ROTARY EVAPORATOR

RE550

First Edition

- Thank you for your Yamato Scientific RE series Rotary Evaporator purchase
- For best test data, we recommend you purchase our BM series Water Bath.
  Please call Yamato Scientific for more details.

Read and apprehend the important warnings in this instruction manual prior to use.

Yamato Scientific

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1. Specifications

Type	RE550
Rotation speed *1	20-180rpm
Accuracy of display rotation speed *1	±3rpm (at 20-180rpm)
Drive system	Worm gear system
Rotation speed display system	Digital
Resolution of rotation speed display	1rpm
Glass joint	⏁24/40 Steam Duct or ⏁29/38 Steam Duct S35/20 Receiving Flask
Lift Mechanism	Electric motor auto lift
Motor	Sparkless Induction High Torque Motor
Glass set	Type A, Type B, Type C
Safety device	Overcurrent protection (fuse)
Exterior dimensions (W×D×H)*2	16.5×13.4×24.0 (inches) 42×34×61 (cm)
Weight	32 lb(14.5kg)
Power source(RE only)	AC230V±10% 50Hz 0.4 A
Option	●Evaporation Flask (opaque & frosted ⏁24/40 or ⏁29/38) 2000ml/500ml/300ml/200ml/100ml ●Receiving Flask (opaque & frostedS35/20) 2000ml/500ml/300ml : ●Joint (opaque & frosted) ⏁24/40-24/40, ⏁24/40-19/22, ⏁24/40-14/20 ⏁29/42-29/38, ⏁29/42-24/40, ⏁29/42-19/38, ⏁29/42-15/25, ●Trap Ball (opaque & frosted) ⏁24/40-24/40, ⏁24/40-19/22, ⏁24/40-14/20 ⏁29/42-29/38, ⏁29/42-24/40, ⏁29/42-19/38, ⏁29/42-15/25
Combination Options	●Water Bath BM110/210/410

*1 The rotation speed indicates performance of the unit equipped with (A, B or C type) glass set in case of unloaded operation under rated power.

*2 Glass set is not included.

2. Safety Information

Safety Symbols

Safety Information

This instruction manual and our products apply various indications for safety. Ignoring these indications can cause such situations as listed below. Read and understand the following warning and caution signs in this manual prior to use.

WARNING Indicates the possibility of serious or fatal injury (Note 1).

CAUTION Indicates the possibility of injury (Note 2) or damage (Note 3) to the equipment.

(Note 1) Serious injury : Bodily harm by electric shock, bone fracture or poisoning which may require hospitalization.

(Note 2) Injury : Bodily harm by electric shock, bone fracture or poisoning which may not require hospitalization.

(Note 3) Damage : Any damage on equipment, facility, structure, etc.

Meaning of Graphic Indications

	Shows warning or caution. Specific contents are described aside each sign.
	Shows users important information not to do. Specific contents are described aside each sign.
	Shows users important information sure to do. Specific contents are described aside each sign.

If the motor overloads - stop operation immediately.

If you continue operation under abnormal conditions, the motor will stop automatically. If the motor stops, turn the control knob to the minimum and turn off the power switch.

＊Overload condition exists when the motor surface temperature reaches more than 90℃.

A cause of motor overheating is seized ball bearings.

Make sure that the volume knob indicates “min” before turning the unit on.

Make sure that the control knob is at “min”. If the control knob is not turned to “min”, the evaporation flask turns round when you turn on the power switch.

Move the lift up or down after you stop rotation of the evaporation flask.

If the lift is moved up or down while the evaporation flask is rotating, scalding may occur due to dispersing of hot water. Be sure to move the lift after turning the control knob to the minimum.

Never fail to ground the unit.

This unit uses a 3-conductor power cord (including ground wire). Be sure to ground the unit for safety.

Flammable chemicals

This unit is not explosion proof. Do not use in flammable or explosive gas environments and do not evaporate explosive substances.

The flask clamp is very springy. Be careful not to break the glass apparatus.

The enclosed flask clamp is very springy to hold the glass apparatus firmly. Be careful not to break the glass.

Only water to be used with the Water Bath.

Only water in the Water Bath. Problems can occur if anything other than water is used. Also be sure not to heat with low water level or the bath can overheat.

Use a trap.

Use a trap when you decompress by hydraulic rotary vacuum pump. When you use our Handy Aspirator, fill to overflow.

Maintain the vacuum seal.

- The vacuum seal is expendable. Exchange the seal in case of vacuum-down.
- You can use the vacuum seal without grease. But you desire more longer life of the seal, put silicon grease onto the ripped side of vacuum seal. If you are afraid of sample contamination, use liquid sample.

Cleaning the exterior of RE series evaporator

Do not use any volatile chemicals to clean the exterior of this unit. This could damage the color and shape. Wipe clean with a soft dry towel , etc.-Do not use a brush.

If the unit is not in use for a long period of time, disconnect the power supply.

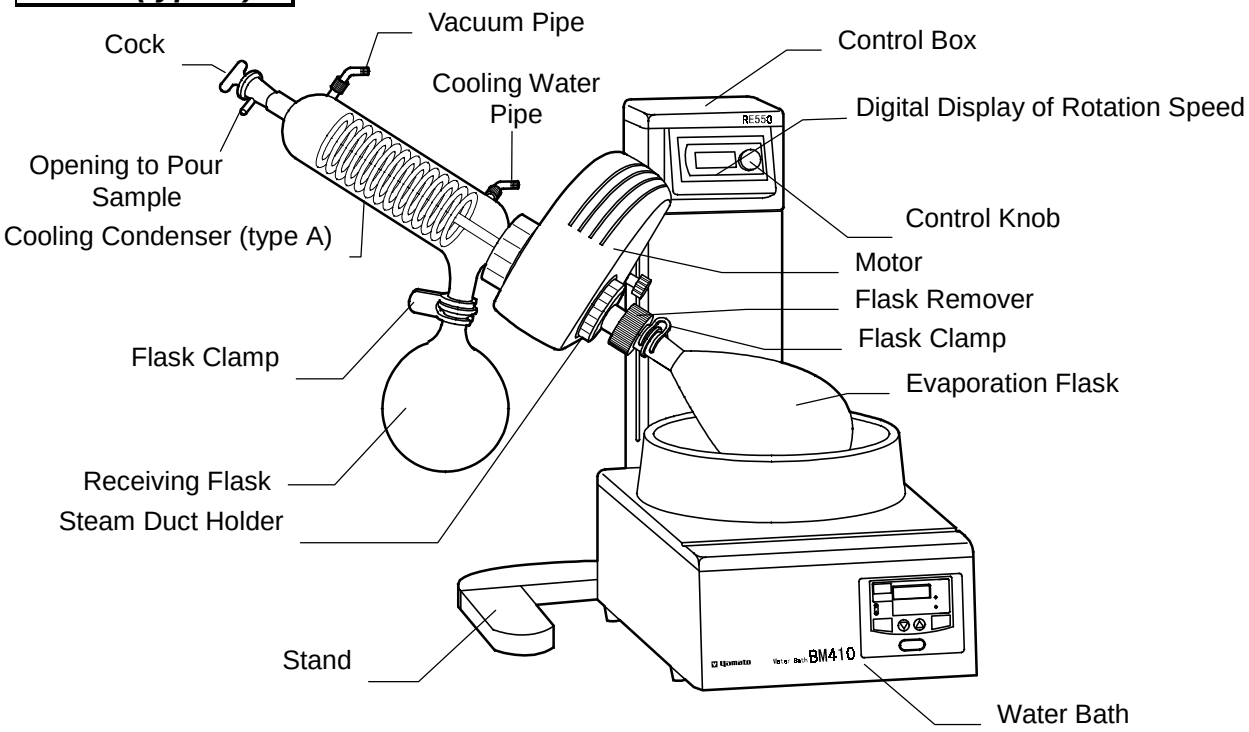
If the unit is not in use for a long period of time, turn the power off and pull out the power cord for safety.

Do not use the unit in flammable or explosive gas environments of substances listed below. Do not evaporate explosive substances.

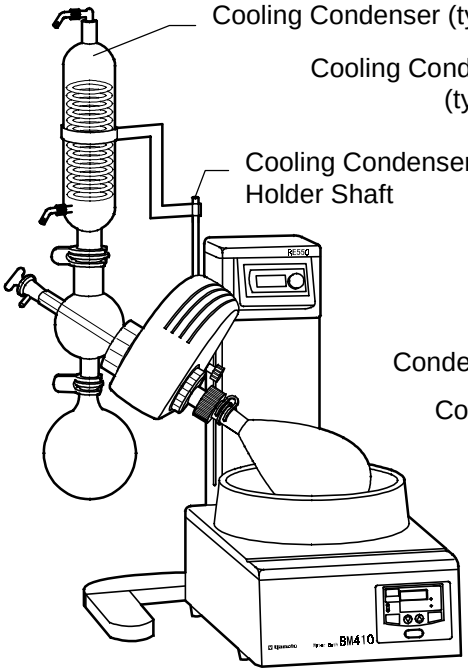
Explosive	Explosive Substance	Nitroglycol, Nitroglycerin, Nitrocellulose, and other explosive nitric esters.
		Trinitrobenzene, Trinitrotoluene, Picric acid, and other explosive nitro compounds.
		Peracetic acid, Methyl ethyl ketone peroxide, Benzoyl peroxide, and other organic peroxides.
		Sodium azide, and other metallic azides
Flammable	Combustible Substance	Metallic lithium, Metallic potassium, Metallic sodium, Yellow phosphorus, Phosphorus sulfide, Red phosphorus, Celluloid, Calcium carbide, Lime phosphate, Magnesium powder, Aluminum powder, and other combustible metal powders and sodium dithionite (hydrosulfite).
	Oxidant	Potassium chlorate, Sodium chlorate, Ammonium chlorate, and other chlorates.
		Potassium perchlorate, Sodium perchlorate, Ammonia perchlorate, and other perchlorates.
		Potassium peroxide, Sodium peroxide, Barium peroxide, and other inorganic peroxides.
		Potassium nitrate, Sodium nitrate, Ammonia nitrate, and other nitrates.
		Sodium chlorite and other chlorites.
		Calcium hypochlorite and other hypochlorites.
	Ignitable Substance	Ethyl ether, Gasoline, Acetaldehyde, Propylene Oxide, Carbon disulfide, and other flammable substances with a flash point below minus 30ºC.
		Normal hexane, Ethylene oxide, Acetone, Benzene, Methyl ethyl ketone, and other flammable substances with a flash point between minus 30ºC and 0ºC.
		Methanol, Ethanol, Xylene, Pentyl acetate (amyl acetate), and other flammable substance with a flash point between 0ºC and 30ºC.
		Kerosene, Light oil, Turpentine oil, Isoamyl alcohol, Acetic acid, and other flammable substances with a flash point between 30ºC and 65ºC
	Combustible Gas	Hydrogen, Acetylene, Ethylene, Methane, Ethane, Propane, Butane and other flammable gas at 15℃ degree and under 1 atmosphere.

3. Identification of Parts

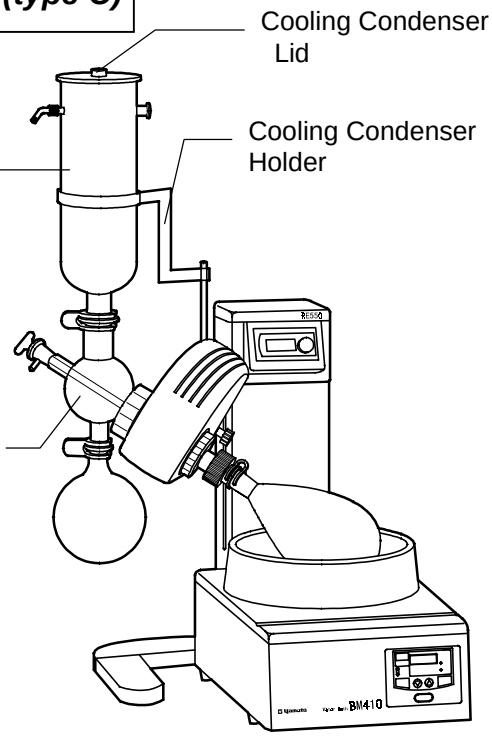
RE550 (type A)



RE550(type B)



RE550(type C)



＊Please understand that our products are subject to some specification changes without notice.

＊The exterior designs above are just examples of the interchangeable components.

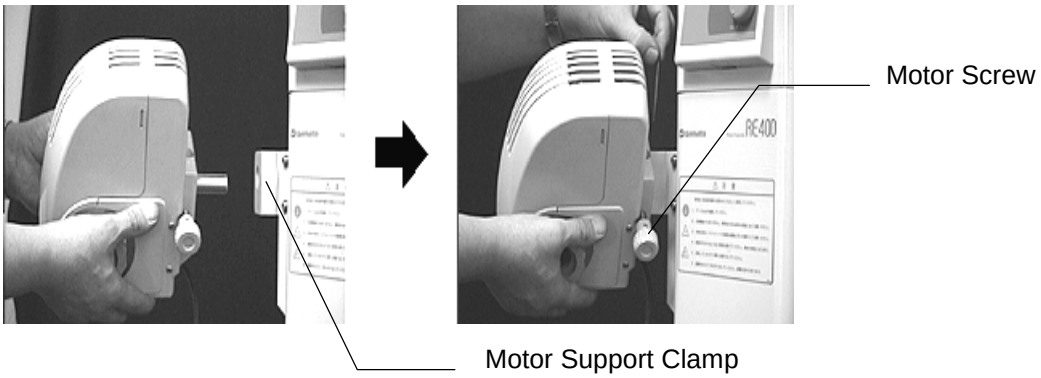
1. Set the Body at a stable place.

Be sure to set the body at a stable place.

2. Attach the motor to the body.

1. Insert the motor bearing bar into the motor support clamp of the body, put D cut surface (flat surface) of the bar perpendicularly to either 2 upper or side screws, and fasten 4 screws tightly by using the attached hexagonal wrench (for M5).
   Then, slant the motor to the right (about 45 °), and finger tightly the motor screw.

If you do not fasten the screws tightly, vibration may occur preventing accurate measurements or the motor may fall causing the glass apparatus to break.



2. Remove the cooling condenser nut (the bigger nut with the coil ring) and coil ring when you attach the motor.

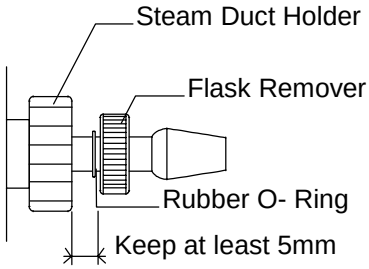
3. Inserting the steam duct into the motor

1.Before installing the steam duct check that the O-rings are in the center hole of motor.
If not, be sure to set them in the correct place (See figure 1 below).

2.Insert the steam duct from the right side into the center hole of the motor.

3.Set the steam duct to the desired position with a minimum of 5mm between the blue flask remover and the steam duct holder.

4.Tighten the steam duct holder by turning clockwise. Be sure to tighten the steam duct holder firmly so the steam duct does not slip.



※When removing the steam duct, first loosen the steam duct holder. Do not remove the steam duct holder or the rings may slip out.

●If the rings come off in setting / removing the steam duct, please refer to figure 1.

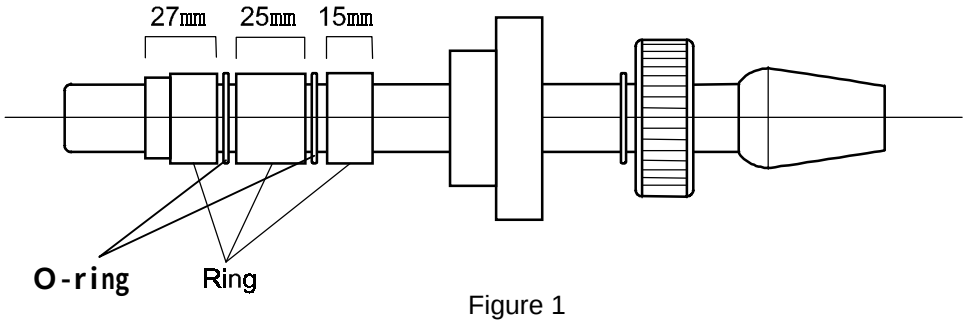


Figure 1

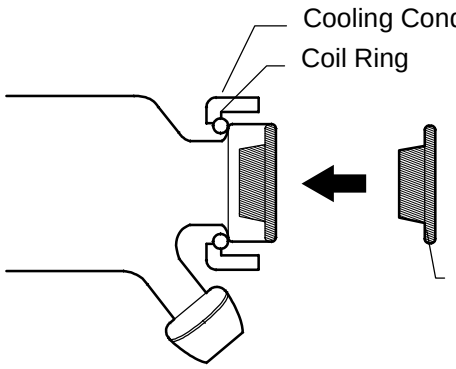
4. Set the cooling condenser nut, coil ring and vacuum seal to the condenser or condenser connector.

1.Remove the cooling condenser nut and coil ring on the left side of motor.

2.Connect the cooling condenser nut and then the coil ring to the condenser or condenser connector (which ever applies). Be sure to put the nut on first.

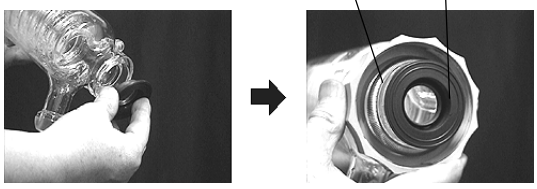
3.Insert the vacuum seal to the condenser or condenser connector (which ever applies).

※ It is optional to put grease on the vacuum seal.

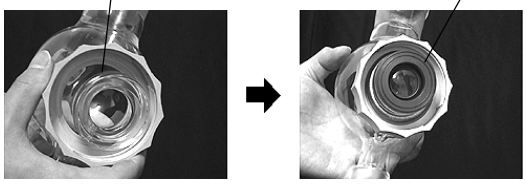


●Insert the convex side of the vacuum seal into the flange of cooling condenser or condenser connector.

Glass Type A



Glass Type B/C



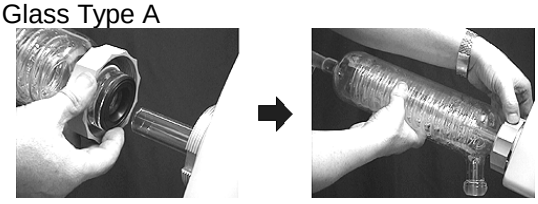
5. Connect cooling condenser or cooling condenser connector to the motor.

Insert the steam duct into vacuum seal, put glass flange to the motor and fasten firmly the cooling condenser nut.

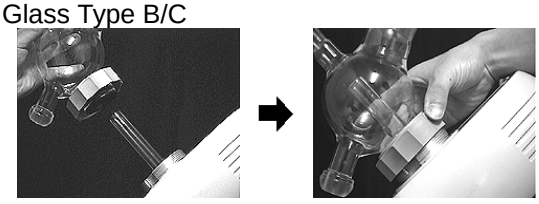
Be careful not to damage the glass coil in cooling condenser when inserting the steam duct.

Be careful not to damage the set vacuum seal when inserting the steam duct.

Glass Type A



Glass Type B/C



●**Removing the coil ring from cooling condenser or condenser connector**

Hook the coil ring by the attached hexagon wrench as shown in the left picture in order to remove the ring easily from the cooling condenser or connecting condenser.

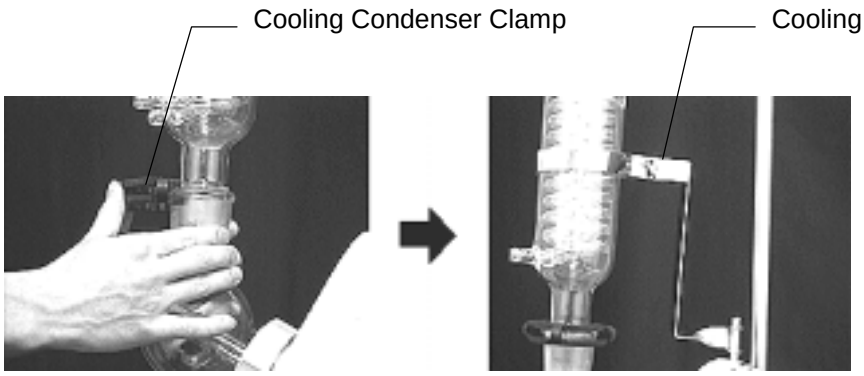
Apply moderate force to remove the coil ring; extreme force may damage the coil ring and or the glass apparatus.

6. Connecting the cooling condenser holder shaft. (glass set B & C only)

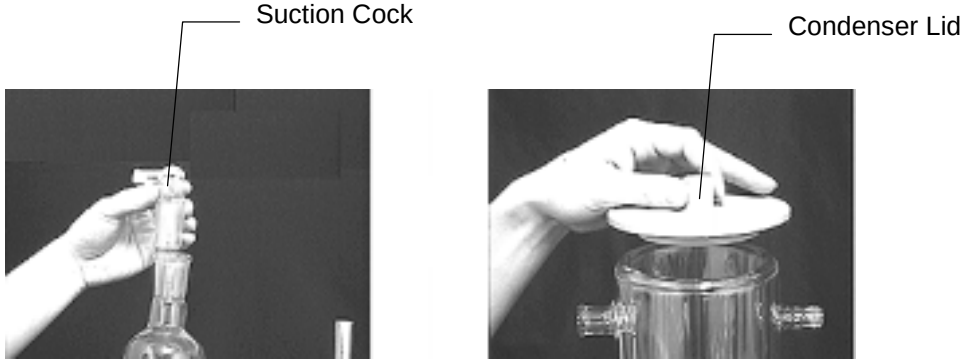
Fit the cooling condenser holder shaft firmly into the screw hole on the back of motor. Put the attached hexagon wrench through the hole on the end of shaft and fasten tightly.

7. Connecting the cooling condenser and condenser holder (B & C condensers only)

1. Connect the cooling condenser to the condenser connector. Attach the cooling condenser clamp.
2. Insert the cooling condenser holder from the top of condenser, while fitting the other side through the holder shaft. (For type C, be sure to insert the cooling condenser holder from the bottom of condenser rather than top and connect the condenser to the condenser connector)



3. Fit the suction cock for type B or the cooling condenser lid for type C.



8. Connecting the Evaporation and Receiving Flasks.

●Evaporation Flask

1.Turn the blue flask remover ring upward.

2.Connect the flask to the steam duct, and attach the evaporation flask clamp.

Flask Clamp

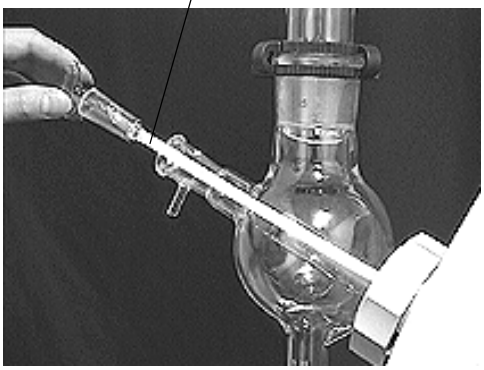
●Receiving Flask

Connect the flask to the cooling condenser or the connecting condenser, and attach the flask clamp.

Flask Clamp

9. Insert the feed tube to the cooling condenser or condenser connector. Assembly is now complete.

Feed Tube



Removing the Evaporation Flask and Steam Duct

10. Evaporation flask

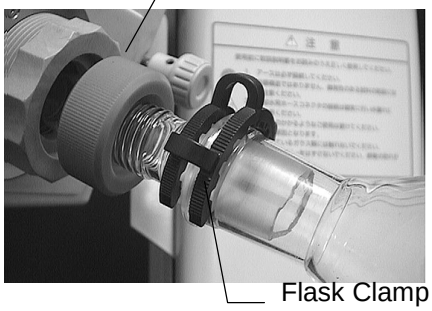
Remover the flask clamp while holding the evaporation flask, and remove the evaporation flask from the steam duct.

If the evaporation flask does not easily come off, use the blue flask remover.

●**For easy evaporation flask removal…**

Turn the flask remover to touch the end of flask. Rotate further left and you can push out the flask easily without force.

＊**If you tap the flask to remove, the glass apparatus may break.**



11. Steam duct

When you loosen the steam duct holder, the joint comes off easily.

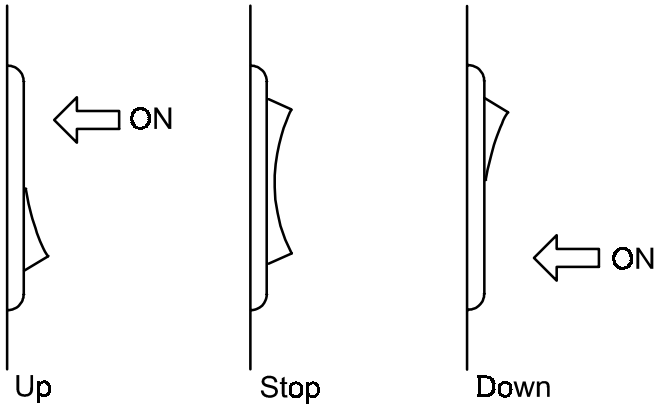
＊**Loosen the steam duct holder, but do not take it off when you remove the steam duct. If you remove the holder, the rings will come off.**

●In case the rings should come off, and you do not know how to assemble them, see the chart for re-assembly(P8).

12. How to operate the lift.

Easily move the lift up or down by using the lift switch located on the right side of the unit.

●Operate the lift switch as follow;



To lift up

- Push the upper side of the lift switch, then the lift goes up.
- Even if you let your hand off the switch, the lift stops automatically.

To lift down

- Push the lower side of the lift switch, then the lift goes down.
- Even if you let your hand off the switch, the lift stops automatically.

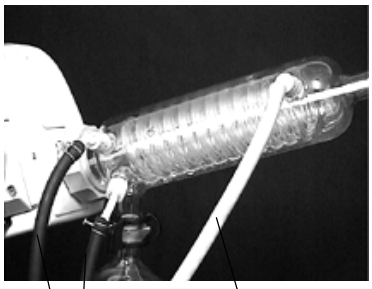
＊**The lift stops automatically at the upper or lower end of stroke.**

13. Connecting the Vacuum Hose and Water Supply

1. Remove plastic threaded joints.
2. Moisten attaching hoses with water for easy attachment.
   Do not use any type of lubricating oil.
3. Connect plastic threaded joints to cooling condenser hoses.
   (id=9mm)
4. Attach hose clamps to plastic threaded joints.
5. Attach to cooling condenser.
6. Connect plastic threaded joint to vacuum hose.
   (id=6mm)
7. Attach to vacuum suction pipe.
   (Hose clamp is not necessary)

Do not connect the hoses to the joints connected to the condenser.

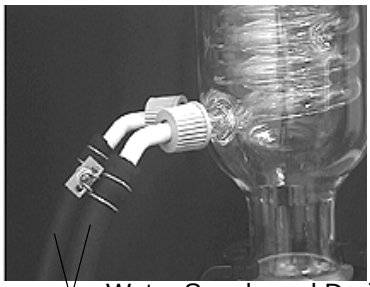
●In case of glass A



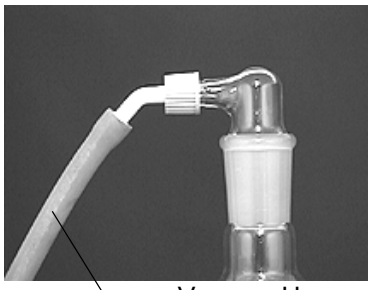
Vacuum Hose

Water Supply and
Drain Hoses

●In case of glass B



Water Supply and Drain Hoses

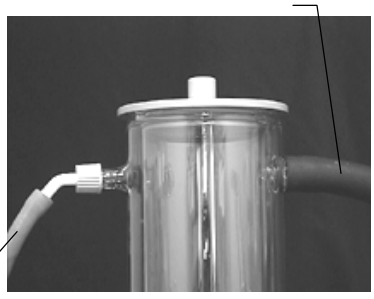


Vacuum Hose

●In case of glass C

Connect the drain hose.
(id=18mm)

Drain Hose(Φ18)



Vacuum Hose

14. Wire connection

1.Connect the motor cable to the back of the main body.

2.Connect the power cord of the body to AC230V 50Hz power source.

Always use a grounded outlet.

15. Prepare bath (separately sold)

BM410 BM210 BM110

5. How To Operate

1. Cooling condenser

●Glass A or B

Circulate the cooling water or alcohol in the cooling condenser.

●Glass C

Put dry ice and pour alcohol carefully so that it does not overflow.

2. Evaporation flask

Put sample into the evaporation flask.

∗Fill evaporation flask to the half of it's capacity. Liquid collected in the receiving flask should also be kept within approximately half capacity.

3.Water bath

Set the bath temperature at the required degree and let heat to the set point.

4. Turn the power on, and move flask down.

1. When the bath temperature reaches the set point, make sure that the control knob stays at "min", and turn on the power switch on the right side of control box.

∗If, at this time, the volume knob is not at "min", the evaporation flask rotates when you turn the power on.

2. Operate the lift switch to move the evaporation flask gently into water bath, and determine the adequate operational position.

5. Start rotation.

Set the control knob at the required speed to rotate. Operate the vacuum device as well for evaporation.

●**Sample Feed**

Sample may be fed during operation without removing the evaporation flask.

1. Connect a teflon tube to the inlet feed cock.(id=6mm)
2. Slowly move the fed cock handle. Sample will be sucked into the flask.

6. Moving lift position

Stop rotation of motor before moving the lift. Scalding may occur due to dispersing of hot water.

7. End of operation

When the operation ends and you want to remove the evaporation or receiving flask , open the feed cock to release vacuum.

8. Power failure.

The unit restarts operation once power is restored.

6. Troubleshooting Guide

Problem Solving Chart

Trouble & Countermeasure

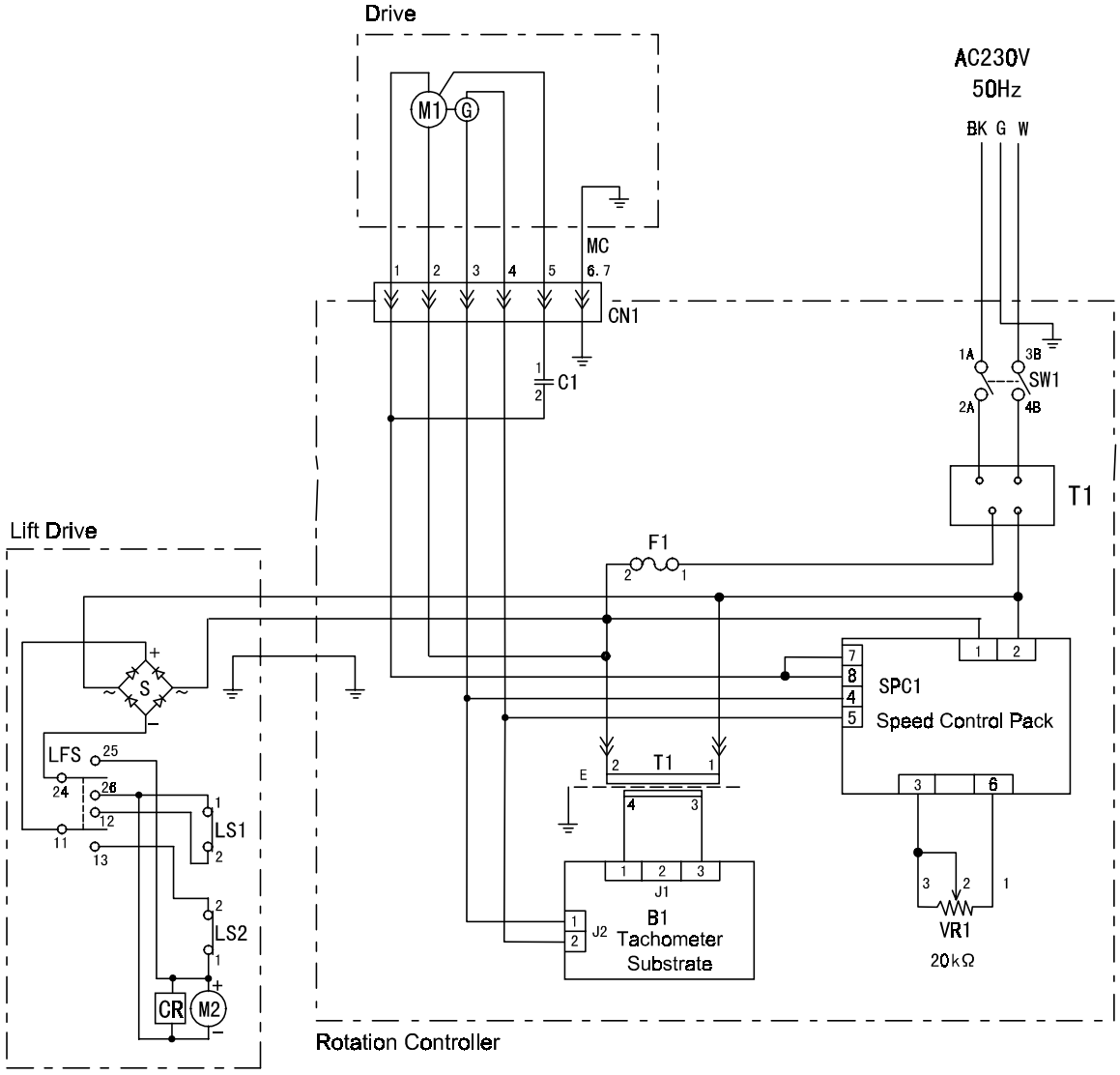
Check the following points if trouble occurs.

Contact Yamato's Technical Service Department for further information.

Trouble	Cause	Countermeasure
Digital display does not light up on the controller	●Power is off ●Disconnection of power cord ●Blown fuse	●Check power source ●Connect the main power cord ●Connect motor power cord ●Exchange fuse (2A)
Lift will not move	●Power is off ●Disconnection of power cord ●Fuse blows Overload (any non-standard heavier glass set or apparatus is equipped)	●Turn the power on ●Connect the cord of body ●Exchange of fuse (2A) ●Provide the specified glass set or apparatus
The flask will not rotate	●Switch of controller is off ●Control knob is at "min" ●Disconnection of motor cable ●Incomplete set-up or fastening of steam duct cause racing ●Something touching the flask	●Turn on the power switch ●Turn the control knob up ●Insert into the socket on the controller ●Fasten the steam duct holder ●Remove obstruction
Incomplete vacuum	●Wear and deterioration of vacuum seal ●Direction of vacuum seal is wrong ●Cooling condenser nut is incompletely fastened ●Glass apparatus break ●Incomplete connection of glass apparatus ●Leak from hose joints	●Exchange of vacuum seal ●Re-set the vacuum seal ●Re-fasten ●Exchange ●Re-set ●Put vacuum grease on ●Check, re-fasten and put vacuum grease on joints

7. Wiring Diagram

RE550



Symbol	Name of Parts	Symbol	Name of Parts
T2	Transformer	F1	Fuse (2A)
SW1	Power Switch	T1	Transformer(Display)
SPC1	Speed Control Pack	B1	Tachometer Substrate
M1	Motor	LFS	Lift Switch
G	Tachogenerator	S	Rectifier Stack
C1	Motor Condenser	LS1	Highest Limit Switch
VR1	Resister to Set Rotation Speed	LS2	Lowest Limit Switch
CN1	Drive Socket	M2	Lift Motor
MC	Drive Cable		

8. Replacement Parts

Name of Parts	Parts No.	Application
Cooling Condenser (A)	RG00A-30021	For A type
Cooling Condenser (B)	RG00B-30020	For B type
Cooling Condenser (C)	RG00C-30021	For C type
Condenser Connector (B)	RG00B-30030	Common use for B&C type
Evaporation Flask	RG00A-30040	For Ø29/38 Steam Duct — Common use for all types
	255183-412-1	For Ø24/40 Steam Duct
Receiving Flask	255191-413-1	Common use for all types
Steam Duct	RG00A-30011	For Ø29/38 Steam Duct — Common use for all types
	RGY0A-30010	For Ø24/40 Steam Duct
Cock	255191-415	Common use for all types
Suction Cock	RG00B-40030	For B type
Cooling Condenser Clamp	7-06-002-6002	Common use for B & C type (the life is limited)
Receiving Flask Clamp	7-06-002-6004	Common use for all types (the life is limited)
Evaporation Flask Clamp	7-06-002-6001	For Ø29/38 Steam Duct — Common use for all types
	KC24	For Ø24/40 Steam Duct — (the life is limited)
Teflon Tube (A)	255191-416	For A type L=540mm
Teflon Tube (B)	255192-417	For B&C type L=350mm
Hose Joint	RG00A-30030	Common use for all types
Hose Clamp	4-32-001-6004	Common use for all types
Ring (Large)	RE500-40093	Common use for all types(the life is limited)
Ring (Middle)	RE500-40061	Common use for all types(the life is limited)
Ring (Small)	RE500-40073	Common use for all types(the life is limited)
O Ring	4-21-002-0011	Used to fix Steam duct (the life is limited)
O Ring	4-21-002-0012	Used to fix Flask Remover (the life is limited)
Vacuum Seal	RE500-40090	Common use for all types (the life is limited)
Fuse (for Body)	2-10-001-0011	
Power Switch	2-01-001-0011	
Speed control pack	1-09-000-0005	
Motor(Rotation)	2-14-000-0022	
Lift Motor	2-14-010-6001	
Motor Condenser		
Motor Speed Resistor		
Transformer(Display)	1-01-320-0005	
Transformer	2-18-002-0003	
Tachometer Substrate	RE510-40120	
Lift Switch	2010086021	
Limit Switch	2020070007	
Rectifier Stack	2220046005	

9. After Sale Service and Warranty

Request for Repair

When you request repair

If any troubles should occur, stop the operation immediately, turn the power off, pull the power cord out and contact Yamato Sciectific's Technical Service Department.

Necessary information

- Model Number
- Serial Number
- Date of Purchase
- Distributor Name
- Information on difficulties

Warranty

- Keep your warranty card for future references. Check the name of the distributor, date of purchase and any other contents of warranty.

- The terms of warranty is two years limited commencing the date of purchase. Repair is made without charge according to the contents of warranty.

- Decontamination Statement:
  We can not accept any product or parts returned to us for repair or credit that is contaminated with or has been exposed to potentially infectious agents or radioactive materials.
  If you need repair, please call Yamato Scientific for a return authorization number. No product will be accepted without this number.