ROTARY EVAPORATOR

RE400

First Edition

- Thank you for your Yamato Scientific RE Series Rotary Evaporator purchase.
- For best test date, we recommend you purchase our BM series Water Bath.
  Please call Yamato Scientific for more details.
- For proper use of this unit, please read the instruction manual and warranty thoroughly before operation. Keep both for any future references.

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

Contents

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 apprehend the following warning and caution signs in this manual prior to use.

WARNING Indicates the possibility of serious or fetal 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 require hospitalization.

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

Meaning of Graphic Indication

	Shows warning or caution. Specific contents are described aside each sign.
	Shows users important information. Specific contents are described aside each sign.
	Shows users important information. 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. If the motor stops, turn the volume knob to the minimum and cut the switch off, suspending operation for a while.

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

Never fail to ground the unit.

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

Be cautious using flammable chemicals

Since this unit is not of explosion proof, do not use in flammable or explosive environments.

The flask clamp contains a strong spring. Be careful not to break the glass apparatus

The enclosed flask clamp contains a strong spring to hold the glass apparatus firmly. Be careful not to break the glass.

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.

- If the vacuum seal dries, friction occurs between the rotary joint, creating a strange noise. (This can cause problems.)
- The vacuum seal is expendable. Exchange the seal in case of vacuum-down.
- Put silicon grease onto the ripped side of vacuum seal so that it might not dry. If you are afraid of sample contamination, use liquid sample. However, you can’t use organic sample.

Cleaning the exterior of the RE series evaporator

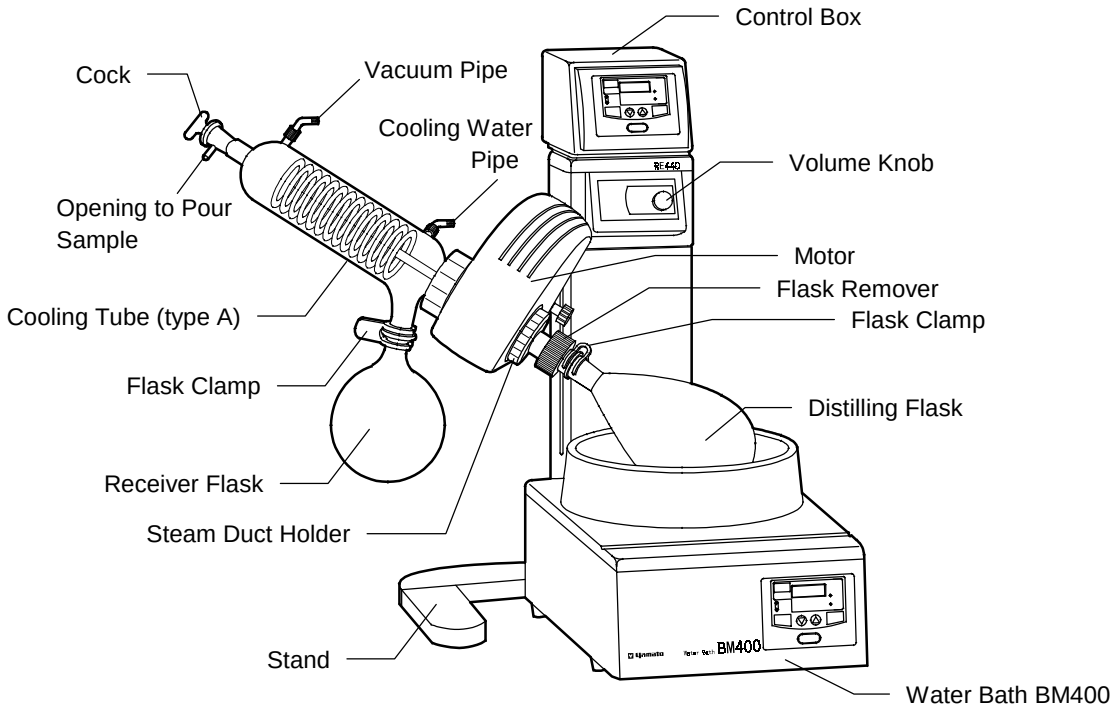
Do not use any volatile chemicals to clean the exterior of this unit. This could damage the color and shape. Wipe clean with a soft dry towel, etc.-Do not use a brush.

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

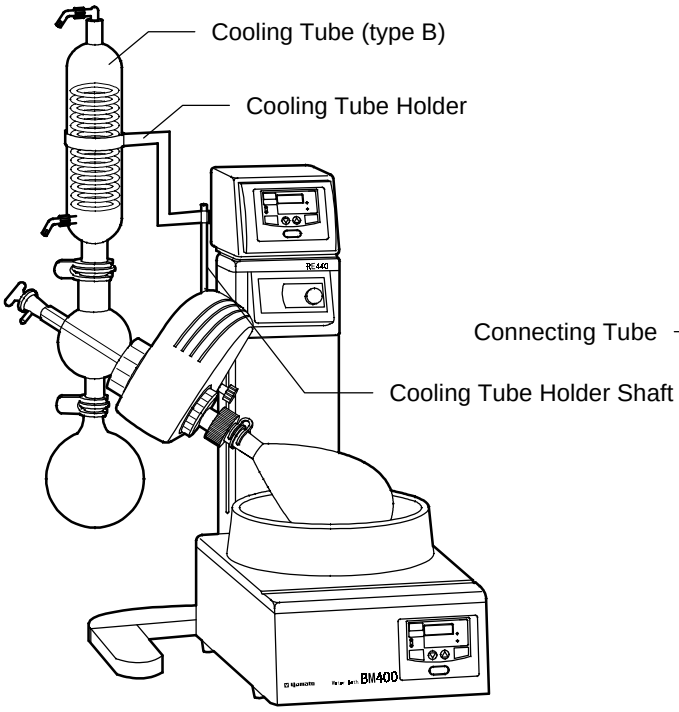
If the unit is not in use for a long period of time, turn the power off and pull out the power cord for safety.

Name of each part

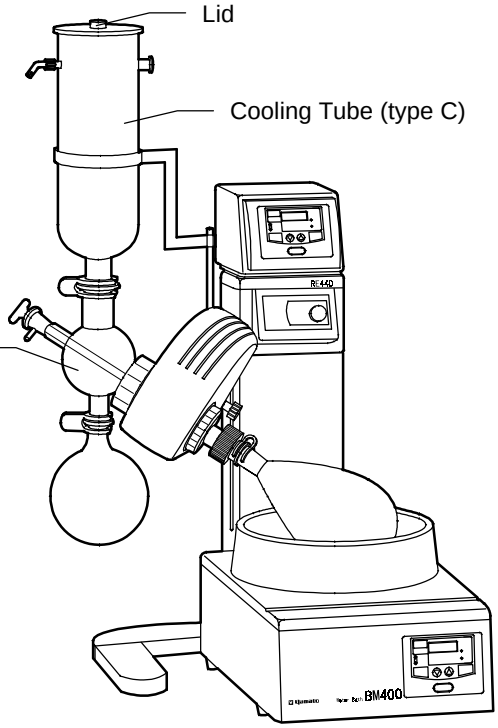
RE400 (type A)



RE400 (type B)



RE400 (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 parts.

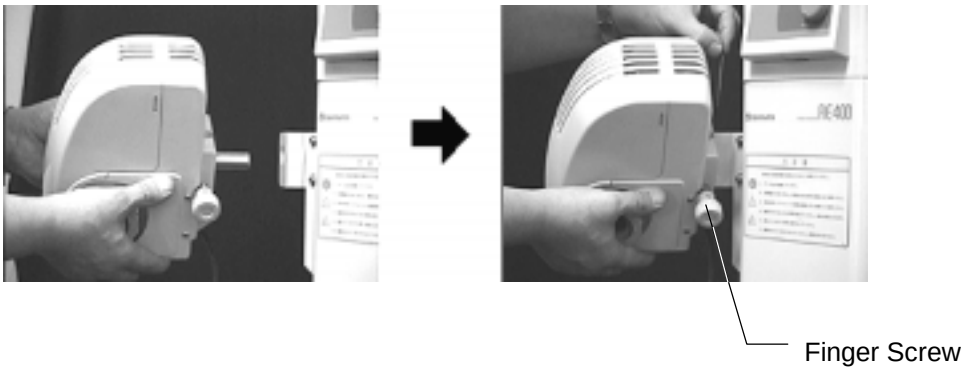
How to Assemble

1. Unpack the package and take out the components.

Unpack the package and set the stand of the body on the stable place. If you don't set the unit on the stable place, vibration or noise occurs, or the unit could fall and get damages.

2. Fix the motor to the body.

1. Insert the motor bearing bar into the metal support 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 slightly to the right (about 45 °), and fix the finger screw of the motor.
   ✳**If you fasten loose, vibration occurs and prevents accurate measurement, or the motor comes off and the glass apparatus could break.**

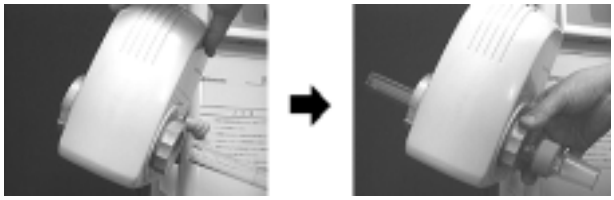


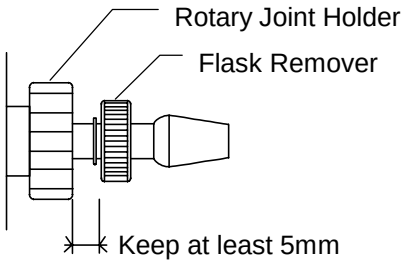
2. Remove the cooling tube fastening knot (the bigger knot with a inner spring) when you fix the motor.

3. Insert the rotary joint into the motor.

Push the rotary joint from the right side into the motor sleeve while turning the (blue) flask remover downward, and fix firmly the rotary joint holder. Keep more than 5mm between the flask remover and the rotary joint holder. Fasten so tightly that the rotary joint wouldn't slip even if you pull with full strength by your single hand. If you fasten loose, the rotary joint might come off during operation, or be sucked in during vacuumization.

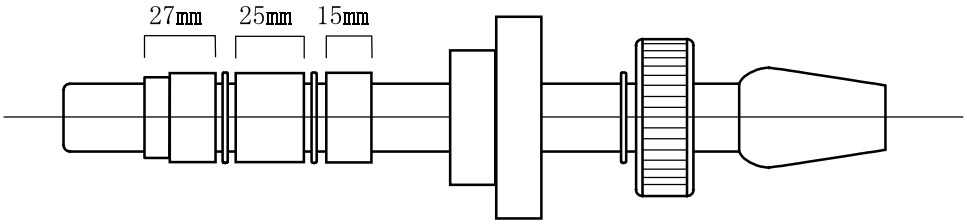
＊**When you remove the rotary joint, don't take off but loosen the rotary joint holder. If you remove the holder, the inside parts would come off.**





●**If rubber parts come off in setting/removing the rotary joint, and you don't know how to assemble...**

See the following picture to re-assemble when the internal parts come off in setting or removing the rotary joint.



4. Fit 3 parts, the cooling tube nut, coil ring and vacuum seal to flange of cooling tube or connecting pipe.

Fit the vacuum seal, cooling tube nut, and coil ring to the flange of either cooling pipe (A set) or connecting pipe (B or C set).

∗I f you put the coil ring first, others wouldn't fit in. In addition, if you put forcibly, glass apparatus could flaw or break.

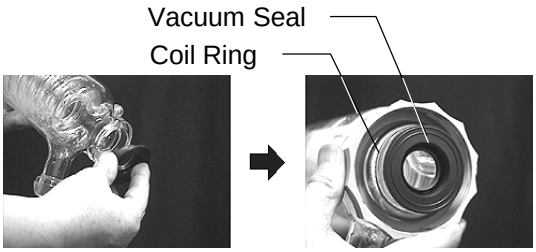
∗To reduce friction and produce more effective vacuum, put vacuum grease on the vacuum seal (accessory).

5. Fit the glass flange to the motor.

Insert the rotary joint into vacuum seal, put glass flange to the motor and fasten firmly the cooling tube nut.

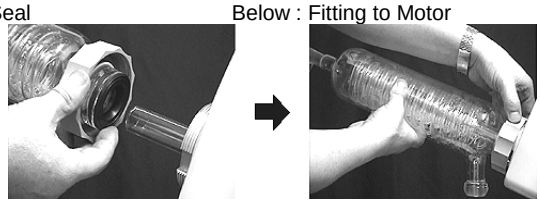
∗Be careful not to damage the set vacuum seal when you put rotary joint into the flange with the seal in case the damage could cause leak.

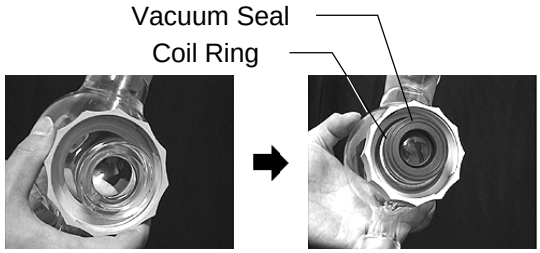
∗In order to reduce friction and produce better vacuum, put vacuum grease (accessory) thinly on the vacuum seal.



Glass Type A Above : Fitting of Coil Ring and Vacuum Seal

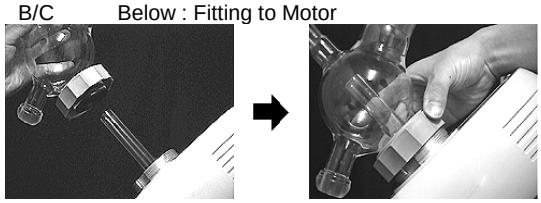
Below : Fitting to Motor





Glass Type B/C Above : Fitting of Coil Ring and Vacuum Seal

Below : Fitting to Motor



●When you remove the coil ring from cooling tube or connecting tube...

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 tube or connecting tube. However, be careful not to force too hard in case the glass apparatus might be damaged.

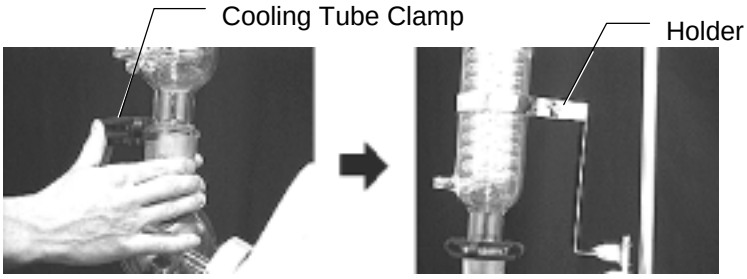
6. Fit the cooling tube holder shaft (glass type B and C only)

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

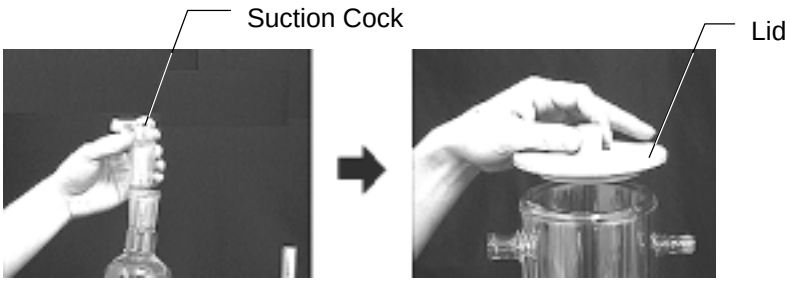
7. Fit the cooling tube holder and joint the cooling tube with the connecting pipe.

Joint the cooling tube to the connecting pipe, and hold by cooling tube clamp. Then, pass the cooling tube holder from top of the cooling tube, while fitting the other side hole to the holder shaft. Level and fix the positions by attached butterfly nut. (In case of C type, pass the cooling tube holder from bottom over the cooling tube and joint it to the connecting pipe.)

＊Wipe the flanges well before you joint the cooling tube to connecting pipe.



Put the suction cock for B type or the cooling tube lid for C type.



8. Fit both distilling flask and receiver flask.

●Distilling Flask

Connect the flask to the rotary joint, and hold by the distilling flask clamp.

●Receiver Flask

Joint the flask to the cooling tube or the connecting pipe, and hold by the flask clamp.

●How to use the (blue) flask remover

Use the flask remover if the distilling flask wouldn't comes off easily from the rotary joint.

Put the flask remover to the end of flask and turn left. You can push out the flask easily without giving too much force.

＊If you pat the flask to remove, the glass apparatus could break. Use the flask remover in case the flask wouldn't comes off.

9. Fit the cock with teflon tube to the cooling tube or connecting pipe. Then you had completed the assembly.

Explanation on Handling of Lift

Hand lift (Supplemental function of RE400)

Adjust by the knobs (big and small) on the right of the body.

1. Loosen the lowest position knob.→Picture 1

2. Turn the lift knob to “Release”, you can freely move the lift up and down. After you determine the position, return the handle to the original position and you can fix the height.→Picture 2,3

3. After you determine the lowest position, fasten the lowest position knob.→Picture 4,5
   The lift wouldn’t go lower than the fixed position. However, this function effectively works only when the lowest position knob is positioned within 135mm from the setting level.

(Picture 1)

(Picture 2)

(Picture 3)

(Picture 4)

(Picture 5)

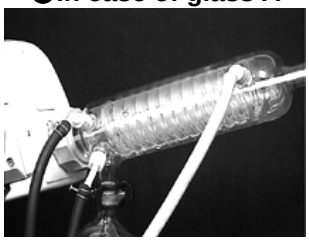
Preparation and Operation Method

1. Fit water supply hose, drain hose and a vacuum hose at first to the hose joints, and insert into the glass screw couplings. (See picture below)

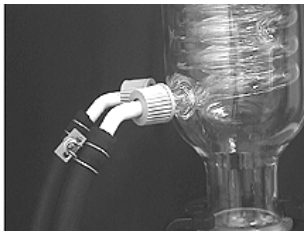
Connect both water supply and drain hoses (inside diameter, 6mm) into cooling water hose joints of the cooling tube, hold by the attached hose clamp and fit to the cooling tube screw couplings.

In addition, connect the vacuum hose with the inside diameter of 6mm (hose clamp is not necessary) to the vacuum hose joint and fix to the vacuum suction pipe of cooling tube.

●In case of glass A



●In case of glass B



●In case of glass C

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

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

＊Prepare additionally an aspirator with displacement of 10 liter/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 RE400Rotary Evaporator.

In addition, you can connect the power code of vacuum controller VR100 to the power socket on the back of Rotary Evaporator controller.

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 operation manual to handle the vacuum adjuster.

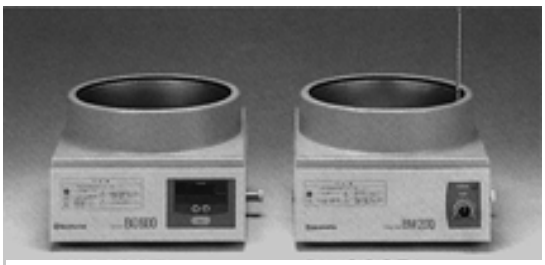
3. Connect the power plug into an outlet.

1. Connect the power code 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 code.
2. Then, joint the motor connecting cable to the socket on the back of controller.

4. 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 BM200

5. Pour cooling water/alcohol into the cooling tube..

●In case of Glass A or B

Circulate the cooling water in the connected cooling tube.

●In case of Glass C

Uncover the cooling tube lid, put dry ice and pour alcohol carefully so that it wouldn't overflow.

6. Put sample into the distilling flask.

After you put sample into the distilling flask, sink the flask quietly into the bath which contains water by the hand lift, and determine the level.

✳**Pour sample to the half of the distilling flask capacity. Liquid collected in the receiver flask shall be also kept within approximately the half capacity.**

7. Heat the bath.

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

8. Turn on the power switch and start operation.

When the bath temperature reaches the set point, turn on the switch on the right side of control box, and handle the volume knob to rotate at a certain frequency. Operate the vacuum device for distillation.

✳**When the operation ends and you want to finish the work, open the cock and bring back pressure inside the container to normal. To take out the distilling flask from the water bath, turn the volume knob to "min", and be sure to turn the switch "OFF". Never fail to take away sample inside the distilling flask after the operation ends.**

●**When you supply sample during the operation...**

In order to supply sample into the distilling flask, connect the teflon tube (inside diameter, 6mm) to the sample injection pipe and handle the cock to let a certain amount sucked in.

When you suspect “Trouble?”

Trouble & Countermeasure

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

Trouble	Cause	Countermeasure
The flask wouldn’t rotate	●Volume is at the “min”	●Turn the volume knob up
	●Disconnection of motor cable	●Insert into the socket on the controller
	●Incomplete set-up or fastening of rotary joint cause racing	●Fasten the rotary joint holder and re-set
	●Something touches the flask	●remove something that contacts
Incomplete vacuumization	●Wear and deterioration of vacuum seal	●Exchange of vacuum seal
	●Cooler nut is incompletely fastened	●Re-fasten
	●Glass apparatus break	●Exchange
	●Incomplete connection of glass apparatus	●Put vacuum grease on
	●Leak from pipe joint	●Stop the leak

＊if you have any question, contact the seller or Yamato Scientific office.

When you request repair

If any troubles should occur, turn off the power switch, pull out the power supply plug (cable) and contact the seller or Yamato Scientific office.

Necessary information

- Type of the unit
- Production No.
- Date of purchase

} See the warranty or nameplate on the unit

- Detailed information on troubles

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

Warranty (Accessory)

- The seller or Yamato Scientific office give you a warranty. Check the name of seller, date of your purchase and other contents on the warranty, and keep it carefully.

- The term of warranty is one year commencing on the date of your 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.

Lists of Exchange Parts

Name of Parts	Parts No.	Application
Cooling Tube (A)	RG00A-30021	For A type
Cooling Tube (B)	RG00B-30020	For B type
Cooling Tube (C)	RG00C-30021	For C type
Connecting Pipe (B)	RG00B-30030	Common use for B and C type
Distilling Flask	RG00A-30040	Common use for all types
Receiver Flask	RG00A-30050	Common use for all types
Rotary Joint	RG00A-30011	Common use for all types
Cock	255191-415	Common use for all types
Suction Cock	RG00B-40030	For B type
Cooling Tube Clamp	7060026002	Common use for B and C type (the life is limited)
Receiver Flask Clamp	7060026004	Common use for all types (the life is limited)
Distilling Flask Clamp	7060026001	Common use for all types (the life is limited)
Teflon Tube (A)	255191-416	For A type 1=540mm
Teflon Tube (B)	255192-417	For B and C type 1=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 Rotary Joint (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

Specification

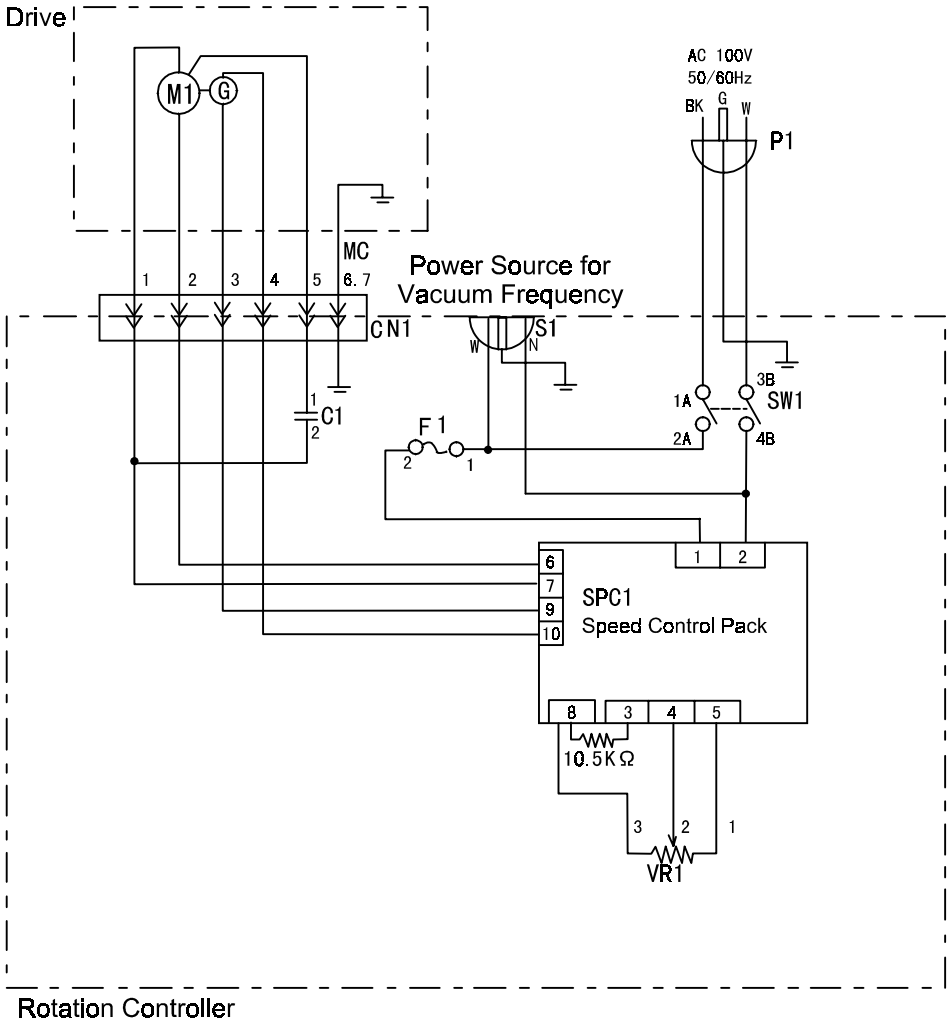
Type	RE400
Rotational frequency control range *1	20-180rpm
Drive system	Worm gear system
Other supplemental system	Movable rotary joint/Distilling flask removal system Power source for vacuum regulator
Lift system	Hand lift
Motor	Induction motor 25W
Glass set	Type A, Type B, Type C
Safety device	Overcurrent protection (fuse)
Exterior dimensions (W×D×H)*2	420×340×580
Power source (including Bath)*3	AC100V±10% 12A
Option	●Distilling Flask (2000ml/500ml/300ml/200ml/100ml : opaque & frosted ⓈⓉ 29/42) ●Receiver Flask (200ml/500ml/300ml : opaque & frosted S35/20) ●Joint (opaque & frosted : ⓈⓉ29/42-29/38, ⓈⓉ29/42-24/40, ⓈⓉ29/42-19/38, ⓈⓉ29/42-15/25, ⓈⓉ24/40-24/40) ●Trap Ball (opaque & frosted : ⓈⓉ29/42-29/38, ⓈⓉ29/42-15/25, ⓈⓉ24/40-24/40)
Combination apparatus	●Water Bath BM100/200/400 ●Oil Bath BO600 ●Vacuum Controller VR100

*1 The rotary frequency control range 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.

*3 12A when Yamato's Water Bath BM200 or BO600 is connected.

RE400



Symbol	Name of Parts
P1	Power Plug
S1	Power Socket
SW1	Power Switch
SPC1	Speed Control Pack
M1	Motor
G	Speed Generator
C1	Motor Condenser
VR1	Volume Knob to Set Rotation Frequency
CN1	Drive Socket
MC	Drive Cable
F1	Fuse

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.
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 chloride, 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 0^{o}C.
		Methanol, Ethanol, Xylene, Pentyl acetate (amyl acetate), and other inflammable 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.