

LAMP HOUSING E7536 INSTRUCTION MANUAL



- Before operating, inspecting or servicing the equipment, read this manual carefully and make yourself familiar with the information provided. Do not attempt to operate or inspect the equipment until you thoroughly understand the contents of this manual. Never handle or operate the equipment in a manner not described in this manual, otherwise serious accidents may result.
- The operator or manager in charge of this equipment should not permit anyone who does not understand the contents of this manual to operate the equipment.
- Even after you have read this manual, keep it near the equipment so that you can easily refer to it as necessary.
- If this manual is lost or damaged, immediately contact Hamamatsu sales office near you to receive an additional copy.
- When this equipment is transferred or sold, ensure that this manual accompanies them, and explain to the new user the need to read through this manual.

 **CAUTION**

EMI noise is generated when triggering the lamp. This noise could possibly give a damage to the device, which is weak against EMI noise such as computer. Therefore, please turn such devices on after the lamp ignites.

1. SAFETY PRECAUTIONS

Make sure to read these "Safety Precautions" carefully before starting to use the equipment and observe them during operation.

1-1 Classification of Warning Instructions

Warning instructions in this manual and on labels are classified as described below. As each word and symbol carry special meanings, familiarize yourself with them and observe the instructions.



Failure to follow DANGER instructions will result in severe injury or death to the operator or person servicing the product.



Failure to follow WARNING instructions could result in serious injury or death to the operator or person servicing the product.



Failure to follow CAUTION instructions may result in injury to the operator or the person servicing product, or damage to the product or peripheral equipment.



This warning symbol shows a caution or warning you must observe. A specific warning is sometimes indicated in this symbol. Read the warning instructions carefully to ensure correct and safe product use.



This type of symbol shows something you must NOT do. The specific prohibited item or action is often indicated in the symbol. Read the instructions carefully and never attempt the prohibited action



This type of symbol shows something you must DO. The specific instruction is often indicated in the symbol. Read the instructions carefully and always use the specified procedure.

1-2 Safety Instructions

● High voltage trigger



DANGER

To avoid high-voltage electrical shock hazards, never attempt to ignite the lamp with keep inserting any metal tool into "X ADJ." or before installing the lamp into the lamp housing. A high voltage (20kV to 30kV) is output during ignition from lamp cathode side.

This label indicates a dangerous high voltage.



High voltage
Output point

● Vibration and shock



WARNING

Handle this product very carefully.
Internal components in this product are precisely adjusted. If excessive vibrations or shocks are applied to this product, the adjustment may become unreliable causing malfunctions, electrical shocks or fire.

● Light emission



WARNING

When working near the emitted light, always wear protective devices (conforming to JIS-T8141 or equivalent regulations). The lamp installed in this housing emits intense ultraviolet rays which are harmful to the eyes and skin. Looking directly into the emitted light or allowing the light to fall on the skin will damage eyesight or cause skin burns.

This label indicates hazardous UV radiation.



WARNING

When the lamp is operated in a closed room, be sure to provide adequate air ventilation.
Lamps (L2175, L2273, L2482, L2423 etc.) using a fused silica bulb emit ultraviolet radiation which decomposes the air and generates nitrogen oxide (NO_x) and ozone (O₃) harmful to the human body.

- **About lamp**



WARNING

Lamp damage with keeping side cover open may cause severe injury due to the presence of high pressure gas (approx. 1MPa at normal room temperature; approx. 4MPa during operation). Also, since the lamp is high temperature for 30 minutes after turned off, side cover should not be opened.



This sticker shows "lamp housing becomes high temperature" during lamp operation. Side cover should not be opened during lamp operation and just after turned off because lamp housing is still high temperature (approx. 500deg.C).

- **Radiated object**



WARNING

Be careful to a fire in case if light is radiated onto flammable materials (like paper, cloth or chemical material). It may cause of a fire due to radiated heat because the light radiated from the output window includes visible/IR (Infrared) light in addition to UV (Ultraviolet) light.

- **Modifications to the lamp housing**



Never modify any part of the lamp housing. Internal components in the lamp housing and power supply are precisely adjusted prior to shipment. Adjustments or modifications may result in abnormal operation, possibly causing fire or electrical shock.

- **Abnormal operation**



If smoke, a peculiar odor, or unusual noise is coming from the product, immediately turn off the power. Continuous operation may result in fire or electrical shock.

- **Connectors**



CAUTION

Securely plug in the power supply connector to avoid looseness or play. Loose connections may result in faulty operation.

● **Install location**



CAUTION

Avoid installing this lamp housing in locations with poor ventilation. Allow a clearance of at least 10cm (4 inches) for exhaust and 5cm (2 inches) for intake. When installing the lamp, anode side should be UP position. Do not install in locations where the air vent holes are blocked. Malfunction or fire may otherwise result. Install the lamp housing on a stable, flat, horizontal surface. Abnormal operation may otherwise result or the lamp housing may fall over during earthquake. If cathode side is placed in UP position by mistake, electrode is given a damage then lamp becomes defect.

● **About location**



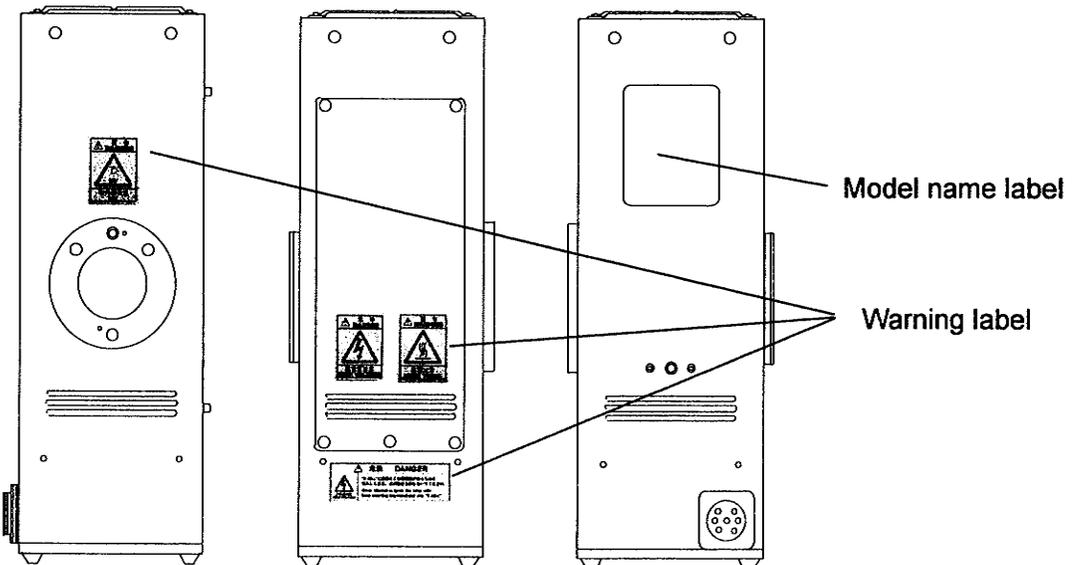
CAUTION

- Avoid installing this lamp housing and power supply in locations with poor ventilation, at high temperatures, or at high humidity. Do not install in locations where the air vent holes are blocked. Malfunction or fire may otherwise result.
- Install the lamp housing and power supply on a stable, flat, horizontal surface. Abnormal operation may otherwise result or the lamp housing may fall over during earthquake.

1-3 Warning Label Positions



These labels must be attached so that they are clearly visible all the time. If they come off or become dirty, replace them with new ones. Warning labels are available (chargeable) from our sales office. When it becomes necessary to replace any warning label, contact the nearby sales office.



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- ※ Contents of this manual are subject to change without prior notice.
- ※ Copying or quoting of this manual whether partially or as a whole is prohibited.
- ※ If any of the following cases apply, please inform us so that we can take necessary measures quickly.
 - Description in the manual is not clear, erroneous or missing.
 - Pages are missing or not collated property.
 - The manual is lost, made dirty or damaged.

2. OVERVIEW

This lamp housing was designed to easily and safely accommodate xenon or mercury-xenon lamps (continuous mode) while maintaining high stability. It has an internal reflecting mirror and light output lens to provide a collimated light beam with high intensity. The built-in interlock function, starter and cooling fan enhance safety, for example, the surface temperature on the housing is kept below +40°C during operation. The optical axis can be easily aligned with the adjuster screws from the outside of the housing.



If you use this lamp housing to operate a lamp of other manufactures, you must check whether it confirms to their electrical specifications. If you are not sure about this, please consult our sales office giving us the lamp manufacture's name, lamp model number and ratings (electrical rating such as lamp current and lamp voltage).

3. FEATURES

- **Separate starter for reliable operation**

The starter is isolated from the power supply and installed on the lamp housing side, so that high voltage leakage is prevented.

- **Compact, lightweight one-box configuration**

The compact, lightweight one-box configuration is portable and allows easy handling.

- **Easy optical axis adjustment during lamp replacement**

The optical axis can be easily adjusted by simply turning the optical axis adjusting screws.

- **Interlock function**

If the side cover becomes loose or the temperature in the lamp housing rises to a level that is not safe, the interlock function is triggered to automatically stop the lamp operation.

- **Light flux is adjustable**

The output light flux can be adjusted by moving the condenser lens back and forth, to match your specific application.

- **Compact and lightweight**

Dimensions: 100 (W) × 280 (H) × 100 (D) mm

Weight: Approx. 3.5 kg

4. CONFIGURATION

Unpack carefully and check the equipment for missing parts or any damage during handling or shipping. If any problem is found please notify the Hamamatsu sales office as soon as possible.

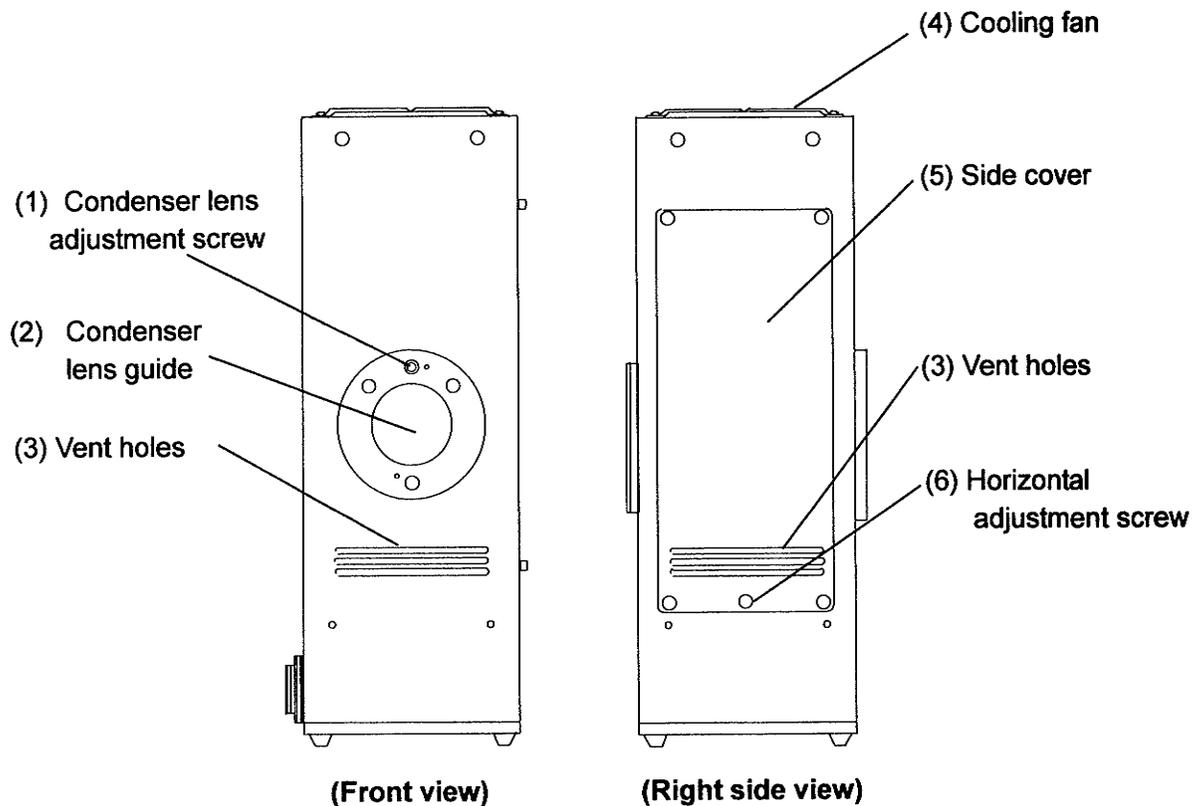
This product consists of the following units and accessories.

- Main Unit..... 1
- Accessories
 - Optical axis adjustment aperture (attached the main unit at shipment)..... 1
 - Hex wrench..... 1
 - M4 spring washer..... 1
- Instruction manual (this manual)..... 1

* This unit should be used in conjunction with the HAMAMATSU power supply, and by itself is not sufficient to operate a lamp.

5. PART NAMES AND FUNCTIONS

5-1 Front and right side views



- (1) **Condenser lens adjusting screw (light output side): LENS ADJ.**
Using the accessory hex wrench, adjust the light output flux to match your application.

(2) Condenser lens guide

(NOTE: An aperture plate is attached to this port. Remove it when using the lamp.) This lamp housing employs a quartz glass lens to efficiently utilize the ultraviolet, visible the infrared light emitted from the lamp. By moving this condenser lens, the desired light output can be selected to match your application. Screw thread of M37 and 1mm pitch is provided on the lens guide.



WARNING

When directly handling the emitted light, always wear protective devices (conforming to JIS-T8141 or equivalent regulations). The lamp installed in this housing emits intense ultraviolet rays harmful to the eyes and skin. Looking directly into the emitted light or allowing the light to fall on the skin will damage eyesight or cause skin burns.

The light emitted from the condenser lens guide contains not only ultraviolet radiation but also visible and infrared light, so heat will be generated at the radiated point. If a flammable material is heated excessively, this may cause a fire.

(3) Vent holes

Exhausts the heat generated from inside the lamp housing to prevent a rise in temperature. To maintain good air ventilation, allow a clearance of at least 5cm (2 inches) between the side panel and the wall or other obstacles.

(4) Cooling fan

Exhausts the heat generated from inside the lamp housing to prevent a rise in temperature. To maintain good air ventilation, allow a clearance of at least 10cm (4 inches) between the cooling fan and the wall or other obstacles. If the temperature inside the lamp housing rises due to blocking of air ventilation path or stopping of the cooling fan, the interlock function is triggered to automatically stop the lamp operation.



After the lamp has been turned on, this cooling fan does not operate until the internal temperature reaches a certain level (about 5 minutes).

(5) Side cover

Remove this cover when replacing the lamp. The lamp will not operate when the side cover is removed or loose because the interlock function is actuated. After having replaced the lamp, reattach the side cover securely.

(6) Horizontal adjustment screw: X ADJ.

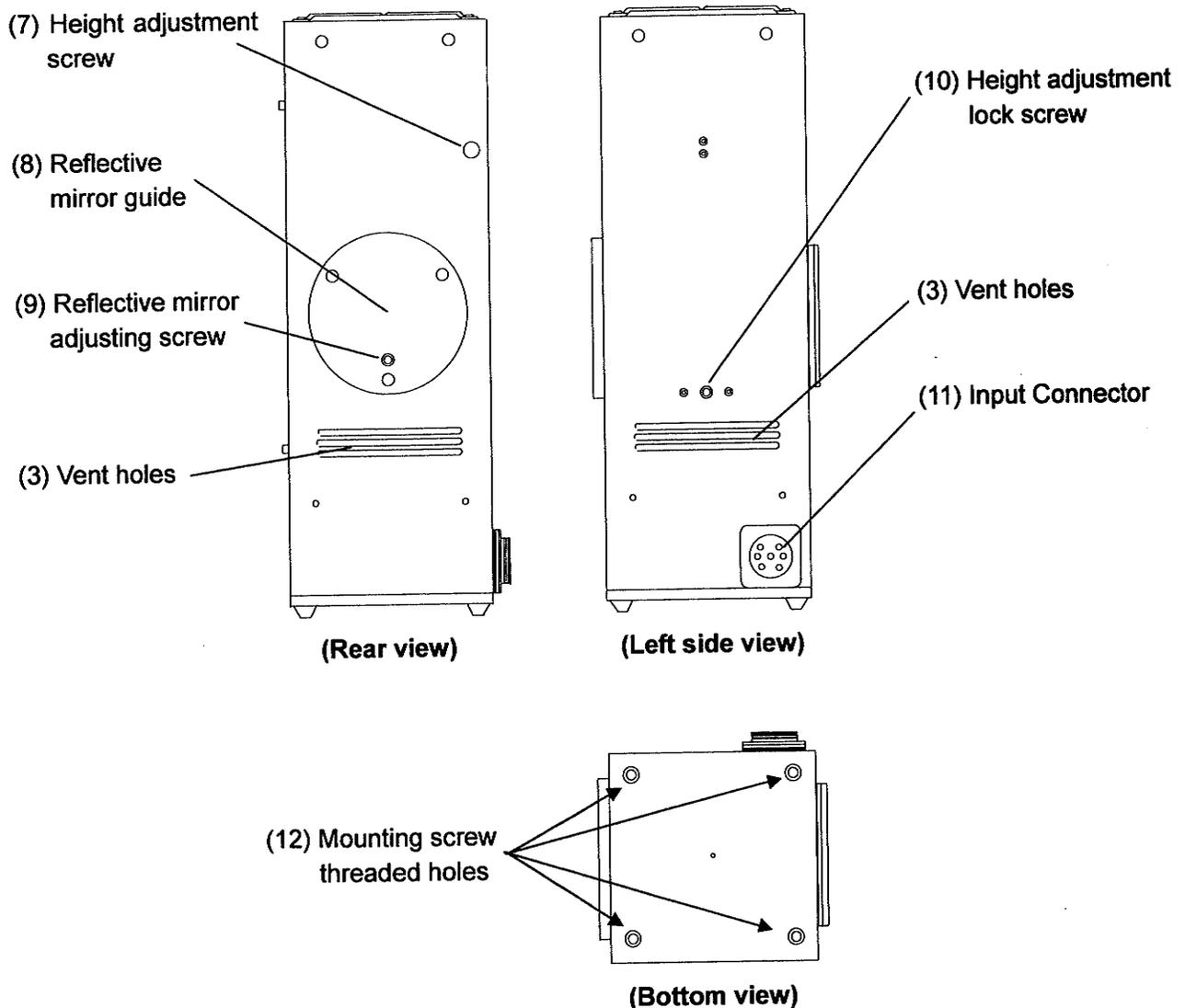
This is the screw to adjust the light axis (lamp axis) in horizontal direction. This screw is used to adjust the lamp axis to the center, and adjust the lamp axis using enclosed hexagonal wrench with keep putting the aperture for light axis adjustment. In this case, adjust the light axis with keep looking the position of brightness point of output light surely. The position where the brightness point can moves is the movable range of adjustment axis. Be careful that it might be a cause of broken if keeps rotating the adjustment screw more than it.



DANGER

To avoid high-voltage electrical shock hazards, never attempt to ignite the lamp with keep inserting any metal tool into "X ADJ." or before installing the lamp into the lamp housing. A high voltage (20kV to 30kV) is output during ignition from lamp cathode side.

5-2 Rear, left side and bottom views



(7) Height adjustment screw: Y ADJ.

After release the lock screw of (10), adjust the focus of reflected light brightness using enclosed hexagonal wrench with keep putting the aperture for light axis adjustment.

(8) Reflective mirror guide

This reflective mirror is used to collect the output light from the lamp efficiently.

(9) Reflective mirror adjustment screw: MIRROR ADJ.

Using the accessory hex wrench, adjust the best focus of the reflected light bright spot.

(10) Height adjuster lock screw: Y LOCK

After the height adjusted, tighten this screw to lock the lamp's height with the accessory hex wrench,

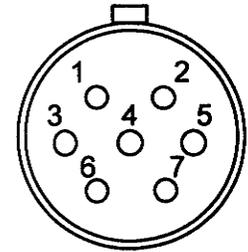
To lock: Turn the screw to the right.

To unlock: Turn the screw to the left.

(11) Input Connector

This connector is used for connecting between the power supply and the lamp housing with enclosed cable. Connect it securely without looseness.

Pin Number	Function
1	(+) Lamp anode
2	(-) Lamp cathode
3	Ground (GND)
4	Interlock
5	Interlock
6	Fan +24V
7	Fan com



(Array and number of contact)

(12) Mounting screw threaded holes

Use these threaded holes when installing the lamp housing inside equipment by adding rubber or plastic feet.

Installation plate bolt: 78 x 78 mm

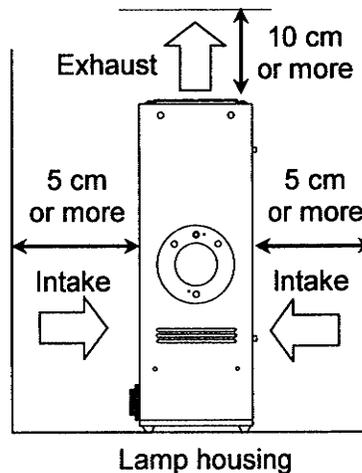
Threaded holes: 4-M4, depth 5 mm

6. INSTALLATION



CAUTION

- Avoid installing the lamp housing and power supply in locations with high temperatures or high humidity.
- Avoid installing in locations with poor ventilation where the exhaust air from the cooling fan is blocked.
- Install the lamp housing and power supply on a stable, flat, horizontal surface, with the plastic feet facing down.
- Avoid installing this in locations with poor ventilation. Allow a clearance of at least 10cm (4 inches) for exhaust and 5cm (2 inches) for intake. (Refer to the following drawing.)



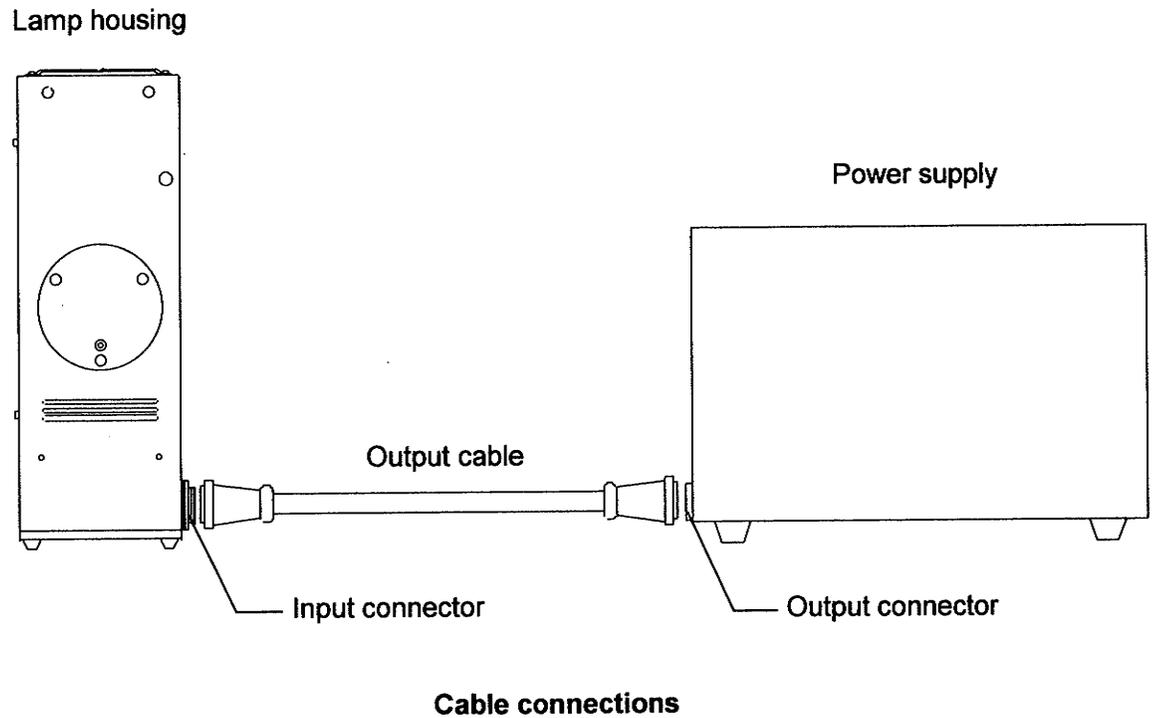
7. OPERATION

7-1 Preparation

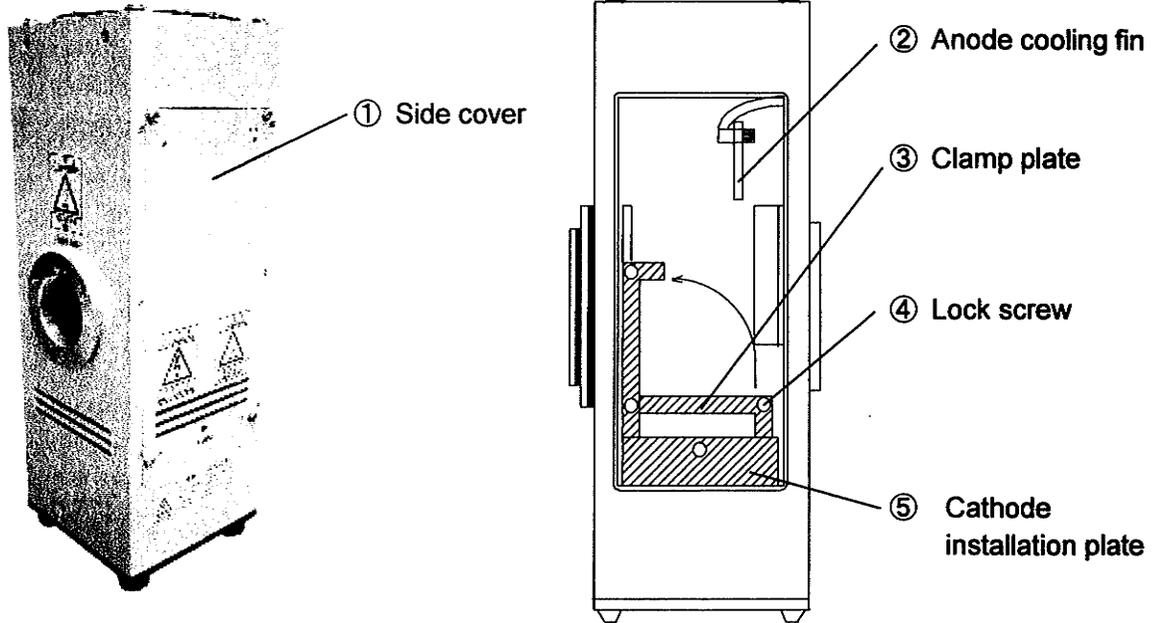
Before starting to operate this product, follow the procedures explained below to ensure safe and correct use.

7-1-1 Connecting to the lamp housing

The power supply and the lamp housing must be connected correctly using the supplied output cable. (Refer to the connection drawing.)



7-2 Installing the Lamp

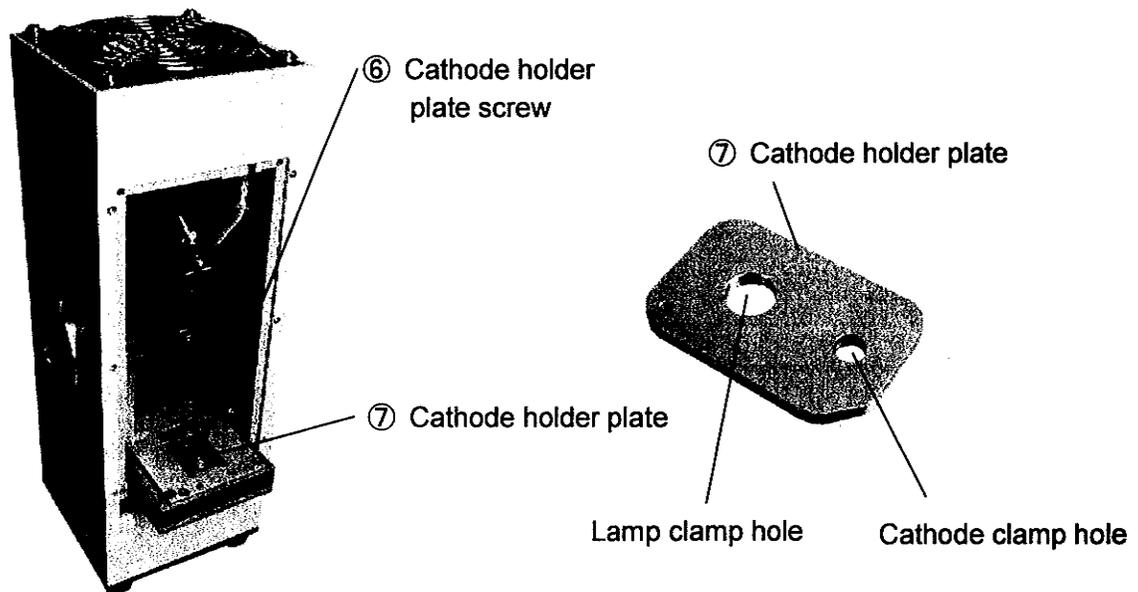


7-2-1 Loosen and remove the screws (4 pieces) on the side cover ①, and remove the side cover ①.

7-2-2 Loosen the lock screw ④ for the cathode installation plate ⑤, and swing up the Clamp plate ③ to unclamp.

7-2-3 Draw out the cathode installation plate ⑤ towards you.
(Insert the accessory hex wrench into the hole on the cathode installation plate and draw it out.)

7-2-4 Using the hex wrench, loosen and remove the screw that fastens the cathode holder plate ⑦ to the cathode installation plate.



7-2-5 Remove the knurled screws from the lamp.



1. Never touch the lens and mirror with your bare hands or scratch them. Operating the lamp with dust, fingerprints or palm prints on the lamp bulb surface can cause permanent prints or loss of transmittance, thus lowering the radiated output intensity or degrading the mechanical strength of the glass bulb. If the glass bulb becomes dirty from contact with fingers or other objects, wipe the bulb off using gauze or absorbent cotton moistened with high-quality alcohol and tightly wrung out. When wiping, take care not to apply any strong force to the lamp.
2. Install the lamp so that the sealed-off tip on the bulb is not aligned with the optical axis. The sealed-off tip must face the side cover.
3. Install the lamp with the anode (+) base positioned up. If the lamp is operated with the anode and cathode bases facing the wrong way, the lamp cathode will be damaged and disabled within a short time.
4. A large current of several amperes flows during lamp operation, so be sure to connect each terminal securely. If poor contact occurs due to play or a loose connection, the radiated intensity from the lamp may become unstable or in the worst case, the lamp may rupture.

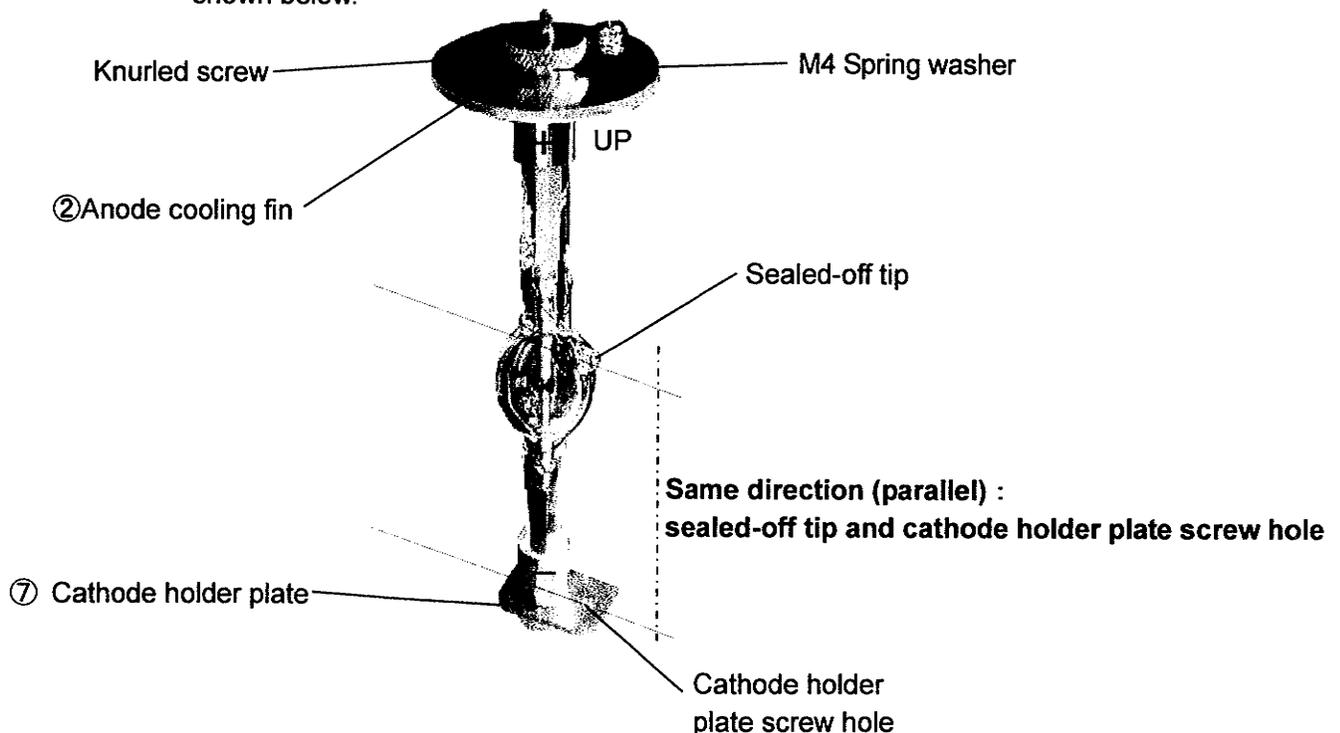


CAUTION

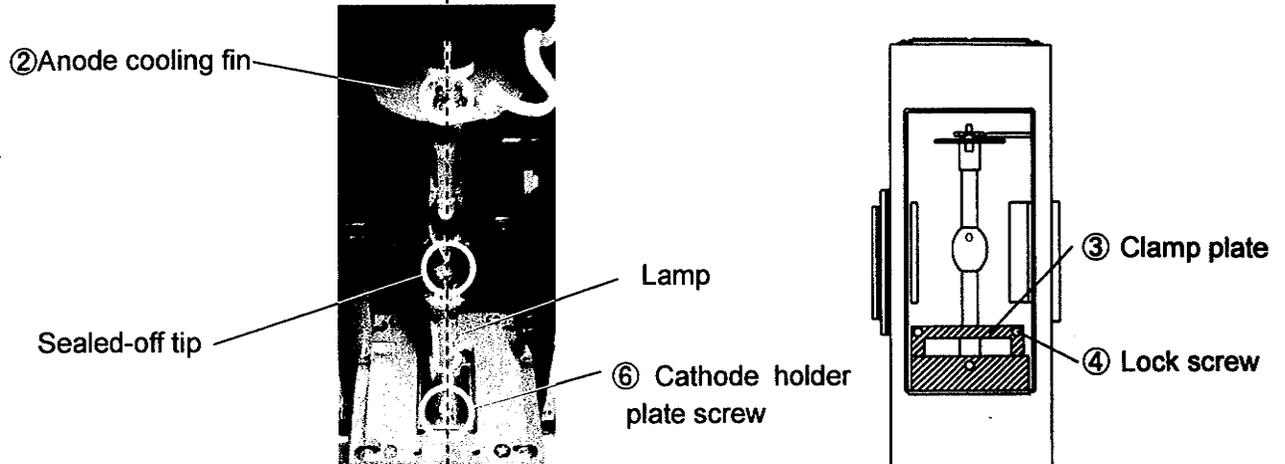
Handle the lamp with extreme caution, because it is filled with gas under high pressure (approx. 10 atmospheres at room temperature and approx. 40 atmospheres during operation). Subjecting the lamp to shocks may cause the bulb to rupture, causing injury from glass fragments. High-pressure gas still remains, even in used lamps so handle it carefully just as when using a new lamp.

7-2-6 Pass the threaded point of the lamp cathode (-) base through the cathode holder plate ⑦, then tighten the knurled screw.

NOTE: The cathode holder plate and the sealed-off tip on the bulb must be positioned as shown below.



7-2-7 Pass the threaded point of the lamp anode (+) base through the hole on the anode heat sink plate (26) and the M4 spring washer, then tighten the knurled screw.



Fix these positions to be set on same direction

7-2-8 Set the cathode holder plate on the cathode installation plate ⑤. Place the cathode holder plate ⑦ into position while holding it slantwise. On that occasion, confirm if the direction of the screw of the anode cooling fin, the sealed-off tip and the cathode holder plate screw are same.

7-2-9 Using the hex wrench, tighten the cathode holder plate screw ⑥. Place the cathode holder plate into position while holding it slantwise.

7-2-10 Place the cathode installation plate ⑤ back into the lamp housing, then return the clamp plate ③ in the original position and tighten the lock screw ④.

7-2-11 Reattach the side cover ① using the four screws (4 pieces).

7-2-12 To adjust the optical axis, screw the optical axis adjustment aperture into the condenser lens guide.



If the side cover is not fastened securely, the interlock function might trigger to prevent lamp operation. So, fasten the side cover securely.

7-3 Stating operation (starting lamp discharge)



DANGER

To avoid high-voltage electrical shock hazards, never attempt to ignite the lamp with keep inserting any metal tool into "X ADJ." or before installing the lamp into the lamp housing. A high voltage (20kV to 30kV) is output during ignition from lamp cathode side.

When finished installing the lamp, plug in the power cable of the lamp power supply at the AC outlet. Then, turn on the power switch on the front panel of the power supply. Upon turning on the power switch, a trigger voltage is applied to the lamp and the lamp lights up. When the temperature inside the lamp housing rises to a certain level, the built-in cooling fan starts operating.



CAUTION

If the lamp fails to start lighting up, restart by turning "ON" side the power switch again. But do not repeat more than 4 times. If the lamp failed to light up 3 times, the lamp, power supply or lamp housing probably has a problem. Please consult us in such cases.

7-4 Warm-up

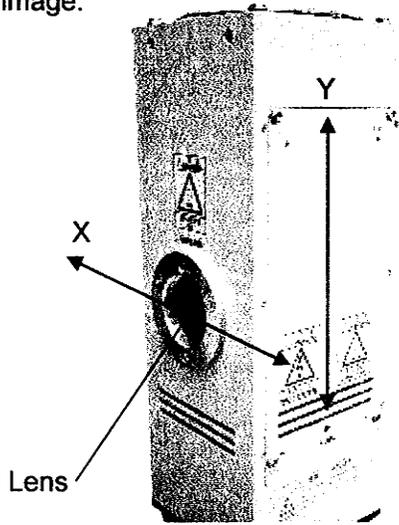
The radiant output intensity of xenon lamp fluctuates (drifts) until it reaches thermal equilibrium. The output intensity will normally become stable within 10 to 20 minutes after the lamp is turned on, although this depends somewhat on the ambient temperature and the lamp ratings.



After the lamp has been turned on, this cooling fan does not operate until the internal temperature reaches a certain level (about 5 minutes).

7-5 Adjusting the Optical Axis

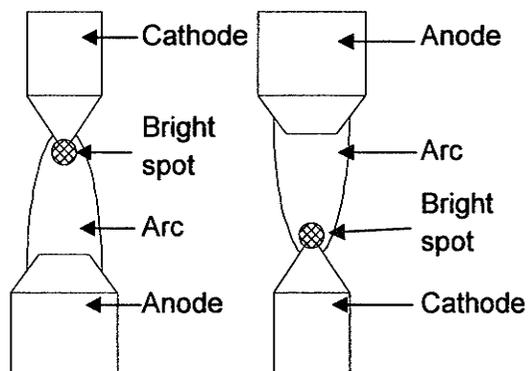
Optical axis adjustments to the lamp, reflective mirror and condenser lens are necessary for efficient collection of the output light from the lamp and also for preventing damage to the lamp electrodes. You will need a proper screen on which to project the lamp output light image.



Projected Image

Only bright spot can be observed as a image.

Direct Image Reflected Image



7-5-1 Install the optical axis adjustment aperture.

Before turning on the lamp, screw the optical axis adjustment aperture into the condenser lens guide.

7-5-2 Release the lock to allow adjustment along the lamp's Y-axis direction.

Using the accessory hex wrench, loosen the lock screw (10) to allow height axis direction adjustment.

7-5-3 Turn the lamp on. (7-3)

Following the description in " 7-3 ", turn the lamp on.

7-5-4 Adjust the optical axis.

Project the output light image of the lamp onto the screen. While viewing the bright spot positions of the direct light and reflected light from the reflective mirror, make adjustments as outlined from (a) to (e) below, so that the bright spots are aligned at the optimum positions.

(a) Adjust the lens focus

Turn the consider lens mirror adjustment (1) (LENS ADJ.) to obtain the best focus of the direct light bright spot.

(b) Adjust the mirror position.

Turn the mirror adjustment screw (9) (MIRROR ADJ.) to obtain the best focus of the reflected light bright spot.

(c) Adjust the lamp's height-axis.

Turn the height-axis adjusting screw (7) (Y ADJ.) to adjust the lamp's height-axis.

(d) Lock the lamp's height-axis.

Using the accessory hex wrench, tighten the height-axis lock screw (10) (Y LOCK) to lock the lamp's height-axis.

(e) Adjust the lamp's horizontal-axis.

Turn the horizontal-axis adjusting screw (6) (X ADJ.) to adjust the lamp's horizontal-axis.

In this case, adjust the light axis with keep looking the position of brightness point of output light surely. The position where the brightness point can moves is the movable range of adjustment axis. Be careful that it might be a cause of broken if keeps rotating the adjustment screw more than it.



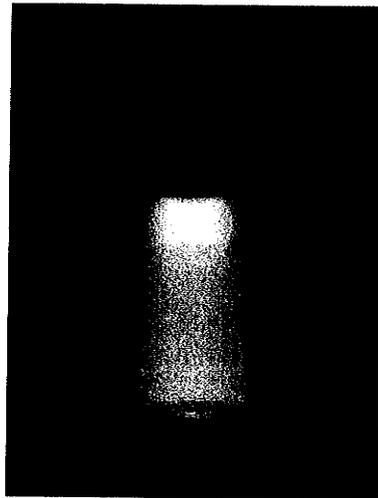
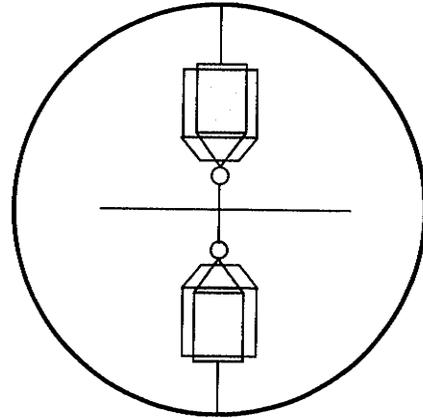
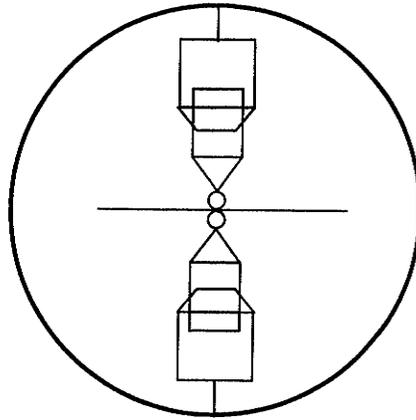
When making optical axis adjustments, always wear protective gear (conforming to JIS-T8141 or equivalent regulations). The lamp installed in this lamp housing emits intense ultraviolet and infrared rays which are harmful to the eyes and skin. Looking directly into the emitted light or allowing the light to fall on the skin will damage eyesight or cause skin burns. Never stare directly into the operating lamp.



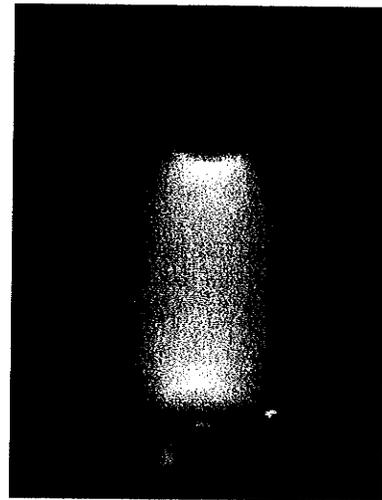
Make the above adjustments so that the focused image point of the reflected light from the reflective mirror is separated from the cathode tip, cathode and lamp bulb wall. If the focused image point is irradiated on the cathode tip or bulb wall, the cathode or bulb wall operating temperature rises excessively which may drastically shorten the lamp life.

- Direct images of the electrode are shown by white cutout. Reflected images of the electrode are shown in gray.

• **Good example**

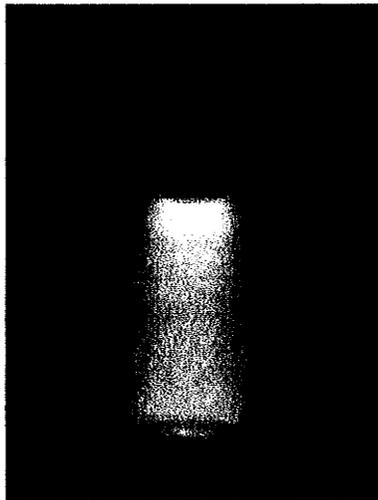
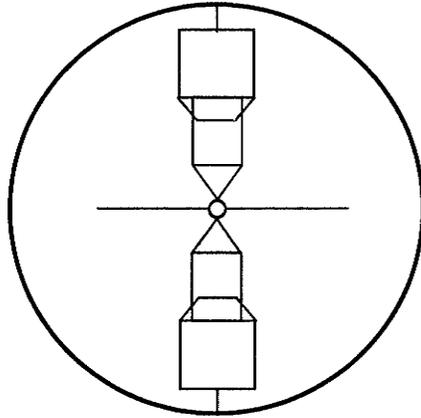


Two bright spots exit.

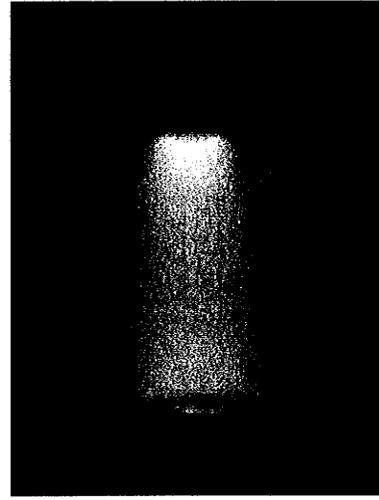
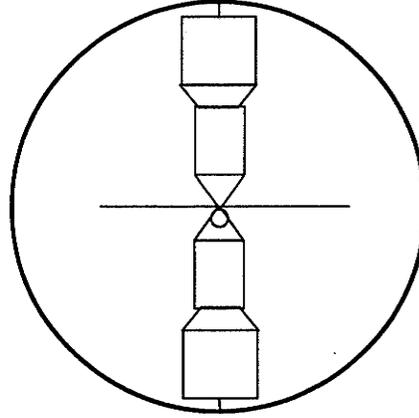


Two bright spots exit.

• **Bad example**



Bright spots overlap with each other.



Reflected light is focused on the cathode.

7-6 Adjusting the Output Light Flux

Turn the consider lens mirror adjustment (1) (LENS ADJ.) to select the output light flux to match your application.

7-7 Turning off the Lamp

To stop lamp operation, turn OFF the lamp power supply switch.

8. SPECIFICATIONS

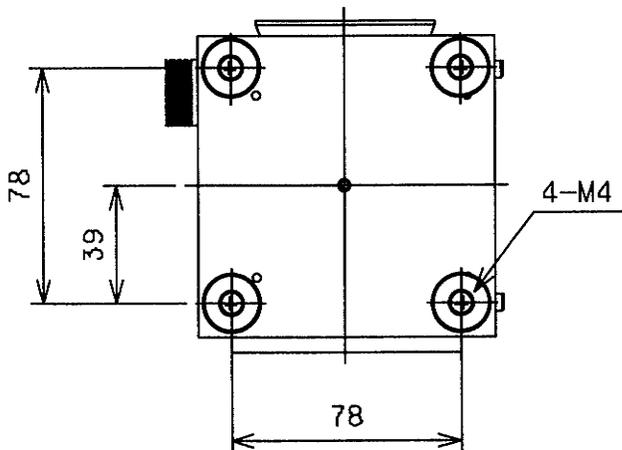
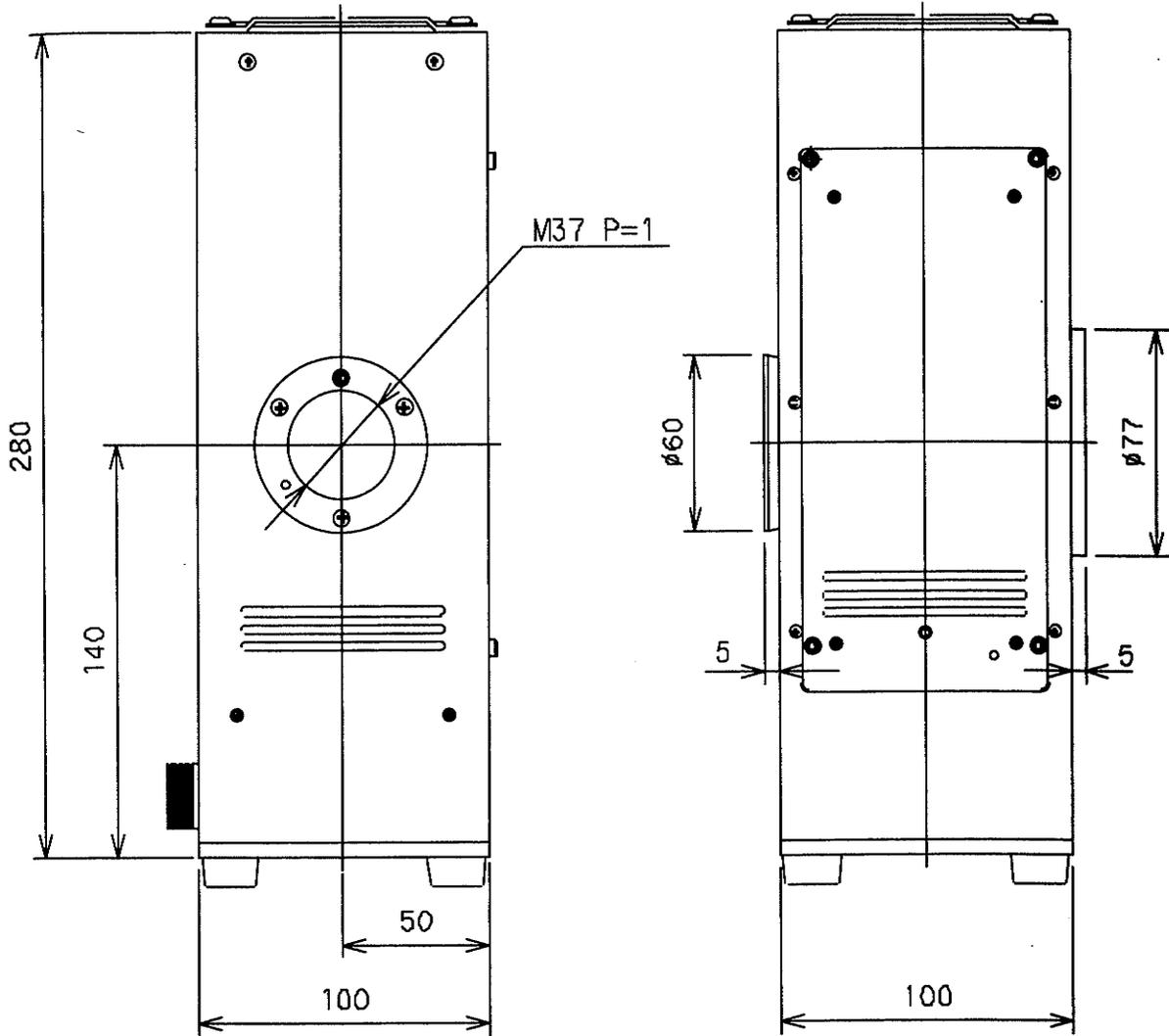
Parameter		Description/ Value				
Lamp	Suitable lamps (Rating and kind)	150 W Xenon Lamps	150 W Hg-Xe Lamps	150 W (GS) Xenon Lamps	200 W Hg-Xe Lamps	
	Suitable lamps Type No.	Fused Silica bulb	L2175	L2482	L2273	L2423
		Ozone-free Silica bulb	L2195	L7047	L2274	L2570
	Lamp Power Consumption		150 W			200 W
	Lamp Current		7.5 A		8.5 A	8.0 A
	Lamp Voltage		20 V Typ.		18 V Typ.	24 V Typ.
Optical	Focus Lens	Material	Fused Silica			
		Dimension	ϕ 30 mm			
		Focal Point	F=30 mm (550 nm)			
		Light Output	Collimating			
	Reflective Mirror	Material	BK7 Al+MgF ₂ Coating (All reflection)			
		Dimension	ϕ 30 mm			
		Curvature	R30 mm			
Optical Axis Height		140 mm (excluding plastic feet)				
Starter output voltage		30 kV Type.				
Cooling Function		Forced air cooling (Built-in automatic cooling fan)*				
Ambient temperature		0 to 40 °C				
Recommended ambient temperature		+ 5 to + 35 °C				
Ambient humidity		Less than 85 % (no condensation)				
Dimensions (excluding projecting parts)		100 (W) × 280 (H) × 100 (D) mm				
Weight		Approx. 3.5 kg				

* The cooling fan automatically starts when the temperature rises in side the lamp housing.

NOTE:

Specifications are subject to change without prior notice for performance improvement and other factors.

9. DIMENSIONAL OUTLINE



單位：mm

10. WARRANTY, MAINTENANCE AND DISPOSAL METHOD

Warranty

This lamp housing is warranted for a period of one year from the date of delivery. If any failure is found in the workmanship or materials within this warranty period, Hamamatsu will repair or replace the defective parts without charge. However, repair or replacement in the following cases will be charged even within the warranty period.

- (1) The lamp housing was misused with regard to the precautions and instructions described in this manual, or faults were caused by inadvertent handling.
 - (2) Faults were caused by electrical or mechanical modifications to it.
 - (3) Faults were caused or induced by natural disaster or man-made accident.
- The warranty is limited to repair or replacement.

Maintenance

If problems arise due to the life end of parts after a long time of operation, return the equipment to our sales office. We will repair or replace the parts and make necessary adjustments.

While every effort is made to repair the returned equipment in as short a time as possible, the repair of equipment which has been purchased some time ago may require additional time. Please acknowledge that repair of equipment using parts which are not in current production or equipment which has been modified or severely damaged by the customer may be refused.

Disposal method

This product, when to be disposed of, should be treated properly according to the waste disposal law by user or by the industrial waste treatment firm duly authorized. When it is used and disposed of in any place outside of Japan, it should be treated properly according to the statutory regulations of the state and local governments applicable to that place.

HAMAMATSU

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