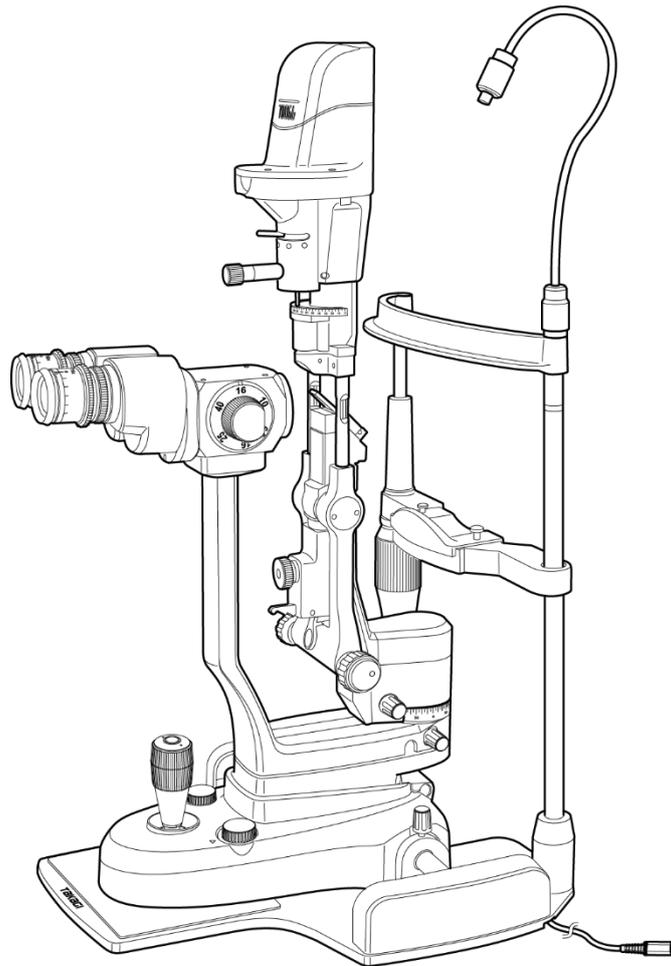




SLIT LAMP MICROSCOPE 700GL

INSTRUCTION MANUAL

MD



We would like to thank you for purchasing our 700GL.

Read this manual thoroughly before use, understand the contents, and handle this instrument safely and correctly.

- Do not use this equipment any other way than described in this manual.
- Keep this manual handy for future reference.
- Contact our distributor or our Sales Department if this manual is lost or damaged.

TAKAGI SEIKO CO.,LTD.

Introduction

Please read this INSTRUCTION MANUAL carefully to understand the details before using this equipment for safe and correct use.

● Important precautions

 WARNING	
	<ul style="list-style-type: none">- Do not disassemble this equipment. Touching an internal high-voltage part may cause an accident.- Do not alter this instrument. This may cause an accident or failure.
	<ul style="list-style-type: none">- This equipment should only be operated by ophthalmologists or medical personnel. Incorrect operation may cause an injury.- Do not use it for any purpose other than the intended use. Incorrect operation may cause an injury.

*For the marks used in this Manual, see “1. SAFETY PRECAUTIONS,” and “1.1 Marks/Symbols Used in this Manual or Equipment.”

■ Intended Use

- This instrument is intended to illuminate a human eyeball and the ocular adnexa with slit light and provide a magnified image as diagnostic information.

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1. Safety Precautions

1.1 Marks/Symbols Used in this Manual or Equipment

- The following symbols indicate the degree of danger or damage likely to occur when disregarded and/or misused.

 WARNING	This symbol indicates that in case of misuse, death or serious injury is likely to occur.
 CAUTION	This symbol indicates that in case of misuse, injury and/or damage may occur.

- The symbols below indicate content, which should be observed.

	These symbols include important information concerning operation and maintenance.
	These symbols indicate actions to be performed without fail. (Compulsory)
	These symbols indicate actions not to be conducted under any circumstances. (Prohibited)
	This symbol indicates reading the Instruction Manual and attached documents is required.

- The following symbols indicate content described below.

	Indicates the power switch.
	Indicates direct current.
	Indicates alternating current.
	Indicates the applied part of the Type B equipment in terms of the degree of protection against electric shock. The chinrest and forehead rest correspond to this.
	Indicates CLASS II EQUIPMENT classified by the type of protection against electric shock.
	Indicates the medical device manufacturer. The number displayed in the vicinity represents the year when the equipment was manufactured.
	Country of manufacture of products.
	The number displayed in the vicinity represents the serial number of the equipment.
	Indicates a carrier that contains unique device identifier information.
	Indicates the product meets all the legal requirements for CE marking.
	Indicates that EC Directives regarding the disposal of electrical and electronic equipment are applied.
	Indicates the European authorized representative name and address.
	Indicates the UK authorized representative name and address.
	Indicates the Switzerland authorized representative name and address.
	Indicates the product meets all the legal requirements for UKCA marking.
	Indicates that the product is a medical device.
	Instructs to read the instruction manual
	Indicates the range of humidity to which the medical device can be safely exposed.
	Indicates the temperature limits to which the medical device can be safely exposed.

1.2 Precautions for Use

- If serious incident occurred, contact to the manufacturer and the competent authority of the Member state in which user and/or patient is established.

•Precautions before use

 WARNING	
	Do not use in a place where there is a flammable chemical, flammable gas, or high-concentration oxygen. Once placed inside the equipment, these products can ignite and burn and cause a fire.
	Connect the power adapter to an outlet which meets the conditions of voltage and frequency displayed on the adapter. If it is connected to any outlet other than this, a fire or a malfunction may occur.
	Do not use any power adapter other than the one included with the equipment. If any adapter other than this is used, it may cause a fire or a malfunction.
	Do not place heavy items on the power cord or allow the power cord to become sandwiched. The cord may be damaged and may cause a fire or an electric shock.
	Do not insert or remove the power adapter into or from an outlet with wet hands. This may cause an electric shock.
	Do not use in a place in which water or chemicals may be splashed. Water or chemicals, once placed inside the equipment, can cause an electric shock or a malfunction.
	Do not use in a place having a strong magnetic force. Out-of-rating current will flow into the equipment, which may cause a fire or a malfunction.

 CAUTION	
	Do not hold any part other than the base to lift this equipment. The component may come off, causing the unit to fall, which may cause an injury.
	Do not use this equipment on an angled surface or in a place subject to vibration or impact. This may lead to injury due to the equipment toppling over or falling.
	Do not store or use this equipment in a place exposed to direct sunlight, high temperature, or high humidity or a place that may be affected by air containing dust, salt, or sulfur. This may cause a fault or a malfunction.

●Precautions during Use

 WARNING	
	Begin by projecting illumination light at the minimum value and gradually increase it up to the required light amount. If more light than necessary is projected into the patient's eye, the retina may be damaged.
	Long-time projection of illumination light on the patient's eye may damage the retina. Avoid long-time use and do not irradiate more illumination light than necessary.
	Children, aphakic eye patients and patients with eye diseases are at great risk to light damage. Use at the minimum light amount for the patient's eyes even if significant risk due to light irradiation from the slit lamp is not recognized.
	If the equipment begins to smoke, smell, or makes an unusual sound, stop use immediately, turn the power off, unplug the power adapter, and contact our distributor or our Sales Department. If the equipment continues to be operated as it is, a fire may occur.

 CAUTION	
	Risk increases if the same patient undergoes medical examination with the same equipment irradiating visible light or other ophthalmic examination equipment within 24 hours. It is assumed that the risk will further increase if a fundus oculi image of the target patient's eye is taken.
	Light damage to the retina may be caused by light irradiation and irradiation time. If the irradiation is reduced to one half, the time required to reach the maximum irradiation time becomes double.
	Operate the microscope and the slit lamp units while paying attention to the position of the patient's face. Otherwise, this may cause an injury of the patient's face.
	Operate the Chinrest while monitoring the posture of the patient. Otherwise, the patient may take an unnatural posture and this may cause an injury.
	Do not lean or apply downward pressure on the equipment. This may cause the equipment to topple over, leading to an injury or a malfunction.
	Do not place objects on the equipment. Objects may fall, causing an injury or a malfunction.
	Do not touch the accessible connector part and patient at the same time. This may cause an injury or a malfunction.
	Do not connect the equipment to any equipment other than the specified one. This may cause a malfunction.
	Do not insert foreign matter, such as clips, into gaps in the equipment. This may cause an electric shock or a malfunction.

●Precautions after Use

 WARNING	
	When inserting the power adapter into or removing it from an outlet, make sure to hold onto the power main body. Pulling the cord portion may break the cord, causing a fire or an electric shock.
	Do not use organic solvent (such as thinner, benzene, acetone, toluene, and ethyl acetate) or bleach to clean the equipment. This may cause a fire or an electric shock. This may also erode resin and painted parts.
	If the equipment has a malfunction, only workers accredited by us can repair it. Touching the internal high-voltage part may cause an electric shock.
	Turn off the power and unplug the power adapter before cleaning the equipment. If the equipment is cleaned with the power ON, an electric shock may result.
	When not using the equipment for a long time, disconnect the power adapter from an outlet. Dust accumulated on the plug may cause a fire.

 CAUTION	
	Cover the equipment with a dust cover to prevent dust when not using the equipment. If a dust cover is not used, accumulated dust may cause a malfunction.
	When the equipment has a malfunction, indicate that the equipment has an existing malfunction with “use is prohibited due to malfunction” to prevent others from using it by mistake.

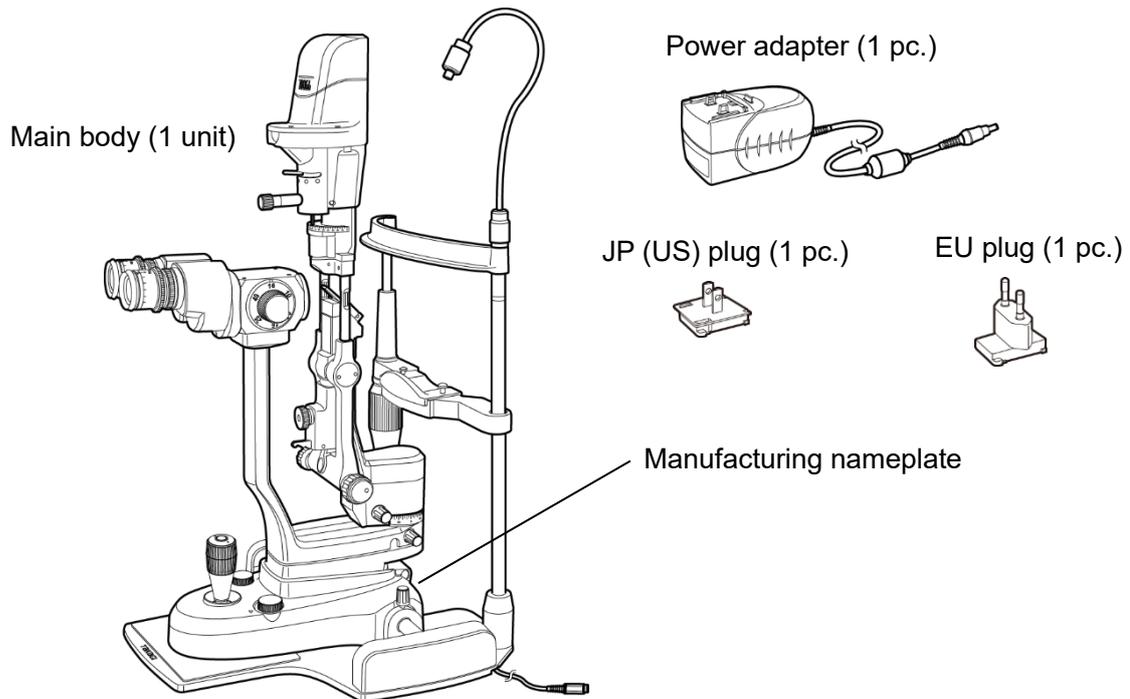
●Information provided by manufacturer (ISO 15004-2:2007)

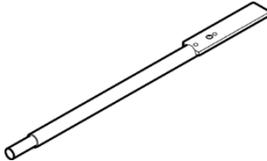
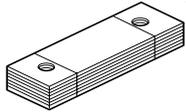
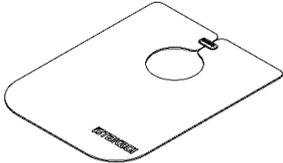
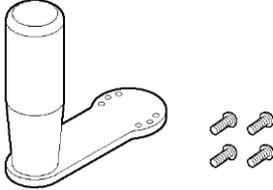
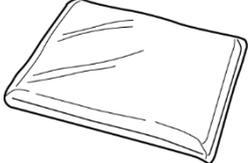
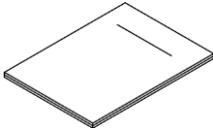
 CAUTION			
	[Information regarding the time required to reach potential light hazard]		
	The light emitted from this instrument is potentially hazardous. The longer the duration of exposure, the greater the risk of ocular damage. Exposure to light from this instrument when operated at maximum output will exceed the safety guideline after 3.2 min for only slit lamp, and 2.7 min for use of the slit lamp and background illumination at the same time.		
		For only slit lamp illumination	For slit lamp + background illumination
	Without filter	3.2 minutes	2.7 minutes
	Blue correction filter	4.7 minutes	3.6 minutes

2. Before Use

2.1 Packaging Information and Indication Label

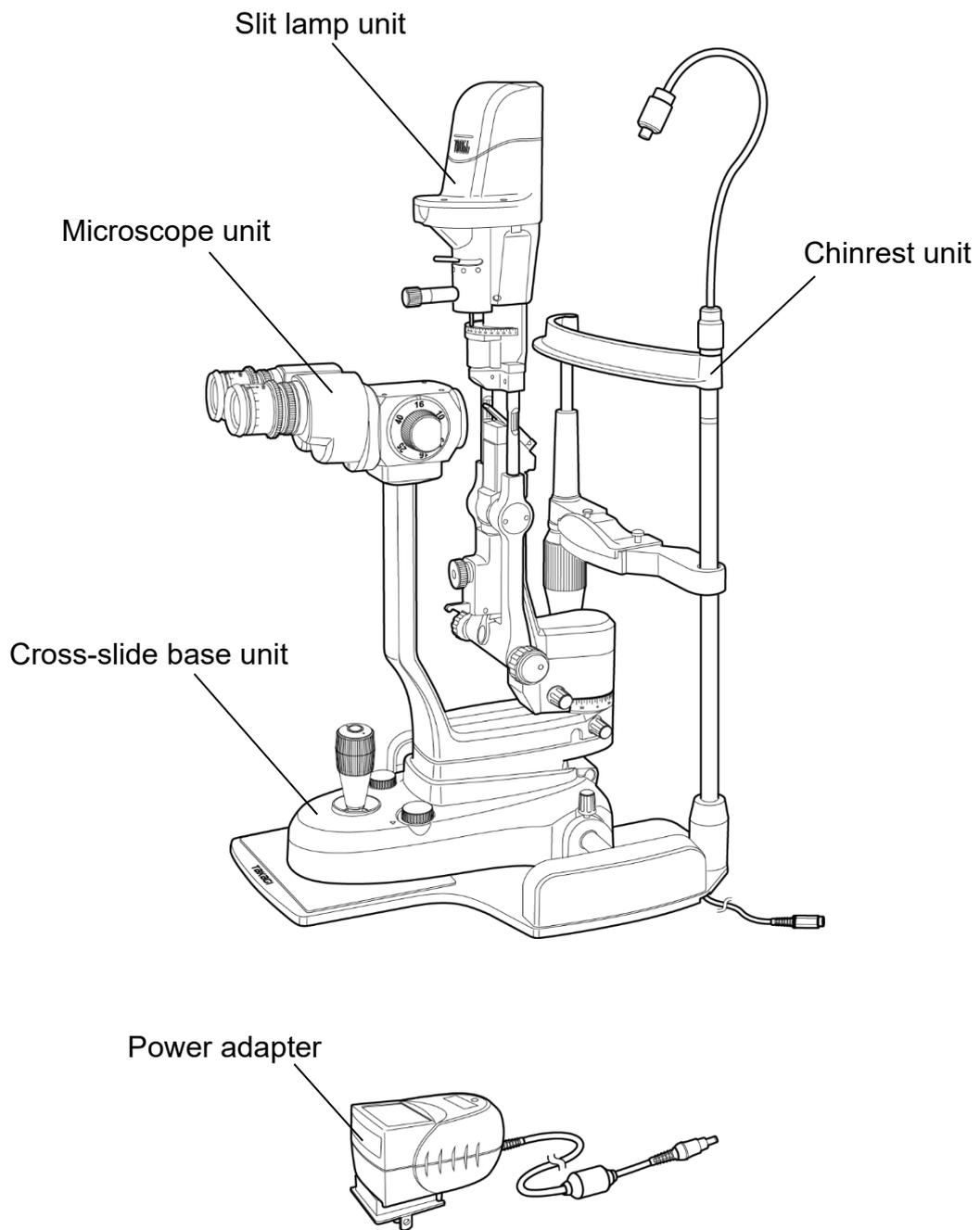
- The accessories shown below are included in the packaging. After unpacking, confirm that all accessories are included and none of the accessories are damaged. If there is any missing or damaged component, contact our dealer or Sales Department.



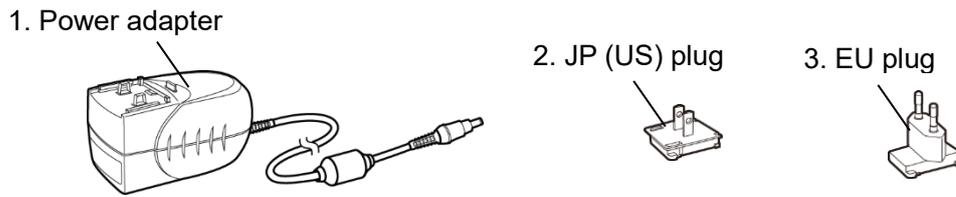
		
Short mirror (1 pc.)	Focusing adjusting rod (1 pc.)	Chinrest sanitary paper (1 pack)
		
Breath shield LS(1 sheet)	Hand Rests (2 pc)	Dust cover (1 sheet)
		
Screw (4 pcs.)	Instruction Manual (1 copy)	

3. Components and Functions

3.1 Overall View and Power Supply

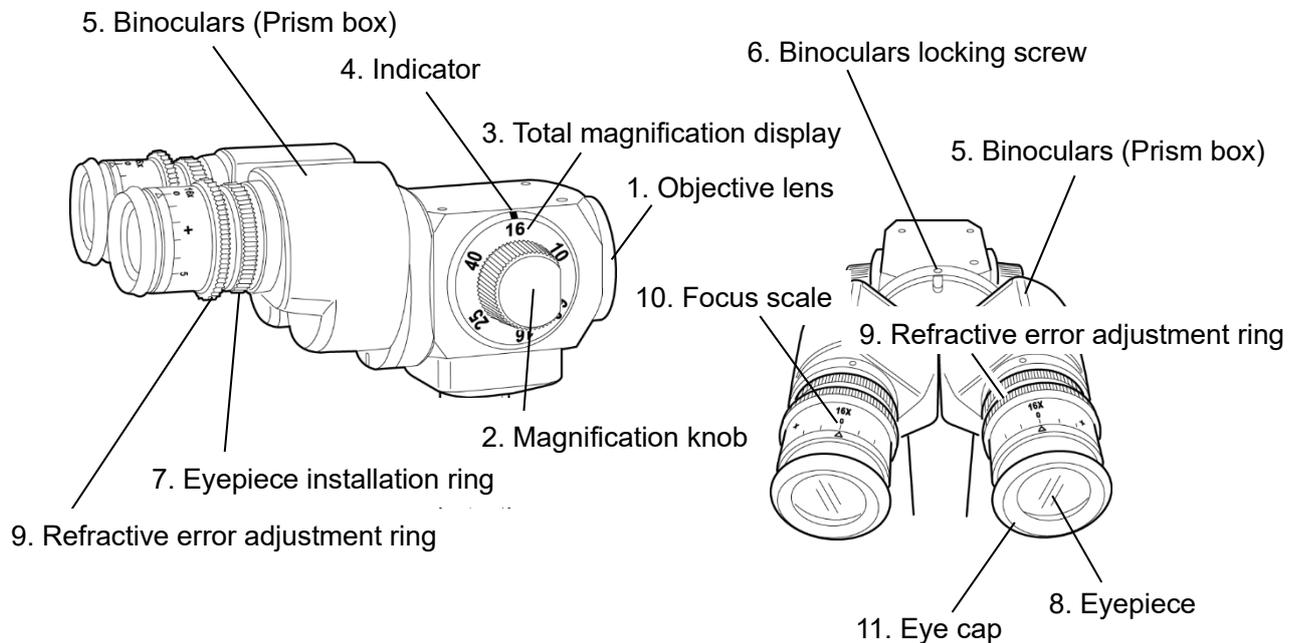


3.2 Power Adapter



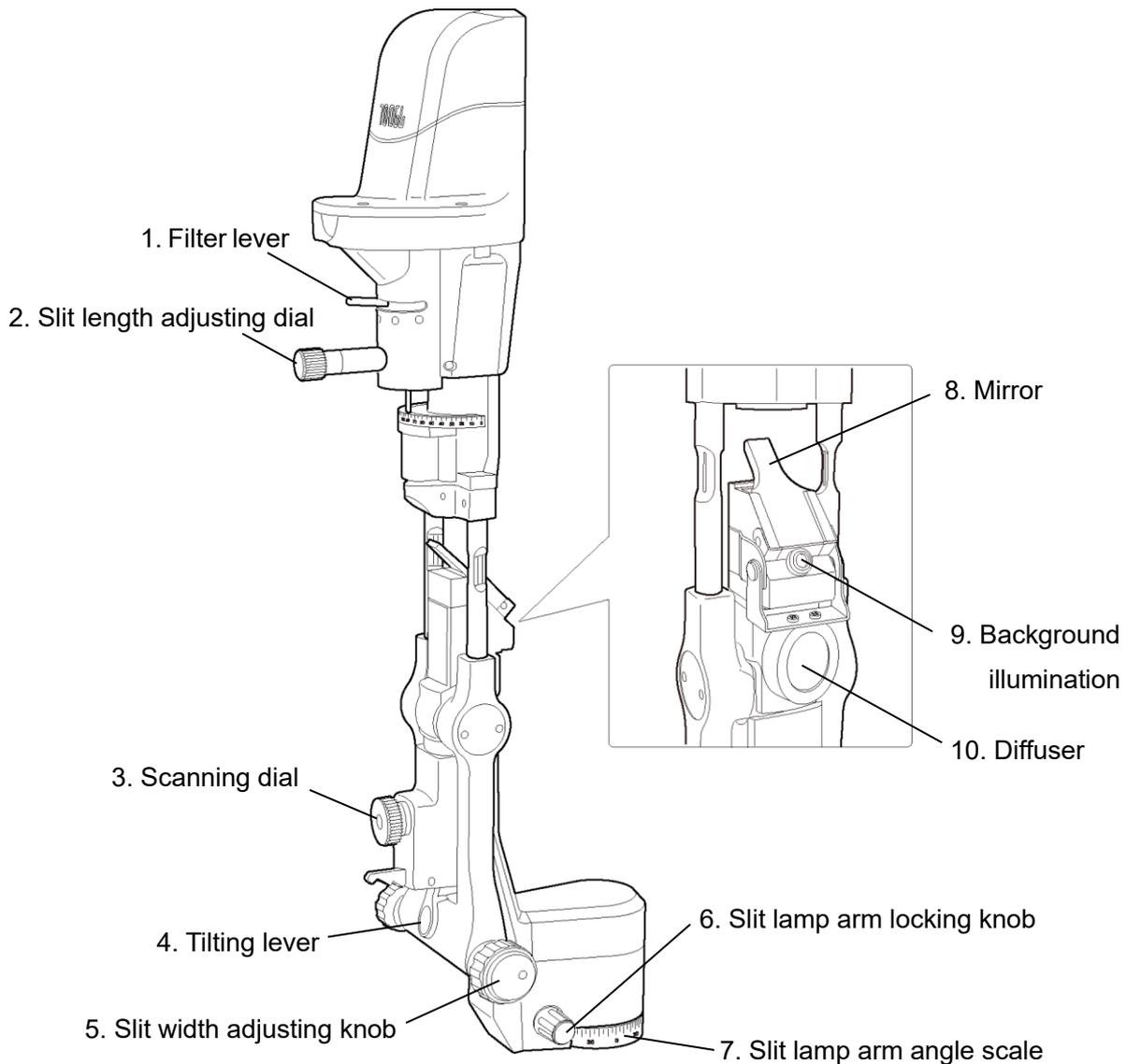
No.	Name	Function
1	Power adapter	Converts the outlet voltage to 5V DC.
2	JP (US) plug	Plug according to specifications for Japan and USA.
3	EU plug	Plug according to specifications for Europe.

3.3 Microscope Unit



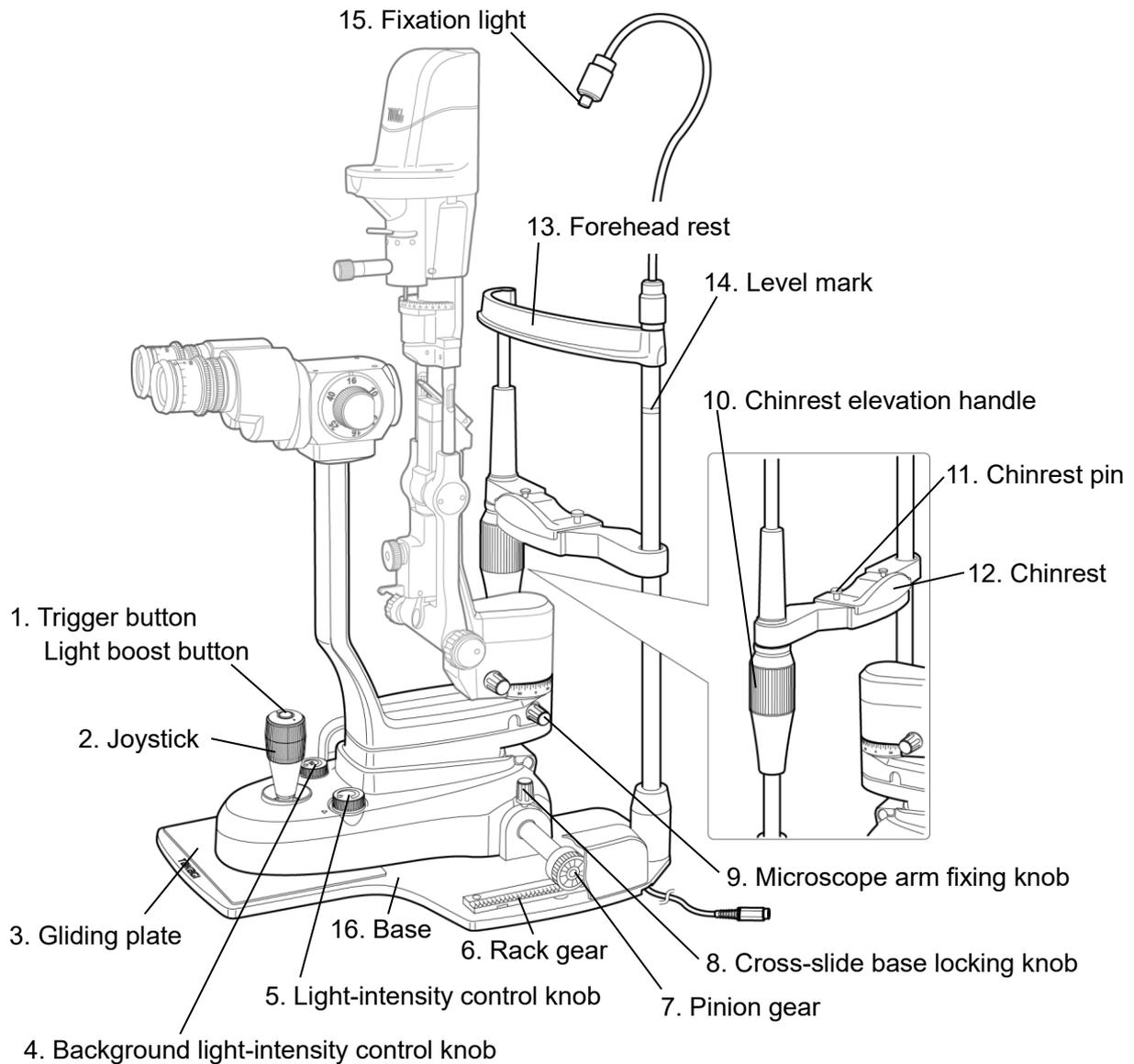
No.	Name	Function
1	Objective lens	Objective lens with a focal length of 125 mm.
2	Magnification knob	Knob to change the microscope magnification in steps by rotation.
3	Total magnification display	The number matching the indicator line displays the total magnification of the microscope.
4	Indicator line	
5	Binoculars (Prism box)	Each prism box has a prism inside. Rotate these prism boxes to the left or right to adjust interpupillary adjustment distance.
6	Binoculars locking screw	Screw to lock the binoculars.
7	Eyepiece installation ring	Ring to lock each eyepiece to the binoculars.
8	Eyepiece	Eyepiece with 16x magnification.
9	Refractive error adjustment ring	Ring to adjust the refractive error of the eyepiece.
10	Focus scale	One scale indicates 1D. The right side has negative (-) scales and the left side positive (+) scales.
11	Eye cap	Can be folded as shown in the figure when using while wearing glasses.

3.4 Slit Lamp Unit



No.	Name	Function
1	Filter lever	The filters can be changed to the following by rotating the lever: transparent (black-line circle display) filter, blue correction (orange display) filter, yellow (yellow display) filter, red free (green display) filter, and blue (blue display) filter.
2	Slit length adjusting dial	The slit length can be changed by rotating the dial. The slit illumination can be rotated by moving the dial to the left or right.
3	Scanning dial	The slit illumination can be scanned by loosening the dial.
4	Tilting lever	The slit lamp unit is tilted by pushing the lever.
5	Slit width adjustment knob	The slit width can be adjusted by rotating the knob.
6	Slit lamp arm locking knob	Locks the rotation of the slit lamp arm.
7	Slit lamp arm angle scale	Indicates the rotation angle of the slit lamp arm.
8	Mirror	Reflects the slit light and irradiates it into the patient's eye.
9	Background illumination	Irradiated part of the background illumination.
10	Diffuser	The slit light from the mirror can be diffused.

3.5 Cross-slide Base Unit, Chinrest Unit

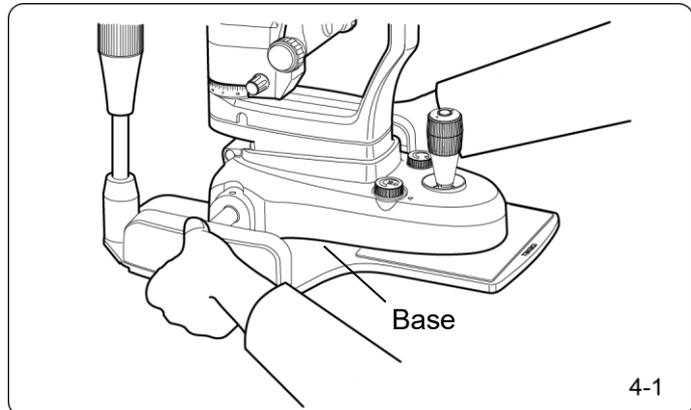


No.	Name	Function
1	Trigger button Light boost button	Button to trigger image capturing and boost a slit light.
2	Joystick	Lever for the vertical and horizontal alignment of the slit lamp.
3	Gliding plate	The cross-slide base unit moves on it.
4	Background light-intensity control knob	Adjusts the background illumination power ON/OFF and background light intensity.
5	Light-intensity control knob	Adjusts the slit lamp illumination power ON/OFF and slit lamp light intensity.
6	Rack gear	Moves and supports the cross-slide base unit with the pinion gear.
7	Pinion gear	Moves and supports the cross-slide base unit with the rack gear.
8	Cross-slide base locking knob	Locks the cross-slide base.
9	Microscope arm fixing knob	Fixes the rotation of the microscope arm.
10	Chinrest elevation handle	The chinrest is elevated by rotating the handle.
11	Chinrest pin	Fixes the chinrest sanitary paper.
12	Chinrest	Places the patient's chin on it.
13	Forehead rest	Applies the patient's forehead to it.
14	Level mark	Aligns the patient's eye height with this mark.
15	Fixation light	Guides the patient's line of sight and maintains it.
16	Base	Part that accommodates slit lamp

4. Assembly

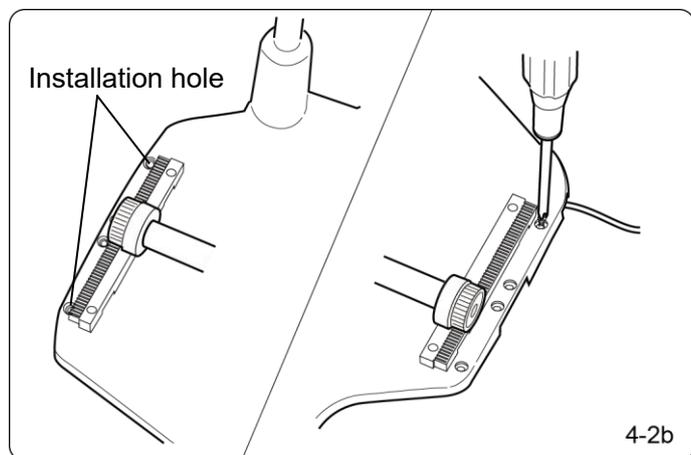
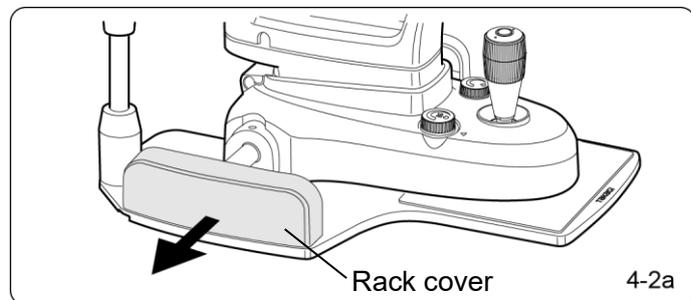
4.1 Unpacking

- Loosen the cross-slide base locking knob, slit arm fixing knob, and microscope arm fixing knob and fix the moving parts.
- After inserting your hands under the base, hold up the main body and place it in place. At this time, be careful not to allow a cable to get caught under the base.



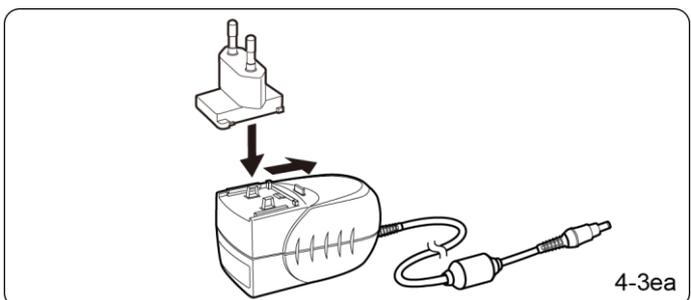
4.2 Fixing on the Table

- Place the main body in a position to fix on the table for installation.
- Remove the right and left rack covers by pulling them outward.
- Mark the positions of the right and left installation holes (4 places) with a pencil on the table.
- Temporarily move the main body to another place and drill holes with a diameter of approximately 2 mm to a depth of approximately 3 mm at each of the holes placed on the table.
- Return the main body onto the table. Align the installation holes on the main body with the holes on the table and fix the main body on the table with the 4 installation screws. At this time, be careful not to allow a cable to get caught under the base.
- Attach the right and left rack covers into their original positions.

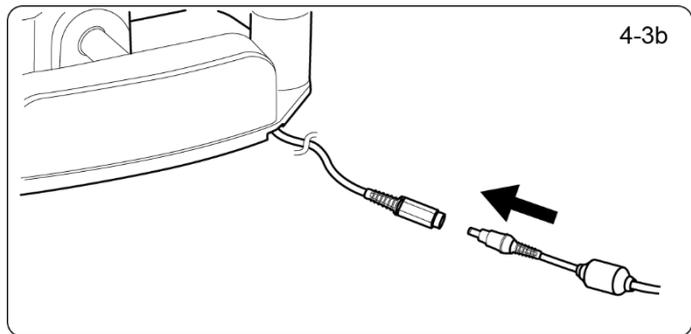


4.3 Power Connection

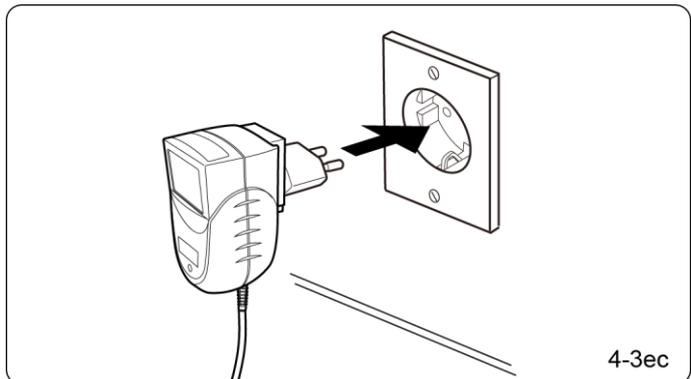
- Attach the plug to the power adapter. Move the plug in the arrow direction and forcefully push it in until it is locked firmly.



- Connect the connection cable to the power adapter.

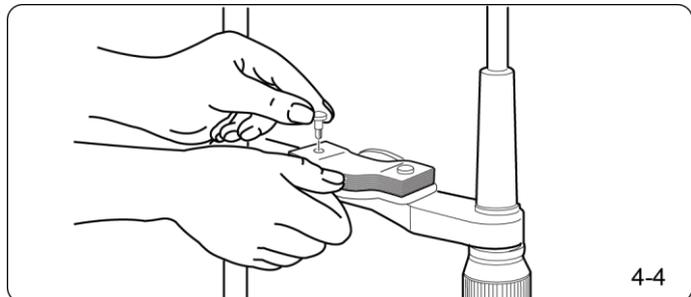


- Insert the power adapter into the outlet.



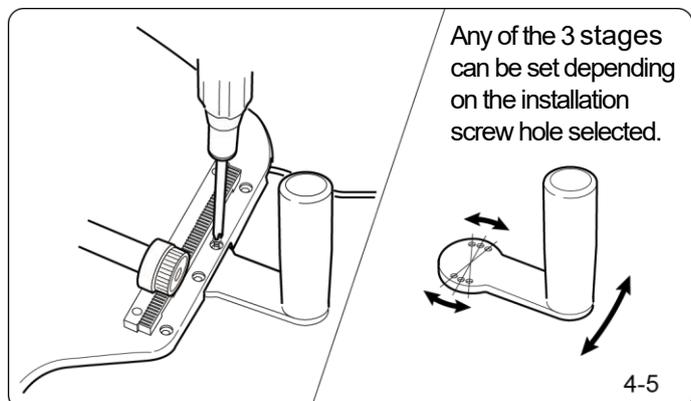
■ 4.4 Attaching the Chinrest Sanitary Paper

- Remove the 2 chinrest pins from the chinrest.
- Take out chinrest sanitary paper of 3 - 5 mm thick from the packaging and fix it on the chinrest with the 2 chinrest pins.



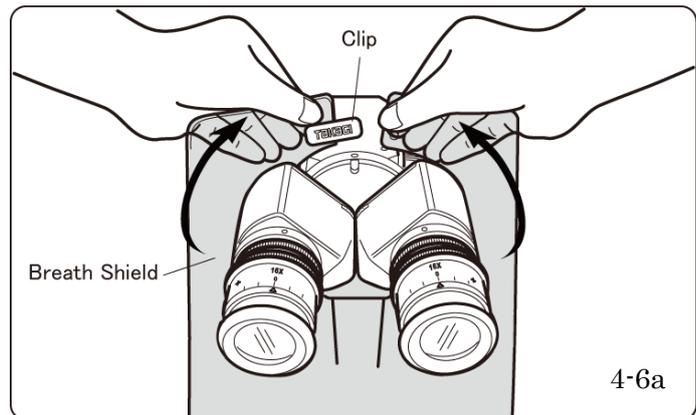
■ 4.5 Attaching Patient's Hand Rests

- Remove the right and left rack covers.
- Attach each hand rest at any angle of the 3 stages with the 2 accessory screws.
- Attach the right and left rack covers to their original positions.

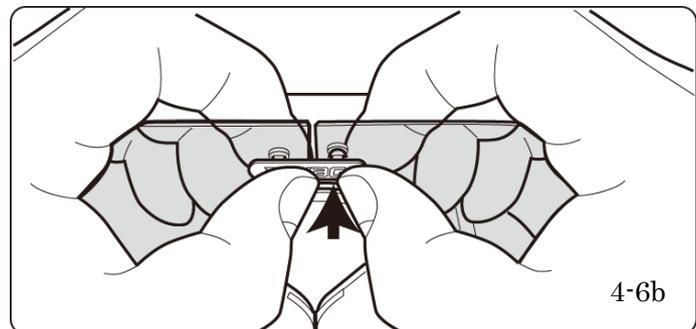


4.6 Attaching the Breath shield LS

- Detach one side of the clip from the breath shield.
- Attach the breath shield to the microscope as shown on the right figure 4-6a.



- Insert one side of the clip into the breath shield like the original and fix it.



4.7 External Connection

 CAUTION	
	Do not connect any equipment other than that specified to this equipment. Connecting the equipment not specified may cause a malfunction.
	Do not simultaneously contact the accessible connector part and patient. An electric shock may occur.
	When connecting the product to the equipment which is supplied by a wall outlet, separate the equipment with the isolation transformer. Connect the power of the equipment and isolation transformer to each different wall outlet. Otherwise, an electric shock may occur.
	Products conforming to IEC60950-1/JIS C 6950-1 (such as PCs) are not suitable for the patient environment*1. If any product conforming to IEC6950-1/JIS C 6950-1 is connected to this equipment, use it in a place where the patient cannot physically touch the equipment and it cannot contact the patient through the examiner. Failure to follow these instructions may cause an electric shock.
	For the use and storage environment of an external equipment, follow the Instruction Manual.

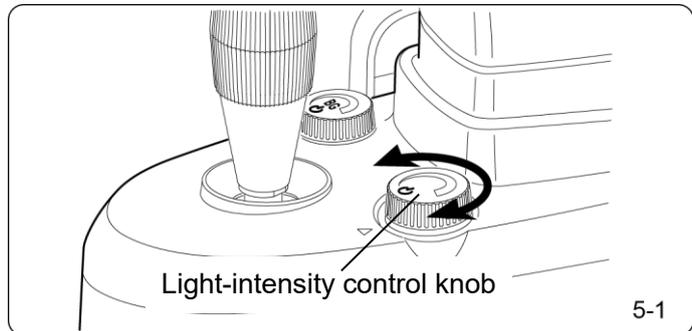
- For purchase of the isolation transformer, contact our dealer or Sales Department.

*1 Patient's environment: Region where intended or unintended contact may occur "between the patient and medical engineering (ME) equipment or part of the ME system" or "between the patient and ME equipment or another person contacting the ME equipment or part of the ME system)

5. Handling and Operation of Each Component

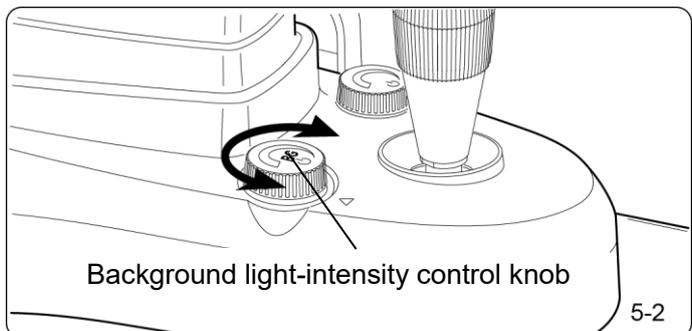
5.1 Switching the Slit Illumination Power ON/OFF

- The slit illumination power is turned ON or OFF by rotating the light-intensity control knob on the right side of the cross-slide base unit.
- The slit illumination power is turned ON and the lower part of the knob lights up blue by rotating the knob clockwise.
- The slit illumination is made brighter by further rotating the knob. - The power is turned OFF and the blue light at the lower part of the knob is extinguished by fully rotating the knob counterclockwise.



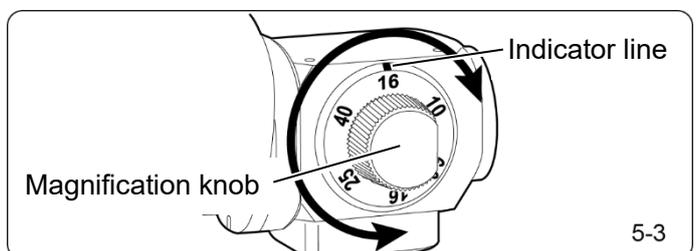
5.2 Switching the Background Illumination Power ON/OFF

- The background illumination power is turned ON or OFF by rotating the background light-intensity control knob on the left part of the cross-slide base unit.
- The background illumination power is turned ON and the lower part of the dial lights up blue by rotating the background light-intensity control knob clockwise.
- The background illumination is gradually made brighter by further rotating the background light-intensity control knob.
- The background illumination power is turned OFF and the blue light at the lower part of the knob is extinguished by fully rotating the background light-intensity control knob counterclockwise.



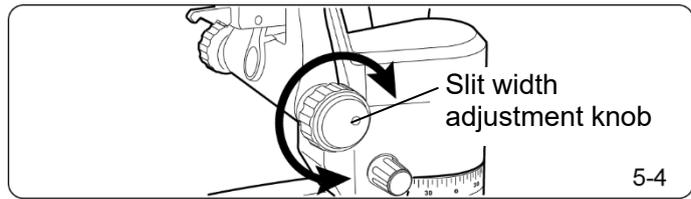
5.3 Changing the Microscope Magnification

- The total magnification of the microscope can be adjusted at any of the 5 steps: 6.3x, 10x, 16x, 25x, and 40x.
- The total magnification is displayed below the indicator line.



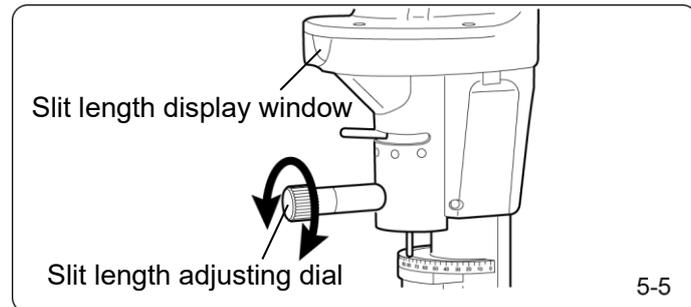
5.4 Changing the Slit Width

- The slit width can be freely adjusted between 0 mm and 14 mm by rotating the slit width adjustment knob.
- The adjustment between 10 to 14 mm is possible only when the slit length can be steplessly adjusted.



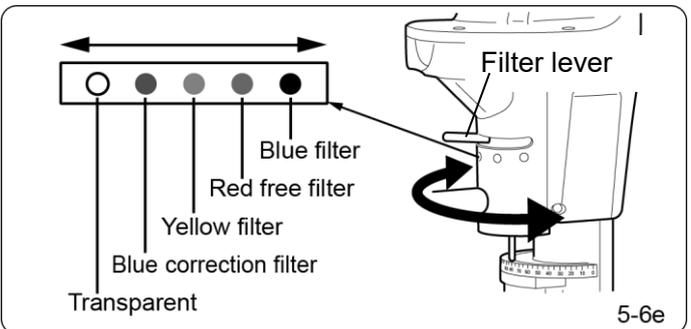
5.5 Changing the Slit Length

- The slit light length can be freely adjusted at each step of 0.2 mm, 1 mm, 2 mm, 3 mm, 5 mm, and 10 mm or between 1 mm and 14 mm by rotating the slit length adjusting dial.
- Illumination is nearly circular when the maximum length is 14 mm under the condition the slit length can be steplessly adjusted.
- The slit length is indicated numerically (unit: mm) in the slit length display window.



5.6 Changing the Filter

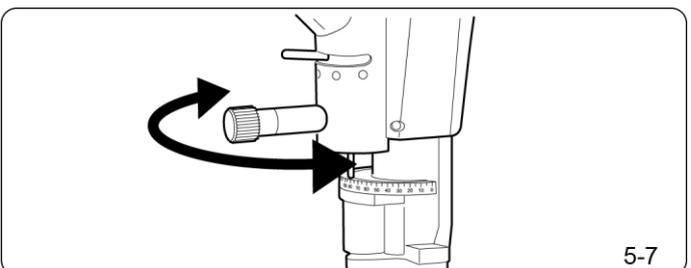
- By moving the filter lever from the transparent filter at the left, any of the following 4 filters can be selected: blue correction filter, yellow filter, red free filter, and blue filter.
- The blue correction filter corrects the attenuation of blue light from the LED light source. It is recommended to use the filter lever normally at the position of the blue correction filter.



- By changing the filter to the yellow filter, blue is cut off and light turns to the one which contains nearly no blue.
- By changing the filter to the red free filter, red is cut off and light turns to the one which contains nearly no red.
- The blue filter is used for the examination in which a fluorescent substance such as fluorescein is excited to use fluorescence. The blue filter is also located at the position where the slit length adjusting dial is rotated.

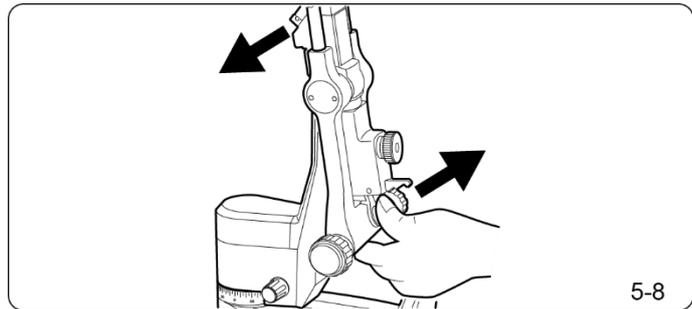
5.7 Rotating the Slit Illumination

- The slit illumination rotates at the center of the illumination field between 0° and 180° when the slit length adjusting dial is moved to the left or right.
- The rotation angle is read at the position where the scale below the dial is aligned with the pin above the scale.
- There are click stops at 45°, 90° and 135°. The degree of rotation is displayed according to the angle scale.



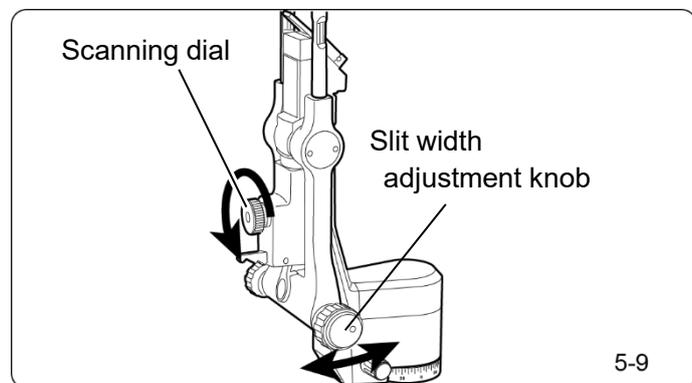
5.8 Tilting the Slit Illumination (Elevation)

- Press the tilt lever, release the click and pull the base of the slit lamp toward the examiner. This will tilt the slit lamp forward and enable illumination of the patient from underneath.
- Illumination from underneath is made at the following 4 angles: 5°, 10°, 15° and 20°. The slit lamp can be fixed by releasing the tilting lever.
- To return to the original condition, press the tilting lever, release the click and press the bottom of the slit lamp toward the patient.



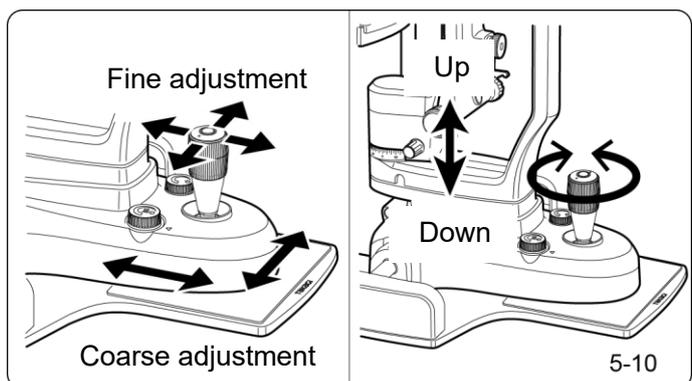
5.9 Scanning the Slit Illumination (Lateral Swing)

- Rotate the scanning dial counterclockwise to release the lock and move the slit width adjustment knob to the left or right so that the slit illumination can move away from the center of the visual field.
- Rotate the scanning dial clockwise to lock the slit lamp so that the slit illumination returns to the center of the visual field.



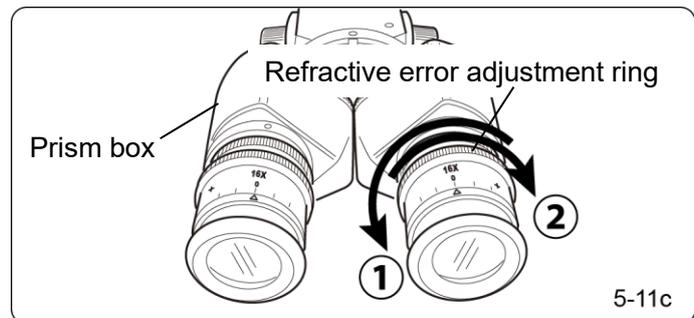
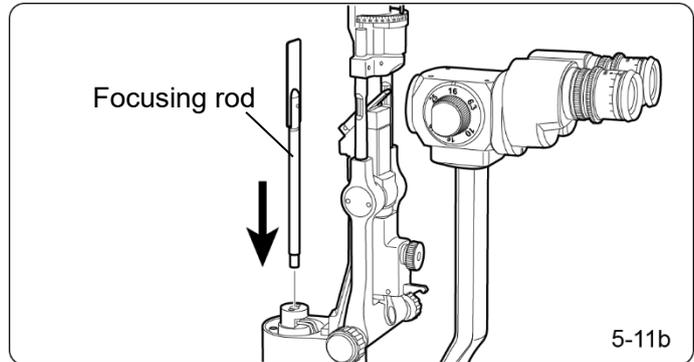
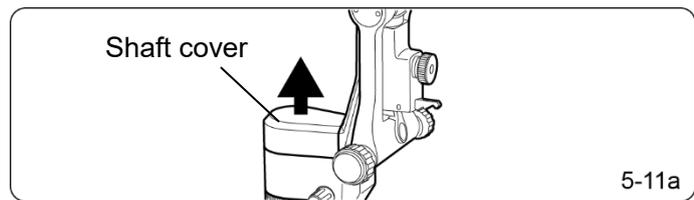
5.10 Focusing the Slit Lamp

- The slit lamp is focused using the joystick.
- For course adjustment, do not tilt the joystick, but slide it on the gliding plate while holding it.
- For fine adjustment, tilt the joystick in the direction to be moved.
- Rotate the joystick to the right (clockwise) to raise the microscope.
- Rotate the joystick to the left (counterclockwise) to lower the microscope.



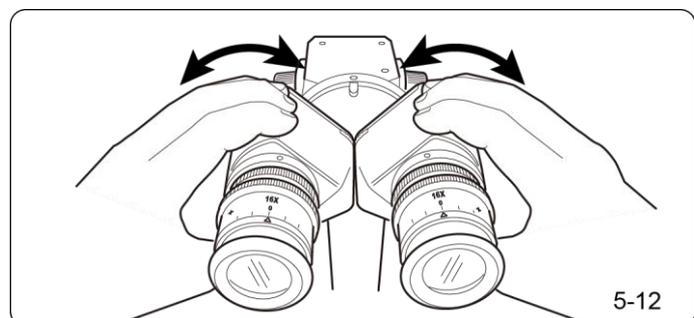
5.11 Adjusting Refractive Error

- Make sure to adjust a refractive error before using the slit lamp.
- Align the slit lamp unit and microscope unit at the position of 0°.
- Remove the shaft cover.
- Insert the focusing rod into the slit shaft. Then, turn it to the reverse side, on which “BACK” is displayed, to face the patient’s side.
- Adjust the filter lever at the position of the blue correction filter.
- Rotate the light-intensity control knob to light up the slit illumination.
- Rotate the slit width adjustment knob to adjust the slit illumination width at approximately 1 mm.
- Rotate the magnification knob to adjust the magnification of the microscope at 10x.
- Rotate the refractive error adjustment ring in the positive direction until it stops.
- Turn the refractive error adjustment ring in the negative direction to the position where the slit image can be seen with the maximum sharpness, while seeing it through the eyepiece.
- Adjust the refractive error of the left eye in the same way.



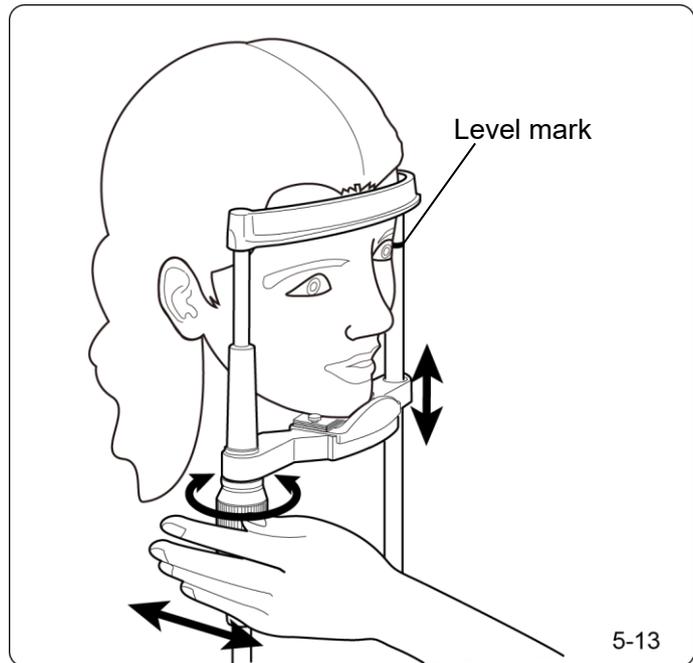
5.12 Adjusting Pupil Distance of the Binoculars

- See through eyepieces with both eyes while refractive error is adjusted.
- Hold the prism boxes in both hands. Open or close them to the left or right and release hands at the position where the slit image is fused.



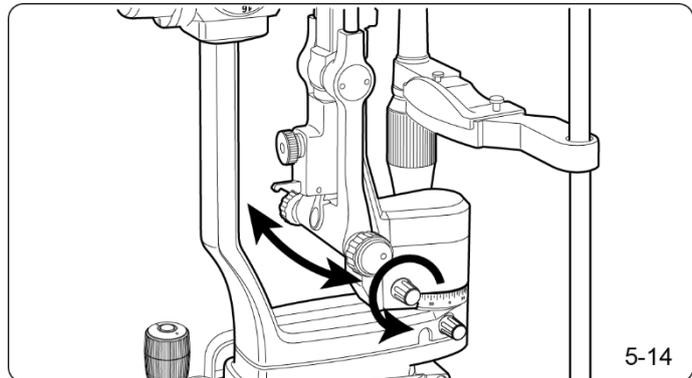
5.13 Adjusting the Chinrest Height

- Place the patient's chin on the chinrest and place the forehead firmly on the forehead rest.
- Rotate the chinrest elevation handle and adjust it so that the level mark matches the height of the patient's eye.



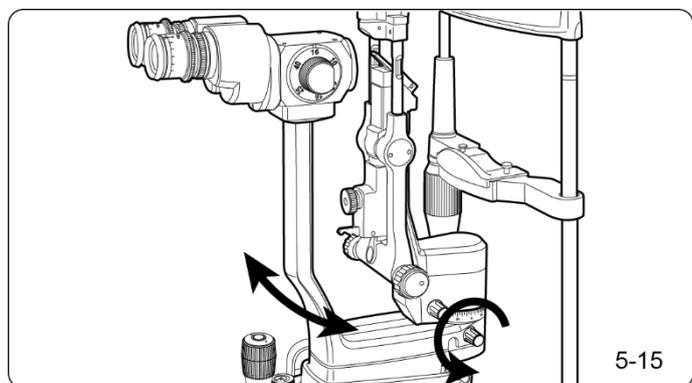
5.14 Slit Illumination Light Direction (Rotation)

- To change the slit illumination light direction, loosen the slit lamp arm rotation locking knob, move the slit lamp unit to the left or right, and fix it as necessary.



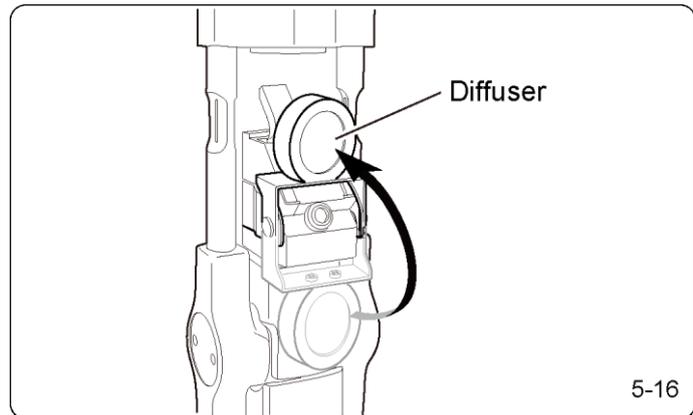
5.15 Microscope Observation Direction (Rotation)

- To change the observation direction by rotating the microscope, loosen the microscope arm fixing knob and move the microscope arm to the left or right.
- To fix the position, tighten the microscope arm fixing knob.



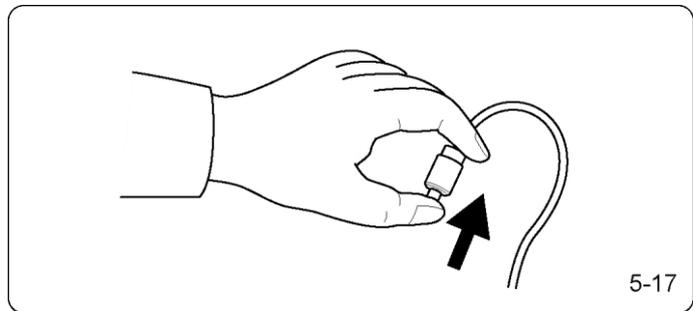
■ 5.16 Diffuser

- The slit light from the mirror can be diffused.
- There is a diffusing lens below the mirror. This can be rotated to the front of the mirror when using.



■ 5.17 Operating the Fixation Light

- The fixation light lights up when the white light emitting part on top of the fixation light is pressed. The fixation light is extinguished by pressing the white part again.
- The fixation arm freely bends and can move to any position to guide the patient's sight line. The base part of the fixation light arm can rotate approximately 270°, but do not rotate it exceeding the limit.



6. Maintenance and Testing

6.1 Product Life Span

- The service life of this equipment is eight (8) years. However, it is based on the assumption that the equipment is used appropriately in an appropriate environment.

6.2 Storage Period for Maintenance and Service Components

- The storage period for the maintenance & service parts is seven (7) years after the last shipment of the product. For more details, contact our Sales Department.

6.3 Check and Check Frequency of Examination Reference Values

- The equipment has no parts that require periodic inspection. Make sure that the equipment normally operates before and after use.

6.4 Cleaning

 WARNING	
	Do not use any organic solvents (thinner, benzene, acetone, toluene, ethyl acetate, etc.) or bleaching agents for cleaning this equipment. A fire or electric shock may occur as well as erosion of resin parts.
	Turn off the power and disconnect the power adapter from the outlet before cleaning the benzene.

- Keep the chinrest clean and remove the chinrest sanitary paper for each patient.
- If the chinrest sanitary paper is not used, wipe chinrest using a cloth moistened with rubbing alcohol for each patient.
- Always keep in mind that the forehead rest should be clean and wipe it using a cloth moistened with rubbing alcohol for each patient.
- Clean the main body cover with a soft, dry cloth. If it is heavily contaminated, wipe it using a cloth dampened with diluted mild detergent and then use a dry cloth.
- Wipe the lens with a soft cloth or lens cleaner (commercial product).
- Follow the Instruction Manual on the equipment connected to the equipment to clean it.

6.5 Transportation and Storage

 WARNING	
	Remove the power adapter from the outlet when not using the equipment for a long time. Dust accumulated on the plug may cause a fire.

 CAUTION	
	Cover the equipment with a dust cover when not using it. If a dust cover is not used, accumulated dust may cause a malfunction.
	Do not store this equipment in a place exposed to direct sunlight, high temperature, or high humidity or a place that may be affected by air containing dust, salt, or sulfur. This may cause a fault or a malfunction.

- For storage, meet the following conditions and use the dedicated packaging box:

- Storage environment

Temperature	-10 – +55°C
Relative humidity	10 – 95% (Non condensing)
Atmospheric pressure	700 – 1060 hPa

- Transportation environment

Temperature	-20 – +60°C (TAKAGI SEIKO standard)
Relative humidity	10 – 95% (Non condensing)

6.6 Instruction Manual and Indications

- Store the Instruction Manual in an accessible place as needed.
- Store the Instruction Manual to ensure a long time good condition.
- The Main body indications are important for correct use of the equipment. For replacement when the indication becomes illegible, contact our distributor or our Sales Department.

6.7 Disposal Method

- When disposing of the packaging materials, sort by material and dispose according to the laws and regulations of the local government.
- When disposing of the equipment, dispose of it according to the laws and regulations of the country and local government or contact our distributor or our Sales Department.

7. Troubleshooting

7.1 General Operation

WARNING



If the equipment has a malfunction, only workers repair personnel certified by us make repairs. Touching the internal high-voltage part may cause an electric shock.

CAUTION



When the equipment has a malfunction, indicate that the equipment has an existing malfunction with “use is prohibited due to malfunction” to prevent others from using it by mistake.

- If trouble occurs during use, check the following first and take measures:

*The light-intensity control knob has been turned, but the slit illumination does not light up.

- Please confirm that the power adapter is inserted into the wall outlet.
(Refer to “4.3 Power Connection.”)

- Please confirm that the light-intensity control knob is at the position of small light amount.
(Refer to “5.1 Switching the Slit Illumination Power ON/OFF.” The slit illumination becomes brighter when the light-intensity control knob is rotated clockwise.)

- Please confirm that the slit is closed.
(Refer to 5.4 Changing the Slit Width. The slit illumination is not irradiated when the slit is closed.)

If the slit illumination does not light up, the anterior eye part may be temporarily projected using the background illumination.

*The background light-intensity control knob has been rotated, but the background illumination is not projected.

- Is the power adapter inserted into the wall outlet? Check it.
(Refer to “4.3 Power Connection.”)

- Please confirm that the background light-intensity control knob is at the position of small light amount.
(Refer to “5.2 Switching the Background Illumination Power ON/OFF.” The slit illumination becomes brighter when the light-intensity control knob is rotated clockwise.)

- Contact our distributor or our Sales Department for any troubles other than the above.

8. Specifications

●MICROSCOPE

Type	Galilean type converging binocular microscope
Magnification	Five-position rotating drum
Total magnifications	6.3x · 10x · 16x · 25x · 40x
Real field of view	φ35.9 · φ23.3 · φ14 · φ8.8 · φ5.5mm
Distance between optical paths	22mm
Focal distance of objective lens	125mm
Convergence angle of binoculars	6°
Magnification of eyepiece	16x

●SLIT LAMP

Slit width adjustment range	0 – 14 mm (at 14 mm, slit becomes nearly circular)
Slit length adjustment range	1– 14 mm
Aperture diaphragms	φ0.2 · φ1 · φ2 · φ3 · φ5 · φ10 mm
Filter type	Blue filter / Red free filter / Blue correction filter / Yellow filter
Light source	LED(3,500K)

●BACKGROUND ILLUMINATION

Light source	LED(3,500K)
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●CROSS-SLIDE BASE

Lateral movement (Coarse movement)	105mm
Longitudinal movement (Coarse movement)	105mm
Longitudinal and lateral movement (Fine movement)	15mm
Vertical movement	30mm

●CHINREST

Chin-rest vertical movement	95mm
Fixation light	Red LED

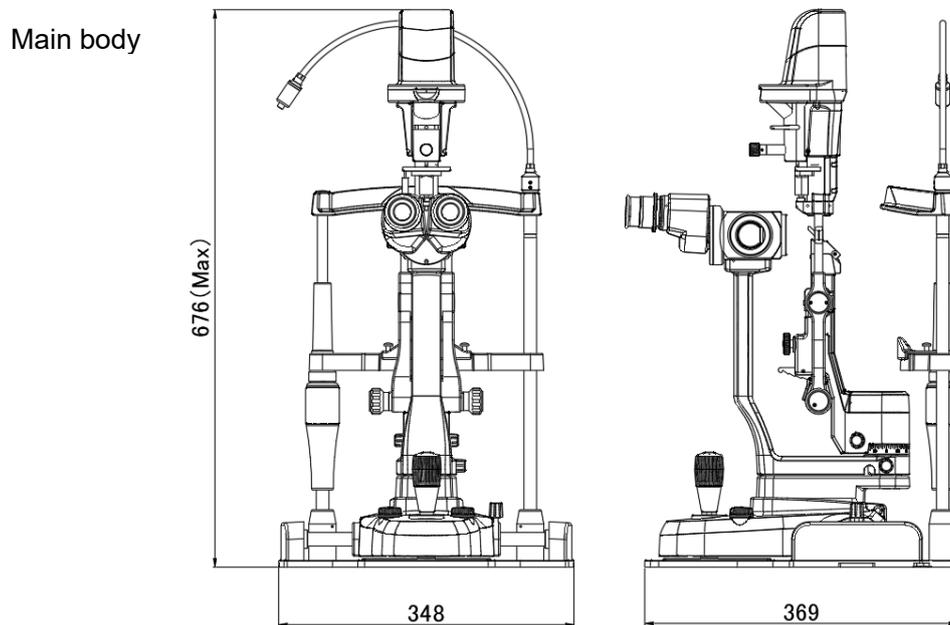
●POWER UNIT (Power adapter)

Input	AC100V-240V 50-60Hz
Output	DC5V

●WEIGHT

Main body	12.5kg
Power adapter	130 g (excluding the plug part)

9. External Dimensions



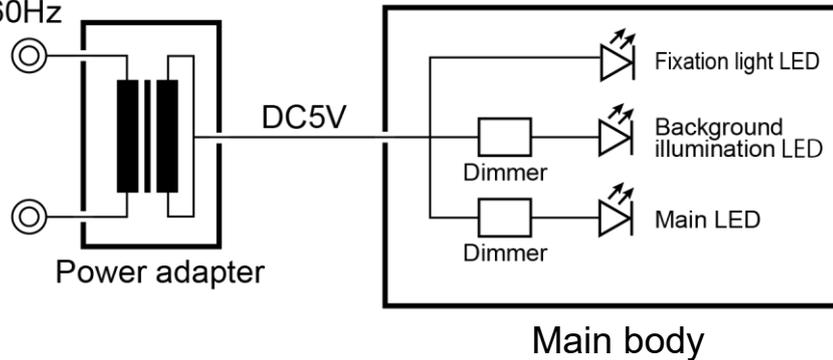
Power adapter



80.6mm×47.9mm×43.3mm
(Excluding the plug part)

10. Electrical Diagram

AC100V-240V 50-60Hz



11. Environmental Conditions

●Use location: Indoors not exposed to direct sunlight

●Use environment

Temperature	+10 – +35°C
Relative humidity	30 – 90% (Non condensing)
Atmospheric pressure	800 – 1060 hPa

●Storage environment

Temperature	-10 – +55°C
Relative humidity	10 – 95% (Non condensing)
Atmospheric pressure	700 – 1060 hPa

●Transportation environment

Temperature	-20 – +60°C (TAKAGI SEIKO standard)
Relative humidity	10 – 95% (Non condensing)

12. Classification

Classification according to the method of protection against electric shock	Class II
Classification of the applied part according to the degree of protection against electric shock	Type B

13. EMC Compatibility Declaration

Note: Medical instruments require special precautions regarding EMC (Electro-Magnetic Compatibility). Install and use this instrument in accordance with the EMC information provided below.

Note: Mobile and portable Radio Frequency (RF) communication devices may interfere with the operation of the medical instruments.

Note: Do not use 700GL by positioning it next to or stacking it on other equipment.

When using 700GL in such ways, confirm the following in that situation:

- Regardless confirm the “6.3 Check and Check Frequency of Examination Reference Values “of this document
- All operations according to “5. “

GUIDANCE AND MANUFACTURER’S DECLARATION ON ELECTROMAGNETIC EMISSIONS

Table 1

This 700GL is intended for use in the electromagnetic environment specified below. The customer or the user of the 700GL should assure that it is used in such an environment.

Emissions Test	Compliance	Electromagnetic Environment - Guidance
RF emissions CISPR 11	Group I	The 700GL uses RF energy only for its internal function; its RF emissions are extremely low, and will not cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	The 700GL is suitable for use in all establishments including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations / flicker emissions IEC 61000-3-3	Complies (Over 200V)	

GUIDANCE AND MANUFACTURER'S DECLARATION – ELECTROMAGNETIC IMMUNITY

Table 2

This 700GL is intended for use in the electromagnetic environment specified below. The customer or the user of the 700GL should assure that it is used in such an environment.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment – Guidance
Electrostatic discharge (ESD) IEC 61000-4-2	± 6kV contact ± 8kV air	± 6kV contact ± 8kV air	Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient / burst IEC 61000-4-4	± 2kV for power supply lines ± 1kV for input & output cords	± 2kV for power supply lines ± 1kV for input & output cords	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	± 1kV differential mode ± 2 k V common mode	± 1kV differential mode ± 2kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions, and voltage variations on power supply input lines IEC 61000-4-11	<5%U _T (>95% dip in U _T) for 0.5 cycle	<5%U _T (>95% dip in U _T) for 0.5 cycle	Mains power quality should be that of a typical commercial or hospital environment. If the user of the 700GL requires continued operation during power mains interruptions, it is recommended that the 700GL is powered from an uninterruptible power supply or a battery.
	40%U _T (60% dip in U _T) for 5 cycles	40%U _T (60% dip in U _T) for 5 cycles	
	70%U _T (30% dip in U _T) for 25 cycles	70%U _T (30% dip in U _T) for 25 cycles	
	<5%U _T (>95% dip in U _T) for 5 seconds	<5%U _T (>95% dip in U _T) for 5 seconds	
Power frequency (50/60Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

Note: U_T is the A.C. mains voltage prior to application of the test level.

GUIDANCE AND MANUFACTURER'S DECLARATION – ELECTROMAGNETIC IMMUNITY

Table 4

This 700GL is intended for use in the electromagnetic environment specified below. The customer or the user of the 700GL should assure that it is used in such an environment.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment – Guidance
<p>Conducted RF IEC 61000-4-6</p> <p>Radiated RF IEC 61000-4-3</p>	<p>3 Vrms 150 kHz to 80 MHz</p> <p>3 V/m 80MHz to 2.5 GHz</p>	<p>3 Vrms</p> <p>3 V/m</p>	<p>Portable and mobile RF communications equipment should be used no closer to any part of the 700GL, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.</p> <p>Recommended separation distance $d=1.2 \sqrt{P}$</p> <p>$d=1.2 \sqrt{P}$ 80 MHz to 800 MHz $d=2.3 \sqrt{P}$ 800 MHz to 2.5 GHz</p> <p>Where P is the maximum output power rating of the transmitter in watts (w) according to the transmitter manufacturer and d is the recommended separation distance in meters (m).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey a, should be less than the compliance level in each frequency range b.</p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> <div style="text-align: center;">  </div>

Note 1: At 80 MHz and 800 MHz, the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the 700GL is used exceeds the applicable RF compliance level above, the 700GL should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the 700GL.

b Over the frequency range 150 KHz to 80 MHz, field strengths should be less than 3 V/m.

RECOMMENDED SEPARATION DISTANCES BETWEEN PORTABLE AND MOBILE RF COMMUNICATIONS EQUIPMENT AND THE 700GL

Table 6

The 700GL is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the use of the 700GL can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the 700GL as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150 kHz to 80 MHz $d=1.2 \sqrt{P}$	80 MHz to 800 MHz $d=1.2 \sqrt{P}$	800 MHz to 2.5 GHz $d=2.3 \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (w) according to the transmitter manufacturer.

Note 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

MEMO

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Instruction Manual (700GL) English version
Registration number : IM(700GL)E
Revision number : Rev. 9
Date of issue or revision : 14 March 2023

Original instructions



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- Contents of this manual and specifications of the product are subject to change without prior notice.
 - While every effort has been made to ensure the smooth operation of this product and accuracy of information in this manual, please contact us should you notice any problems, errors, ambiguities, or omissions.
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