ROTARY EVAPORATOR
RE440
RE540

(100V)

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.

Table of Contents

1. Specifications

Type	RE440	RE540
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
Other Supplemental System	Movable Steam Duct Mechanism, Flask Remover	
	Power Socket (for Vacuum Controller)	
Glass Joint	ℨ29/38 Steam Duct, S35/20 Receiving Flask	
Lift Mechanism	Electric motor auto lift	
Motor(rotation)	Induction motor 25W	
Glass set	Type A, Type B, Type C	
Safety device	Overcurrent protection (fuse 2A)	
Exterior dimensions (W×D×H) *2	420×340×580 mm	
Weight	13kg	14kg
Power source (RE only)	AC100V±10% 50/60Hz 2 A	
Option	●Evaporation Flask (opaque & frosted ℨ 29/42) 2000ml/500ml/300ml/200ml/100ml ●Receiving Flask (opaque & frosted S35/20) 2000ml/500ml/300ml ●Joint (opaque & frosted) ℨ29/42-29/38, ℨ29/42-24/40, ℨ29/42-19/38, ℨ29/42-15/25, ℨ24/40-24/40 ●Trap Ball (opaque & frosted) ℨ29/42-29/38, ℨ29/42-15/25, ℨ24/40-24/40	
Combination apparatus	●Water Bath BM100/200/400 ●Oil Bath BO600	

*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

Graphic indications

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 overload conditions, the motor may stop by the safety device. If the motor stops, turn the volume knob to the minimum and cut the switch off.

＊Overload means the situation when the motor surface heats up more than 90℃ due to rust on ball bearing etc.,

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

Make sure that the volume knob is at "min". If the volume 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 volume knob to the minimum.

Never fail to ground the unit.

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

Be cautious using 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, cut the power supply.

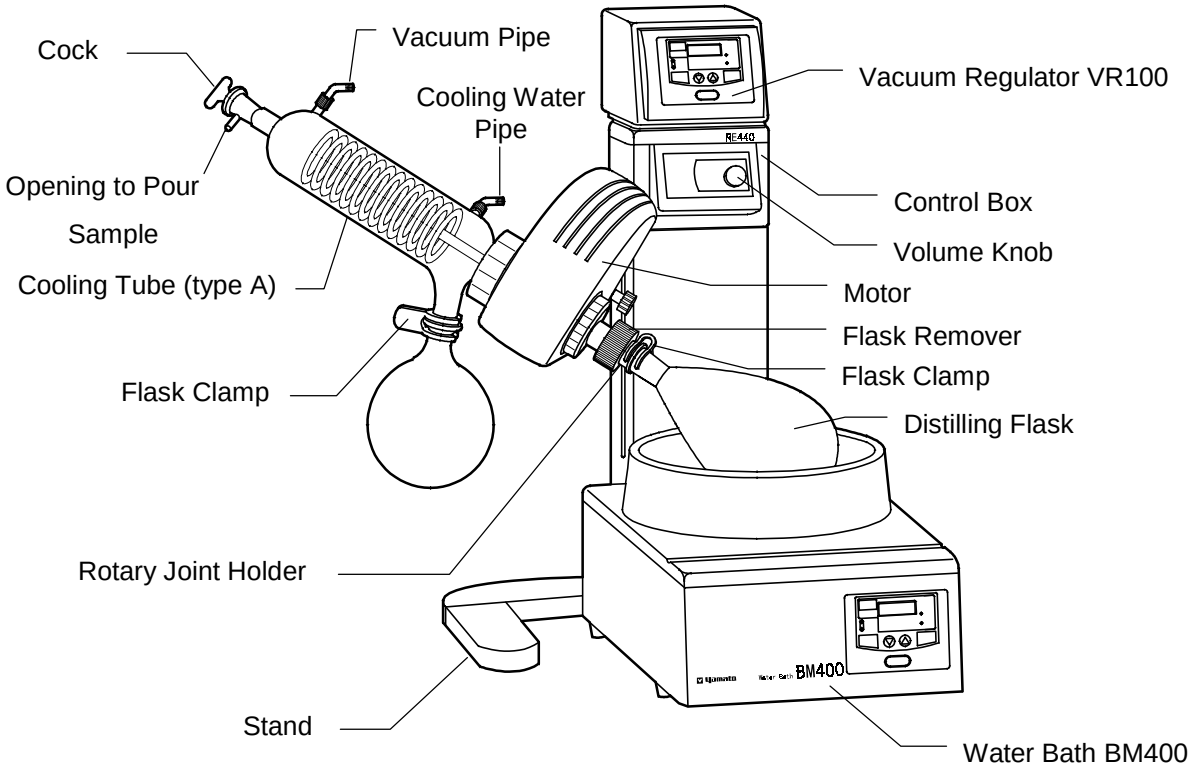
If the unit is not in use for a long period of time, turn the power off and pull out the power cord for safety.

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

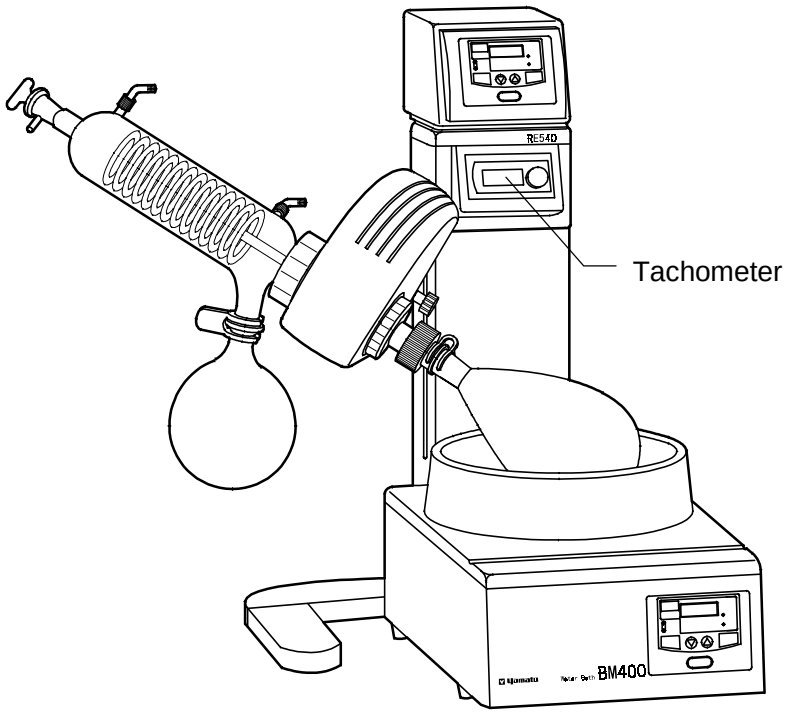
Explosive	Explosive Substance	Nitroglycol, Nitroglycerin, Nitrocellulose, and other explosive nitric esters.
		Trinitrobenzene, Trinitrotoluene, Picric acid, and other explosive nitro compounds.
		Peracetic acid, Methyl ethyl ketone peroxide, Benzoyl peroxide, and other organic peroxides.
		Sodium azide, 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
With Condenser A

RE440 (type A)

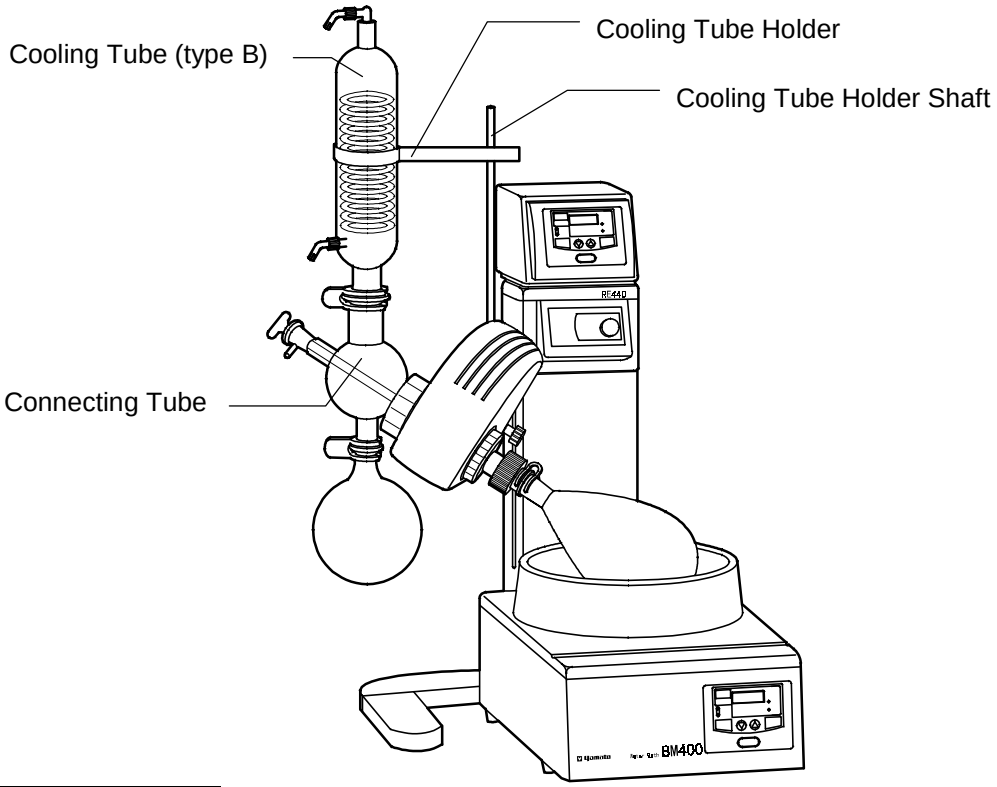


RE540 (type A)

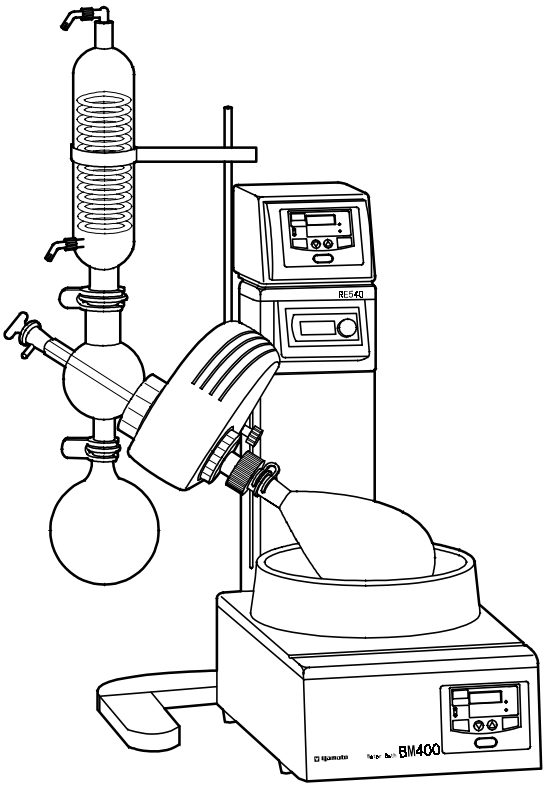


Identification of Parts
With Condenser B

RE440 (type B)

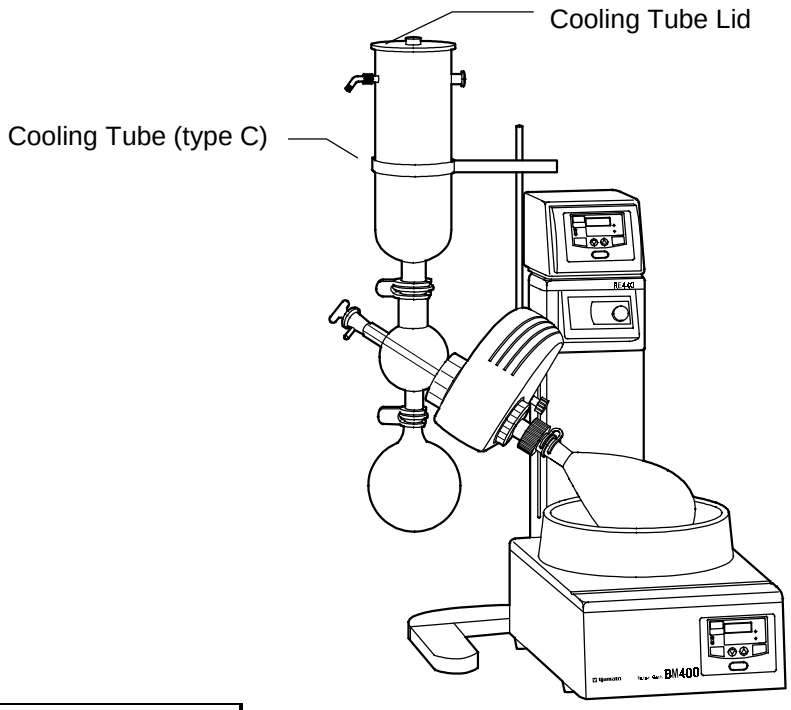


RE540 (type B)

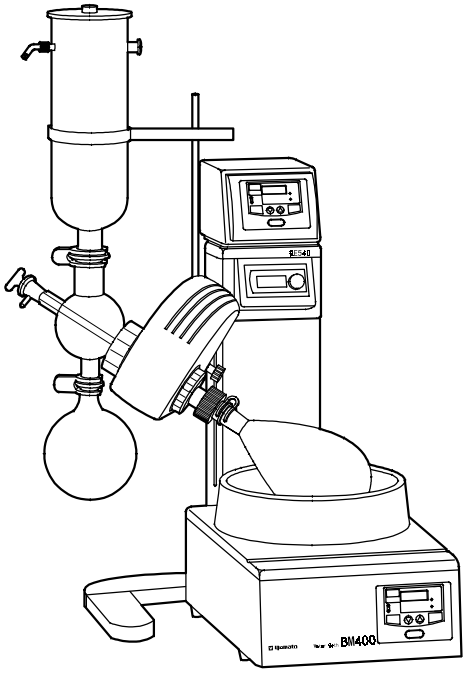


Identification of Parts
With Condenser C

RE440 (type C)



RE540 (type C)



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

＊The exterior design above are just examples of the interchangeable parts.

4. Installation/Assembly

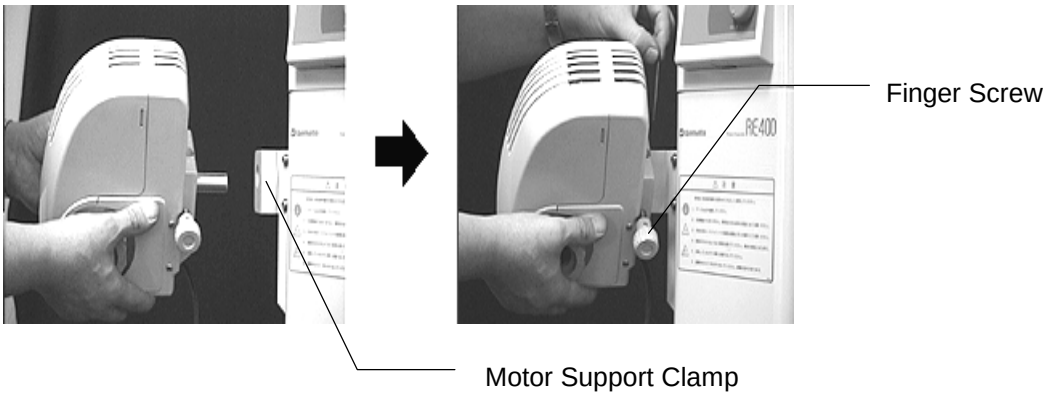
1. Set the Body at a stable place.

Be sure to set the body at a stable place.

2. Fix 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 pr side screws, and fasten 4 fix screws tightly by using the attached hexagonal wrench (for M5).
   Then, slant the motor to the right (about 45 °), and fix the finger screw of the motor tightly.

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 fix the motor.

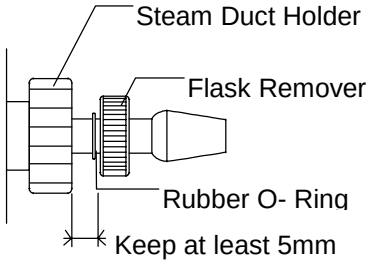
3. Inserting the steam duct into the motor

1.Before you insert the steam duct, make sure the O-rings inside the motor center hole are not out of place. If so, reset them in the right place.

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.

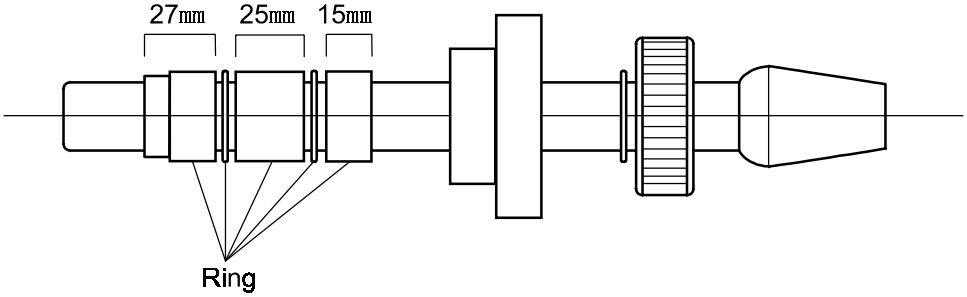
4.Tighten the steam duct holder by turning clockwise. Be sure to tighten the steam duct holder firmly so that the steam duct does not slip.



※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 and you do not know how to assemble…..

See the following picture to re-assemble.



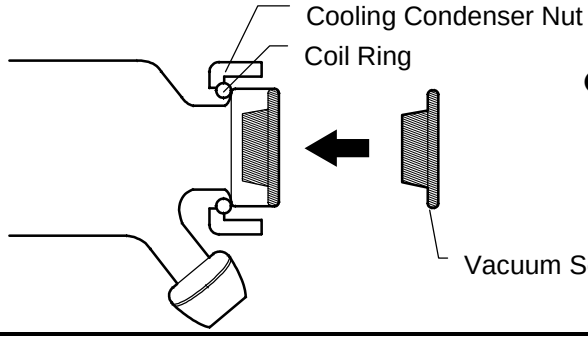
4. Set the cooling condenser nut, coil ring and vacuum seal to the condenser or condenser connector.

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.

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

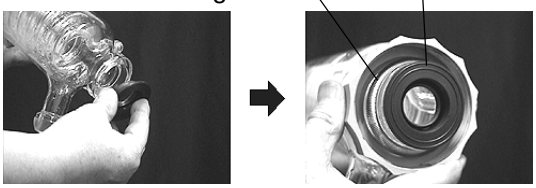
Insert the steam duct into vacuum seal, put glass flange to the motor and fasten firmly the cooling condenser nut.

＊Be careful not to damage the set vacuum seal when you put steam duct into the flange with the seal in case the damage could cause leak.

Glass Type A

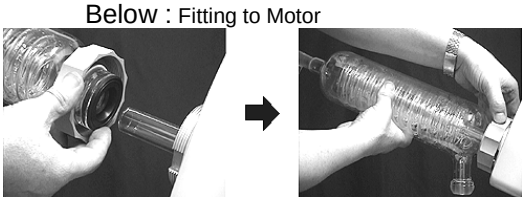
Vacuum Seal

Coil Ring



Above : Fitting of Coil Ring and Vacuum Seal

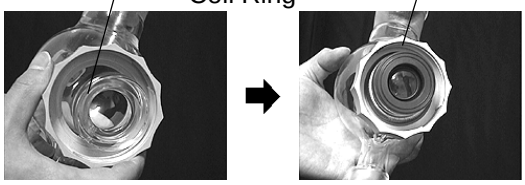
Below : Fitting to Motor



Glass Type B/C

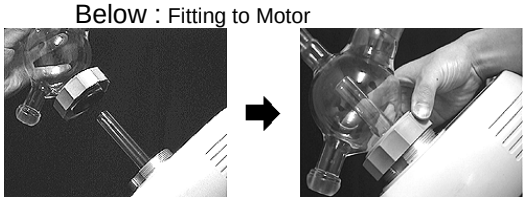
Vacuum Seal

Coil Ring



Above : Fitting of Coil Ring and Vacuum Seal

Below : Fitting to Motor



●When you remove the coil ring from cooling condenser or condenser connector

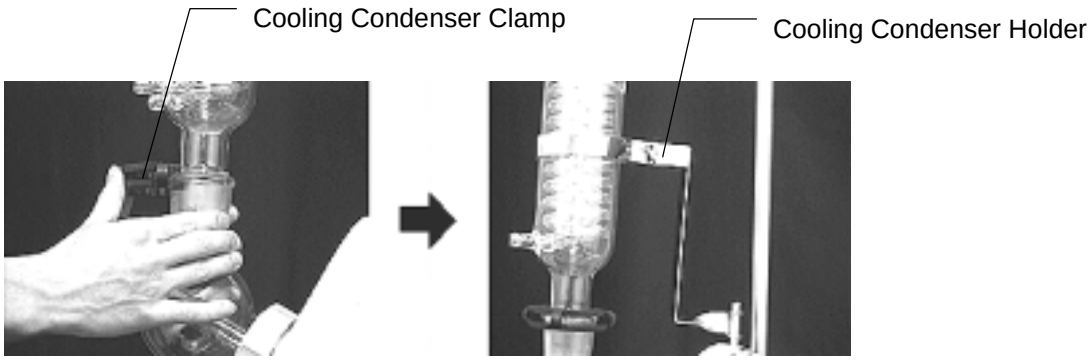
Hook the coil ring by the attached hexagon wrench as shown in the left picture in order to remove the ring easily from the cooling condenser or connecting condenser. However, be careful not to force too hard in case the glass apparatus or the coil ring might be damaged.

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

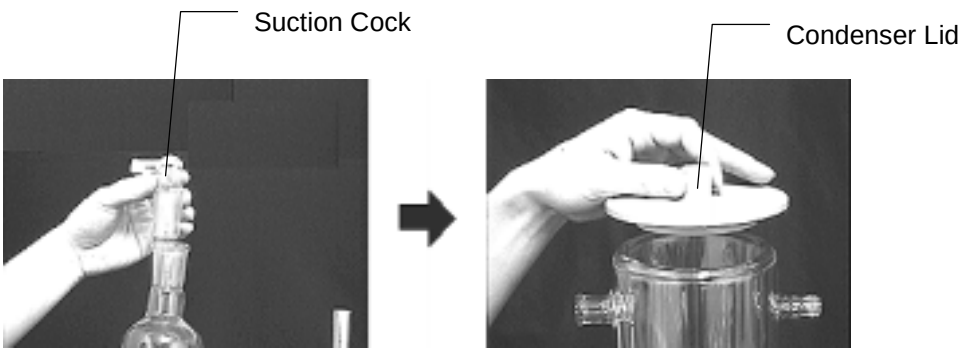
Fit the cooling condenser holder shaft firmly into the screw hole on the back of motor. Put the attached hexagon wrench through the hole on the end of shaft and fasten tightly.

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

1. Connect the cooling condenser to the condenser connector and hold by 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 cooing condenser holder from the bottom of condenser rather than top and then connect the condenser to the condenser connector)



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



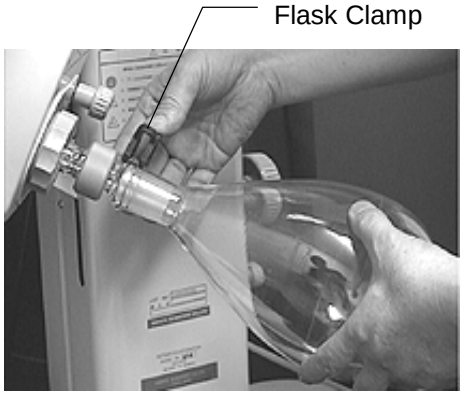
8. Connecting the Evaporation and Receiving Flasks.

Insert the evaporation flask into the steam duct and hold by the flask clamp. In addition, connect the receiving flask in the same way by the flask clamp to the cooling condenser or condenser connector.

●Evaporation Flask

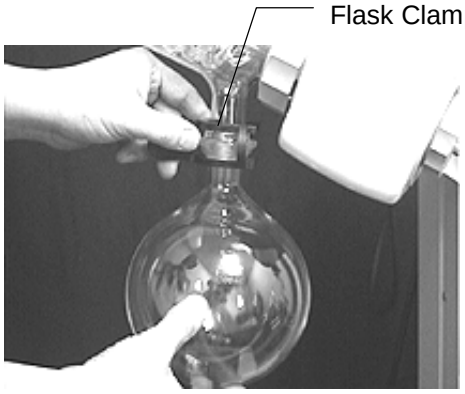
1.Turn the blue flask remover ring upward.

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

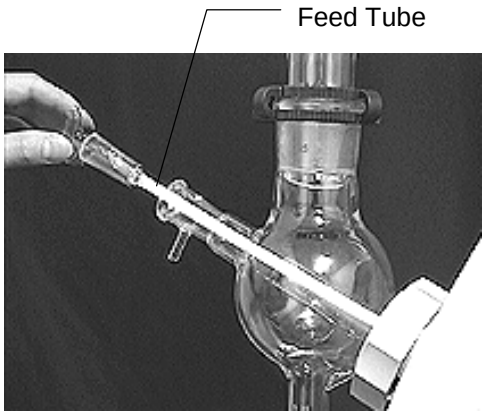


●Receiving Flask

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



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



Removing the Evaporation Flask and Steam Duct

10. Evaporation flask

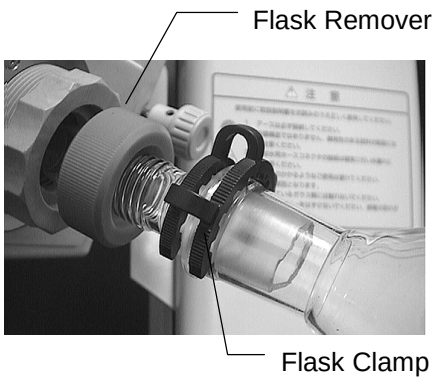
Remover the flask clamp while holding the evaporation flask, and remove the evaporation flask from the steam duct.

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.

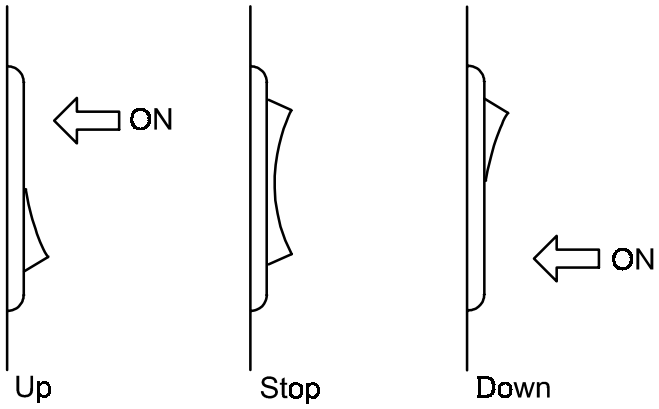
＊**Loosen the steam duct holder, but do not take it off when you remove the steam duct. If you remove the holder, the rings will come off.**

●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.

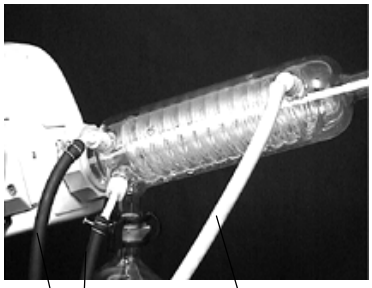
＊**The lift stops automatically at the upper or lower end of stroke.**

13. Fit the hose joints to the water supply, drain and vacuum hoses at first, and connect to the cooling water and vacuum pipes.

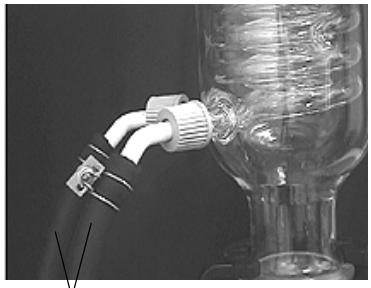
1. In case the joints are connected to the condenser, remove them.
2. Insert the hose joints into the water supply and drain hoses (inside diameter, 9mm) , hold by the attached hose clamps and fix to the cooling pipes of cooling condenser.
   In the same way, insert the hose joint into the vacuum hose (inside diameter of 6mm),fix to the vacuum suction pipe (hose clamp is not necessary).

Do not fit the hoses to the hose joints connected to the condenser.

●In case of glass A

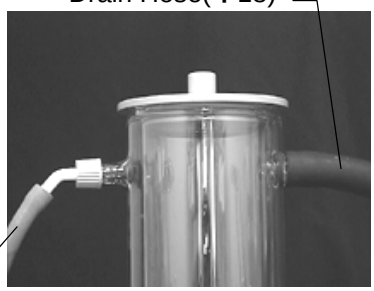


●In case of glass B



●In case of glass C

Connect the drain hose with the inside diameter of 18mm to drain of cooling condenser.



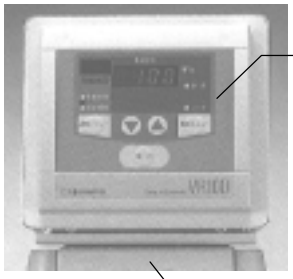
14. Connect the power plug into an outlet.

1. Connect the power cord of the body to AC100V power source.
   Never fail to connect the earth for safety.
   ＊**Be sure to switch off whenever you insert or pull out the power cord.**
2. Then, joint the motor connecting cable to the socket on the back of controller.

15. Connect the vacuum controller, in case it is attached.

＊**Prepare additionally an aspirator with displacement of 10 ﾘｯﾄﾙ/min. as a vacuum device.**

●Combination with the vacuum controller VR100.
You can fix the vacuum controller, as shown in the right picture, by metal fastener onto the controller box of RE400/500 Rotary Evaporator.
In addition, you can connect the power cord of VR100 to the power socket on the back of Rotary Evaporator controller.
＊In case of RE200, you can not fix the vacuum controller on RE200 and connect the power cord of VR100 to RE200, so set and handle on a stable place near by.



Look at the back panel of vacuum controller where hoses to connect are indicated. Follow the indications and connect the hoses.

＊**Be sure to read the attached instruction manual to handle the vacuum controller.**

16. Prepare bath (separately sold)

Set the bath in front of the body, and pour water into it.

＊**Be sure to read the attached operation manual to handle the bath.**

BM400/BO600　　BM200　　BM100

5. How To Operate

1. Pour cooling water/alcohol into the cooling condenser.

●In case of glass A or B

Circulate the cooling water in the cooling condenser.

●In case of glass C

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

2. Put sample into the evaporation flask.

Put sample into the evaporation flask.

＊Pour sample to fill the half of the evaporation flask capacity. Liquid collected in the receiving flask shall be also kept within approximately the half level.

3.Heat the bath.

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

4. Turn the power on, and operate the lift.

1.When the bath temperature reaches the set point, make sure that the volume 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 put the evaporation flask gently into water bath, and determine the adequate operational position.

5. Start rotation

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

●**When you supply sample during the unit operating**

Connect the teflon tube (inside diameter 6mm) to the opening for sample and handle the cock to let certain amount sucked in.

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

If the lift is moved up from or down into the bath while the evaporation flask is rotating, scalding may occur due to dispersing of hot water.

7. When the operation ends

When the operation ends and you want to remove the evaporation or receiving flask , open the cock and bring back pressure inside the container to normal.

8. Operation after restarting from power failure.

The unit restarts the same operation as before after recovering from power failure.

6. Troubleshooting Guide

Problem Solving Chart

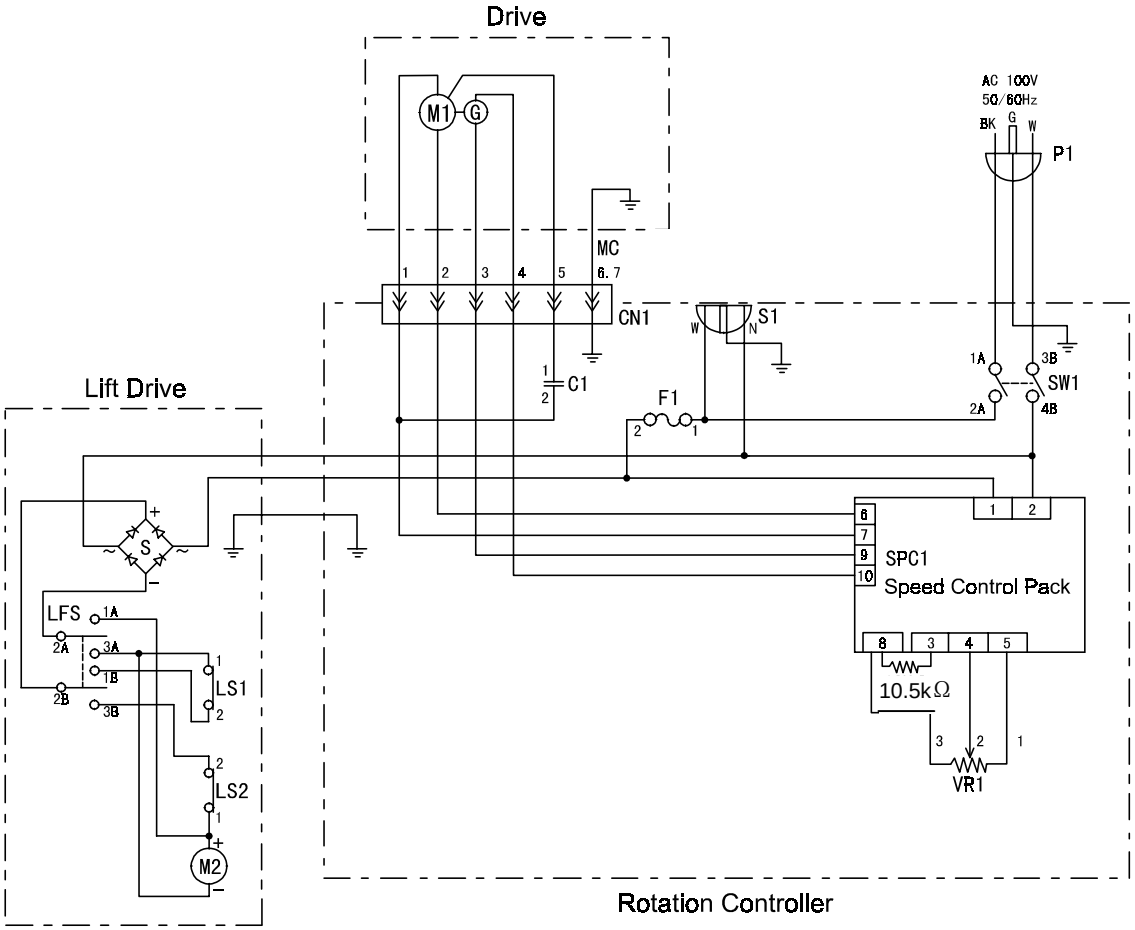
Trouble & Countermeasure

Check the following points if there should or seem to be some machine trouble.

Contact Yamato's Technical Service Department in case trouble is not solved in spite of countermeasures below.

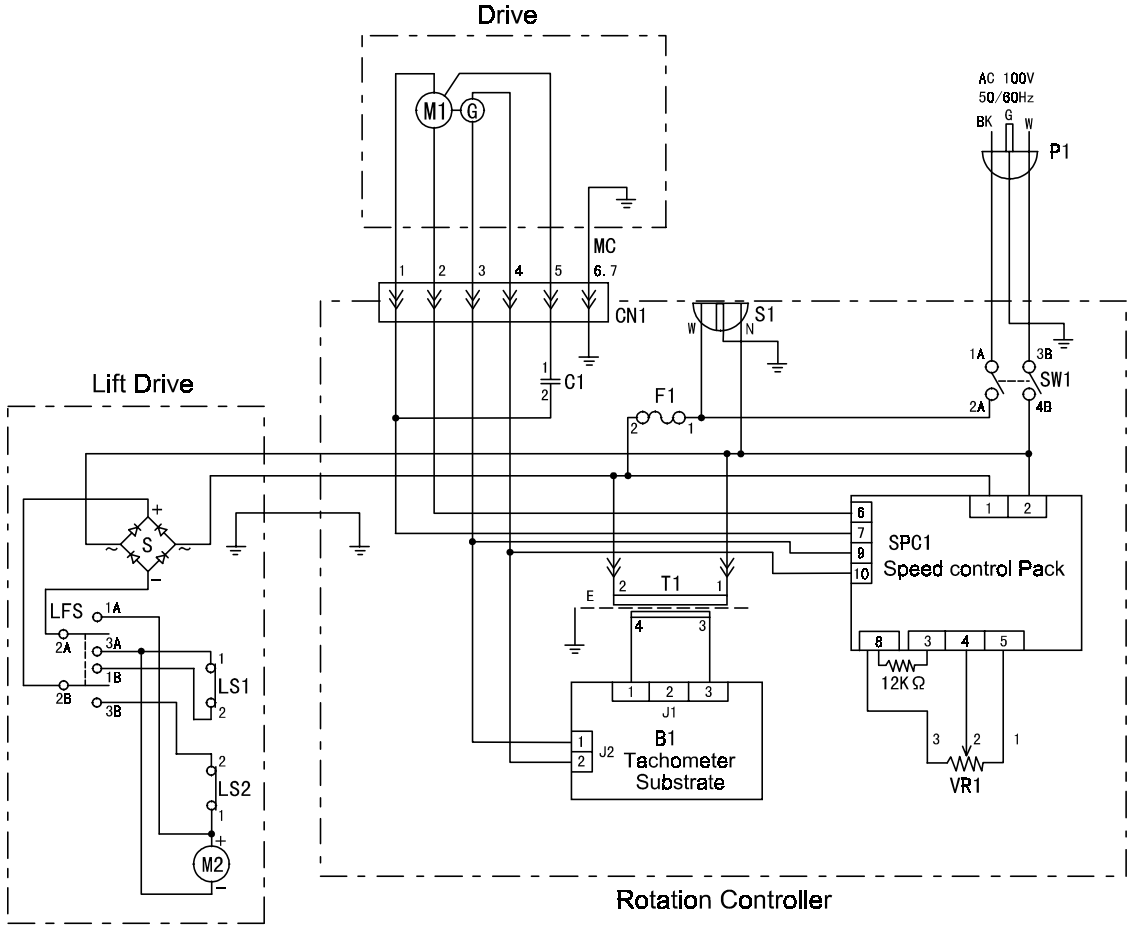
Trouble	Cause	Countermeasure
Digital display does not light up on the controller.	●Power is off ●Disconnection of power cord ●Fuse blows	●Check power source ●Connect the cord of motor and body ●Exchange of fuse (2A)
Lift will not move.	●Power is off ●Disconnection of power cord ●Fuse blows Overload (any 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 ●Volume knob is at the "min" ●Disconnection of motor cable ●Incomplete set-up or fastening of steam duct cause racing ●Something touches the flask	●Turn on the power switch ●Turn the volume knob up ●Insert into the socket on the controller ●Fasten the steam duct holder ●remove something that contacts
Incomplete vacuumization	●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

RE440



Symbol	Name of Parts	Symbol	Name of Parts
P1	Power Plug	CN1	Drive Socket
S1	Power Socket (for Vacuum Controller)	MC	Drive Cable
SW1	Power Switch	F1	Fuse (2A)
SPC1	Speed Control Pack	LFS	Lift Switch
M1	Motor	S	Rectifier Stack
G	Tachogenerator	LS1	Highest Limit Switch
C1	Motor Condenser	LS2	Lowest Limit Switch
VR1	Resister to Set Rotation Speed	M2	Lift Motor

RE540



Symbol	Name of Parts	Symbol	Name of Parts
P1	Power Plug	MC	Drive Cable
S1	Power Socket (for Vacuum Controller)	F1	Fuse (2A)
SW1	Power Switch	T1	Transformer
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

8. Lists of Exchange 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	Common use for all types
Receiving Flask	RG00A-30050	Common use for all types
Steam Duct	RGY0A-30010	Common use for all types
Cock	255191-415	Common use for all types
Suction Cock	RG00B-40030	For B type
Cooling Condenser Clamp	7060026002	Common use for B & C type (the life is limited)
Receiving Flask Clamp	7060026004	Common use for all types (the life is limited)
Evaporation Flask Clamp	7060026001	Common use for all types (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	4320016004	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	4210020011	Used to fix Steam duct (the life is limited)
O Ring	4210020012	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)	2100010011	Φ5.2×20 AC125V 2A

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

Be sure to show the warranty when service man visits you.

Warranty (Accessory)

- 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 one year limited commencing the date of purchase. Repair is made without charge according to the contents of warranty.

- As for repair after expiration of the warranty period, consult the seller or our service office. As long as the function of the unit is maintained by repair, upon your request, we'll repair it with charge.

Minimum period to keep repair parts in stock

Minimum period to keep repair -parts in stock is 7 years after the production stop. The repair parts means any necessary parts to maintain the performance of the unit.