

Chart Projector
NH-500LED

Operational Manual

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1. Introduction

In this manual, the reader is provided with information on correct handling and Operational procedure as well as safety considerations pertinent to NH-500LED.

Before carrying out tests and/or adjustments, read the instructions thoroughly so that effective operation is ensured. As this constitutes an important reference and user guide, be sure to keep it on hand at all times.

General Definitions of Safety Symbols are indicated below.

 DANGER	<p>Serious injury or death may occur when this warning is ignored. Imminent danger.</p>
 CAUTION	<p>Personal injury or physical damage may occur when this warning is ignored. General warning. Caution. Risk of danger.</p>
	<p>Denotes general ban or prohibition.</p>
	<p>General mandatory action.</p>
<p><u>Chart Projector</u> Type: NH-500LED Power Source: 100V-240 V/50Hz-60Hz Power Consumption: 90W Lamp: 3W White LED Weight: 4.0 kg Dimensions: 320 x 245 x 225 mm</p>  	<p>The label on the main body. This label is found on the main body.</p>
	<p>Follow the instructions.</p>
<p>XXXX</p> 	<p>Manufacture year (XXXX year)</p>
	<p>Approval CE standard</p>

2. Safety consideration

- Do not touch the optical parts. Measurement accuracy will be adversely affected. When not in use, NH-500LED should be protected with the provided dust cover.
- Observe the following environmental conditions for used and storage time. Avoid dew condensation at all.

	Temperature	Relative humidity
Use	+10°C to +40°C	30% to 85%
Storage	-10°C to +60°C	below 70%



- If a surrounding temperature turns into 40°C or more, NH-500LED gets hot, and if it touches, there is danger of a burn.
- In case of occurrence of abnormality (noise or smoke), unplug the power cord immediately and contact your local distributor. Using the instrument in such a condition may cause fire or physical damage.
- As NH-500LED is a precision optical instrument, operations must be carried out at all times by experienced, authorized personnel. Damage to the equipment or personal injury will result.
- NH-500LED is a precision optical instrument. Handle with care at all times, making sure not to accidentally drop it.
- In case of malfunction, never try to repair by yourself. Unplug the power cord immediately and contact your local distributor.



- ⊘ Do not attempt to remodel or disassemble NH-500LED. Damage to the instrument or personal injury will result. If the instrument fails to work properly, you should not try to repair the fault. Consult your dealer immediately.
- ⚠ In case of occurrence of abnormality (noise or smoke), unplug the power cord immediately and contact your local distributor. Using the instrument in such a condition may cause fire or physical damage.
- ⊘ Keep in a secure, stable situation for storage and use of the instrument.
- ⊘ Do not put in the polarity (+/-) of a battery conversely.
- ⊘ Do not put in a battery into fire or carry out neither charge nor heating.
- ⊘ Do not mix a new battery, an old battery and the battery by which a maker differs from a kind. There is fear of a liquid leak, generation of heat, and a burst of a battery. The disposition of the used battery is according to the local regulations.

DANGER

- ❗ The power cord must be finally connected to an electrical ground (safety ground) at the power outlet.
- ❗ Keep the power cord clean without any dust or oil on it. The dirty terminal may cause malfunction or fire.
- ⊘ Do not touch the plug when your hands are wet. Electric shock or personal injury could result.
- ⊘ Do not soak the power cord in water or do not pour water.
- ⊘ Avoid damaging the power cord (such as bending it in an extremely small size, pulling, placing a heavy object on it). When the power cord is damaged (breaks, damage of cover, etc), replace it to a new cord to prevent any electric shock or fire from occurring.
- ❗ Insert the power cord firmly into the outlet and the instrument. If not, fire or electric shock may occur.
- ❗ Check whether the power cord is connected correctly.
- ❗ When plugging and unplugging the power cord, always hold the plug.
- ❗ When you move NH-500LED, turn off the power switch, and the power cord should extract and carry out.
- ⊘ Do not use only by the child, or do not use in the place that an infantile hand reaches. It may be injured.
- ⊘ When lighting up the lamp, do not look into the projection lens. Eyesight declines or there is danger of loss of eyesight.
- ⊘ Do not install NH-500LED near the explosive or the substance which is easy to ignite.
- ⊘ Do not install at the place with high temperature, humid environment or moisture.
- ⊘ Avoid the place with many parts for dust, gas and salt, or sulfur.
- ⊘ Do not expose shock or excessive pressure.
- ❗ Check continuously whether it is normal during use of equipment.
- ❗ When you carry the device, protect from a shock using the packing material when you bought.
- ❗ Do not put the thing which is easy to burn on NH-500LED. It becomes the cause of a fire.

3.Composition

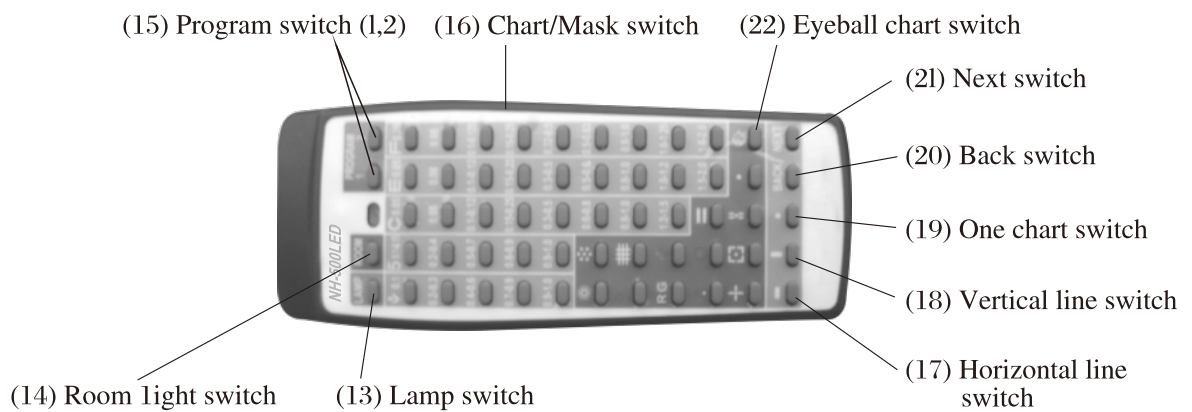
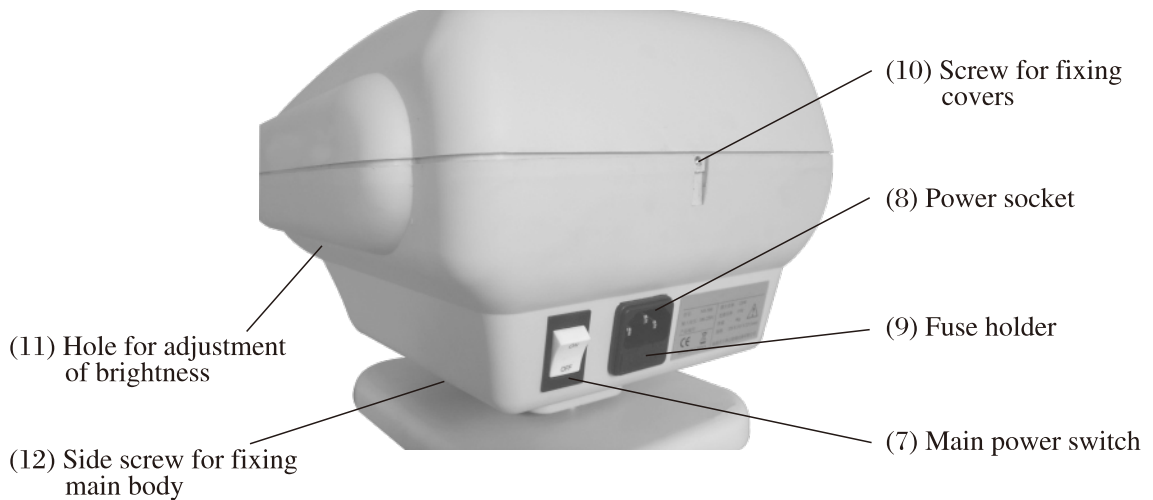


- When you open the packing case, please confirm that the following accessories are assembled and that there is no damage in each. When there is missing, and a damaged thing, please ask immediately the distributor. Moreover, we recommend you to keep the packing case and material, without throwing away for a case so that you may carry the device.
- When you discard packing material, please classify for every material and dispose according to the law of your country or the local regulations, etc.

Standard composition

● Projector main unit	1
● Screen	1
● Power code	1
● Test scale sheet	1
● Chart card	1
● Dust cover	1
● Spare fuse(250V 2A)	2
● Remote control box	1
● LR03 alkali battery	2
● Operation manual	1
● Hexagon wrench(5mm)	1
● Base	1
● Base setting	1
● Base copper bush	1

4.Name of each component



5.Setting



CAUTION

- Do not install at the place with dusty humid environment or moisture.
- Please tighten certainly the screw which fixes the main body and base by the hexagon wrench. (5mm.)
- As NH-500LED is a precision optical instrument, please deal with it not to give a strong shock etc.

1. Setting for the main body

1) Fixation with Base (6).

Fix certainly the attachment part of the main body with the joint ball of the base, and tighten the side screw (12) by the hexagon wrench (5mm). If not fixable, it will move suddenly and will become the cause of an injury.

2) Fixation with Unit arm or Wall arm

Fix certainly the attachment part of the main body with the joint ball of the base, and tighten the side screw (12) by the hexagon wrench (5mm). If not fixable, it will move suddenly and will become the cause of an injury.

2. Power supply

Connect the power cord to the power socket (8) and AC wall outlet.

3. Remote control box

Remove the battery lid of remote control box. Put two LR03 batteries in as the display of + and -.

4. Setting of the screen

Projection screen insert the provided string into two holes at the upper part of the screen and tie its ends. Attach a hook to the wall at the height of the patient's eyes and the screen will be hung horizontally.

* If you use except the screen in standard accessories, the performance of inspection equipment originally may not come out. Be sure to use the screen in standard accessories.

5.Projection focusing

1) Set NH-500LED at the place where NH-500LED and the patient are positioned at the same distance from the screen.

2) Turn on the main power switch (7).

3) Press the 0.1 chart switch (Lanolt or Snellen) on the remote control box and project the chart.

4) Loosen the side screw (12) and adjust the angle of the main body so that the chart will be at the center of the screen.

5) Turn the focus adjustment ring (2) and adjust focus using the provided test scale sheet (for 2 to 7m distance) so that the light will be focused on the 0.1 chart. (Move NH-500LED forward and backward and make the size of chart and scale to become the same.

- * Unless the size of the chart of projection distance and the test scale sheet is same, eye measurement cannot be performed correctly. Be sure to adjust.
- * If the remote control box is not operated for 5 minutes, the lamp will go out automatically. The light will be re-switched on if LAMP switch on the remote control box is pushed again.

6. Adjustment of the brightness

1) Turn on the main power switch.

2) Put a thin driver (a length of 6cm or more) into the hole for adjustment of brightness (11) and push the button. A buzzer sounds 3 times. Orange LED lights up on and the Landolt chart of 0.05 is displayed.

3) Push "Back switch (20)" and "Next switch (21)" of the remote control and adjust brightness.

(Initial setting: 200 – 250Cd/m² (5m)) (Next switch: bright, Back switch: dark)

*Adjustment within the ISO standard of 80 – 320Cd/m² is possible.

4) Push Lamp switch (13) so that a buzzer sounds 3 times and the brightness is memorized.



6.Operation



CAUTION

- If continuation use is carried out, the projection lens and the main body may get hot. Be careful of a burn.

- If vibration and a shock are given during operation, the mask and the chart shift and it may not be projected correctly. In this case, turn OFF/ON the main power switch. It comes to be projected correctly.
- Remote control is using infrared rays. If the apparatus which used other infrared rays is used simultaneously, NH-500LED may not operate correctly.
- Since the batteries are contained in remote control box, be fully careful for there to be no injury at the time of fall.

1. Power supply

Turn ON the main power switch (7).

2. Operation of the remote control box

Press any pushbutton (visual acuity and special test charts or masks) and any chart is fed or changed selectively. Various masks can be applied to the projected chart.

1) Lamp switch

By pushing LAMP switch (13) of remote control, the lamp lights up or the light is put out.

(When not operating the remote control more than for 5 minutes, the lamp goes out automatically. It is auto saving function.)

If the light is made to re-switch on, the chart before auto saving function starts will be turned on.

2) Perform masking while visually monitoring projected image. Mask operation can be used only in the place of the chart. (It cannot be used with special chart.)

①. Horizontal line mask

Usually, although it is used by OPEN (state which does not use a mask), when carrying out mask operation, the horizontal line switch (17) is pushed. The mask is applied to the top line of projected chart.

In order to change the position of the mask, it changes by Next switch (21) (below) and Back switch (20) (above).

When having applied the mask to the top or the bottom, it moves to the following chart and the mask moves to the bottom or the top.

②. Vertical line mask

Usually, although it is used by OPEN (state which does not use a mask), when carrying out mask operation, the vertical line switch (18) is pushed. The mask is applied to the leftmost line of projected chart. In order to change the position of the mask, it changes by Next switch (21) (right) and Back switch (20) (left).

When having applied the mask to the leftmost or the rightmost, it moves to the following chart and the mask moves to the rightmost or the leftmost.

③. One chart mask

Usually although it is used by OPEN (state which does not use a mask), when carrying out mask operation, the one chart switch (19) is pushed. The mask is applied to the left of most top of projected chart. In order to change the position of the mask, it changes by Next switch (21) (right) and Back switch (20) (left).

When having applied the mask to the leftmost or the rightmost, it moves to the following line and the mask moves to the rightmost or the leftmost.

When having applied the mask to the left of most top or the right of most top, it moves to the following chart and the mask moves to the right of most top or the left of most top.

3. User program mode

1) How to memorize the program mode

Two kinds of memorization are possible for the user program. Here, each is called "Program 1" and "Program 2" .

a) The procedure for entering into the program mode

1. Pushing Program switch 1 or Program switch 2 (15) is continued 5 seconds or more.

* At the time of auto power saving function, push Program switch 5 seconds or more after pushing the LAMP switch and making a chart project.

2. A buzzer sounds 3 times, and working indicator goes out, the first chart and mask are memorized and projected.

b) How to input the program

1. A chart or mask which you want to memorize is made to project by the remote control box.

2. Push the LAMP switch, a buzzer sounds once and the chart or mask currently displayed is memorized.

3. Repeat the procedure of above 1 and 2 to memorize the following chart or mask again if necessary.

* Maximum 49 kinds of charts can be memorized. After the 49 kinds of charts being memorized, if it is going to carry out the next chart to be memorized, a buzzer sounds twice, and the last chart will be replaced by the new one.

[Special operation]

■ When you want to delete all charts: Push the LAMP switch (13) 5 seconds. a buzzer sounds 3 times, all memorized charts will be deleted.

c) How to memorize the charts or masks

1. Push Program switch 1 or 2 (15) which you chose by a).

2. A buzzer sounds twice. memorization was completed.

Even if the power supply is turned OFF the memorized charts are not lost.



■ Auto saving mode can not be available during the User program Mode.

2) How to use program mode

1. Push Program switch 1 or Program switch 2 (15).

* At the time of auto power saving function, push Program switch after pushing LAMP switch.

2. A buzz sounds once, the first chart and mask are memorized and projected, the working indicator blinks. If there is no chart in the memory, the eyeball chart will be projected.

3. Push NEXT switch (21) to project next memorized chart or mask, Push BACK switch(20) to project the former chart or mask.

In the case of first chart or mask, a buzzer sounds 2 times and the former chart or mask is not shown.

In the case of last chart or mask, a buzzer sounds 2 times and the next chart or mask is not shown.

4. If a chart or a mask is pushed, the program mode will end and return to the usual operation. If LAMP switch is pushed, it will also end.



■ When you exam by the program mode, carry out checking in the chart whose intention the chart projected had. Exact exam cannot be performed when examine by belief.

■ When it is in the program mode without operation for long time, it returns to the usual operation.

4. ROOM switch (14)

By using optional deviator, operation of a room light is available by the remote control.

7. Storage and Maintenance

1. The cautions on handling

- 1) When not in use, protect the instrument with a supplied dustproof cover.
- 2) Do not touch the optical pans with fingers and be sure to avoid dust. When dust is attached to the optical, remove it with a brush or an air brush. When a fingerprint or oil is attached to the optical, attach the mixed-solution of alcohol and wipe it off by a lens cleaning paper or gauze.
- 3) If the surfaces of the body and main unit are dirty gently wipe with a dry cloth. For hard to remove stains, a damp cloth or neutral detergent is recommended.
 - Avoid using organic solvents that will damage the water based paint finish of the instrument.
- 4) If the instrument is not used for any length of time, remove the power cord from the outlet.
- 5) If the instrument is not used for any length of time, remove the batteries from the remote control.

2. How to replace the fuse



- Since there is a possibility of receiving an electric shock, first, unplug the power cord from the outlet.
 - Other causes can be considered, when there is a poor operation, even if fuse was exchanged. Unplug the power cord immediately and contact your local distributor.
 - If it uses except appointed fuse, it will be easy to go out or will become the cause of the accident. Use appointed fuse. (250V 2A)
- 1) Remove the power cord from the power socket (8).
Remove the fuse holder (9) and replace the fuse.
 - 2) If a nail is hooked on the slot of the fuse holder and it pulls to the front, the cover will separate.
 - * Note that two fuses are inserted in the fuse holder. A defective fuse can not be identified visually.
Therefore, detach and check both.

4. How to replace the batteries in the remote control

Pull the battery lid and then, pick out the old batteries and replace them with new ones. Place new batteries as illustrated on the bottom of the battery housing.

Install two batteries to prevent fluid leakage due to corrosion. (LR03 alkali batteries x 2)

8. Trouble shooting

Check the following matter before considering failure.

Even if checked the following matter, when not being repaired, contact to your local distributor.

1. Even if turn on the main power switch (7), lamp does not light up.

Cause 1: Poor connection of the power cord

Connect the power cord to the power socket (8) certainly

Cause 2: The fuse has burned out.

Replace the fuses. (7.3. How to replace the fuse)

2. Unevenness is in the brightness of the viewing field.

Cause 1: A dirt on the optical or chart

Wipe the optical or chart. (7.1.The cautions on handling)

3. Even if the switch of the remote control is operated, the main unit does not react.

Cause 1: Consumption of the battery

Replace the batteries. (7.4. How to replace the batteries)

9. Specification

1. Main unit

- 1) Projection distance: 2.0 – 7.0m
- 2) Projection magnification: 30 x (at 5m distance projection)
- 3) Projection field: 335 x 222mm (at 5m distance projection)
- 4) Luminance: 80 – 320Cd/m² (200Cd/m² at 5m distance projection)
- 5) Chart and mask selection speed: 0.3 second
- 6) Program: 2 kinds (50 charts or 38 masks)
- 7) Tilting angle: $\pm 10^\circ$
- 8) Lamp: 3W white LED
- 9) Dimensions: 248(W) x 336(L) x 234(H) mm
- 10) weight: 4.5kg
- 11) Auto saving mode: 5 seconds
- 12) Power source: 100 – 240V
- 13) Power consumption: 90W
- 14) Class I B type

2. Remote control

- 1) Control: Wireless remote control
- 2) Dimensions: 62(W) x 193(L) x 26(H) mm
- 3) weight: 100g

3. Charts

- 1) Total charts: 50 kinds

4. Approval CE standard