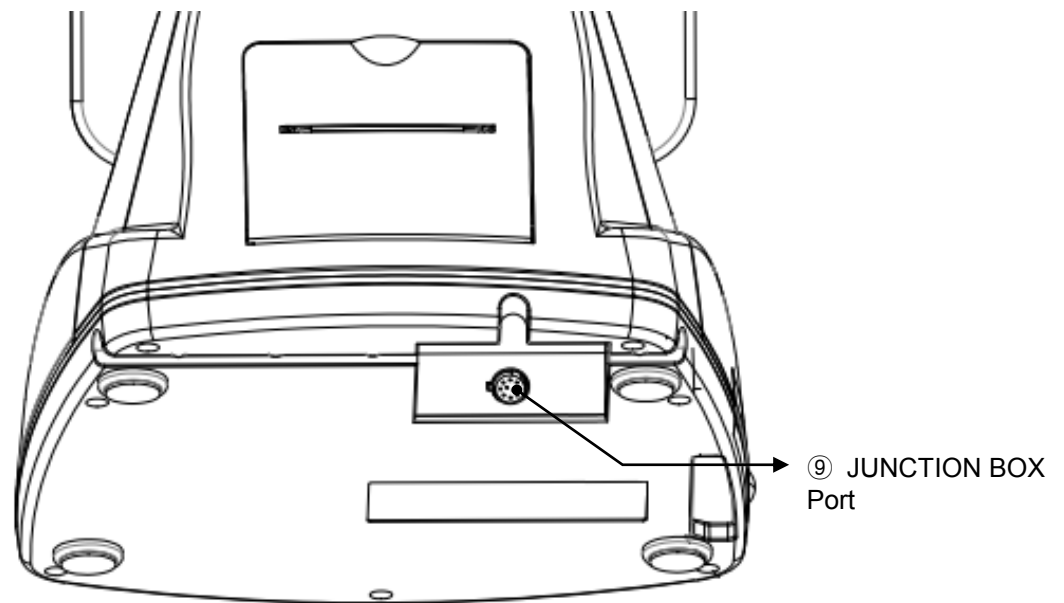


[Figure 4-3] Operation Panel (front side and reversed side)





[Figure 4-4] Operation Panel (Left-side)



[Figure 4-5] Operation Panel (Back side)

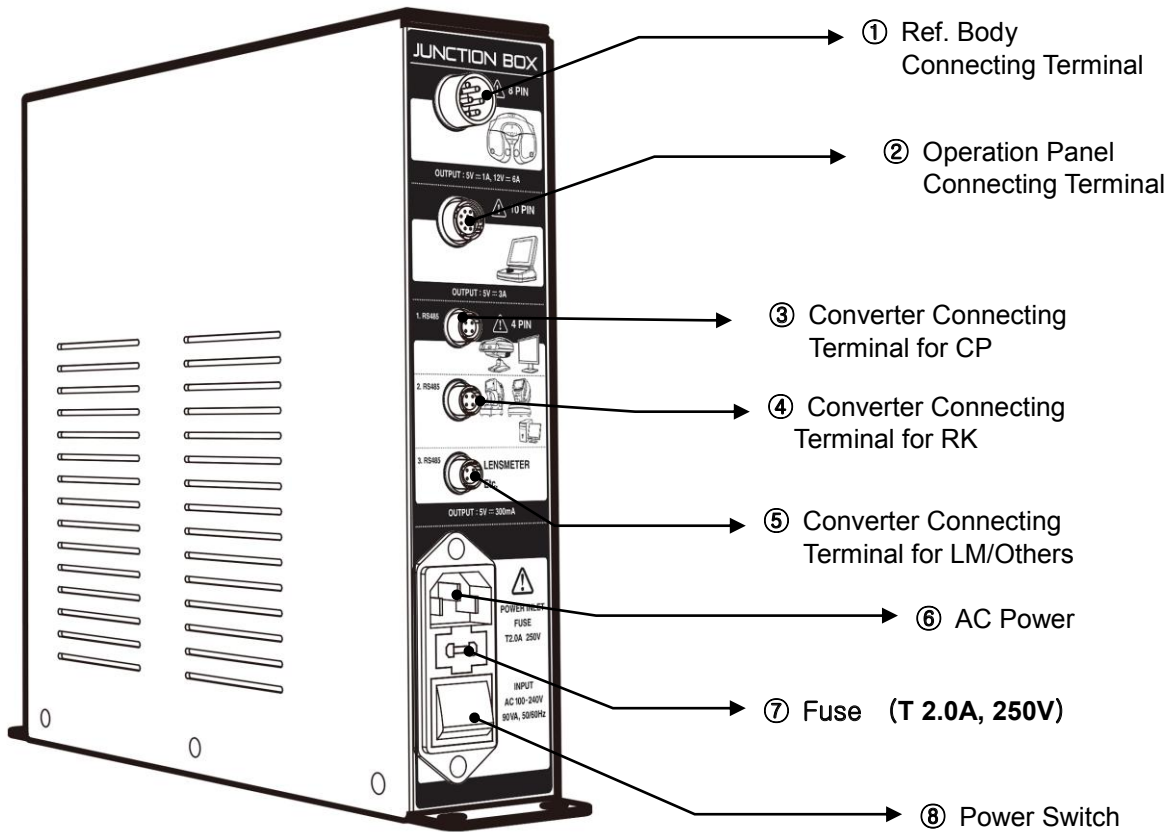
Nomination	Function
① Tablet holder	A device that can hold a Tablet PC with a dedicated application installed. It also has a tilting function and the screen rotates 240°.
② Mini printer	Print test results.
③ Keypad button	Choose various tests and charts by pressing the button.
④ Jog dial & Button	Change the lenses' value by turning it to (+), (-), (Left) and (Right). When you click the middle button, the data Filed items are sequentially changed.
⑤ DIP switch	Set up switch according to Tablet PC IP. ↓ ↓ : 192.168.10.10 ↑ ↓ : 192.168.10.20 ↓ ↑ : 192.168.10.30 ↑ ↑ : 192.168.10.40

⑥ Red/Green LED	Green LED turns on when connected with Tablet PC. Red LED turns on when not connected.
⑦ USB Port	Connect with Tablet PC by USB cable.
⑧ Wi-Fi Module	Access the Wi-Fi network.
⑨ JUNCTION BOX Port	Connect it with 10pins of the Junction Box.

[Table 4-2] Operation Panel

### 4.3 Junction Box

Junction Box connects the Ref. Body with the Operation Panel, communicates with panels, and supplies each device with power.



[Figure 4-6] Junction Box

Nomination	Function
① Ref. Body Connecting Terminal	A terminal to connect 8pins cables of Ref. BODY.
② Operation Panel Connecting Terminal	A terminal to connect 10pins cables of the Operation Panel.
③ Converter Connecting Terminal for CP	A terminal to connect the CP series converter and 4 pins cables.

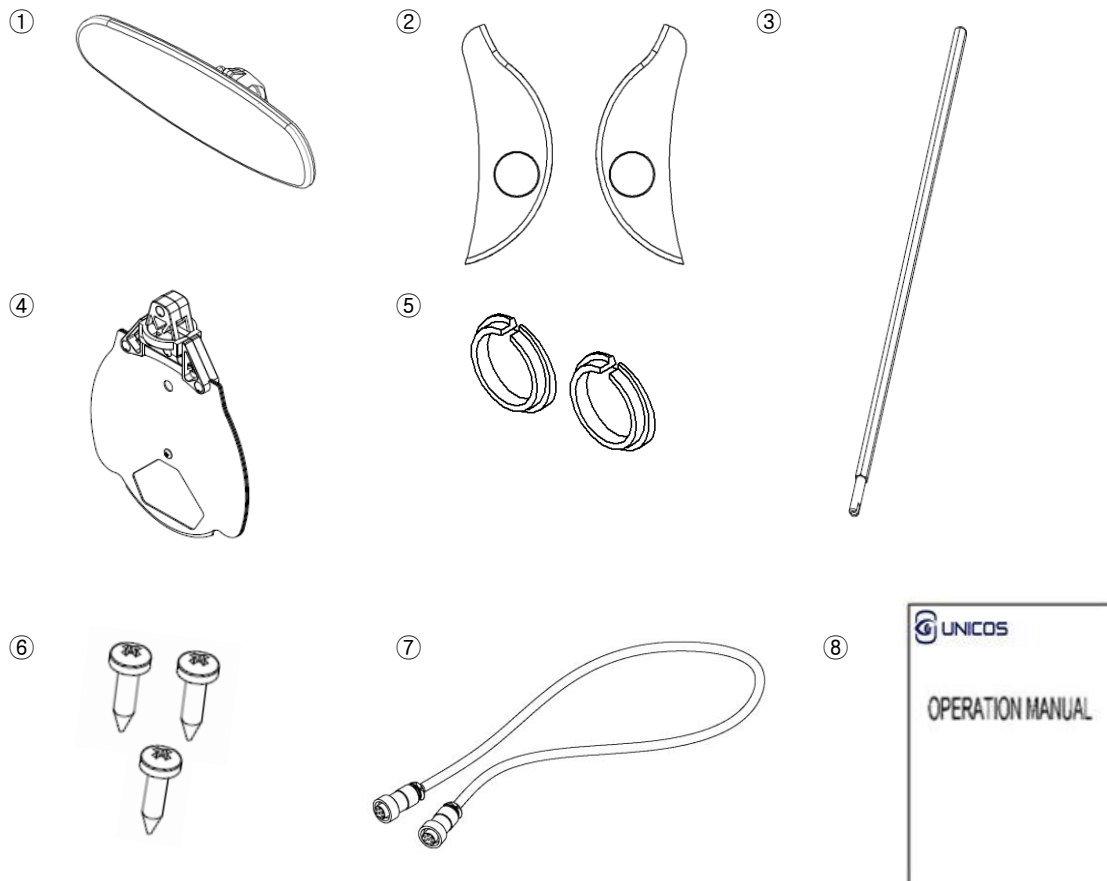
④ Converter Connecting Terminal for RK or PC	A terminal to connect RK series converter and 4 pins cables. (or PC)
⑤ Converter Connecting Terminal for LM/Others	A terminal to connect LM series converter and 4 pins cables. (or others)
⑥ AC Power Inlet	A terminal to connect outer power cord with this equipment
⑦ Fuse (T 2.0A, 250V)	A device to protect this equipment from excessive currents.
⑧ Power Switch	A switch to power on or off the UDR-800A.

[Table 4-3] Junction Box

#### 4.4 Accessories

Those are various accessories offered by UDR-800P.

##### 4.4.1 Ref. Body



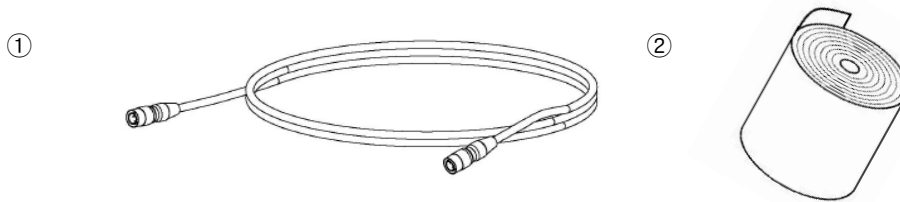
[Figure 4-7] Ref. Body Accessories

Nomination	Function	Q'ty
① Forehead Prop	A prop to fix the patient's forehead.	1
② Face Protector (2EA)	Softly touched for a human face. Can be attached or detached.	2

③ A Bar for Near Vision Chart	A bar to fix Near Vision Chart.	1
④ Near Vision Chart	Chart for Near Vision test.	1
⑤ Bolt Cover (2EA)	Bolt Covers in reserve	2
⑥ Screw Bolt (2EA)	Bolts for the cover of the leveler.	2
⑦ A Cable to connect with the Junction Box	A cable to connect the Junction Box and the Ref. Body. Is offered to basis 3 M at product shipping.	1
⑧ Operation Manual	B5(254mm X 180mm)	1

[Table 4-4] Ref. Body Accessories

**4.4.2 Operation Panel**



[Figure 4-8] Operation Panel Accessories

Nomination	Function	Q'ty
① Interface Cable	A cable to connect Operation Panel and Junction Box. (10 pins) Is offered to basis 3 M at product shipping	1
② Print Papers	Print papers in reserve.	1

[Table 4-5] Operation Panel Accessories

**4.4.3 JUNCTION BOX**

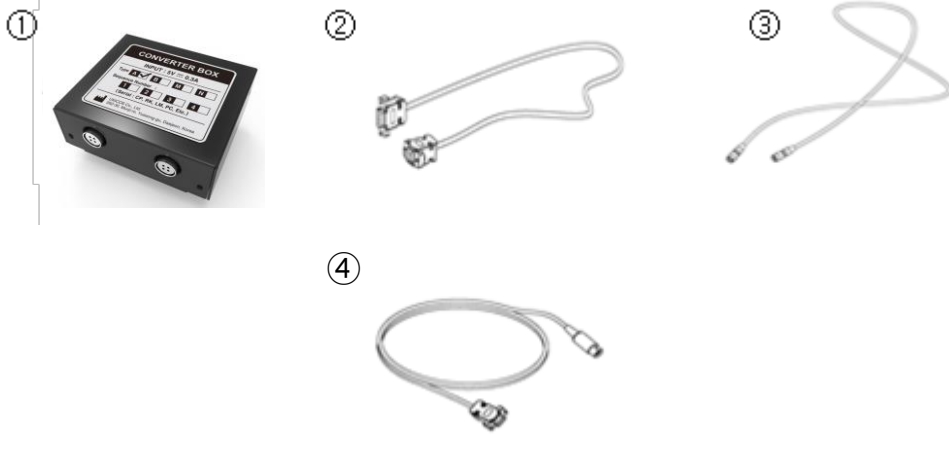


[Figure 4-9] Junction Box Accessories

Nomination	Function	Q'ty
① Power Cable	A terminal to connect with the outer power.	1
② Fuse (T 2.0A, 250V)	A device to protect this equipment form excessive currents.	2

[Table 4-6] Junction Box

**4.4.4 Converter Box**

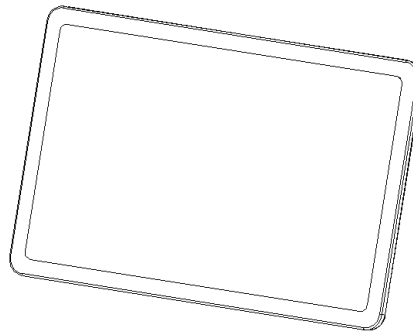


[Figure 4-10] Converter Box Accessories

Nomination	Function	Q'ty
① Converter Box (A-type)	Connect RS232 serial communication device such as RK, CP, LM, PC ect.(RS485 to RS232 communication converter)	2
② RS232 serial Cable	A cable to connect the Converter Box and RS232 serial communication device such as RK, CP, LM, PC, etc.	2
③ RS485 Cable	A cable to connect the Converter Box and the Junction Box.(4 pins)	2
④ ACP-700 Serial Cable	A cable to connect the Converter Box and ACP-700 Port	1
⑤ Converter Box (A-type)	Connect RS232 serial communication device such as RK, CP, LM, PC ect.(RS485 to RS232 communication converter)	2

[Table 4-7] Converter Box

**4.4.5 Tablet PC**

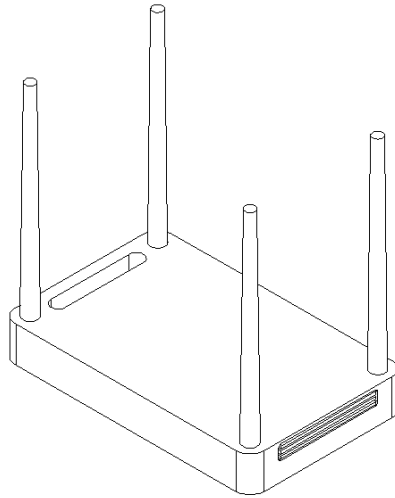


[Figure 4-11] Tablet PC

Nomination	Function	Q'ty
① Tablet PC	UDR-800P Application which can control the Ref. Body is installed.	1

[Table 4-8] Tablet PC

4.4.6 Wireless router



[Figure 4-12] Wireless router

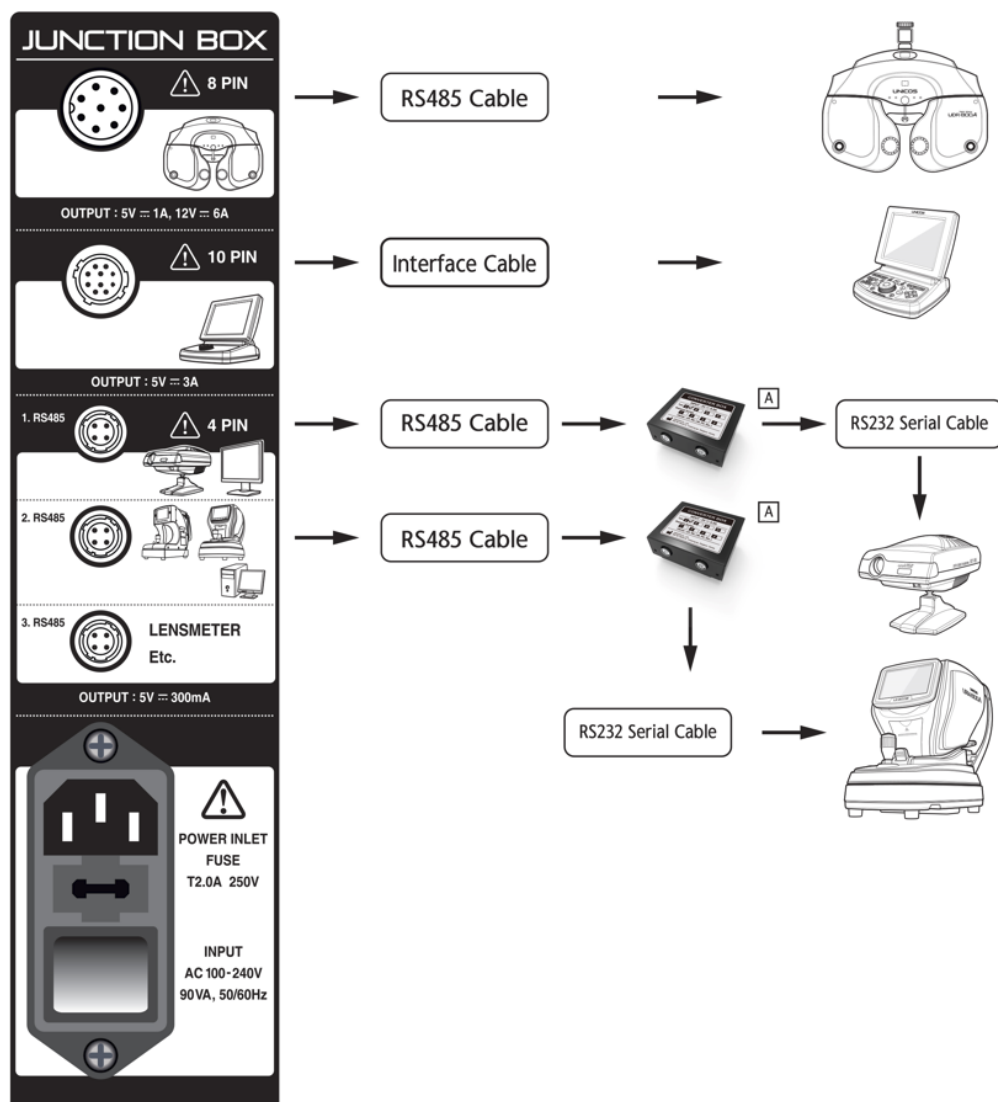
Nomination	Function	Q'ty
① Wireless router	Connect Tablet PC and Operation panel through wireless router.	1

[Table 4-9] Wireless router

### 4.5 How to install UDR-800P

Follow the below directions to install the most basic system.

- 1) Check out whether all the basic components are.
- 2) Connect the Ref. Body to the Junction Box by 8 pins cable. The Junction Box must be powered off.
- 3) Connect the Operation Panel to the Junction Box by 10 pins cable.
- 4) Connect CP series.(refer to below picture)
- 5) Connect RK series.(refer to below picture)
- 6) Connect the power cable of the Junction Box and then check out whether all cables are connected properly.
- 7) Power on ACP series.
- 8) Power on RK series.
- 9) Power on wireless router.
- 10) Turn on Tablet PC, and then connect to 'unicos\_uds' on Wi-Fi list.
- 11) Launch UDR-800P application on Tablet PC.
- 12) Power on Junction Box.
- 13) After power on, the Ref. Body gets initialized, and it sounds the beep sound from operation panel.  
Check the green led is on operation panel.
- 14) Start vision test after initialization of the Ref. Body and the Operation Panel
- 15) Please refer to the chapter 7~9 for various options for the test and its applications.



[Figure 4-13] UDR-800P Connection Diagram

4.5.1 How to install UDR-800P for the Network

Installation Environment : This is a description of the EMR (Patient Medical Report used in a hospital) dedicated configuration when the UDR-800A is connected to a network.

Basically, when UDR-800A is sold, converter box type A is provided as standard.

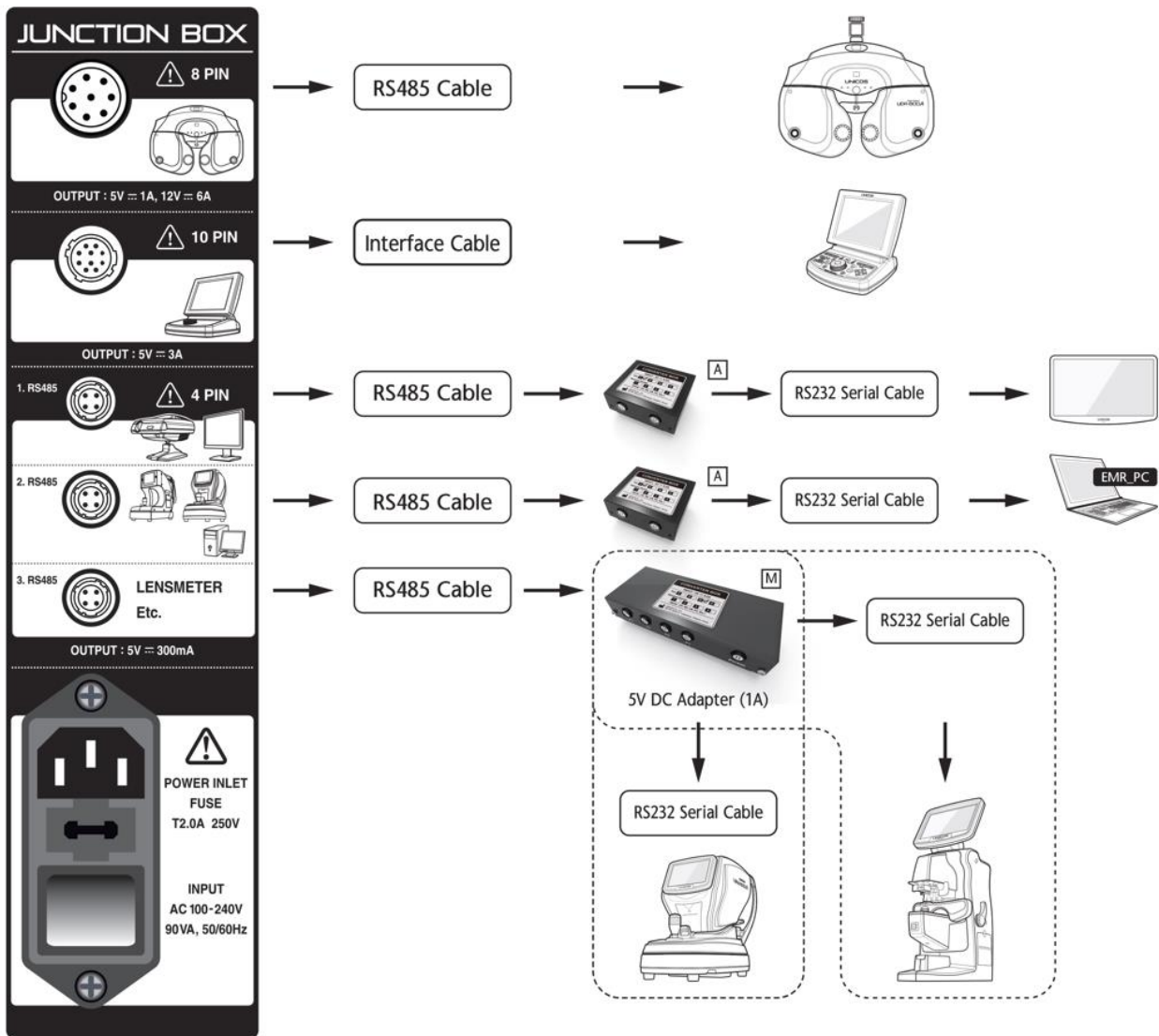
But in places like hospitals, PCs are used for EMR.

Therefore, the PC is connected to the place where the existing RK product was connected, and there are insufficient ports to connect other peripherals (RK, LM, etc.). A Type M converter box is used here.

RS232 serial communication such as RK and LM can be connected to the Type M converter box (Room 1 configuration is complete). Second, multiple UDR-800A are sometimes used. A Type M converter box is used for two or more UDR-800A to form a parallel network.

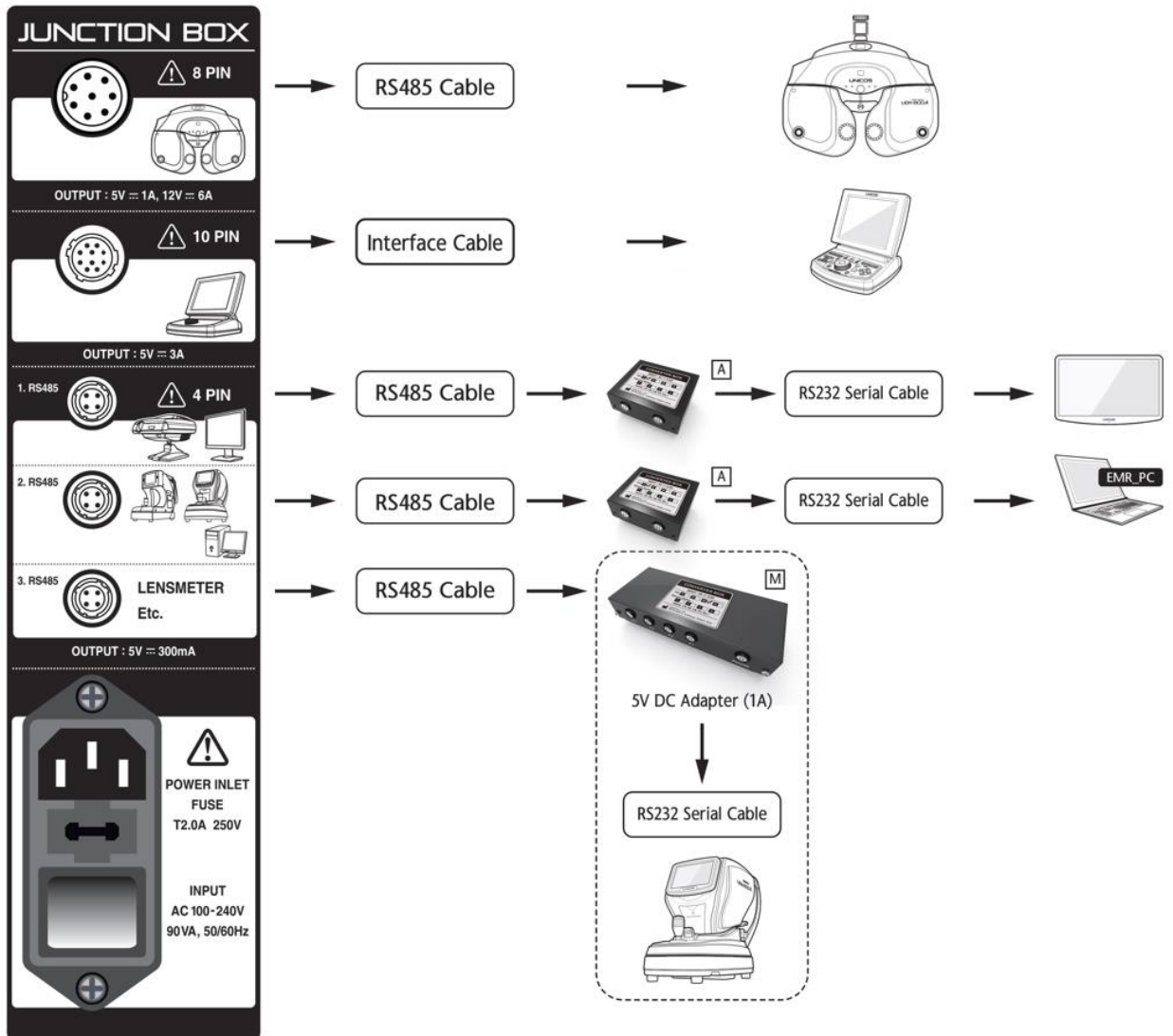
Type M must be used for connection between multiple junction boxes (UDR-800A). (A separate adapter is used for type M converter boxes to prevent power conflict.)

Scenario 1 Network \_Exam Room 1

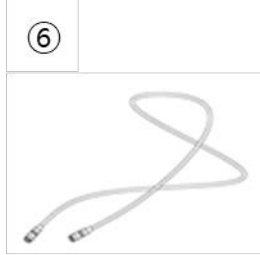
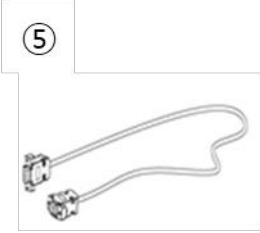




**Scenario 1 Network \_Exam Room 2**



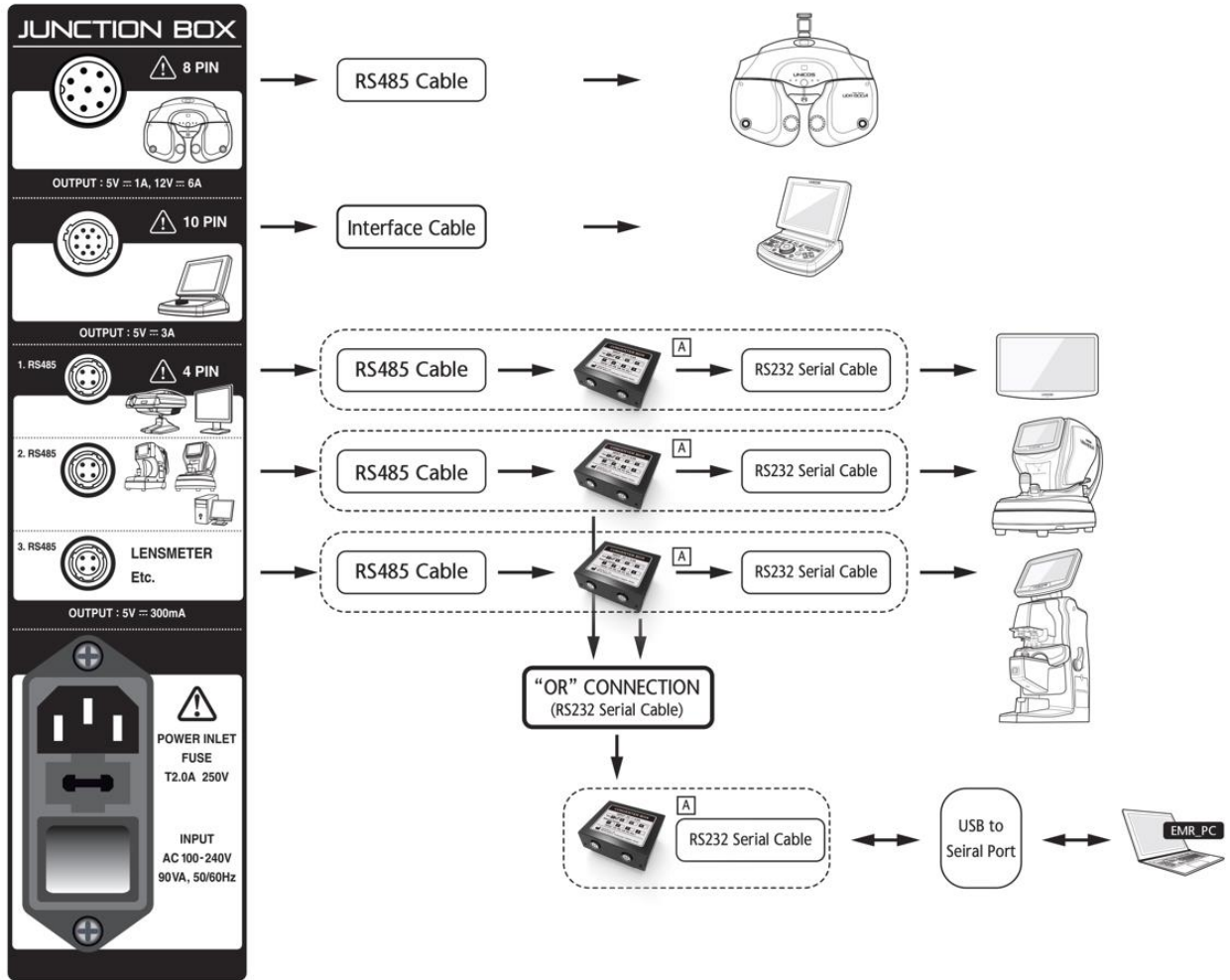
Network-only accessories (Option)



Additional accessories (Option)

Nomination	Function	Q'ty
⑤ RS 232 serial cable	A cable to connect the Converter Box and RS232 serial communication device such as RK, CP, LM, PC, etc.	2
⑥ RS 485 cable	A cable to connect the Converter Box and the Junction Box.(4 pins)	3
⑦ 5V DC adapter (1A)	5V DC adapter for M type converter box only	2
⑧ M type Converter Box	Network-only converter box M type converter box is only used when two or more UDR-800A devices are connected to a network.	2

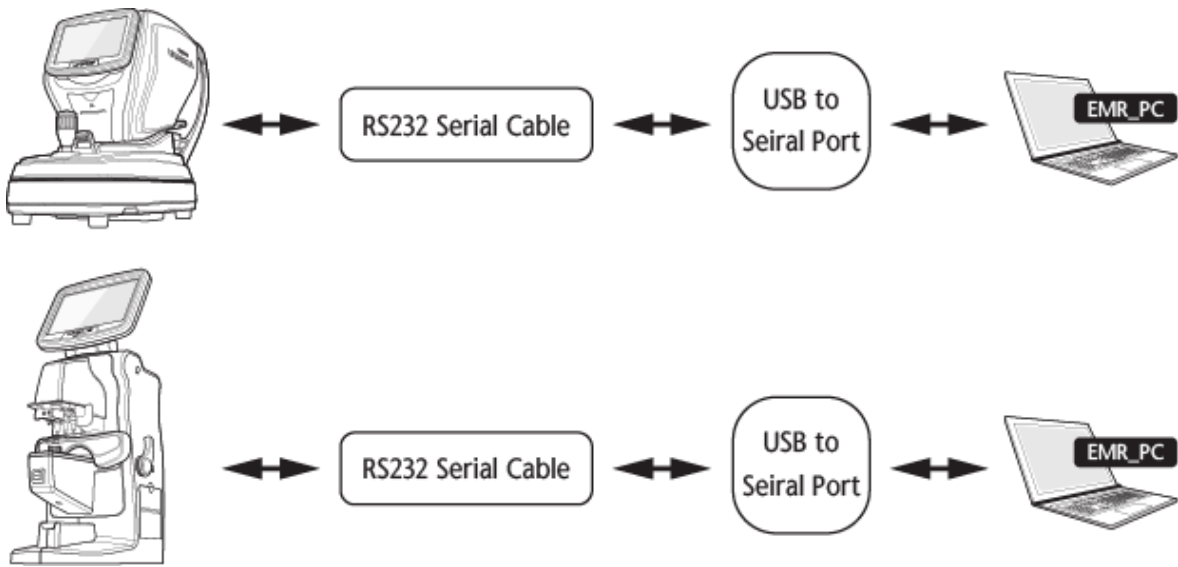
**Scenario 2 Stand Alone \_ Exam Room**



**Additional accessories (Option)**

Nomination	Function	Q'ty
Converter Box (A-type)	Connect RS232 serial communication device such as RK, CP, LM, PC ect.(RS485 to RS232 communication converter)	2
⑤ RS 232 serial cable	A cable to connect the Converter Box and RS232 serial communication device such as RK, CP, LM, PC, etc.	2
⑥ RS 485 cable	A cable to connect the Converter Box and the Junction Box.(4 pins)	2
USB to Serial Cable(Optional)	USB to serial cable used for direct connection to PC	1

Scenario 3 No Digital Refractor



Additional accessories (Option)

Nomination	Function	Q'ty
① USB to Serial Cable(Optional)	USB to serial cable used for direct connection to RK or Lensmeter	2
② RS232 serial cable	A cable to connect the Converter Box and RK and LM series Port.	2

#### 4.5.2 Notice to install UDR-800P

- Checkpoint before installing UDR-800P
  - Check out if there is a Leakage current or Voltage into the interior case of UNIT TABLE with a tester. It may cause a damage of instrument if used under the condition of a Leakage current or Voltage.
  - Check the condition of connection for the cable when use in case of utilizing A/C of UDR-800P separately.
- Warnings when install UDR-800P to UNIT TABLE
  - Do separate the part on which JUNCTION BOX and CONVERTER BOX is laid not to be touched directly against the exterior case of UNIT TABLE. If not separated, it may cause a damage of device.
  - Stick a insulator(for example, insulation sheet or Styrofoam) to the bottom of JUNCTION BOX.
  - Stick a insulator(for example, insulation sheet or Styrofoam) to the bottom of CONVERTER BOX.
  - Need to arrange the surrounding cable. Do separate and arrange each cable such as A/C cable and other communication cable so that they may be not mixed up.
  - Check out if there is a Leakage current in JUNCTION BOX and CONVERTER BOX
- Method to check a leakage current by means of Tester
  - Set a tester toward A/C terminal, touch the ground of A/C terminal and the head of bolt of JUNCTION BOX or CONVERTER BOX with tester and then check the measurement value.
  - Need to check the condition of connection if measured as "V" unit.



1. Must connect or disconnect power cable only after switching off and furthermore don't operate the unit with wet hands. Otherwise, may cause an electric shock.

2. Ref. body may hurt a patient in the process of initialization. Please measure only after the initialization is over fully.

## 5. Basic operation

UDR-800P is designed to operate the necessary functions by means of Dials on Operation panel, Key pad button and the dedicated application. It's minimized the button which is overlapped between Keypad and Buttons on touch screen so that it could supply users with circumstances to operate the device easily. Let's see the name of Key pad and Button on touch screen and how to operate them.

### 5.1 How to control Key pad button on OP PANEL

The scope of Key pad on Operation panel is Operation panel is grouped by function for user's convenience.



[Figure 5-1] Key pad

- [LM / RK / SUBJ / FIN / UA] Button
  - Change the test mode.
  - [LM]: LM Mode
  - [RK]: RK Mode
  - [SUBJ]: Subjective Mode
  - [FIN]: Final prescription Mode
  - [UA]: UA Mode
- [RESET] Button
  - Initialize all the data on measuring (NORMAL).
  - A popup message will appear if [RESET] button is pressed once, then it dose same thing as pressing [OK] button on the screen if [RESET] buttons is pressed again. (The Ref.Body will initialize if press the [RESET] button while holding the [SHIFT] button)
- [SHIFT] Button
  - Extend the function of the button.
  - Press the [SHIFT] button and the left [OPEN/CLOSE] button together to turn on/off AUX OFF mode.
  - Press the [SHIFT] button and the left [OPEN/CLOSE] button together to turn on/off LENS FIX mode.
  - Press the [SHIFT] button and the left [RESET] button together to initialize REF. Body.
  - Press the [SHIFT] button and [+] button(or [-] button) to apply SHIFT SPH step set in 'Lens & data'
- [OPEN], [CLOSE] Button
  - Open and Close the measurement windows(lens).

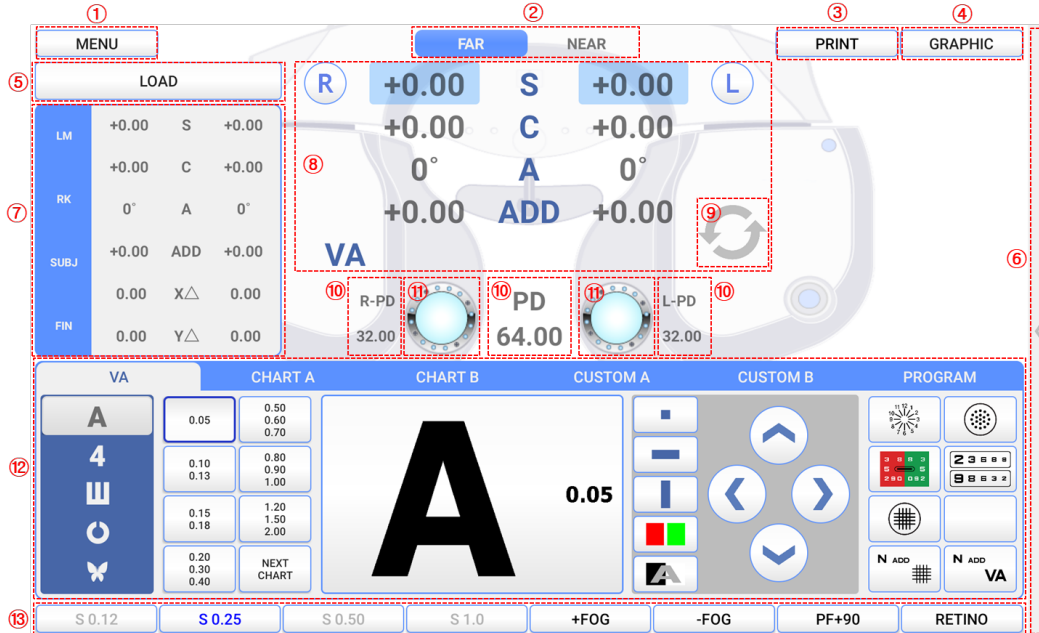
- [R], [L], [BIN] Button
  - Right / Left / Binocular : Select the eyes to be measured. If the CLOSE lens is inserted, it will not be removed.
  - Press [SHIFT] and [R](or [L]) together to select the Dominant Eye.
  - Press [SHIFT] and [BIN] together to release the Dominant Eye.
  
- [+] / [-], Dial Button
  - Alter the chosen field value according to the applied step unit by rotating dial or pressing [+] / [-] Button. It could be moved to S -> C -> A field with Dial button.
  
- [1] / [2] Button
  - Execute Cross Cylinder Test. Cross Cylinder Test is executed as same as the mode to be designated on "System Configuration".
  - In case of "JACKSON MODE", whenever press [1] / [2] Button Cross Cylinder is to be turned over.
  
- [PROG.], [PREV], [NEXT] Button
  - If press [PROG] button, program selecting screen will appear.
  - [NEXT] button is to pass to the next process and [PREV] button is to go back to the previous process.
  
- MASKING Button
  - Execute masking functions to show a part of chart when using VA chart..
  - Move the mask to Up/Down and Right/Left by using arrow button.
  - If touch one character among VA chart on application, masking function is applied on it.



[Figure 5-2] Masking Function

## 5.2 How to control main screen

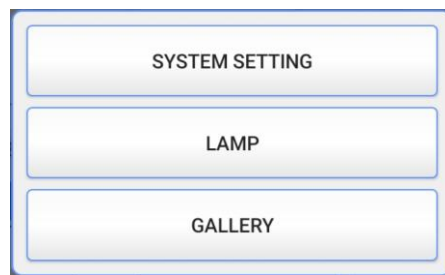
Here is the explanation of features and functions for button on main screen.



[Figure 5-3] Main Screen

### ① Menu button

- When touch the menu button, menu selecting window appears.
- When touch LAMP button, a window that can control LED brightness appears.
- When touch GALLERY button, a window appears that allow you to view color blindness tests, near charts, and eyeball images.



[Figure 5-4] menu selecting window

### ② Near/Far distance mode change button

- It changes Far distance mode and Near distance mode when press the button. On near distance mode, tilting is done automatically.

### ③ Print button

- When you touch print button, the test result screen appears. And when you press the print button again on the test result screen, it is printed on paper. It can be set to print immediately without displaying the screen.
- After printing is completed, the test result can be saved in DATABASE, and the test result can be automatically initialized.
- If there is no printing paper, the letter will turn red.



NAME: 000000 **RESULTS** PD: 64.00 mm

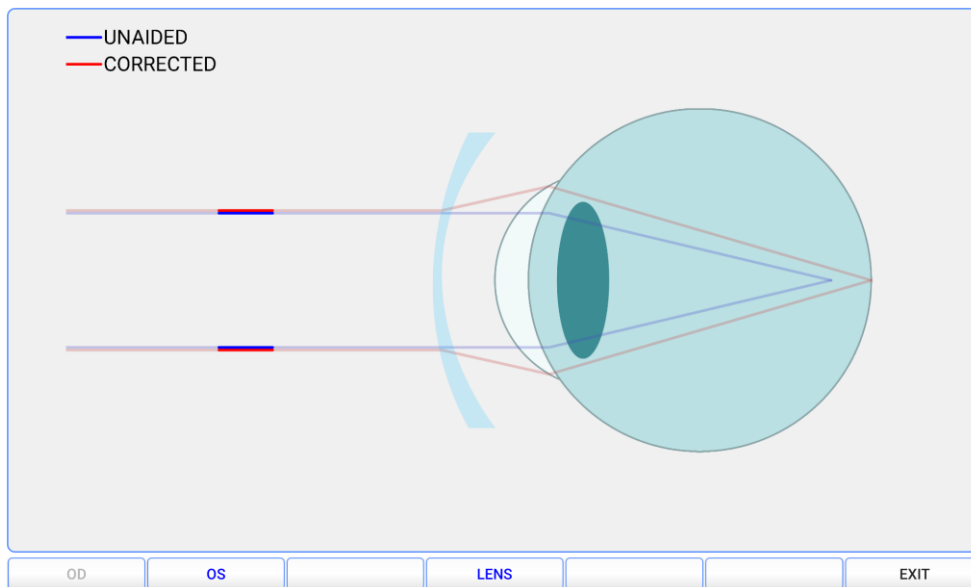
FAR		SPH	CYL	AXIS	ADD	VA
UA	R	----	----	----	----	
	L	----	----	----	----	
RK	R	+0.00	+0.00	0°	+0.00	
	L	+0.00	+0.00	0°	+0.00	
LM	R	+0.00	+0.00	0°	+0.00	
	L	+0.00	+0.00	0°	+0.00	
SUBJ	R	+0.00	+0.00	0°	+0.00	
	L	+0.00	+0.00	0°	+0.00	
FIN	R	+0.00	+0.00	0°	+0.00	
	L	+0.00	+0.00	0°	+0.00	

NEAR    LIST 1    LIST 2    LIST 3    PRISM    PRINT    CANCEL

[Figure 5-5] Test result screen

④ Graphic button

- The current test result is expressed as an image.
- The blue line means unaided eye, the red line means corrected eye.



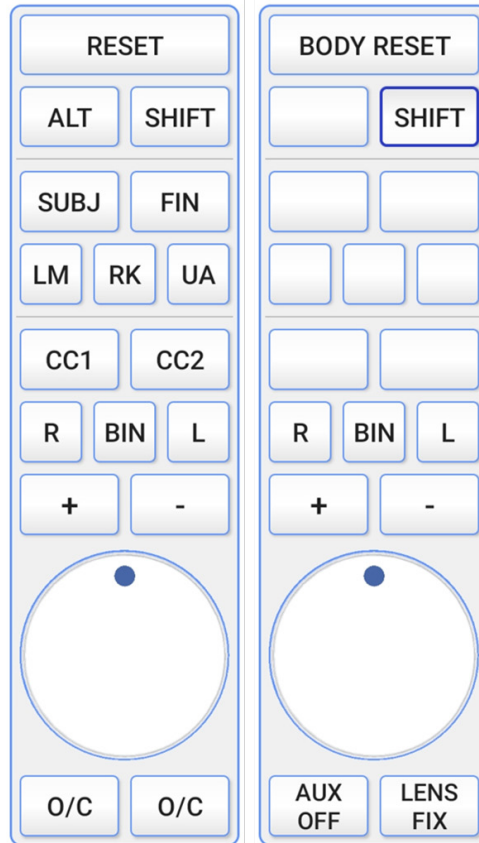
[Figure 5-6] Graphic screen

⑤ Load button

- By touch the load button, you can load previously saved LM, RK, DB data.
- Data received from LM, RK are saved by each date and time up to 10.
- For more information, see 7.3.

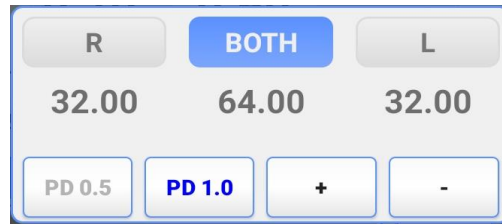
⑥ Operation panel button hide/release

- By touching the button, the buttons on operation panel are shown or hidden on the screen.
- It has the same functions as the button on the operation panel, so you can control the Ref.Body using only the Tablet PC.



[Figure 5-7] Operation Panel button screen

- ⑦ View saved test result
  - Check the currently saved LM / RK / SUBJ / FIN test result immediately.
- ⑧ FIELD selecting button
  - Can select the field(R/L/BIN) which want to amend a value on touch screen. If CLOSE lens was inserted, it will be removed when selected eye changed.
  - [S] button: Select the field for Sphere power(SPH)
  - [C] button: Select the field for Cylinder power(CYL)
  - [A] button: Select the field for Axis(AX)
  - [ADD] button: Select the field for Addition
  - [VA] button: Select the field for Visual acuity
  - [X $\Delta$ ] button: Select the field for horizontal prism
  - [Y $\Delta$ ] button: Select the field for vertical prism
- ⑨ ADD / VA and X $\Delta$  / Y $\Delta$  Display switch button
  - Touch button to switch from ADD / VA to X $\Delta$  / Y $\Delta$ .
- ⑩ PD setting button
  - Can select the field(R/L/BIN) which want to amend a value on screen.
  - When entering the PD setting window, the PD lens is inserted, and when the screen is turned off, the lens used before is inserted.
  - The window disappears when you touch outside the window.



[Figure 5-8] PD setting window

⑪ AUX. LENSES


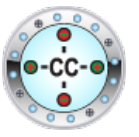





- If touch Lens button on main screen, window for Auxiliary lens appears in the center of screen. There are 3 mode such as R, L and BIN to select auxiliary lens but the selected lens is inserted without warning if touch the lens on window.
- The window disappears when you touch outside the window.



[Figure 5-9] Auxiliary lens for right eye, Left eye and Binocular eye

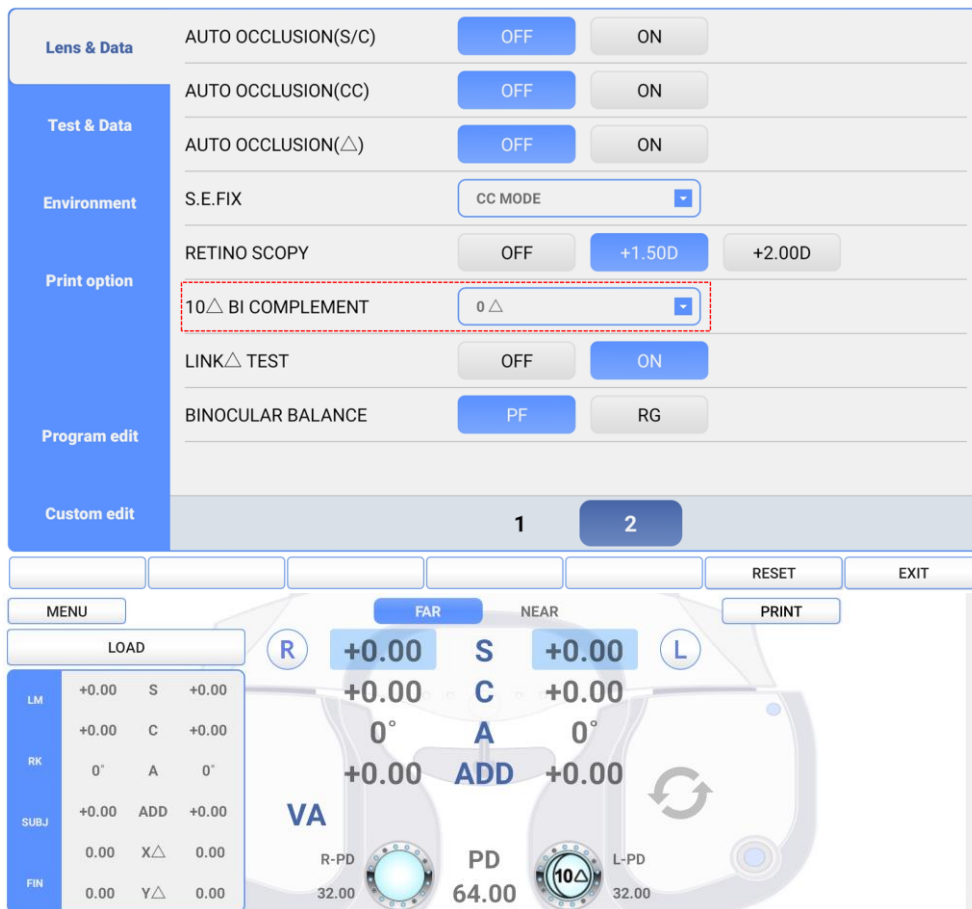
**[ UDR-800P List of Auxiliary lens ]**

Lens	Application	Description	Lens	Application	Description
	R/L	Window Open		R/L	Window Close
	R/L	Polarized light 45 degrees		R/L	Polarized light 135 degrees
	R	6ΔBU		L	10ΔBI
	R	Horizontal Maddox		L	Vertical Maddox

	R/L	Pin Hole		R/L	Jackson Cylinder	Cross
	R	Red Filter		L	Green Filter	
	R/L	PD check		R/L	Retinoscopy Lens (Test distance 67cm)	
	R/L	Retinoscopy Lens (Test distance 50cm)				

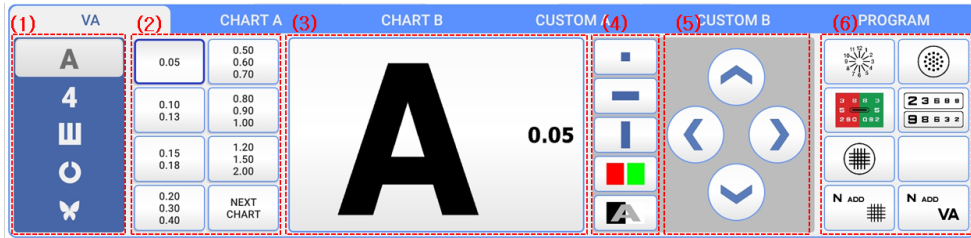
[Table 5-1] List of Auxiliary lens

※ 10Δ BI lens is changeable from 0Δ to 5Δ according to the value designated on Lens& Data page 2, '10Δ BI COMPLEMENT.' In case the lens is installed already, the supplementary prism degrees appear on the left eye lens mark.



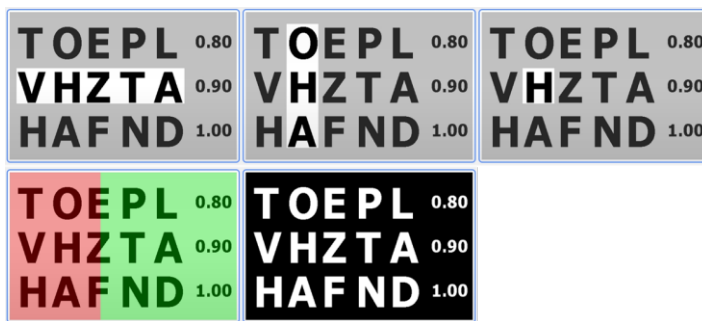
[Figure 5-10] Choosing Option of 10ΔBI Prism Lens and Installation

⑫ Chart selecting window  
- VA Chart







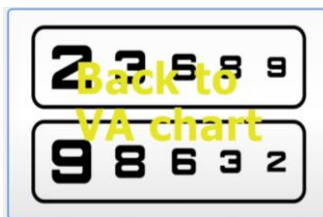
[Figure 5-11] VA Chart selecting window

- (1) Chart type: You can choose letter, number, snellen, landolt and image chart.
- (2) Chart size: You can choose chart size.
- (3) Displays the currently selected chart.
- (4) Masking buttons: You can choose masking mode, Red/Green chart and Black/White chart.



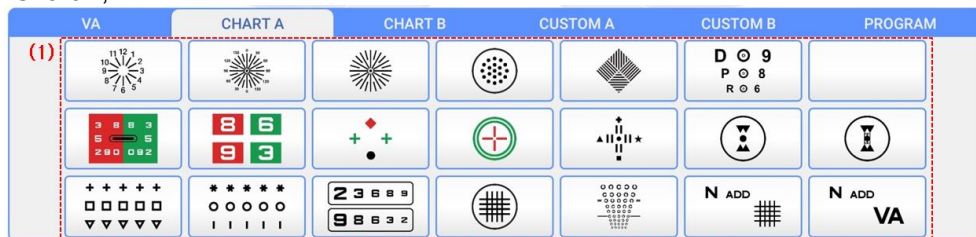
[Figure 5-12] Horizontal, Vertical, Single masking, Red/Green chart, Black/White chart

- (5) This is the button to move the masking. In normal VA chart, when touch  or  button, it turns to horizontal masking chart. And when touch  or  buttons, it turns to vertical masking chart.
- (6) By setting a frequently used chart, you can use it quickly. If you select chart, the phrase 'Back to VA chart' appears in window (3) as shown in [Figure 5-13]. And when you touch the window (3), it returns to the previously used VA chart. The chart list can be modified on the 'Menu -> Custom edit' screen.



[Figure 5-13] Selected chart image

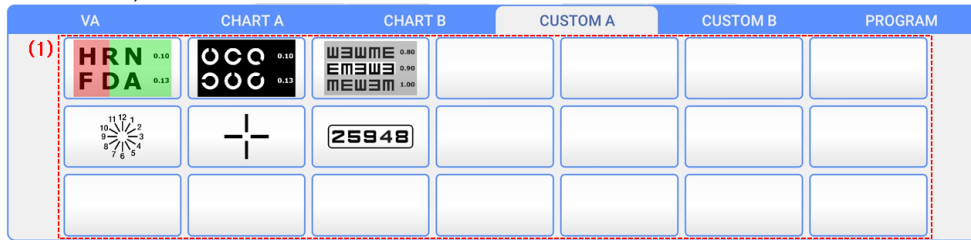
- Chart A, B



[Figure 5-14] CHART A

- (1) You can select other than VA chart.

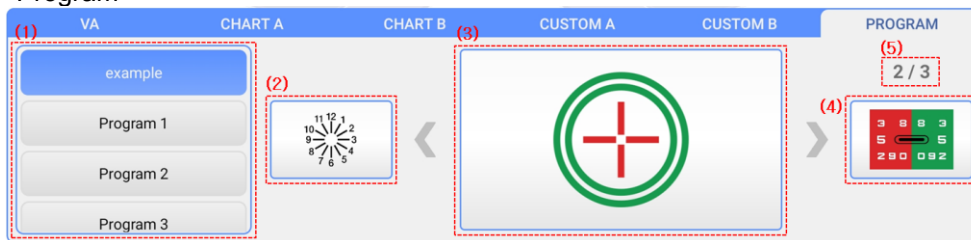
– Custom A, B



[Figure 5-15] CUSTOM A

- (1) Can select a chart edited by the user. You can see 'Custom edit of 8.1.2' how to edit custom chart.

– Program



[Figure 5-16] PROGRAM

- (1) Can select program edited by the user. You can see 'Program edit of 8.1.2' how to edit program.
- (2) Return to the previous chart of the currently selected program. It has the same function as the [PREV] button on Operation panel.
- (3) Display currently selected chart.
- (4) Move to the previous chart of the currently selected program. It has the same function as the [NEXT] button on Operation panel.
- (5) Display the order of the currently selected charts and total number of charts.

## 6. Test Mode

UDR-800P offers 6 kinds of test modes to directly compare objective test result with the subjective test result.

You can designate the test mode you want, according to the startup mode of Test & Data page 2'

Lens & Data	DEFAULT PROGRAM	Standard
Test & Data	FOG: BALANCE	+0.00
	FOG: RED/GREEN	+0.00
Environment	STARTUP MODE	EMPTY
Print option	SUBJ STARTUP	RK LM ANY
Program edit		
Custom edit		

[Figure 6-1] Startup mode of 'Test & Data page 2'

- Empty Mode (Vision Test Startup Mode): It is a startup mode to do vision test of UDR series. It is a temporary mode on which you cannot check the result after the mode is changed. Changing it into SUB mode is recommended, after the vision test got started.
- UA Mode (Unaided Vision Test Mode): It is an unaided vision test mode. By pressing [UA] button, you can change other modes into UA mode.
- RK Mode (Auto Ref/Keratometer Test Mode): It is a mode to save the test results of the auto ref/keratometer. After receiving information from the auto ref/keratometer, touch [RK LOAD] button to save the test results. You can change others into RK mode by pressing [URK] button.
- LM Mode (Auto Lensmeter Mode): It is a mode to save test results of auto lensmeter. After receiving information from the lensmeter, touch [LM LOAD] button to save the test results of lensmeter. Press [ULM] button to change others into LM mode (estimated to be offered).
- SUBJ Mode (Subjective Vision Test Mode): It is a kind of test mode of UDR-800P. Different from the Empty Mode, the results are shown after the mode is changed. Press [SUBJ] button to change others into SUB mode.
- FIN mode (Mode of Vision Test Prescription): On this mode, you can show the resulted prescription following the vision test. Press [FIN] to change others into FIN mode.

### 6.1 Why does need Test Mode?

The patient can directly experience and compare objective test result (obtained from Ref/Keratometer and Lensmeter) and subjective test result obtained from UDR series.

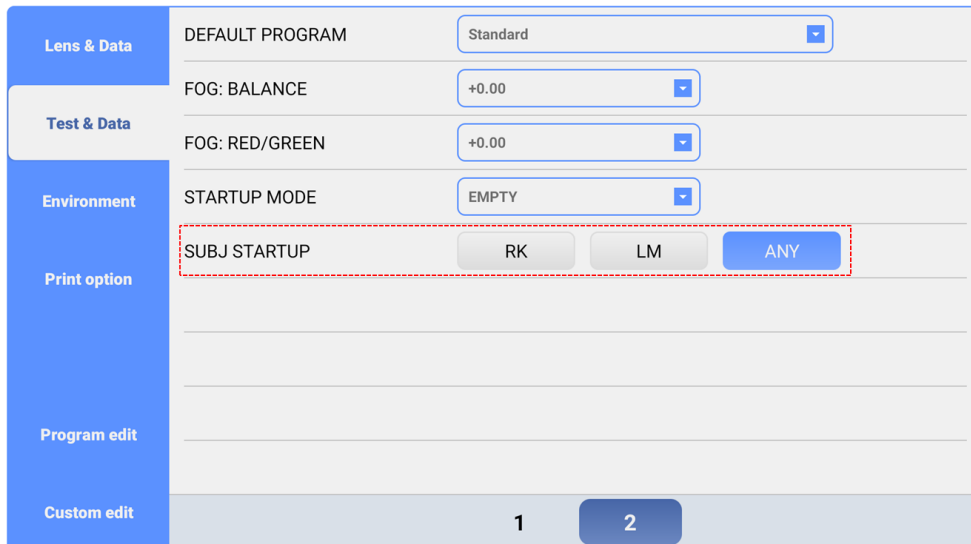
In other words, the patient can compare directly objective test results with subjective test results, through mode changes. Beside it could compare and analyze the information of the patient from various aspects, make complementary correction between them and allow the proper prescription for the patient.

### 6.2 Test Mode and Results Copy

On every mode except UA mode, the pre-existing mode value is duplicated into new mode one time only when mode is changed.

In case of UA mode, different from other modes, the information is not copied because it operates independently. Moreover, since it copies to use the results of UA mode whenever mode is changed, so that you may avoid inconvenience to reset and save the test time.

You can restrict copy of the results on SUBJ mode by SUBJ startup of 'Test & Data page 2'.



[Figure6-2] SUBJ STARTUP of Test & Data page 2

### 6.3 Use of PRESET, AUX OFF, LENS FIX Mode

- PRESET Mode

On PRESET Mode, the lenses are not changed while values of field(S, C, A, VA, ADD, PRISM) are changed. So, the patient does not feel any discomfort while the information for objective test value is set in the system without any network. Furthermore, the intervene of accommodation force could be restricted.

Press [CC1] button while pressing [SHIFT] button to begin PRESET mode, then 'PRESET' mode appears on the upper part of screen. Set the field value by selecting the field, and lift PRESET mode by pressing [CC1] button while pressing [SHIFT] button. Lenses are inserted at once according to the determined value of field.



[Figure 6-3] PRESET Mode



- **AUX OFF Mode**  
AUX OFF Mode temporarily removes auxiliary lenses (Polarized Light, Red/Green, Fixed Cross Cylinder Lenses, 6Δ BU Lenses and 10Δ BI Lenses,) which are put in during vision test.

By pressing left [OPEN/CLOSE] button while pressing [SHIFT] button, the AUX OFF mode is activated, showing 'AUX OFF' mode on the upper part of screen. And then, the auxiliary lenses are temporarily removed. Aging by pressing left [OPEN/CLOSE] button while pressing [SHIFT] button, lift AUX OFF mode, and the removed auxiliary lenses would be put in again.



[Figure 6-4] AUX OFF Mode

- **LENS FIX Mode**  
LENS FIX mode is a function that does not insert lenses set automatically when selecting chart during vision test.

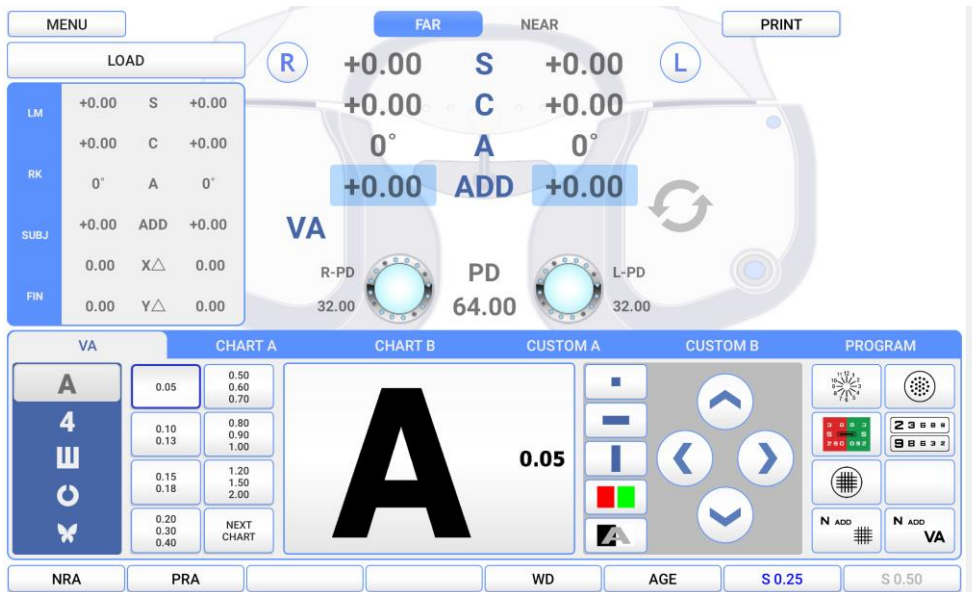
By pressing right [OPEN/CLOSE] button while pressing [SHIFT] button, LENS FIX mode is activated. Again by pressing right [OPEN/CLOSE] button while pressing [SHIFT] button, lift LENS FIX mode.



[Figure 6-5] LENS FIX Mode

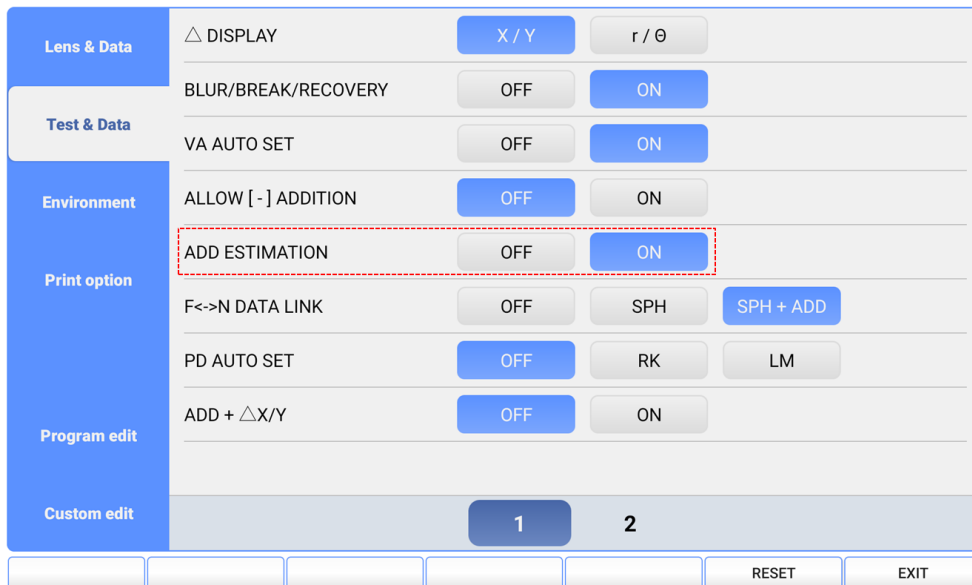
## 6.4 Test of Far Vision and Near Vision

- There are two vision such as Far vision and Near vision. Generally, vision means Far vision, and actually this manual also treats Far vision test throughout the most part. However, as the problems of Near vision are growing recently, UDR-800P serves both Far vision and Near vision.
- To do Near vision test, change the mode by pressing [FAR/NEAR] button on touch screen, or adjust Addition only, while maintaining Far vision mode by pressing [ADD] button. If a patient has even presbyopia with nearsightedness(myopia), it's recommended to test on [ADD] mode by pressing [ADD] button.
- On each method, the Ref. Body of UDR-800P is tilted to the opposite side of the patient, and input the information about the work distance and the patient's age for an accurate test when you do Near vision test.



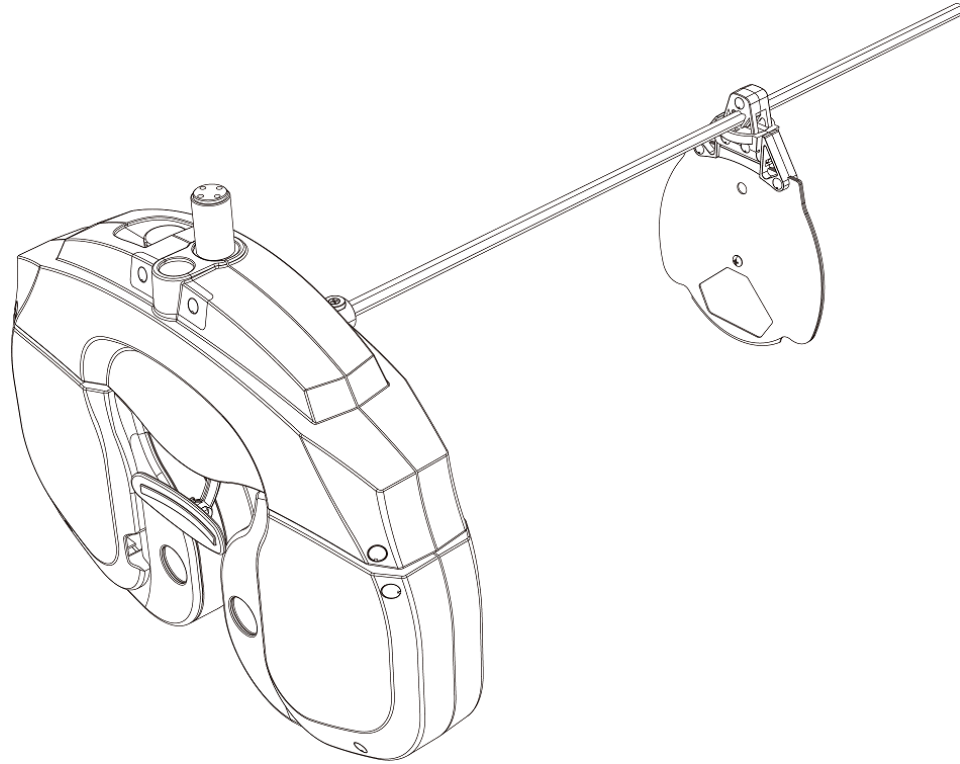
[Figure 6-6] ADD Mode

- Set up the working distance  
You can adjust the tilting degree while continuously checking it by pressing [WD] button on key below of screen.
- Set up patient's eye  
Can alter age by pressing [AGE] button and furthermore, Add per age is automatically applied if ADD ESTIMATION of Test & Data – page 1 is set into 'ON'.



[Figure 6-7] Applying addition per age

On Near vision test mode, hang up the near vision chart to test how far the patient can see the chart, and put Addition if necessary.



[Figure 6-8] Hang up the Near Vision Chart

## 7. Communication with Various Vision Test Devices

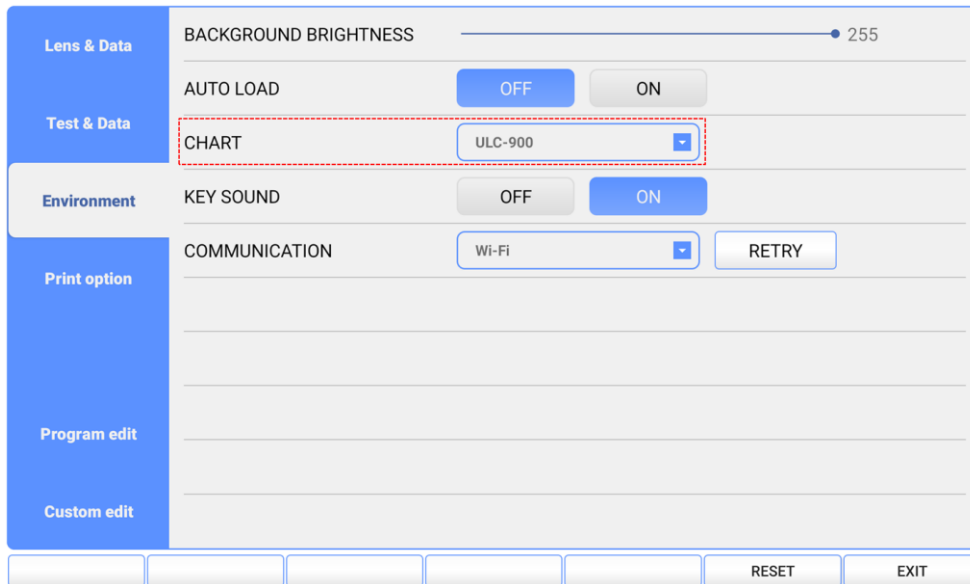
UDR-800P could be connected a various optometry devices with a single network.

- Chart Projector: ACP series, ULC series
- Auto Ref / Keratometer: URK series
- Auto Lensmeter: ULM series

### 7.1 Option setting for Chart (ACP, ULC series)

To use UDR-800P proper, Chart Projector must be installed. In case Chart Projector is installed, just follow as below to choose the options

Set up 'ACP-900' or 'ULC-900' the CHART on Environment page, then touch EXIT.



[Figure 7-1] CHART on Environment

### 7.2 Option setting for Auto Ref/Keratometer((URK series) and Lensmeter (ULM series)

It's recommended to install URK series and ULM series to make full use of the function of UDR-800P.

Set up the TYPE to UDTF2 and Baudrate to 9600 in URK, ULM series.

### 7.3 Load and Save the data of Auto Ref / Keratometer (URK series)

- Transmit the test results of the Auto Ref / Keratometer (URK series) to UDR-800P
  - ① Measure the patient's eye by auto ref/keratometer.
  - ② The test results are transmitted to UDR series from UDR-800P, by pressing PRINT button on URK series.
  - ③ Touch [RK LOAD] button on UDR-800P, and insert the lenses to meet the information received from URK series. (value of S, C, A, and PD).
  
- Save the test results of the Auto Ref / Keratometer (URK series) or the measurement data of UDR series into the database of UDR series
  - ① Transmit the test results of the Auto Ref / Keratometer to UDR-800P. The data that is transmitted into the DATABASE is saved automatically in order of date and time.

LM	RK	DB		R	L
			RK_2022-06-13_24:55:40	SPH	-1.75    -2.00
			RK_2022-06-13_24:54:51	CYL	-1.50    -1.25
			RK_2022-06-13_24:54:38	AXIS	170°    175°
				ADD	+0.00    +0.00
				X△	0.00    0.00
				Y△	0.00    0.00
				DELETE	CANCEL    LOAD

[Figure 7-2] Saved RK data list

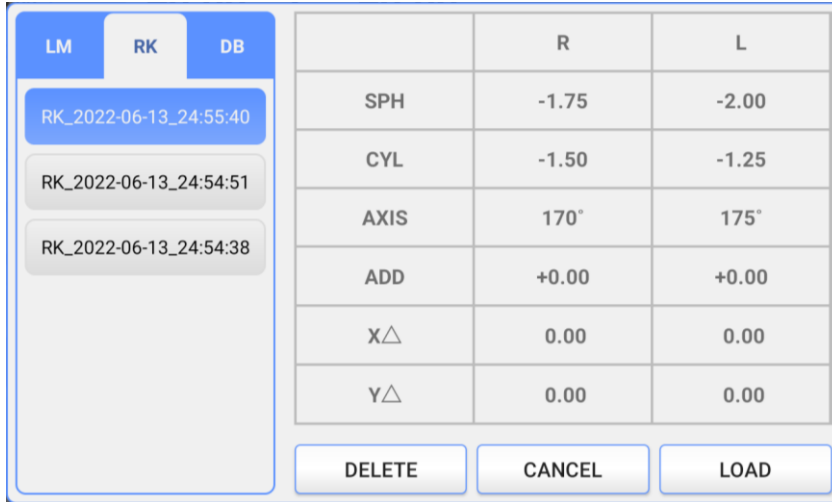
To save the measurement data of UDR-800P, the 'AUTO SAVE' menu of 'Print option' must be set as 'ON' so that the measurement data may be saved automatically.

Lens & Data	PRINT SUBJECTIVE	UA	BIN VF	SUBJ	FIN
	PRINT OBJECTIVE	RK	LM		
Test & Data	PRINT KERATO DATA	OFF	ON		
	PRINT △ TEST DATA	OFF	ON		
Environment	PREVIEW RESULT	OFF	ON		
	AUTO CLEAR	OFF	ON		
Print option	AUTO SAVE	OFF	ON		
	Print	OFF	ON		
Program edit	INPUT NAME	OFF	ON		
	Custom edit	1	2		
					RESET    EXIT

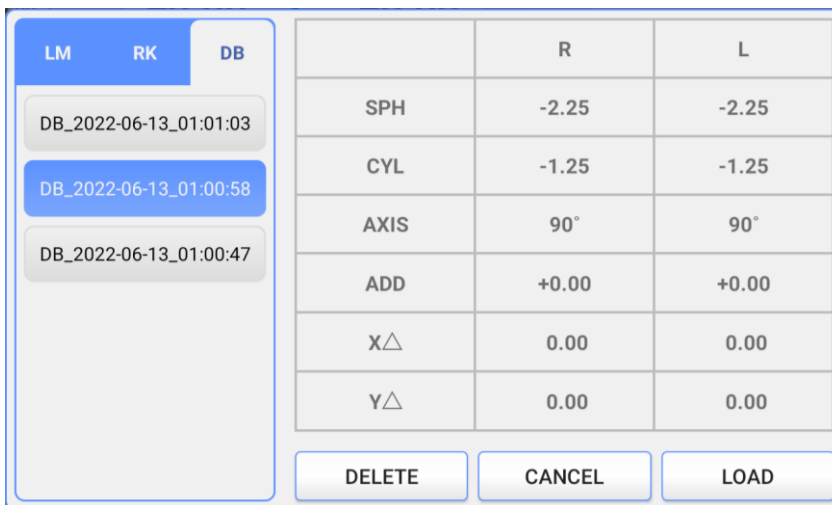
[Figure 7-3] Set up the AUTO SAVE menu, on Print option

### 7.4 Make Use of Built-In Database

UDR-800P can save the past results of 30 patients at most (or Maximum 10 results for each data). The data that receive from other device or the test results after printing out are saved automatically into the memory of UDR series, on a basis of first-come-first-go. To pull out the results of the built in database, choose the necessary menu by pressing [LOAD] button, and then check out the past results that are arranged according to the patients' IDs. The lenses also can be put in automatically.



[Figure 7-4] List of RK data which is transmitted



[Figure 7-5] List of FIN measurement data

## 8. Choose Menu

UDR-800P serves a various function through 'MENU' choice mode. Enter Menu mode by touching in upper left corner of the main screen.



[Figure 8-1] MENU Selection

- **SYSTEM SETTING:** Set up a various options related with system.
- **LAMP:** Set up the brightness of LED for near vision test.
- **GALLERY:** Serve color blindness test and supply various charts and images for near vision test.

### 8.1 SYSEYEM SETTING

UDR-800P can realize the optimal test environment through menus of the 'SYSTEM SETTING'. To enter, you can touch 'MENU' button on the upper left corner of screen, and then select [SYSTEM SETTING].

#### 8.1.1 Bottom buttons

- **RESET:** Rest the system settings to default values by touching the [RESET] button.
- **EXIT:** Save the setting values, and then exit the SYSTEM SETTING screen.

## 8.1.2 Introducing each page

- Lens & data page 1

Set up the information related with lens control which is necessary in the process of test.

Lens & Data	SPH STEP	0.12D	0.25D	0.50D	1.00D
Test & Data	CYL FORM	[-]		[+]	
	CYL STEP	0.25D	0.50D	1.00D	
Environment	AXIS STEP	1°	5°	15°	30°
Print option	△ STEP	0.1	0.5	1.0	
	SPH + SHIFT STEP	1.00D	2.00D	3.00D	4.00D
Program edit	AXIS UP/DOWN	OFF		ON	
	CC TYPE	0.25	0.50	DUAL	
Custom edit		1	2		
					RESET
					EXIT

[Figure 8-1] Test & Data page 1

- ① SPH STEP: Designate the increased or decreased values of SPH. You can choose one among 0.12D, 0.25D, 0.50D and 1.00D.
- ② CYL FORM: Designate the CYL mark. You can choose one between + and -. If touch [+/-] on the screen at CYL mode, CYL mark change + or -.
- ③ CYL STEP: Designate the increased or decreased value of CYL. You can choose one among 0.25D, 0.50D and 1.00D.
- ④ AXIS STEP: Designate the increased or decreased value of AXIS. You can choose one among 1°, 5°, 15° and 30°.
- ⑤ Δ STEP: Designate the increased or decreased value of prism. You can choose one among 0.1Δ, 0.5Δ and 1.0Δ.
- ⑥ SPH+SHIFT STEP: Designate the increased or decreased value of SPH when SHIFT pressed. You can choose one among 1.00D, 2.00D, 3.00D and 4.00D.
- ⑦ AXIS UP/DOWN : Designate the axis rounding when increased or decreased value of AXIS. You can choose OFF or ON.
- ⑧ CC TYPE: Designate the type of Cross Cylinder. You can choose one among Jackson Cross Cylinder 0.25 or 0.50, and DUAL(Dual Cross Cylinder).



- Lens & Data page 2

Set up the information related with lens control which is necessary in the process of test.

Lens & Data	AUTO OCCLUSION(S/C)	OFF	ON
Test & Data	AUTO OCCLUSION(CC)	OFF	ON
	AUTO OCCLUSION( $\Delta$ )	OFF	ON
	S.E.FIX	CC MODE	
Print option	RETINO SCOPY	OFF	+1.50D +2.00D
	10 $\Delta$ BI COMPLEMENT	0 $\Delta$	
Program edit	LINK $\Delta$ TEST	OFF	ON
	BINOCULAR BALANCE	PF	RG
Custom edit	1 2		
		RESET	EXIT

[Figure 8-2] Test & Data page 2

- ① AUTO OCCLUSION(S/C): Determine whether to occlude the lenses automatically for the patient, in case SPH and CYL lens are changed drastically. You can choose OFF or ON.
- ② AUTO OCCLUSION(CC): Determine whether to occlude the lenses automatically for the patient, in case Cross Cylinder lens is changed drastically. You can choose OFF or ON.
- ③ AUTO OCCLUSION:  $\Delta$ : Determine whether to occlude the lenses automatically for the patient, in case Prism is changed drastically. You can choose OFF or ON.
- ④ S.E. Fix: Determine whether to fix the SPH. You can choose one among OFF (SPH is fixed all the time,) CYL MODE (SPH is fixed only on CYL mode,) CC-ONLY (SPH is fixed only on Cross Cylinder mode,) and ALWAYS (SPH is not fixed, all the time,).
- ⑤ RETINOSCOPY: Designate the degree of the lens for Retinoscopy. You can choose one among OFF, +1.5D and +2.0D.
- ⑥ 10 $\Delta$ BI COMPLEMENT: Designate additional degree to add on 10 $\Delta$  BI separate prism. You can choose one between 0~5 $\Delta$ .
- ⑦ LINK  $\Delta$ TEST: Determine whether to synchronize the value of prism after Heterophoria with the value of prism in the main area. You can choose OFF or ON.
- ⑧ BINOCULAR BALANCE: Determine whether to use binocular balance lens type. You can choose PF(Polar filter) or RG(Red/Green).

- Test & Data page 1

Set up the items related with the test and data control which is necessary in the process of test.

Lens & Data	△ DISPLAY	<input checked="" type="button" value="X / Y"/>	<input type="button" value="r / θ"/>
	BLUR/BREAK/RECOVERY	<input type="button" value="OFF"/>	<input checked="" type="button" value="ON"/>
Test & Data	VA AUTO SET	<input type="button" value="OFF"/>	<input checked="" type="button" value="ON"/>
	ALLOW [-] ADDITION	<input checked="" type="button" value="OFF"/>	<input type="button" value="ON"/>
Environment	ADD ESTIMATION	<input type="button" value="OFF"/>	<input checked="" type="button" value="ON"/>
	F<->N DATA LINK	<input type="button" value="OFF"/>	<input type="button" value="SPH"/> <input checked="" type="button" value="SPH + ADD"/>
Print option	PD AUTO SET	<input checked="" type="button" value="OFF"/>	<input type="button" value="RK"/> <input type="button" value="LM"/>
	ADD + △X/Y	<input checked="" type="button" value="OFF"/>	<input type="button" value="ON"/>
Program edit		<input checked="" type="button" value="1"/>	<input type="button" value="2"/>
Custom edit			
		<input type="button" value="RESET"/>	<input type="button" value="EXIT"/>

[Figure 8-3] Test & Data page 1

- ① △ Display: Designate marking method of  $\Delta$ . You can choose X/Y or r/θ.
- ② BLUR/BREAK/RECOVERY: Determine whether to setup the value of BLUR / BREAK / RECOVERY. You can choose YES or NO.
- ③ VA AUTO SET: Determine whether to apply the value of VA by Chart Mask, in the process of Visual Acuity test. You can choose OFF or ON.
- ④ ALLOW [-] ADDITION: Determine whether to allow the minus value of Addition. You can choose OFF or ON.
- ⑤ ADD ESTIMATION: Determine whether to designate presumptuous Addition according to ages. You can choose OFF or ON.
- ⑥ F<->N DATA LINK: Designate the applying method of ADD value, when it is transferred between Long Distance Mode and Short Distance Mode. You can choose one among SPH+ADD (apply added ADD to SPH), SPH (apply only SPH), and OFF (do not apply,).
- ⑦ PD AUTO SET: Designate the method to set up automatic PD value. You can choose RK, LM, or OFF.
- ⑧ ADD+ $\Delta$ X/Y: Designate whether to apply prism in the addition. You can choose OFF or ON.

- Test & Data page 2

Set up the items related with the test and data control which is necessary in the process of test.

Lens & Data	DEFAULT PROGRAM	Standard
Test & Data	FOG: BALANCE	+0.00
	FOG: RED/GREEN	+0.00
Environment	STARTUP MODE	EMPTY
Print option	SUBJ STARTUP	RK LM ANY
Program edit		
Custom edit		

1 2

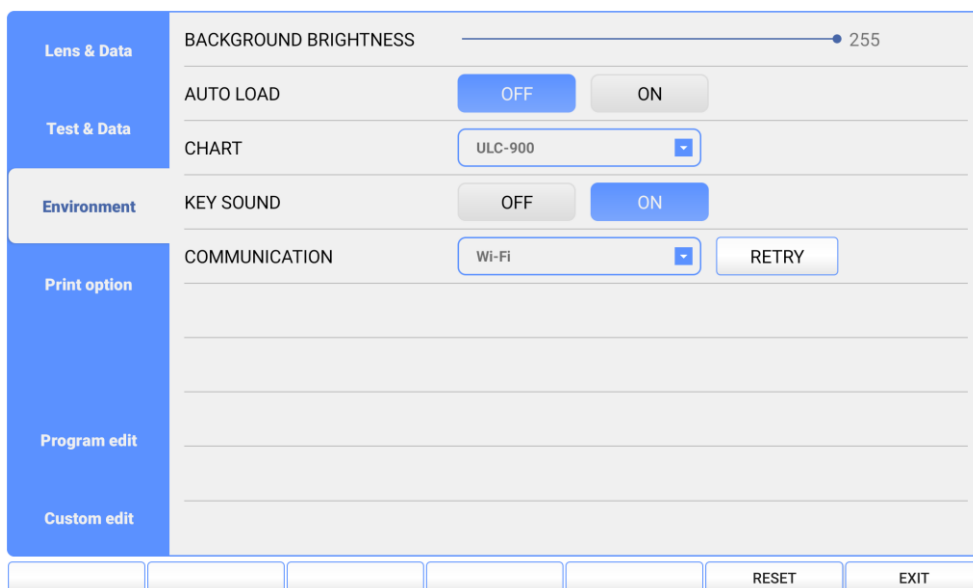
RESET EXIT

[Figure 8-4] Test & Data page 2

- ① **DEFAULT PROGRAM:** Designate basic programs for vision test. You can choose one among Custom Program including STANDARD.
- ② **FOG: BALANCE:** Designate the value of Fogging for the Balance Test of Binocular. You can choose one from +0.00D to +1.00D.
- ③ **FOG: RED/GREEN:** Designate the value of Fogging for the Red/Green Test. You can choose one from +0.00D to +1.00D.
- ④ **STARTUP MODE:** Designate the start mode when the system was initialized by [RESET] button. You can choose one among EMPTY, UA, LM, RK, and SUB.
- ⑤ **SUBJ STARTUP:** Designate the mode on which the information is copied, when you entered SUB mode by pressing [SUBJ] button. You can choose RK, LM, or ANY.

- Environment

Set up the options about Test Environment.



[Figure 8-5] Environment

- ① **BACKGROUND BRIGHTNESS:** Adjust the transparency of body image on the main screen.
- ② **AUTO LOAD:** Select whether to load immediately according to data received from RK and LM. You can choose OFF or ON.
- ③ **CHART:** Select chart connected with UDR-800P. You can choose ULC-900 or ACP-900.
- ④ **KEY SOUND:** Turn off or on the sound when click the button on the operation panel or touch the button on screen.
- ⑤ **Communication:** You can choose Wi-Fi or USB. When selecting Wi-Fi, it must be connected to the provided wireless router. When selecting USB, Tablet PC and operation panel must be wired by cable. You can retry the connection by touching [RETRY] button.

- Print option

Set up the options related with printing.

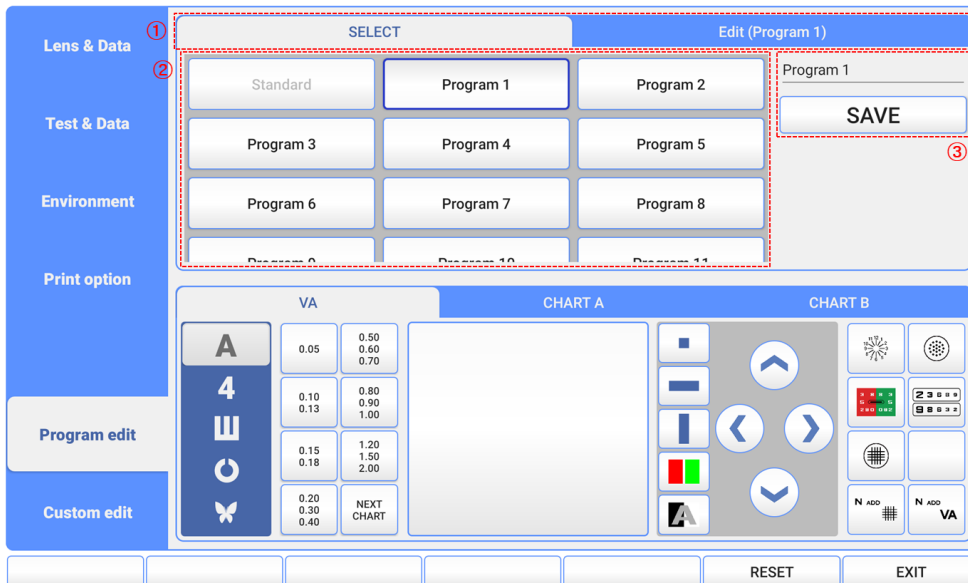
Lens & Data	PRINT SUBJECTIVE	UA	BIN VF	SUBJ	FIN	
	PRINT OBJECTIVE	RK	LM			
Test & Data	PRINT KERATO DATA	OFF	ON			
Environment	PRINT $\Delta$ TEST DATA	OFF	ON			
Print option	PREVIEW RESULT	OFF	ON			
	AUTO CLEAR	OFF	ON			
Program edit	AUTO SAVE	OFF	ON			
	Print	OFF	ON			
	INPUT NAME	OFF	ON			
Custom edit		1	2			
					RESET	EXIT

[Figure 8-6] PRINT OPTION

- ① PRINT SUBJECTIVE: Designate the items of subjective test result to be printed.  
 UA: UA mode test result  
 BIN VF: Vision functions test result  
 SUBJ: SUBJ mode test result  
 FIN: FIN mode test result
- ② PRINT OBJECTIVE : Designate the items of objective test result to be printed.  
 RK: RK mode test result  
 LM: LM mode test result
- ③ PRINT KERATO DATA: Determine whether to print the value of KEAROMETRY (Radius of corneal curvature). You can choose OFF or ON.
- ④ PRINT  $\Delta$  TEST DATA: Determine whether to print the value of Prism for each Heterophoria Test. You can choose OFF or ON.
- ⑤ PREVIEW LIST: Determine whether to use preview function. You can choose OFF or ON.
- ⑥ AUTO CLEAR: Determine whether to initialize the test result when touch [PRINT] button. You can choose OFF or ON.
- ⑦ AUTO SAVE: Determine whether to save the test result when touch [PRINT] button. You can choose OFF or ON.
- ⑧ PRINT: Determine whether to print. You can choose OFF or ON.
- ⑨ INPUT NAME: Determine whether to input patient name when print. You can choose OFF or ON.

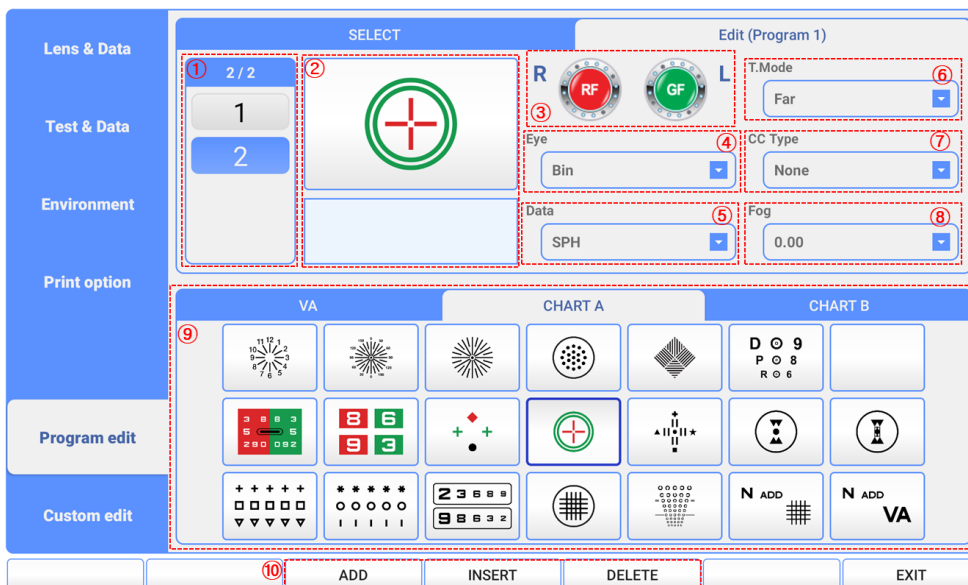
- Program edit

Edit user setting program.



[Figure 8-7] Program edit (SELECT tab)

- ① SELECT tab is screen for selecting program to edit, EDIT tab is a screen for editing program the program. Select the item you want to edit on the SELECT tab and move on EDIT tab.
- ② You can check the list of saved program list, and if you touch the program you want to edit, it will be displayed in a blue border.
- ③ You can change the name of the selected program, and it is saved if you touch the [SAVE] button.



[Figure 8-8] Program edit (EDIT Tab)

- ① You can check the number of step of the selected program. And you can select the

step.

- ② It is a window for checking the set chart of selected step.
- ③ When touching the lens image, auxiliary lens selection screen is displayed. In that screen, you can set up auxiliary lens of selected step.
- ④ Select the direction of eye. You can choose Right, Left or Bin.
- ⑤ Select field of data. You can choose SPH, CYL, AXIS, ADD, VA, PRISM, PRISM, PRISMY or ADD VA.
- ⑥ Select TEST MODE, Far distance mode and Near distance mode. Select distance mode and Near distance mode by touching the combo box on the screen.
- ⑦ Select cross cylinder type. You can choose 0.25, 0.50 or Dual.
- ⑧ Select fogging value form +0.00D to +2.00D.
- ⑨ When touch the chart you want, selected step's chart will be set.
- ⑩ You can add step by touching 'ADD' and 'INSERT' button. And when you touch the 'DELETE' button, delete the selected step.

- Custom edit

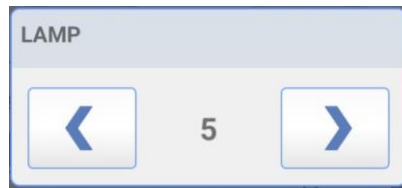
Edit user setting chart(CHART A, CHART B).



[Figure 8-9] Custom edit

- ① Select chart to edit. You can choose CUSTOM A, CUSTOM B or QUICK.
- ② If you select the location you want to edit, it will be marked with a blue thick border.
- ③ If you select the chart you want to add, the chart at selected location is set.

## 8.2 LAMP



[Figure 8-10] LAMP setting window

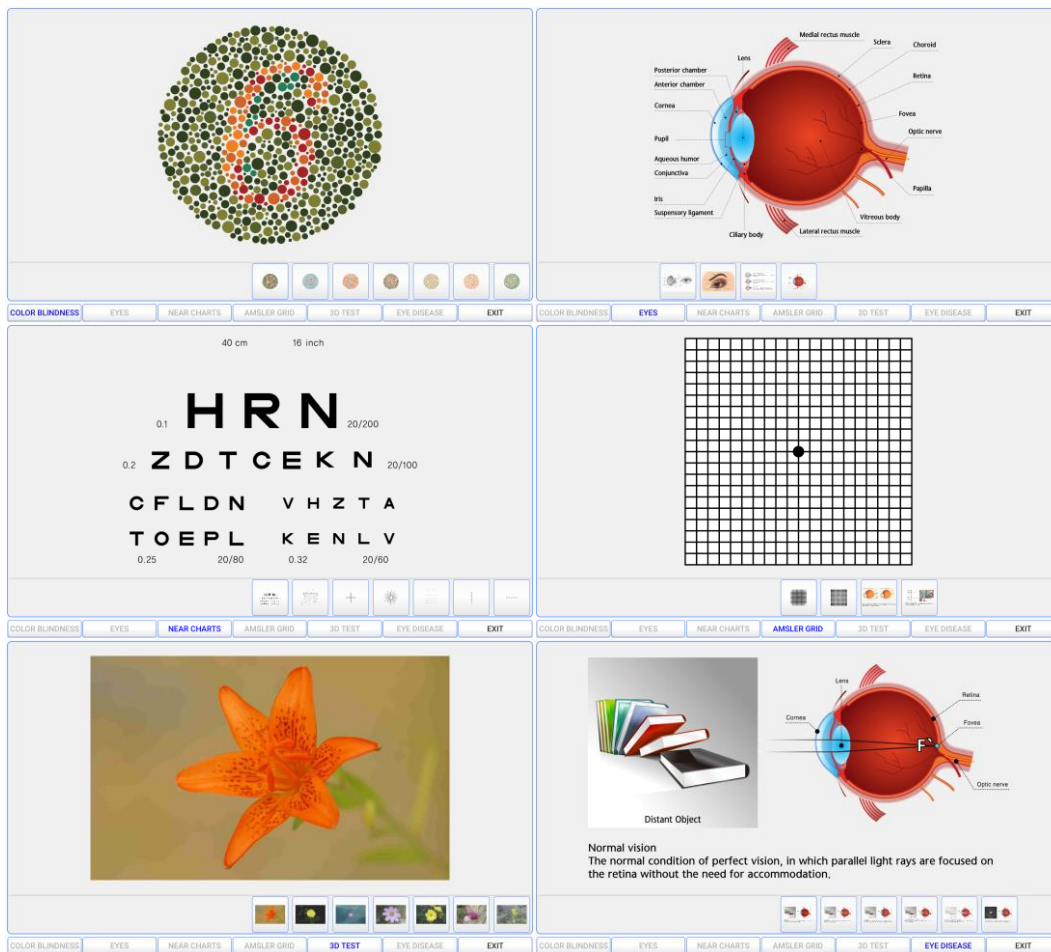
It is possible to adjust the brightness of LED for near vision test. It can be adjusted with the left and right arrow buttons, and from 0 to 10.

## 8.3 Gallery

UDR-800P serves a color-blindness test and visual function test with Operation panel, furthermore serves near vision test with near vision chart.

And could explain various vision and ophthalmic diseases very easily to the patient.

If select the item to be used at the menu of screen, the various images appear properly. The image become big if touch the small image at the bottom.



[Figure 8-11] GALLERY Screen



## 9. Basic Programs Operation

UDR-800P allows a more convenient and more prompt visual acuity test with 1 System-Defined Program and 11 User-Defined Programs. When you use System-Defined Program, various tests offered by UDR-800P are available. Therefore, on this chapter, let's go through the System-Defined Program from beginning to end, and grasp UDR-800P basic operation and its running method at the same time.

### 9.1 Start System-Defined Basic Program

Power on the junction box of UDR-800P and wait until the system initialization. For a convenient test, let's start after changing it into [SUBJ] mode on main screen. Press [PROG] button to operate the System-Defined Program. Or touch the PROGRAM tab button on main screen. When the System-Defined Program starts, you would see the name and step mark of current program.



[Figure 9-1] Choice and Operation of the STANDARD Program

**9.1.1 Adjustment of the SPH-CYL-AXIS Value**

Step 1 of the System-Defined Program is basically to adjust the value of SPH-CYL-AXIS for right eye. Early data field is setup as SPH Binocular. Press [R] or [L] to shift to the Monocular mode, and adjust SPH fit for the patient's status. Move on to press [Distorted Vision Clock Dial] button to shift on the Distorted Vision Mode. Then adjust the value of AXIS and CYL fit for the patient's status. After all the adjustment is over and the best vision of the patient's Monocular comes out, go on to the next step.



[Figure 9-2] Adjustment of 1<sup>st</sup> step S - C -A Value

**9.1.2 Cross Cylinder Test using Dots Chart (AXIS)**

The 2<sup>nd</sup> step of the System-Defined Program is to revise the value of AXIS for the right eye more elaborately, based on the result of 1st step SPH-CYL-AXIS test. In case of Jackson Cross Cylinder Test, ask the patient with which eye he looks more clearly, while pressing number [1] and [2] buttons alternately. When he says number [1], turn the dial in + direction (counterclockwise,) while number [2] in - direction (clockwise.) Continue this until the patient answers that he sees both with similar clarity.



[Figure 9-3] 2<sup>nd</sup> step Cross Cylinder Test (Axis)

**9.1.3 Cross Cylinder Test using Dots Chart (CYL)**

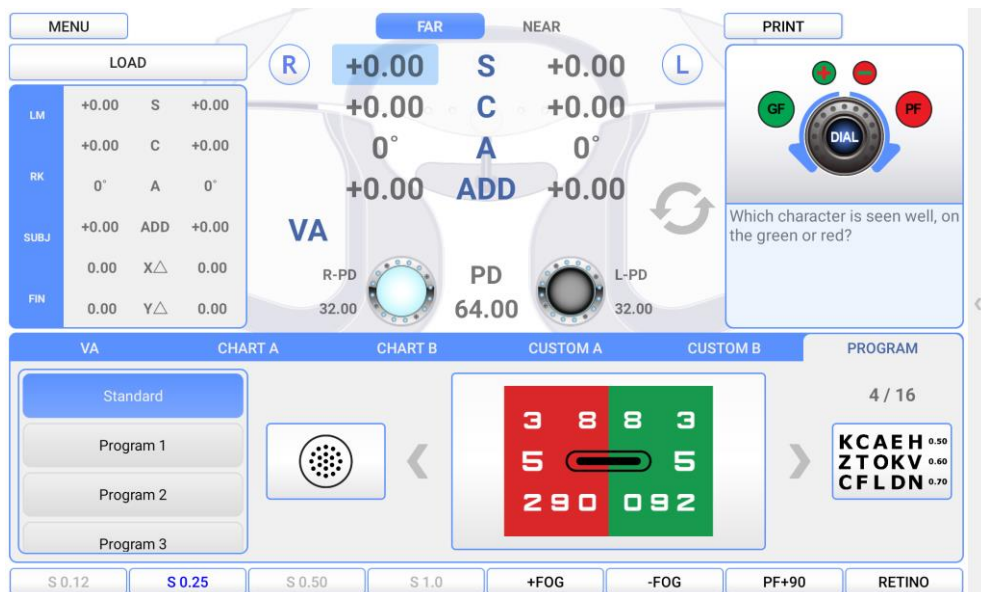
The 3<sup>rd</sup> step of the System-Defined Program is to revise the value of CYL for the right eye more elaborately, based on the result of 1st step SPH-CYL-AXIS test. In case of Jackson Cross Cylinder Test, ask the patient with which eye he looks more clearly, while pressing number [1] and [2] buttons alternately. When he says number [1], turn the dial in + direction (counterclockwise,) while number [2] in – direction (clockwise.) Continue this until the patient answers that he sees both with similar clarity.



[Figure 9-4] 3rd step Cross Cylinder Test (CYL)

**9.1.4 Red/Green Balance Test for single eye**

The 4<sup>nd</sup> step of the System-Defined Program is to revise the value of SPH for the right eye more elaborately, based on the result of 1st step SPH-CYL-AXIS test. After questioning the patient with which letter does he sees more clearly, between the letter in green background and red background respectively. When he says the letter in green background is clearer, turn the dial in + direction (counterclockwise,) while one in the red background – direction (clockwise,) because that is not revised. Continue this until the patient says that he sees both letters with similar clarity.



[Figure 9-5] 4<sup>th</sup> step Red/Green Balance Test for Monocular

### 9.1.5 Check the Power of Glasses for Right Eye

After the test of right eye is finished, check the power of glasses for right eye again. If necessary, use a mask for the test.



[Figure 9-6] 5<sup>th</sup> step Check the Power of Glasses for Right Eye

### 9.1.6 Adjustment of the SPH-CYL-AXIS Value

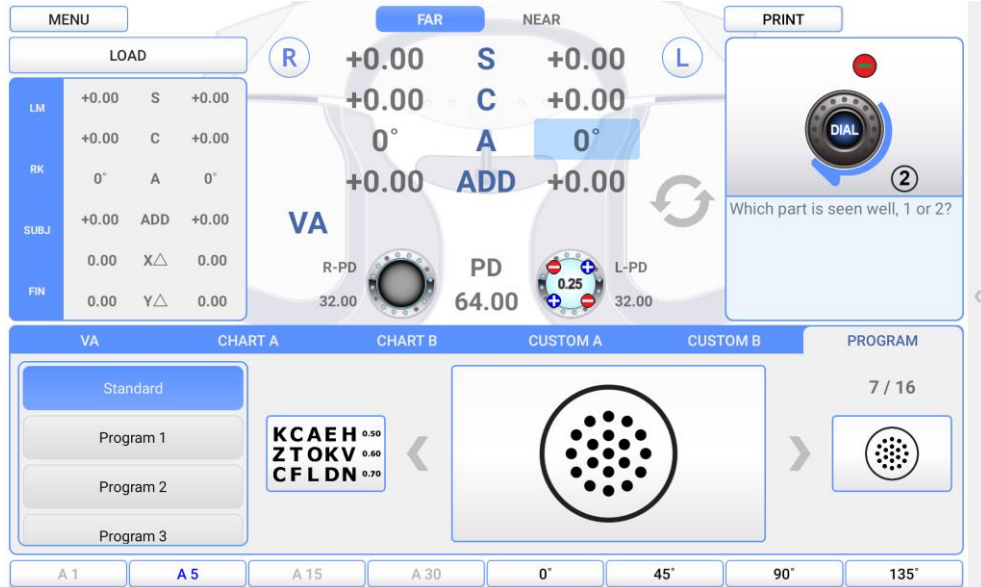
6<sup>th</sup> step of the System-Defined Program is basically to adjust the value of SPH-CYL-AXIS for left eye.



[Figure 9-7] Adjustment of the S-C-A Value

**9.1.7 Cross Cylinder Test using Dots Chart (AXIS)**

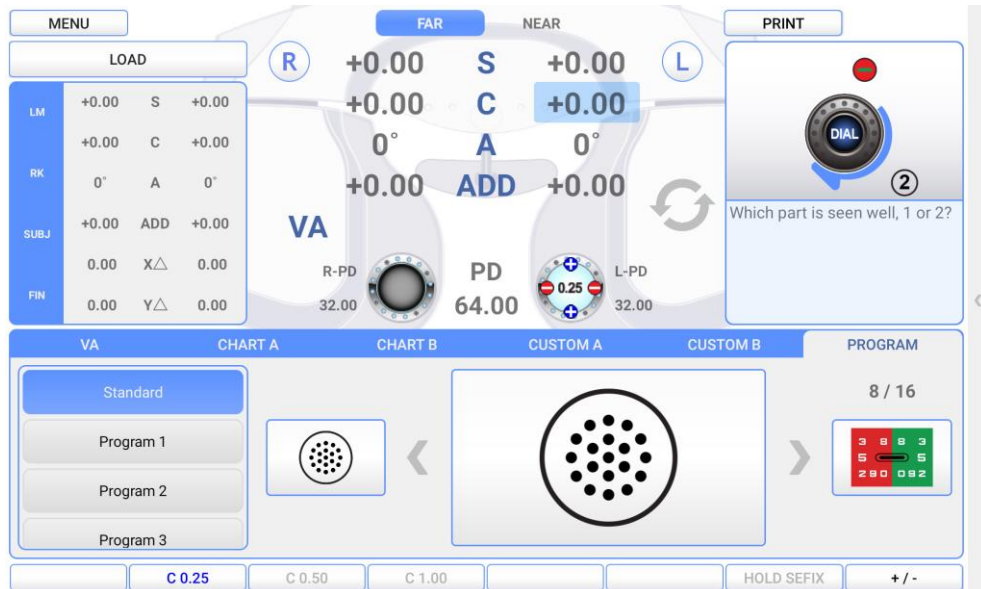
7<sup>th</sup> step of the System-Defined Program is to revise the value of AXIS for the left eye more elaborately, based on the result of 6<sup>th</sup> step SPH-CYL-AXIS test. For a detail explanation, please refer to the article 9.1.2 Cross Cylinder Test using Dots Chart (AXIS).



[Figure 9-8] Cross Cylinder Test (AXIS)

**9.1.8 Cross Cylinder Test using Dots Chart (CYL)**

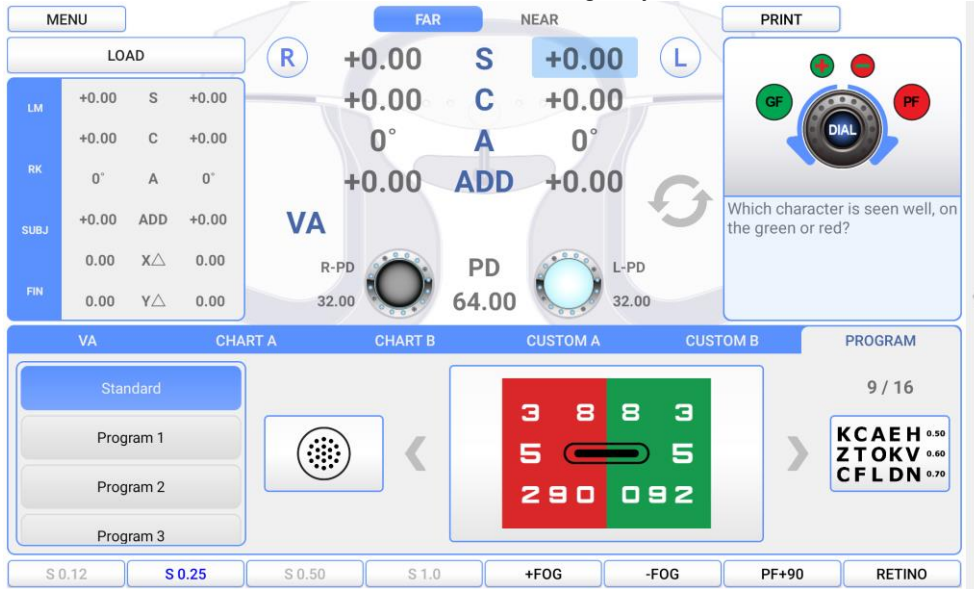
8<sup>th</sup> step of the System-Defined Program is to revise the value of CYL for the left eye more elaborately, based on the result of 6<sup>th</sup> step SPH-CYL-AXIS test. For a detail explanation, please refer to the article 9.1.3 Cross Cylinder Test using Dots Chart (CYL).



[Figure 9-9] Cross Cylinder Test (CYL)

9.1.9 Red/Green Balance Test for single eye

9<sup>th</sup> step of the System-Defined Program is to revise the value of SPH for the left eye more elaborately, based on the result of 6th step SPH-CYL-AXIS test. For a detail explanation, please refer to the article 9.1.4 Red/Green Balance Test for single eye.



[Figure 9-10] Red/Green Balance Test for single eye

9.1.10 Check the Power of Glasses for Left Eye

After the test of left eye is over, check the power of glasses for left eye again. If necessary, use a mask for the test.



[Figure 9-11] Check the Power of Glasses for Left Eye

### 9.1.11 Binocular Balance Test at Polarized Light

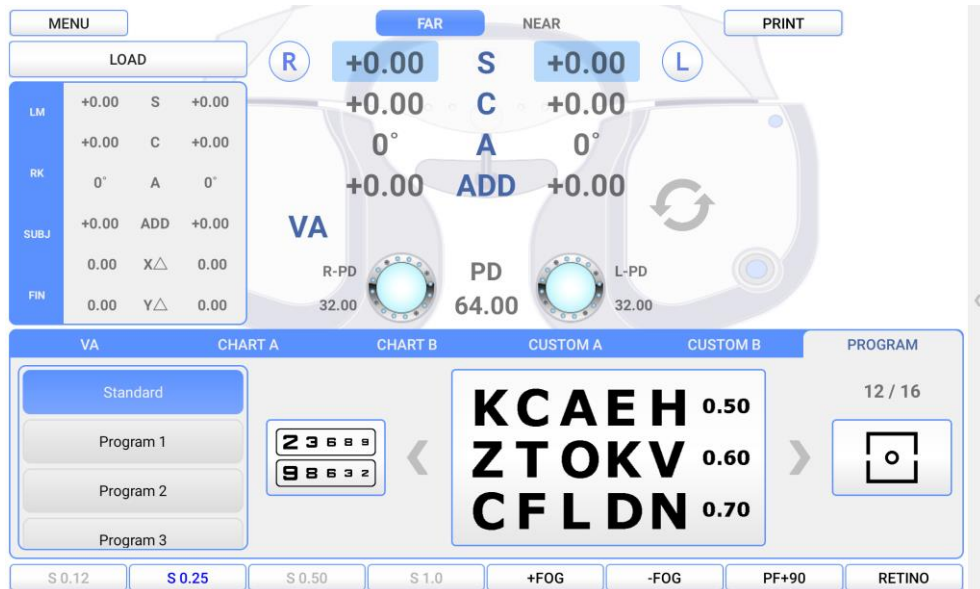
In the middle of binocular vision test, check the binocular balance for corrected monocular value, using Polarized Light Filter (left side with 45 degrees and right with 135 degrees). For more detailed information, please refer to the article 10.17 Binocular Balance Test at Polarized Light.



[Figure 9-12] Binocular Balance Test at Polarized Light

### 9.1.12 Check the Power of Glasses for both eyes

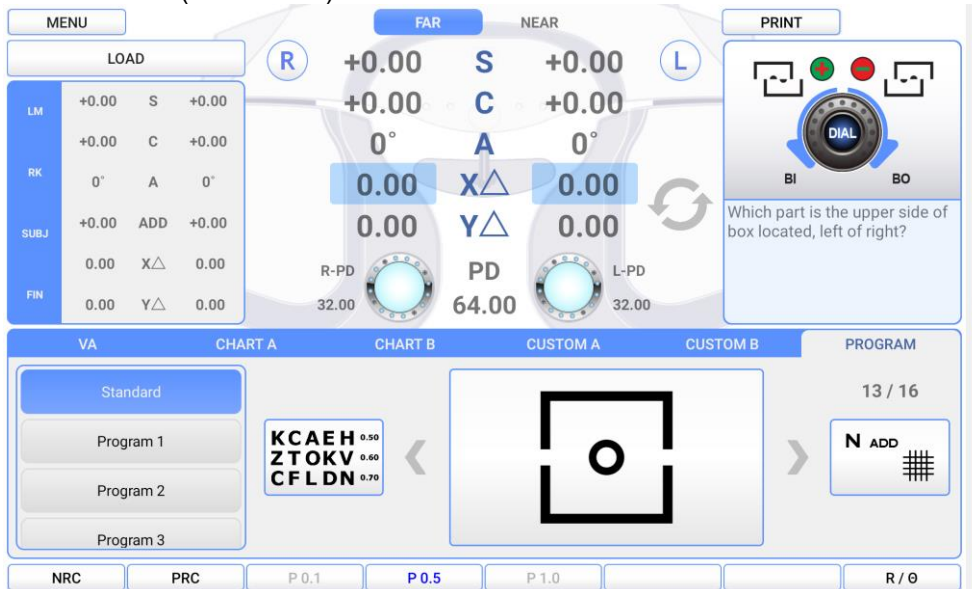
After the test of both eyes is finished, check the power of glasses for both eyes again. If necessary, use a mask for the test.



[Figure 9-13] Check the Spherical Refractive Power for both eyes

### 9.1.13 Far Distance Horizontality / Vertical Coincidence(Aniseikonia) Test

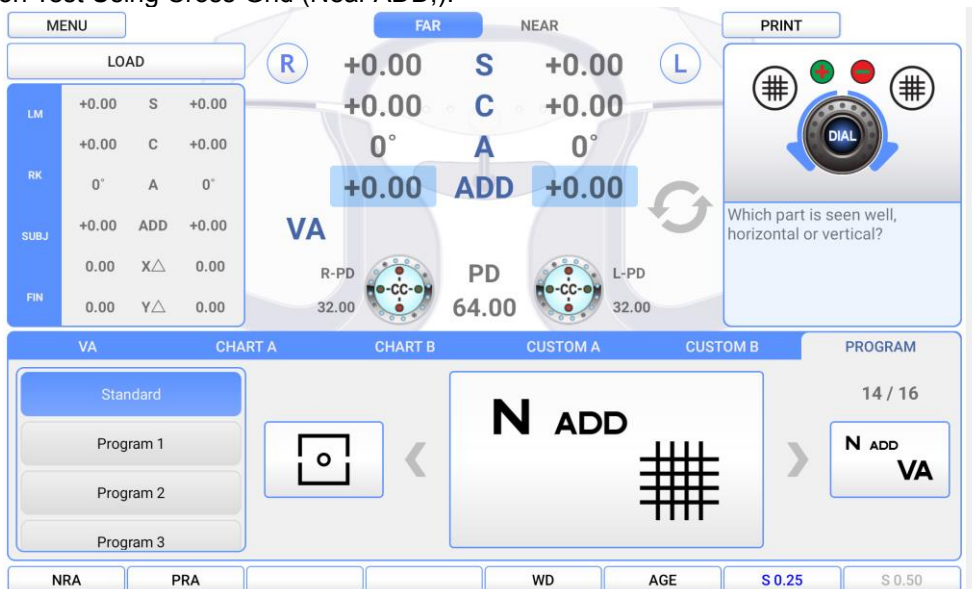
Process a test using Horizontal/Vertical Unequal Coincidence(Aniseikonia) chart in the middle of binocular visual acuity test. Test Heterophoria following the guidance, and do Coincidence(Aniseikonia) Test if necessary, and then record the result. For more detailed explanation, please refer to the article 10.19. Horizontal Coincidence(Aniseikonia) Test and 10.20. Vertical Coincidence (Aniseikonia) Test.



[Figure 9-14] Far Distance Horizontality / Vertical Coincidence (Aniseikonia) Test

### 9.1.14 Near Distance Cross Grid Test

Check the accommodation force on Near Distance Mode by Cross Grid. Add or deduct value of ADD following the guidance. For more detailed information, please refer to the article 10.2 Near Distance Addition Test Using Cross Grid (Near ADD,).



[Figure 9-15] Near Distance Cross Grid Test



### 9.1.15 Near Vision Test with Addition (Near VA with ADD)

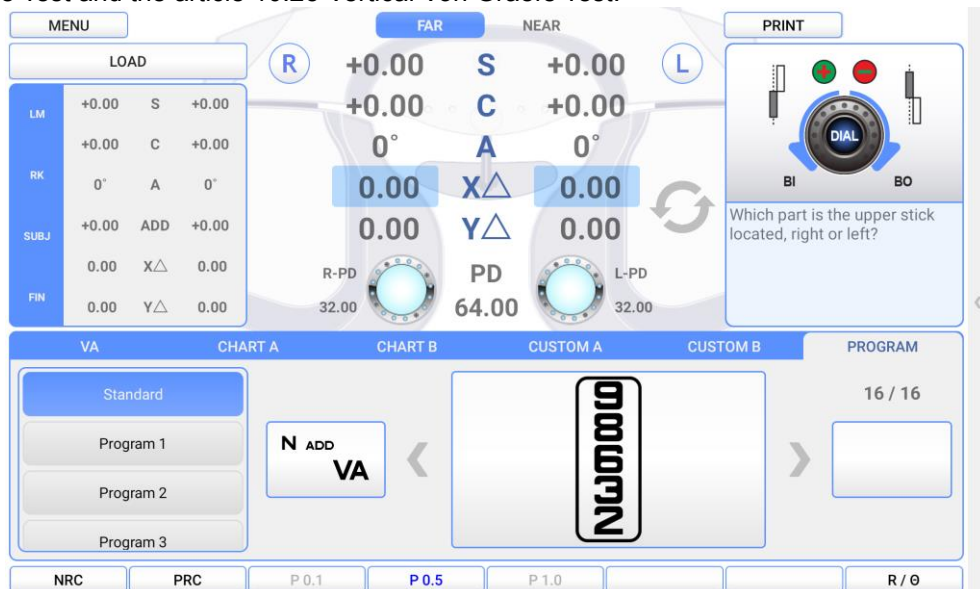
Test the Near Vision with Addition. For more detailed information, please refer to the article 10.1 Near VA with ADD.



[Figure 9-16] Near Vision Test with Addition



### 9.1.16 Near Distance Horizontal / Vertical Von Graefe Test

Test using Horizontal / Vertical Von Graefe Chart at Near distance. Process a Heterophoria test following guidance. For more detailed information, please refer to the article 10.24 Horizontal Von Graefe Test and the article 10.25 Vertical Von Graefe Test.



[Figure 9-17] Near Distance Horizontal / Vertical Von Graefe Test

By following all the above, all standard tests are finished, which are in order of Monocular Refraction(right) → Monocular Refraction(left) → Binocular test → Binocular Vision → Near Distance Test.

	<p>Ref. body may hurt a patient in the process of initialization. Please measure only after the initialization is over fully.</p>
	<p>Do turn off the power when not in use for a long time.</p>

## 10. Unit Test

The following items can be tested using UDR-800P.

- NEAR VA WITH ADD : Near Vision Acuity with Addition
- NEAR ADD : Near Point Addition Test using Cross Grid
- NEGATIVE ACCO. : Negative Relative Accommodation Test
- POSTIVE ACCO. : Positive Relative Accommodation Test
- NEGATIVE CONV. : Negative Relative Convergence Test
- POSITIVE CONV. : Positive Relative Convergence Test
- CYLINDER TEST-POWER : Test of Cylinder Power
- CYLINDER TEST-AXIS : Test of Cylinder Axis
- RED/GREEN TEST : (Monocular) Red/Green Test
- CROSS CYL. TEST-POWER : Cross Cylinder Test-Power Test
- CROSS CYL. TEST-AXIS : Cross Cylinder Test-Axis Test
- CROSS GRID : Cross Grid Test (Ver2.00 and over)
- MADDOX ROD HORZ. : Horizontal Maddox Rod Test
- MADDOX ROD VERT. : Vertical Maddox Rod Test
- BINOCULAR BALANCE : Binocular Balance Test at Polarized Light
- DUOCHROME BALANCE : Red/Green Test at Polarized Light
- WORTH 4 DOTS : Control (Worth 4 Dots) Test
- SCHOBER HORZ. : Horizontal Schober Test
- SCHOBER VERT. : Vertical Schober Test
- COINCIDENCE HORZ. : Horizontal Coincidence(Aniseikonia) Test
- COINCIDENCE VERT. : Vertical Coincidence(Aniseikonia) Test
- PHORIA HORZ. : Horizontal Phoria Test without Fixation
- PHORIA VERT. : Vertical Phoria Test without Fixation
- PHORIA FIX HORZ. : Horizontal Phoria Test with Fixation
- PHORIA FIX VERT. : Vertical Phoria with Fixation
- MINUTE STEREO : Minute Stereo Acuity Test
- VON GRAEFE HORZ. : Horizontal Von Graefe Test
- VON GRAEFE VERT. : Vertical Von Graefe Test

### 10.1 Near Vision Test with Addition (Near VA with ADD)

- Purpose: Test the Near Vision with Addition..
- Chart: Near Vision Chart
- Auxiliary Lens: None
- Target: Test the Near Vision with Addition, for left right, and Binocular
- Way of Test

**N ADD**  
**VA**

1. On Chart clause of main screen, touch [N ADD VA] chart to express the Near Vision Chart.
2. Press [R] [BIN] [L] to choose the field for test.
3. Record the estimated value of left, right, and both eyes.

MENU		LOAD	
LM	+0.00 S +0.00		
	+0.00 C +0.00		
RK	0° A 0°		
SUBJ	+0.00 ADD +0.00		
	0.00 X△ 0.00		
FIN	0.00 Y△ 0.00		

VA	CHART A	CHART B	CUSTOM A	CUSTOM B	PROGRAM

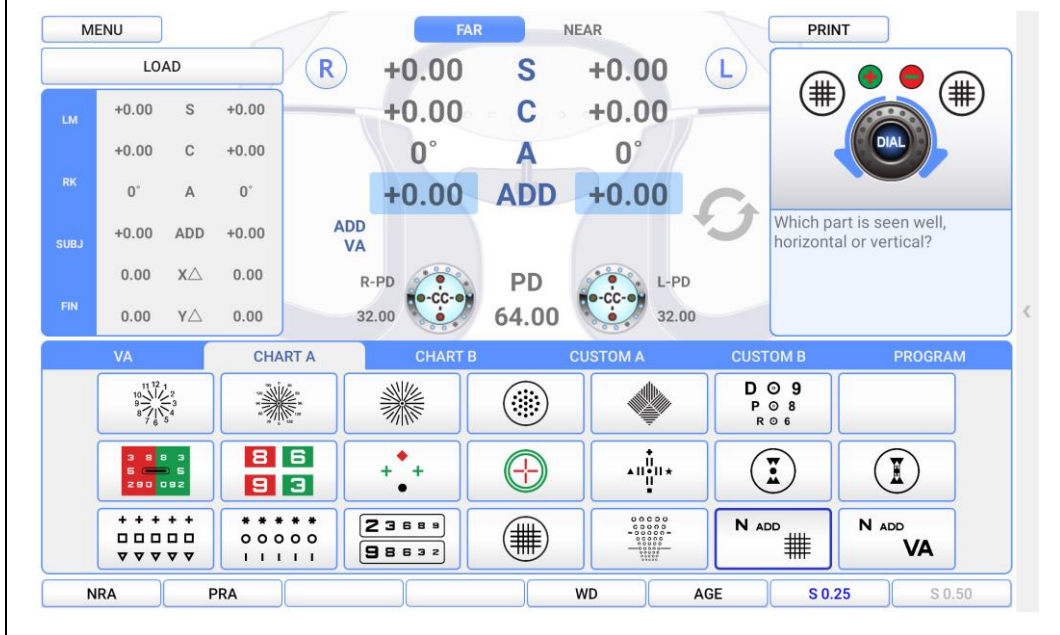
[Figure 10-1] Test of Near Vision with Addition

## 10.2 Near Addition Test using Cross Grid

- Purpose: Correct Near Addition according to Accommodation, using Cross Grid.
- Chart: Near Vision Chart (Cross Grid)
- Auxiliary Lens: Fixed Cross Cylinder Lens
- Target: Make the clarity and thickness of horizontal/vertical lines equally, similar with Far Vision Cross Grid Test.
- Way of Test



1. On Special Chart clause of touch screen, press [N ADD #] button to drop the Near Vision Cross Grid Chart at a place of about 40<sub>cm</sub>.
2. Press [R] [BIN] [L] to choose the field for test.
3. Change the ADD value until the thickness or clarity of horizontal or vertical line becomes equal.
4. Record the estimated value of left, right, and both eyes.
  - ▶ When the vertical line is seen clearly, turn the dial clockwise (- direction.)
  - ▶ When the horizontal line is seen clearly, turn the dial counterclockwise (+ direction.)



[Figure 10-2] Addition Test Using Cross Grid

### 10.3 Negative Relative Accommodation test

- Purpose: In subjective test, estimate the negative relative accommodation.
- Chart: Near Vision Chart
- Auxiliary Lens: None
- Target: Calculate the value of BREAK and RECOVERY for left, right and both eyes.
- Way of Test

The diagram illustrates the process of entering the Negative Relative Accommodation (NRA) test. It starts with a selection screen for 'N ADD' charts, which leads to the 'NRA' test interface. The 'NRA' screen shows a central display with parameters for Right (R) and Left (L) eyes, including Spherical (S), Cylindrical (C), and Axis (A) values, all currently set to 0.00. It also shows ADD values for VA and ADD, both set to +0.00. Below the main display, there are two dials for R-PD (32.00) and L-PD (32.00), and a central PD (64.00) dial. A 'DIAL' control is used to adjust the test value. A dialog box on the right asks 'Which part is seen well, horizontal or vertical?' and has 'OK' and 'CANCEL' buttons. At the bottom, there are buttons for 'MENU', 'FAR', 'NEAR', 'PRINT', and 'PROGRAM', along with a grid of chart options (VA, CHART A, CHART B, CUSTOM A, CUSTOM B) and 'BLUR' and 'RECOVERY' buttons.

1. On Special Chart clause of touch screen, touch [NADD #] chart and [NRA] buttons to enter the Negative Relative Accommodation Test.
2. Press [R] [BIN] [L] to choose the field for test.
3. Turn the dial counterclockwise.  
When the chart is beginning to be blurred, press (RECOVERY) on the left dialog box of touch screen.
4. If recovered point is found turning the dial clockwise, press [OK] button to conclude the test on the left dialog box of touch screen.

[Figure 10-3] Negative Relative Accommodation Test

### 10.4 Positive Relative Accommodation

- Purpose: In subjective test, estimate Positive relative accommodation.
- Chart: Near Vision Chart
- Auxiliary Lens: None
- Target: Calculate the value of BREAK and RECOVERY for left, right and both eyes.
- Way of Test

**N ADD**

➔

PRA

1. On Special Chart clause of touch screen, touch [NADD #] chart and [PRA] buttons to enter the Positive Relative Accommodation Test.
2. Press [R] [BIN] [L] to choose the field for test.
3. Turn the dial clockwise.  
When the chart is beginning to be blurred, press (RECOVERY) on the left dialog box of touch screen.
4. If recovered point is found turning the dial counterclockwise, press [OK] button to conclude the test on the left dialog box of touch screen.

[Figure 10-4] Positive Relative Accommodation

### 10.5 Negative Relative Convergence

- Purpose: In subjective test, process Negative Relative Convergence test.
- Chart: Near Vision Chart
- Auxiliary Lens: None
- Target: Calculate the value of BLUR, BREAK, and RECOVERY.
- Way of Test

NRC

1. On touch screen, press [FAR] to choose FAR Vision Mode or NEAR Vision Mode.
2. On touch screen, press [XΔ] and [NRC] to process test.
3. In case of Far Vision Mode, Horizontal Von Graefe Chart is spread out on the screen automatically. In case of Near Vision Mode, drop the Near Vision Van Graefe Chart at a place of about 40cm, so that the patient would see it.
4. Turn the dial counterclockwise. When the chart is beginning to be blurred, choose (BREAK) on the touch screen.
5. Turn the dial counterclockwise. When the chart is beginning to be separated as two, choose (RECOVERY) on the touch screen.
6. Turn the dial clockwise. When the charts are united as one, press (OK) button to conclude the test.

[Figure 10-5] Negative Relative Convergence

### 10.6 Positive Relative Convergence

- Purpose: In subjective test, process Positive Relative Convergence test.
- Chart: Near Vision Chart
- Auxiliary Lens: None
- Target: Calculate the value of BLUR, BREAK, and RECOVERY.
- Way of Test

PRC

1. On touch screen, press [FAR] to choose FAR Vision Mode or NEAR Vision Mode.
2. On touch screen, press [XΔ] and [PRC] to process test.
3. In case of Far Vision Mode, Horizontal Von Graefe Chart is spread out on the screen automatically. In case of Near Vision Mode, drop the Near Vision Van Graefe Chart at a place of about 40cm, so that the patient would see it.
4. Turn the dial counterclockwise. When the chart is beginning to be blurred, choose (BREAK) on the touch screen.
5. Turn the dial counterclockwise. When the chart is beginning to be separated as two, choose (RECOVERY) on the touch screen.
6. Turn the dial clockwise. When the charts are united as one, press (OK) button to conclude the test.

[Figure 10-6] Positive Relative Convergence Test

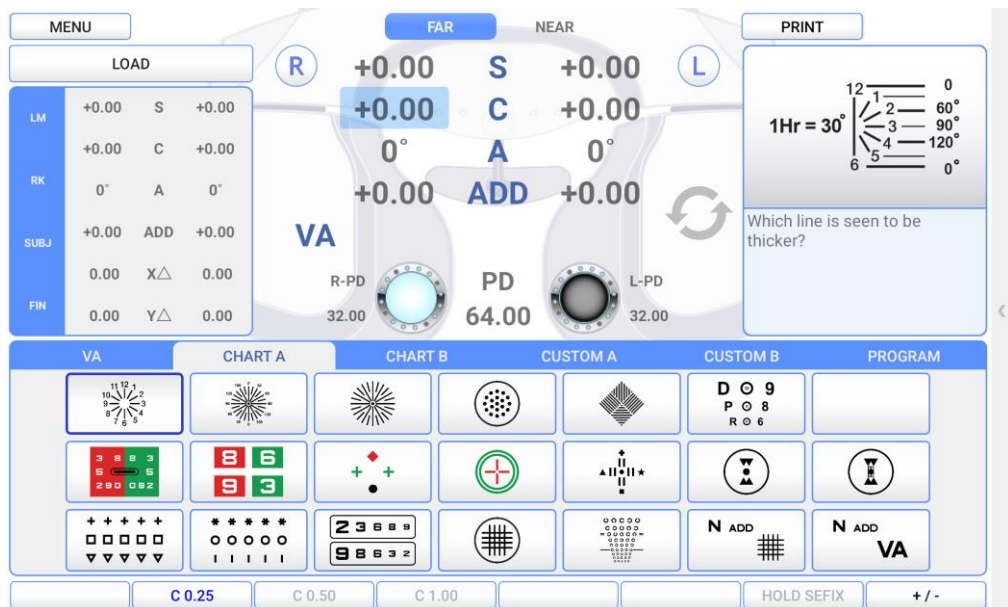


### 10.7 Cylinder Power Test

- Purpose: Obtain maximum revised circumference degrees for monocular, using Clock Dial, Subjective test.
- Chart: Clock Dial
- Auxiliary Lens: None
- Target: All the lines must be seen as equally.
- Way of Test



1. This test must be performed only after fixing the cylinder axis.
2. On Chart clause of main screen, press Clock Dial button to change it into distorted vision test mode.
3. Press (R) or (L) button to choose the field for test.
4. On touch screen, press (C) or left/right button to change it into Cylinder Power mode.
5. Turn the dial in (-) direction, until all the lines are seen equally. When the location of the line which is seen the thickest is changed, the axis must be adjusted.
  - ▶ When the thickest seen line moves counterclockwise, deduct the AXIS value.
  - ▶ When the thickest seen line moves clockwise, add the AXIS value.



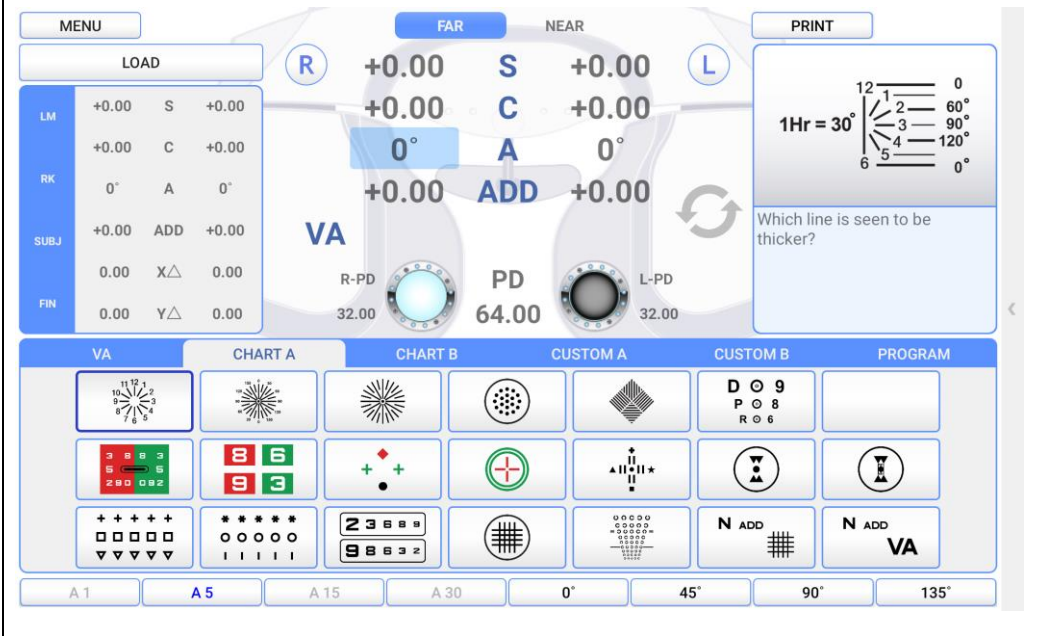
[Figure 10-7] Cylinder Power Test

### 10.8 Cylinder Axis Test

- Purpose: Obtain maximum revised circumference degrees by 30 degrees' unit for Monocular, using Clock Dial, Subjective test.
- Chart: Clock Dial
- Auxiliary Lens: None
- Target: All the lines must be seen as equally.
- Way of Test



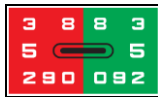
1. On Chart clause of touch screen, press Clock Dial button to change it into distorted vision test mode.
2. Press (R) or (L) to choose the field for test.
3. On the touch screen, Press (S) or left/right button to change it to Spherical Power mode, and add Fogging until the line of Clock Dial is seen equally.
4. Question the patient like, 'In which hour direction line is seen the thickest and the darkest?'
5. When the patient says all the lines are seen equally, he is determined not to have distorted vision. If a certain bar is seen thicker, multiply 30 by the number seen by that bar, and press [A] or left/right button to fix the distorted vision axis.



[Figure 10-8] Test of Cylinder Axis

### 10.9 (Monocular) Red/Green Test

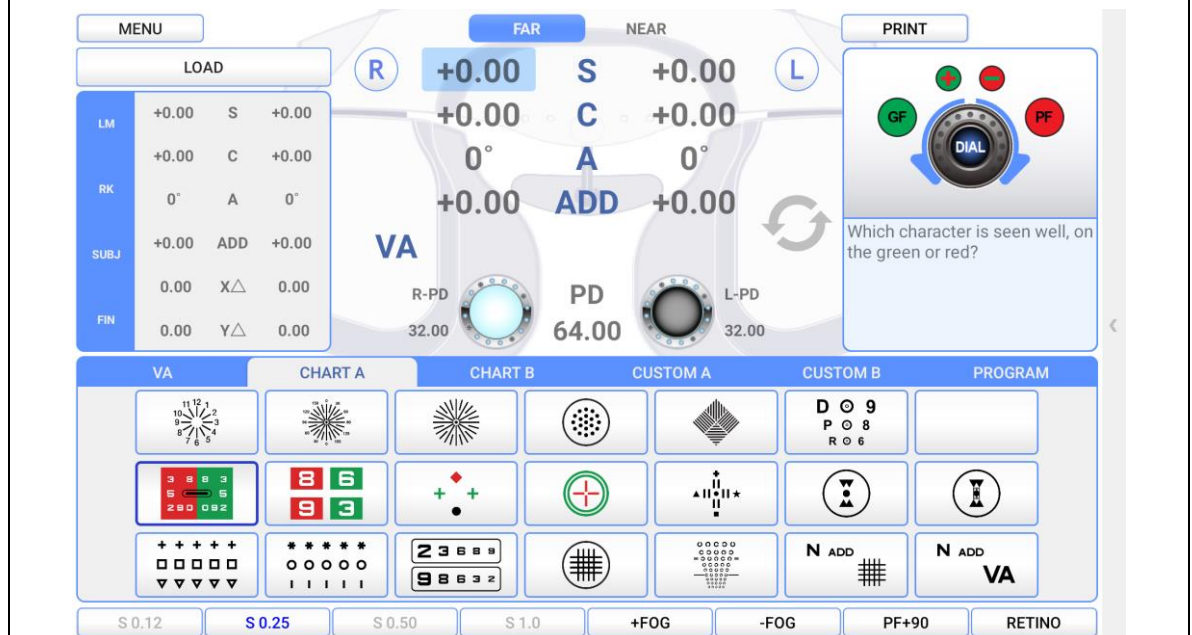
- Purpose: Check the maximum revised Spherical Refractive Power for Monocular by Red/Green Test Chart, using the principle of chromatic aberration, Subjective test.
- Chart: Red/Green Chart
- Auxiliary Lens: None
- Target: Letters on Red and Green Charts must be seen equally and clearly.
- Way of Test



1. On Chart clause of main screen, press Red/Green Chart button to change it into Red/Green Test Mode.
2. Press (R) or (L) key to choose the field for test.
3. Question the patient that which of green and red is seen more clearly or more thickly, and check whether both of them are seen equally.
4. If red one is seen more clearly or both of them are seen clearly, try to add -0.25D and If green one is seen more clearly, try to add +0.25D.
6. Adjust until both are seen equally.

※ Attention

- In case of distorted vision, this test is not available for the normal visual acuity above 1.0 or an accurate visual acuity test.
- In some cases, a patient cannot compare the black letters in red and green background respectively, and cannot react following his preference.
- If a corrected vision of a patient is 1.0, you must ask him whether he is able to see well “29 in red and 92 in green.” In case a corrected vision is low, ask him to read the bigger letter on the upper side.



[Figure 10-9] (Monocular) Red/Green Test

### 10.10 Jackson Cross Cylinder Test



- Purpose: Subjective test, revise maximum circumference refractive power and axis for Monocular, using Jackson Cross Cylinder
- Chart: Dot-Group Chart
- Auxiliary Lens: Cross Cylinder Lens (0.25 / 0.50)
- Target: The Dot-Group Chart must be seen as same, although the Cross Cylinder is crossed.
- Way of Test



1. On Chart clause of main screen, press Dot-Group Chart to move on to Cross Cylinder Test Mode.

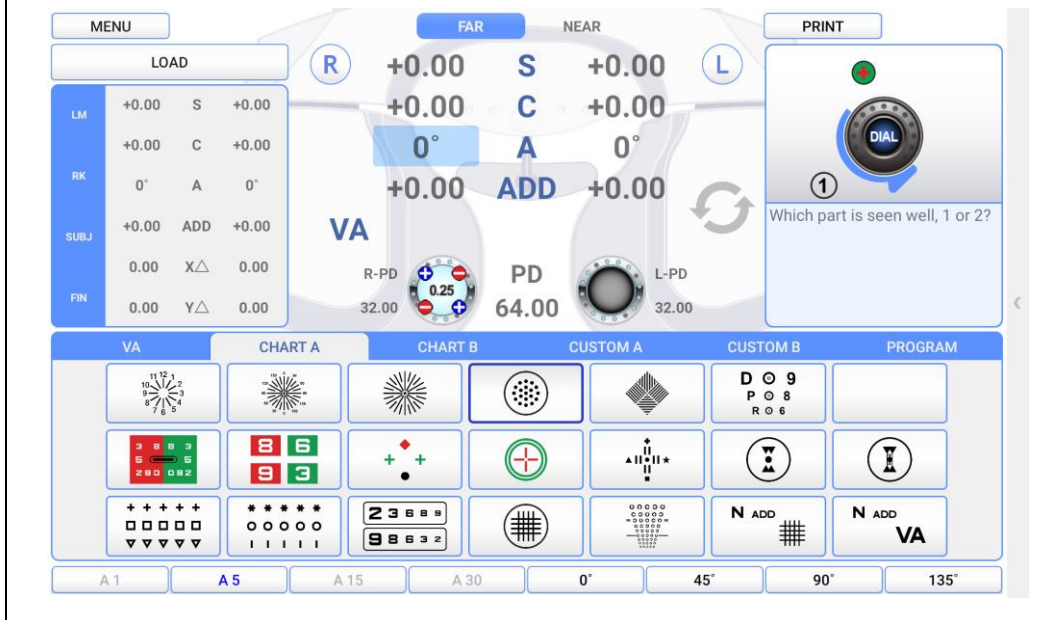
2. Press (R) or (L) to choose the field for test.

3. On the touch screen, press [CC 0.25] [CC 0.50] button to change it into Jackson Cross Cylinder Mode.

4. While pressing number (1)  and number (2),  ask the patient which side letter is seen more clearly.

- ▶ If number 1 is seen clearly, turn the dial counterclockwise(+ direction).
- ▶ If number 2 is seen clearly, turn the dial clockwise(- direction).

5. To estimate the distorted vision axis, press [A] or left/right button. To estimate circumference power, press [C] or left/right button.



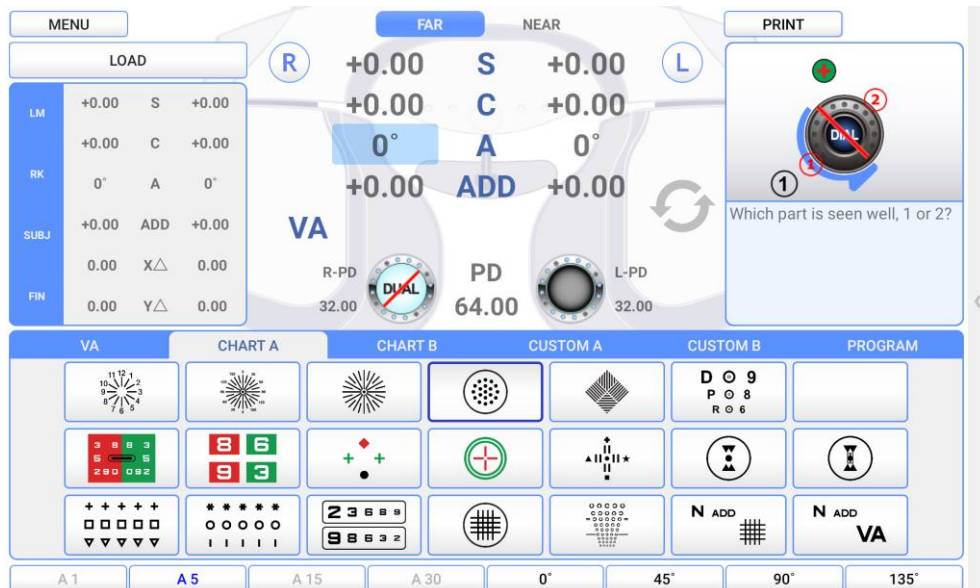
[Figure 10-10] Jackson Cross Cylinder Test (Distorted Vision Axis Test)

### 10.11 Dual Cross Cylinder Test

- Purpose: In subjective test, revise maximum circumference refractive power and axis for Monocular, using Dual Cross Cylinder
- Chart: Dot-Group Chart
- Auxiliary Lens: Dual Cross Cylinder Lens (DUAL)
- Target: Separated two Dot-Group Chart must be seen same.
- Way of Test




1. On Chart clause of main screen, press Dot-Group Chart to move on to Cross Cylinder Mode.
2. Press (R) or (L) to choose the field for test.
3. On the touch screen, touch [CC DUAL] to change it into Dual Cross Cylinder Mode.
4. From the patient's view, the Dot-Group Chart is separately shown divided as two.
  - ▶ If the left one is seen clearly, turn the dial counterclockwise (+ direction.)
  - ▶ If the right one is seen clearly, turn the dial clockwise (- direction.)
  - ▶ If the patient says there is no difference, finish the test.
5. Press [A] or left/right button to estimate the distorted vision axis.  
Press [C] or left/right button to estimate the circumference power.



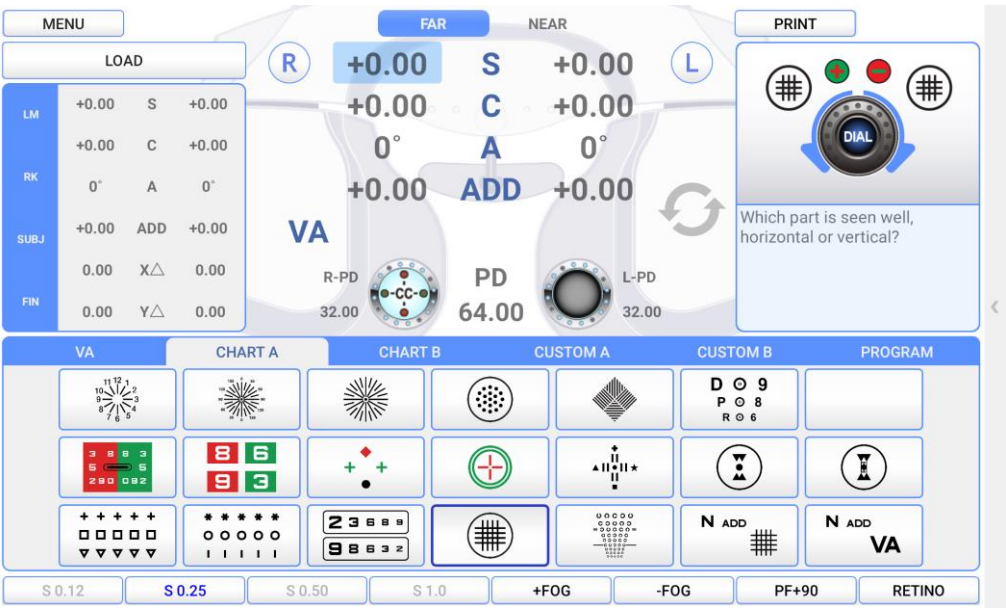
[Figure 10-11] Dual Cross Cylinder Test (Distorted Vision Axis Test)

### 10.12 Cross Grid Test

- Purpose: Check the maximum revised Spherical Refractive Power, using Far Vision Cross Grid chart.
- Chart: Cross Grid Chart
- Auxiliary Lens: Fixed Cross Cylinder Lens
- Target: Make the clarity and thickness of horizontal/vertical lines equally.
- Way of Test



1. On Chart clause of main screen, enter the Cross Grid Test by pressing [CROSS GRID] button.
2. Press [R] [BIN] [L] to choose the field for test.
3. Adjust the SPH value until thickness or clarity of horizontal or vertical line becomes equal.
  - ▶ When the vertical line is seen clearly, turn the dial clockwise(-direction)
  - ▶ When the horizontal line is seen clearly, turn the dial counterclockwise(+direction)

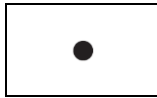


[Figure 10-12] Cross Grid Test

- Before the test, should be set up the Vision Axis & the Cylinder Power so as not to effect to "against the rule astigmatism or Inverse astigmatism" & "with the rule astigmatism or Direct astigmatism". Cross Grid Test is very useful to the patient who got a weak accommodation power.

### 10.13 Horizontal Maddox Rod Test

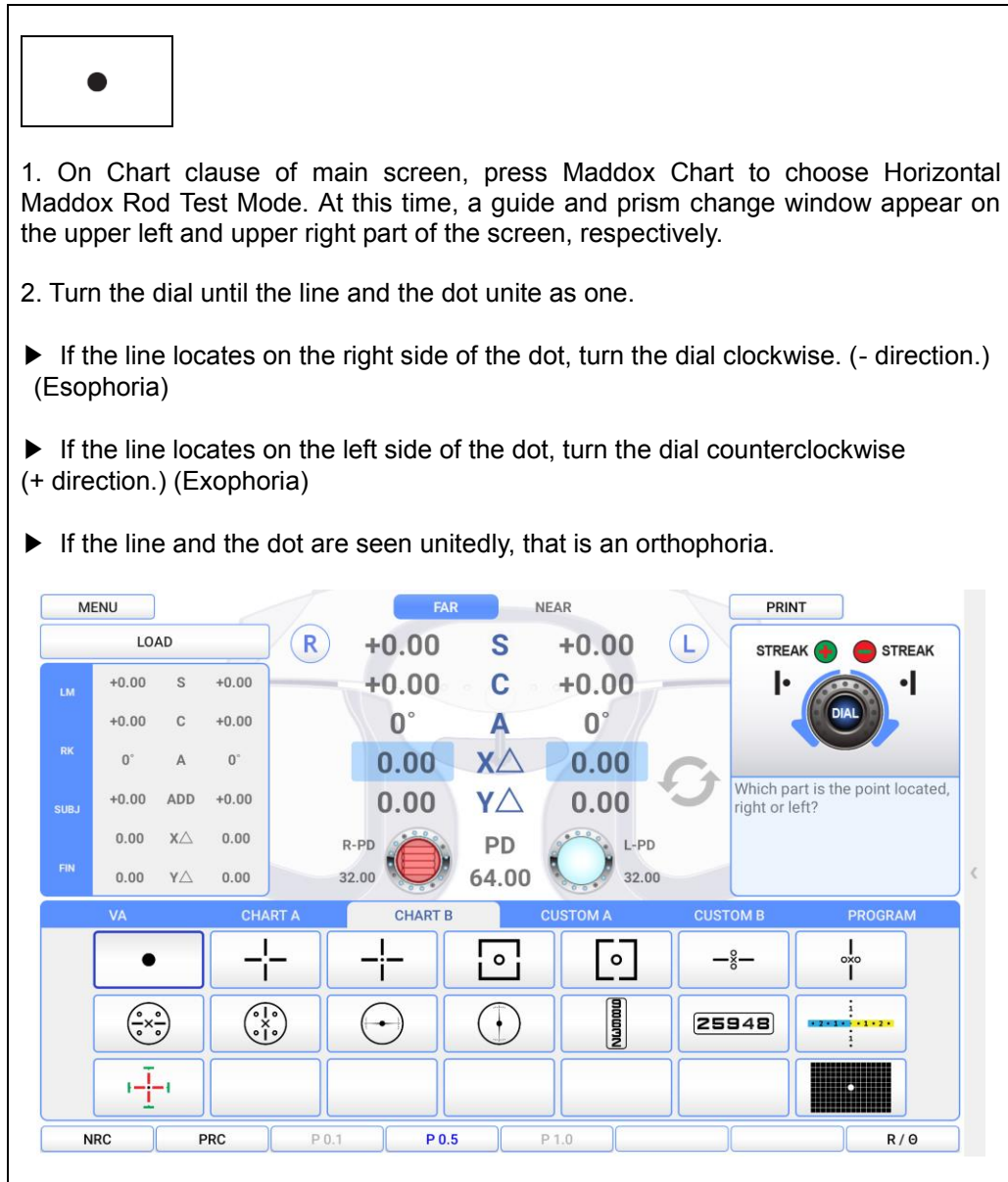
- Purpose: In subjective test, do Horizontal Heterophoria in the way of Maddox Rod.
- Chart: Maddox Chart
- Auxiliary Lens: Horizontal Maddox for right eye, Rotating Prism for left eye.
- Target: The vertical bar seen from the right eye and the Maddox Chart seen from the left eye must be united.
- Way of Test



1. On Chart clause of main screen, press Maddox Chart to choose Horizontal Maddox Rod Test Mode. At this time, a guide and prism change window appear on the upper left and upper right part of the screen, respectively.

2. Turn the dial until the line and the dot unite as one.

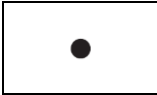
- ▶ If the line locates on the right side of the dot, turn the dial clockwise. (- direction.) (Esophoria)
- ▶ If the line locates on the left side of the dot, turn the dial counterclockwise (+ direction.) (Exophoria)
- ▶ If the line and the dot are seen unitedly, that is an orthophoria.



[Figure 10-13] Horizontal Maddox Rod Test

### 10.14 Vertical Maddox Rod Test

- Purpose: In subjective test, do the Vertical Heterophoria in the way of Maddox Rod.
- Chart: Maddox Chart
- Auxiliary Lens: Rotating Prism for right eye, Vertical Maddox for left eye.
- Target: The horizontal bar seen with the left eye and the Maddox Chart seen with the right eye must be united.
- Way of Test



1. On Chart clause of main screen, press Maddox Chart to choose the Horizontal Maddox Rod Test Mode At this time, a guide and prism change window appear on the upper left and upper right part of the screen, respectively.

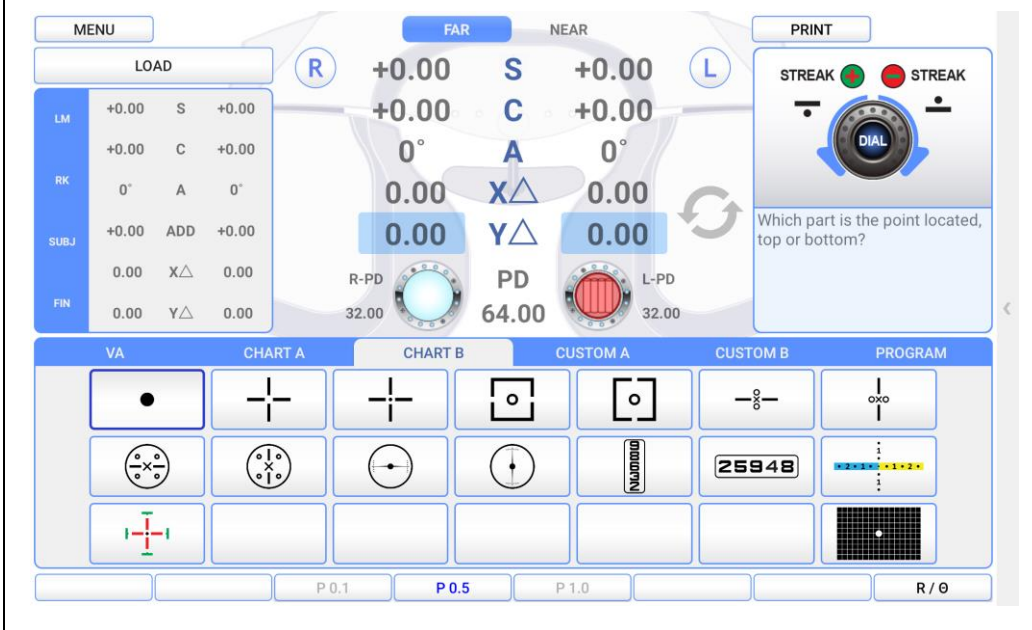
2. At this time, on upper left of main screen, press Vertical Prism button, to change it into Vertical Maddox Rod Test Mode.

3. Turn the dial until the line and the dot are united as one.

▶ If the line locates over the dot, turn the dial clockwise (- direction.) (Hypophoria)

▶ If the line locates under the dot, turn the dial counterclockwise (+ direction.) (Hyperphoria)

▶ If the line and the dot are seen as united, that is an orthophoria.



[Figure 10-14] Vertical Maddox Rod Test



### 10.15 Binocular Balance Test at Polarized Light

- Purpose: In subjective test, keep the binocular balance against maximum revised value of Monocular
- Chart: Binocular Balance Chart at Polarized Light
- Auxiliary Lens: Polarized Light Filter with 135 degrees for right eye, and with 45 degrees for left eye
- Target: The upper line seen with the right eye and the lower line seen with the left eye must be seen equal clearly.
- Way of Test

2	3	6	8	9
9	8	6	3	2

1. On Chart clause of main screen, press the Chart of Binocular Balance Test at Polarized Light, to enter the Binocular Balance Test at Polarized Light Mode.
2. Press Binocular [BIN] button to open Binocular field, and add Fogging to about 0.5D, and then loosen the interrupted accommodation.
3. Ask the patient which of the upper and lower one is clearer.
  - ▶ If the upper line is seen clearly, press [R] button and turn the dial counterclockwise, to increase the right side SPH value.
  - ▶ If the lower line is seen clearly, press [L] button and turn the dial clockwise, to increase the left side SPH value.
  - ▶ When both of upper and lower sheet are seen as same clear, finish the test.

※ Attention

- If a corrected vision is below 0.4, sometimes it is hard to discern because the Chart is seen blurred. At this time, cover the more blurry side firstly, and then open it again. If there is any difference in the patient's vision, his Binocular have function, while no difference no function.
- If a patient has a dominant eye and the difference is more than 0.25D, the dominant eye sees well. Therefore, you can skip this test.

Which part is seen well, top or bottom?

[Figure 10-15] Binocular Balance Test at Polarized Light

### 10.16 Polarized Light Red/Green Test

- Purpose: Subjective test, keep the balance of Monocular and Binocular simultaneously against the maximum revised value for single.
- Chart: Polarized Light Red/Green Chart
- Auxiliary Lens: Polarized Filter with 135 degrees for right eye, and with 45 degrees for left eye
- Target: The upper line seen with the right eye and the lower line seen with the left eye must be seen equally well. In addition to, in the upper line seen with the right eye, the letters in red and green background respectively, must be seen as same, as well as the letters in the red and green background in the lower line seen with the left eye.
- Way of Test



1. On Chart clause of main screen, Enter to the test mode by pressing Polarized Red / Green Test Chart.
2. Question the patient which one he sees more clearly, between the red letter and green letter upside.
3. Press [R] and turn the dial in clockwise (- direction,) if the left letter is clear, while in counterclockwise (+ direction) in case of right one.
4. Press [L] and turn the dial in clockwise (- direction,) if the left letter is clear, while in counterclockwise (+ direction) in case of right one.
5. Question the patient which one he sees more clearly, between the red letter downside and the green letter upside.
6. Press [R] and turn the dial in clockwise (- direction,) if the left letter is clear, while in counterclockwise (+ direction) in case of right one.
7. Press [L] and turn the dial in clockwise (- direction,) if the left letter is clear, while in counterclockwise (+ direction) in case of right one.
8. Balance both eyes.
9. If the upper line is seen clearly, press [R] and turn the dial counterclockwise (+ direction) to increase the value of the right side SPH.
10. If the lower line is seen clearly, press [L] and turn the dial counterclockwise (+ direction) to increase the value of the left side SPH.
11. Repeat this until both of upper and lower lines are seen clearly.



[Figure 10-16] Red / Green Test at Polarized Light

### 10.17 Worth For Dots Test (Worth 4 dots)

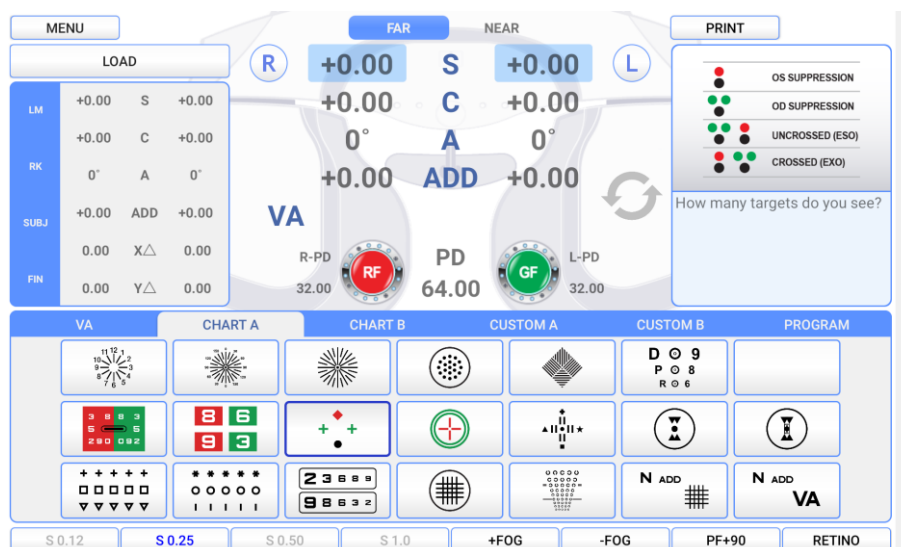
- Purpose: Find out repression Subjective test. You can check out whether there is any internal/external Heterophoria.
- Chart: Worth 4 Dot Chart
- Auxiliary Lens: Red Filter for right eye, and Green Filter for left eye.
- Target: Check up as how many the dots are seen. In normal case, it is 4.
- Way of Test








1. On Special Chart clause of touch screen, press Worth 4 Dot Chart to enter the Repression Test Mode.

2. Question the patient how many lights he sees.

- ▶ If he says 4 dots, the patient's fusion is normal.
- ▶ If he says 2 red dots, the patient is using right eye only, and the Repression is occurring in his left eye.
- ▶ If he says 3 green dots, the patient is using left eye only, and the Repression is occurring in his right eye.
- ▶ If he sees 5 dots, it is Diplopia. If the red dot is right side of the green dot, the patient has internal Strabismus/internal Heterophoria, while the red dot on the left side of the green dot, he has external Strabismus/external Heterophoria.
- ▶ While he sees 5 dots and 3 dots and 2 dots appears continuously alternately, it is an Alternate Repression of right/left eyes.



[Figure 10-17] Repression Test

Chart Shape	Meaning	Description
	Fusion	2 green dots on left and right side, a red dot upside, and the downside dot are seen alternatively, or as white, or seen as 4 dots in light red, these cases are normal.
	Right Eye Suppression	Seen 3 green dots only, it is Right Eye Suppression.
	Left Eye Suppression	Seen 2 red dots only, it is Left Eye Suppression.
	Heterophoria	Seen 2 red dots and 3 green dots, it is Heterophoria.
	Alternative Suppression	What the patient sees is unstable and 2 red dots and 3 green dots appear alternatively, it is Alternative Repression.

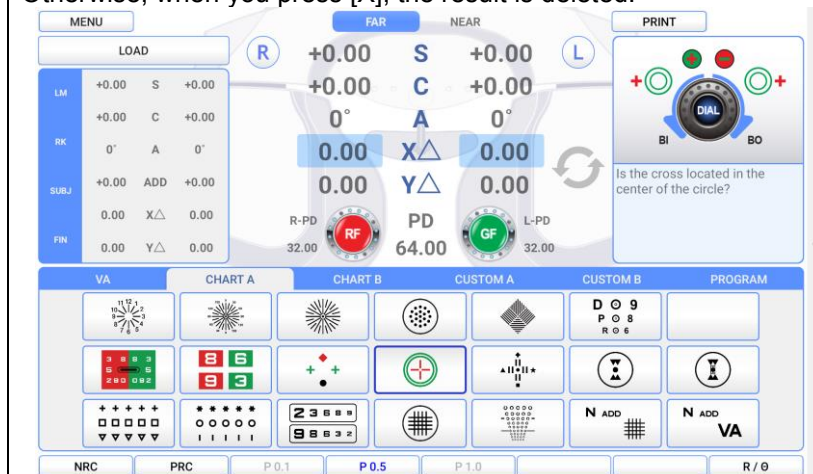
[Table 10-1] Interpretation of Suppression Test Result

### 10.18 Schober Test





- Purpose: In subjective test, process Heterophoria in a way of Schober.
- Chart: Schober Chart
- Auxiliary Lens: Red Filter for right eye, Green Filter for left eye, and Rotating Prism for both eyes.
- Target: The cross seen with the right eye must be in the middle of the circle seen with the left eye
- Way of Test



1. On Chart clause of main screen, press Schober Chart and enter Heterophoria test mode.
2. Question the patient like this. "Is the red cross inside the green circle?"  
If the answer is "Yes," no Heterophoria. If the answer is "No," it is Heterophoria, so go on to the next test.
3. Question the patient like this.  
"Is the cross on the left side or on the right side of the circle?"
  - ▶ On left side: External Heterophoria. Turn the dial counterclockwise (+ direction) to increase the value of BI prism, until the cross locates in the middle of the circle.
  - ▶ On right side: Internal Heterophoria. Turn the dial clockwise (- direction) to increase the value of BO prism, until the cross locates in the middle of the circle.
4. Question the patient like this.  
"Is the cross upside or downside the circle?"
  - ▶ Upside: Upside Heterophoria for left eye. Press Vertical Prism button and turn the dial clockwise (- direction) until the cross locates in the middle of the circle.
  - ▶ Downside: Upside Heterophoria for right eye. Press Vertical Prism button and turn the dial counterclockwise(- direction) until the cross locates in the middle of the circle.
5. To save the test result after the test is over, press [OK] button of touch screen. (Heterophoria test is saved automatically so that you can check it out separately.) Otherwise, when you press [X], the result is deleted.



[Figure 10-18] Schober Test

Chart Shape	Heterophoria Type	Correction of Heterophoria
	Esophoria	Turn the dial clockwise (- direction) to increase the value of BO prism, until the cross locates in the middle of the circle.
	Exophoria	Turn the dial counterclockwise (+ direction) to increase the value of BI prism, until the cross locates in the middle of the circle.
	Left Hyperphoria	Press Vertical Prism button and turn the dial clockwise (- direction) until the cross locates in the middle of the circle.
	Right Hyperphoria	Press Vertical Prism button and turn the dial counterclockwise (+ direction) until the cross locates in the middle of the circle.

[Table 10-2] Interpretation of Schober Test Result

### 10.19 Horizontal Coincidence(Aniseikonia) Test

- Purpose: Subjective test, process Aniseikonia and Horizontal Heterophoria by Coincidence (Aniseikonia) Chart.
- Chart: Horizontal Coincidence(Aniseikonia) Chart
- Auxiliary Lens: Polarized Filter with 135 degrees for right eye, and 45 degrees for left eye.
- Target: The upper half of the square seen with the right eye and the lower half of the square seen with the left eye must be arranged as a regular square, with the standard of Fixation.
- Way of Test



1. On Chart clause of main screen, press Aniseikonia Chart to enter the Heterophoria Mode.

2. Ask the patient whether he sees the squared chart, and if yes, if that chart is tilted towards left side and right side, or is arranged straight.

▶ In case the Square Chart is tilted towards left side: Turn the “Exophoria” dial counterclockwise to increase the value of BI prism, until the Square Chart is arranged straight.

▶ In case the Square Chart is tilted towards right side: Turn the “Esophoria” dial clockwise to increase the value of BO prism, until the Square Chart is arranged straight.

3. As a final checkout, ask the patient whether he sees the dot in the middle and the Square Chart, and if the sizes of the upper and lower square are same or different.

- ▶ If the sizes of the upper and lower square are the same, press [OK].
- ▶ If the sizes of the upper and lower square are different, press [NG].

4. When the test is over, press [OK] button of touch screen to save the result, or [X] button to delete the result.



[Figure 10-19] Horizontal Coincidence(Aniseikonia) Test

### 10.20 Vertical Coincidence(Aniseikonia) Test

- Purpose: In subjective test, process Aniseikonia and Vertical Heterophoria by Coincidence (Aniseikonia) Chart.
- Chart: Vertical Coincidence(Aniseikonia) Chart
- Auxiliary Lens: Polarized Filter with 135 degrees for right eye, and 45 degrees for left eye.
- Target: The right half of the square seen with the right eye and the left half of the square seen with the left eye must be arranged as a regular square, with a standard of Fixation.
- Way of Test



1. On Special Chart clause of touch screen, enter Vertical Heterophoria Mode by pressing Coincidence (Aniseikonia) Chart.

2. Ask the patient if he sees the square chart well, if yes, ask if that square chart is tilted toward up and down, or is arranged straight.

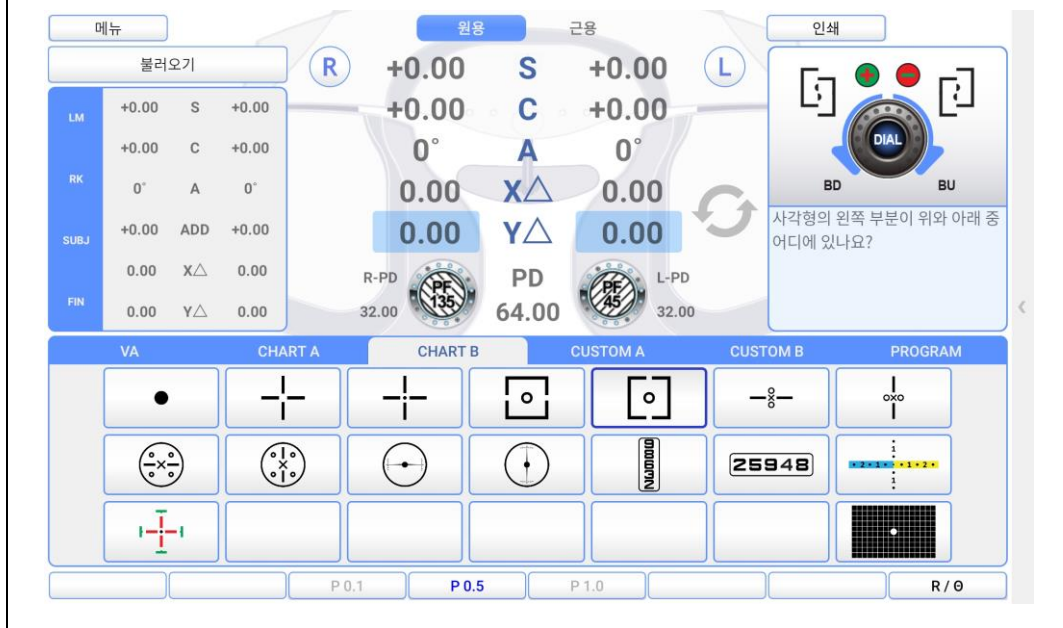
▶ When the left square chart is tilted upside: "Upside Heterophoria of right eye." Turn the dial counterclockwise to increase BD prism, until the square is arranged straight.

▶ When the right square chart is tilted toward upside: "Upside Heterophoria of left eye." Turn the dial clockwise to increase BU prism, until the square is arranged straight.

3. As a final check, ask the patient if he sees the dot in the middle and the square chart, and whether the sizes of upper and lower square are of same.

▶ If the sizes of the left and right square are the same, press [OK].

▶ If the sizes of the left and right square are different, press [NG].

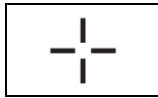


[Figure 10-20] Vertical Coincidence(Aniseikonia) Test



### 10.21 Phoria Test without Fixation

- Purpose: In subjective test, progress Heterophoria test in a way of Pola Cross without Fixation.
- Chart: Polarized Cross Chart without Fixation
- Auxiliary Lens: Polarized Filter with 135 degrees for right eye, and 45 degrees for left eye.
- Target: The vertical seen with the right eye and the horizon seen with the left eye are united and seen as cross.
- Way of Test





1. On Chart clause of main screen, enter Heterophoria Mode by pressing Pola Cross Chart without Fixation.

2. Ask the patient, "Does it seem like a cross?"



- ▶ If the answer is "Yes", there is no Heterophoria. Test done.
- ▶ If the answer is "No", it is Heterophoria. Process the next test.

3. To start with Horizontal Heterophoria test, ask the patient as following.

4. "Does the letter (  ) locate on the left side of the letter (  ), or the right side of it?"

- ▶ Located on left: "Exophoria." Turn the dial counterclockwise to increase BI prism, until the cross is seen well.
- ▶ Located on right: "Esophoria." Turn the dial clockwise to increase BO prism, until the cross is seen well.







5. To start with Vertical Heterophoria, ask the patient as following.

6. "Does the letter (  ) locate upside of the letter (  ), or downside of it?"

- ▶ Located upside: "Left Hyperphoria." Turn the dial clockwise to increase BU prism, until the cross is seen well.
- ▶ Located downside: "Right Hyperphoria." Turn the dial counterclockwise to increase BD prism, until the cross is seen well.



[Figure 10-21] Phoria Test without Fixation

Chart Shape	Heterophoria Type	Description
	Esophoria	1) Turn the dial clockwise until the Vertical Chart of the Cross becomes a cross shape, to increase BO prism.
	Exophoria	2) Turn the dial clockwise until the Vertical Chart of the Cross becomes a cross shape, to increase BI prism.
	Left Hyperphoria (Right Hypophoria)	3) Press [BDBU]. Turn the dial clockwise until the Horizontal Cross Chart becomes a cross shape.
	Right Hyperphoria (Left hypophoria)	4) Press [BDBU]. Turn the dial counterclockwise until the Horizontal Cross Chart becomes a cross shape.
	Exophoria + Right.Hyperphoria	5) Correct the Horizontal Heterophoria like (2), and correct the Vertical Heterophoria like (4).
	Esophoria + Left.Hyperphoria	6) Correct the Horizontal Heterophoria like (1), and correct the Vertical Heterophoria like (4).

[Table 10-3] Interpretation of Phoria Test

## 10.22 Phoria Test with Fixation

- Purpose: Subjective test, progress Heterophoria in a way of Pola Cross with Fixation.
- Chart: Polarized Cross Chart with Fixation
- Auxiliary Lens: Polarized Filter with 135 degrees for right eye, and 45 degrees for left eye.
- Target: The cross on the right upper side in 2 directions seen with the right eye and the cross on the left lower side in 2 directions seen with the left eye are united and seen as one.

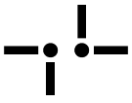
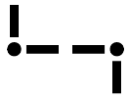






### Way of Test



1. On Chart clause of main screen, enter Heterophoria Mode by touching Pola Cross Chart with Fixation.
2. Ask the patient, "Does it seem like a cross?"
  - ▶ If the answer is "Yes," there is no Heterophoria. Test done.
  - ▶ If the answer is "No," it is Heterophoria. Process the next test.
3. First of all, to start with Horizontal Heterophoria, ask the patient as following.
4. "Does the letter (ㄴ) locate on the left side of the letter (ㄷ), or the right side of it?"
  - ▶ Located on left: "Exophoria" Turn the dial counterclockwise to increase BI prism, until the cross is seen well.
  - ▶ Located on right: "Esophoria" Turn the dial clockwise to increase BO prism, until the cross is seen well.
5. To start with Vertical Heterophoria, ask the patient as following.
6. "Does the letter (ㄴ) locate upside of the letter (ㄷ), or downside of it?"
  - ▶ Located upside: "Left Hyperphoria" Turn the dial clockwise to increase BU prism, until the cross is seen well.
  - ▶ Located downside: "Right Hyperphoria" Turn the dial counterclockwise to increase BD prism, until the cross is seen well.



[Figure 10-22] Phoria Test with Fixation

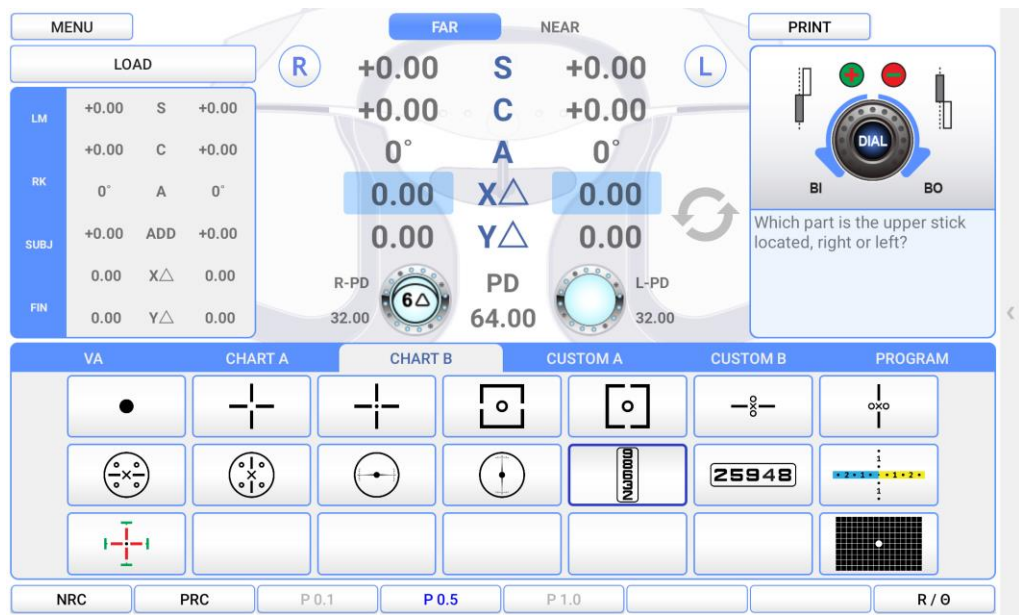
Chart Shape	Heterophoria Type	Description
	Esophoria	1) Turn the dial clockwise until the Vertical Chart of the Cross becomes a cross shape, to increase BO prism.
	Exophoria	2) Turn the dial clockwise until the Vertical Chart of the Cross becomes a cross shape, to increase BI prism.
	Left.Hyperphoria	3) Press [BDBU]. Turn the dial clockwise until the Horizontal Cross Chart becomes a cross shape.
	Right.Hyperphoria	4) Press [BDBU]. Turn the dial clockwise until the Horizontal Cross Chart becomes a cross shape.
	Esophoria + Right.Hyperphoria	5) Correct the Horizontal Heterophoria like (1), and correct the Vertical Heterophoria like (4).
	Esophoria + Left.Hyperphoria	6) Correct the Horizontal Heterophoria like (1), and correct the Vertical Heterophoria like (4).
	Exophoria + Right.Hyperphoria	7) Correct the Horizontal Heterophoria like (2), and correct the Vertical Heterophoria like (4).
	Exophoria + Left.Hyperphoria	8) Correct the Horizontal Heterophoria like (2), and correct the Vertical Heterophoria like (3).

[Table 10-4] Interpretation of Phoria Test

### 10.23 Horizontal Von Graefe Test

- Purpose: In subjective test, process Heterophoria in a way of Von Graefe.
- Chart: Numbers Chart
- Auxiliary Lens: 6 $\Delta$ BU prism for right eye, and Rotating Prism for left eye
- Target: Be a state in which the upper vertical line and the lower vertical line are arranged in a row.
- Way of Test

1. On Chart clause of main screen, enter Horizontal Von Graefe Mode by touching horizontal Von Graefe chart.
2. Ask the patient if the horizontal bars are located on one straight line.
  - ▶ “Yes,” no Heterophoria. Test done.
  - ▶ “No,” it’s Heterophoria. Process the next test.
3. Of 2 of horizontal bar, which bar is the left side.
  - ▶ In case of upside vertical bar on left side: Turn the “Esophoria” dial clockwise to add BO prism, until the vertical bars are arranged on one straight line.
  - ▶ In case of downside vertical bar on left side: Turn the “Exophoria” dial counter clockwise to add BI prism, until the vertical bars are arranged on one straight line.

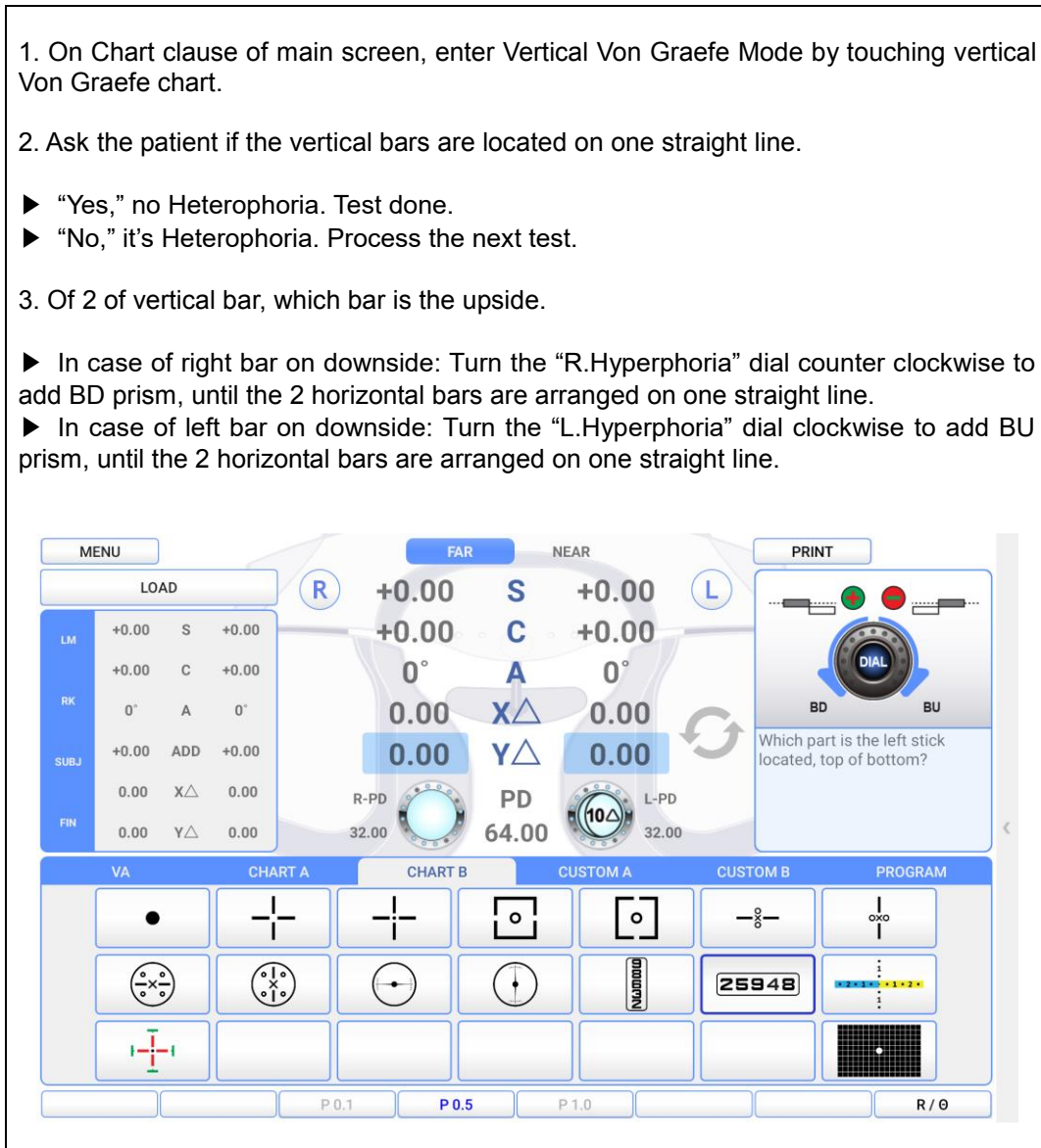


[Figure 10-23] Horizontal Von Graefe Test

### 10.24 Vertical Von Graefe Test

- Purpose: Subjective test, process Heterophoria in a way of Von Graefe.
- Chart: Numbers Chart
- Auxiliary Lens: Rotating Prism for right eye, and 10 $\Delta$ BI Prism for left eye
- Target: Be the state in which the left horizontal line and the right horizontal line are arranged on one straight line in the middle.
- Way of Test

1. On Chart clause of main screen, enter Vertical Von Graefe Mode by touching vertical Von Graefe chart.
2. Ask the patient if the vertical bars are located on one straight line.
  - ▶ “Yes,” no Heterophoria. Test done.
  - ▶ “No,” it’s Heterophoria. Process the next test.
3. Of 2 of vertical bar, which bar is the upside.
  - ▶ In case of right bar on downside: Turn the “R.Hyperphoria” dial counter clockwise to add BD prism, until the 2 horizontal bars are arranged on one straight line.
  - ▶ In case of left bar on downside: Turn the “L.Hyperphoria” dial clockwise to add BU prism, until the 2 horizontal bars are arranged on one straight line.



[Figure 10-24] Vertical Von Graefe Test

**10.25 Minute Stereo Acuity Test**

- Purpose: Subjective test, progress a minute stereo Acuity test.
- Chart: Minute Stereo Vision Chart
- Auxiliary Lens: Polarized Filter with 135 degrees for right eye, and 45 degrees for left eye.
- Target: With Fixation as a center, it must be seen as rotating clockwise and as embossed.
- Way of Test



1. On Special Chart clause of touch screen, press Minute Stereo Vision Chart and choose Minute Stereo Vision Test Mode.

2. Ask the patient, “How do you see the bars, with the standard of Fixation, from at 12, 3, 6, to 9 o'clock (clockwise)?”

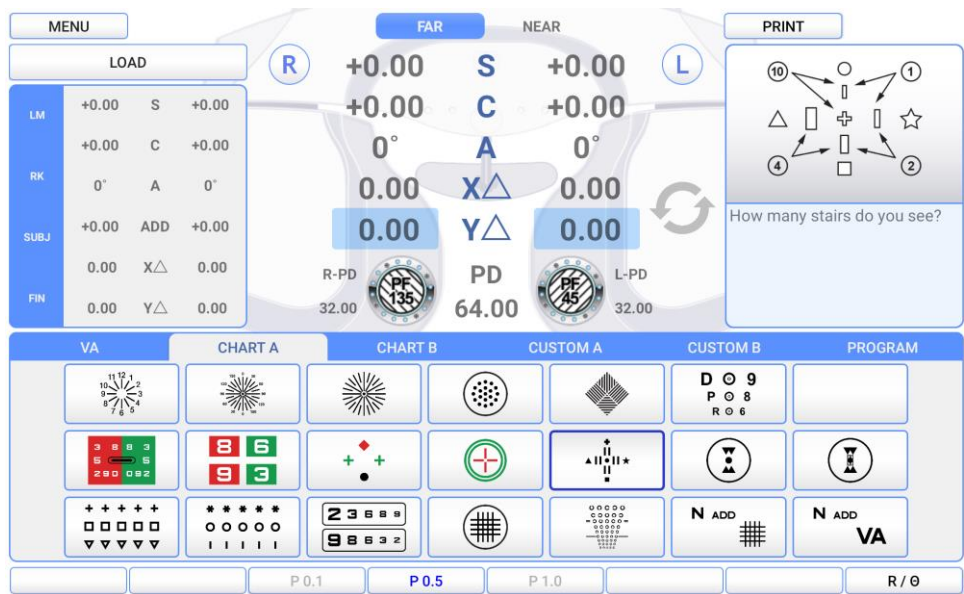
▶ All the bars including central Fixation look like flat: The patient does not have the capability of stereo vision. Choose NG.

▶ The bars at 12 and 3 o'clock look like cubic: The patient can perceive to 1 arc minute. Choose [1'].

▶ The bars at 3 and 6 o'clock look like cubic: The patient can perceive to 2 arc minutes. Choose [2'].

▶ The bars at 6 and 9 o'clock look like cubic: The patient can perceive to 4 arc minutes. Choose [4'].

▶ The bars at 12 and central Fixation look like cubic: The patient can perceive to 10 arc minutes. Choose [10'] and setup it.



[Figure 10-25] Minute Stereo Vision Test

# 11. Test Result Display and Print out

The test result of UDR-800P is available on the screen or on papers by printing.

## 11.1 View the Result Screen

Touch [PRINT] button on main screen to check test result. Press [Far/Near] button to see Far Vision Test Result and Near Vision Test Result, and it can be printed directly on papers by touching [PRINT] button on bottom of screen. The explanation about this part is done in 5.2, so please refer to that for detail information.

## 11.2 Print on Papers

Touch [PRINT] to print the result on papers. On 'Print option', if 'PREVIEW LIST' is setup as ON, the previously mentioned 'TEST RESULT' would be operated. To print the result, touch [PRINT] button.

If it is supposed to be printed on papers only after all tests are done, it takes so long time and much paper, to complete printing.

Because it offers various options related with 'Print option' print time and paper saving is possible if it is setup to print only designated results.

Name:	Patient name
Date: 2022-06-01	Date
Time: 14:30:00	Time
Age : 40	Age
Dominant Eye: Right	Dominant eye
PD: 64.00 / 60.00(NEAR)	Far vision PD / Near vision PD
WD: 40 cm	Working distance
--<R>----[U A]----<L>--	Naked visual acuity test information
(Far)	
VA:0.10 0.18 0.10	
--<R>----[U A]----<L>--	
(Near)	
VA:0.10 0.18 0.10	
[Objective data]	[Objective data]
--<R>----[L M]----<L>--	Lens meter data
(Far)	(Far)
+00.00 SPH +00.00	
+00.00 CYL +00.00	
000 AXS 000	
+00.00 ADD +00.00	
O 03.00 P-X I 03.00	
U 03.00 P-Y D 03.00	
--<R>----[L M]----<L>--	(Near)
(Near)	
+00.00 SPH +00.00	
+00.00 CYL +00.00	
000 AXS 000	
+00.00 ADD +00.00	
O 03.00 P-X I 03.00	



U 03.00 P-Y D 03.00	
--<R>----[R K]----<L>-- (Far)	Auto refractor & keratometer data (Far)
+00.00 SPH +00.00	
+00.00 CYL +00.00	
000 AXS 000	
+00.00 ADD +00.00	
O 03.00 P-X I 03.00	
U 03.00 P-Y D 03.00	
--<R>----[R K]----<L>-- (Near)	(Near)
+00.00 SPH +00.00	
+00.00 CYL +00.00	
000 AXS 000	
+00.00 ADD +00.00	
O 03.00 P-X I 03.00	
U 03.00 P-Y D 03.00	
[Subjective data]	[Subjective data]
--<R>----[SUB]----<L>-- (Far)	Subject mode
+00.00 SPH +00.00	
+00.00 CYL +00.00	
000 AXS 000	
+00.00 ADD +00.00	
O 03.00 P-X I 03.00	
U 03.00 P-Y D 03.00	
--<R>----[FIN]----<L>-- (Near)	Final mode
+00.00 SPH +00.00	
+00.00 CYL +00.00	
000 AXS 000	
+00.00 ADD +00.00	
O 03.00 P-X I 03.00	
U 03.00 P-Y D 03.00	
[Prism data]	[Prism data]
-<R>-[ Schober ]-<L>- (Far)	Schober test
O 03.00 P-X I 03.00	
U 03.00 P-Y D 03.00	
-<R>-[Coincidence]-<L>- (Far)	Coincidence test
O 03.00 P-X I 03.00	
U 03.00 P-Y D 03.00	
-<R>-[ Maddox ]-<L>- (Far)	Maddox test
O 03.00 P-X I 03.00	
U 03.00 P-Y D 03.00	
-<R>-[ Phoria ]-<L>- (Far)	Phoria without fixation test
O 03.00 P-X I 03.00	
U 03.00 P-Y D 03.00	

<p>-&lt;R&gt;- [ PhoriaFix ]-&lt;L&gt;-          (Far)          O 03.00 P-X I 03.00          U 03.00 P-Y D 03.00</p>	<p>Phoria with fixation test</p>
<p>-&lt;R&gt;- [ Vongraefe ]-&lt;L&gt;-          (Far)          O 03.00 P-X I 03.00          U 03.00 P-Y D 03.00</p>	<p>Vongraefe test</p>
<p>[Additional data]          (Far)</p>	<p>[Visual acuity test result for binocular]</p>
<p>--- BLR ----- RCV ---          NRA (OU):            +00.25   +00.25          NRA (R):            +00.25   +00.25          NRA (L):            +00.25   +00.25</p>	<p>NRA</p>
<p>(Far)          --- BLR ----- RCV ---          PRA (OU):            -00.25   -00.25          PRA (R):            -00.25   -00.25          PRA (L):            -00.25   -00.25</p>	<p>PRA</p>
<p>(Far)          -- BLR -- BRK -- RCV --          NRC:            00.50   00.50   00.50</p>	<p>NRC</p>
<p>(Far)          -- BLR -- BRK -- RCV --          PRC:            00.50   00.50   00.50</p>	<p>PRC</p>
<p>UNICOS CO., LTD.            +82-42-581-0047          http://www.e-unicos.com</p>	<p>PRINT FOOTER</p>

## 12. Maintenance

### 12.1 Replacement of Printing Paper

Replace the roll printing paper as soon as possible if the red line appears in the paper.  
 Make sure to confirm kind and size of the paper.  
 (kind : thermal paper, size: 58mm in width and 30mm in diameter)

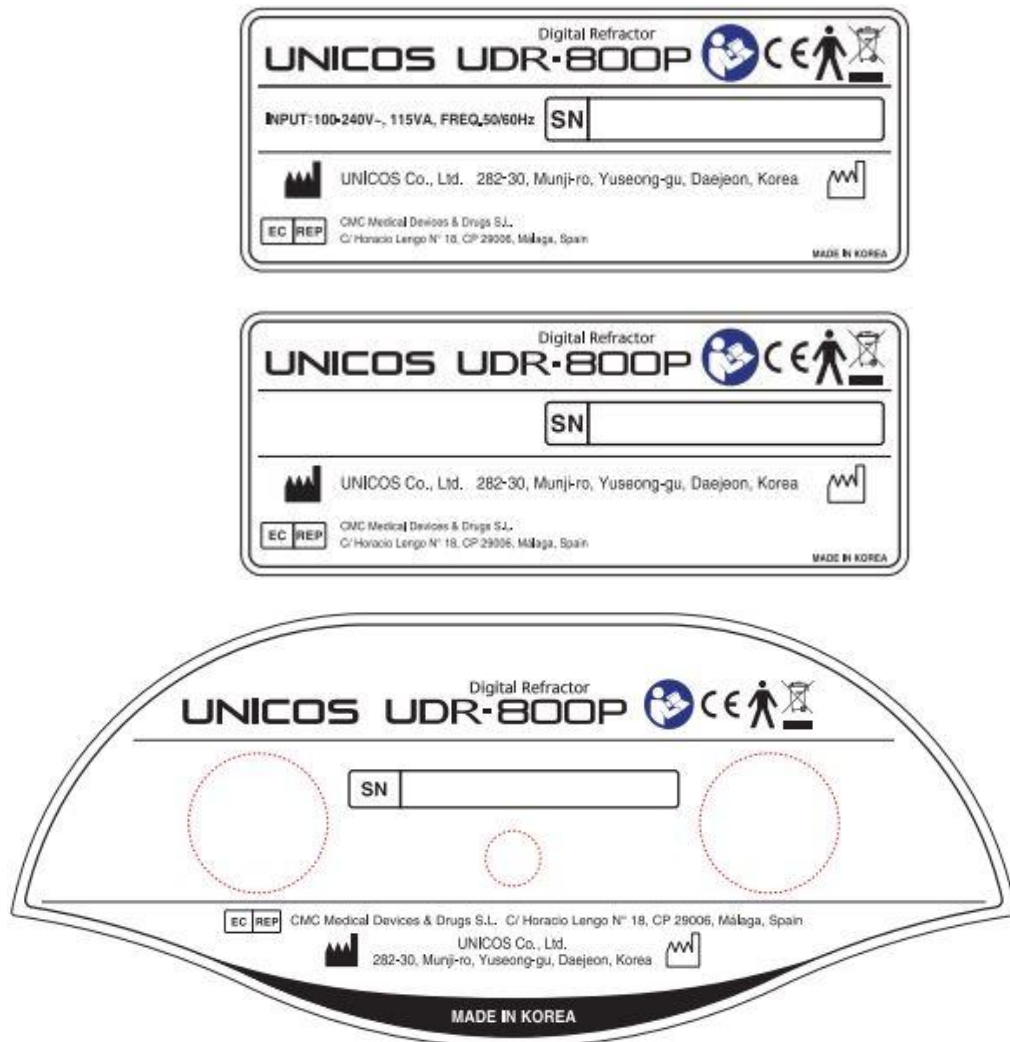
### 12.2 Cleaning

- Basically, keep this instrument clean. Don't use volatile object, thinner or benzene, etc.
- Polish each part with a dry cloth containing detergent solution.

### 12.3 Service Information

#### 12.3.1 Repair

- If there is a problem with the equipment, ask the sales representative for consultation.
  - Please refer to the product label and inform your sales representative of the information below.
- Model of the instrument: UDR – 800P
  - Serial Number: 10-digit characters indicated on the name plate
  - Symptom: In detail



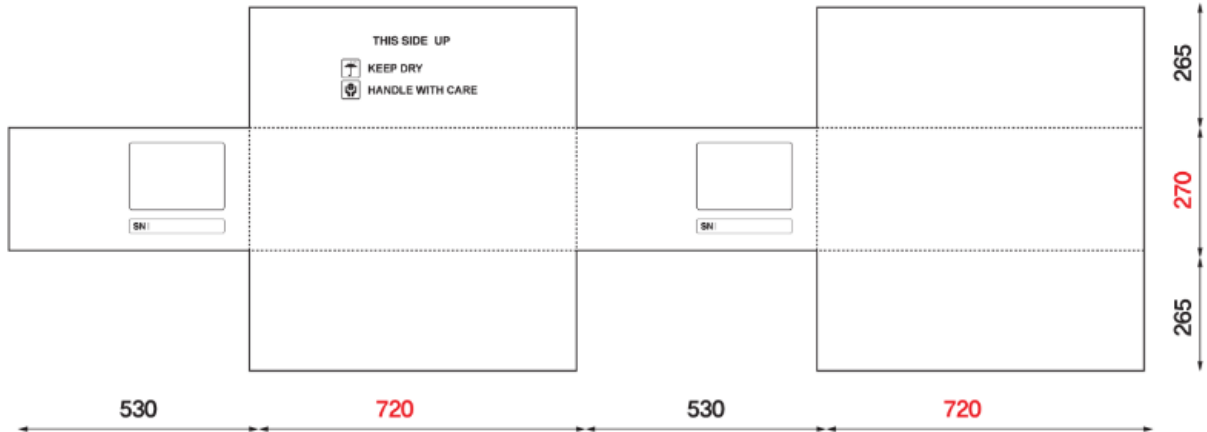
[Figure 12-1] Name plate

[Appendix] Hardware Specification

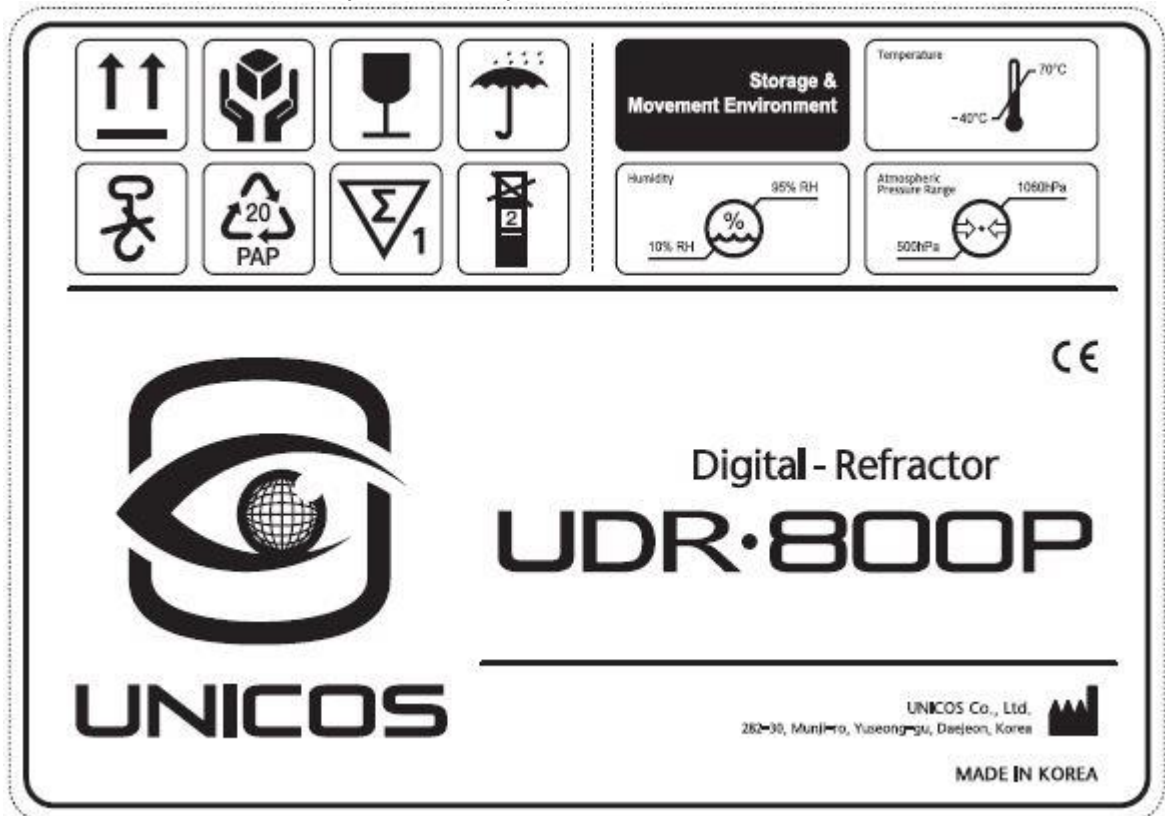
Measuring Range	
Spherical Lens	-29.00 ~ +26.75D (Regular) -19.00 ~ +16.75D (Cross Cylinder, Prism Test) (Step: 0.12D / 0.25D / 0.5D / 1D / 2D / 3D)
Cylinder Lens	0.00 ~ 8.75D (Step: 0.25D / 0.5D / 1D / 2D / 3D)
Cylinder Axis	0 ~ 180° (Step: 1 / 5 / 15 / 30 / 45°)
Pupil Distance	Far: 48 ~ 80 mm (Step: 0.5 / 1.0 mm) Near: 45 ~ 75 mm (Step: 0.5 / 1.0 mm)
Working Distance	35 ~ 70 cm (Step: 5 cm)
Rotary Prism	0 ~ 20 Δ (Step: 0.1Δ / 0.2Δ / 0.5Δ / 1Δ / 2Δ)
Cross Cylinder	Jackson Cross Cylinder ±0.25D Jackson Cross Cylinder ±0.50D Dual Cross Cylinder
Retinoscopy Lens	+1.5D, +2.0D (Test Distance 67cm, 50cm)
Specifications	
Body	362(width) * 83(depth) * 300(height)mm, 3.5 kg
Controller	215(width) * 230 (depth) * 226(height) mm, 1.5 kg
Junction Box	266(width) * 60(depth) * 239(height) mm, 1.0 kg
Tablet PC (PAD) Recommended Specifications	O S : Android 10
	CPU : Snap-Dragon 662
	RAM : 3GB
Power Supply	AC 100 - 240V~, 50 / 60Hz
Power Consumption	115VA
Auxiliary Lens	
Open/Close Lens	Open / Close Select
Pin Hole Lens	Φ 1mm
Maddox Rod	Right eye (horizontal red), Left eye (vertical red)
Red/Green Filter	Right eye (red), Left eye (green)
Polarized Light Filter	Right eye (135°, 45°), Left eye (45°, 135°)
Separating Prism	Right eye (6ΔBU), Left eye (10ΔBI can be added to 0~5Δ)
PD Test Lens	On / Off Select
Fixed Cross Cylinder Lens	Jackson Cross Cylinder ±0.50D, Axis fixation 90°
Vision Degrees	32°

## 13. Packing






### 13.1 Packing Foam Design






### 13.2 UDR-800P Box Label (120X148mm)



13.3 Packaging step

<p>Step 1</p>	<p>Plastic bag packaging Material : PE Size : 0.4Tx750x1300 Color : transparency</p>	
<p>Step 2</p>	<p>Foamed polystyrene packaging Material : poly urethane Top Cushion Size : 658(D)x526(W)x155(H) ( pair) Color : Silver</p> <p>Foamed polystyrene packaging Material : poly urethane Bottom Cushion Size : 658(D)x526(W)x157(H) ( pair) Color : Silver</p>	
<p>Step 3</p>	<p>Paper box packaging Material : KLB225.CK.K.CK.KLB225 Size : 660(D)x530(W)x295(H) Color : 1 degree black, Yellow</p>	
<p>Step 4</p>	<p>Rope packaging Material : P.P Size : 15mm Color : yellow</p>	
<p>Step 5</p>	<p>Finish packaging</p>	

	<ol style="list-style-type: none"> <li>1. Be cautious not to fall down or not to drop when carrying</li> <li>2. Be cautious not to be hurt on your finger when holding the rope to carry.</li> <li>3. Please contact manufacturer or distributor if the packing box is damaged because it may damage equipment.</li> <li>4. Please contact manufacturer or distributor if it's contaminated by rainwater because it may damage a equipment or it may present a risk of electric shock.</li> </ol>
	<ol style="list-style-type: none"> <li>1. Please use gloves when unpacking box.</li> <li>2. Hold the both side of rope when cutting to prevent any injury.</li> </ol>
	<ol style="list-style-type: none"> <li>1. Do not store and move the packing box being upside down.</li> <li>2. Do not place heavy things over 20kg when keeping.</li> <li>3. Do not throw it or drop from high.</li> </ol>

## 14. EMC (Electromagnetic Compatibility) Information

<b>NOTICE</b>	<p>“Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the UDR-800P, including cables specified by the UNICOS.</p> <p>Otherwise, degradation of the performance of this equipment could result.”.</p>
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The Electromagnetic Compatibility Directive sets the essential requirements for electrical and electronic equipment that may disturb or even be disturbed by other equipment. The UDR-800P complies with these requirements as tabled below. Follow the guidance on the tables for use of the device in the electromagnetic environment.

Equipment is suitable for use in professional healthcare facility environment only.

The use of accessories, transducers and cables other than those specified, with the exception of transducers and cables sold by the UNICOS of the medical electrical equipment or medical electrical system as replacement parts for internal components, may result in increased EMISSIONS or decreased IMMUNITY of EQUIPMENT or SYSTEM.

### 14.1 Guidance and manufacturer’s declaration-electromagnetic emission

The UDR-800P is intended for use in the electromagnetic environment specified below. The customer or the user of the UDR-800P should assure that it is used in such an environment.		
Emissions test	Compliance	Electromagnetic environment-guidance
Radiated disturbance CISPR 11	Group 1 Class A	The EMISSIONS characteristics of UDR-800P make it suitable for use in industrial areas and hospitals (CISPR 11 class A). If it is used in a residential environment (for which CISPR 11 class B is normally required) this equipment might not offer adequate protection to radio-frequency communication services. The user might need to take mitigation measures, such as relocating or re-orienting the equipment.
Mains terminal disturbance voltage CISPR 11	Group 1 Class A	
Harmonic current IEC61000-3-2	Class A	The UDR-800P is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Voltage Fluctuation/Flicker IEC 61000-3-3	Complies	

14.2 Guidance and manufacturer's declaration-electromagnetic emission

Immunity test	IEC60601-1-2 Test Level	Compliance Level	Electromagnetic environment Guideline
Electrostatic discharge (ESD) IEC 61000-4-2	8 kV Contact 15 kV Air	8 kV Contact 15 kV Air	The floor should be wooden or cemented floor or ceramic tile floor. In case that the floor is made of chemical compound materials, the relative humidity should be at least 30%
Radiated RF Electromagnetic Field immunity IEC 61000-4-3	3 V/m 80 MHz-2.7 GHz 80% AM at 1 kHz	3 V/m 80 MHz-2.7 GHz 80% AM at 1 kHz	The UDR-800P is suitable to use in professional healthcare environment.
Immunity to Proximity Fields from RF wireless Communications Equipment Table 9 in IEC 60601-1-2	28 V/m Max. 385-5785 MHz in according to table 9	28 V/m Max. 385-5785 MHz in according to table 9	RF communication equipment is used no closer than 30 cm to any part of the UDR-800P, including cables specified by UNICOS
Electrical Fast Transient/Burst IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for I/O lines 100 kHz repetition frequency	± 2 kV for power supply lines ± 1 kV for I/O lines 100 kHz repetition frequency	The quality of supplied power should be suitable for general business site or hospital environment.
Surge IEC 61000-4-5	± 1 kV line to line ± 2 kV line to earth	± 1 kV line to line ± 2 kV line to earth	The quality of supplied power should be suitable for general business site or hospital environment.
Immunity to conducted disturbances induced by RF fields according to IEC 61000-4-6	3 V 0.15-80 MHz 6 V in ISM bands between 0.15 and 80 MHz 80% AM at 1kHz  Power supply line & I/O lines	3 V 0.15-80 MHz 6 V in ISM bands between 0.15 and 80 MHz 80% AM at 1kHz  Power supply line & I/O lines	The strength of RF field in the frequency range higher than 150 kHz~80MHz, the strength of the RF field should be smaller than 3 V
Voltage dips/ Voltage interruption IEC 61000-4-11	0 % U <sub>T</sub> : 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°  0 % U <sub>T</sub> ; 1 cycle and 70 % U <sub>T</sub> ; 25/30 Cycles Single phase: at 0°  0 % U <sub>T</sub> ; 250/300 cycle	0 % U <sub>T</sub> : 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°  0 % U <sub>T</sub> ; 1 cycle and 70 % U <sub>T</sub> ; 25/30 Cycles Single phase: at 0°  0 % U <sub>T</sub> ; 250/300 cycle	The quality of supplied power should be suitable for general business site or hospital environment. For the user to operate the equipment continuously even the electric power supply is interrupted, This device does not require a Uninterrupted Power Supply or battery because it does not pose a risk.
Magnetic field of supply frequency (50/60Hz) IEC 61000-4-8	30 A/m	30 A/m	The magnetic field of power frequency should be coincided with the general value found in the business site or hospital environment
Note: U <sub>T</sub> is the AC voltage of the power before using test level			



## 15. Disposal of waste products

When disposing of the products below to contact us

COMPANY : UNICOS Co., Ltd

ADD: 282-30, Munji-ro, Yuseong-gu, Deajeon, Republic of Korea

Tel : +82-42-825-8045

Fax : +82-42-581-0053



This instrument incorporates a lithium battery, which may pollute the environment if the instrument is disposed.

Please ask a professional waste disposal company to handle disposal or your distributor before disposing of the instrument.