7. Maintenance

(1) To Replace Heating Elements

This instrument uses a platinum wire heater of 150 μm in diameter. If changes are made to the platinum wire heater (for example, using a platinum wire of 100 μm in diameter or making the length between the terminals longer or shorter), the amount of heat in relation to the voltage output will vary. This platinum wire may, therefore, break at 75 or thereabout on the scale where exceeding the allowable value of the heater, even if it is within the adjustable range by the heater adjustment knob. Also, when used over a long period of time, the heating element will deteriorate due to oxidation. In the respective cases, the heating element needs replacing.

CAUTION!

Length of Platinum Wire
A short length of platinum wire heater may result in a weakening of the resistance and increased loads to the circuit, thus causing the failure of the circuit board. To avoid it, be sure and set the platinum wire heater long enough to allow an exposed area of 10mm or longer.

CAUTION!

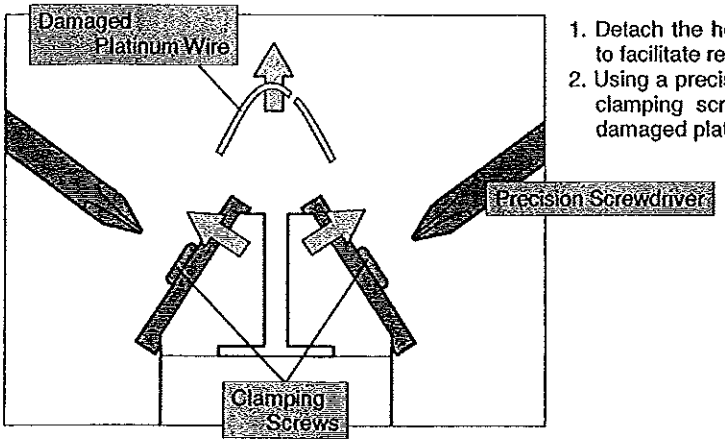
Thickness of Platinum Wire
Normally a 100μm or 150μm platinum wire is used. The use of a platinum wire of different thickness may cause the failure of the circuit board. In the event of such a failure, be aware that there is no guarantee that the failure can be recovered.

CAUTION!

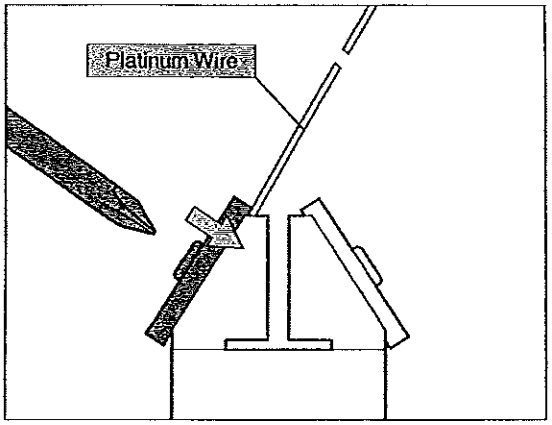
Material of Heating Element
Always use a platinum wire heater with this instrument. The use of a heater wire of different material may cause the failure of the circuit board. In the event of such a failure, be aware that there is no guarantee that the failure can be recovered.

CAUTION!

Be sure to turn off the main power supply and allow the heater to cool off completely before replacing the heating element. Do not turn the power supply back on until all procedures are completed.



1. Detach the heater unit from the heater manipulator to facilitate replacing the heating element.
2. Using a precision screwdriver or the like, loosen the clamping screws on both sides and remove the damaged platinum wire.

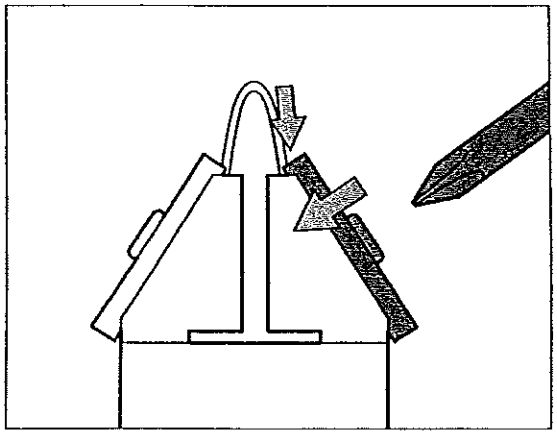


3. Put in one end of the spare platinum wire and fasten it with the clamping screw.
4. Bend the platinum wire in an arc and cut it in the most appropriate length with a pair of nippers or the like.

CAUTION!

Length of Platinum Wire

A short length of platinum wire heater may result in a weakening of the resistance and increased loads to the circuit thus causing the failure of the circuit board. To avoid this, be sure and set the platinum wire heater long enough to allow an exposed area of 10mm or longer.



5. Put the cut end of the platinum wire into the other side and fasten the platinum wire with the clamping screw.
6. Finally, reattach the heater unit to the heater manipulator to finish the procedure.

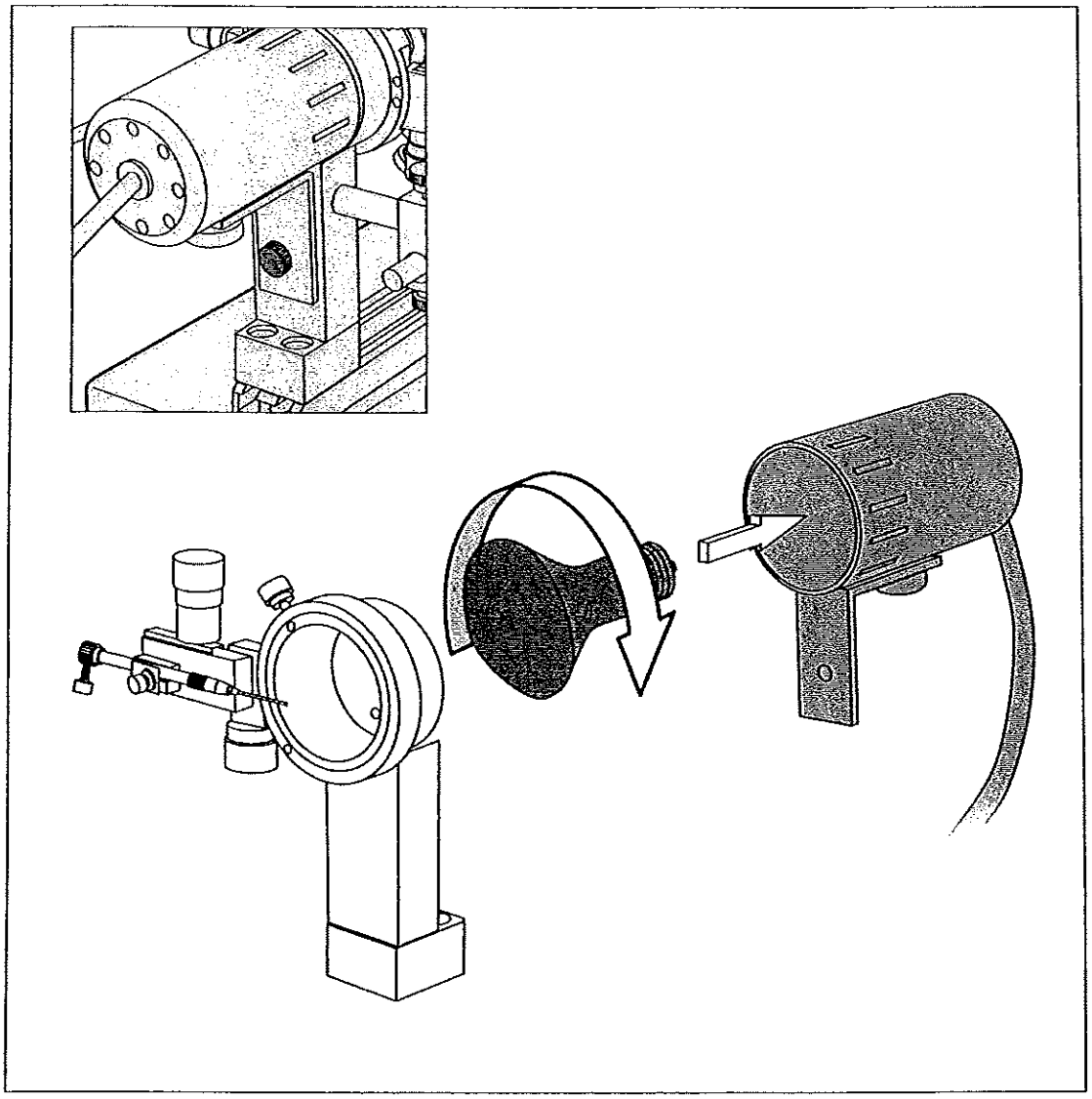
(2) To Replace Light Bulbs

The light bulb used for this model can be substituted with a commercially available light bulb subject to the common specifications, rating, and size. To replace the light bulb, use the following procedure.

CAUTION!

Be sure to turn off the main power supply and allow the heated light bulb to cool off completely before replacing the light bulb with a new one. Do not turn the power supply back on until all procedures are completed.

1. Remove the mounting knob located at the columnar support of the lamp housing and remove the lamp housing.
2. Turn the light bulb counterclockwise to remove it.
3. Ensure that a new light bulb is compatible with the replaced light bulb in terms of specifications and rating. Screw the new light bulb in the lamp socket in the housing by turning it clockwise.
4. Put the lamp housing back into position on the columnar support and fasten it with the mounting knob.



(3) To Replace Fuses

The fuse holder is housed inside the AC Power Inlet. To replace the fuse, use the following procedure.

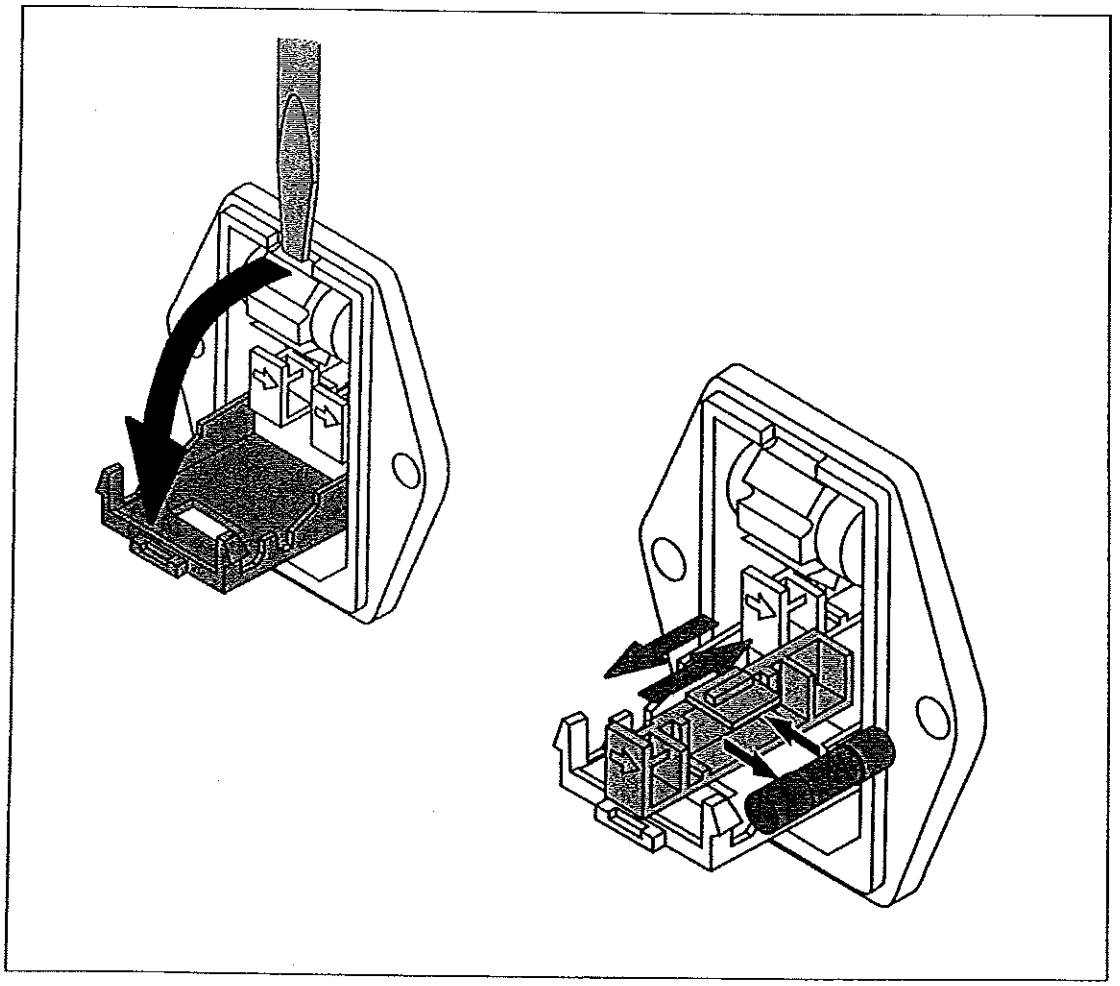
CAUTION!

Be sure to turn off the main power supply and disconnect the power cord before replacing the fuse. With the power cord plugged in, the cover will not open. Do not turn the power supply back on until all procedures are completed.

1. Put a flatblade screwdriver in the slot on top of the AC Power Inlet and pull the cover open, as shown in the illustration.
2. Pull the fuse holder open and replace the blown fuse with a new one that is equal in fuse value to the blown fuse.
3. With a new fuse installed, put the fuse holder back into place, as shown in the illustration.
4. Close the cover to finish the procedure.

CAUTION!

When replacing the fuse, pay attention to the following points.
1.Always use a new fuse that is equal in fuse rating to the blown fuse.
2.Do not make changes to the Voltage Selector.



(4) To Change the Working Voltage

This instrument is made for use with the working voltage AC100V/120V/220V/240V. The Voltage Selector is incorporated in the AC Power Inlet. To change the working voltage, use the following procedure. Depending on the working voltage to be selected, the fuse value may need to be changed as appropriate. Before starting the procedure, ensure that you have a fuse of appropriate fuse value ready for use.

CAUTION!

If the power supply voltage is changed between 100V/120V and 220V/240V, be sure to replace the power fuse as instructed below. The use of a wrong rating fuse may cause the fuse to be blown frequently or may disable the fuse at overload.

Matching Table of Fuse Value

No	Present Voltage		Voltage Changed To				Notes
			100V	120V	220V	240V	
1	100V			2A	0.8A	0.8A	Replace fuses when changed to 220V/240V.
2	120V		2A		0.8A	0.8A	Replace fuses when changed to 220V/240V.
3	220V		2A	2A		0.8A	Replace fuses when changed to 100V/120V.
4	240V		2A	2A	0.8A		Replace fuses when changed to 100V/120V.

Gray areas in the above table signify the need to change the fuse value. Ensure that you have a compatible new fuse ready for use.

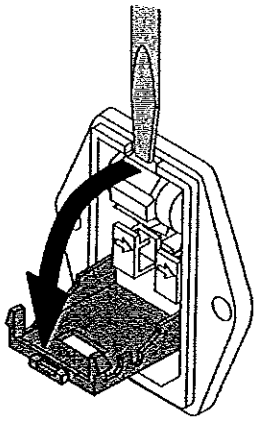
CAUTION!

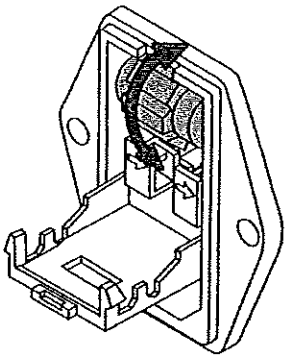
Be sure to turn off the main power supply and disconnect the power cord before changing the working voltage. With the power cord plugged in, the cover will not open. Do not turn the power supply back on until all procedures are completed.

1. Put a flatblade screwdriver in the slot on top of the AC Power Inlet and pull the cover open, as shown in the illustration.
2. Make a new setting of the proper working voltage using the Voltage Selector, as shown in the illustration.
3. Ensure that the selected voltage agrees with the local working voltage. Then, close the cover to finish the procedure.

CAUTION!

Ensure that the selected voltage agrees with the local working voltage. If a wrong voltage is selected, it may cause a breakdown.





8. Specifications

■Model : MF-900

■Product Name : Microforge

■Dimensions : 200(W) x 350(D) x 300(H)mm

■Weight : 6.1 Kg

■Working Distance:
Microscope Focus Direction (Y-axis) Coarse/Fine Working Range ··· 30mm
Microscope Swing Mechanism (X-axis) Working Range ··· About 5°
Microscope Tilt Mechanism (Z-axis) Working Range ··· About 3°
Heater Manipulator X-axis Working Range ··· 14mm
Heater Manipulator Y-axis Working Range ··· 14mm
Heater Manipulator Z-axis Working Range ··· 14mm
Pipette Manipulator X-axis Working Range ··· 12mm
Pipette Manipulator Z-axis Working Range ··· 28mm

■Magnifications
Eyepiece Lens ··· 10x
Objective Lens ··· 5x / 10x
Total Magnifications ··· 50x / 100x
A graduation on the scale ··· ×50 ⇒ 20μm, ×100 ⇒ 10μm

■Light Bulb : 100/110V 25W

■Heating Element: Platinum Wire/150μm in diameter

■Working Voltage:
☐AC100V(rated)±5% 50Hz-60Hz
☐AC120V(rated)±5% 50Hz-60Hz
☐AC220V(rated)±5% 50Hz-60Hz
☐AC240V(rated)±5% 50Hz-60Hz

■Power Consumption : About 35W

■Fuse
AC100V/AC120V ··· 2A 250V 2 pieces (φ5 x 20mm) Type-T : Time-lag Fuse
AC220V/AC240V ··· 0.8A 250V 2 pieces (φ5 x 20mm) Type-T : Time-lag Fuse

■Components:
MF-900 Main Unit (Assembly of Power Supply, Microscope, and Illuminator) ··· 1
Eyepiece Lens (10x, without graticule) ··· 1
Eyepiece Lens (10x, with graticule) ··· 1
Objective Lens (5x) ··· 1
Objective Lens (10x) ··· 1
Heater Unit ··· 1
Air Nozzle ··· 1
Foot Switch ··· 1
Power Cord ··· 1

■Accessories included:
Spare Heating Element (φ150μm) ··· 1
Spare Light Bulb ··· 1
Allen Wrench ··· 2
Silicone Rubber Gasket ··· 1 pack

Consumables (Optionally Available)

☐Platinum Wire Heating Element: 150um x 300mm (Model Name: PT-B)
☐Light Bulb for MF-900: 100/120V 25W (Model Name: MF-900L3)

Customer Support Contact Information

In the event this instrument should fail to perform properly or further assistance is required, please contact the nearest Narishige office listed below.

Narishige Customer Support Center

27-9, Minamikarasuyama 4-chome, Setagaya-ku, Tokyo 157-0062, Japan
Phone: +81-3-3308-8232 FAX: +81-3-3308-2005
e-mail : sales@narishige.co.jp Web site : http://www.narishige.co.jp

NARISHIGE INTERNATIONAL USA, INC.

1710 Hempstead Turnpike, East Meadow, NY 11554, U.S.A.
Phone : +1-516-794-8000 FAX : +1-516-794-0066
e-mail : narishige-usa@pb.net Web site : http://www.narishige.co.jp

NARISHIGE INTERNATIONAL LTD.

Unit 7, Willow Business Park, Willow Way, London SE26 4QP, U.K.
Phone : +44-20-8-699-9696 FAX : +44-20-8-291-9678
e-mail : eurosales@narishige.co.uk Web site : http://www.narishige.co.jp

9. Troubleshooting

If the equipment fails to work properly, consult with the following troubleshooting chart. If none of the remedies results in the solution of a problem, consult with your local Narishige representative. Please do not attempt to repair by yourself.

Symptoms	Causes	Remedies
When turning the power switch on, POWER indicator does not illuminate.	The voltage selected at the AC Power Inlet does not agree with the local working voltage.	Select the correct voltage that agrees with the local working voltage.
	The fuse is blown.	Replace the fuse with a new one.
The illumination lamp does not illuminate.	The light bulb is burnt out.	Replace the light bulb with the spare one.
	The light adjustment knob is set to the minimum.	Manipulate the light adjustment knob to increase the output.
	The light connector (cable) is not connected to the main unit.	Connect the light connector (cable) to LIGHT connector jack in the main unit.
	The light bulb has come loose.	Retighten the light bulb.
The heater generates no heat. (HEATER indicator does not illuminate.)	The foot switch is not pressed.	Step on the foot switch.
	The foot switch is not connected.	Connect the foot switch.
	A break in the foot switch cable or failure of the foot switch.	Service is required. Consult your local Narishige representative.
The heater generates no heat, but HEATER indicator illuminates.	A break in the platinum wire heating element.	Replace the platinum wire heating element.
	The heater adjustment knob is set to the minimum.	Manipulate the heater adjustment knob to increase the output.
	The heater cable is not connected.	Connect the heater cable properly.
	The platinum wire heating element is installed loose, or it is oxidized.	Retighten the installed part, or polish the oxidized part.
The heat generation of the heater is not stable.	The heater is exposed to the current of air sent by air conditioners or the like.	Change the direction of the current of air, or turn off the air conditioner.
	The heating element has been oxidized by heat. (Increased resistance)	1. Sandpaper the oxidized part lightly. 2. The platinum wire heating element is too long. Adjust it to the most appropriate length.
The heating element melts.	The heater output is too high, or the time of heat generation is too long.	Service is required. Consult your local Narishige representative.
A pipette bends in the opposite direction.	The glass capillary is overheated and the heat is spread all over it.	Manipulate the heater adjustment knob to reduce the heater output.
	The pipette is positioned too close to the heater.	Move the heater away from the pipette.
	The pipette has been heated for too long.	Shorten the micropipette fabrication time.