Thank you for purchasing the NEITZ Halogen Binocular Indirect Ophthalmoscope $IO$-$\alpha$ Small Pupil (hereafter called as $IO$-$\alpha$). Before use, please read this Instruction manual to your safety, and keep it handy for future reference.

**TABLE OF CONTENTS**

1. Safety Precautions
   1.1. Common Precautions .............................................................. 3
   1.2. Precautions to Power Supply Part............................................. 4

2. Item Check List
   2.1. $IO$-$\alpha$ with Power Supply Unit PSU-3 .................................. 6
   2.2. $IO$-$\alpha$ with Battery Pack BP-Li ........................................... 7

3. Nomenclature
   3.1. $IO$-$\alpha$ Main Body with Head Band Unit..................................... 8
   3.2. Power Supply Unit PSU-3
       3.2.1. Table-Top Model .................................................................. 8
       3.2.2. Wall Mounting Model ........................................................... 9
   3.3. Lithium Ion Battery Pack BP-Li .................................................. 9

4. Operation Method

   **For Customer Purchased $IO$-$\alpha$ With Power Supply Unit PSU-3**
   4.1. The Preparation
       4.1.1. Power Supply Unit PSU-3 Desk-Top Model............................... 10
       4.1.2. Power Supply Unit PSU-3 Wall Mounting Model ....................... 10
       4.1.3. How to Connect $IO$-$\alpha$ to the Power supply Unit .................... 11
       4.1.4. How to Wear $IO$-$\alpha$ ................................................................ 11
       4.1.5. Adjustment of Eyepiece Position ............................................ 11
       4.1.6. Adjustment of Pupillary Distance .......................................... 12
   4.2. The Observation
       4.2.1. How to Adjust the Illumination Brightness................................ 12
       4.2.2. How to Change the Illumination Field ..................................... 12
       4.2.3. Selecting of Filter .................................................................. 12
       4.2.4. Observation Method .............................................................. 12

   **For customer purchased $IO$-$\alpha$ with Lithium Ion Battery Pack BP-Li**
   4.1. The Preparation
       4.1.1. Lithium Ion Battery Pack BP-Li ............................................. 15
       4.1.2. How to Connect $IO$-$\alpha$ to the Lithium Ion Battery Pack BP-Li .... 16
       4.1.3. Charging the Battery ............................................................ 17
       4.1.4. How to Attach / Detach the Battery .................................... 17
       4.1.5. How to Connect / Disconnect the Battery .............................. 17
4.1.6. How to turn on the \textit{IO-\alpha}........................................ 18
4.1.7. How to wear the \textit{IO-\alpha}...................................... 18
4.1.8. Adjustment of Eyepiece Position.................................................. 18
4.1.9. Adjustment of Pupillary Distance.................................................. 19

4.2. The Observation
4.2.1. How to adjust the Illumination Brightness........................................ 19
4.2.2. How to change the Illumination Field............................................ 19
4.2.3. Selecting of Filter........................................................................ 19
4.2.4. Observation Method....................................................................... 19

5. Maintenance
5.1. \textit{IO-\alpha} Main Body
5.1.1. Cleaning...................................................................................... 22
5.1.2. How to exchange the Bulb............................................................... 22
5.1.3. Storage......................................................................................... 22
5.1.4 Safekeeping and Transportation....................................................... 23
5.1.5 Disposal......................................................................................... 23

5.2. Power Supply Unit PSU-3
5.2.1. Cleaning...................................................................................... 23
5.2.2. Storage......................................................................................... 23
5.2.3. Safekeeping and Transportation....................................................... 23
5.2.4. Disposal......................................................................................... 23

5.3. Lithium Ion Battery Pack BP-Li
5.3.1. Cleaning...................................................................................... 23
5.3.2. Storage......................................................................................... 23
5.3.3. Safekeeping and Transportation....................................................... 23
5.3.4. Disposal......................................................................................... 23

6. Troubleshooting
6.1. \textit{IO-\alpha} Main Body.................................................................... 24
6.2. Power Supply Unit PSU-3................................................................. 24
6.3. Lithium Ion Battery Pack BP-Li......................................................... 25

7. Technical Specifications
7.1. \textit{IO-\alpha} Main Body with Head band unit....................................... 26
7.2. Power Supply Unit PSU-3................................................................. 26
7.3. Lithium Ion Battery Pack BP-Li......................................................... 26
7.4. Carrying Case................................................................................... 27
7.5. Standard Accessories...................................................................... 27
7.6. Option............................................................................................. 28

8. Technical Support and Contact Information........................................ 28
1. SAFETY PRECAUTIONS

This instruction manual uses a variety of common symbols and icons to assist you in proper handling and usage of this product, and to warn you of potential hazards to yourself and others. These symbols and icons and their significance are described below.

**WARNING** Improper handling may cause death or serious injury.

**CAUTION** Improper handling may cause damage or physical loss.

<table>
<thead>
<tr>
<th>Symbols for prohibited action</th>
<th>Symbols for instructing action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prohibited</td>
<td>Mandatory</td>
</tr>
<tr>
<td>Disassembly prohibited</td>
<td></td>
</tr>
<tr>
<td>Wet hand prohibited</td>
<td></td>
</tr>
</tbody>
</table>

For customers in Europe

The “CE” mark indicates that this product complies with the European requirements for safety, health, environment and customer protection. CE-mark products are for sale in Europe.

The symbol indicates that this product is not to be discarded with normal household waste in European Union.

1.1. COMMON PRECAUTIONS

**WARNING**

- The time of illuminating to eyes must be minimal and do not exceed 1 minute with each eye. Otherwise it may damage your eyes.
- Do not irradiate an illumination more than required. Otherwise it may damage your eyes.
- Do not use it near the source of flammable gas such as propane gas or the gasoline and mine dust. Otherwise it may cause a fire ignition and an explosion.
- Do not leave in the place where a small children can touch. Otherwise it may cause injury and swallow the small parts by mistake.
- Do not cover it with cloth or bedclothes. Otherwise it may cause a fire ignition and an injury.
## CAUTION

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Triangle]</td>
<td>Do not use it with other AC adapter or battery pack than a standard included in this set. Otherwise, it may cause an electric shock or trouble.</td>
</tr>
<tr>
<td>![Triangle]</td>
<td>Do not use the battery pack with unstable condition or as dangled. Otherwise, it may cause a damage and an injury.</td>
</tr>
<tr>
<td>![Triangle]</td>
<td>Do not use in extremely humid place, nor where the water hangs. Otherwise, it may cause an electric shock or trouble.</td>
</tr>
<tr>
<td>![Triangle]</td>
<td>Do not let short-circuit between terminals, and do not touch terminals with finger. Otherwise, it may cause an electric shock or trouble.</td>
</tr>
<tr>
<td>![Triangle]</td>
<td>Do not sterilize. It may cause an injury or trouble.</td>
</tr>
<tr>
<td>![Triangle]</td>
<td>Do not apply a strong impact and do not hurl it. Otherwise, it may cause a damage and an injury.</td>
</tr>
<tr>
<td>![Triangle]</td>
<td>Do not touch with wet hand. Otherwise, you may get an electric shock.</td>
</tr>
<tr>
<td>![Triangle]</td>
<td>Never attempt to disassemble or modify it, as this may result in an electrical shock, fire ignition or an injury.</td>
</tr>
<tr>
<td>![Triangle]</td>
<td>Unplug from outlet if not use for a long period or during the cleaning. Otherwise, it causes an electric shock, fire ignition and a damage.</td>
</tr>
<tr>
<td>![Triangle]</td>
<td>Charge the battery or confirm an electric power amount, beforehand. Otherwise, it causes nonuse or interruption.</td>
</tr>
<tr>
<td>![Triangle]</td>
<td>In case screws loosens, fasten it tightly again. Otherwise, it may cause destruction and injury.</td>
</tr>
<tr>
<td>![Triangle]</td>
<td>Stop using and disconnect when a malfunction is found such as stink or smoke. Otherwise, it may cause an injury and a fire ignition.</td>
</tr>
</tbody>
</table>

### 1.2. Precautions to Power Source Part

## WARNING

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Triangle]</td>
<td>Do not use in extremely humid nor salty place, nor where the water hangs. Otherwise it may cause an electric shock.</td>
</tr>
<tr>
<td>![Triangle]</td>
<td>Do not use near the source of flammable gas such as propane gas or the gasoline and mine dust. Otherwise it may cause a fire ignition and an explosion.</td>
</tr>
<tr>
<td>![Triangle]</td>
<td>Do not use the power source cord and accessories other than in the original set. Otherwise it may cause a fire ignition and a trouble.</td>
</tr>
<tr>
<td>![Triangle]</td>
<td>Do not use with a power source plug with dust and foreign matter. Otherwise it may cause a fire ignition.</td>
</tr>
<tr>
<td>![Triangle]</td>
<td>Do not use with damaged cords. Otherwise it may cause an electric shock and a fire ignition.</td>
</tr>
<tr>
<td>![Triangle]</td>
<td>Arrange the electric wiring tidy. Otherwise, it may cause destruction of device and tumbling of user and an injury.</td>
</tr>
<tr>
<td>Icon</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td><img src="" alt="No Foreign Matter" /></td>
<td>Do not insert foreign matter from the gap of the main body. Otherwise it may cause a fire ignition and a trouble.</td>
</tr>
<tr>
<td><img src="" alt="No Wet Hands" /></td>
<td>Do not touch the cord, outlet and the device with wet hand. Otherwise you may get an electric shock.</td>
</tr>
<tr>
<td><img src="" alt="Unplug If Not Use" /></td>
<td>Unplug from outlet if not use for a long period or during the cleaning. Otherwise, you may get an electric shock, or it may cause a fire ignition and a trouble.</td>
</tr>
<tr>
<td><img src="" alt="Unplug Promptly" /></td>
<td>Unplug from outlet promptly when water or liquid entered. Otherwise, you may get an electric shock, or it may cause a fire ignition and a trouble.</td>
</tr>
<tr>
<td><img src="" alt="Do Not Touch Plug" /></td>
<td>Do not touch the metal parts of the plug with any other metal material when the plug is inserted in an outlet. Plug surely. Otherwise, you may get an electric shock and it may cause a fire ignition.</td>
</tr>
<tr>
<td><img src="" alt="Do Not Pull Cord" /></td>
<td>When pull the plug from an outlet, please hold the plug and do not pull a cord. Otherwise it may cause the damage to the cord, an electric shock or a fire ignition.</td>
</tr>
</tbody>
</table>

## CAUTION

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="" alt="Do Not Use Sunlight" /></td>
<td>Do not use under direct sunlight or harmful light. Otherwise this device may get heated and cause the trouble.</td>
</tr>
<tr>
<td><img src="" alt="Do Not Use Solvents" /></td>
<td>When cleaning do not use volatile solvents such as thinner nor polishing powder nor boiling water. Otherwise it may cause a deformation and a damage.</td>
</tr>
<tr>
<td><img src="" alt="Use Original Box" /></td>
<td>Be sure to use an original packing box during the movement and transportation. Otherwise, it may cause a deformation and a trouble.</td>
</tr>
</tbody>
</table>
2. ITEM CHECK LIST

Depending on the Power supply device and Set number, the set component is different. Please check that all items and accessories are present. If any items are missing or damaged, please contact your dealer.

2.1. IO-α WITH POWER SUPPLY UNIT PSU-3

<table>
<thead>
<tr>
<th>ITEMS</th>
<th>SET NUMBERS</th>
<th>SET</th>
<th>SET</th>
<th>SET</th>
<th>SET</th>
</tr>
</thead>
<tbody>
<tr>
<td>IO-α Main Body with Head Band Unit</td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Power Transformer PSU-3T with AC Adapter</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>(Table-top Model)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Transformer PSU-3K with AC Adapter</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>(Wall mounting Model)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wall mounting Fitting Set</td>
<td>Installation Screw-1 pc.</td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Tapping screw-3 pcs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Screw-2 pcs.</td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wall mounting Plate-1 pc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transformer mount Plate-1 pc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spare Light Bulb</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Teaching Mirror</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Hanger C</td>
<td></td>
<td>1</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Scleral depressor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Detachment Chart</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Carrying Case</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Aspheric Lens</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OPTIONAL</td>
</tr>
<tr>
<td>Desk Stand</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OPTIONAL</td>
</tr>
</tbody>
</table>
### 2.2. IO-α WITH BATTERY PACK BP-Li

<table>
<thead>
<tr>
<th>ITEMS</th>
<th>SET NUMBERS</th>
<th>Set 1</th>
<th>Set 2</th>
<th>Set 3</th>
<th>Set 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>IO-α Main Body and Head Band Unit</td>
<td>![Icon]</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Battery Pack BP-Li</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Lithium Ion Rechargeable Battery</td>
<td>![Icon]</td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Recharger</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>AC Adapter</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Extension Cord</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Head Band Hook</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Belt Hook</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Strap</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Tying Ring</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Spare Light Bulb</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Teaching Mirror</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Scleral depressor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Detachment Chart</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Carrying Case</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Aspheric Lens</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OPTIONAL</td>
</tr>
<tr>
<td>Desk Stand</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OPTIONAL</td>
</tr>
</tbody>
</table>
3. NOMENCLATURE

3.1. IO-α MAIN BODY WITH HEAD BAND UNIT

1. Lamp House
2. Lamp House Cord
3. Lamp House Plug
4. Filter Change Lever
5. Aperture Change Lever
6. Illumination Angle Adjustment Knob
7. Observation Angle Adjustment Knob
8. Cover Glass
9. Slit for Setting Teaching Mirror
10. Pupillary Distance Adjustment Lever
11. Eyepiece
12. Overband
13. Optic part Fixing Knob
14. Overband Stopper
15. Overband Fixing Knob
16. Back Head band
17. Cover
18. Back Head Band Fixing Knob
19. Head band
20. Head band Fixing Knob
21. Forehead Pad
22. Cord Clip

3.2. POWER SUPPLY UNIT PSU-3

3.2.1 Table-Top Model

1. Main Body
2. Power Supply Switch
3. Pilot Lamp
4. Brightness Adjustment Knob
5. DC Jack
6. Receptacle
7. Rubber Foot
8. Name Plate
9. Installation Screw Hole
3.2.2. Wall Mounting Model

Set for Wall Mounting

1 - Main Body, 2 - Power Supply Switch, 3 - Pilot Lamp, 4 - Brightness Adjustment Knob, 5 - DC Jack, 6 - Receptacle, 7 - Rubber Foot, 8 - Name Plate, 9 - Installation Screw Hole, 10 - Hanger Installation Hole, 11 - Transformer Mount Plate, 12 - Screw, 13 - Wall mounting plate, 14 - Tapping Screw, 15 - Installation screw, 16 – Hanger C.

3.3. Lithium Ion Battery Pack BP-Li

4. OPERATION METHOD

FOR CUSTOMER PURCHASED IO-α WITH POWER SUPPLY UNIT PSU-3

4.1. THE PREPARATION

4.1.1 Power Supply Unit PSU-3 Desk-Top Model

Put Power supply unit PSU-3 in the appropriate place before use.

4.1.2 Power Supply Unit PSU-3 Wall Mounting model

1. Please fix the Transformer Mount Plate (11) to the back side of Transformer using the Screws (12).
2. Wall Mounting Plate (13) should be fitted with Tapping Screws (14).
3. Please hang the transformer on the wall and fix with Installation Screw (15).
4. Finally insert Hanger C (16) to the Hanger Installation Hole (10).
4.1.3. How to Connect IO-α to the Power Supply Unit

1. Insert the Lamp House Plug (3) of the IO-α into the Receptacle (6) of PSU-3 until stop.
2. Then insert DC plug of the AC adapter into the DC Jack (5) of PSU-3 and Power supply plug into an outlet.
3. Push the Power Supply Switch button from OFF (○ seal) to ON (┃ seal) after turning the Brightness Adjustment Knob (4) left to minimizing the brightness. The Pilot Lamp (3) turns on, and the device is ready.

In the case of Hanger use:

1. The power switch of connected IO-α turned off when you hang it on the Hanger C, and the Illumination turns off too.
2. Power switch turns on when you take it off the hanger, and illumination turns on.

| Switching ON and OFF by the Hanger is a temporary function. When you do not use it for a long time please turn off it by Power Supply |

4.1.4. How to wear IO-α

1. Please loosen the Back Head Band Fixing Knob (18) and wear the Headband, to adjust your forehead to Forehead pad.
2. In the position which was the most stable to the head, fasten the Back Head band fixation knob (18). It would be more stable if position the Headband deeply as shown in the figure.
3. Adjust the depth with turning the top Head band fixation knob to become a good position.

4.1.5. Adjustment of Eyepiece Position

1. Holding the Optic part in one hand and loosen the Optic part Fixing Knob (13).
2. Adjust the position of the Eyepiece with moving forward and backward, up and down, and changing the angle to get best viewing.
3. Tighten the Fixing Knob (13) to fix the position.
4.1.6. Adjustment of Pupillary Distance
1. Rotate the Observation Angle Adjustment Knob (7) which located in both side, toward Large Circle Mark.
2. Place a target such as your thumb etc. to front about 400 mm of the Optic part.
3. Slide the Pupillary Distance Adjustment Lever (10) as for the target become the center of eyesight when viewing it with one-eye alternately.

4.2. The Observation

4.2.1 How to Adjust the Illumination Brightness
Adjust the brightness turning the Brightness Adjustment Knob (4) of PSU-3 clockwise.

4.2.2 How to Change the Illumination Field
Choose a necessary Illumination Field with rotating the Aperture Change Lever (5). Three kinds of Illumination Filed Diameter can be adjusted.
- SMALL mark: D 19 mm
- MEDIUM mark: D 50 mm
- LARGE mark: D 80 mm

4.2.3. Selecting of Filter
Select a necessary filter with rotating the Filter change lever (4). Three kinds of filter: UV, Red-free and Cobalt Blue can be selected.
- WHITE mark: UV filter
  Normally use at this position. Cutting ultraviolet rays while keeping the original color.
- GREEN mark: Red-free filter
  Darker vessels and high contrast can be obtained.
- BLUE Mark: Cobalt Blue filter
  Use for examination using fluorescein.

4.2.4. Observation Method
- Holding Aspheric Lens (option product) in one hand and let illumination light in the pupillary area of patient’s eye. The position will be stable if you attach an empty finger having an Aspheric Lens to the face of the patient.
- Then gradually move the lens away from the eye, the best position for clear observation can be found.
- Use properly by the pupil diameter.
Observation in Large Pupil →
Rotate Illumination Angle Adjustment Knob and Observation Angle Adjustment Knob toward upper side. The illumination light goes away from observation light and observation angle becomes large. The observation is easy, and the binocular vision is in a good condition.

Observation in Small Pupil ←
Rotate Illumination angle adjustment knob and Observation angle adjustment knob toward under side. The illumination light moves close to the observation light and then the observation angle becomes small.

Observation in Horizontal Flat Pupil →
Rotate Illumination angle adjustment knob toward under side and the Observation angle adjustment knob toward upper side. The illumination light moves close to the observation light and then the observation angle becomes large.

Observation in Vertical Flat Pupil ←
Rotate Illumination angle adjustment knob toward upper side and the Observation angle adjustment knob toward under side. The illumination light moves away from the observation light and then the observation angle becomes small.
**Observe Peripheral of the Fundus**

Observe target sclera while pressing by using Scleral depressor.

**Sharing of Fundus Image**

Insert Teaching mirror to the Slit for the Teaching mirror. Then the same image which the examiner observes can be seen from the side of the mirror. The Teaching Mirror can be inserted in a both side of the Optic part. When detaching, pull out the mirror by pressing upper and down part.

◆ The distance between patient’s eye and aspheric lens differ according to the diopter (D) of the aspheric lens.

◆ Choice of the aspheric lens
  - Bright and high magnification, but limited field of view.............. + 14 ~ 16 D
  - Normal observation................................................................. + 20 D
  - Dark and low magnification, but wide field of view................... + 28 ~ 30 D

◆ Dirty lens is interfere the fundus observation, therefore wipe well with dried soft cloth before using.
4. OPERATION METHOD

FOR CUSTOMER PURCHASED IO-α WITH POWER SUPPLY UNIT
LITHIUM ION BATTERY PACK BP-Li

4.1. THE PREPARATION

4.1.1. Lithium Ion Battery Pack BP-Li

Preparation is depending on how to wear the Battery Pack. Please check the Table and find the suitable part.

<table>
<thead>
<tr>
<th>How you wear the Battery Pack</th>
<th>Preparation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Putting on the desk or in a pocket.</td>
<td>It is not necessary to set any accessories to the Battery Pack.</td>
</tr>
<tr>
<td>Suspending from your neck.</td>
<td>Attach a Neck Strap to the Dual ring on the top of Battery Pack.</td>
</tr>
<tr>
<td>Please see Pic. 1</td>
<td></td>
</tr>
<tr>
<td>Hanging on to your belt etc.</td>
<td>Fix a Belt hook to the Main body of Battery pack with an attached Screw. Tighten well.</td>
</tr>
<tr>
<td>Please see Pic. 2</td>
<td></td>
</tr>
<tr>
<td>Attaching to the Head Band Unit of IO-α.</td>
<td>Fix a Headband hook to the Main body of Battery pack with an attached screw. Tighten well.</td>
</tr>
<tr>
<td>Please see pic.3</td>
<td></td>
</tr>
</tbody>
</table>

Pic. 1

Pic. 2
4.1.2. How to Connect \( IO-\alpha \) to the Lithium Ion Battery Pack BP-Li

Connection is depending on how to wear the Battery Pack.

**Using the Battery Pack as attached to the top of Head Band Unit of \( IO-\alpha \)**

- Attach the Battery pack to the Head Band Fixing Knob (20) on the top of Head band Unit of \( IO-\alpha \).
- Insert U-shaped part of Head Band Hook to Adjustment Knob from the back firmly to the end as shown with arrow.
- Make sure that the Hook does not have rattling.

**Using the Battery Pack as carrying or wearing with Strap or hanging on the belt**

- Connect \( IO-\alpha \) via included Extension cord (12) to the Battery pack
- Put Tying Ring to the Adjustment Knob in the back of the Head Band and fix the Extension Cord (12) with the Ring.
4.1.3 Charging the Battery

1. Place the Battery charger in the flat, stable place such as the top of the desk.
2. Insert DC Plug of AC Adapter to the Battery charger’s input jack.
3. Insert the Power supply plug of AC adapter to the outlet. When plugging, the Pilot lamp (POWER) turns RED on.
4. Set the Battery to the Battery charger like sliding as shown in picture. If the battery is set correctly the Pilot Lamp (CHARGE) turns ORANGE on.

The color of CHARGE Lamp changed by the conditions of charging as following.

<table>
<thead>
<tr>
<th>Lamp Color</th>
<th>Charging condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORANGE</td>
<td>Charging</td>
</tr>
<tr>
<td>GREEN</td>
<td>Charge complete (takes 2 hours)</td>
</tr>
<tr>
<td>ORANGE and BLINKING</td>
<td>Irregular charging</td>
</tr>
</tbody>
</table>

It is possible to use the battery that charged by then before lamp turns GREEN on. There is no trouble to recharge repeatedly the Battery additionally.

4.1.4. How to Attach / Detach the Battery

Insert the Battery diagonally with the terminal side forwarded to the Battery Pack Main Unit. When the battery inserted properly, the Stopper (6) completely returns to the original position with a sound and maintains the Battery. Please refer the picture.

It is not possible to insert the battery in wrong direction. Please do not insert it by force.

Detach the Battery after removing the Stopper, push the Eject Knob to the direction of ▲ mark.

4.1.5. How to Connect / Disconnect the Cord

Connect Lamp House Plug (3) to the Receptacle (5) by picking a rubber part of the Plug up with the finger. There is only one connecting position and by turning a rubber part slightly you can find the proper position easily. When properly connected, a metal ring is locked by with the click.
4.1.6. How to turn on / off the IO-α

After all preparations are completed, rotate the Brightness Adjustment Knob (7) of Battery Pack then the Illumination of IO-α is lit. The Brightness Adjustment Knob can operate On-Off and if turn it clockwise the intensity of illumination increases.

The residual quantity light changes according to remaining capacity of Battery.

<table>
<thead>
<tr>
<th>Pilot Lamp Color</th>
<th>Remaining capacity of Battery</th>
</tr>
</thead>
<tbody>
<tr>
<td>GREEN</td>
<td>Fully charged or sufficiently</td>
</tr>
<tr>
<td>ORANGE</td>
<td>Became around 10-15% of full charged battery</td>
</tr>
<tr>
<td>RED</td>
<td>Became less than 10% of full charged battery</td>
</tr>
</tbody>
</table>

Remaining capacity of Battery is depending on the Battery condition or usage. We recommend to charge the Battery immediately when Pilot Lamp is turned on by ORANGE or RED.

4.1.7. How to Wear IO-α

1. Please loosen the Back Head Band Fixing Knob (18) and wear the Headband, to adjust your forehead to Forehead pad.
2. In the position which was the most stable to the head, fasten the Back Head band fixation knob (18). It would be more stable if position the Headband deeply as shown in the figure.
3. Adjust the depth with turning the top Head band fixation knob to become a good position.

4.1.8. Adjustment of Eyepiece Position

1. Holding the Optic part in one hand and loosen the Optic part Fixing Knob (13).
2. Adjust the position of the Eyepiece with moving forward and backward, up and down, and changing the angle to get best viewing.
3. Tighten the Fixing Knob (13) to fix the position.
4.1.9. Adjustment of Pupillary Distance

1. Rotate the Observation Angle Adjustment Knob (7) which located in both side, toward Large Circle Mark.
2. Place a target such as your thumb etc. to front about 400 mm of the Optic part.
3. Slide the Pupillary Distance Adjustment Lever (10) as for the target become the center of eyesight when viewing it with one-eye alternately.

4.2. THE OBSERVATION

4.2.1 How to Adjust the Illumination Brightness
To adjust the brightness turning the Brightness Adjustment Knob (4) of PSU-3 clockwise.

4.2.2 How to Change the Illumination Field
Choose a necessary Illumination Field with rotating the Aperture Change Lever (5). You can choose one out of three kinds of Illumination Filed Diameter.

- SMALL mark: D 19 mm
- MEDIUM mark: D 50 mm
- LARGE mark: D 80 mm

4.3.3 Selecting of Filter
Select a necessary filter with rotating the Filter change lever (4). You can select from three kinds of filter: UV, Red-free and Cobalt Blue.

- WHITE mark: UV filter
  Normally use at this position. Cutting ultraviolet rays while keeping the original color.
- GREEN mark: Red-free filter
  Darker vessels and high contrast can be obtained.
- BLUE Mark: Cobalt Blue filter
  Use for examination using fluorescein.

4.2.4. Observation Method

- Holding Aspheric Lens (option product) in one hand and let illumination light in the pupillary area of patient’s eye. The position will be stable if you attach an empty finger having an Aspheric Lens to the face of the patient.
- Then gradually move the lens away from the eye, the best position for clear observation can be found.
- Use properly by the pupil diameter.
Observation in Large Pupil

Rotate Illumination Angle Adjustment Knob and Observation Angle Adjustment Knob toward upper side. The illumination light goes away from observation light and observation angle becomes large. The observation is easy, and the binocular vision is in a good condition.

Observation in Small Pupil

Rotate Illumination angle adjustment knob and Observation angle adjustment knob toward under side. The illumination light moves close to the observation light and then the observation angle becomes small.

Observation in Horizontal Flat Pupil

Rotate Illumination angle adjustment knob toward under side and the Observation angle adjustment knob toward upper side. The illumination light moves close to the observation light and then the observation angle becomes large.

Observation in Vertical Flat Pupil

Rotate Illumination angle adjustment knob toward upper side and the Observation angle adjustment knob toward under side. The illumination light moves away from the observation light and then the observation angle becomes small.
Observe Peripheral of the Fundus

Observe target sclera while pressing by using scleral depressor.

Sharing of Fundus Image

Insert Teaching mirror to the Slit for the Teaching mirror. Then the same image which the examiner observes can be seen from the side of the mirror. The Teaching Mirror can be inserted in both sides of the Optic part. When detaching, pull out the mirror by pressing upper and down part.

◆ The distance between patient’s eye and aspheric lens differ according to the diopter (D) of the aspheric lens.
◆ Choice of the aspheric lens
  ▶ Bright and high magnification, but limited field of view………….. + 14 ~ 16 D
  ▶ Normal observation………………………………………………….. + 20 D
  ▶ Dark and low magnification, but wide field of view………………… + 28 ~ 30 D
◆ Dirty lens is interfere the fundus observation, therefore wipe well with dried soft cloth before using.
5. MAINTENANCE

5.1. IO-α  MAIN BODY

5.1.1. CLEANING

*Lens part and cover glass*
Please wipe dirt off with soft cloth tenderly. If you cannot remove stains, please use the commercial glass lens cleaner. Do not touch lens with a bare finger at any time and always keep lens clean.

*Terminal parts*
Wipe the terminal parts with cotton swabs.

*Other parts*
Wipe with dry cloth or wipe with soft cloth slightly moistened with much diluted natural detergent and dry afterwards.

*Forehead Pad*
It is removable and washable. Use neutral detergent and gently wash is recommended.

5.1.2. HOW TO EXCHANGE THE BULB

1. Make sure that the Power switch is off.
2. Pull up the Lamp House (1) by pushing the indent part which are in the right and left side of it with something like a stick as shown in the picture.
3. Pull out the old Bulb from Lamp House.
4. Insert the new one.

5.1.3. STORAGE

- Operating temperature range: from 10 ºC to 40 ºC (50 F to 104 F)
- Storage temperature range: from -20 ºC to 60 ºC (-4 F to 140 F)
5.1.4. **SAFEKEEPING AND TRANSPORTATION**
Keep it in an original case and avoid any pressure or impact.

5.1.5. **DISPOSAL**
Dispose it according to local garbage rules.

5.2. **POWER SUPPLY UNIT PSU-3**

5.2.1. **CLEANING**

*Main Body*
Please wipe with soft cloth tenderly. If you cannot remove stains, please use the commercial glass lens cleaner. Do not touch lens with a bare finger at any time and always keep lens clean.

*Terminal parts*
Wipe the terminal parts with cotton swabs.

5.2.2. **STORAGE**
- Operating temperature range: from 10 °C to 40 °C (50 F to 104 F)
- Storage temperature range: from -20 °C to 60 °C (-4 F to 140 F)

5.2.3. **SAFEKEEPING AND TRANSPORTATION**
Keep it in an original case and avoid any pressure or impact.

5.2.4. **DISPOSAL**
Dispose it according to local garbage rules.

5.3. **LITHIUM ION BATTERY PACK BP-LI**

5.3.1. **CLEANING**

*Main Body*
Please wipe with soft cloth tenderly. If you cannot remove stains, please use the commercial glass lens cleaner. Do not touch lens with a bare finger at any time and always keep lens clean.

*Terminal parts*
Wipe the terminal parts with cotton swabs.

5.3.2. **STORAGE**
- Operating temperature range: from 10 °C to 40 °C (50 F to 104 F)
- Storage temperature range: from -20 °C to 60 °C (-4 F to 140 F)

5.3.3. **SAFEKEEPING AND TRANSPORTATION**
Keep it in an original case and avoid any pressure or impact.

5.3.4. **DISPOSAL**
Dispose it according to local garbage rules.
6. TROUBLESHOOTING

Please check the following contents when not working properly. If the problem is not solved, stop use and please contact the dealer immediately. Contact information is available in the end.

6.1. IO-α MAIN BODY

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Causes</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illumination is not turned on.</td>
<td>• Cord are not properly connected.</td>
<td>→ Please connect right.</td>
</tr>
<tr>
<td></td>
<td>• DC plug is not inserted.</td>
<td>→ Insert it.</td>
</tr>
<tr>
<td></td>
<td>• Battery pack is not charged.</td>
<td>→ Please charge the battery.</td>
</tr>
<tr>
<td>Illumination is dark and blinks.</td>
<td>• Choose a dimming filter.</td>
<td>→ Please try to change the filter.</td>
</tr>
<tr>
<td></td>
<td>• Residual quantity turns red.</td>
<td>→ Please charge.</td>
</tr>
<tr>
<td>Even full charged, not usable long</td>
<td>• Lifetime of battery is over.</td>
<td>→ Please ask your distributor to exchange it.</td>
</tr>
<tr>
<td>An Illumination field is uneven and occurs shadow.</td>
<td>• The cover glass is not clean nor cleared?</td>
<td>→ Please clean.</td>
</tr>
<tr>
<td></td>
<td>• The position of filter or diaphragm is not proper.</td>
<td>→ Change the position until it clicks.</td>
</tr>
<tr>
<td>An image fades during the observation</td>
<td>• Eyepieces and an observation mouth dirty or not cleared.</td>
<td>→ Please clean.</td>
</tr>
<tr>
<td></td>
<td>• Aspheric lens is dirty.</td>
<td>→ Please clean.</td>
</tr>
</tbody>
</table>

6.2. POWER SUPPLY UNIT PSU-3

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Causes</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>A pilot lamp does not turn on</td>
<td>• Not connected to an outlet.</td>
<td>→ Please connect.</td>
</tr>
<tr>
<td></td>
<td>• Not connected to DC Jack.</td>
<td>→ Please connect.</td>
</tr>
<tr>
<td></td>
<td>• An AC adapter is not connected.</td>
<td>→ Please connect.</td>
</tr>
<tr>
<td></td>
<td>• Power switch is not turned on.</td>
<td>→ Please turn on.</td>
</tr>
<tr>
<td></td>
<td><strong>In case of hanger use</strong></td>
<td>→ Reposition the hanger back to the normal position.</td>
</tr>
<tr>
<td></td>
<td>• Hanger is down by various reasons.</td>
<td></td>
</tr>
<tr>
<td>The IO-α series does not turn on</td>
<td>• Power supply plug of the IO series is not inserted in a receptacle.</td>
<td>→ Please insert.</td>
</tr>
</tbody>
</table>
### 6.3. Lithium Ion Battery Pack BP-Li

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Causes</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>While charging</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>POWER light is not on</td>
<td>• Power supply plug is not inserted in a power supply outlet. • DC plug of the AC adapter is not connected to Jack of the battery charger.</td>
<td>→ Please insert.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>→ Please connect.</td>
</tr>
<tr>
<td>CHARGE light is not on (No charge)</td>
<td>• Battery is not a proper. • Terminals of the battery is dirty or not cleared?</td>
<td>→ Check the battery.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>→ Please clean.</td>
</tr>
<tr>
<td>CHARGE light blinks</td>
<td>• Check the same points described in ”CHARGE light is not on”. • Reinstall the battery</td>
<td>→ Try again.</td>
</tr>
<tr>
<td><strong>When attach, detach the battery</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The battery is not inserted to the Battery Pack Main body.</td>
<td>• Direction of battery is not correct. • Install battery to the battery pack while cord is not disconnected. • The aperture of the battery is not cleared or terminals is deformed.</td>
<td>→ Check direction.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>→ Disconnect the cord.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>→ Check and remove.</td>
</tr>
<tr>
<td><strong>In Operation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A residual quantity light does not turn on</td>
<td>• No charge • Terminals of the battery is not clean or cleared? • The main body of battery pack is not clean or cleared?</td>
<td>→ Charge the batteries.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>→ Please clean.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>→ Remove and clean.</td>
</tr>
<tr>
<td>An instrument connected to the Battery Pack does not turn on</td>
<td>• Not connect to the proper product. • Glitch of the product or blow-out of the bulb. • Lamp House Cord is not connected to the Battery pack.</td>
<td>→ Check the instrument.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>→ Please check.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>→ Please connect.</td>
</tr>
<tr>
<td>Even a residual quantity light is green, but not usable for a long time</td>
<td>• Battery lifetime is over.</td>
<td>→ Exchange the battery.</td>
</tr>
</tbody>
</table>
7. TECHNICAL SPECIFICATIONS

7.1. IO-α MAIN BODY AND HEAD BAND UNIT

- Pupillary Distance : 54 mm to 74 mm
- Lens Diopter : +1D
- Observation angle : 0.9° to 2.6°
- Filters : UV, Red-Free, Cobalt Blue
- Illumination Area : Ø19 mm, Ø50mm, Ø80mm (at the distance of 50 cm)
- Illuminance : More than 500 Lx
- Light Source : Halogen Bulb L-51, 6V 10W
- Headband Adjustment Range : 53 cm to 63 cm
- Dimensions: 230 mm (W) x 310 mm (D) x 250 mm (H)
- Weight : 480 g

7.2. POWER SUPPLY UNIT PSU-3 (TABLE-TOP AND WALL MOUNTING MODEL)

7.2.1. Main Body

- Dimensions : 160mm×100mm×95mm (D)
- Weight : Approximately 380g

7.2.2. AC Adapter

- Input Voltage: 100 ~ 240V
- Power Frequency : 50/60Hz
- Output Voltage: DC 2.3 ~ 6V, below 2A
- Electricity Consumption : 35VA

7.3. LITHIUM ION BATTERY PACK BP-Li

7.3.1. BP-Li Main Body

- Dimensions : 48mm x 83mm x 49mm
- Weight : 75g (without Battery and Accessory)
- Operating Temperature: 0° ~ 40°C
- Storage Temperature: -20° ~ 60°C

7.3.2. Lithium Ion Rechargeable Battery 2400RS
- Dimension: 39mm x 72 mm x 21mm
- Weight: 108g
- Capacity: 2400mAh (Capable to operate IO-α for approximately 80min.)
- Output Voltage: DC 7.4V

7.3.3. Battery Charger
- Dimensions: 62mm x 120mm x 25mm
- Weight: 110g
- Input Voltage: 12VDC 1A

7.3.4. AC Adapter
- Input Voltage: 100V ~ 240VAC
- Power Frequency: 50 ~ 60Hz
- Output Voltage: 12VDC 1.25A

7.3.5. Package
- Dimensions: 310mm x 190mm x 90mm
- Total Weight: Approximately 800g

7.4. CARRYING CASE
- Dimensions: 460mm×320mm×150mm
- Weight: Approximately 4600g (including IO-α, PSU-3 and Standard Accessories)

7.5. STANDARD ACCESSORIES
- Scleral Depressor
- Teaching Mirror
- Detachment Chart
- Spare Bulb
7.6. **Option**

7.5.1. Aspheric Lens

- Dioptr : 20D
- Magnification: 3.08 times
- Visual Field: 60°

7.5.2. Desk stand

- Height: 32 cm
- Base: 18 cm x 18 cm

8. **TECHNICAL SUPPORT AND CONTACT INFORMATION**

Please contact the following address if you have any questions or need technical support. Our phone customer support is available from 9:15 am to 5:40 pm Monday to Friday (local time in Japan).

**NEITZ INSTRUMENTS CO., LTD.**
36-13 Wakamatsu-Cho, Shinjuku-Ku, Tokyo 162-0056, JAPAN
Tel.: (+81) 03-3204-2068
Fax: (+81) 03-3204-2069
E-mail: int@neitz.co.jp
URL: [www.neitz-ophthalmic.com](http://www.neitz-ophthalmic.com)