Instruction Manual

Xenon Light Source 300W
ＭＡＸ−３０３

Thank you for purchasing the Asahi Spectra MAX-303 Xenon Light Source.

The MAX-303 generates spectra from UVB to IR wavelengths and allows you to customize these spectra to match your specific needs through the use of optional accessories.

Read this instruction manual carefully before using your MAX-303 to achieve optimum performance and to help extend the life of the unit.

Asahi Spectra Co.,Ltd.

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Safety Precautions

Be sure to read and observe the following warnings and cautions before using the unit.
Operating the MAX-303 unit in an inappropriate manner or failing to maintain it properly may result in degraded performance or damage to the unit. Such damage is not covered by the warranty.

List of the Safety Symbols

The safety symbols in this instruction manual and the safety labels on the products are classified as follows. Be sure to read and observe the following safety symbols before using the unit.

⚠	Warning	This symbol indicates the risk of death or serious injury if you do not follow the instructions or operate the unit in an inappropriate manner.
⚠	Caution	This symbol indicates the risk of injury or damage to the unit if you do not follow the instructions or operate the unit in an inappropriate manner.
⚠		Various safety symbols are indicated in this symbol. Be sure to read and observe the instructions before using the unit.
🚫		This symbol indicates prohibited actions. Be sure to read and observe the instructions before using the unit.
▮		This symbol indicates instructions that must be obeyed. Be sure to read and observe the instructions before using the unit.

Safety labels are attached in the following locations.

⚠ **C a u t i o n**

-When using OUV lamp, you must prepare an exhaust system to evacuate ozone to outside.

-Turning the lamp on and off repeatedly within a short time period may degrade the lamp's performance or considerably shorten its life.

-Once the lamp is turned off, wait at least 15 minutes before turning it on again.

⚠ **Warning**

Hot surface inside. Burn hazard. Allow this area to cool before opening the door.

⚠ **Caution**

Do not look directly at the light.

⚠ **W a r n i n g**

-Read the instruction manual carefully before using your MAX-303. Read and observe the following warnings and cautions before using the unit.

-Do not disassemble or modify the unit or lamp. Injury, fire, or electric shock may result from improper handling of components. Repairs due to the above condition will be charged whether or not the product is under warranty.

-Use the product only with AC power supply indicated in the specifications.

-Immediately stop operation if you notice smoke, an unusual noise or smell, or excessive heat coming from the unit. Continued operation under these circumstances may result in fire or electric shock.

-Before replacing the lamp, unplug the AC power cable from the power outlet.

-Make sure to turn off the main power when checking or cleaning the product.

-Do not look directly at the light.

-Do not point the light guide directly at human skin.

Safety Precautions

⚠️ Warning	Handle the lamp with extreme care. Do not subject the lamp to strong impact. Doing so may cause the lamp to explode due to the high pressure of the gas inside.
	Do not block the exhaust ducts of the cooling fan or the air inlet vents on the sides. Doing so may cause internal heat build-up which may result in fire. Ensure at least 30cm of space in front of the air inlet vents and exhaust ducts.
	Before replacing the lamp, unplug the AC cable from the power outlet to avoid risk of electric shock.

⚠️ Caution	Do not subject the unit to any of the following conditions, as these may result in fire or electric shock:
	  - Direct sunlight
	  - Any type of open flame
	  - Flammable or corrosive gas
	  - High humidity
	  - Dusty environment
	  - Temperatures below 10 deg C (50 deg F) or above 35 deg C (95 deg F)

	Do not place flammable materials such as paper, fabric, or chemicals near the unit or place anything over the lamp, as this may result in fire.
	The unit must be in a horizontal position during operation. Do not stand in a vertical position when using.
	Do not place or store any objects on top of the unit.
	This product must be used with provided dedicated cables. Do not use with any power voltage other than the indicated voltage.
	Ensure a proper grounded connection to avoid possible electric shock.
	Do not touch the plug with wet hands or pull the cable forcibly, as these may result in disconnection, electric shock or fire.
	Before connecting other instruments to the unit, make sure that the unit and the instruments being connected are all powered off, to avoid risk of electric shock.
	Do not drop or hit the unit, as strong impact may damage the unit.
	Keep hands and other items away from the rotating parts so that they do not get caught or dragged in.
	This product emits ultraviolet or infrared light which may irritate exposed skin.
	Immediately turn off the power and unplug the AC cable if you notice unusual occurrences such as smoke or an unusual smell or noise. Continued operation under these circumstances may result in damage to the unit, fire or electric shock.
	Once the lamp is turned off, wait at least 15 minutes before turning it on again.
	The unit contains components (LCD panel, etc.) that may have special disposal procedures. Consult your local authorities when disposing of the unit.

🚫 Prohibited	Do not disassemble or modify the unit or lamp. It may cause failure.
	Do not touch the optical components such as the lens, lamp or mirror with bare hands. It can degrade the performance of the unit.

Wear Protective Glasses	Do not look at the light beam directly while the lamp lights. Wear the protective glasses when you check the light beam.

Accessories

Check that you have received all of the following items before using the MAX-303.

(1) Main unit

Item no.: MAX-303
Size: 196(W) x 345(D) x 302(H)mm

(2) Lamp cartridge
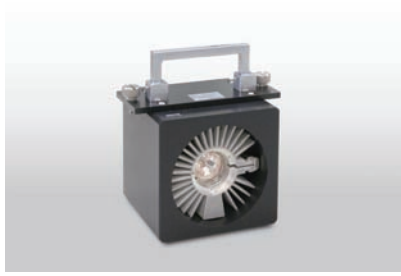
2 types: UV type
         VIS type

(3) Light guide fitting device
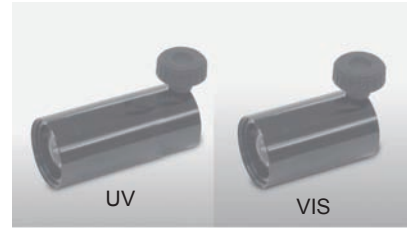
Size: UV type 44mm dia. x 98mm
      VIS type 44mm dia. x 75mm

(4) AC cable

Length: 3m

(5) Mirror module

4 types: UV type
         UV - VIS type
         VIS type
         IR type

(6) Filter fitting tool
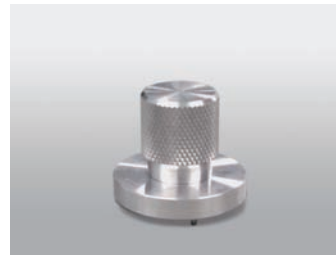
Used to replace the optical filter
Size: 31(W) x 31(D) x 27(H)mm

(7) Filter ring

Usable filter size: 25mm dia.
thickness 1 - 6mm Quantity: 8 pcs

(8) RS-232C cable

D-Sub 9-pin straight cable
Length: 1.8m

(9) Instruction manual
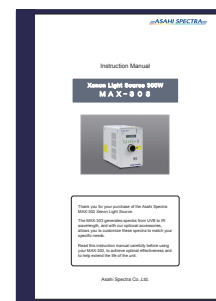
< Options >

Light guide

Size: 5mm dia. x 1000mm
Material: Quartz, Hybrid
*Other lengths are available.

Collimator lens

Name	
・Collimator lens	・High condensing lens
- x0.5 type	- 2.5mm dia. type
- x1.0(STD) type	- 5mm dia. type
- x2.0 type	・Direct attachable collimator lens
・Hexagonal collimator lens	- Straight type
	- Downward type

Filter holder

Size: 84(W) x 18.5(D) x 121(H)mm

Names and Functions of Parts

Main unit

Front

Rear
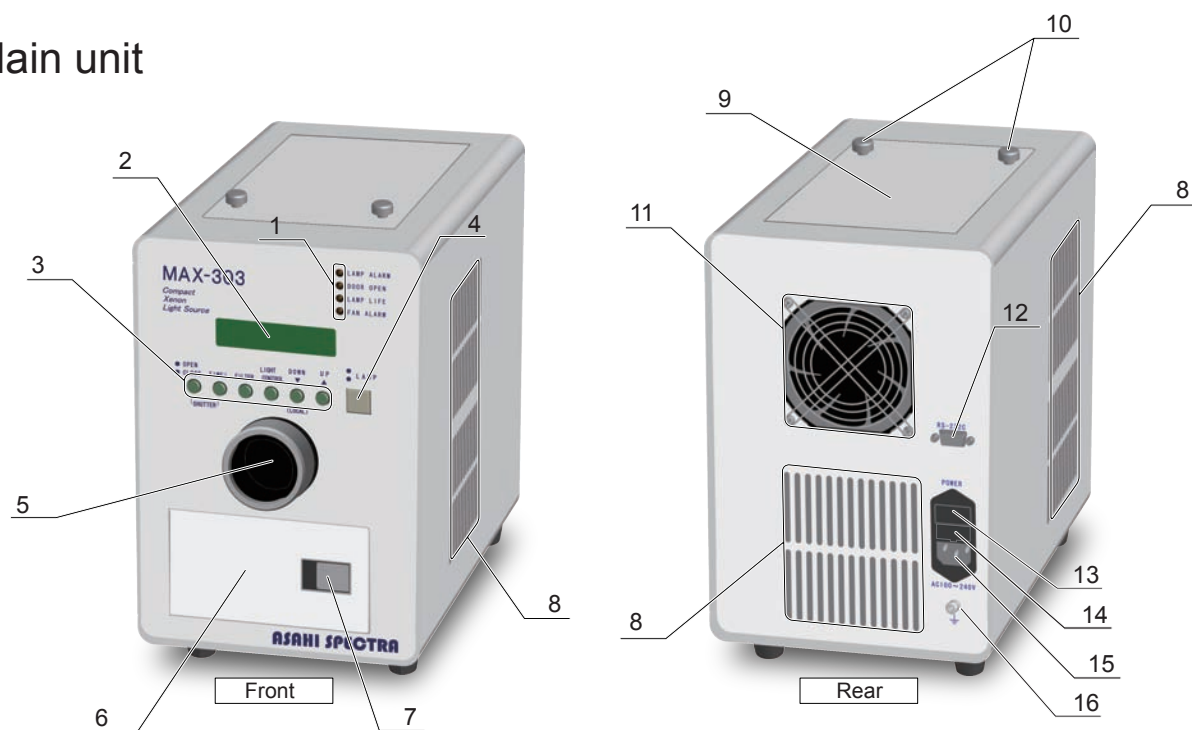
	Names	Functions
1	Warning lamps	Indicate the following alarm conditions when illuminated: Lamp trouble, open top cover, short lamp life and cooling fan trouble. (For details, refer to P. 7.)
2	LCD panel	Displays function settings, such as filter wheel, timer and light intensity.
3	Control buttons	Used to operate or set various functions, such as open/close aperture, timer, and light intensity attenuation. (For details, refer to P. 8.)
4	LAMP button	Turns the lamp on or off.
5	Light aperture (mount for the light guide fitting device)	Emits light from the unit's internal xenon lamp. Threaded to fit the light guide.
6	Front door	Provides access to the filter wheel, allowing you to install or remove an optional optical filter. A maximum of 8 filters can be mounted on the filter wheel.
7	Front door knob	Used to open or close the front door.
8	Air inlet vent	Allows air to flow into the unit to cool the internal parts such as the lamp and power supply unit.
9	Top cover	Provides access to the lamp mount and mirror module, allowing you to install or remove the lamp and mirror module.
10	Top cover fixing bolt	Fixes the top cover. To prevent accidents, the lamp will not turn on if the fixing bolts are not securely tightened.
11	Cooling fan	Cools internal parts such as the lamp and power supply unit by blowing heated air out of the exhaust ducts.
12	RS-232C port	Allows you to connect an RS-232C serial interface to control the MAX-303 from a computer (not supplied).
13	Main power switch	Switches the main power on or off.
14	Fuse holder	Contains 2 fuses.
15	Power connector	Used to connect the supplied AC cable.
16	Grounding terminal (GND)	Use to connect a grounded plug to prevent electric shock or current leakage.

Names and Functions of Parts

LCD panel

Initial screen

Lamp life screen

Filter position no.

Registered filter name

Light intensity

Total hours of lamp usage

```
F1:FILT1    LI:  100
TM:      1.0s    LCL
```

```
F1:FILT1    LI:  100
LF:      0.0h    LCL
```

Timer setting

Control method
(Local control:LCL / Remote control:RMT)

Warning lamps

MAX-303

Compact
Xenon
Light Source

● LAMP ALARM — 1

● DOOR OPEN — 2
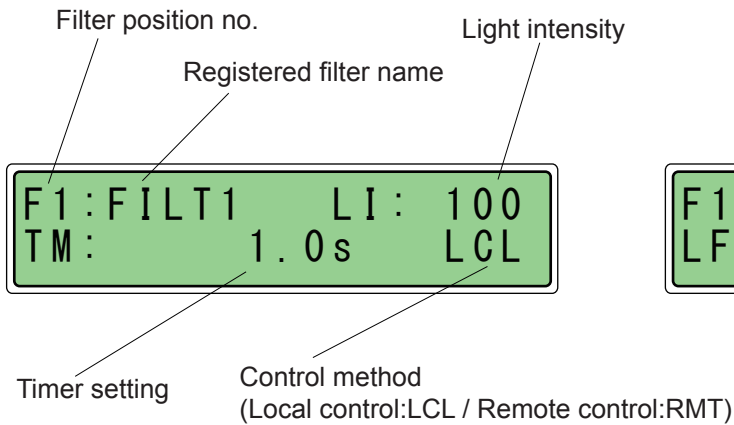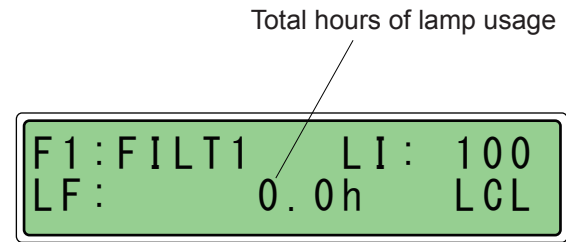
● LAMP LIFE — 3
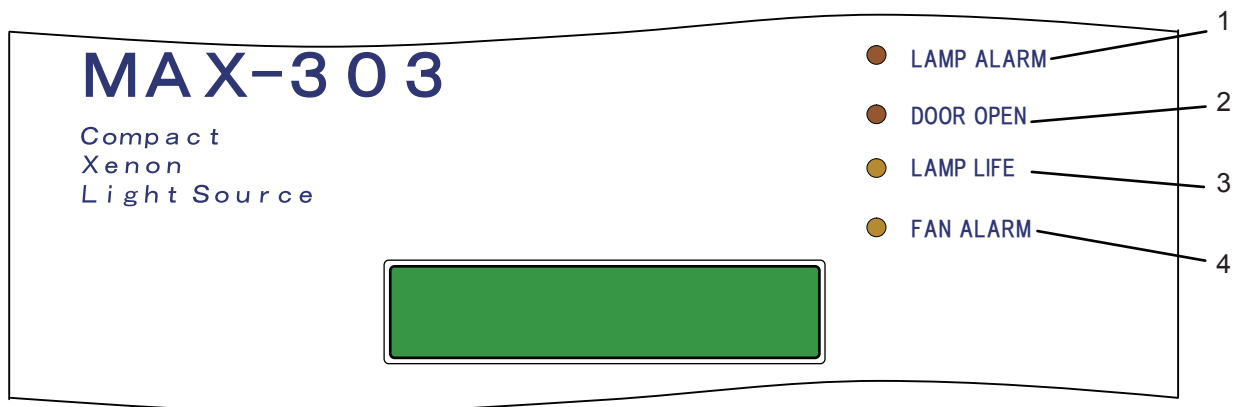
● FAN ALARM — 4

	Names	Functions
1	LAMP ALARM	- Lights (red) when the lamp fails to light up.
2	DOOR ALARM	- Lights (red) when the top cover is open.
3	LAMP LIFE	- Lights (orange) when lamp usage exceeds 500 hours total.
4	FAN ALARM	- Lights (orange) if the cooling fan stops or if a sharp rise in internal temperature is detected.

Names and Functions of Parts

Control buttons

```
  ☼ OPEN              LIGHT      DOWN    U P        ☼
  ● CLOSE   TIMER  FILTER CONTROL  ▼     ▲        ● LAMP

    ◯        ◯      ◯      ◯      ◯      ◯         ▢

    └SHUTTER┘                   (LOCAL)

    1        2      3      4      5      6         7
```
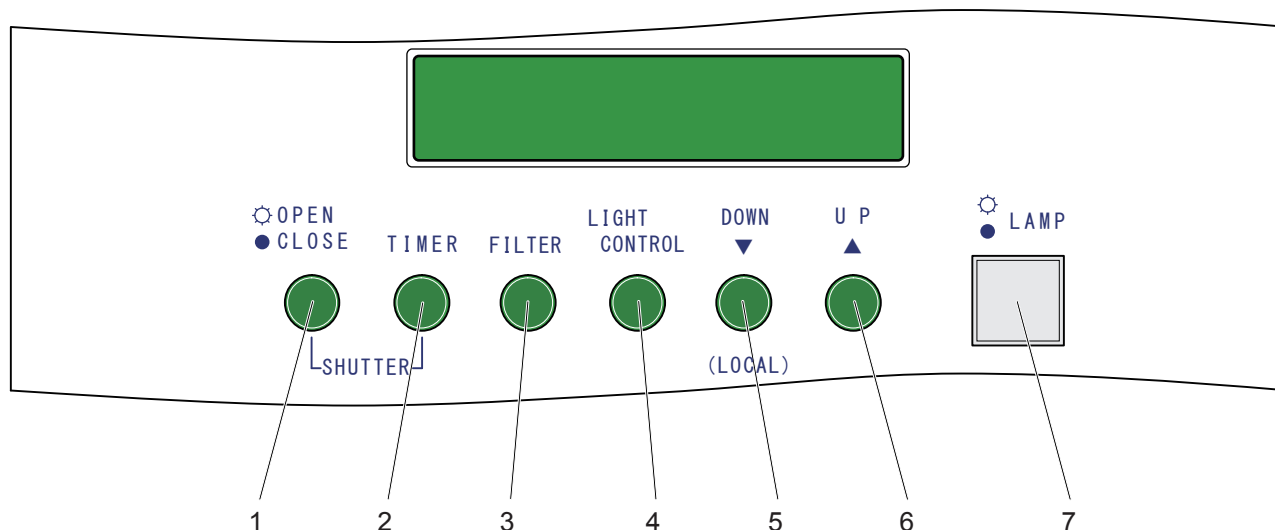
	Names	Functions
1	OPEN CLOSE button	Use this button to open and close the light aperture. While this button is on (green) ---> Shutter is open. While this button is off ---> Shutter is closed.
2	TIMER button	- Use this button to set the timer (duration of light emission in seconds)
3	FILTER button	- Use this button to change the position of the filter wheel. - Use this button to register the name(s) of the filter(s) in the filter wheel.
4	LIGHT CONTROL button	- Use this button to attenuate the light intensity. - Use this button to reset the total hours of lamp usage.
5	▼DOWN button	- Use this button to decrease setting values for various operations. - Use this button to check the lamp usage hours.
6	▲UP button	- Use this button to increase setting values for various operations. - Use this button to reset the lamp usage hours and return to the initial screen.
7	LAMP button	- Use this button to turn the lamp on or off.

Specifications of Standard Parts

⚠️ Warning	Handle the lamp with extreme care. Do not subject the lamp to strong impact. Doing so may cause the lamp to explode due to the high pressure of the gas inside.
🚫 Prohibited	Do not touch the optical components such as the lens, lamp or mirror with bare hands. It can degrade the performance of the unit.

Xenon lamp

Our lamp design achieves optimal brightness by utilizing a 300W short arc xenon lamp and our own specially designed optical components.
The emitted light comprises a continuous spectrum ranging from UV to IR wavelengths. The lamp also uses specially designed mirrors and lenses for maximum performance in the UV portion of the spectrum.

Lamp spectral performance
  *Actual data measurement.
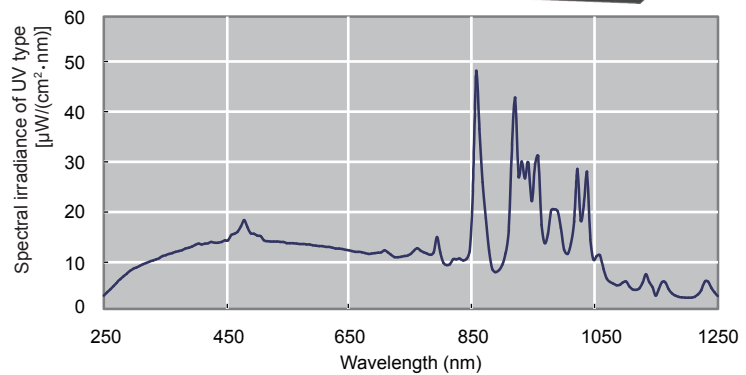
Reference Lamp cartridges for MAX-301 and MAX-302 cannot be mounted in the MAX-303 because they are not compatible with those of the MAX-303.

Types of lamp

- There are 2 types of lamp for MAX-303.
- You can select the VIS or UV type lamps according to your requirements.

   *You can identify the different types of lamp from the sticker attached to the top of the main unit.

	VIS Type	UV Type
Radiance range	VIS to IR	250nm to IR
Applicable mirror module	VIS or IR mirror module	UV, UV-VIS, VIS or IR mirror module

9
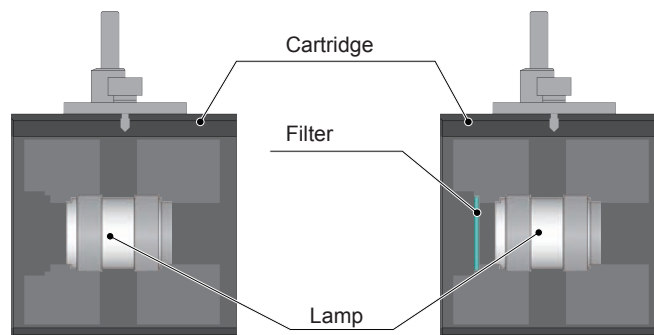
Specifications of Standard Parts

Mirror module

The mirror module is equipped with high-performance cold mirrors with in-house coatings. This design allows the mirror modules to achieve our highest levels of performance.

*The spectral graphs below show only mirror module spectral performance.

UV mirror module spectral performance
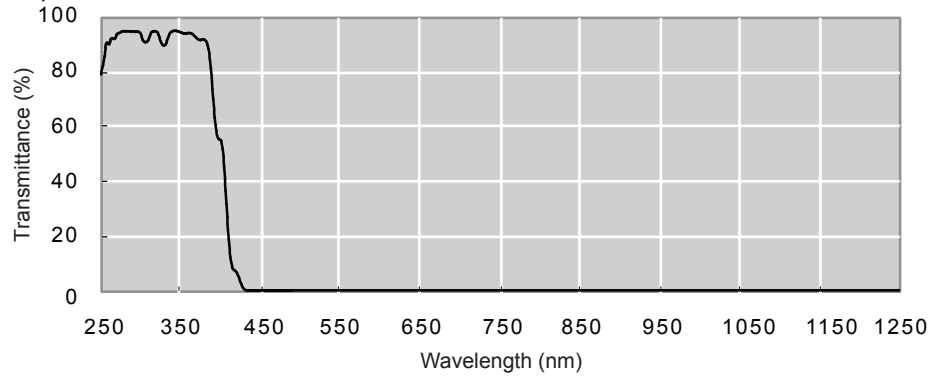
UV-VIS mirror module spectral performance
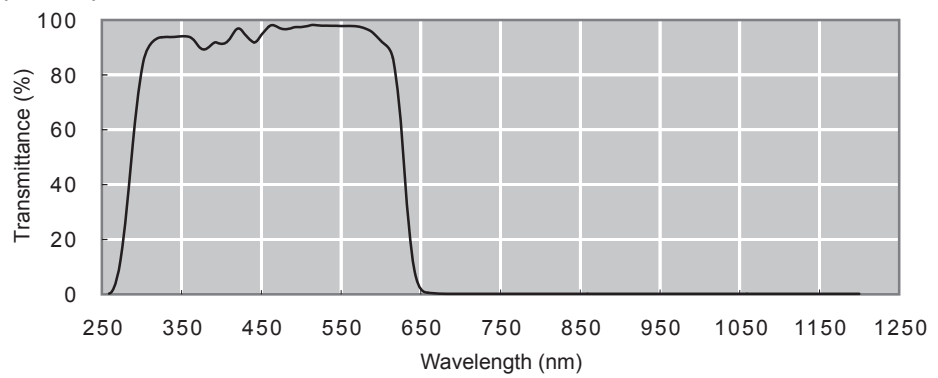
VIS mirror module spectral performance
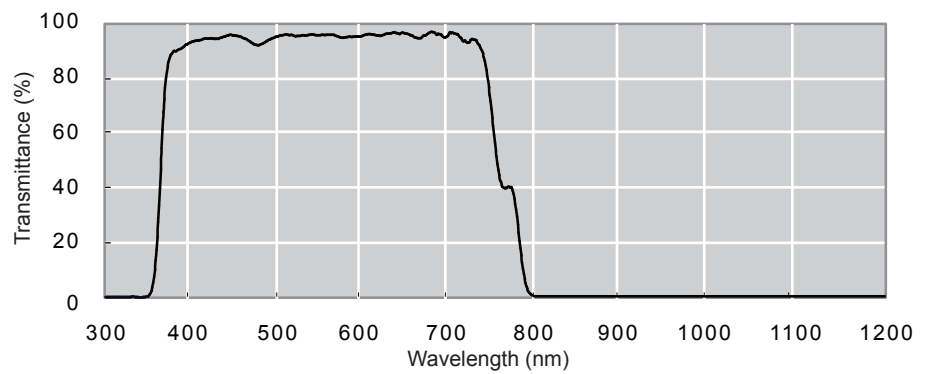
IR mirror module spectral performance
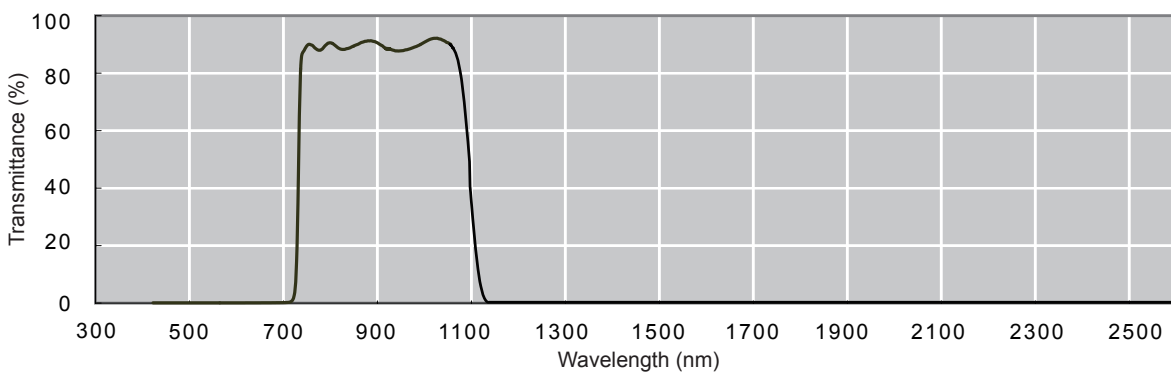
Specifications of Standard Parts

Filter wheel

The filter wheel enables you to select a filter using the control buttons.
The selected filter is rotated into position in front of the light beam.

A maximum of 8 filters can be mounted in the filter wheel. (bandpass, long or shortpass filters, etc.)

Suitable filter size
Diameter: 25mm
Thickness: 1 - 6mm
*A spacer may be required, depending on the filter thickness (less than 2mm).

< Dimensions >

M27×P0.75

φ 120

unit : mm

Filter ring

< Dimensions >

Filter ring   Spacer   Stopper ring

M27×P0.75   φ19   M27×P0.75   φ30   φ23   φ25   φ19   M27×P0.75

4   4   2

10

Unit : mm
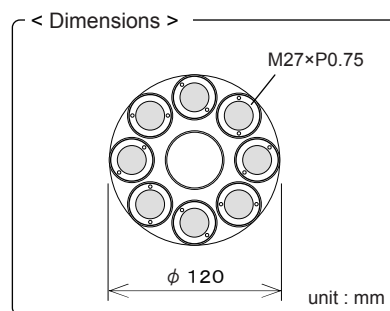
The filter ring is used to fit an optical filter to the filter wheel.

*8 filter rings are included as standard accessories.
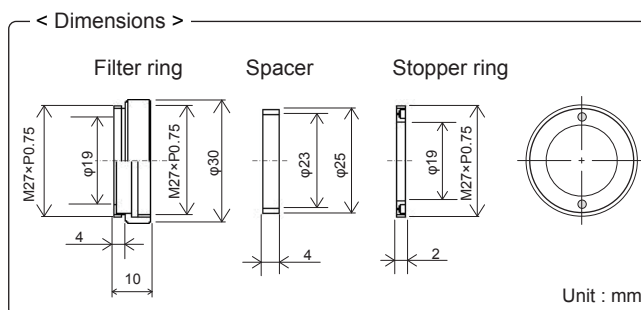
Circular variable ND filter

The circular variable ND filter enables you to attenuate the light intensity by rotating the filter using the control buttons.

Light intensity variable range: 100 - 5 (T)

Relative intensity

100

50

0

0   90   180   270   360

Angle of rotation (deg.)

Before Operation

Precautions for Installation

⚠	Warning	Do not block the exhaust ducts of the cooling fan or the air inlet vents on the sides. Doing so may cause internal heat build-up which may result in fire. Ensure at least 30cm of space in front of the air inlet vents and exhaust ducts.
⚠	Caution	Do not place flammable materials such as paper, fabric, or chemicals near the unit or place anything over the lamp, as this may result in fire.
⚠	Caution	Do not subject the unit to any of the following conditions such as direct sunlight, heater, flammable or corrosive gas, high humidity, dusty environment or temperatures below 10 deg C (50 deg F) or above 35 deg C (95 deg F) as these may result in fire or electric shock.
⚠	Caution	The unit must be in a horizontal position during operation.
⚠	Caution	Do not place or store any objects on top of the unit.

Control buttons can only be operated when the main power is on.
Only the (LOCAL), LAMP and OPEN CLOSE buttons can be operated during remote controlled operation.

Precautions for Operation

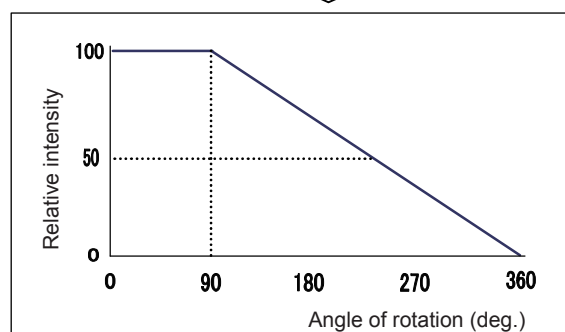|	
LAMP button	- Press this button to turn the lamp on or off while the main power is on. (Pressing this button while the main power is off will not turn on the lamp.) - The color of this button indicates whether the lamp is on or off. The button is lit green when the lamp is on, and is unlit when the lamp is off. - Press this button while it is lit green to turn the lamp off . Caution: Once the lamp is turned off, wait at least 15 minutes before turning it on again. Turning the lamp on and off repeatedly will shorten the lamp life considerably.
OPEN CLOSE button	- Once the lamp is turned on, you must open and close the shutter (using the OPEN CLOSE button) in order to emit light. - The color of this button indicates whether the shutter is open/closed. The button is lit green when the shutter is open, and is unlit when the shutter is closed.
▼ DOWN button ▲ UP button	- Use these buttons to modify the values of various settings. - Press the DOWN button to decrease a setting value. - Press the UP button to increase a setting value.
Cooling fan	- The cooling fan runs continuously while the main power is switched on. - After using the MAX-303, leave the main power on so that the fan can continue to cool the unit. - Do not turn off the main power switch until unit has cooled completely. Caution: Do not block the fan or the air intake vents.

Safety Functions

As a safety precaution, the lamp turns off automatically under certain conditions.
These conditions and the recovery procedure for each are as follows:

Condition	Recovery Procedure
Top cover is opened during operation	Close the top cover and press the LAMP button for more than 1 second. See also DOOR OPEN on P. 39.
Cooling fan stops during operation	Cycle (turn off and on) the main power, then press the LAMP button for more than 1 second. See also FAN ALARM on P. 39.
Lamp reaches abnormally high temperature	Make sure that the air inlet vent or exhaust duct is not blocked. Wait at least 15 minutes before turning on the main power.

If the problem is still observed after you perform the above recovery procedure(s), the product may be malfunctioning.
Turn off the main power immediately and contact our sales department. (Refer to P. 40 for contact information.)

Preparing to Operate the MAX-303

⚠ Warning	Do not block the exhaust ducts of the cooling fan or the air inlet vents on the sides. Doing so may cause internal heat build-up which may result in fire. Ensure at least 30cm of space in front of the air inlet vents and exhaust ducts.
⚠ Caution	This product must be used with provided dedicated cables. Do not use with any power voltage other than the indicated voltage.
⚠ Caution	Do not subject the unit to any of the following conditions such as direct sunlight, heater, flammable or corrosive gas, high humidity, dusty environment or temperatures below 10 deg C (50 deg F) or above 35 deg C (95 deg F) as these may result in fire or electric shock.

Connecting the AC cable

(1) Insert the AC cable into the main power connector located on the rear of the main unit.

(2) Insert the electric plug of the AC cable into the wall outlet.

Main power connector

Grounding terminal

AC cable

Electrical plug
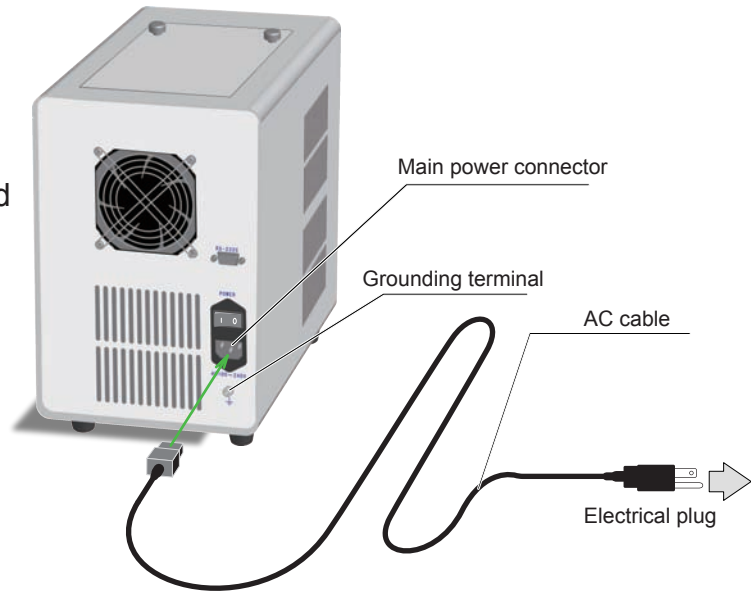
⚠ Caution	Ensure a proper grounded connection to avoid possible electric shocks.

Connecting the Light Guide and the Collimator Lens

To use the light guide and the collimator lens with the MAX-303, connect them as shown below.

*Rotate the knobs clockwise to fasten.

Remove the protective caps before connecting.

(1)

(4)

Do not bend the light guide sharply. (For details, refer to P. 42.)

(2)

(3)
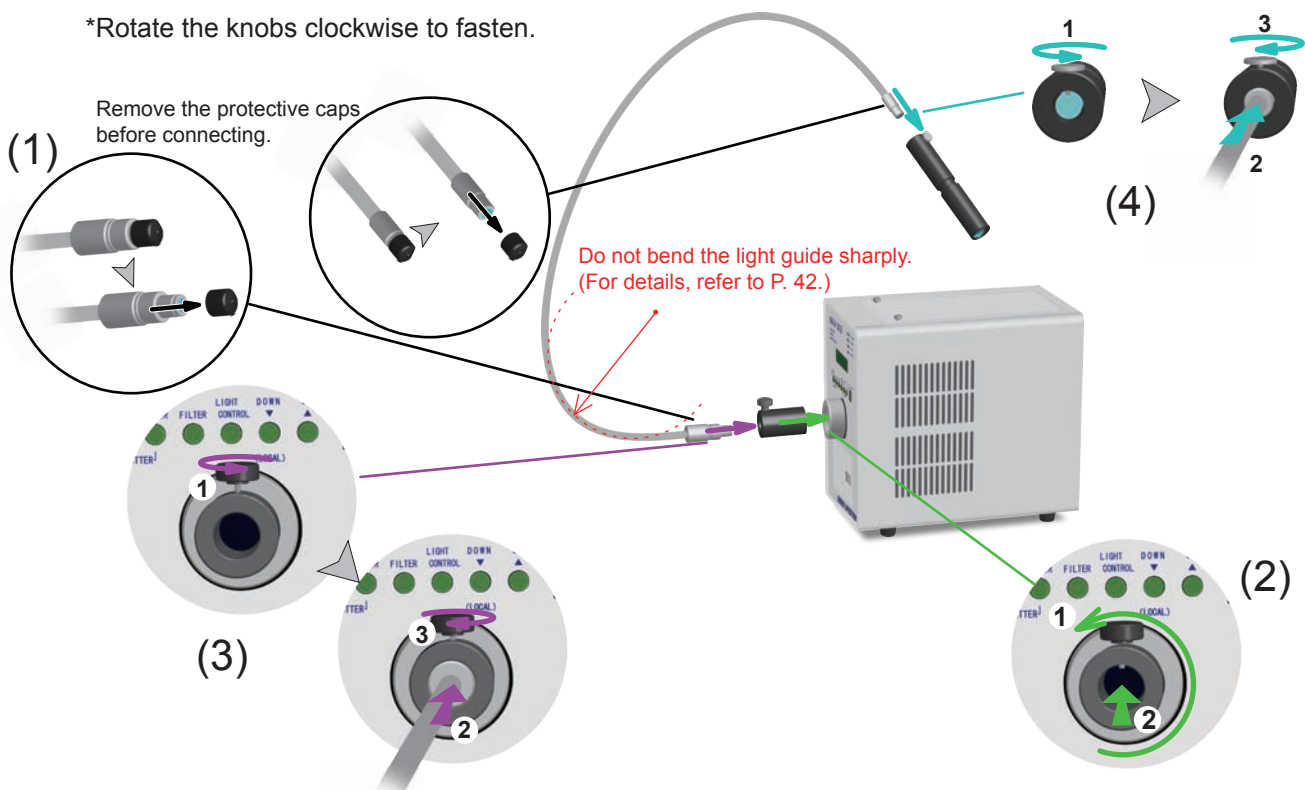
Preparing to Operate the MAX-303

Mounting a Filter (Option)

Note Turn off the main power when you mount the filter.
If you mount a filter while the main power is on,
your hands may become caught in the filter wheel.

Filter fitting tool

(1) Remove the stopper ring from the filter ring.

    *Turn the stopper ring counterclockwise
    using the filter fitting tool.
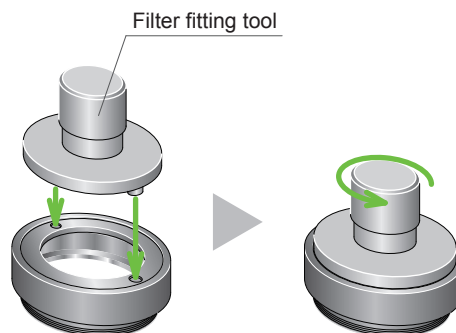
(2) Mount the optical filter into the filter ring.

    *When using a thick filter, remove the spacer
    from the filter ring.

Note When cleaning a filter surface, wipe it out gently
using a soft cloth moistened with alcohol.

Spacer

2

1
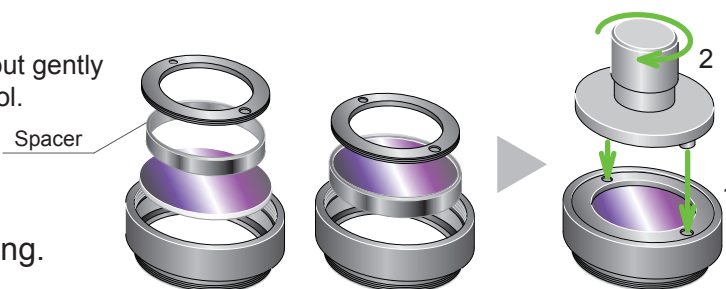
(3) Mount the stopper ring to the filter ring.

    *Turn the stopper ring clockwise using the filter fitting tool.
    *Use the spacer for thin filters (less than 2mm thick).

Note Be careful not to overtighten the stopper ring,
as doing so may crack or damage the filter.

(4) Pull the hook and open the front door.

MAX-303
Compact
Xenon
Light Source

LAMP ALARM
DOOR OPEN
LAMP LIFE
FAN ALARM

OPEN
CLOSE   TIMER   FILTER   LIGHT CONTROL   DOWN ▼   U P ▲   L A M P

SHUTTER   (LOCAL)

(5) Mount the filter ring on the filter wheel.
    *Turn the filter ring clockwise.

(6) Close the front door.

ASAHI SPECTRA
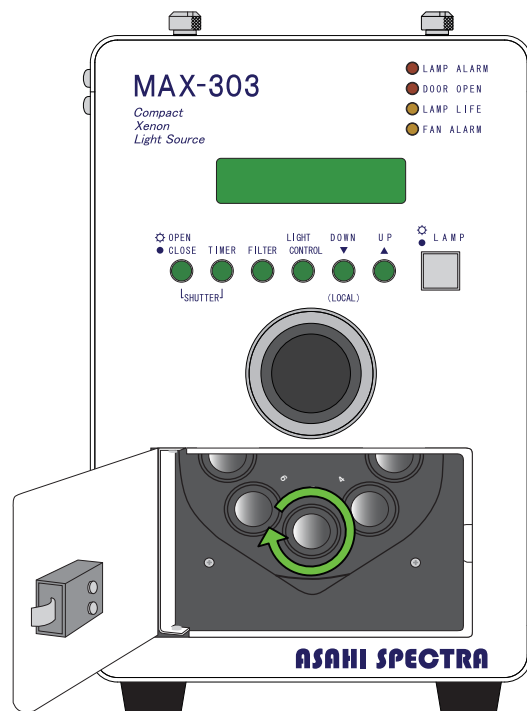
Operating the MAX-303

Turning on the Main Power

Cooling fan

Main power switch

Turn on the main power switch on the rear of the unit.

- The cooling fan turns on.

↓

- The LCD panel displays the initialization screen shown on the right.

↓

- The LCD panel displays the initial settings.
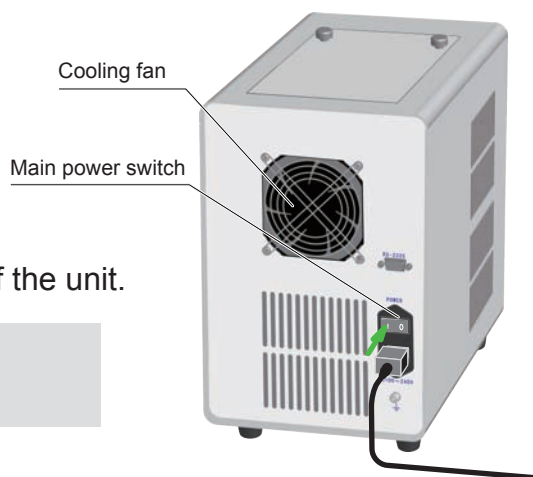
LCD panel

```
MAX-303    Ver: 1.03
Initializing......
```

```
F1:FILT1    LI:   100
TM:    1.0s        LCL
```

Turning on the Lamp

LAMP button

LCD panel

Press and hold the LAMP button for one second.

- The LAMP button lights yellow, indicating that the lamp is on.
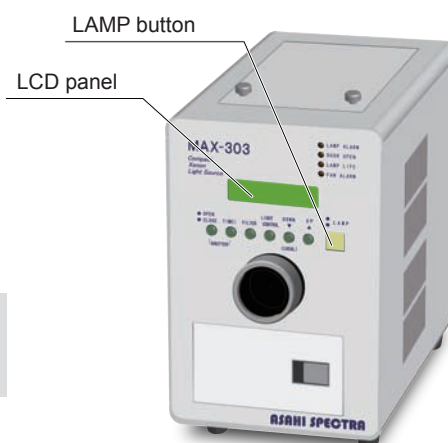
*Once the lamp is on, light is emitted only when the shutter is opened.
 For instructions on opening/closing the shutter, refer to P. 16.
*It may take more than one second for the lamp to turn on.
*During remote mode, the lamp does not light even if the LAMP button is pressed.

Notes on remote mode operation:

*If the LAMP button is pressed during remote mode, remote mode is stopped and the lamp is turned off.
*If the OPEN CLOSE button is pressed during remote mode, remote mode is stopped and the shutter is closed.

To resume operation in normal mode or remote mode, press the LOCAL button.

Operating the MAX-303

You can control the light emission by opening or closing the shutter. The shutter takes approx. 80 msec to open or close.

	Wear Protective Glasses	Wear protective glasses when checking the light beam.

Note   Do not use sharp objects such as the tip of a pen to press the setting buttons.

Opening the Shutter (Starting light emission)

Press the OPEN CLOSE button.

- OPEN CLOSE button lights green.
- Shutter opens* and light is emitted.

```
F1:FILT1     LI:   100
TM:      1.0s      LCL
```

OPEN
CLOSE TIMER FILTER LIGHT CONTROL DOWN ▼ U P ▲ LAMP

└SHUTTER┘   (LOCAL)
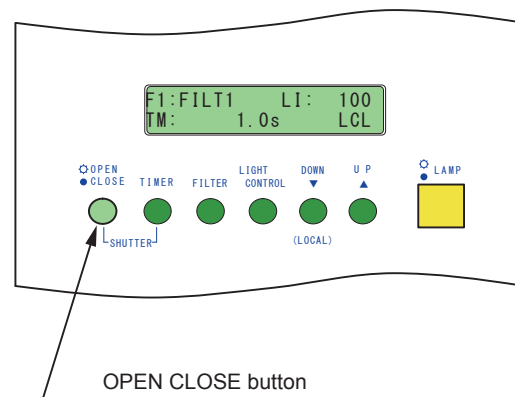
OPEN CLOSE button

Closing the Shutter (Stopping light emission)

Press the lit OPEN CLOSE button.

- The OPEN CLOSE button is no longer lit.
- The shutter closes* and light is blocked.

*The xenon lamp remains on during this operation.

Operating the MAX-303

Setting the Timer for Timed Light Emission

This section explains how to set the timer during timed light emission, in which light is emitted for a specified duration. The timer can be set in the range from 0.5 to 99999.9 seconds. (Setting range is 0.1 - 99999.9 seconds.) The default setting is 1 second.

LCD Panel

```
F1:FILT1    LI:  100
TM:    1.0s       LCL
```

▼DOWN▲UP button

TIMER button

Example) To set the duration to 15 seconds, follow the steps below.

(1) Press and hold the TIMER button for more than 2 seconds.

LCD Panel

```
F1:FILT1    LI:  100
TM: 00001.0s      LCL
```

Blinking   Setting value

- The LCD displays the screen as shown on the right. The default timer setting is 1.0 second.

- The TIMER button blinks green.
- The OPEN CLOSE, FILTER, ▼DOWN and ▲UP buttons light green.

When you are setting the timer, the control buttons operate as indicated below.
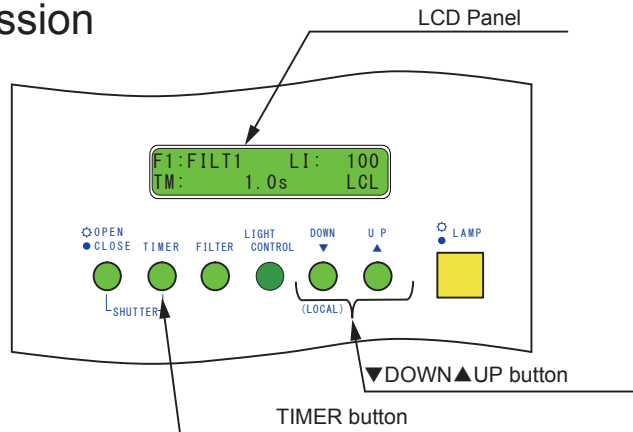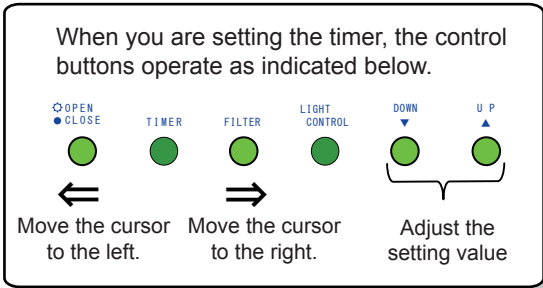
⇐ Move the cursor to the left.

⇒ Move the cursor to the right.

Adjust the setting value
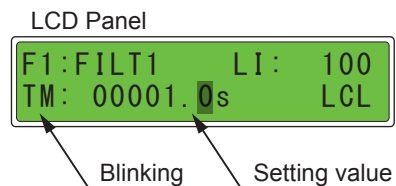
(2) Move the cursor to the left by pressing the OPEN CLOSE button.

(3) Press ▼DOWN or ▲UP as needed to change the value to 5.

*Pressing the ▼DOWN button decreases the value.
*Pressing the ▲UP button increases the value.

```
F1:FILT1    LI:  100
TM:  00005.0s     LCL
```

Move the cursor, and modify the value.

(4) Move the cursor to the left by pressing the OPEN CLOSE button.

(5) Press ▼DOWN or ▲UP as needed to change the value to 1.

```
F1:FILT1    LI   100
TM: 00015.0s      LCL
```

Move the cursor, and modify the value.

(6) Press the blinking TIMER button.

- The "TM" in the display stops blinking.
- The control buttons turn off.

```
F1:FILT1    LI:  100
TM:     15.0s     LCL
```

The value has changed.

Finish

Stops blinking.

*The xenon lamp remains on during timer setting.

Operating the MAX-303

This section explains how to control light emission with the timer.
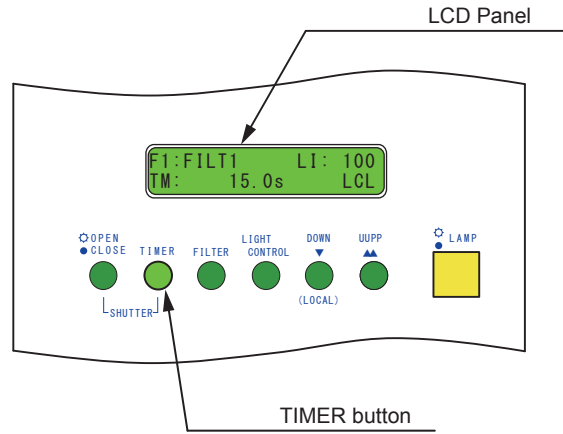Refer to P. 17 for details on how to set the timer.

Wear Protective Glasses	Wear protective glasses when checking the light beam.

Opening/Closing the Shutter
Timed Light Emission

LCD Panel


```
F1:FILT1    LI: 100
TM:    15.0s    LCL
```

TIMER button

Example) To emit light for 15 seconds (timer set to 15 seconds).

Press the TIMER button.

LCD panel

- The OPEN CLOSE and TIMER buttons light green.
- The shutter opens to start light emission.

```
F1:FILT1    LI:   100
TM:    15.0 s    LCL
```

Timer set value
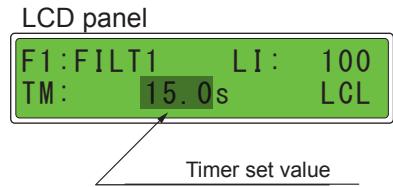
- The timer starts to count down.

If you want to stop light emission while the timer is counting down, press the TIMER button.

```
F1:FILT1    LI:   100
TM     9.3 s    LCL
```

Counting down by 0.1 s
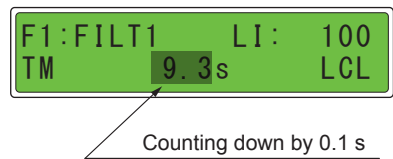
- The shutter closes to end light emission.
- The OPEN CLOSE and TIMER buttons turn off.

```
F1:FILT1    LI:   100
TM:    15.0 s    LCL
```

- The timer value on the LCD panel automatically resets to the original value (15.0 seconds in this example).

*The xenon lamp remains on during this operation.

Operating the MAX-303

Rotating the Filter Wheel
(Changing the Filter Position)

LCD Panel

The filter wheel lets you select a filter.
The selected filter is rotated into position in front of the light beam.
Refer to P. 14 for details on mounting filters.
Refer to P. 20 - 21 for details on assigning names to filters.

```
F1:FILT1      LI: 100
TM:     1.0s      LCL
```
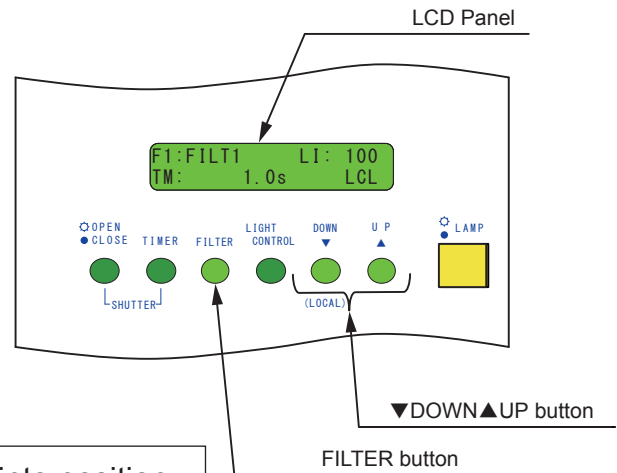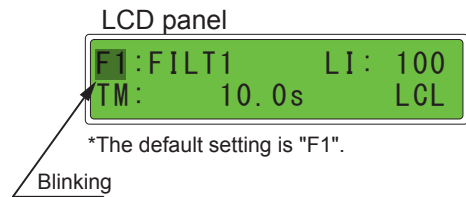
○OPEN ●CLOSE TIMER FILTER LIGHT CONTROL DOWN ▼ U P ▲ ○ LAMP

└SHUTTER┘   (LOCAL)

▼DOWN▲UP button

FILTER button

Example) Moving the F3 filter on the filter wheel into position.

(1) Press the FILTER button.

- The FILTER button blinks green.
- The ▼DOWN and ▲UP buttons light green.

LCD panel

```
F1:FILT1      LI: 100
TM:     10.0s      LCL
```

*The default setting is "F1".

Blinking

(2) Change the filter position to F3 by pressing the ▼DOWN and ▲UP buttons.

- Pressing ▼DOWN decreases the filter position by one.
- Pressing ▲UP increases the filter position by one.
  【Setting range : F1 - F8】

- The filter wheel rotates the F3 filter to the light emitting point.

```
F3:FILT3      LI: 100
TM:     10.0s      LCL
```
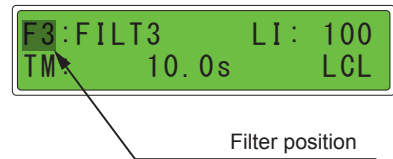
Filter position

(3) Press the FILTER button.

- The FILTER button turns off.

The settings are stored in the memory.
*Can not use any other buttons without the operation of (3) after changing the filter position.

*The xenon lamp remains on during this operation.

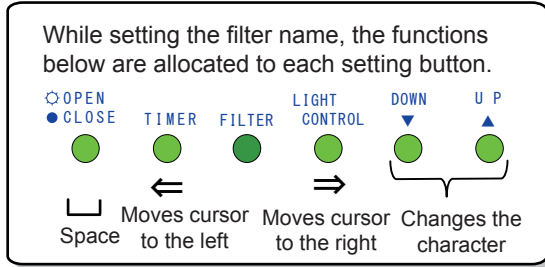## Assigning Names to Filters

You can use any of the following characters when assigning a name to a filter.
The numbers indicate the order in which characters are displayed
when the ▼DOWN and ▲UP buttons are pressed.
- Press ▲UP to display the next character (increasing number)
- Press ▼DOWN to display the previous character (decreasing number)

While setting the filter name, the functions
below are allocated to each setting button.

☼OPEN
●CLOSE   TIMER   FILTER   LIGHT CONTROL   DOWN ▼   UP ▲

␣ Space   ⇐ Moves cursor to the left   ⇒ Moves cursor to the right   Changes the character

You can change the character at the position where the cursor is blinking.

LCD panel

```
F1:4█        LI: 100
TM:    1.0s      LCL
```
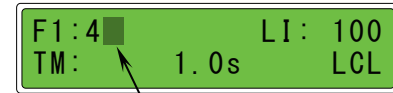
Blinking

Character list

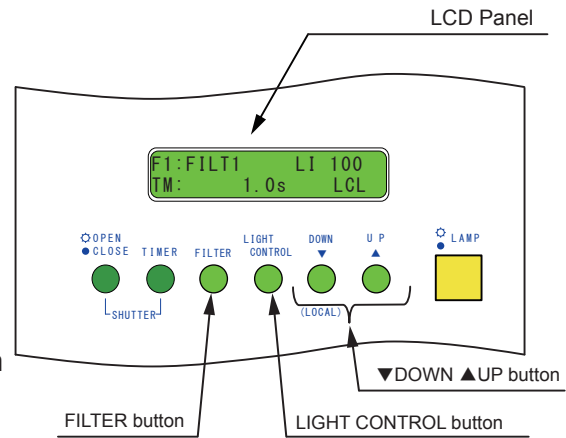| #	Char	#	Char	#	Char	#	Char	#	Char	#	Char
1		17	0	33	@	49	P	65	`	81	p
2	!	18	1	34	A	50	Q	66	a	82	q
3	"	19	2	35	B	51	R	67	b	83	r
4	#	20	3	36	C	52	S	68	c	84	s
5	$	21	4	37	D	53	T	69	d	85	t
6	%	22	5	38	E	54	U	70	e	86	u
7	&	23	6	39	F	55	V	71	f	87	v
8	'	24	7	40	G	56	W	72	g	88	w
9	(	25	8	41	H	57	X	73	h	89	x
10	)	26	9	42	I	58	Y	74	i	90	y
11	*	27	:	43	J	59	Z	75	j	91	z
12	+	28	;	44	K	60	[	76	k	92	{
13	,	29	<	45	L	61	¥	77	l	93	|
14	-	30	=	46	M	62	]	78	m	94	}
15	.	31	>	47	N	63	^	79	n		
16	/	32	?	48	O	64	_	80	o		

20

Operating the MAX-303

Assigning Names to Filters

After mounting a filter in the filter wheel, you can assign it a name to enable easier identification that simply using the wheel position (F1 - F8).
The filter name can be up to 8 characters in length, and can contain any of the characters shown in the table on P. 20.
Before assigning a name to a position in the filter wheel, you must first mount a filter at that position in the wheel. For instructions on how to mount a filter in the filter wheel, refer to P. 14.

LCD Panel

F1:FILT1   LI 100
TM: 1.0s   LCL

OPEN CLOSE (SHUTTER)   TIMER   FILTER   LIGHT CONTROL   DOWN ▼   U P ▲ (LOCAL)   LAMP

FILTER button

LIGHT CONTROL button

▼DOWN ▲UP button

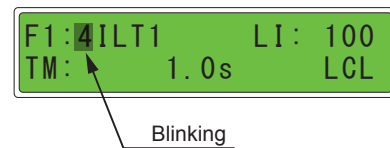Example) To assign the name "436" to the filter mounted at filter position F1 of the filter wheel.

(1) Press and hold the FILTER button for over 2 seconds.

- The TIMER, LIGHT CONTROL, ▼DOWN, and ▲UP buttons light green.
- The Filter button blinks green.

LCD panel   Filter position

F1:FILT1   LI: 100
TM: 1.0s   LCL

Blinking
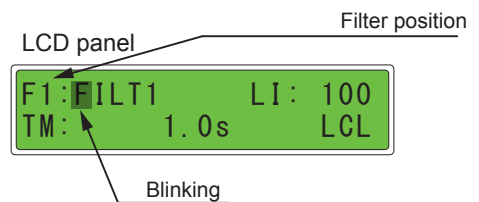
(2) Press and hold ▼DOWN or ▲UP until "4" appears at the cursor.

Refer to P. 20 for a list of available characters.

F1:4ILT1   LI: 100
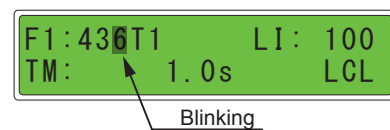TM: 1.0s   LCL

Blinking

(3) Press LIGHT CONTROL to move the cursor to the right.

F1:43LT1   LI: 100
TM: 1.0s   LCL

Blinking

(4) Press ▼DOWN or ▲UP until "3" appears at the cursor.

(5) Press LIGHT CONTROL to move the cursor to the right.

F1:436T1   LI: 100
TM: 1.0s   LCL
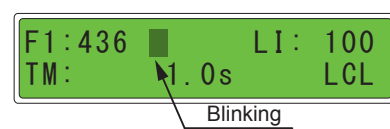
Blinking
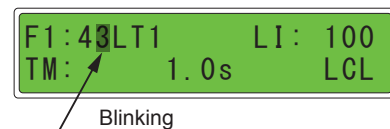
(6) Press ▼DOWN or ▲UP until "6" appears at the cursor.

(7) Press LIGHT CONTROL to move the cursor to the right.

(8) Press OPEN/CLOSE to change the current character to a space.

F1:436 1   LI: 100
TM: 1.0s   LCL

Blinking

(9) Press LIGHT CONTROL to move the cursor to the right.
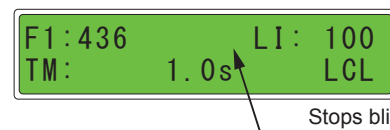
F1:436   LI: 100
TM: 1.0s   LCL
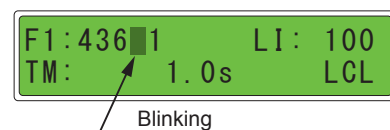
Blinking

(10) Press OPEN/CLOSE to change the current charactor to a space.

(11) Press the blinking FILTER button.

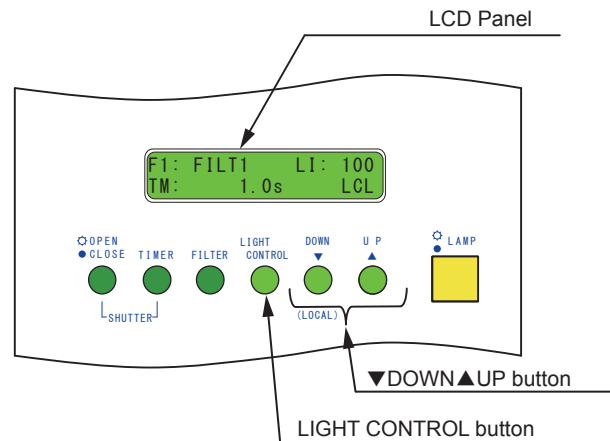- The TIMER, LIGHT CONTROL, ▼DOWN, and ▲UP buttons turn off.

The settings are stored in the memory.

F1:436   LI: 100
TM: 1.0s   LCL

Stops blinking.

Operating the MAX-303
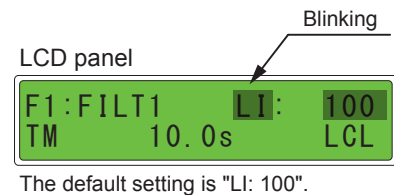
Attenuating the Light Intensity

LCD Panel

Attenuation of the light intensity is achieved using the circular variable ND (neutral density) filter. The resulting intensity ranges from 100 down to 5.

```
F1: FILT1    LI: 100
TM:     1.0s      LCL
```

○OPEN ●CLOSE TIMER FILTER LIGHT CONTROL DOWN ▼ U P ▲ ☼ LAMP ●

└SHUTTER┘ (LOCAL)

▼DOWN▲UP button

LIGHT CONTROL button

Example) To attenuate the light intensity to 25.

(1) Press the LIGHT CONTROL button.

The LIGHT CONTROL, ▼DOWN and ▲UP buttons light green.

Blinking

LCD panel
```
F1:FILT1      LI:    100
TM       10.0s      LCL
```
The default setting is "LI: 100".

(2) Set the light intensity to "LI: 25" by pressing ▼DOWN or ▲UP until the value becomes 25.

- Press ▲UP to increase the light intensity value.
- Press ▼DOWN to decrease the light intensity value.
【Setting range : 5 - 100】

Blinking
```
F1:FILT1      LI:     25
TM:      10.0s      LCL
```
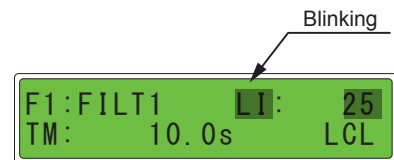
(3) Press the lit LIGHT CONTROL button.

- The LIGHT CONTROL, ▼DOWN and ▲UP buttons turn off.

*The settings are stored in the memory.

*Can not use any other buttons without the operation of (3) after attenuating the light intensity.

*The xenon lamp remains on during this operation.

Shutdown Operation

Turning off the Lamp

Press the LAMP button.

LAMP button
LCD panel

- The LAMP button turns off, indicating that the lamp has turned off properly.

*The cooling fan will continue to run after the lamp has turned off.

⚠	Caution	The lamp remains hot after it is turned off. Be sure that it has completely cooled, otherwise it may result in damage to the unit or burns.
⚠	Caution	Once the lamp is turned off, wait at least 15 minutes before turning it on again.

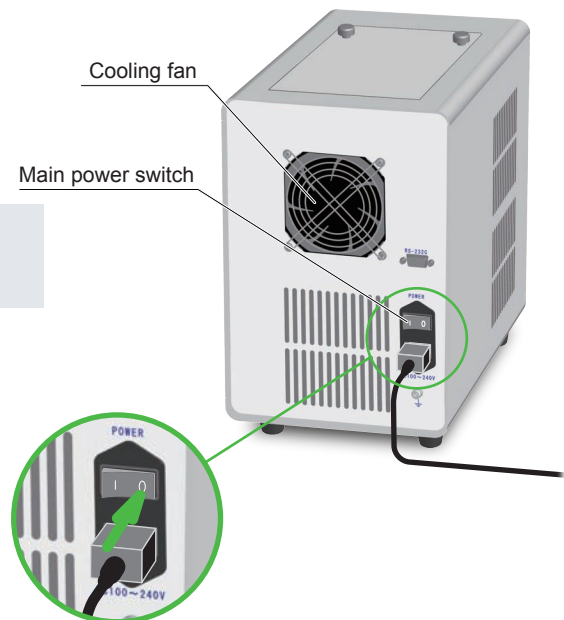## Turning off the Main Power

Turn off the main power switch.

Cooling fan
Main power switch

- The LCD panel turns off.
- The cooling fan stops running.

Caution) Check the following before you disconnect the AC cable from the unit.

- LCD panel is turned off.
- LAMP button is turned off.
- POWER switch is turned off.

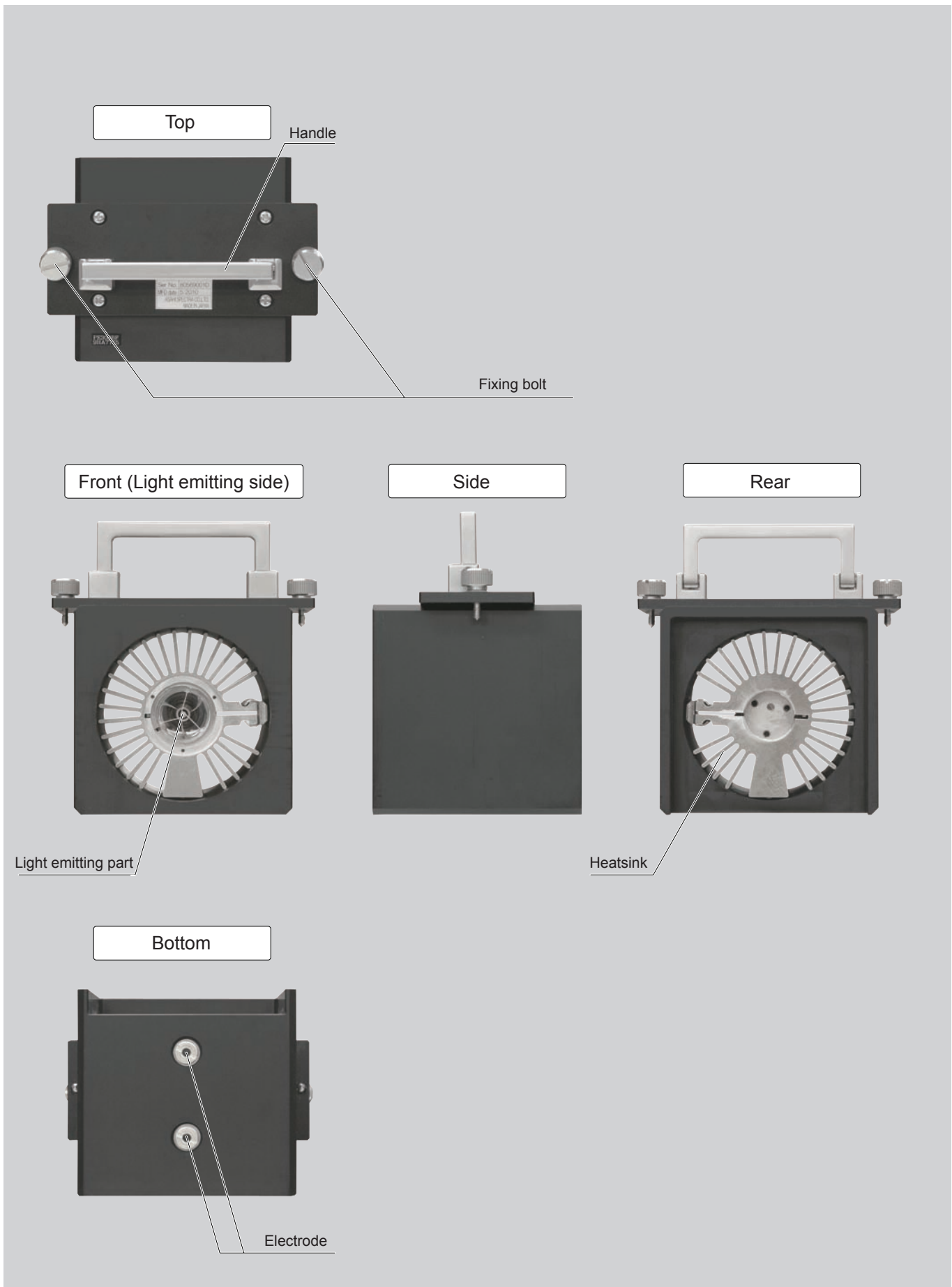| ⚠	Caution	Do not touch the plug with wet hands or pull the cable forcibly, as these may result in disconnection, electric shock or fire.

Replacing the Lamp Cartridge

⚠ Warning	Handle the lamp with extreme care. Do not subject the lamp to strong impact. Doing so may cause the lamp to explode due to the high pressure of the gas inside.
♨ Caution	The lamp remains hot after it is turned off. Be sure that it has completely cooled, otherwise it may result in damage to the unit and burns.

Precautions for handling the lamp cartridge

- Do not touch the xenon lamp, electrodes or heat sink with your bare hands. Touching these surfaces leaves a residue that turns to soot due to the high temperature of the lamp, decreasing the brightness of the lamp.
  We recommend that you wear fabric gloves when handling the xenon lamp.

- Do not replace the lamp cartridge until the xenon lamp is completely cooled.
  The lamp cartridge is extremely hot during operation and immediately after the lamp is turned off.

- Before replacing the lamp cartridge, always turn off the main power and disconnect the AC cable from the outlet to avoid risk of electric shock.

- Do not attempt to remove the xenon lamp from the lamp cartridge. The xenon lamp and lamp cartridge are assembled as a single unit.
  Pack up the used lamp cartridge carefully to prevent breakage and send it to us or your dealer. We will install a new lamp in the lamp cartridge and ship the cartridge back to you.

- Lamp replacement takes about 2 - 4 weeks excluding the shipping time.
  We recommend that you send us a lamp cartridge for lamp replacement before it reaches 500 hours of use.

- If operating the MAX-303 continuously (24 hours a day), we recommend keeping a spare lamp cartridge available to avoid disruption while the lamp of the lamp cartridge is being replaced.

- $\pm$15kV is generated momentarily between electrodes of the lamp. Therefore, be sure that the lamp cartridge is completely inserted and that both fixing bolts are securely fastened to the top cover.

Replacing the Lamp Cartridge

Part Names of the Lamp Cartridge

Top

Handle

Fixing bolt

Front (Light emitting side)

Side

Rear

Light emitting part

Heatsink

Bottom

Electrode

Replacing the Lamp Cartridge

## Removing the Used Lamp Cartridge

(1) Check the following before replacing the lamp cartridge.

⚠ Warning	Before replacing the lamp, unplug the AC cable from the power outlet to avoid risk of electric shock.
♨ Caution	The lamp remains hot after it is turned off. Be sure that it has completely cooled, otherwise it may result in damage to the unit or burns.

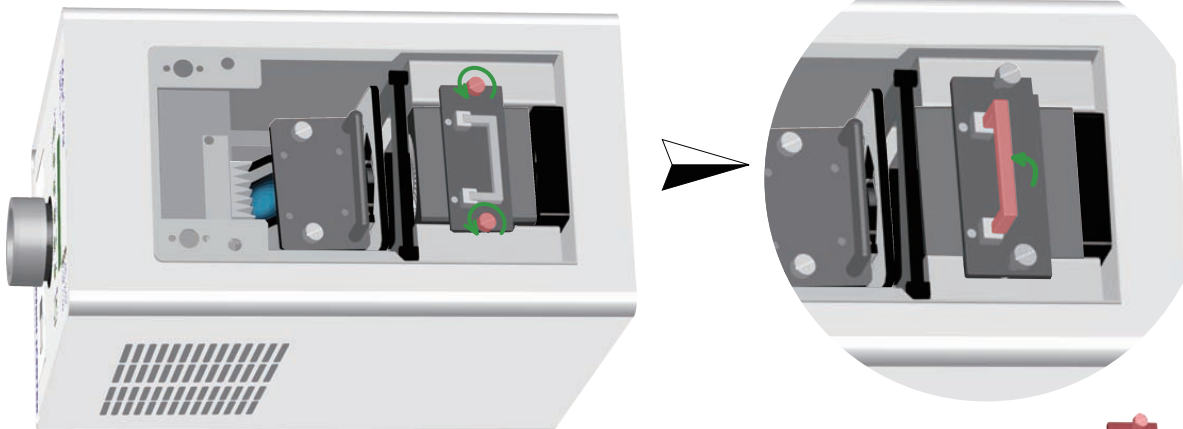(2) Loosen the 2 fixing bolts and remove the top cover.

*The bolts do not fall out when loosened.
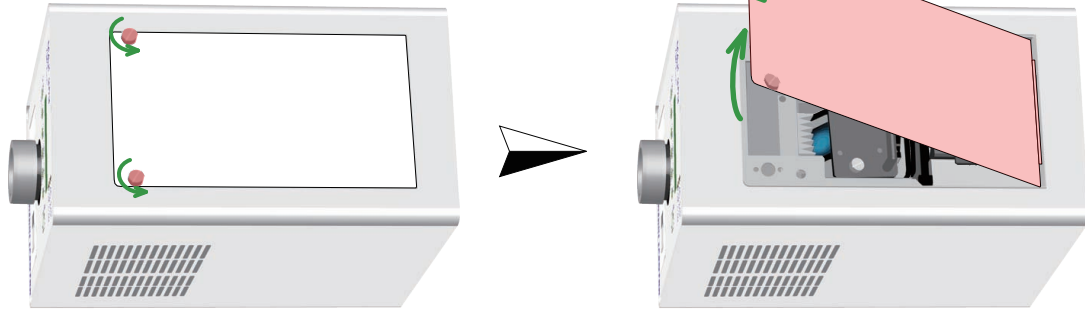
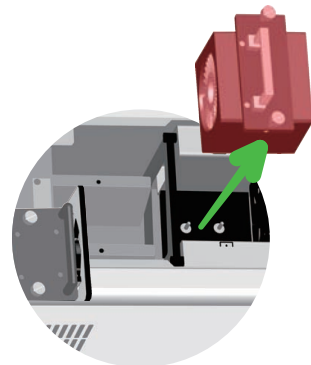*You can also replace the mirror module when the top cover is removed.

(3) Loosen the 2 fixing bolts of the lamp cartridge and pull the handle up.
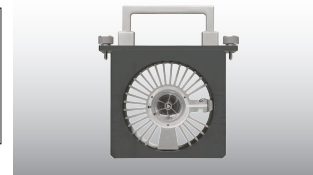
*The bolts do not fall out when loosened.

(4) Hold the handle firmly and pull it out.

*If you cannot pull it out, the fixing bolts may not be sufficiently loosened.

If you need a new lamp cartridge, please contact us or your dealer for a lamp replacement.

| ⚠ Caution | Continuing to use the lamp beyond its rated lifetime (500 hours) may result in damage to the power supply or circuit board system. We recommend that you replace the lamp as soon as it reaches 500 hours of use. | |

Replacing the Lamp Cartridge

Mounting the Lamp Cartridge

(1) Check the following before replacing the lamp cartridge.

⚠ Warning	Before replacing the lamp, unplug the AC cable from the power outlet to avoid risk of electric shock.

(2) Insert the lamp cartridge into the main unit.

- Check that the new lamp cartridge is facing in the proper direction.
- The front side of the lamp cartridge should face the front side of the main unit.
  Slide the lamp cartridge down along the guide rail
  until the cartridge stops and is firmly seated.
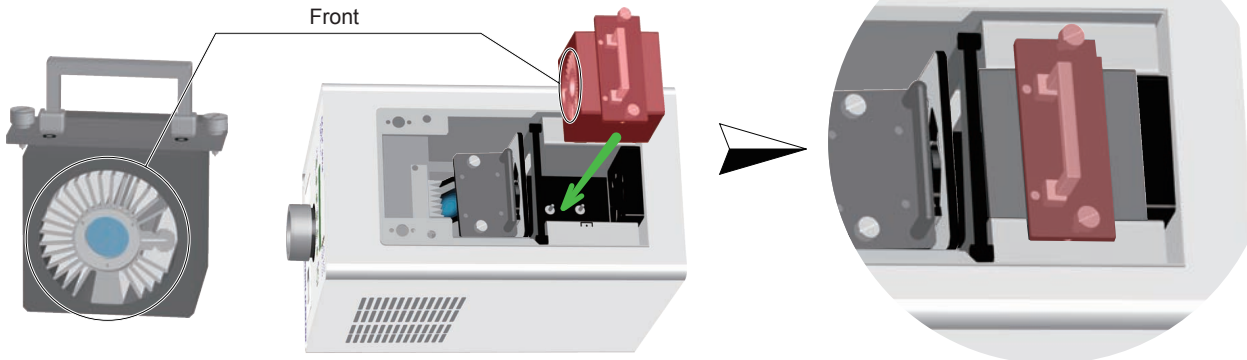
(3) Pull the handle down and tighten the 2 fixing bolts of the lamp cartridge.

*The fixing bolts cannot be tightened unless the lamp cartridge is properly seated.
Make sure that it is completely inserted into the main unit.

*Failure to tighten the fixing bolts securely may result in failure when the main power
or lamp is turned on. Make sure the fixing bolts are securely tightened.
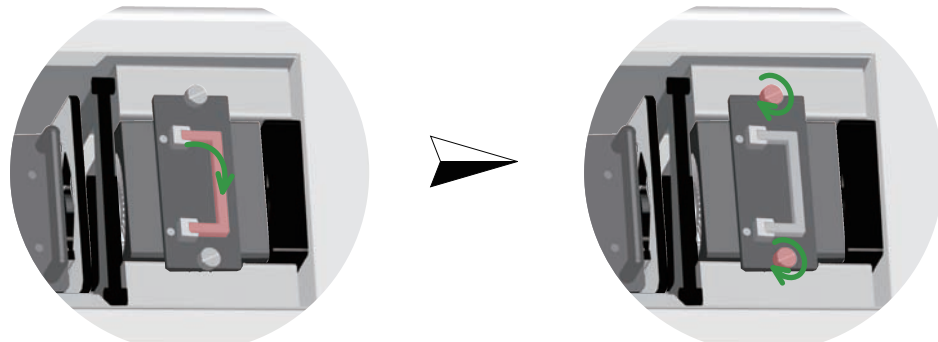
(4) Mount the top cover.

- Mount the top cover and tighten the fixing bolts.
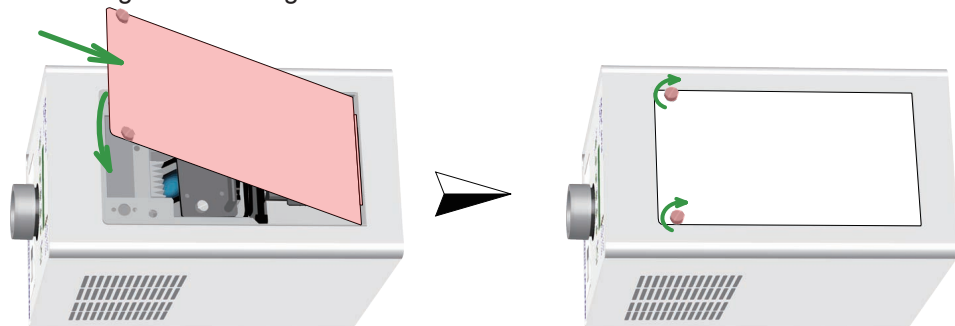
(5) Turn on the main power.

- Connect the AC cable and turn on the main power.
*If a failure occurred during lamp replacement, the safety
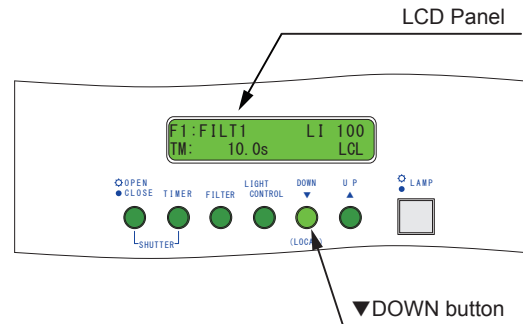function is activated and the warning lamp lights up.

Replacing the Lamp Cartridge

Checking the Lamp Usage Hours

⚠ Caution	Continuing to use the lamp beyond its rated lifetime (500 hours) may result in damage to the power supply or circuit board system. We recommend that you replace the lamp as soon as it reaches 500 hours of use. The lamp is guaranteed to maintain at least 50% of its initial light intensity during its rated lifetime.

LCD Panel

```
F1:FILT1      LI 100
TM:    10.0s       LCL
```

OPEN/CLOSE TIMER FILTER LIGHT CONTROL DOWN ▼ U P ▲ LAMP

SHUTTER (LOCA)

▼DOWN button

LCD panel

```
F1:FILT1        LI: 100
TM     10.0s        LCL
```
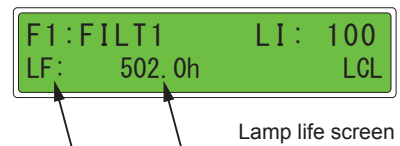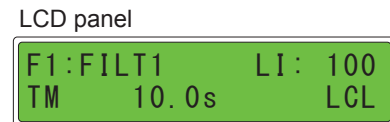
(1) Press the ▼DOWN button.

- The LCD panel displays the lamp life screen.

*The default setting is "0.0h".
*We recommend replacing the lamp
  when the total hours used exceeds 500 hours.

```
F1:FILT1        LI: 100
LF:    502.0h        LCL
```

Lamp life screen

(2) Press the ▼DOWN (LOCAL) button while
    the lamp usage screen is displayed.

- The LCD panel returns to the initial screen.

```
F1:FILT1        LI: 100
TM     10.0s        LCL
```
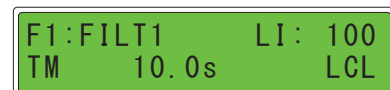
Replacing the Lamp Cartridge

Resetting the Lamp Usage Hours

This section explains how to reset the lamp usage hours (the total number of hours that the lamp has been used) after the lamp has been replaced.
*The LAMP LIFE warning lamp turns on when the lamp usage hours exceed 500 hours.
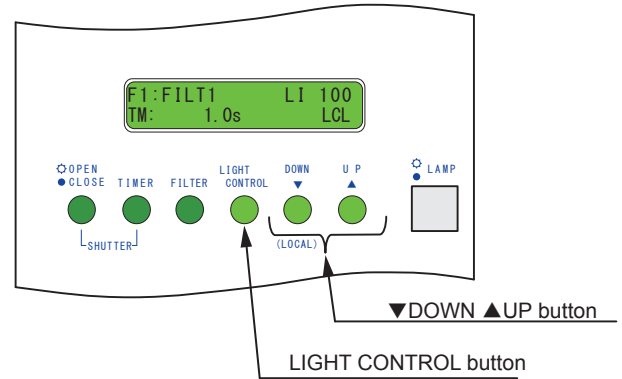
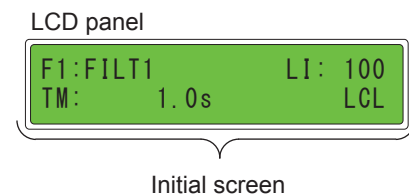| ⚠ Caution	Continuing to use the lamp beyond its rated lifetime (500 hours) may result in damage to the power supply or circuit board system. We recommend that you replace the lamp as soon as it reaches 500 hours of use. The lamp is guaranteed to maintain at least 50% of its initial light intensity during its rated lifetime.

Note The counter does not reset automatically when the lamp is replaced. Be sure to reset the counter to zero.
Do not attempt to reset the lamp usage hours except after lamp replacement.
Otherwise, it is not possible to accurately determine when the lamp has reached the end of its rated life time.

*Replace the lamp cartridge before resetting the lamp usage hours. (Refer to P. 26 - 27)

*Turn off the lamp when resetting the lamp usage hours. (Refer to P. 23)

```
F1:FILT1      LI 100
TM:    1.0s        LCL
```

☼OPEN ●CLOSE TIMER FILTER LIGHT CONTROL DOWN ▼ U P ▲ ☼ LAMP

⌊SHUTTER⌋ (LOCAL)

▼DOWN ▲UP button

LIGHT CONTROL button

LCD panel

(1) Press the ▼DOWN button.
  （in the initial screen）

```
F1:FILT1        LI: 100
TM:      1.0s         LCL
```
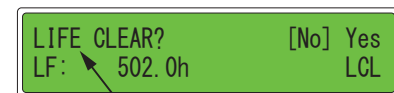
Initial screen

- The LCD panel displays the lamp life screen, which displays the total lamp usage hours.
  The default is "0.0h".

```
F1:FILT1        LI:  100
LF:   502.0h         LCL
```

Lamp usage hours are displayed.

Lamp life screen
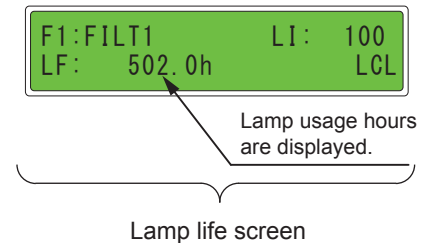
(2) Press and hold the LIGHT CONTROL button for over 2 seconds.

- The LIGHT CONTROL button turns on.
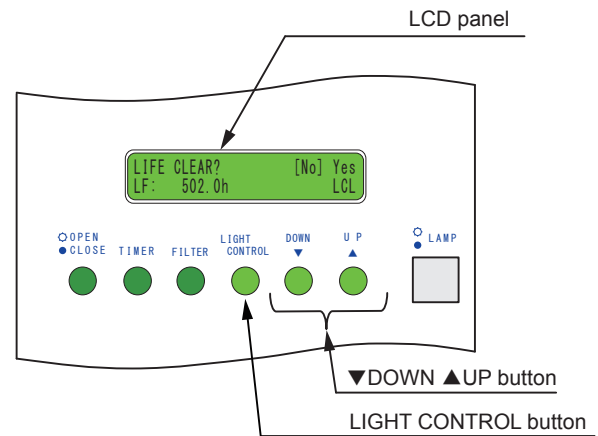- The ▼DOWN and ▲UP buttons light up in green.

- The LCD panel prompts for confirmation of the reset by displaying the message "LIFE CLEAR? [No] Yes".

```
LIFE CLEAR?         [No] Yes
LF:   502.0h          LCL
```

Prompt displayed when resetting lamp usage hours

Replacing the Lamp Cartridge

Resetting the Lamp Usage Hours

LCD panel

```
LIFE CLEAR?        [No] Yes
LF:   502.0h          LCL
```

OPEN
CLOSE TIMER FILTER LIGHT CONTROL DOWN ▼ UP ▲ LAMP

▼DOWN ▲UP button

LIGHT CONTROL button
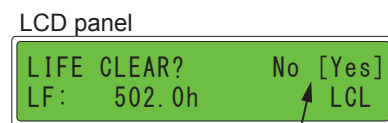
(3) Press the ▲UP button to move the cursor to "Yes".

- [ ] moves to Yes.

*Press the ▼DOWN button and select "No" if you do not want to reset the lamp usage hours.

LCD panel

```
LIFE CLEAR?        No [Yes]
LF:   502.0h          LCL
```
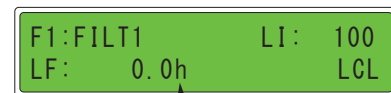
"Yes" is selected.

(4) Press the LIGHT CONTROL button to confirm your selection (Yes or No).

*This step enters your selection.

- The LIGHT CONTROL button turns off.
- The ▼DOWN and ▲UP buttons turn off.

- The LCD panel returns to the lamp usage screen.
- The lamp usage display reads "0.0h".

```
F1:FILT1        LI:  100
LF:    0.0h           LCL
```

Used lamp hours are reset.

(5) Press the ▼DOWN button.

-The LCD panel returns to the initial screen.

```
F1:FILT1        LI:  100
TM:    1.0s           LCL
```

Initial screen

Finish

# Replacing the Mirror Module

| 🚫 Prohibited | Do not touch the optical components such as the lens, lamp or mirror with bare hands. It can degrade the performance of the unit. |
|---|---|

The mirror module and light guide fitting device (condenser lens) are designed for maximum performance in both UV and VIS combinations.

This unit designed based on the combination of mirror module and light guide fitting device. Therefore, when replacing the mirror module, please check the light guide fitting device whether it suits for the mirror module or not. Failure to match types will result in decreased performance.
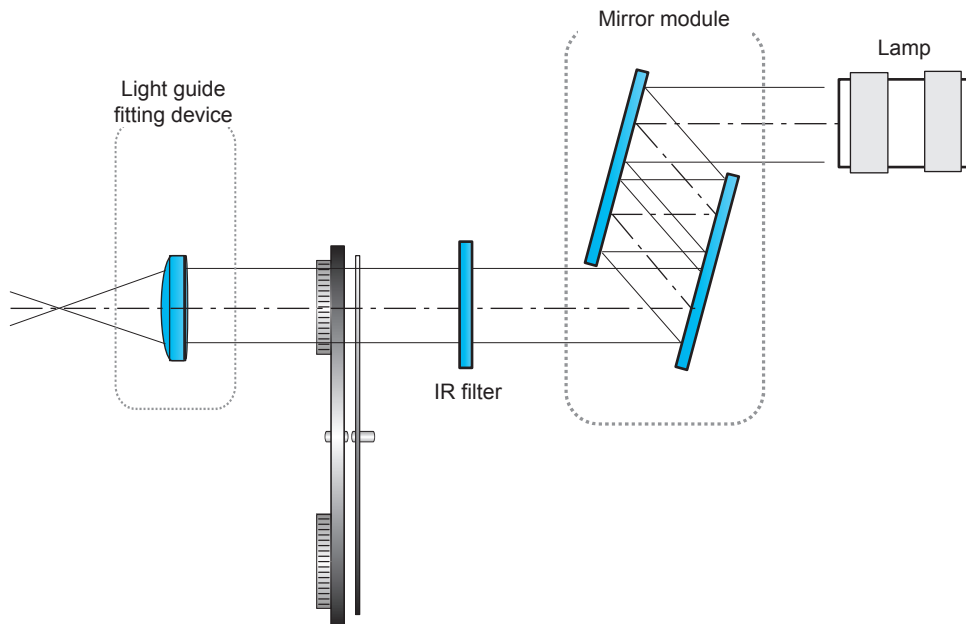


## Combination of the Mirror Module and the Light Guide Fitting Device (condenser lens)

- The light guide fitting device is available in two types: UV(quartz) and VIS(BK-7).
  The light guide fitting devices have labels that indicate their type (UV or VIS).
- The mirror modules have labels that indicate their type (UV, UV-VIS, VIS or IR).
  Before using the mirror module, be sure that the labels of the mirror module and light guide fitting device match.

# Replacing the Mirror Module
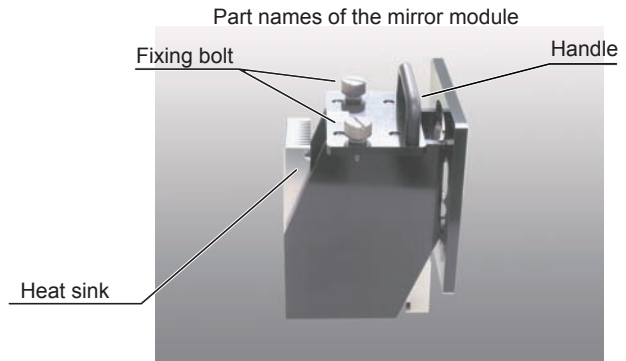
## Removing the Mirror Module

(1) Check the following before replacing the lamp cartridge.

| ⚠ Caution | The mirror module remains hot after it is turned off.  Be sure that it has completely cooled, otherwise it may result in damage to the unit and burns. |
|---|---|

*Make sure that the main power switch is turned off and the AC cable is unplugged.

Part names of the mirror module
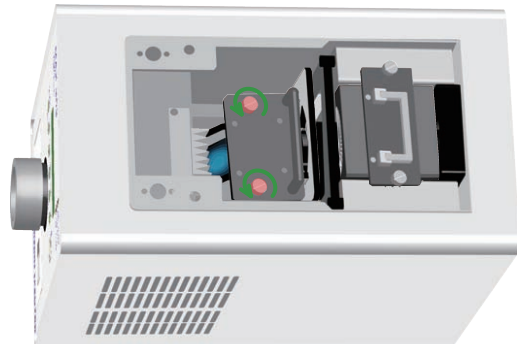
Fixing bolt

Handle

Heat sink

(2) Loosen the 2 fixing bolts and remove the top cover.
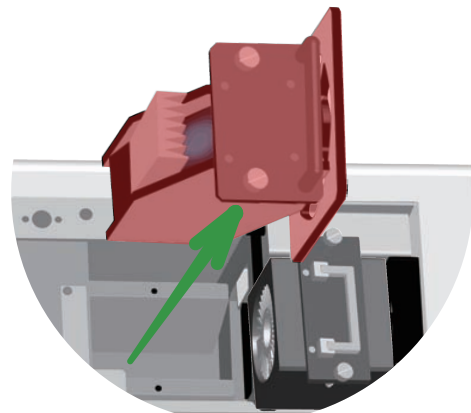
*The fixing bolts do not fall out when loosened.
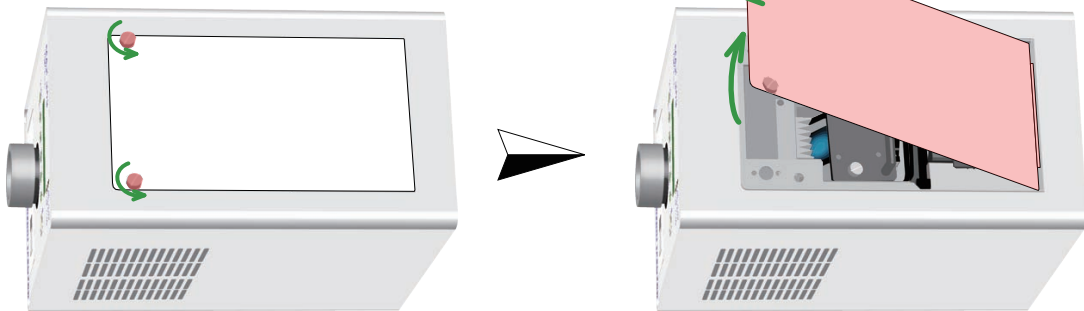
(3) Loosen the 2 fixing bolts of the mirror module.

(4) Hold the handles of the mirror module firmly and pull it out.

*The fixing bolts do not fall out when loosened.

*If you cannot pull it out, the fixing bolts may not be sufficiently loosened.

# Replacing the Mirror Module

## Mounting the Mirror Module

(1) Insert the mirror module into the main unit and
tighten the two fixing bolts of the mirror module to secure it in place.

- Make sure that the mirror module is oriented properly.
- Carefully insert the module into the main unit, sliding the module downward along the guide rail.

*The fixing bolts cannot be tightened unless the mirror  module is properly seated.
Be sure that the module is inserted completely.
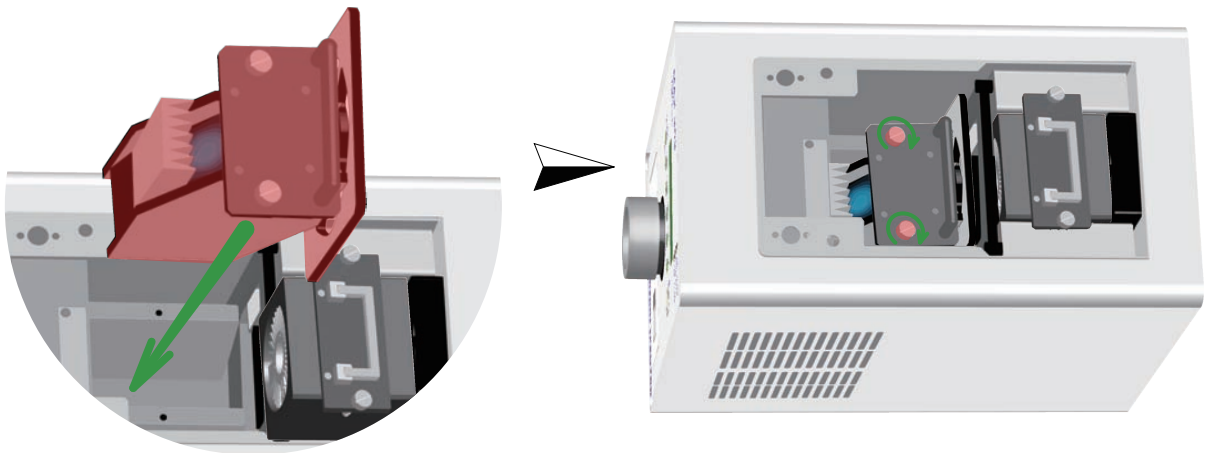
(2) Mount the top cover and tighten the fixing bolts.

*The fixing bolts cannot be tightened if the mirror module is not inserted completely.
*If the top cover is not mounted properly, the safety function activates and the DOOR OPEN
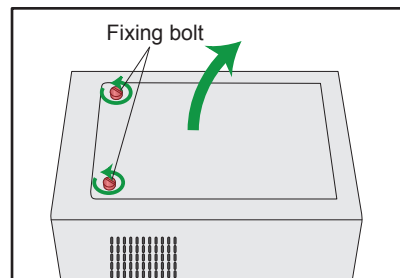warning lamp lights.
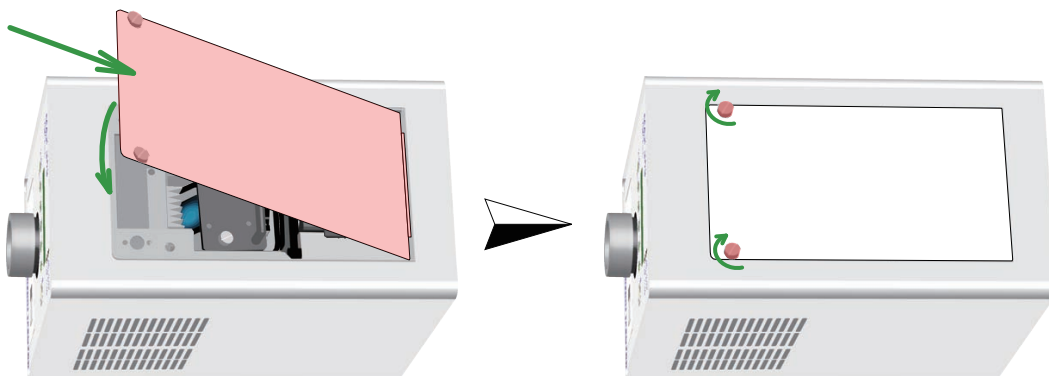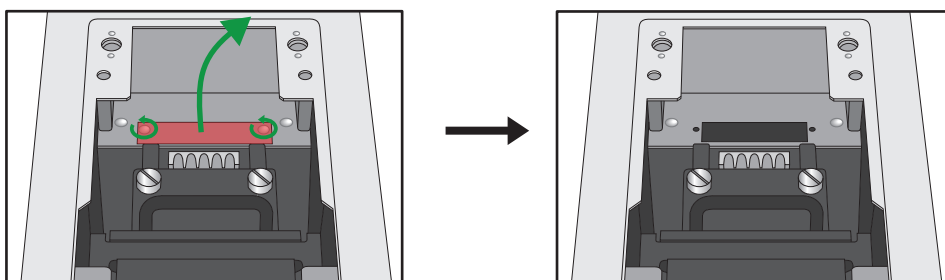
# Mounting the Filter Holder（Option）

(1) Check the following before mounting the filter holder.

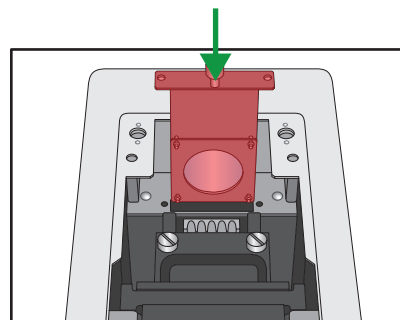| ⚠ Caution | The lamp remains hot after it is turned off. Be sure that it has completely cooled, otherwise it may result in damage to the unit and burns. |
|---|---|

(2) Loosen the 2 fixing bolts and remove the top cover.
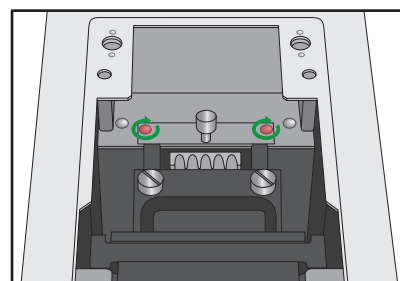

Fixing bolt

(3) Loosen the 2 fixing bolts of the cover for filter holder.



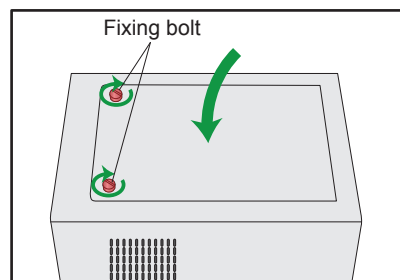(4) Insert the filter holder.



(5) Tighten the 2 fixing bolts of the filter holder.



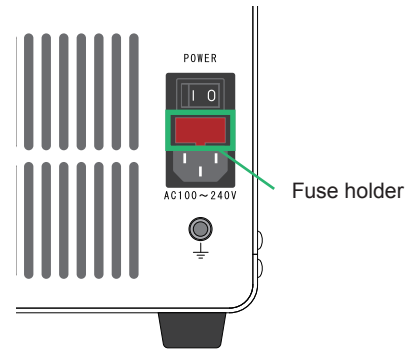(6) Mount the top cover and tighten the 2 fixing bolts.

　*Make sure the top cover is completely closed.
　 Otherwise, the safety function activates and
　 warning lamp lights.


Fixing bolt

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# Replacing the Fuse

(1) Turn off the main power and disconnect the AC cable.
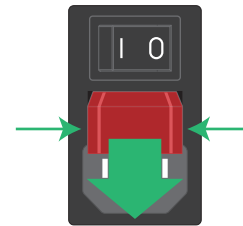
| ⚠ Caution | Do not touch the plug with wet hands or pull the cable forcibly, as these may result in disconnection, electric shock or fire. |
|---|---|



Fuse holder

(2) Pull out the fuse holder under the main power switch.

- There are 2 fuses in the holder.

*Use a flat blade screwdriver to pull the holder out.
 Press both edges, but not hard enough to damage the holder.



(3) Remove the used fuse.

- Check whether the fuse has melted.

- One or both fuses may have melted.
 If the fuses are not blown or melted (fuses are still usable),
 put the fuses back and proceed to step (5).



In-use fuses
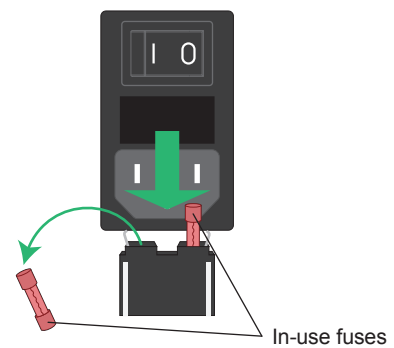
(4) Insert the new fuses.

New fuses

| Note | Use only fuses with the proper rating.  Using any other types of fuse may result in system failure, damage or fire. |
|---|---|

Fuses are consumables.  Both internal fuses are used.
Please prepare new fuses when you replace them.
Contact us to order new fuses or if fuses melt frequently.
(Refer to P. 40)
Fuse rating: 6.3A / Size: 5(dia.) x 20mm (Midget type)
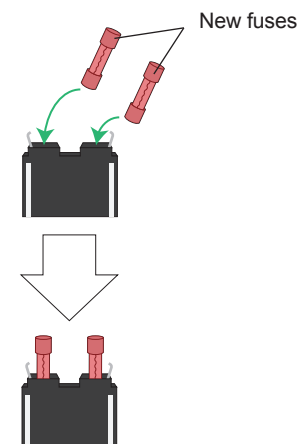


(5) Insert the fuse holder.



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# Care and Storage

## Care and Cleaning

| 🚫 Prohibited | Do not touch the optical components such as the lens, lamp or mirror with bare hands. It can degrade the performance of the unit. |
|---|---|

### Main Unit

- Use a dry, soft cloth to wipe away dirt and dust.
- Use a cloth moistened with water to clean the unit.

### Optical Components

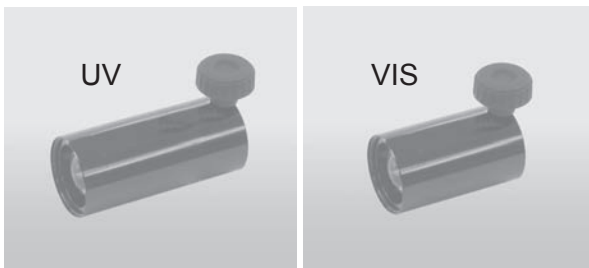When cleaning optical filters, lenses, filter holder and the end of the light guide, wipe them out gently using soft cloth moistened with alcohol.

Light guide fitting device

Light guide

UV        VIS

The lens suited for the NA of light guides is assembled inside light guide fitting device.
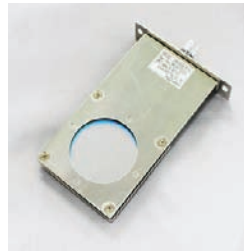
The end surfaces of the light guide are polished flatly.

Optical filter          Filter holder          Collimator lens

**Note** Be especially careful when handling optical filters as their surfaces are easily damaged. Contact us if you have questions on maintenance of accessories.

## Storage

Do not store the main unit in a location subject to any of the following conditions, as these may lead to a loss of performance:
- Vibration and shock
- Direct sunlight
- High humidity or dust levels
- Temperatures below 10 deg C (50 deg F) or above 35 deg C (95 deg F)
- Day/night temperature fluctuations

- Store accessories in a hard container to protect them from damage.

**Note** Do not bend the light guide sharply more than the bending radius when storing it. If the light guide is bent more than the defined value, fibers are broken and cannot transmit a light. The broken light guide cannot be repaired.

# Troubleshooting

If you experience a problem while operating the MAX-303, consult the following information to help determine the cause of the problem and its solution. If the problem is not listed below or not user-solvable, contact us for repair information.

| 🚫 Prohibited | Do not disassemble or modify the unit or lamp.  Improper handling of components may result in injury, fire or electric shock. |
|---|---|

IMPORTANT

Be sure to contact us for all repair work. The performance of the unit cannot be guaranteed if repairs are done by anyone other than Asahi Spectra.
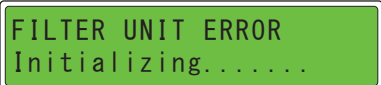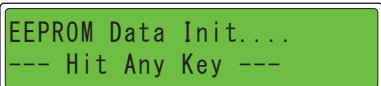
## Troubleshooting

| Problem | Troubleshooting |
|---|---|
| Main power switch cannot be turned on. | Is the AC cable plugged into an outlet?<br>→ Refer to P. 13.<br><br>Has the fuse blown?<br>→ Replace the fuse.  Refer to P. 35. |
| Lamp cartridge cannot be removed. | Loosen 2 fixing bolts completely. |
| No light is emitted from the aperture. | Is the main power switch turned on?<br>→ Turn on the main power switch.<br><br>Is the LAMP button lit green?<br>→ Press the LAMP button for more than 1 second until it lights green.<br><br>Is the OPEN CLOSE button lit green?<br>→ Press the OPEN CLOSE button so that it lights green. The shutter then opens.<br><br>Is the top cover properly closed?<br>→ Interlock function has operated. Mount the top cover properly.<br><br>Do the lamp used hours exceed the lamp life?<br>→ The lamp life is 500 hours. If it is already over 500 hours, replace the lamp with a new one and reset the hour meter. Refer to P. 28 for checking the lamp usage hours.<br><br>Are any of the warning lamps on?<br>→ Refer to P. 39. <br><br>● LAMP ALARM<br>● DOOR OPEN<br>● LAMP LIFE<br>● FAN ALARM |
| The light emission timer cannot be set. | Has the previous operation finished?<br>→ Complete or cancel the previous operation.<br><br>Is "TM" blinking?<br>→ Press the TIMER button for more than 2 seconds. "TM" then blinks, allowing you to set the timer. |
| Filter wheel is not working. | Is "F x" blinking?<br>→ Press the FILTER button for more than 2 seconds. "F x" then blinks, allowing you to operate the filter wheel.<br><br>Is the previous operation finished?<br>→ Complete or cancel the previous operation. |
| Light intensity cannot be set. | Is "LI" blinking?<br>→ Press the LIGHT CONTROL button. "LI" then blinks, allowing you to set the light intensity.<br><br>Has the previous operation finished?<br>→ Complete or cancel the previous operation. |
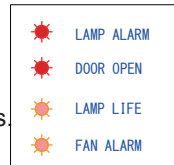
# Troubleshooting

## Troubleshooting for Error Messages

| Error message | Error | Troubleshooting |
|---|---|---|
| SHUTTER UNIT ERROR<br>Initializing....... | The shutter has stopped at an improper position. | Switch off the power switch and turn it on again. |
| ND UNIT ERROR<br>Initializing....... | The circular variable ND filter has stopped at an improper position. | Switch off the power switch and turn it on again. |
| FILTER UNIT ERROR<br>Initializing....... | The filter wheel has stopped at an improper position. | Switch off the power switch and turn it on again. |
| EEPROM Data Init....<br>--- Hit Any Key --- | An error was detected with data in the internal memory. | Press any key to continue. The system is restored but all data is deleted. Settings are returned to the default settings. |
| MAX-303          Ver:1.03<br>EEPROM Data Restore | An error has been detected in the main data; however, the data is automatically restored. | No action required. |
| MAX-303          Ver:1.03<br>EEPROM Data Stock | Main data is different from the backup data. Data is copied automatically from the main data to backup data. | No action required. |
| --- Emergency Stop --- | The system has received an "EMG" command from the computer or the computer has stopped operating. | Switch off the power switch and turn it on again. |

*If the information listed above does not resolve the problem, contact us for assistance.

# If the Warning Lamps Light

The MAX-303 has warning lamps that light up when the anomalies are detected.
The lamps and their indications are listed below.

| Warning Lamp | Indication When Lit | Troubleshooting |
|---|---|---|
| 🔴 LAMP ALARM | The internal xenon light has failed to light. | Make sure that the AC cable is properly connected to the outlet and the lamp cartridge is properly mounted.<br><br>Make sure that the lamp cartridge is properly mounted. |
| 🔴 DOOR OPEN | The top cover of the unit is open.<br>*At the same time, the xenon lamp turns off. | Make sure that the top cover is properly closed. |
| 🟠 LAMP LIFE | The xenon lamp has been used for 500 or more hours. | Check the lamp usage hours.<br><br>We recommend replacing the lamp cartridge once it has been used for over 500 hours. |
| 🟠 FAN ALARM | FAN ALARM turns on when the cooling fan stops working or the temperature increases.<br>*At the same time, the xenon lamp turns off. | Make sure that the cooling fan is working.<br><br>If the cooling fan has stopped:<br>Switch off the power switch and turn it on again.<br><br>If the cooling fan is working:<br>The internal temperature is too high. Check the cooling fan and air inlet and remove any obstructions. Allow the fan to keep running to cool the interior of the unit. |

*If the information listed above does not resolve the problem, contact us for assistance.

# Warranty and Return Policy

## 1 ) Warranty policy

1. The warranty period is 1 year starting from the date on the invoice.
   Consumables, such as a lamp, are guaranteed for a limited period only.
   The warranty no longer applies to consumable after 1 year of use of the unit.
   The warranty certificate is not included in the package.
2. The unit will be repaired without charge only if it has been operated as instructed in this manual.
3. We cannot accept any responsibility for damage resulting directly or indirectly from use
   of this product.
4. Repairs due to the following conditions will be charged irrespective of whether the product is
   under warranty:
   (1) The product has been used or stored in an improper manner.
   (2) The product has been disassembled or repaired without our permission.
   (3) The product has been damaged by rough handling, natural disaster, electrical interference
       or an unforeseeable accident.
   (4) The product has been used in a manner other than its intended purpose.
   (5) The serial number cannot be identified.

## 2 ) Return policy

1. When shipping the unit to us for repair or service:
   (1) You must contact us or your dealer and acquire an RMA number.
       The unit cannot be repaired or serviced without an RMA number.
        - Include a letter detailing the following information.
         a) Detailed report of the problem.
         b) All accessories: Such as quartz light guide, quartz collimator lens, cables etc.
            See "Accessories" on page 5.
         c) Serial number: Normally on the side of the main unit.
        - Unit can be repaired up to 7 years after the end of discontinuation of production.
   (2) Pack the unit securely with enough cushioning to enable it to withstand shock during
       handling and shipping to us.
Note: All user settings will be reset during repair or maintenance service.
      Be sure to make a note of your settings before sending back the unit for service.
2. The customer is responsible for all shipping charges, including those incurred by Asahi Spectra
   when returning the product to the customer. Shipping charges are not covered under the terms of
   the 1-year warranty. Furthermore, all duties and local taxes must be paid by the user.

If you have any questions about the warranty and return policy, please contact us or your dealer.

# Specifications

## Main Unit

| Model | MAX-303 |
|---|---|
| Output wavelength | 235* - 1050nm *Design value<br>(Diffters according to the lamp and mirror module.) |
| Circuit method | Switching power supply |
| Input voltage | AC100 - 240V 50/60Hz<br>(Input range: AC90 - 264V) |
| Apparent power | Less than 530VA (AC100V/50Hz)<br>Less than 520VA (AC240V/50Hz) |
| Lamp type | Compact xenon lamp 300W |
| Lamp voltage, current | 14V, 21A (DC) *Representative value |
| Lamp life | 500h (Average) |
| Optical axis alignment | Cartridge type (Alignment-free) |
| Cooling method | Forced air cooling |
| Shutter | Pulsed motor drive |
| Exposure time set | 0.5 - 99999.9sec |
| Light intensity control | 100 - 5 (Steps) Continuously variable |
| Filter wheel | 8 channels  *25mm dia/ t=6mm filter is usable |
| Mirror module | UV Type(250 - 385nm), UV-VIS Type(300 - 600nm),<br>VIS Type(385 - 740nm), IR Type(750 - 1050nm) |
| Controller | Built-in |
| Remote control | RS232C *The cable must be less than 3m. |
| Safety mechanism | Xenon lamp problem, Top door open, Lamp usage exceeding 500 hours,<br>Cooling fan problem, Temperature anomaly |
| Recommended environment | Temperature 10 - 35 deg C (50 - 95 F)<br>Humidity 20 - 80% *No condensation |
| Dimensions | 196(W) x 345( D ) x 302(H)mm |
| Weight | 12.6kg |

## Dimensions (mm)
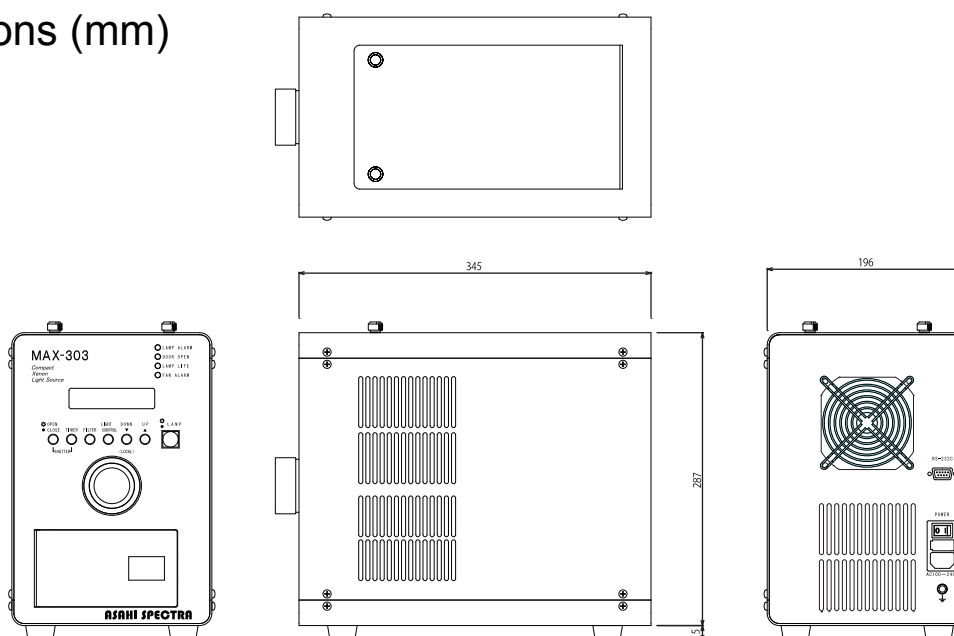
# Specifications
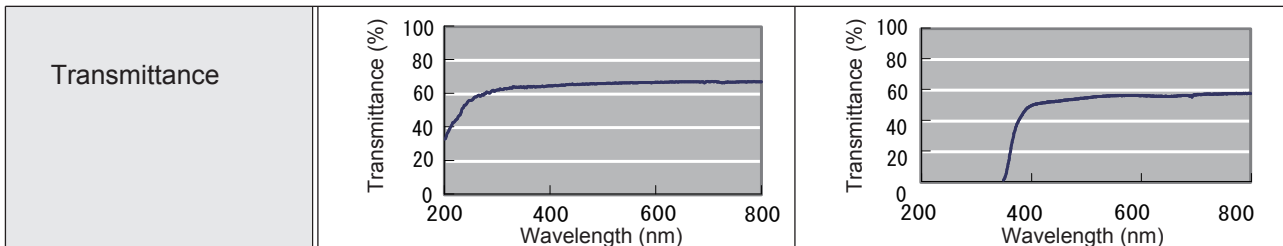
## Accessories

### Precautions when Using Accessories

| Optical filter | - When cleaning filter surface, wipe it out gently using soft cloth moistened with alcohol.<br>- Turn off the main power when mounting the filter.<br>- Use light pressure when wiping to avoid damaging the surface of the glass. |
|---|---|
| Light guide | - Do not handle the light guide roughly or bend sharply more than the bending radius.<br>- Do not pull out light guide forcefully from the light guide fitting device when removing it.<br>- Do not touch the end surfaces of the light guide.  If this should happen, wipe the surface with a clean cloth lightly moistened with alcohol. |
| Collimator lens | - Do not handle the collimator lens roughly.<br>- Do not pull out the collimator lens forcefully from the light guide when removing it.<br>- Do not touch the end surfaces of lens.  If this should happen, wipe out the surface gently using soft cloth moistened with alcohol. |

### Optical Light Guide
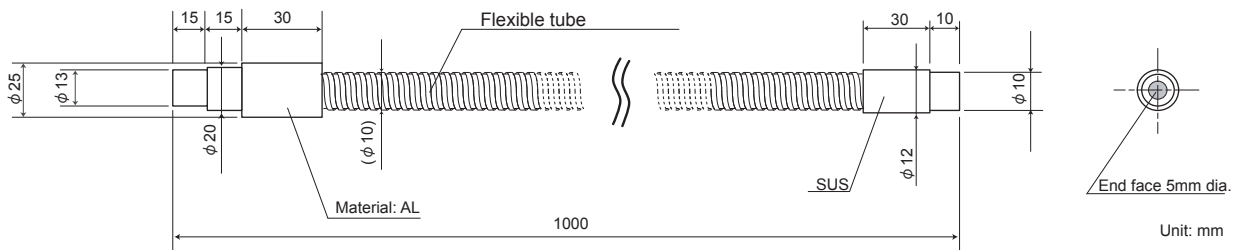


| Material | Quartz | Hybrid |
|---|---|---|
| Core / Clad diameter | 190 $\mu$m / 200 $\mu$m diameter | 45 $\mu$m / 50 $\mu$m diameter |
| N.A. | 0.22 | 0.57 |
| Bending radius | R=50mm | R=50mm |
| Heat durability | Entrance surface 500℃<br>Exit surface 150℃<br>Other parts 80℃ | Entrance surface 350℃<br>Exit surface 150℃<br>Other parts 80℃ |
| Transmittance |  |  |

# Specifications

## Accessories

### Collimator lens

Standard x1.0     Double illuminated area x2.0     Half illuminated area x0.5

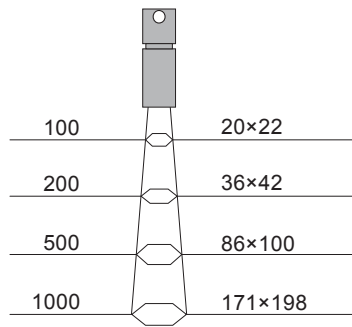Distance and illuminated area (mm)

| Distance | Standard x1.0 | Double illuminated area x2.0 | Half illuminated area x0.5 |
|---|---|---|---|
| 100 | □23 | □56 | □12 |
| 200 | □43 | □86 | □26 |
| 500 | □105 | □175 | □68 |
| 1000 | □209 | □325 | |

### Hexagonal collimator lens

Distance and illuminated area (mm)
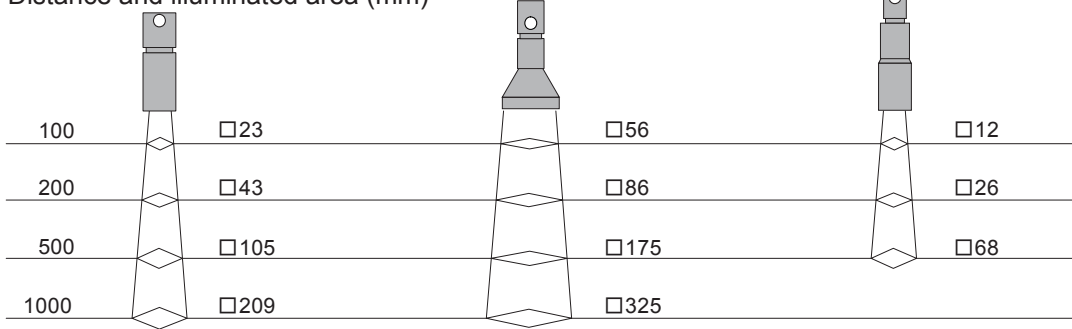
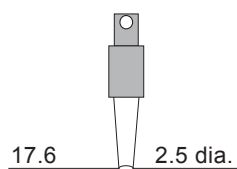| Distance | Illuminated area |
|---|---|
| 100 | 20×22 |
| 200 | 36×42 |
| 500 | 86×100 |
| 1000 | 171×198 |
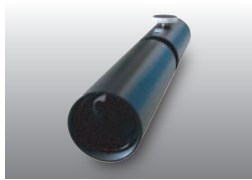
### High condensing lens

Distance and illuminated area (mm)

2.5 dia. type

17.6     2.5 dia.

5 dia. type

42.2     4.5 dia.
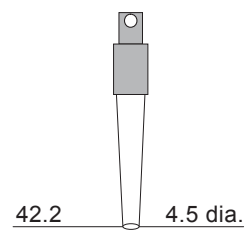
### Direct attachable collimator lens
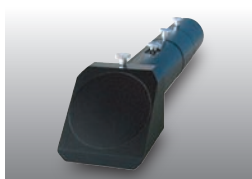
Distance and illuminated area (mm)

Straight type

1000   500   200   100

MAX-303

□227   □124   □63   □42

Downward type

MAX-303

| Distance | Illuminated area |
|---|---|
| 100 | □42 |
| 200 | □63 |
| 500 | □124 |
| 1000 | □227 |
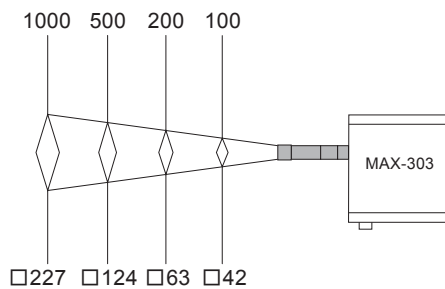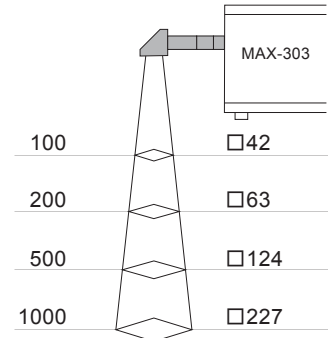
Contents of this instruction manual are subject to change without notice.

# MAX-303   Xenon Light Source 300W
# Remote Control by Computer
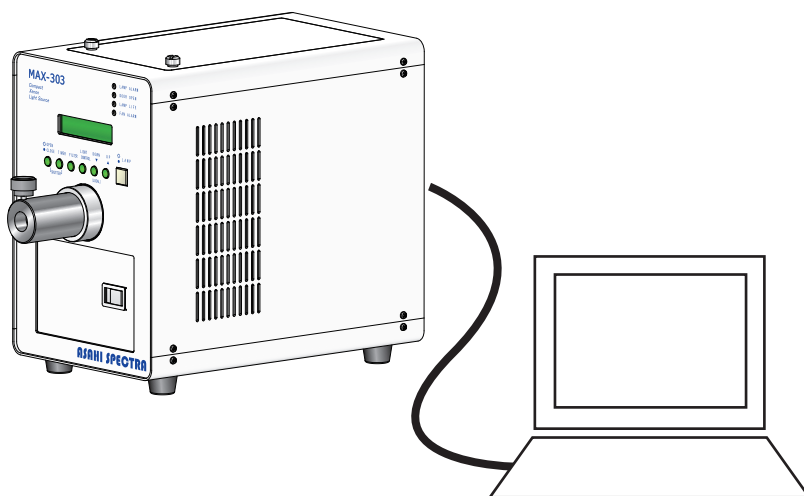
# Type of Communication Cable (RS232C)

Light Source Side (DSUB9PIN) male                         PC Side (DUSB9PIN) female

1. This is the recommended type.

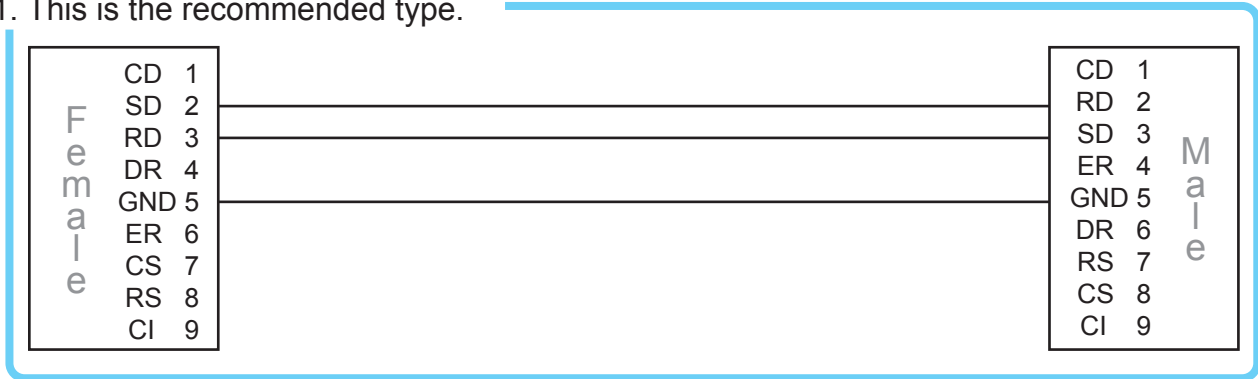| Female | | | | Male |
|---|---|---|---|---|
| CD | 1 | | CD | 1 |
| SD | 2 | | RD | 2 |
| RD | 3 | | SD | 3 |
| DR | 4 | | ER | 4 |
| GND | 5 | | GND | 5 |
| ER | 6 | | DR | 6 |
| CS | 7 | | RS | 7 |
| RS | 8 | | CS | 8 |
| CI | 9 | | CI | 9 |

2. This type is acceptable.

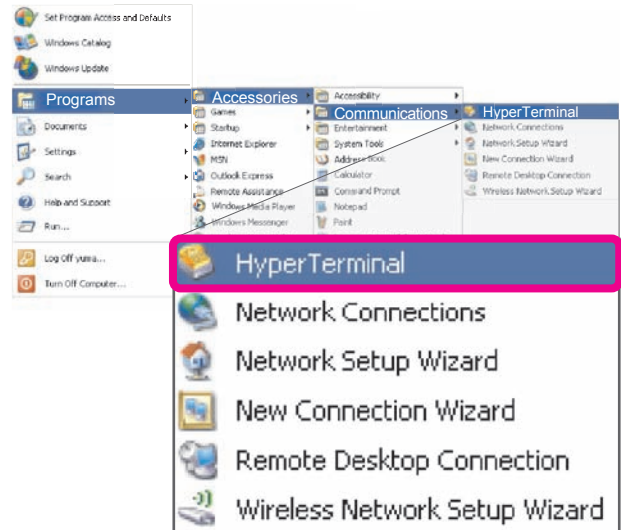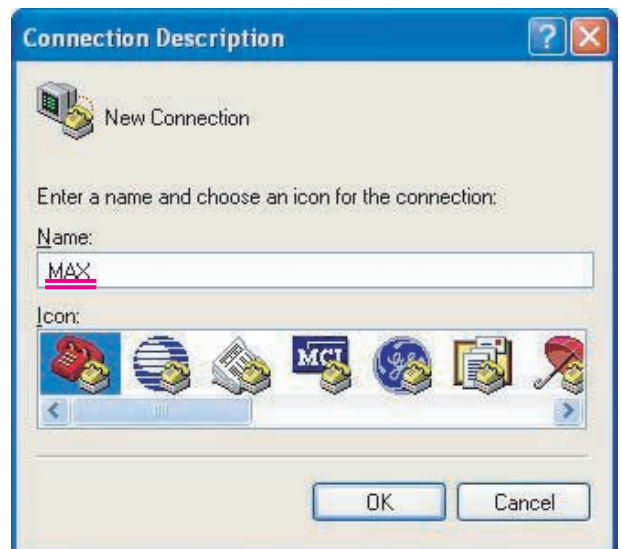| Female | | | | Male |
|---|---|---|---|---|
| CD | 1 | | CD | 1 |
| SD | 2 | | RD | 2 |
| RD | 3 | | SD | 3 |
| DR | 4 | | ER | 4 |
| GND | 5 | | GND | 5 |
| ER | 6 | | DR | 6 |
| CS | 7 | | RS | 7 |
| RS | 8 | | CS | 8 |
| CI | 9 | | CI | 9 |

# Connection Settings

## Ex) HyperTerminal

1. Select "HyperTerminal".

   "Programs" ➡ "Accessories"
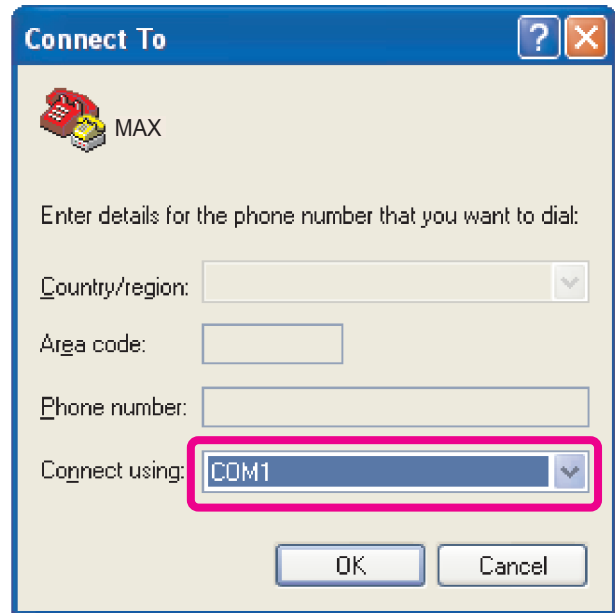   ➡ "Communications" ➡ "HyperTerminal"

2. Enter the file name and click "OK".

# Connection Settings
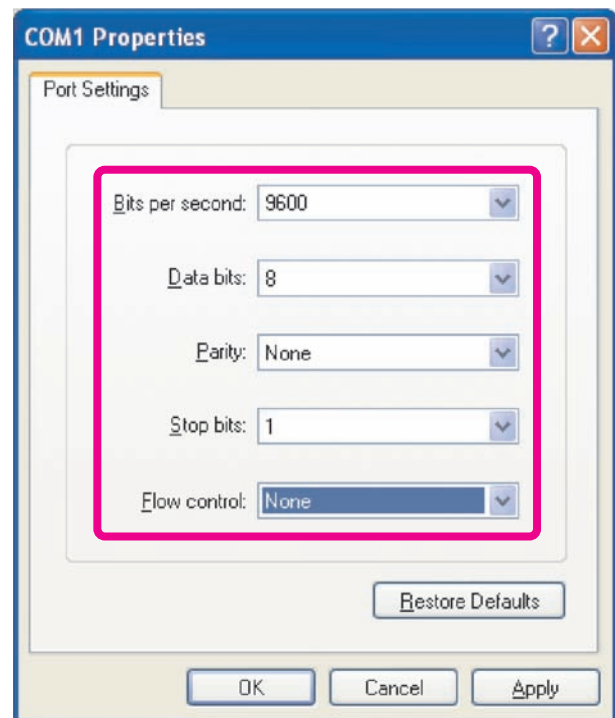
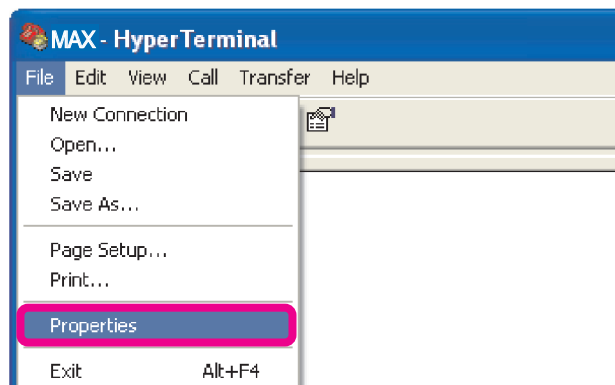3. Select the communication port and click "OK".

4. Set the details of the communication port as shown on the right, and click "OK".

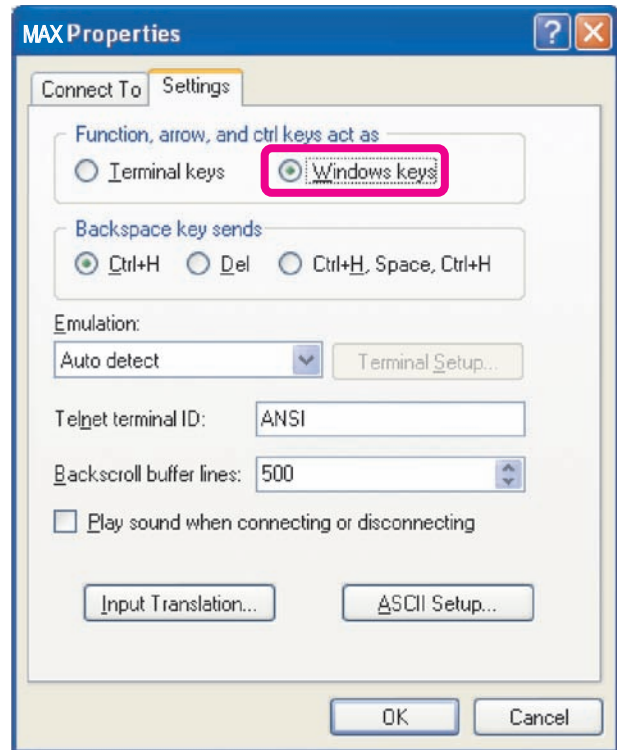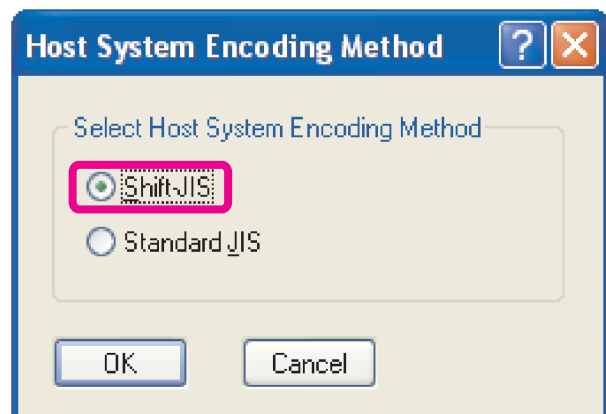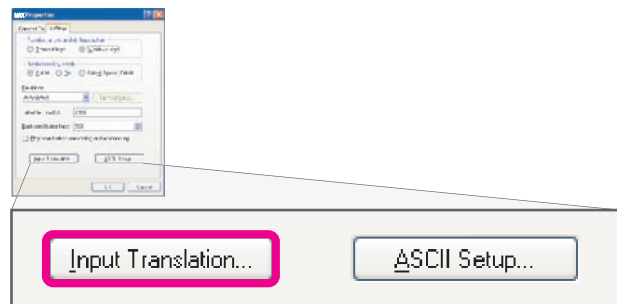5. Select "Properties"

"File" ➡ "Properties"

# Connection Settings
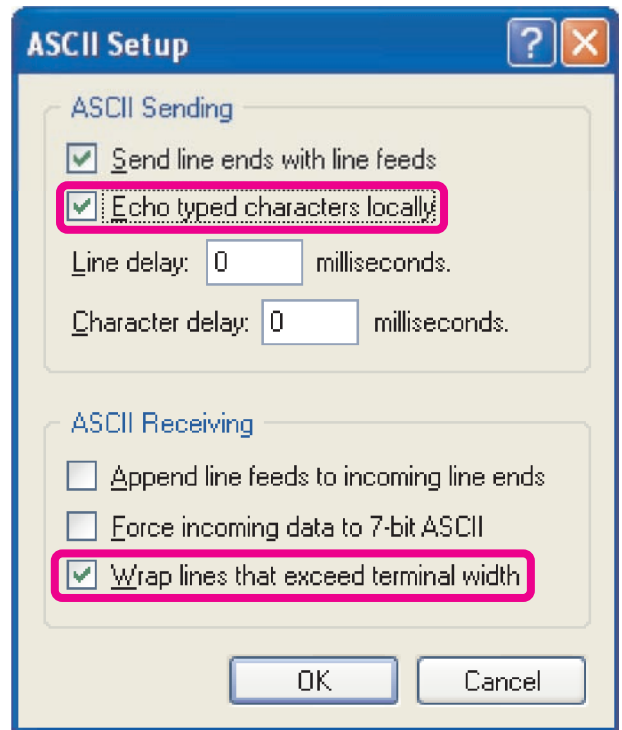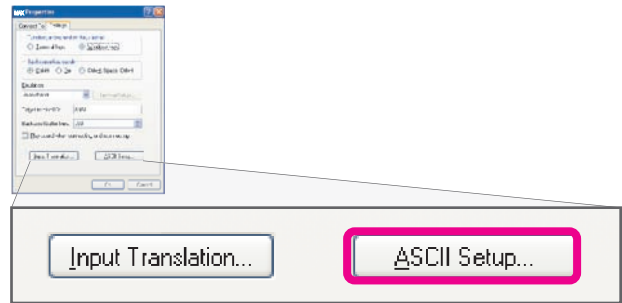
6. Select "Windows keys".



7. Click "Input Translation..." and
   select "Shift-JIS".

# Connection Settings

8. Click "ASCII Setup..." and set the details as shown on the right.

# Remote Control by Computer

<table>
<tr><td>⚠ Caution</td><td>Before connecting other instruments to the unit, make sure that the unit and the instruments being connected are all turned off to prevent electric shock.</td></tr>
</table>

Rules and hints on remote control commands:

- Commands and queries must be submitted using half-width alphanumeric characters.
  The characters must be all uppercase or all lowercase. Do not mix uppercase and lowercase characters.
- Replies are displayed only in uppercase characters.
- The system enters remote mode when the first remote command is received.
- The system remains in remote mode until the cancel command is submitted or the ▼DOWN button is pressed.

## (1) Communication cable

● When using the Dsub 9-pin straight cable

(PC)
DSUB 9-pin female connector

(Light source)
DSUB 9-pin male connector

| | Pin No. | | Pin No. | |
|---|---|---|---|---|
| Not used | 1 | | 1 | Not used |
| RxD | 2 | | 2 | TxD |
| TxD | 3 | | 3 | RxD |
| Not used | 4 | | 4 | Not used |
| SG | 5 | | 5 | SG |
| Not used | 6 | | 6 | Not used |
| RTS | 7 | | 7 | CTS |
| CTS | 8 | | 8 | RTS |
| Not used | 9 | | 9 | Not used |

● When using minimum wiring

(PC)
DSUB 9-pin female connector

(Light source)
DSUB 9-pin male connector

| | Pin No. | | Pin No. | |
|---|---|---|---|---|
| Not used | 1 | | 1 | Not used |
| RxD | 2 | | 2 | TxD |
| TxD | 3 | | 3 | RxD |
| Not used | 4 | | 4 | Not used |
| SG | 5 | | 5 | SG |
| Not used | 6 | | 6 | Not used |
| Not used | 7 | | 7 | CTS |
| Not used | 8 | | 8 | RTS |
| Not used | 9 | | 9 | Not used |

## (2) Communication parameters

| Transmission speed | 9600bps |
|---|---|
| Data format | 8 bits |
| Parity | Non-parity |
| Terminator | [CR] [LF] |
| Flow control | Not used  *1 |

*1 There are control constraints depending on cables.
For detailed information, refer to "(1) Communication cable".

## (3) Codes and their meanings

| nnn | Positive number |
|---|---|
| nnn.n | Positive number with 1 decimal place |
| [x\|y] | x or y |

- The characters must be all uppercase or all lowercase.
  Do not mix uppercase and lowercase characters.
  Example: [Life?]
          (LIFE?)
- The reply is always in uppercase characters only.
- A space between the command and argument is optional.

## (4) Command list

| Open and close the shutter | Command form | S[1\|0] | Open and close the shutter. [1:OPEN｜0:CLOSE] |
|---|---|---|---|
| | Reply | OK | The command is properly executed. |
| | Query form | S? | Request the shutter state (open/closed). |
| | Reply to query | SHUTTER xxxx | The shutter state is displayed with "xxxx" set to: "OPEN" (shutter open) / "CLOSE" (shutter closed) |

| Set the shutter timer | Command form | Tnnn.n | Set the shutter timer.   nnn.n=0.1 - 99999.9 (seconds) |
|---|---|---|---|
| | Reply | OK | The command is properly executed. |
| | Query form | T? | Request the value of the timer setting. |
| | Reply to query | Tnnn.n[s] | The timer setting is displayed. |

| Start the shutter timer | Command form | TS | Start the shutter timer. |
|---|---|---|---|
| | Reply | OK | The command is properly executed. |
| | Query form | No command | (Use T? for timer setting and S? for shutter state) |
| | Reply to query | No command | |

| Stop the shutter timer | Command form | TP | Stop the shutter timer. |
|---|---|---|---|
| | Reply | OK | The command is properly executed. |
| | Query form | No command | |
| | Reply to query | No command | |

6

# Remote Control by Computer

| Change the position of filter wheel | Command form | Fnnn | Change the position of filter wheel.  nnn=1 - 8 |
|---|---|---|---|
| | Reply | OK | The command is properly executed. |
| | Query form | F? | Request the position of the filter wheel. |
| | Reply to query | FILTER<br>    NO.n xxx | The filter wheel position is displayed:<br>n:filter no.  xx:name |

| Register the name of filter. | Command form | FL xx | Register the name of selected filter.<br>xx: alphabet up to 8 digit.<br>Refer to "List of registerable characters" on P.20. |
|---|---|---|---|
| | Reply | OK | The command is properly executed. |
| | Query form | No command | (Use F? to request the position of the filter wheel) |
| | Reply to query | No command | |

| Attenuate the light | Command form | LInnn | Attenuate the light.  nnn=5 -100 |
|---|---|---|---|
| | Reply | OK | The command is properly executed. |
| | Query form | LI? | Requests the light intensity setting. |
| | Reply to query | LI nnn | The light attenuation level is displayed. |

| Turn on/off the lamp | Command form | PW[1│0] | Turn on/off a lamp.  [1:ON│2:OFF] |
|---|---|---|---|
| | Reply | OK | The command is properly executed. |
| | Query form | PW? | Inquire the state of lamp. |
| | Reply to query | LAMP xxx | The lamp state is displayed with "xxx" set to: "ON" / "OFF" |

| End remote mode operation | Command form | L | End remote mode operation. |
|---|---|---|---|
| | Reply | OK | The command is properly executed. |
| | Query form | No command | |
| | Reply to query | No command | |

| Inquire the lamp used hours | Query form | LIFE? | Request the lamp usage hours. |
|---|---|---|---|
| | Reply to query | LF nnn[h] | The lamp usage hours are displayed with<br>"nnn" set to the total number of hours. |

## (5) Error message

| ERROR COMMAND | Command error.  Occurs when:<br>- Invalid command (command not found in the above list)<br>- Command contains mixed-case characters (both uppercase and lowercase) |
|---|---|
| ERROR RANGE | Argument (number) error.  Occurs when:<br>- Argument is out of range (beyond settable value) |
| ERROR EXECUTE | Execution error.<br>  Occurs when the PW command is issued under the following conditions:<br>- Lamp cartridge is not mounted<br>- Top door is open<br>- Cooling fan has stopped<br>- Lamp usage has exceeded 500 hours |
| ERROR ARGUMENT | Occurs when:<br>- No argument is set<br>- Incomplete argument is set |

## (6) Emergency stop

| EMG | Remote mode is canceled and all operations are stopped.<br>Lamp is immediately turned off. |
|---|---|

*Turn off the main power switch after an emergency stop.

## (7) Emergency stop using control buttons on the controller

If the LAMP button is pressed during remote mode, the internal lamp turns off and the unit enters emergency stop mode.
If the OPEN/CLOSE button is pressed during remote mode, the shutter closes.
To restart operation, press the ▼DOWN button.