SINCE 1889

Yamato

Fume Hood

Model: MS-90C

Instruction Manual

- First Edition -

- **Thank you very much for purchasing this Yamato MS-90C fume hood.**
- **Please read the *Instruction Manual* and *Warranty* before using this unit to assure proper operation. After reading these documents, be sure to save them securely for future reference.**

⚠Warning: Before using the unit, be sure to read carefully and fully understand important warnings in the *Instruction Manual*.

Yamato Scientific America Inc.

Table of Contents

1. Safety precautions

Explanation of Symbols

About Symbols

A variety of symbols are indicated in this instruction manual and on products to assure safe operation. Improper operation can lead to the possible injuries or damages stated below.

Be sure to fully understand the descriptions below before proceeding to the text.

⚠ Warning	Indicates a situation which may result in death or serious injury (Note 1)
⚠ Caution	Indicates a situation which may result in minor injury (Note 2) and property damage (Note 3).

(Note 1) Serious injury means a wound, an electrical shock, a bone fracture or intoxication that may leave after effects or require hospitalization or outpatient visits for a long time.

(Note 2) Minor injury means a wound or an electrical shock that does not require hospitalization or outpatient visits for a long time.

(Note 3) Property damage means damage to facilities, devices and buildings or other properties.

Meanings of pictograms

This symbol indicates a matter that encourages the user to adhere to warning (“caution” included).

Specific description of warning is indicated near this pictogram.

This symbol indicates prohibitions

Specific prohibition is indicated near this pictogram.

This symbol indicates matters that the user must perform.

Specific instructions are indicated next to the icon.

1. Safety precautions

List of symbols

Warning

General warnings

Danger!
High voltage

Danger!
High temperature

Danger!
Moving part

Danger!
Hazard of explosion

Caution

General cautions

Electrical shock!

Burning!

Caution for no liquid heating!

Caution for water leak!

For water only

Poisonous material

Prohibitions

General Prohibition

Fire Prohibited

Do not disassemble

Do not touch

Compulsions

General compulsions

Connect ground wire

Install levelly

Pull out the power plug

Regular inspection

1. Safety precautions

Warning・Cautions

⚠ Warning

Never operate the unit in an atmosphere containing flammable or explosive gas

Because the unit is not explosion-proof, never operate the unit in an atmosphere containing flammable or explosive gas.

Never use the unit under high-temperature environment

・If the working face is hard chloroethylene, do not use the unit near a fire or under high-temperature environment, which may damage the working face.
・The operating temperature of this unit is 5～35℃. Please set this unit at a place with the temperature of 5～35℃.

Do not use this unit for perchloric acid experiment

If use perchloric acid, it will result in explosion due to exterior and interior corrosion.

Do not use radioactive substance

This unit cannot be used to treat radioactive substance.

Do not use for organism

This unit cannot be used to treat organism (especially Pathogenicity material).

When there's a fire

Setting near a flame damper, the hood cannot exhaust if operating the flame damper when there's a fire.

Be sure to connect the ground wire

Be sure to connect the ground wire correctly. Otherwise, electrical leak may result and cause an electrical shock or a fire.

Never use electrical power cords bundled

When these are used bundled, they might overheat causing a fire.

Take care not to damage electrical power cords

Avoid tightly bending, pulling with a strong force or twisting to prevent electrical power cords from damage. A fire or an electrical shock may result.

1. Safety precautions

Warning・Cautions

⚠ Warning

Never alter the switchboard

Do not have any alteration on replacing internal parts and wires of the switchboard, or else may result in damage of its function or fire. Because it connects with power, do not contact it with wet hand, which may result in electric shock.

Never alter the voltage selector switch

Do not have any alteration on the voltage selector switch, or else may result in damage of its function or fire. Because it connects with power, do not contact it with wet hand, which may result in electric shock.

Regularly check the steel wire ropes of glass door

It uses a balance way to open and close the glass door which is hoisted by the steel wire ropes. The working life of the ropes is expected to be 3 years, while they might break off according to the using situation. Therefore, please check the ropes regularly.

Open or close the door with two hands

When open or close the door, please use two hands.

Never block the exhaust port

The exhaust port is designed concerning airflow distribution and air exhaust. If the exhaust port is blocked, it will influence the exhaust effect or the exhausted air backflow will hurt human.

Never adjust the exhaust damper

The damper has already been adjusted before shipping. Adjusting the damper casually might reduce the exhaust capacity and break the balance of air supply and exhaust, which is harmful for the human body.

Please avoid the electric shock of socket

This unit is attached with socket in the front. The electric shock will occur if touch the socket with wet hand or block the socket with high-electric conductivity substance.

Please avoid the electric leakage of socket

When use the attached socket in the front, connect the experiment machine whose resistance is proper, otherwise might result in electric leakage or fire.

1. Safety precautions

Warning・Cautions

⚠ Warning

⚠ **Please avoid impact on the glass door**

Although it's toughened glass, the strong impact on the glass will result in glass breaking and could hurt people.

⚠ Caution

During a thunder storm

During a thunderstorm, turn off the power immediately, otherwise fire or electric shock may be caused.

Do not use this unit for fluorhydric acid experiment

The window and protective cover are made of glass. If use fluorhydric acid, the glass will be corroded and the interior of the unit is invisible due to fogging.

No open flame close to the glass door

No open flame close to the glass door. The glass door will break after grilling and could hurt people.

Have the heat source in the center of groove

Use the heat source, like burner and heater, in the center of groove when doing experiment.

⚠ **Do not wash off the high-concentration drugs in the groove**

Exhaust the high-concentration drugs after diluting. Exhaust way should comply with the regulations of your company.

Please prepare fire extinguisher

Please prepare fire extinguisher near the cover to avoid the risk of fire.

1. Safety precautions

Warning・Cautions

⚠ Caution

About the unit body

- The exterior coating of the unit is chemical proofing. The coating will peel off if scratched and then result in corrosion.
- A lot of gas generated during experiment will adhere to the interior and working face. Clean it with water regularly.

About working face

- The working face should be leveled. Please do liquid treatments nearby the water exhaust port.
- Do not put corrosive or incendive drugs in the groove for a long time.

Cleaning of handle

Handle and handle installing part are made from ABS resin. Use neutral detergent to clean them. Do not use organic solvent which will damage the handle.

1. Safety precautions

Warning・Cautions

⚠ Caution

⚠ Choose a proper place for installation

● Air supply

・ The air supply corresponded with hood air displacement is necessary. If the air supply is not enough, the designed air volume of hood cannot be assured. Corresponding air supply countermeasures should be adopted for this situation.

● Cross flow

If the hood is installed at the following places, the cross flow (outer turbulence flow) will occur. In different situations, corresponding countermeasures about cross flow should be adopted. The air speed of cross flow must be less than 20% of it in front of hood.

・Close to entrance door

Influenced by the air flow generated from door open and close or people going in and out.

・Corridor

The air flow generated from people walking. (Suppose the walking speed of people is 4km/h, it will generate air flow at 1.1m/s)

・Air conditioner at the ceiling is nearby the air exhaust port

According to the shapes of air exhaust port, the air speed is about 4～6m/s. If the air exhaust port is near to the air conditioner, the speed of air flow will reduce, but the air flow sensed by the hood will directly flow into the opening part of hood. It will turn to downdraft when the air flow of air conditioner meets the exhaust of the hood, therefore it might flow into the opening part.

・Air conditioner at the ceiling or on the wall is nearby the air inlet port

The air speed of air inlet port is about 2～4m/s and the exhaust air speed is slower. Because it is far away from the inlet port, the air speed reduces quite a lot. Therefore, the cross flow might generate nearby according to different situations.

・In front of or at the side of bed-set type straight blow vessel

If set at the side, the side or front air flow meeting the drug shelf or other obstacles cause changing of air flow direction, might influenced by the second air flow.

・Close to ventilating fan or pressure fan

The air speed of ventilating fan or pressure fan, like household fan, is very fast, which will influence seriously.

・Open window or door

The blowing-in and - out air from the window or door might generate cross flow.

2. Before using the unit

Installation procedures and preparation before operating

1. Confirm the model

Please confirm whether the unit ordered by your company is arrived. Refer to the table below to confirm the model, and then conduct installation.

Model	Interior	Working face
MS-90C	Stainless steel	Stainless steel

2. Damage

If the product is damaged due to the accident in shipping, contact with the logistics company immediately to confirm.

3. Choose a proper place for installation

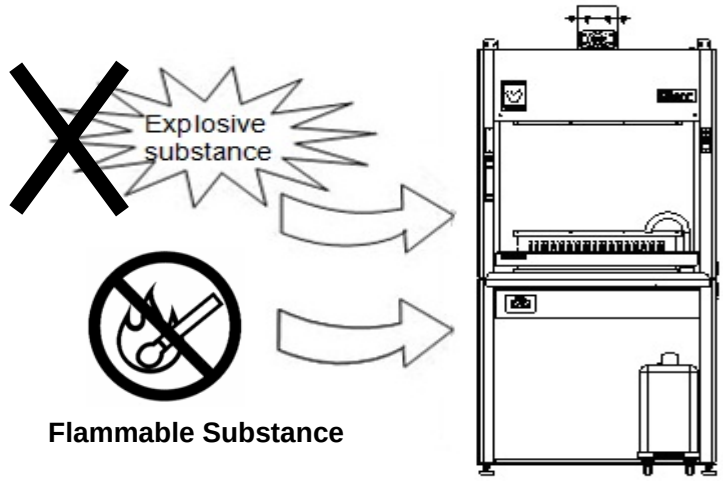
Do not install the unit at following places or outdoor

- Rough or dirty surface
- Flammable gas or corrosive gas is generated
- Ambient temperature is above 35℃
- Ambient temperature fluctuates violently
- There is excessive humidity and dust
- There is a constant vibration

4. Do not use this unit in an area where there is flammable or explosive gas

●Never use this unit in an area where there is flammable or explosive gas. This unit is not explosion-proof. An arc may be generated when the power switch is turned ON or OFF, and fire/explosion may result.

●Refer to page 39 [12. List of dangerous materials]



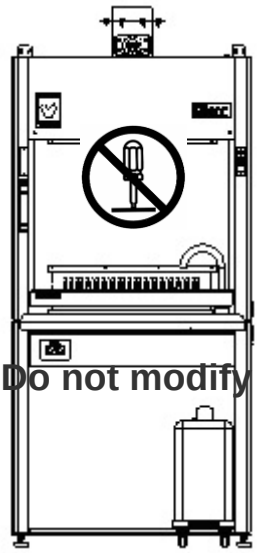
Flammable Substance

2. Before using the unit

Installation procedures and preparation before operating

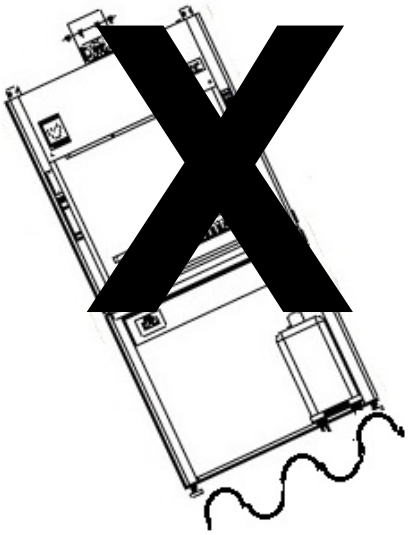
5. Do not modify

●Modification of this unit is strictly prohibited. This could cause a failure.



6. Do not topple or tilt this unit

●Set this unit to the flattest place. Setting this unit on rough or slope place could cause the unexpected trouble or malfunction.



7. Installation

●Unexpected earthquake or impact might have the unit topple down or move, which might damage the unit.

●Set away from places where people go by frequently, and do the security measures well.

8. Handling of power cord

●Do not entangle the power cord. This will cause overheating and possibly a fire.

●Do not bend or twist the power cord, or apply excessive tension to it. This may cause a fire and electrical shock.

●Do not lay the power cord under a desk or chair, and do not allow it to be pinched in order to prevent it from being damaged and to avoid a fire or electrical shock

●Keep the power cord away from any heating equipment such as a room heater. The cord's insulation may melt and cause a fire or electrical shock

●If the power cord becomes damaged (wire core exposes, breakage, etc.), immediately turn off ELB and main power, and then contact your dealer for replacement of the power cord.

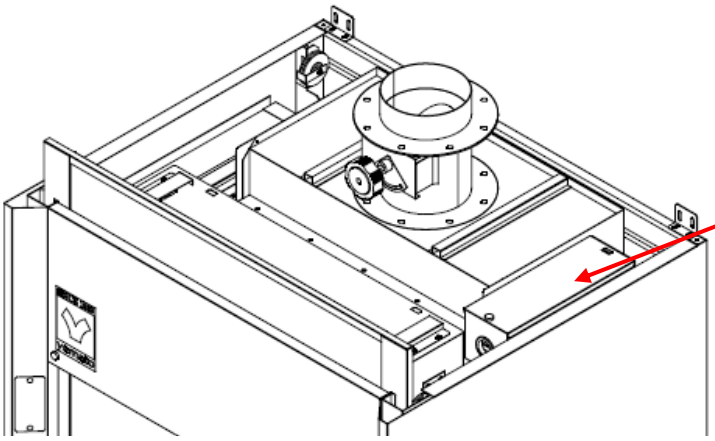
●Connect the power plug to the socket which is supplied appropriate power and voltage

9. Choose a specified switchboard or socket

Choose a switchboard or socket matching the electric capacity.

The machine can choose AC115V or AC220V power supply according to the power supply situation. Power supply voltage selector switch is located next to the ELCB in power distribution box.

After the installation is finished, never alter the voltage selector switch, or else may result in failure or fire.



Electric capacity: AC115V 10A or AC220V 5A (standard)

∗ There could be the case that the unit does not run even after turning ON the power. Inspect whether the voltage of the main power is lowered than the specified value, or whether power supply voltage selector switch is wrongly switched over, or whether other device(s) uses the same power line of this unit. If the phenomena might be found, change the power line of this unit to another power line.

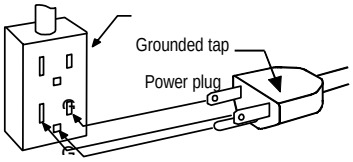
If use branch line socket to conduct multipoint socket wiring or coiling, the power pressure will turn to be lower and reduce the air speed, which may cause failure.

Do not connect with other stuff except the grounding terminal, like air pipe, water pipe, telephone line, etc., which might cause accident or failure.

10. Always ground this unit

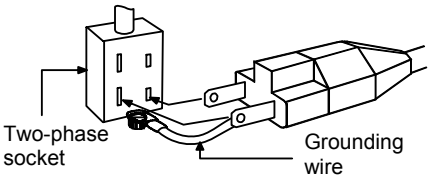
- When grounding is needed, consult with the dealer or the Business Department of YAMATO.
- Confirm connecting with switchboard or socket.

Please use grounding socket



Grounding socket
Power plug

When use two-phase socket



Insert the grounding connector into plug, confirm the polarity of socket and connect them. The grounding wire (green) of grounding connector is connected with the grounding terminal of power unit.

If no grounding terminal

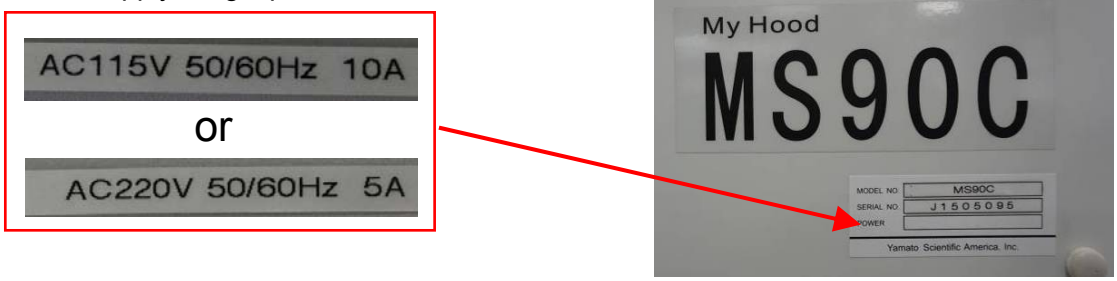
- When grounding is needed, consult with the dealer or the Business Department of YAMATO.

The grounding wire cannot be connected with air or water pipe, which might cause accident, such as fire.

11. Paste an appropriate power supply label

●After selecting the power supply voltage, Paste an appropriate power supply label on the rating plate.

Power supply: single phase AC115V 50/60Hz 10A or AC220V 50/60Hz 5A.

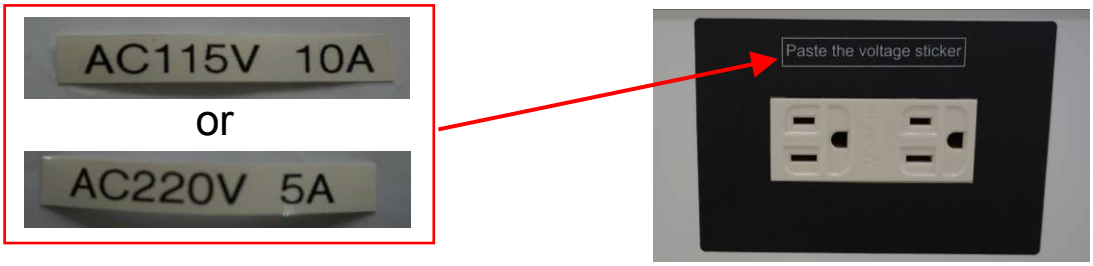


12. The capacity of socket is specified

●After selecting the power supply voltage, attach the appropriate socket capacity label to the socket.

●Confirm the socket capacity and connect with appropriate plug. Use it within specified electric capacity.

Electric capacity of socket: single phase AC115V 10A or AC220V 5A



・Installation procedures of MS-90C (stand)

This product consists of hood and stand. Please install it as per the following procedures.

⚠ Installing optional parts and moving the unit are prohibited before the upper and lower units fixed by bolts.

◆ Standard type:

① Place the MS-90C at a convenient temporary place (stand first). When the unit is already installed and desired to relocate, do not disassemble the hood from the stand it should be move as a whole.

② Disassemble 2 transporting fittings which fix the two sideboards of the hood. (fittings are fixed by 4 downside M8 bolts)

③ After disassembling fittings, move the hood and place on the stand.(Please make sure that the shock pads are aligned on the stand beforehand)

⚠ Caution

- The hood should be moved by more than 4 people.
- When moving the hood, be level or else result in damage of interior materials.

※ Make sure that the hood is already in a proper place before installing the tap, it might scratch or damage the inside part of the hood when the tap was installed first.

④ Use accessorial M8 screws to fix the hood from stand (4 points) (refer to diagram 2-1). When installing, please measure the inner dimension of pillars in the front of hood, the dimensions should match the upper and lower part of the hood. (the door cannot be operated well if the dimensions not match)

※ dimension adjusting ： refer to page 13 (diagram 2-4)

⑤ Confirm that working face is level or not after fixing. If not level, please adjust the adjusting foot. After adjusting, lock the locknut of adjusting foot tightly (refer to diagram 2-2).

※ When tools are not on hand, please use the accessorial simple wrench of product.

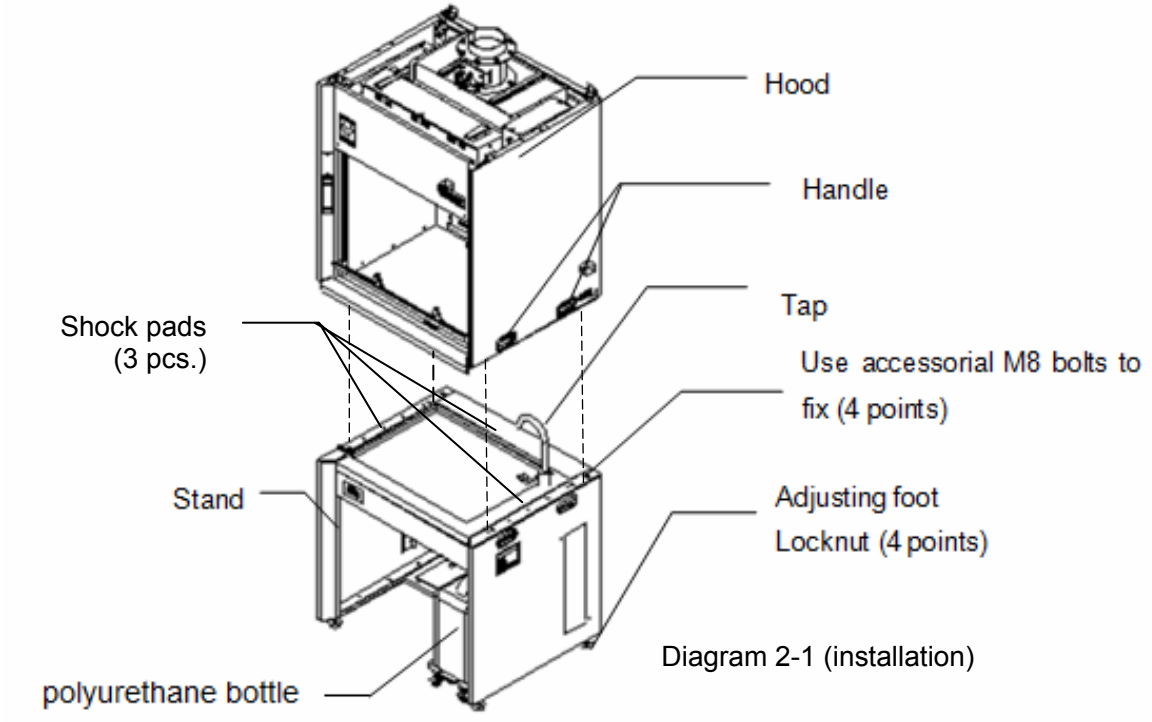


Diagram 2-1 (installation)

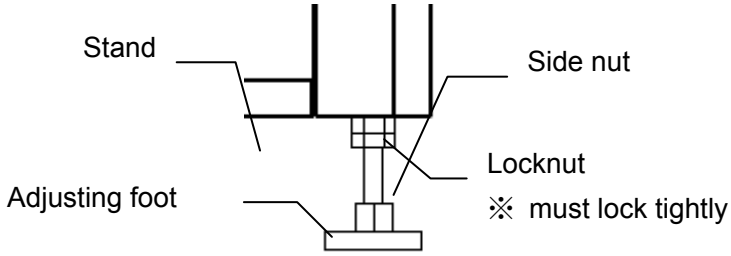


Diagram 2-2 (enlarged drawing of adjusting foot)

◆ With movable caster (optional)

① Place the MS-90C at a convenient temporary place (stand first). Fix the stand with adjusting feet. Because it's movable, have the casters suspended when installing and using the hood.

※ (for moving purposes only)

※ If the optional casters are installed, the height of working face would be 875mm. (The standard height is 850mm)

②～⑤ are the same with the procedures of standard type.

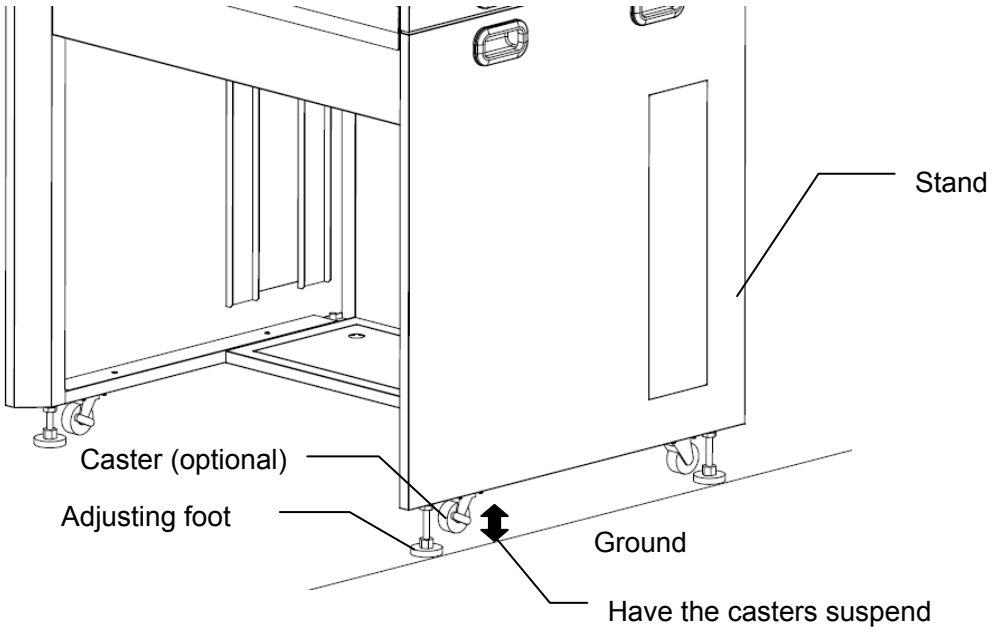


Diagram 2-3 (movable caster)

・Installation procedures of MS-90C (desktop/hood)

Install the desktop unit as per the following procedures.

① Disassemble 2 transporting fittings which fix the two sideboards of hood. (fittings are fixed by 4 downside M8 screws)

② Second, about laying the stand

- Please confirm whether there is other stuff or bumps.
- Please confirm whether it's level. (if not level, adjust first)
- Please confirm whether the stand has enough weight capacity.

③ Before stacking the hood, cover the front setting places of stand with towels. Put up the hood, lay on the towels and then align to proper place. After laying hood properly, remove the towels. (Please make sure that the shock pads are aligned on the stand beforehand)

⚠ Caution

- The hood should be moved by more than 4 people.
- When moving the hood, be level or else result in damage of interior materials.

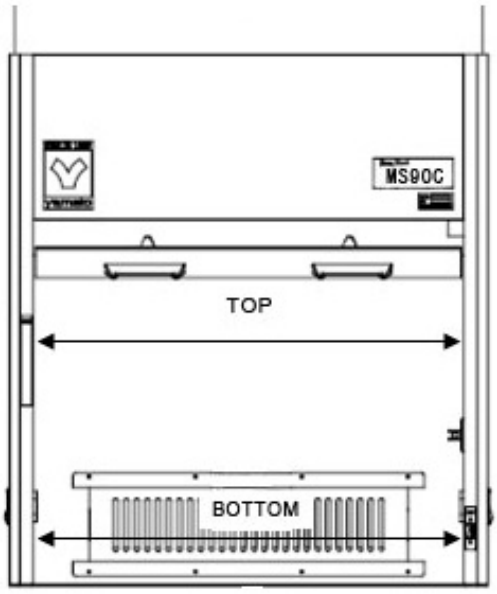


Diagram 2-4（dimension adjusting）

④ Measure the inner dimension of pillars in the front of hood (Diagram 2-4) and have the upper and lower dimensions be the same.
(the door cannot be operated well if the dimensions did not match)

⑤ Use accessorial M8 bolts to fix the hood from stand. (Diagram 2-1)

・Installation procedures of accessories

◆ Cover of water outlet

① If the water outlet on the working face is not in use, please cover it with accessorial cover.

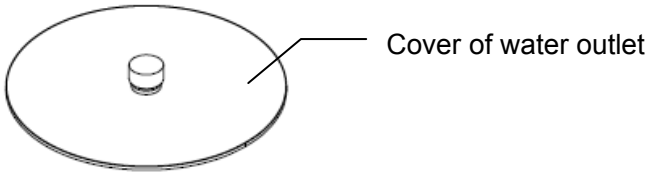


Diagram 2-5（cover of water outlet）

◆ Front operation panel

① Use screws to fix accessorial front operation panel to left and right side boards.

② Hang the hooks of front operation panel to the holes and fix it with screws.

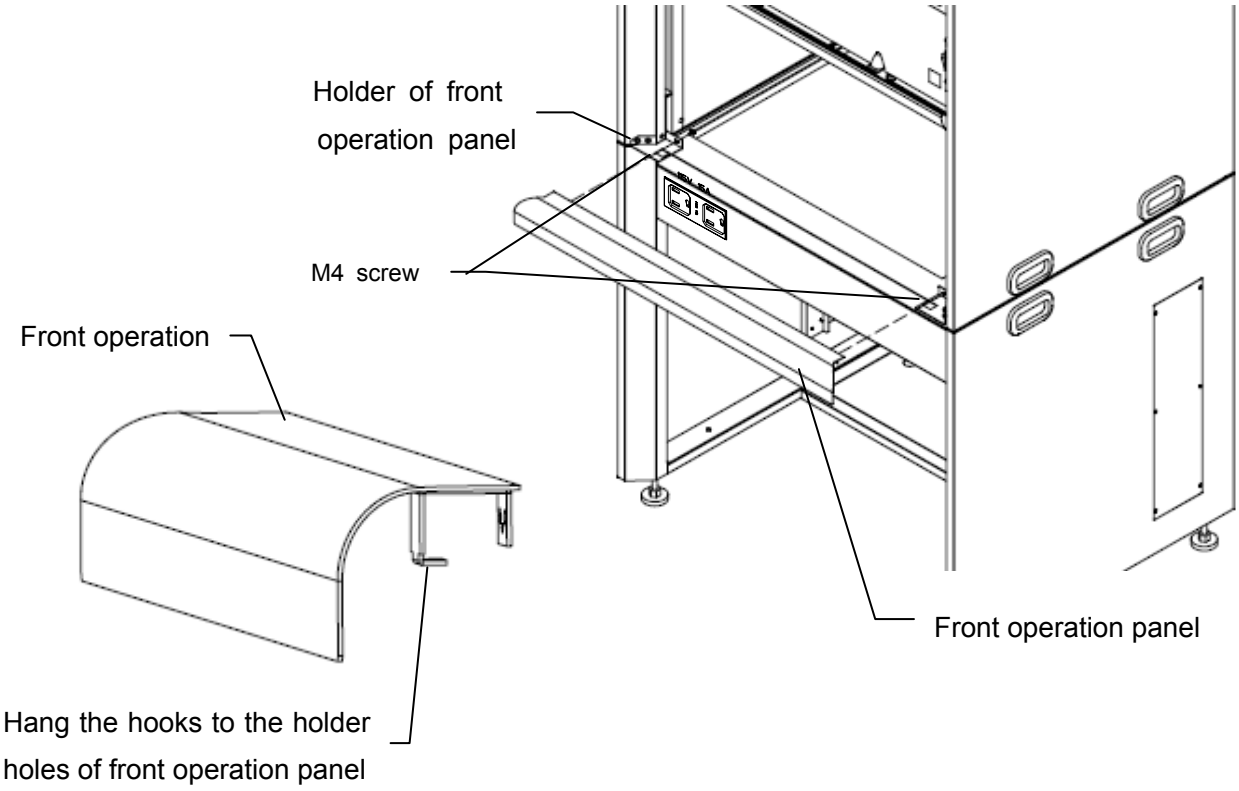


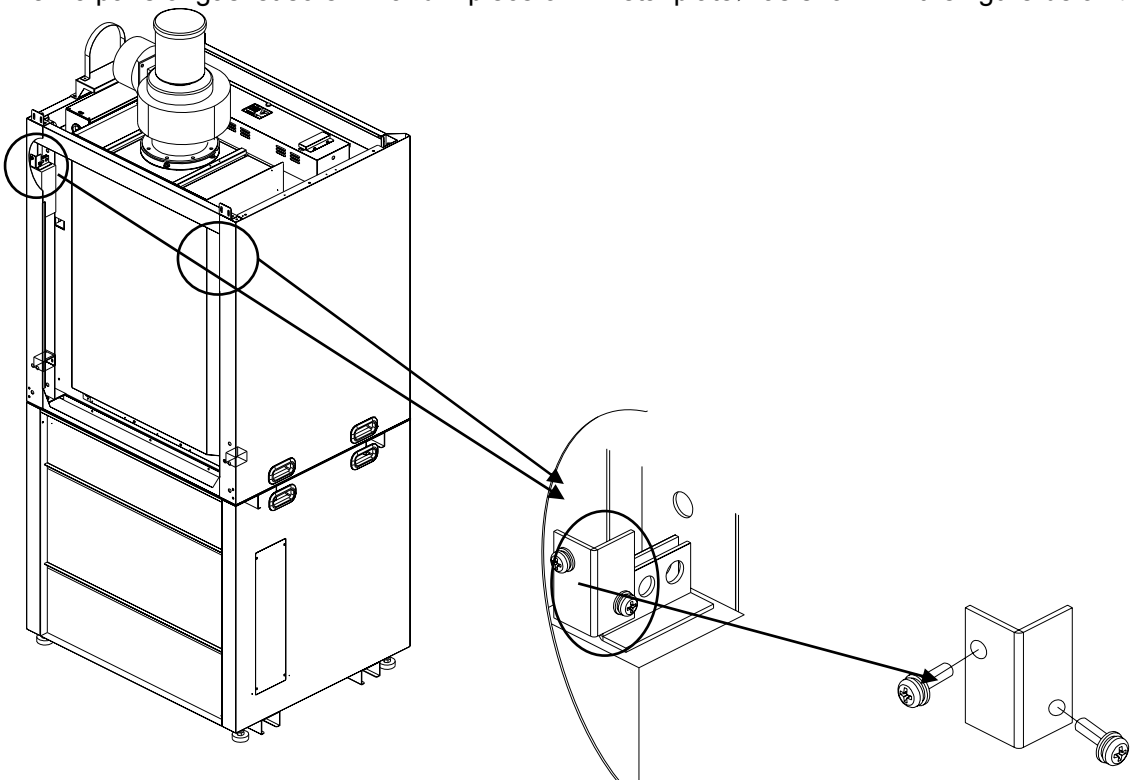
Diagram 2-6 (installation of front operation panel)

Installation procedures

◆ Lock piece of weight farmar fixed plate（About each one）

With the wall fixed before，the locking block must be removed, otherwise the door not free to slide up and down。

M6*20 pairs of gasket screw **4** and **2** piece of L metal plate，as shown in the figure below。



◆ Wall and ground fixing fittings

Prepare the staybolts; fix the fixing fittings of adjusting foot and wall to the ground and wall.

※ It's easier to install the socket before fixing the ground and wall. For socket [Page 19 (Connection work for Customer)].

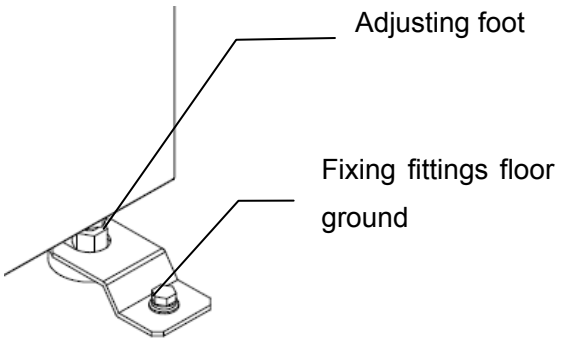


Diagram 2-7 (Ground fixing)

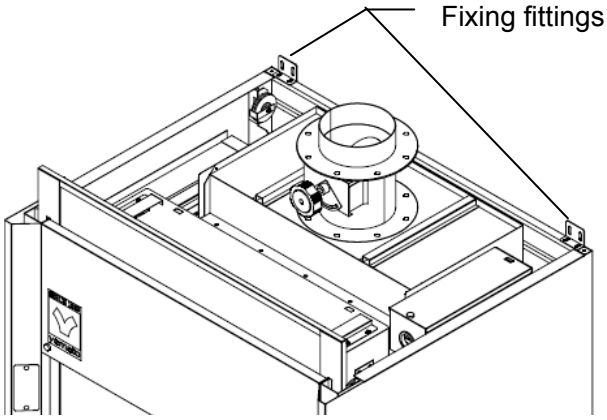


Diagram 2-8 (Wall fixing)

◆ Device of waste liquid

① Please install the water exhaust port under the water outlet of stand.

② Use hose clip to fix the water exhaust hose to water exhaust port.

③ Set the device of waste liquid (polyurethane bottle) at the bottom of stand with the water exhaust hose in it, and then lock the casters tightly.

④ When taking out the hose, make sure that it is drained well the residual liquid might flow out.

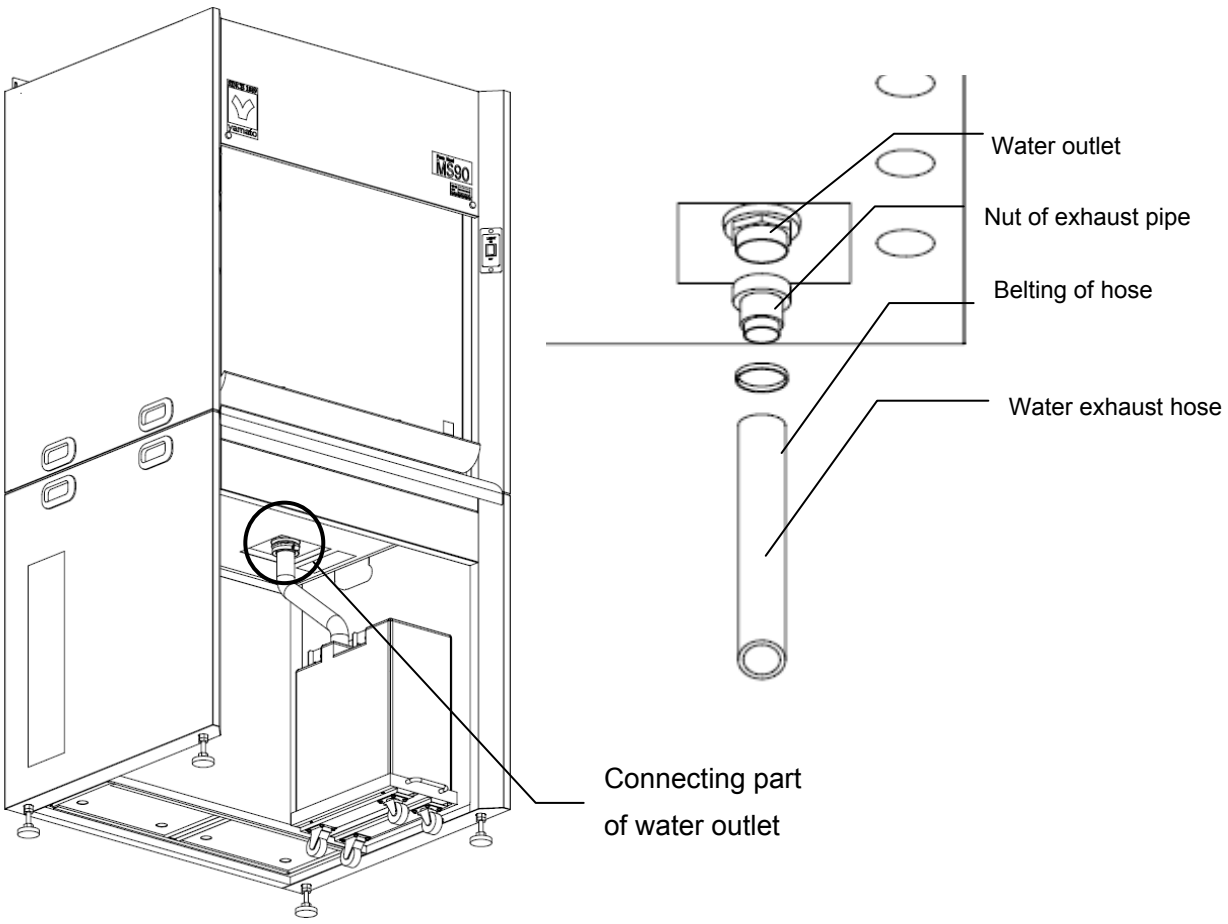


Diagram 2-9 (Setting polyurethane bottle)

◆ Tap

① The tap base is installed on the working face where the washer and tap neck part install.

※ For a convenient use of tap, please see diagram 2-10

② For water pipe connection, refer to page 19 [Connection work of customer].

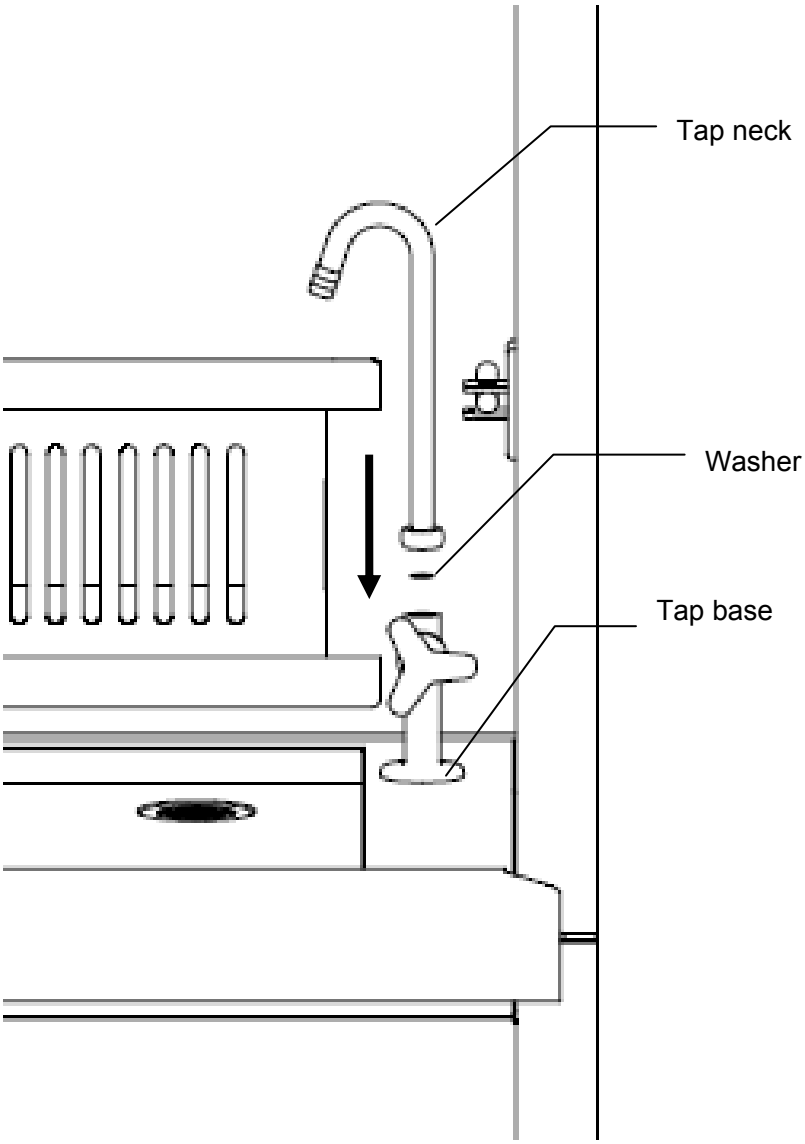


Diagram 2-10 (Installed tap)

Socket

The wires of socket go though the wiring hole on the rear and pull to the top switchboard.

※ Refer to page 38 [11. Wiring Diagram]

Pipe connection work

① The dimension of unit pipe connector is on page 37 [10. Specification]. Please use PE pipe to do pipeline.

② When using the flexible tube, please refer to page 19.

Water pipe connection work (optional)

Please have the local professional constructor to do piping connection.

Drainage

There is no accessorial water saving device. Please drain water as per the following ways.

① Set the device of waste liquid at the stand to hold water.

② Please install the valve, or else the odor in the exhaust pipe will back flow.

Flexible tube (optional)

※ Fix the flexible tube (hard chloroethylene)

① Install the flange at exhaust damper, and fix the flexible tube to flange with hoop.

② When conducting window air exhaust, refer to page 20 [Connection work of customer].

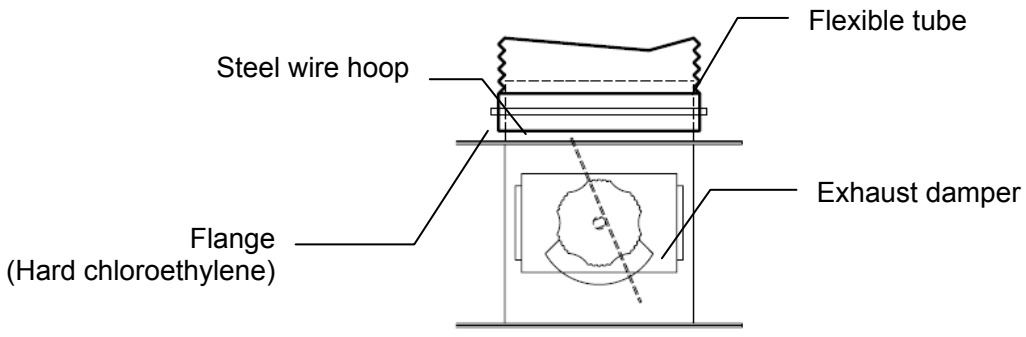


Diagram 2-11 (Installation procedures of flexible tube)

If using a flexible tube to exhaust air from window

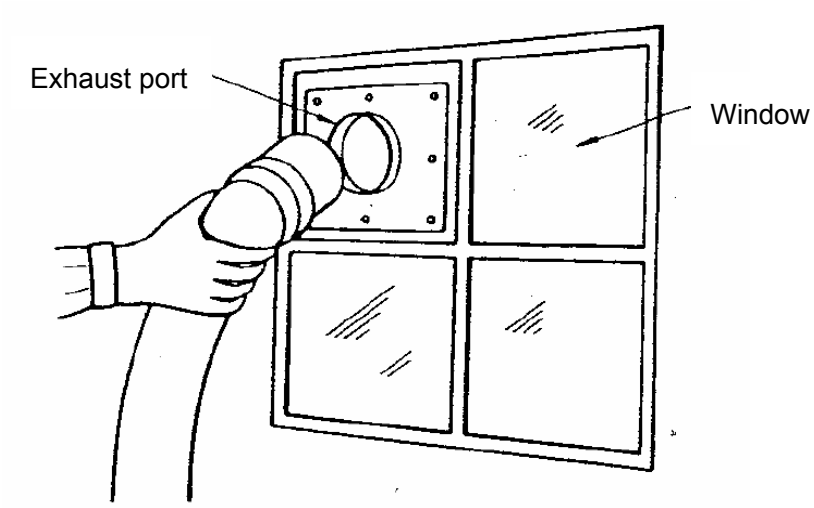
（※ When purchasing flexible tube, the exhaust port for window is necessary.）

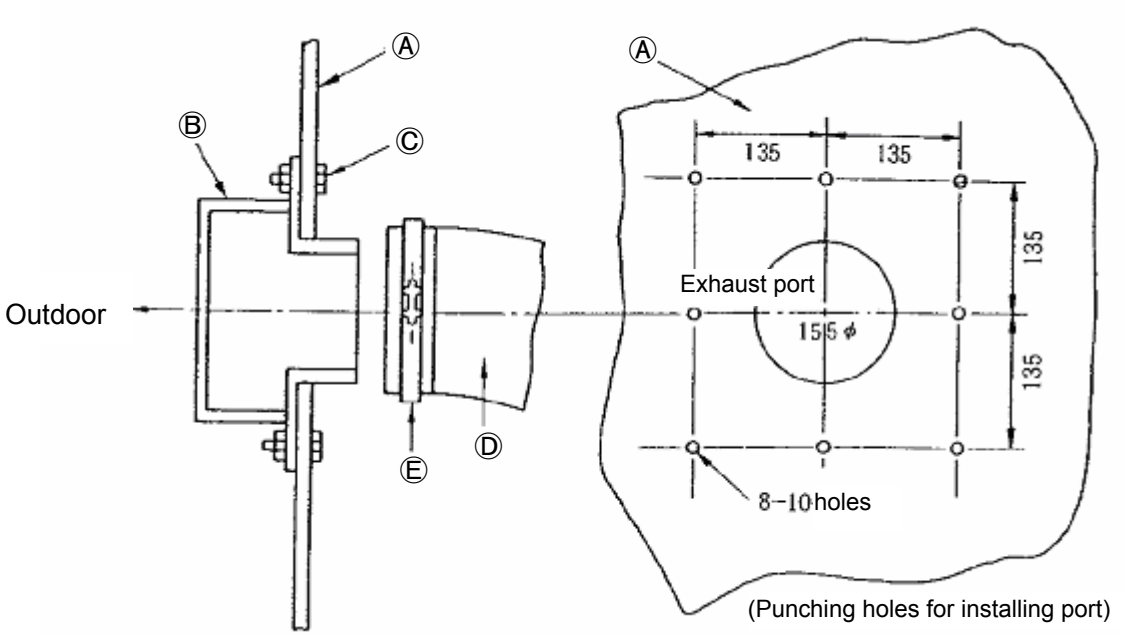
① Please dismount a piece of window glass nearby the hood.

② Make the installing port of exhaust port at the installing plate whose dimension is the same with the dismounted glass, and then install the installing plate at the dismounted place.

③ Use screws to install the exhaust port.

④ If there is no installing plate, find a plate 3～5mm thick.





Ⓐ Installing plate installed at the glass dismounted place

Ⓑ Exhaust port

Ⓒ Installing bolt of exhaust port

Ⓓ Flexible tube

Ⓔ Steel wire hoop

Diagram 2-12 (Window exhaust)

3. Names and functions of parts

Appearance (standard)

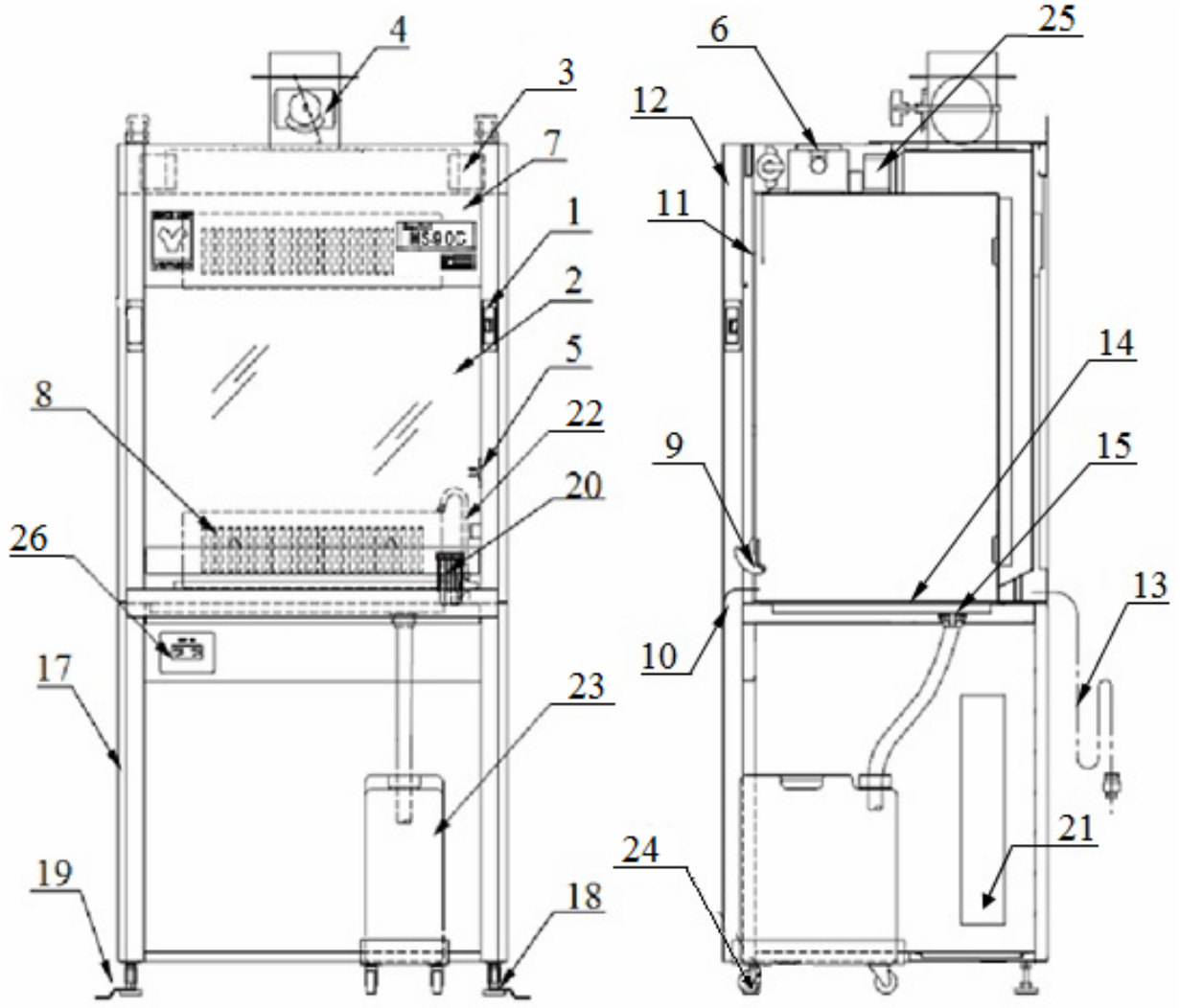


Diagram 3-1 (Appearance standard)

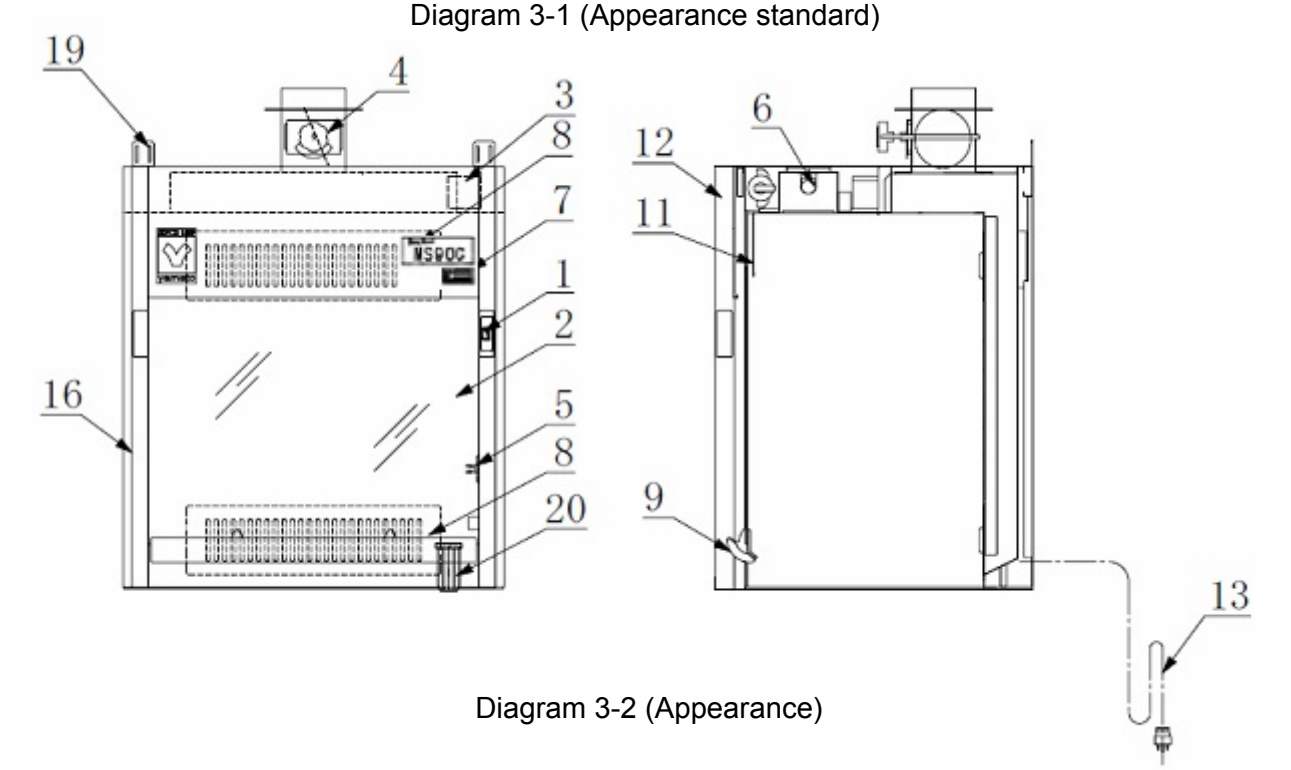


Diagram 3-2 (Appearance)

3. Names and functions of parts

Appearance (standard)

№	Name	Function
1	Switch of fluorescent light	Control the ON and OFF of fluorescent light (interior lighting)
2	Front window frame	It's a door to adjust working opening extent, and can be fixed at any positions.
3	Switchboard	Install the power supply system of hood.
4	Connector of exhaust pipe	The connector of hood air exhaust. Install the exhaust pipe there, including the damper which adjusts the air volume.
5	Brake block to prevent door from falling down	Prevent the steel wire rope of front window frame from breaking, used for safeguard.
6	Fluorescent light	Provide lighting during hood working.
7	Front panel	Decorative plate
8	Exhaust port (with damper)	Air exhaust part in hood. Use damper to adjust the air displacement.
9	Handle	Used to open and close the front window frame.
10	Front operation panel	Prevent substance from retaining on the working face.
11	Interior material	The material of interior experiment environment surface
12	Exterior material	Exterior material of hood
13	Plug	Supply power to hood
14	Working face	The platform to do experiment
15	Exhaust port	To connect the device of waste liquid, cover with blind plate if not use it.
16	Upper body	The working platform to do experiment and its surroundings.
17	Lower body	Holding space for device of waste liquid
18	Adjusting foot	To adjust the level
19	Fixing fittings of wall and ground	Fix the unit body to prevent moving.
20	Operation monitor of exhaust fan	When the front window frame closes, we can visually inspect the air exhaust status though the motion of vane.
21	Function plate	It can be disassembled for connection of piping and wiring.
22	Tap	Water supply port. Use the handle to control open and close of water supply.
23	Device of waste liquid	The bottle to collect waste liquid.
24	Caster	Movable caster
25	Transformer ※	Increase the input electrical current voltage to higher levels.
26	Socket	Supply power to the machine used in the hood.

※：If the optional casters are installed, the height of working face would be 875mm.
(The standard height is 850mm)

※：Refer to page 37 [11. Wiring Diagram]

4. Using procedures

Before operating, please adjust the air volume in order to have normal use. For the adjusting method, refer to page 23 [Adjusting air volume].

Operating procedures

① All the breakers of switchboard are ON.

② The fluorescent light can be controlled by ON/OFF switch.

③ Sliding up and down the glass door can open and close. When the glass door is open, please use the brake block to prevent door from falling down.

④ Using this opening extent is to expedite the controlling air speed at opening part and make it safer to use. Except taking and putting stuff, please use this unit at lower opening extent.

⚠ Caution	● Suggest replacing the deformed brake block. ● When the working face heats up, please have the opening extent 100mm away from the heat source.
⚠ Warning	Please set up the brake block well to avoid accident when open the glass door.

⑤ The power voltage can be selected during installation, so that it is able to use a machine with AC115V 10A or AC220V 5A power source.

⚠ Warning	● The electric capacity of socket is the total capacity of 2 outlets. Over rated capacity might cause fire. ● Take care of electric shock of socket. The electric shock will occur if touch the socket with wet hand or insert the socket with high-electric conductivity substance. ● The applied machine must have grounding plug. Not connecting with grounding wire might cause electric leakage or fire.

⑥ Use the handle to open and close the tap in the hood. The working face is leveled plane. Avoid the splashed of water.

⑦ The device of waste liquid is contained at the lower body of unit body. Refer to page 18 for connection method (Diagram 2-10). Make sure that there are no liquid droplets when pulling out the hose.

⑧ Casters are used to move the unit body. For safety, please use adjusting feet to suspend casters after installation.

Adjusting air volume

① Measure the air speed at opening part.

Operating the exhaust fan, have the door half open. Divide the opening part equally into 6 sections, and use anemograph to measure the air speed in each center of the 6 sections. (Diagram 4-1)

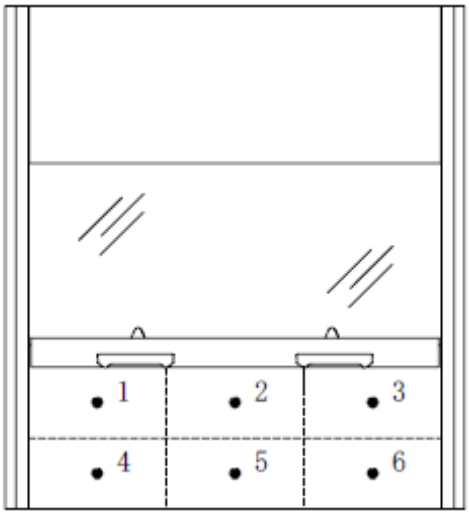


Diagram 4-1 (Measuring positions of air speed)

※ In the state of the opening part (door position) half open, measure the air speed in each center of the 6 sections.

② Calculate the average value of air speed of 6 points (formula 1), and compare with the corresponding standard exhaust air volume of each model (page 36). If the air volumes are different, adjust the damper handle on top to have the volume the same.

$$Q = 60 \times A \times V$$ [Formula1]

Q : air volume [m^3/min]

A : area of opening part [m^2]

V : air speed [m/s]

・Adjusting method of damper handle

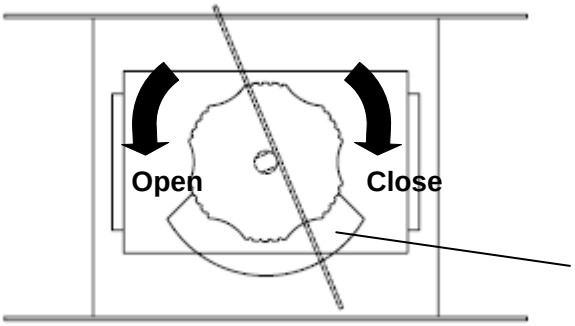


Diagram 4-2 (Adjusting exhaust air volume)

Using shutters

Slide the upper and lower shutter to open and close it.

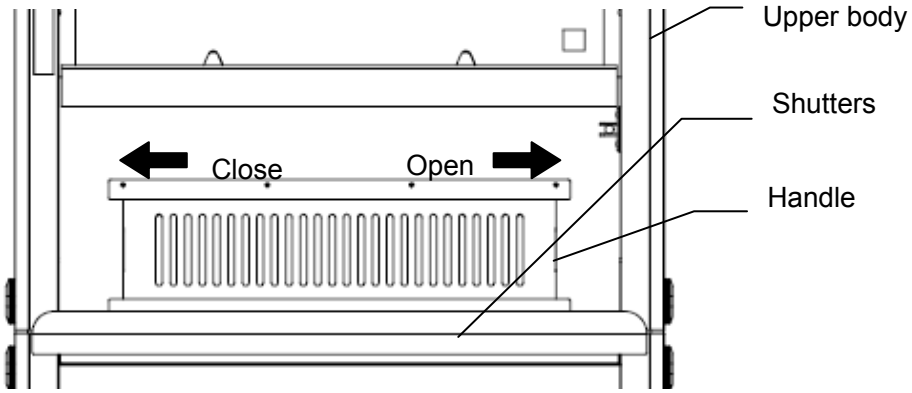


Diagram 4-3(Slide the shutters)

Adjusting the opening extent of shutters according to applied drugs and experiment will have good exhaust effect. The use examples of shutters are as below.

Example 1)
When applying heavy gas (like organic experiment), set the opening extent as below.
Upper shutters: small opening extent
Lower shutters: full open

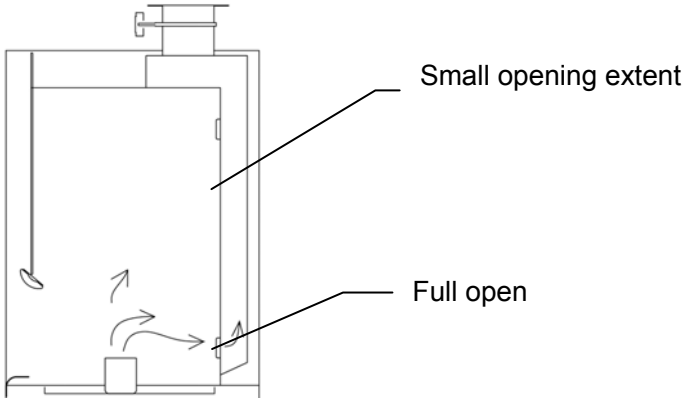


Diagram 4-4(Use example of shutters 1)

Example 2)
When applying light gas (like inorganic experiment), set the opening extent as below to do heating experiment
Upper shutters: full open
Lower shutters: small opening extent

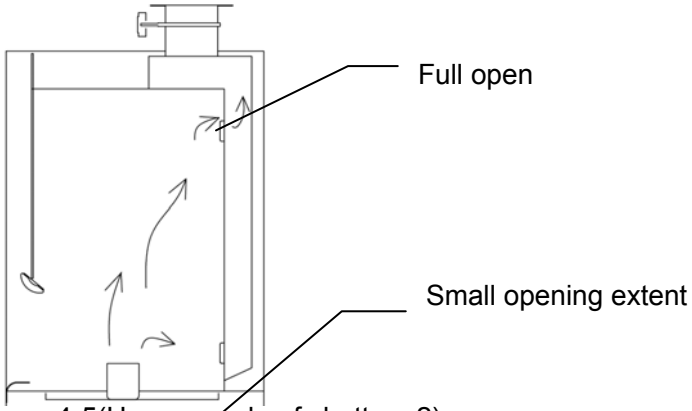


Diagram 4-5(Use example of shutters 2)

Warning Confirm that the shutters are open, because it cannot exhaust air if full close.

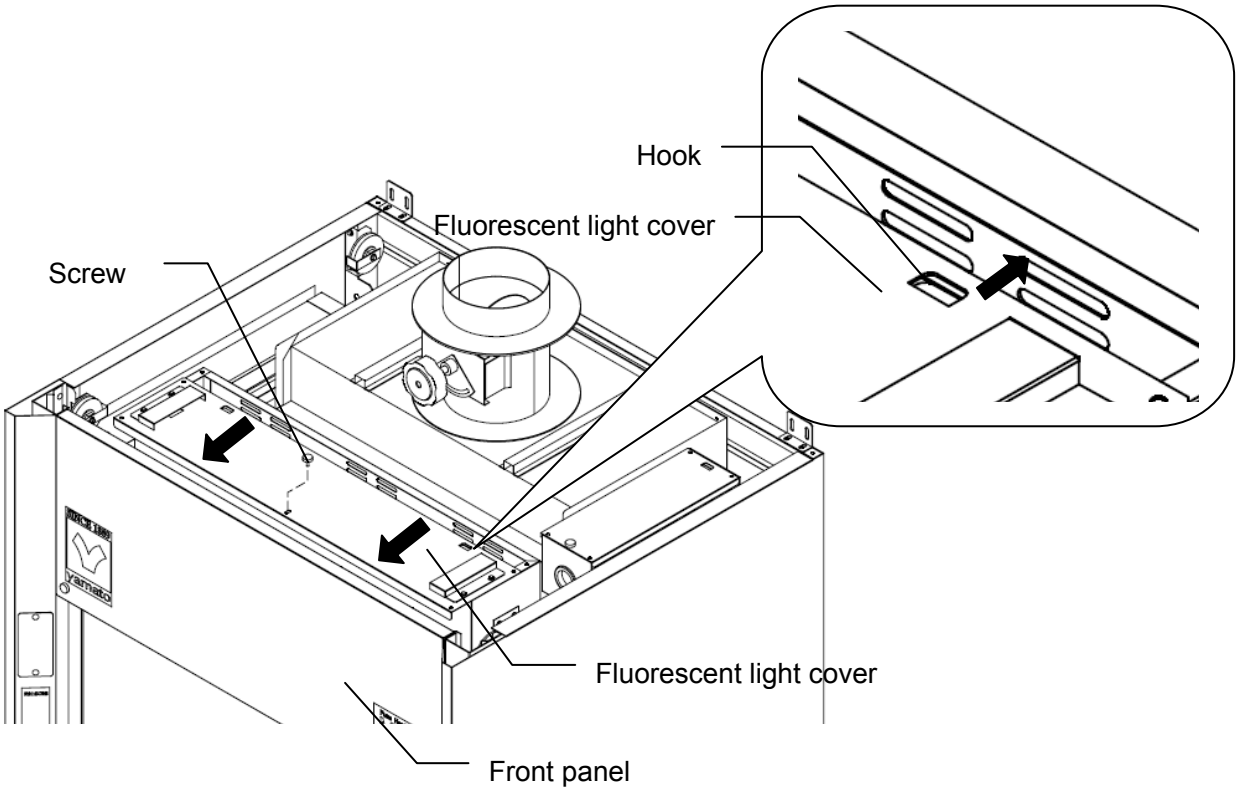
Replacement procedures of fluorescent light

① Take away the screws of fluorescent light cover, and then pull out the cover.

② Replace a new fluorescent light.

③ After replacement, install the cover as per the reverse procedures of above procedures. Hang the cover on the hook.

※ The fluorescent light is a Single phase AC 220V 20W



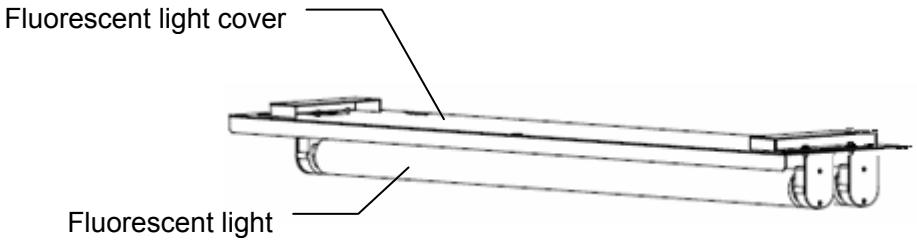


Diagram 4-6 (Replacement of fluorescent light)

5. Usage precautions

Operating precautions

⚠ Danger	●Do not apply radioactive substance. Please use special equipment to do the experiment of radioactive substance. ●Do not apply organism (especially pathogenicity substance). Please use special equipment to do the experiment of pathogenicity substance.
⚠ Warning	●Do not use this unit for perchloric acid experiment If use perchloric acid, it will result in corrosion of interior and exterior, and even the explosion if accumulated too much. ●Never use this unit in an area where there is flammable or explosive gas. This unit is not explosion-proof. An arc may be generated when the power switch is turned ON or OFF, and fire/explosion may result. ●Never block the exhaust port. Using a bigger machine that could block the exhaust port will reduce the air volume and generate a turbulent flow resulting in a backflow of exhaust air.

- Please use the heat source as per the following power.

	Model	Calorie (kcal/hr)	Machine conversion (approximately)	
			Gas heater	Electric heat
When the front air speed is 0.5m/s	MS-90C	1,000	1	1kW

- Please apply the heat source like gas heater and heating plate and do the experiment in the center.
- When you don't have an exhaust fan, do not use the heater like burner.

Working face

- Before exhausting the waste liquid containing strong acid and/or strong alkali, please dilute with water.
- Do not put corrosive, flammable drugs on the working face for long time.
- Although the stainless steel is antirust effectively, it might rust (corrode) according to service environment.
- Hard polyethylene resists about 50℃. When using a heat source like heater, please use insulation board and never put the heat source directly on the working face.

5. Usage precautions

Front panel of operation

- It might be corroded according to different service environment, please maintain regularly.
- Please replace timely when corrosion occurs.

Surrounding environment

- Please set the water hose and/or fire extinguisher near the work place incase of a fire.
- Do not place any flammable, explosive substance or obstacles near the hood.

Maintenance

- Please regularly inspect the steel wire ropes which hoist the glass door. (The service life of ropes might be 3 years which may be shorter according to service condition)
- Use water to clean the exterior and working face of hood regularly.
- When the hood body is corroded or weathered, please replace.
- The power source must be cut off when inspecting.
- Refer to page 32 [9. After sales service and warranty] for details.

5. Usage precautions

Others

Warning

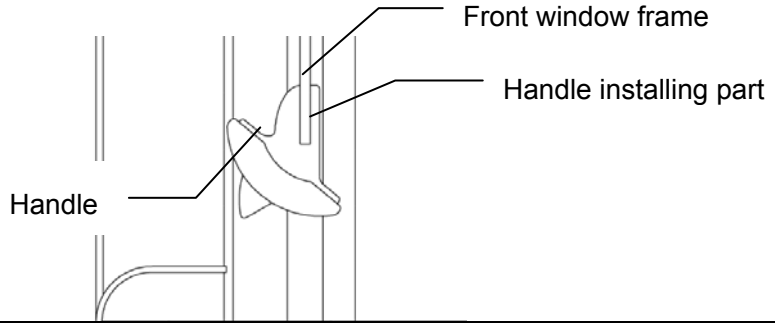
- Take care of electric shock in switchboard.
  Because the power source is connected in the switchboard, take care of electric shock when operating breaker.
- After the installation is finished, never alter switchboard.
  Do not have any alteration when replacing internal parts and wires of the switchboard, or else may result in failure or fire.
- After the installation is finished, never alter the voltage selector switch.
  Do not have any alteration on the voltage selector switch, or else may result in failure or fire.

Blackout recovery

If the unit stops running due to blackout, when the power is supplied normally again, the unit will automatically recover to the state before the blackout and start running.

Notices of cleaning handle

Handle and handle installing part are made from ABS resin. Use neutral detergent to clean them. Do not use organic solvent which will damage them.



6. Maintenance

Daily inspection/maintenance

⚠ Warning

●When doing an inspection and maintenance, please cut off the main power, if not expect special circumstances.

⚠ Caution

Unit body

● Please use soft cloth whose water is wringed up to wipe the smudges off. Never watered directly which may cause electric shock. Do not use gasoline, banana oil, detergent or brush to clean which might result in deforming, deteriorating and discoloring.

Point of inspection

Inspection of exhaust port

●Please regularly inspect whether the water and air exhaust port is blocked.

●Refer to page 32 [9. After sales service and warranty] for details.

7. When the unit is not to be used for long time or when discard

When the unit is not used for long time or when discard

⚠Warning	⚠Caution
When discard ●Do not put it at a place where the children play. ●Please disassemble all the drive parts. ●Please treat it as large waste.	When the unit is not used for long term ●Cut off the power of unit body and pull out the power cord.

Notes about discard

Environmental protection consideration

When discarding the unit, consider the environment, please disintegrated it and discard it separately. Other factors such as resources recycling are also need to be considered. The main components and materials of this unit are as below:

Name of main part	Materials
Main components of unit body	
Exterior	Steel plate, epoxy polyester coating, stainless steel (SUS304)
Interior	MS-90C: stainless steel (SUS304)
Handle	ABS resin
Working face	MS-90C: stainless steel (SUS304)
Sticker	Synthetic resin
Main components of electrical parts	
Switch	Resin, copper, other composites
Power cord	Composites of synthetic rubber, copper, nickel
Wire	Composites of glass fiber, flame-retardant plastic, copper, nickel
Transformer	Copper, nickel, iron steel

8. Troubleshooting

Troubleshooting procedures

Notify	Reason	Solution
The breaker is cut off in short time	Wiring short circuit	Inspect the position of short circuit and do wiring again
	Overload operation	Take away the overload objects
Hard to slide the front window frame	No lube for pulley	Apply lube at pulley and slide way
	The steel wire ropes are separated from pulley	Put the ropes into pulley groove
	The steel wire ropes at balance block are break off	Replace the steel wire ropes
Air volume decreases	The angle of damper deviates	Adjust the exhaust damper
	Accumulated dusts in pipes result in more pressure losses, the setting air volume can not be exhausted	Clean the pipe and clear off dusts
	Outer air gets inside due to damage of blade and pipe and loose screws	● Repair the damaged parts ● Screw tightly the nut with washer
The fluorescent light does not light	Breaker is off	Open the breaker
	The fluorescent light is aging	Replace the fluorescent light
No power at socket	Wires break off	Rewiring
	Breaker is off	Open the breaker
	No power of primary side	Confirm the primary side and connect with power
Air volume is not enough	Unexpected obstacles getting into pipe	Inspect pipe and remove obstacles

9. After sales service and warranty

When requesting a repair

If the failure occurs, stop the operation, turn OFF the power switch, and unplug the power plug. Please contact the sales agency that this unit was purchased, or Yamato Scientific America Inc.'s sales office.

Check following items before contact

- ●Model Name of Product
- ●Production Number
- ●Purchase Date

} See the warranty or production plate attached to this unit.

- ●About Trouble (in detail as possible)

Please show your warranty to our service representative.

Warranty (attached separately)

●Warranty is given by your dealer or Yamato Scientific America Inc.'s sales office, please fill in your dealer, date of purchase and other information and store securely.

●Warranty period is one full year from the date of purchase. Repair service for free is available according to the conditions written on the warranty.

●For repairs after the warranty period consult your dealer or one of our sales offices. Paid repair service is available on your request when the product's functionality can be maintained by repair.

Remove equipment

⚠ Warning

- The expertise is required to remove the product, please contact your dealer or one of our sales offices and it's chargeable.

Minimum guarantee period of repair parts

- The minimum guarantee period of repair parts for this product is seven years after end of production.

  Repair parts here refer to parts necessary for maintaining performance of the product.

9. After sales service and warranty

Maintenance of hood /suggest to sign a contract about maintenance and point of inspection

Aging and smudges caused by hood usage might influence the product performance.

In order to securely use the product, besides the general inspection and maintenance from customer, the regular inspection and maintenance from professional service personnel is also necessary.

When purchase the hood, please sign the [Maintenance Contract (chargeable)].

The following table lists the items and periods of standard and regular inspection and maintenance, convenient for your reference.

Please consult your dealer or one of our sales offices for detail.

◆ Summary and inspection period of [Items of inspection and maintenance]

Item	Items of inspection and maintenance	Content of inspection and maintenance	Period of inspection and maintenance
Performance	Air exhaust function	Measure the front air speed	1 year
Appearance	Exterior	Damage, corrosion, smudge	1 year
	Fluorescent light	Light, lights blink	1 year
	Working face	Damage, corrosion, smudge	1 year
	Front window frame	Open and close, damage	1 year
	Other basic items	Corrosion, damage, aging	1 year
Piping system	Tap, pipe	Water leakage, corrosion, damage, aging	1 year
Pipeline	outside, damper, etc.	Damage, corrosion, loose connection parts	1 year

9. After sales service and warranty

◆ Summary of periods of inspection and guarantee of consumptive parts and replacing parts

Name of main part		Period of point inspection	Guarantee period [Replace · Repair]
Electrical parts	Fluorescent light	1 year	1 year
Structural parts	The steel wire ropes of front window	1 year	3 year
	Brake block to prevent door from falling down	1 year	3 year
	Tap	1 year	1 year
	Washer of tap	1 year	3 year

Note 1: The replacement period is not the guarantee period.
Note 2: The parts listed in the table are main parts.
Note 3: The replacement period is approximately estimated period in order to have customer be at ease to use the product for long time. This is also one part of safety design (the cost of inspection and maintenance can be budgeted).

9. After sales service and warranty

Regular self-inspections of exhaust system

In order to prevent poisonous gas intoxication or dust harm caused by failure or blocking of air exhaust system, please have regular self-inspection on following items. Our company can provide chargeable regular inspection, please contact your dealer or one of our sales offices for detail.

NO	Position	Items of inspection
1	Hood	(1) Wear, corrosion, pit, etc.
		(2) Status of intake air and if there is obstacles or not
2	Pipeline	(1) Outer wear, corrosion, pit, etc.
		(2) Status of internal wear, corrosion, etc. and dust accumulation
		(3) Status of exhaust damper
		(4) If the connecting parts are loose or not
		(5) Status of inspection port
3	Capacity of air exhaust	(1) Control the air speed
		(2) Inhibit the concentration

10. Specification

Standard type (MS-90C)

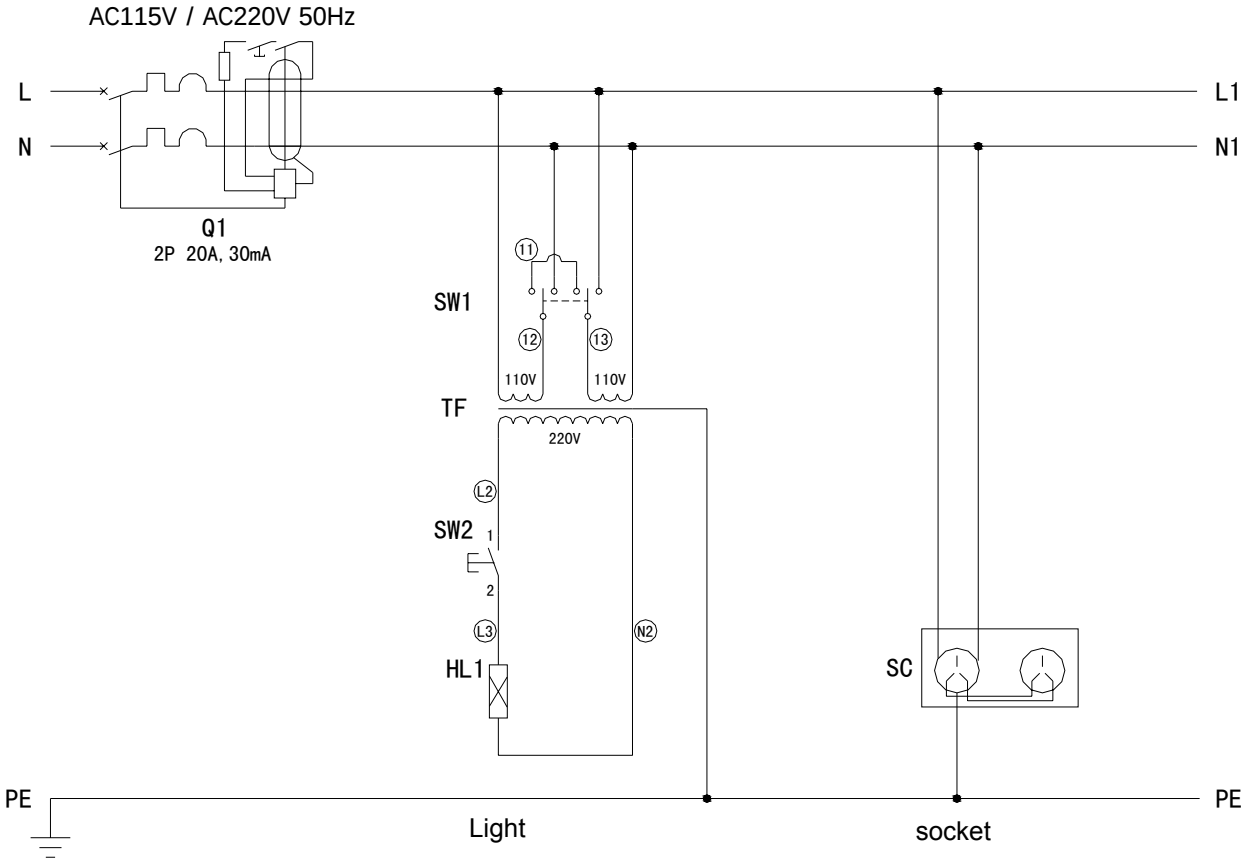
Model		MS-90C
Exhaust pipe	Exhaust damper	Stainless steel Inner diameter Φ150, outer diameter Φ152 Fixed by flange
	Matched pipe	Hard polyethylene Inner diameter Φ160, outer diameter Φ165
Fluorescent light		Single phase AC 220V 20W (2)
Water exhaust port		Drainer Water exhaust port Φ40
Material	Exterior	Cold-rolled steel plate, chemical proofing powder coating, with adjusting feet
	Interior	Stainless steel (SUS304)
	Working face	Stainless steel (SUS304)
	Glass door	Toughened glass 5mm Close and open (up and down) with balance block
Safety structure		① Brake block to prevent door from falling down ② Opening extent sticker of door
Air volume (m^3/min) ※1		7
Internal static pressure Pa(㎜ H_2O)		40 (4)
Power source(50/60Hz) rated current		Single phase 115V or 220V (capacity of breaker 20A)
Outer dimension W×D×H(㎜)		900×750×1985/2035 (with flange)
Weight（Kg）		130
Temperature and humidity condition of location		5～35℃, 20～80% (no frosting)
Transformer		AC115V-220V/60W
Tap		Gooseneck tap, nominal value 1/2B flexible tube, external or internal thread fixing
Socket		115V 10A or 220V 5A 2 outlets with grounding
Device of waste liquid		Unit body (tray): cold-rolled steel plate (chemical proofing powder coating), with casters 20L polyurethane bottle, connecting tools of draining water (nut, hose, steel wire hoop)
Movable fittings		Nylon caster (Φ50)
Accessories		Instruction manual, warranty, fixing bolts for upper and lower bodies fixing, fixing fittings of wall and ground, tools for adjusting foot, cover of water outlet, shock pads, front operation panel.

※ 1. Recommended value (controlling air speed of opening part: 0.5m/s when the door is half open)

※ 2. The stand of working face is 850mm high (standard height 850mm)

11. Wiring diagram

◆ Standard Type



Symbol	Name of part
Q1	ELCB(115V / 220V 20A)
TF	Transformer
SW1	Supply voltage selection switch
SW2	Lighting switch
HL1	Fluorescent light
SC	Socket

12. List of dangerous materials

Never use an explosive substance or flammable substance or a substance containing them for this device.

Explosive substance	Explosive substance	①Nitroglycol, glycerine trinitrate, cellulose nitrate and other explosive nitrate esters
		②Nitrobenzene, trinitrotoluene, picric acid and other explosive nitro compounds
		③Acetyl hydroperoxide, methyl ethyl ketone peroxide, benzoyl peroxide and other organic peroxides
Flammable substance	Flammable substance	Metal “lithium”, metal “potassium”, metal “natrium”, yellow phosphorus, phosphorus sulfide, red phosphorus, celluloids, calcium carbide (a.k.a, carbide), lime phosphide, magnesium powder, aluminum powder, metal powder other than magnesium and aluminum powder, sodium dithionous acid (a.k.a., hydrosulphite)
	Acidic substance	①Potassium chlorate, sodium chlorate, ammonium chlorate, and other chlorates
		②Potassium perchlorate, sodium perchlorate, ammonium perchlorate, and other perchlorates
		③Potassium peroxide, sodium peroxide, barium peroxide, and other inorganic peroxides
		④Potassium nitrate, sodium nitrate, ammonium nitrate, and other nitrates
		⑤Sodium chlorite and other chlorites
		⑥Calcium hypochlorite and other hypochlorites
	Flammable substances	①Ethyl ether, gasoline, acetaldehyde, propylene chloride, carbon disulfide, and other substances with ignition point at a degree 30 or more degrees below zero.
		②n-hexane, ethylene oxide, acetone, benzene, methyl, ethyl, ketone, and other substances with ignition point between 30 degrees below zero and less than zero.
		③ Methanol, ethanol, xylene, pentyl acetate, (a.k.a. amyl acetate) and other substances with ignition point between zero and less than 30 degrees.
		④Kerosene, light oil, terebinth oil, isopenthyl alcohol (a.k.a. isoamyl alcohol), acetic acid and other substances with ignition point between 30 degrees and less than 65 degrees.
	Combustible gas	Hydrogen, acetylene, ethylene, methane, ethane, propane, butane and other gases combustible at 15 degrees at one air pressure.

13. List of replacement parts

Structural parts

No ※	Part name		Code	Specification	Manufacturer
1	Steel wire rope of front window frame		MS9040190	MS90-40190	YSC
2	Brake block to prevent door from falling down	MS-90C	KT18040600	HM-250V (cutting-off process)	YSC
3	Adjusting foot		4280040008	KC-280-3	YSC
4	Tap		A139900002	XU PAI 8593	YSJ
5	Caster (of tray)		SJA08058	26115-73	YSJ
			SJA08059	26215-73 (with brake)	

※ For [NO], please refer to [3. Names and functions of parts].

Electrical parts

Symbol ※	Part name	Code	Specification	Manufacturer
Q1	ELB (115V 20A)	A010410001	BV-DN 1P+N 20A 30mA	MITSUBISHI
SW1	Switch	A011502001	3A/250V(T80-T)	YSJ
SW2	Switch	A011501001	C136	YSJ
FL	Fluorescent light	A019900002	PAK-LED-T5-8WD-865	YSJ
SC	Socket	A011306004	WN1512K	YSJ
-	Terminal block	A011302002	T3052-6-4P-CLO	YSJ
TF	Transformer	B010701004	AD21-100A2	YSJ

※ For symbol, please refer to page 38 [11. Wiring diagram].

14. Standard installation manual

Install the product according to the followings: (Confirm separately for optional items or special specifications).

Model	Serial number	Date	Installation mgr. (company name)	Installation mgr.	Judgment

№	Item	Implementation method	TOC No. Reference page of the operating instruction manual	Judg ment
Specification				
1	Model, accessories	・Confirm the specification according to model ・Confirm according to accessories	2. Before put into service P.8 10. Specification P.36	
2	Setting	・Visual check of environmental conditions Caution: Take care for environment	1. Safety precautions P.7	
		・Securing a space		
3	Connection work	・electric, water pipe, gas, drainage, pipeline	2. Before put into service Customer's requirements about equipment P.18	
Operation-related matters				
1	Power voltage	・ Measure the user's voltage (switchboard, outlet) with a multimeter ・Measure voltage during operation (shall meet the standard) Caution: Always use a plug that meets the specification for attaching to the power switch or breaker.	2. Before put into service ・must connecting grounding wire P.10 10. Specification P.37 ・Specification—power source	
2	Operation start	・Operation start	4. Using procedures P.23	
3	Adjust air volume	・Adjust air volume	4. Using procedures P.24 10. Specification P.37	

14. Standard installation manual

Instruction					
1	Operation instruction	Explain operations of each part according to the instruction manual	4. Using procedures ・Operating procedures 1. Safety precautions ～ 12. List of dangerous materials	P.23 P.1 P.39	
2	Error codes	Explain the customer about error codes and procedures for release according to the instruction manual	8. Trouble shooting ～9. After sales service and warranty	P.32 P.33	
3	Maintenance and inspection	Explain operations of each part according to the instruction manual	6. Maintenance procedures ・Daily inspection/maintenance	P.36	
4	Completion of installation Entries	・Fill in the installation date and the installation mgr. on the nameplate of the main unit ・Fill in necessary information to the warranty card and hand it over to the customer ・Explanation of the route for after-sales service	9. After sales service and warranty	P.33	

15. Unit · Connection working

In order to maintain after delivery, please fill in the following information.

The hood needs to be connected to your facility's exhaust fan, pipeline, water supply, drainage and electricity in order to function correctly. If you are using poisonous materials it should have a separate exhaust fan, pipeline and drainage to avoid contamination or intoxication. Proper maintenance for all supplies is necessary.

After a period of time, it's inconvenient for maintenance if the construction responsibilities are not defined.

Please fill in the information of product and constructor for further maintenance after delivery.

Item	Name	Manufacturer, constructor	Model	Delivery· construction date
Product	Hood	YAMATO Scientific	MS-90C	
Product	Exhaust fan			
Construction	Air exhaust pipe			
Construction	Water supply			
Construction	Drainage			
Construction	Electric			
Construction	Gas			

Limited liability

Be sure to use the unit strictly with the following handling and operating instructions in this instruction manual.

Yamato Scientific Chongqing Co., Ltd. assumes no responsibility for an accident or a malfunction caused by use of this product in any way not specified in this operating instruction.

Never attempt to perform matters prohibited in this operation instruction.

Otherwise, an unexpected accident may result.

Notice

- Descriptions in this operating instruction are subject to change without notice.
- We will replace a manual with a missing page or paging disorder.

Instruction Manual

Fume Hood

Model MS-90C

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Revision

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