Shaking Bath

Model

BW101/201/400

Instruction Manual

- Second Edition -

- Thank you for purchasing " Shaking Bath, BW Series" of Yamato Scientific Co., Ltd.
- To use this unit properly, read this "Instruction Manual" thoroughly before using this unit.
  Keep this instruction manual around this unit for referring at anytime.

⚠WARNING!:
Carefully read and thoroughly understand the important warning items described in this manual before using this unit.

Yamato Scientific Co. LTD.,

Contents

Explanation

MEANING OF ILLUSTRATED SYMBOLS

Illustrated Symbols

Various symbols are used in this safety manual in order to use the unit without danger of injury and damage of the unit. A list of problems caused by ignoring the warnings and improper handling is divided as shown below.Be sure that you understand the warnings and cautions in this manual before operating the unit.

⚠WARNING! If the warning is ignored, there is the danger of a problem that may cause a serious accident or even fatality.

⚠CAUTION! If the caution is ignored, there is the danger of a problem that may cause injury/damage to property or the unit itself.

Meaning of Symbols

This symbol indicates items that urge the warning (including the caution).
A detailed warning message is shown adjacent to the symbol.

This symbol indicates items that are strictly prohibited.
A detailed message is shown adjacent to the symbol with specific actions not to perform.

This symbol indicates items that should be always performed.
A detailed message with instructions is shown adjacent to the symbol.

Table of Illustrated Symbols

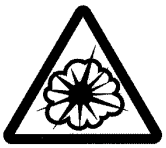
Warning


Warning, generally


Warning, high voltage


Warning, high temperature


Warning, drive train


Warning, explosive

Caution


Caution, generally


Caution, electrical shock


Caution, scald


Caution, no road heating


Caution, not to drench

Caution, water only


Caution, deadly poison

Prohibit


Prohibit, generally


Prohibit, inflammable


Prohibit, to disassemble


Prohibit, to touch

Compulsion


Compulsion, generally


Compulsion, connect to the grounding terminal

Compulsion, install on a flat surface


Compulsion, disconnect the power plug


Compulsion, periodical inspection

Fundamental Matters of "WARNING!" and "CAUTION!"

WARNING!

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 page23 "List of Dangerous Substances".)

Always ground this unit

Always ground this unit on the power equipment side in order to avoid electrical shock due to a power surge.

If a problem occurs

If smoke or strange odor should come out of this unit for some reason, turn off the power key right away, and then turn off the circuit breaker and the main power. Immediately contact a service technician for inspection. If this procedure is not followed, fire or electrical shock may result. Never perform repair work yourself, since it is dangerous and not recommended.

Do not use the power cord if it is bundled or tangled

Do not use the power cord if it is bundled or tangled. If it is used in this manner, it can overheat and fire may be caused.

Do not process, bend, wring, or stretch the power cord forcibly

Do not process, bend, wring, or stretch the power cord forcibly. Fire or electrical shock may result.

Do not disassemble or modify this unit

Do not disassemble or modify this unit. Fire or electrical shock or failure may be caused.

Do not touch high-temperature parts

Some parts of this unit may become hot during and just after operation. It may cause burns.

CAUTION!

During a thunder storm

During a thunderstorm, turn off the power key immediately, then turn off the circuit breaker and the main power. If this procedure is not followed, fire or electrical shock may be caused.

Requirements for Installation

WARNING!

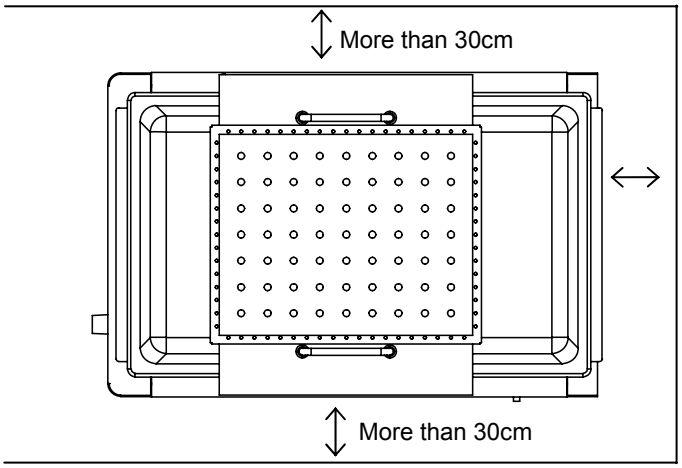
1. Always ground this unit

- Connect the power plug to a receptacle with grounding connectors.
- Do not forget to ground this unit, to protect you and the unit from electrical shock in case of power surge. Choose a receptacle with grounding connectors as often as possible.
- Do not connect the grounding wire to a gas pipe, or by means of a lightning rod or telephone line. A fire or electrical shock will occur.

2. Choose a proper place for installation

- Do not install this unit in a place where:
  - Rough or dirty surface.
  - Flammable gas or corrosive gas is generated.
  - Ambient temperature exceeds 35°C.
  - Ambient temperature fluctuates violently.
  - There is direct sunlight.
  - There is excessive humidity and dust.
  - There is a constant vibration.

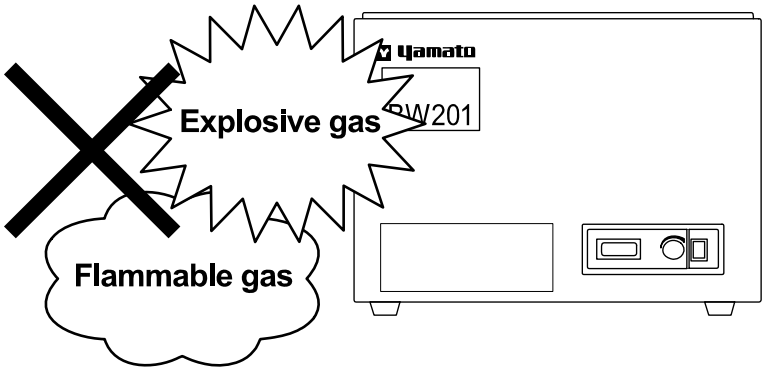
- Install this unit on a stable place with the space as shown below.



Requirements for Installation

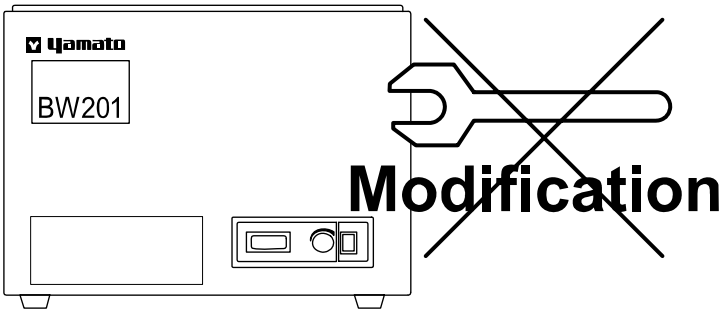
3. Do not use this unit in an area where there is flammable or explosive gas

- 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.
- To know about flammable or explosive gas refer to page23 “List of Dangerous Substances”.



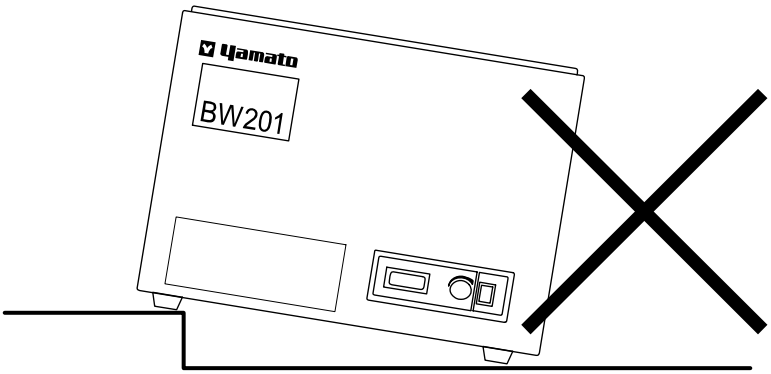
4. Do not modify

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



5. Installation on horizontal surface

- Set this unit to the flattest place. Setting this unit on rough or slope place could cause the vibration or noise, or cause the unexpectible trouble or malfunction.



Requirements for Installation

⚠CAUTION!

6. Choose a correct power distribution board or receptacle

- Choose a correct power distribution board or receptacle that meets the unit's rated electric capacity.

Electric capacity: 100V AC, 15A

7. Before/after installing

- It may cause injure to a person if this unit falls down or moves by the earthquake and the impact. etc..To prevent, take measures that the unit cannot fall down, and not install to busy place.
- Touching the unit may cause a burn during and just after the operation. To prevent, take measures that putting up a notice of operating etc..

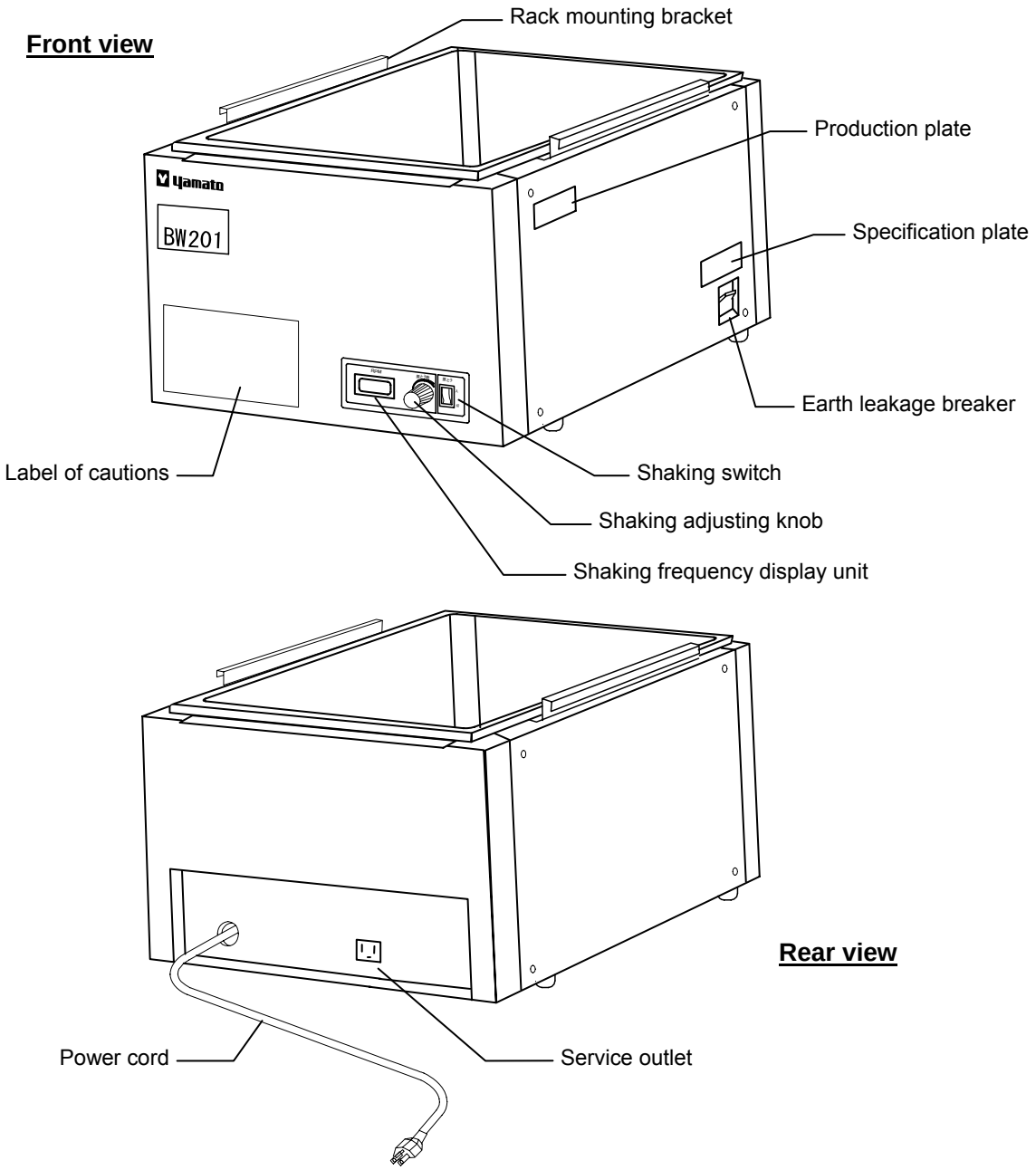
8. Handling of power code

- 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 (wiring exposed, breakage, etc.), immediately turn off the power at the rear of this unit and shut off the main supply power. Then contact your nearest dealer for replacement of the power cord. Leaving it may cause a fire or electrical shock.
- Connect the power plug to the outlet which is supplied appropriate power and voltage.

Description and Function of Each Part

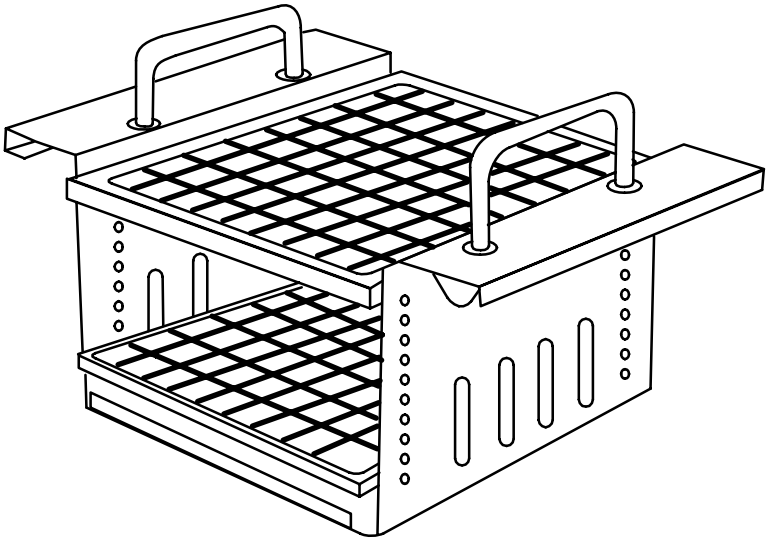
Main Unit



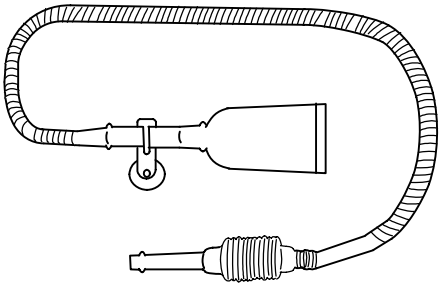
Part Name	Function
Shaking Adjusting Knob :	Turn to clockwise to raise the shaking speed, and turn to counterclockwise until the original point to stop shaking. The maximum setting value is 160 RPM.
Shaking Switch :	Press "ON" (UP) to start shaking, and press "OFF" (LOW) to stop shaking.
Shaking Frequency Display Unit :	Displays the current shaking frequency in RPM.
Earth Leakage Breaker :	Turn "ON" (UP) to supply the power, and turn "OFF" (LOW) to shut off the power.
Rack mounting bracket :	Shaking rack is to be mounted.

Attached Accessories

Shaking Rack



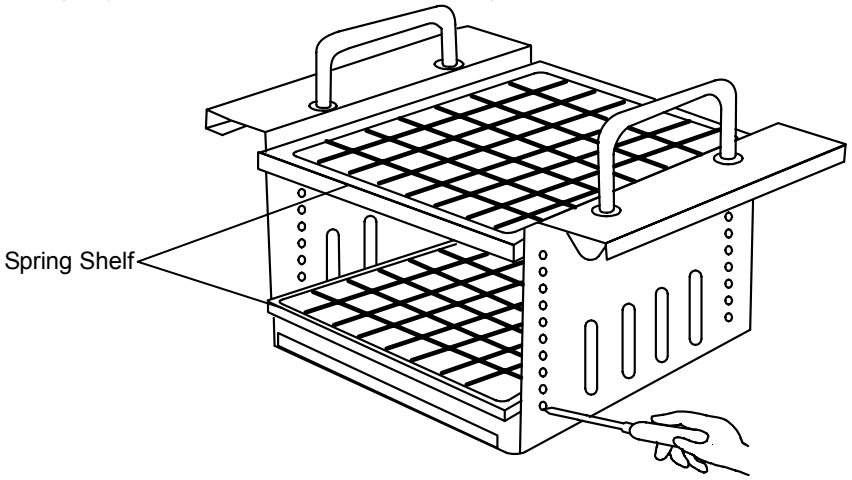
Water Drain Pump (Only for BW201/400)



Preparation

1. Adjust the shaking rack

- Detach the spring shelf and spring matching to the shape, size of the sample container, and spring mounting position. The spring shelf is fixed to the side of the rack with screws. Remove the screws from the shelf using the driver, and set the shelf to the appropriate position. Besides, since each spring is just hooked on the shelf, pulling up the shelf detaches the spring.

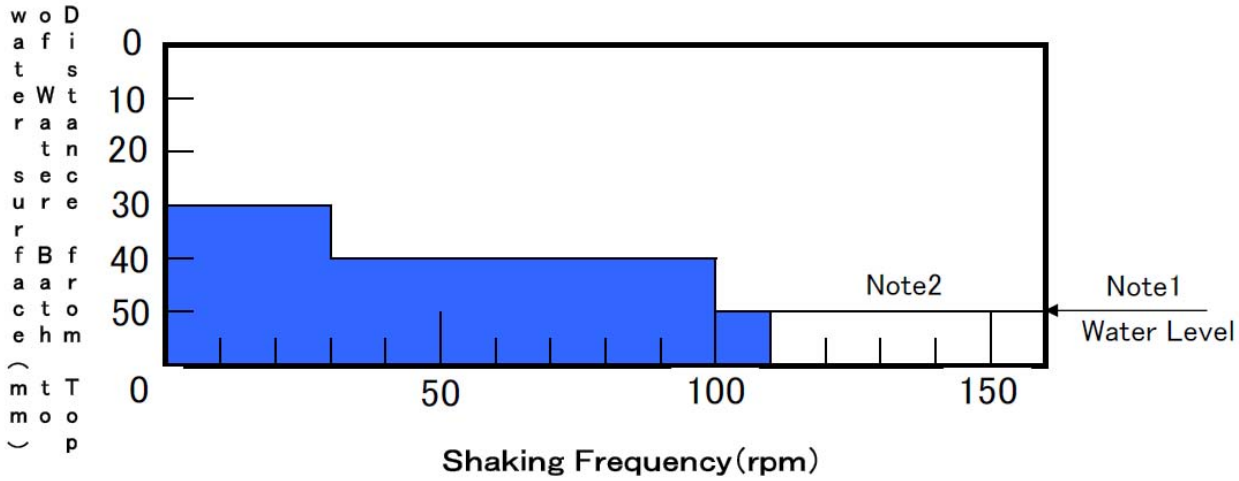


2. Adjust the shaking width

- The shaking width of the device at the shipping is set at 40mm. If the user needs the smaller value than this, adjust the shaking width referring to the "Shaking Width Adjusting Method" (Page 12).

3. Pour the water into the water bath

- The water level differs depending on the shaking frequency or shape and quantity of the container. Pour the water up to the appropriate water level referring to the following graph.



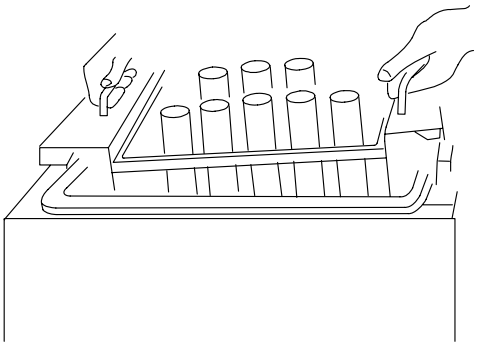
NOTE)

1. This is the water level without spilling the water when inserting the test tube to the rack with gap.
2. In case of operating BW201, there is the case that the water is spilt out of the bath when inserting the test tube to the rack with no gap. Remove the test tubes in the second to third row counted from both ends.
3. When using this unit by combining with the Immersion constant temperature device, the maximum water level is set 60mm under the top of the water bath.

Preparation

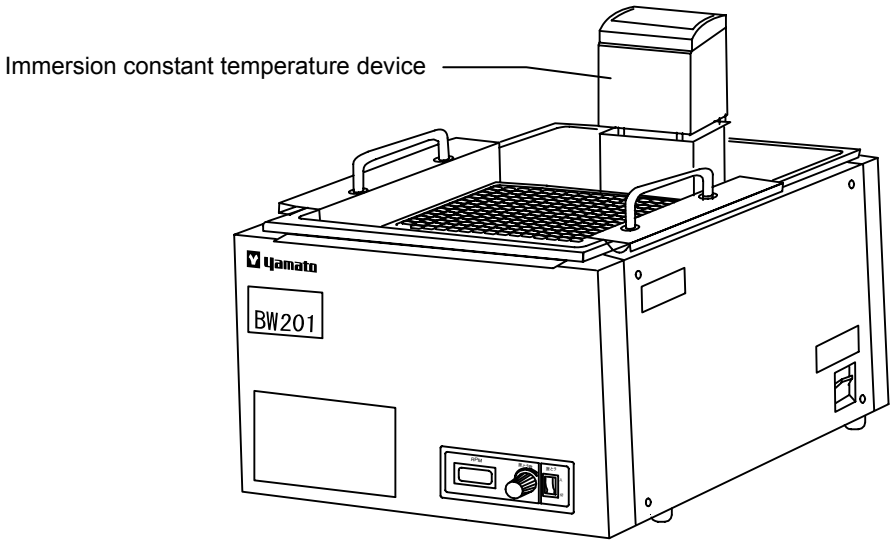
4. Set the shaking rack

- For easy setting, set one side of the shaking rack to the rack mounting bracket, and then set the other side of the rack with the rack expanding to outside.

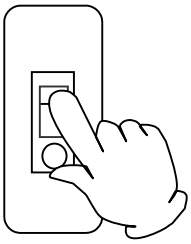
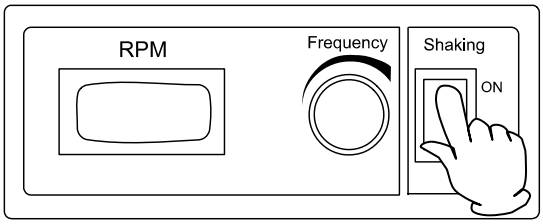
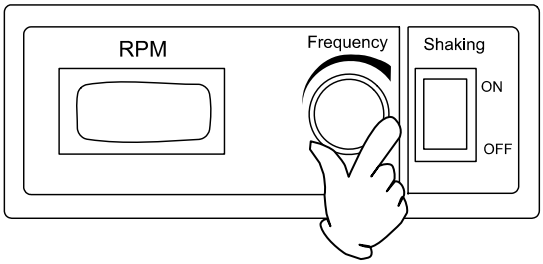
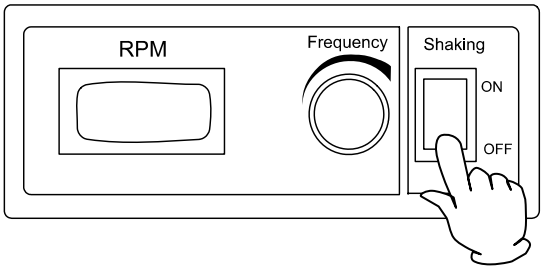


5. Immersion constant temperature device (Use the “Thermo-Mate BF” Model.)

- For using this unit combining to the Immersion constant temperature device, set it behind the main body.
- The power can be supplied by connecting to the service outlet at the rear of the main body. Note that use the service outlet with the earth leakage breaker of the main body be "ON" status.



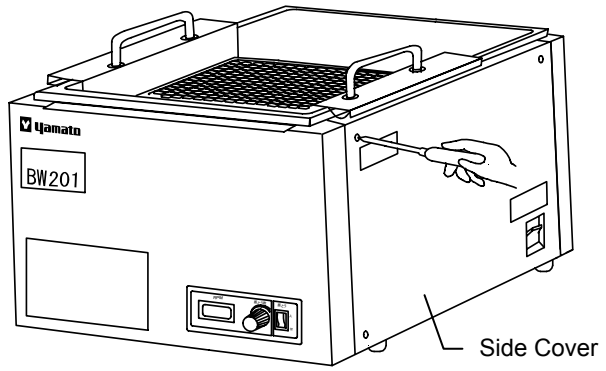
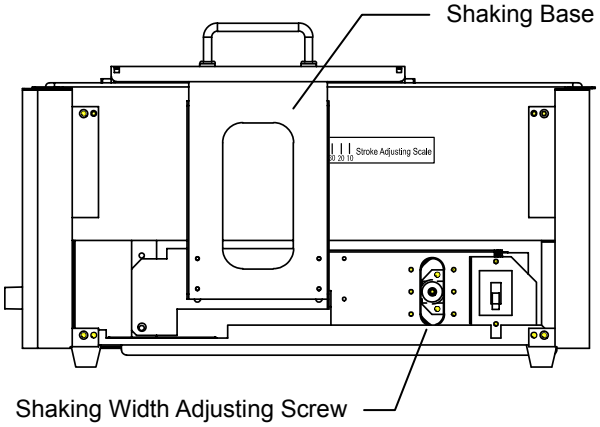
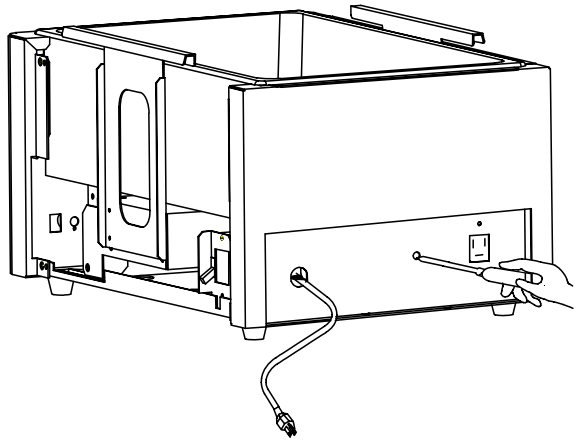
Shaking Frequency Setting

Shaking Frequency Setting Method 	**⚠CAUTION!** Turn the shaking frequency adjusting knob back to the minimum for preventing from risk, and turn on the earth leakage breaker. 1. Toggle the earth leakage breaker to "ON".
	2. Toggle the shaking switch to "ON". Pressing the "ON" side (UP) of the shaking switch changes the device into the shaking status.
	3. Set the shaking frequency. Turning the shaking frequency adjusting knob to clockwise raises the shaking speed. The shaking frequency is displayed on the shaking frequency display unit. Set the shaking frequency as watching the displayed value. ❖ Use this unit with the shaking frequency at under 160 rpm.
	4. For stopping shaking… Pressing the "OFF" side of the shaking switch stops shaking. The power is still supplied to the device with this status (just stopping shaking status). If the user does not operate subsequently, turn off the earth leakage breaker. Turn the shaking frequency adjusting knob back to the minimum for preventing from risk, and turn on the power.

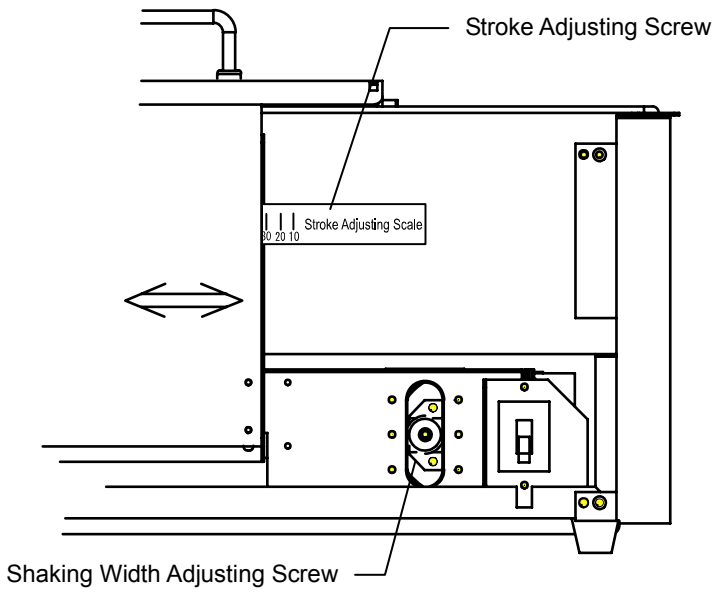
Shaking Width Adjusting Method

⚠CAUTION!

Turn off the power without fail, and remove the cord from the outlet before setting.

	1. Remove four screws on the right side of the main body, and detach the side cover.
	2. Set the shaking base at the forefront of the unit.
	3. Insert the driver (outer diameter: about φ6mm, length: around 100mm or more), and fix it so as not to move to left and right.

Shaking Width Adjusting Method



4. Loosen the shaking width adjusting screw using the driver, and adjust the end of the shaking base to the stroke adjusting scale. After adjusting, tighten the shaking adjusting screw securely using a driver.
5. Pull out the driver inserted to the rear of the main body.
6. Attach the side cover.
7. Turn on the power, and check the performance. Start the operation after checking that there exist no noise and the shaking activates smoothly. If any noise is detected, detach the side cover, and check whether the shaking adjusting screw is loosened, or whether the roller is set on the rail of the shaking base.

WARNING!

If a problem occurs

If smoke or strange odor should come out of this unit for some reason, turn off the power key right away, and then turn off the breaker and the main power. Immediately contact a service technician for inspection. If this procedure is not followed, fire or electrical shock may result. Never perform repair work yourself, since it is dangerous and not recommended.

Substances that cannot be used

Never use explosive substances, flammable substances and substances that include explosive or flammable ingredients in this unit. Explosion or fire may occur. (Refer to page23 “List of Dangerous Substances”.)

Do not get caught in the shaking part

Do not get your hand caught in the moving part of the rack during shaking.

Adjust the shaking width after turning off the earth leakage breaker without fail

Turn off the earth leakage breaker before adjusting the shaking width, and remove the cord from the outlet. Touching the shaking switch might be in danger of operating the device suddenly.

CAUTION!

This unit is not explosion-proof

Never use flammable liquid and the sample that include vapor.

Do not sprinkle water on this unit

Pay attention not to sprinkle water on the control panel and earth leakage breaker. When the device get wet with water, turn off the breaker of power supply and wipe water off immediately. Failure to do so could cause the electric leakage or electric shock.

Water to be applied

Do not use the water including other liquids.
The recommended water to be applied is, if possible, either ion exchange water or distilled water. Using that of water reduces accumulation of fur or dirt, so it allows you easy maintenance.

Best	Passable	⚠ Danger
Ion exchange water, Distilled water	City water	Flammable liquid

Do not use this unit at 80℃ or more, or under the room temperature

Using this unit at 80℃ or more, the inner temperature might rise, and thus cause the malfunction of the electrical parts or deterioration of the packing. Do not operate this unit under such temperature.

⚠CAUTION!

Operate with the shaking frequency at 160 rpm or under

When operating this unit with the shaking frequency at over 160 rpm, the unit activates and might be in danger of falling from the working base. Operate this unit with the shaking frequency at 160 rpm or under.

Do not pour too much water

Pouring too muck water might be spilt the water out of the water bath during shaking. Keep the amount of the water at the appropriate water level. (Refer to "3. Pour the water into the water bath" on Page 9.)

Do not step on this unit

Do not step on this unit. It will cause injury if this unit fall down or break.

Do not put anything on this unit

Do not put anything on this unit. It will cause injury if fall.

During a thunder storm

During a thunderstorm, turn off the power key immediately, then turn off the circuit breaker and the main power. If this procedure is not followed, fire or electrical shock may be caused.

Return after power failure

When power is supplied after a power failure, the device automatically starts operation again with the same state as just before the power failure. It is danger that the device starts unattached operation after a power failure. We recommend for you to turn off the switch of this unit if a power failure occurs during operation.

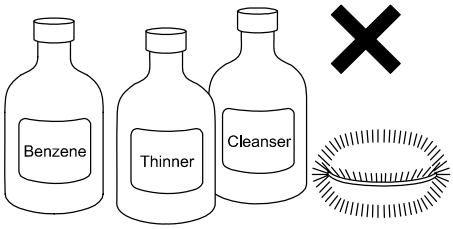
Daily Inspection and Maintenance

⚠WARNING!

- Disconnect the power cable from the power source when doing an inspection or maintenance unless needed.
- Perform the daily inspection and maintenance after returning the temperature of this unit to the normal one. (Be sure to check the water in the test bath is cooled down.)
- Never disassemble this unit except adjusting the shaking width.

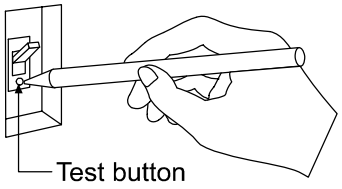
⚠CAUTION!

- Use a well-drained soft cloth to wipe dirt on this unit. Do not use benzene, thinner or cleanser for wiping. Do not scrub this unit. Deformation, deterioration or color change may result in.



Monthly maintenance

- Check the earth leakage breaker function.
  1. Connect the power cord.
  2. Turn the breaker on.
  3. Push the red test switch by a ballpoint pen etc.
  4. If there is no problem, the earth leakage breaker will be turned off.



Water bath maintenance

- The density of the water in the water bath is concentrated gradually, and dirt might be attached and accumulated. If a fur or dirt is attached or accumulated, dip the water out of the water bath, and clean it completely.
- When the water bath becomes dirt with a fur or so, drain the water from the water bath using the attached drain pump (only attached to BW201/400), remove the rack, then the water bath by grasping the handle, and clean the water bath in the sink.

For any questions, contact the dealer who you purchased this unit from, or the nearest sales division in our company.

When not using this unit for long term / When disposing

⚠CAUTION!

When not using this unit for long term…

- Turn off the power and disconnect the power cord.

⚠WARNING!

When disposing…

- Keep out of reach of children.
- Remove the driving parts.
- Treat as large trash.

Environmental protection should be considered

We request you to disassemble this unit as possible and recycle the reusable parts considering to the environmental protection. The feature components of this unit and materials used are listed below.

Component Name	Material
Parts of Main Unit	
Exterior	Iron bonderizing steel plate baked with melamine resin coating
Water bath	Stainless steel plate SUS304
Shaking rack	Stainless steel plate SUS304
Rack spring	Stainless steel SUS304
Rubber leg	Synthetic rubber
Electric parts mounting plate	Aluminum
Fly wheel	Iron SS41
Ditch rubber	Silicon rubber
Knob	6 Nylon
Cushion rubber	Polyethylene
Bearing guide	Polyacetal
Production plates	Polyester
Electrical Parts	
Motor	Iron, Aluminum alloy, and others
Gear head	Iron, Aluminum alloy, and others
Power Cord, Wiring Material, etc.	Wiring material and board coated by synthetic rubber and resin

In the Event of Failure…

Trouble Shooting

Condition	Possible Causes
The device does not start shaking when turning on the shaking switch.	• Earth leakage breaker is turned to “OFF”. • Power plug is not connected to the receptacle correctly. • The shaking frequency adjusting knob is set to the minimum. • Shaking rack is touching any obstacle. • The shaking adjusting screw is loosening. • Thermal protector of shaking motor is operated. After removing an obstacle, reset the power supply.

When power failure occurs…

- When power is supplied after a power failure, the device automatically starts operation again with the same state as just before the power failure. It is danger that the device starts unattached operation after a power failure.
- We recommend for you to turn off the switch of device if a power failure occurs during operation.

In the case if the error other than listed above occurred, turn off the power switch and primary power source immediately. Contact the shop of your purchase or nearest Yamato Scientific Service Office.

In Case of Request for 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 the Yamato Scientific's sales office.

< Check following items before contact >

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

} See the production plate attached to this unit.

- ◆ About Trouble (in detail as possible)

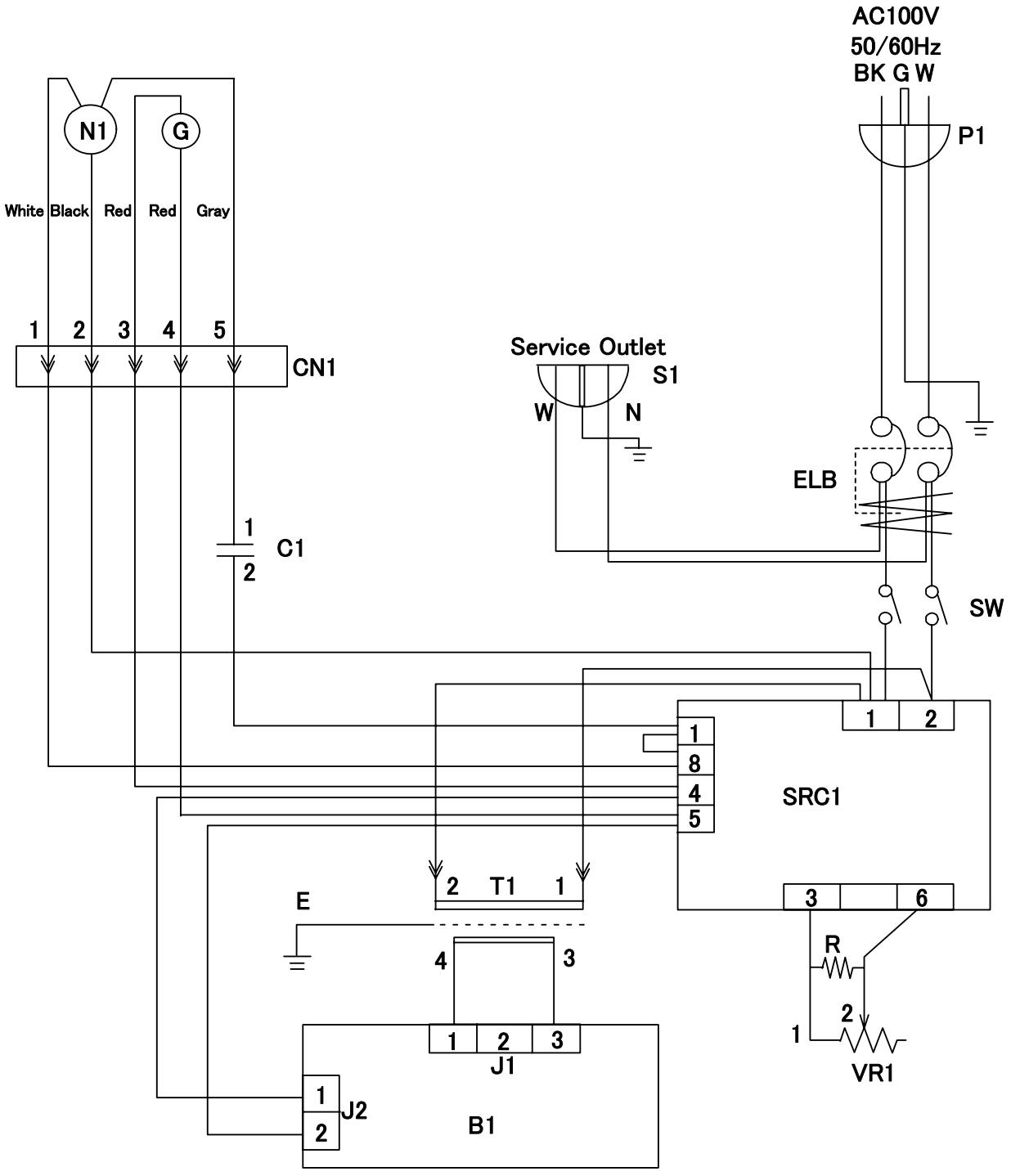
Minimum Retention Period of Performance Parts for Repair

The minimum retention period of performance parts for repair of this unit is 7 years after discontinuance of this unit.
The "performance part for repair" is the part that is required to maintain this unit.

Specification

		BW101	BW201	BW400
Performance	Shaking method	2-way shaking method		
	Shaking width	10 to 40mm adjustable		
	Shaking frequency	20 to 160 times/min. (Non-stage transmission)		
	Operating temperature range	Room temp. to 80℃: Using with Immersion constant temperature device (Yamato Scientific “Thermo-Mate BF” Model.)		
Configuration	Water bath	Stainless steel plate SUS304		
	Shaking frequency control method	Feedback phase control		
	Shaking frequency setting system	Using the shaking frequency adjusting knob		
	Shaking frequency display system	Digital display		
	Additional function	Service outlet for “Thermo-Mate”: 100V AC 12A		
	Usable liquid	Water only		
	Safety device	Earth leakage breaker, Motor overload prevention (Auto-return thermal protector)		
Standards	Internal dimensions of bath (W×D×H mm)	230×390×150	300×500×150	380×535×150
	External dimensions (*) (W×D×H mm)	295×445×285	370×560×285	445×585×295
	Water bath capacity	Approx. 12L	Approx. 20L	Approx. 30L
	Weight	Approx. 28Kg	Approx. 35Kg	Approx. 42Kg
	Power supply	Main unit: 1A, 100V AC 12A (With “Thermo-Mate BF”)		
	No. of container	Test tube (Diameter 15mm)		
		60	126	190
		Erlenmeyer flask (50mL)		
		10	21	30
Accessories		Shaking rack, Drain pump (Only with BW201/400)		

* : The projection is not included for external dimensions.



Symbol	Part name	Symbol	Part name
P1	Power plug	C1	Condenser for motor
P2	Power socket	B1	Rotation times display board
ELB	Earth leakage breaker	VR1	Rotation times setting volume
SRC1	Speed control pack	CN1	Driving part socket
T1	Transformer	SW	Switch
M1	Motor	R	Resistor

Replacement Parts Table

BW101/201

Part Name	Code No.	Specification	Manufacturer
Motor (with thermal protector)	2-14-000-0038	100V 25W S8125GC-S12(TP)	Seishin
Gear head	2-14-000-0041	S8KA7.5B1	Seishin
Speed controller	1-09-000-0005	SRC02 100V	Seishin
Rotation times display board	RE510-40120		Yamato Scientific
Transformer	4-18-000-0044	100V FR 301N234	Yamato Scientific
Earth leakage breaker	2-06-000-0019	FG32R/15-30NA 15A	Fuji Denki
Outlet	2-08-001-0002	WN1101	Matsushita
Variable resistor	2-12-002-0005	RV20YN 15S 50kΩ	Tokyo Cosmos
Switch	2-01-001-0016	DS-850S-F2-ON	Miyama

BW400

Part Name	Code No.	Specification	Manufacturer
Motor (with thermal protector)	2-14-000-0039	100V 40W S9140GCH-S12(TP)	Seishin
Gear head	2-14-000-0042	S9KA7.5B1H	Seishin
Speed controller	1-09-000-0005	SRC02 100V	Seishin
Rotation times display board	RE510-40120		Yamato Scientific
Transformer	4-18-000-0044	100V FR 301N234	Yamato Scientific
Earth leakage breaker	2-06-000-0019	FG32R/15-30NA 15A	Fuji Denki
Outlet	2-08-001-0002	WN1101	Matsushita
Variable resistor	2-12-002-0005	RV20YN 15S 50kΩ	Tokyo Cosmos
Switch	2-01-001-0016	DS-850S-F2-ON	Miyama

Refer to the described code No. for the part to be replaced.

List of Dangerous Substances

Never use explosive substances, flammable substances and substances that include explosive or flammable ingredients in this unit.

EXPLOSIVE

EXPLOSIVE:	Ethylene glycol dinitrate (nitro glycol), Glycerin trinitrate (nitroglycerine), Cellulose nitrate (nitrocellulose), and other explosive nitrate esters
	Trinitrobenzene, Trinitrotoluene, Trinitrophenol (picric acid), and other explosive nitro compounds
	Acetyl hidroperoxide (peracetic acid), Methyl ethyl ketone peroxide, Benzyl peroxide, and other organic peroxides

FLAMMABLE

IGNITING:	Lithium (metal), Potassium (metal), Sodium (metal), Yellow phosphorus, Phosphorus sulfide, Red phosphorus, Celluloid compounds, Calcium carbide, Lime phosphate, Magnesium (powder), Aluminum (powder), Powder of metals other than magnesium and aluminum, Sodium hydrosulfite
OXIDIZING:	Potassium chlorate, Sodium chlorate, Ammonium chlorate, and other chlorate
	Potassium perchlorate, Sodium perchlorate, Ammonium perchlorate, and other perchlorate
	Potassium peroxide, Sodium peroxide, Barium peroxide, and other inorganic peroxide
	Potassium nitrate, Sodium nitrate, Ammonium nitrate, and other nitrate
	Sodium chlorite and other chlorites
	Calcium hypochlorite and other hypochlorites
INFLAMMABLE LIQUID:	Ethyl ether, Gasoline, Acetaldehyde, Propylene chloride, Carbon disulfide, and other flammable substances having a flash point of lower than -30℃
	Normal hexane, ethylene oxide, acetone, benzene, methyl ethyl ketone, and other flammable substances having a flash point of -30℃ or higher but lower than 0℃
	Methanol, Ethanol, Xylene, Pentyl acetate (amyl acetate), and other flammable substances having a flash point of 0℃ or higher but lower than 30℃
	Kerosene, Light oil (gas oil), Oil of turpentine, Isopentyl alcohol (isoamyl alcohol), Acetic acid, and other flammable substances having a flash point of 30℃ or higher but lower than 65℃
FLAMMABLE GAS:	Hydrogen, Acetylene, Ethylene, Methane, Propane, Butane, and other flammable substances which assume a gaseous state at 15℃ and 1 atm

(Source: Appendix Table 1 of Article 6 of the Industrial Safety and Health Order in Japan)

Responsibility

Please follow the instructions in this document when using this unit. Yamato Scientific has no responsibility for the accidents or breakdown of device if it is used with a failure to comply.
Never conduct what this document forbids. Unexpected accidents or breakdown may result in.

Note

- The contents of this document may be changed in future without notice.
- Any books with missing pages or disorderly binding may be replaced.

Instruction Manual for
Shaking Incubator
Model BW101/201/400
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