

ROTARY EVAPORATOR

RE210

RE510

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.



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

Yamato Scientific

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1. Specifications

Type	RE210	RE510
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	Arm jack	Manual
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 × 11.4 × 32.9 (inches) 42 × 29 × 83.5 (cm)	16.5 × 13.4 × 24.0 (inches) 42 × 34 × 61 (cm)
Weight	26.5 lb(12kg)	32.0 lb(14.5kg)
Power source (RE only)	AC230V ± 10% 50Hz 0.3A	
Option	Evaporation Flask (opaque & frosted ¥24/40 or ¥29/38) 2000ml/500ml/300ml/200ml/100ml Receiving Flask (opaque & frosted ¥S35/20) 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 Arm Jack JK200	

*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.

Safety Information

Safety Precautions

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 °C. A cause of motor overheating is seized ball bearings.

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.

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 a consumable and should be replaced if a vacuum leak occurs.

The vacuum seal may be used without vacuum grease. For longer life use silicon vacuum grease placed on the ripped side of the seal.

Safety Information

Safety Precautions

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, 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.

Safety Information

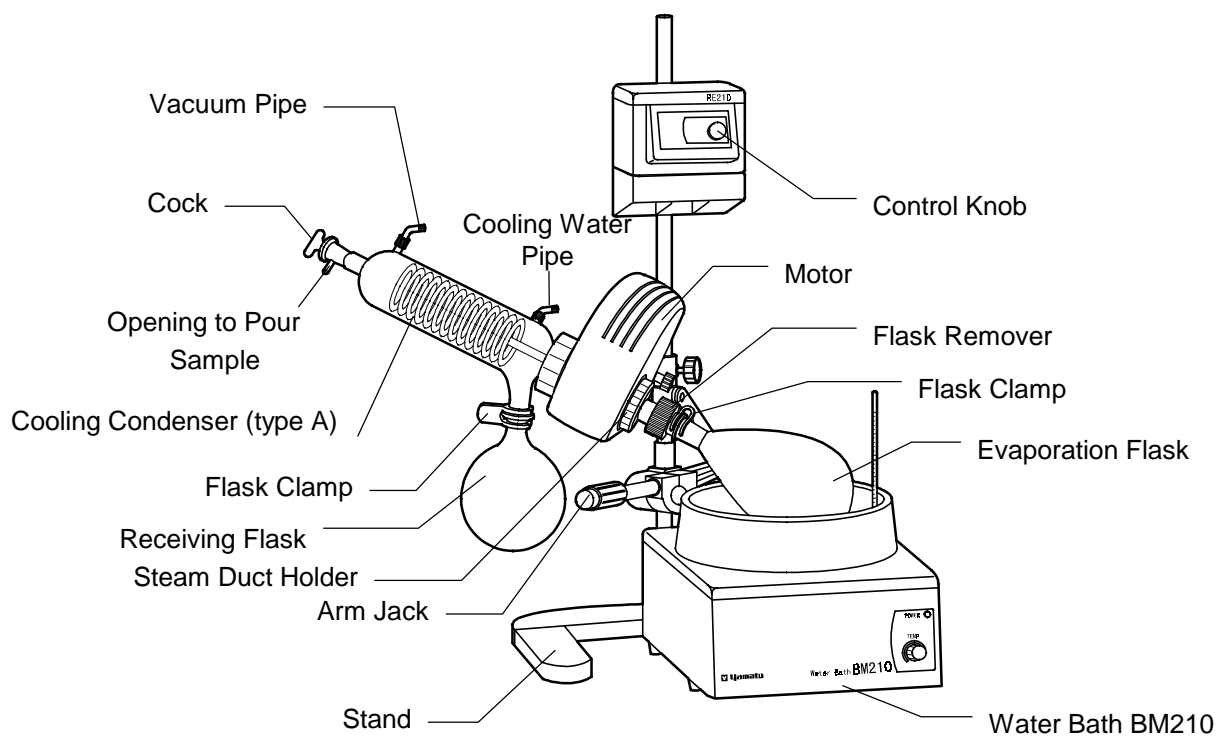
Hazardous Material

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

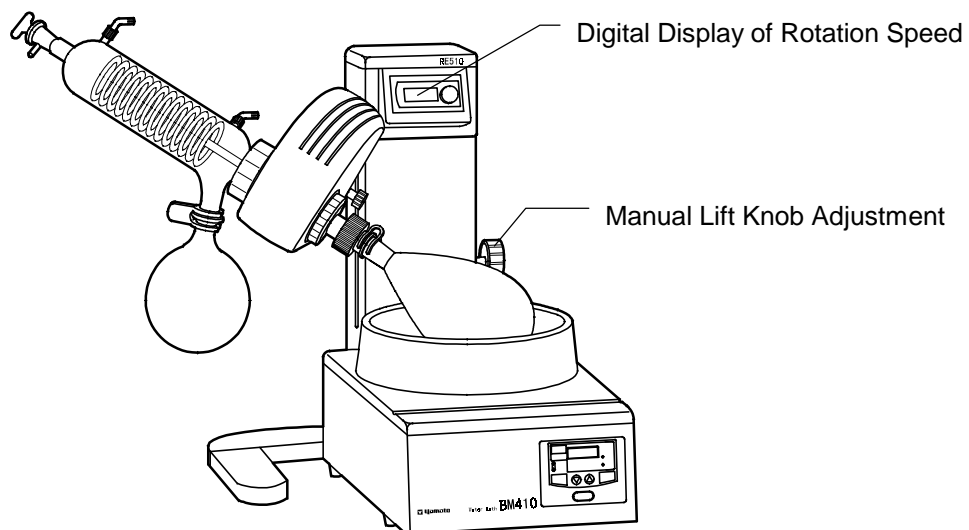
Explosive	Explosive Substance	Nitroglycol, Nitroglycerin, Nitrocellulose, and other explosive nitric esters.
		Trinitrobenzene, Trinitrotoluene, Picric acid, and other explosive nitro compounds.
		Peracetic acid, Methyl ethyl ketone peroxide, Benzoyl peroxide, and other organic peroxides.
		Sodium azide, 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 30°C.
		Normal hexane, Ethylene oxide, Acetone, Benzene, Methyl ethyl ketone, and other flammable substances with a flash point between minus 30°C and 0°C.
		Methanol, Ethanol, Xylene, Pentyl acetate (amyl acetate), and other flammable substance with a flash point between 0°C and 30°C.
		Kerosene, Light oil, Turpentine oil, Isoamyl alcohol, Acetic acid, and other flammable substances with a flash point between 30°C and 65°C
	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

RE210 (type A)

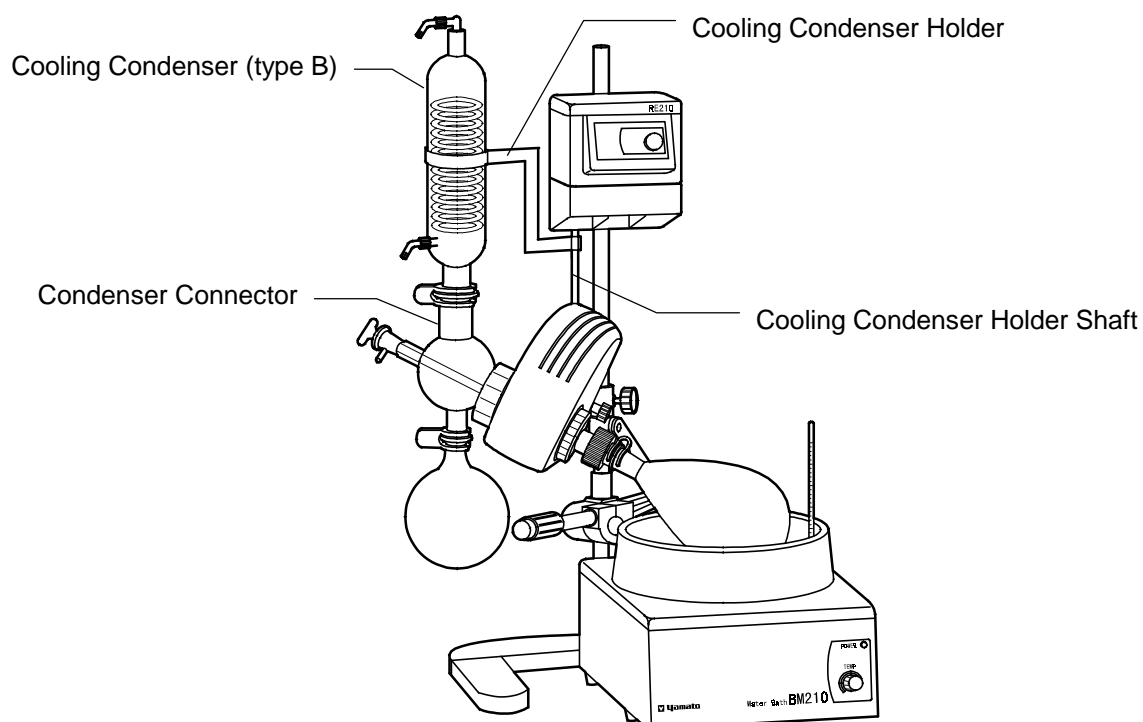


RE510 (type A)

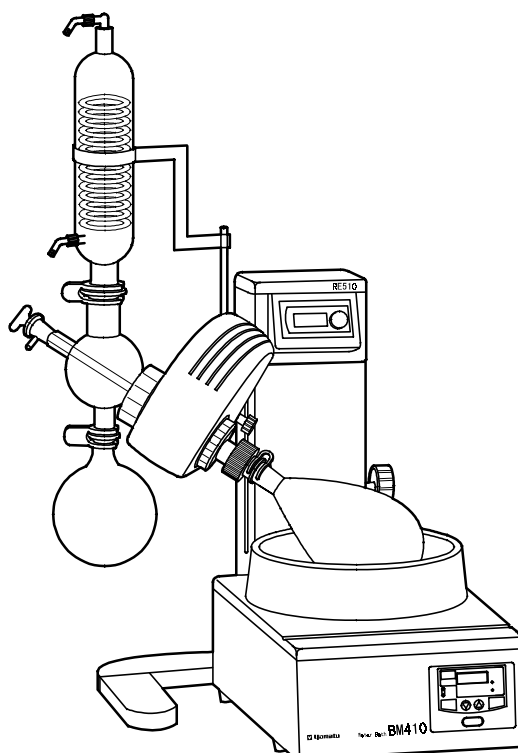


Identification of Parts with Condenser B

RE210 (type B)

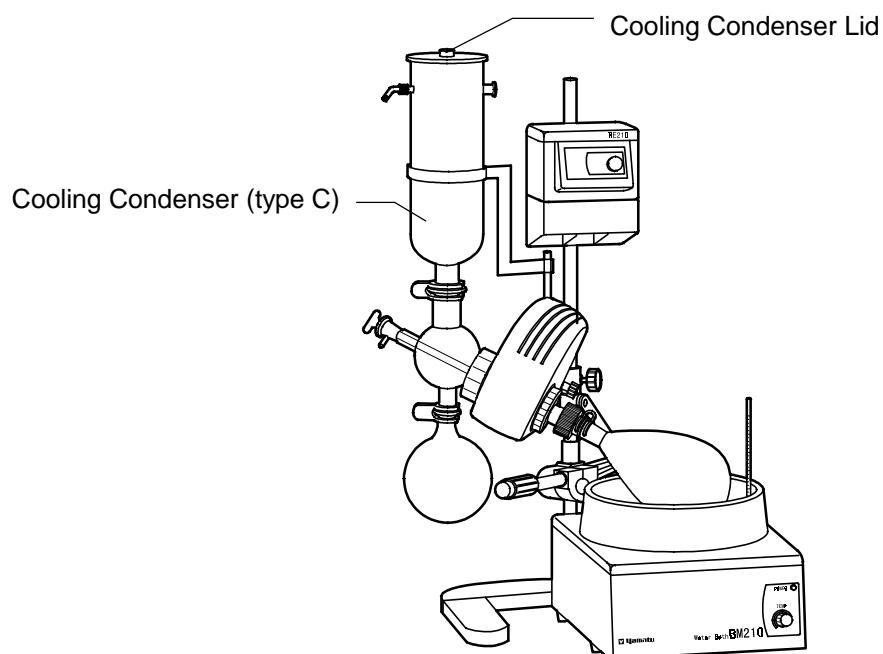


RE510 (type B)

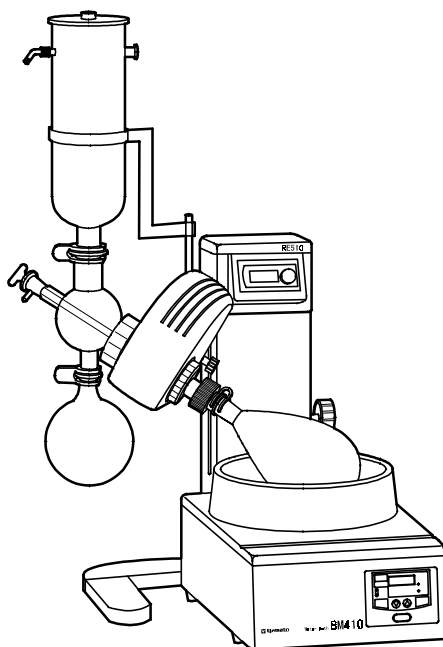


Identification of Parts with Condenser C

RE210 (type C)



RE510 (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.

4. Installation/Assembly

RE210

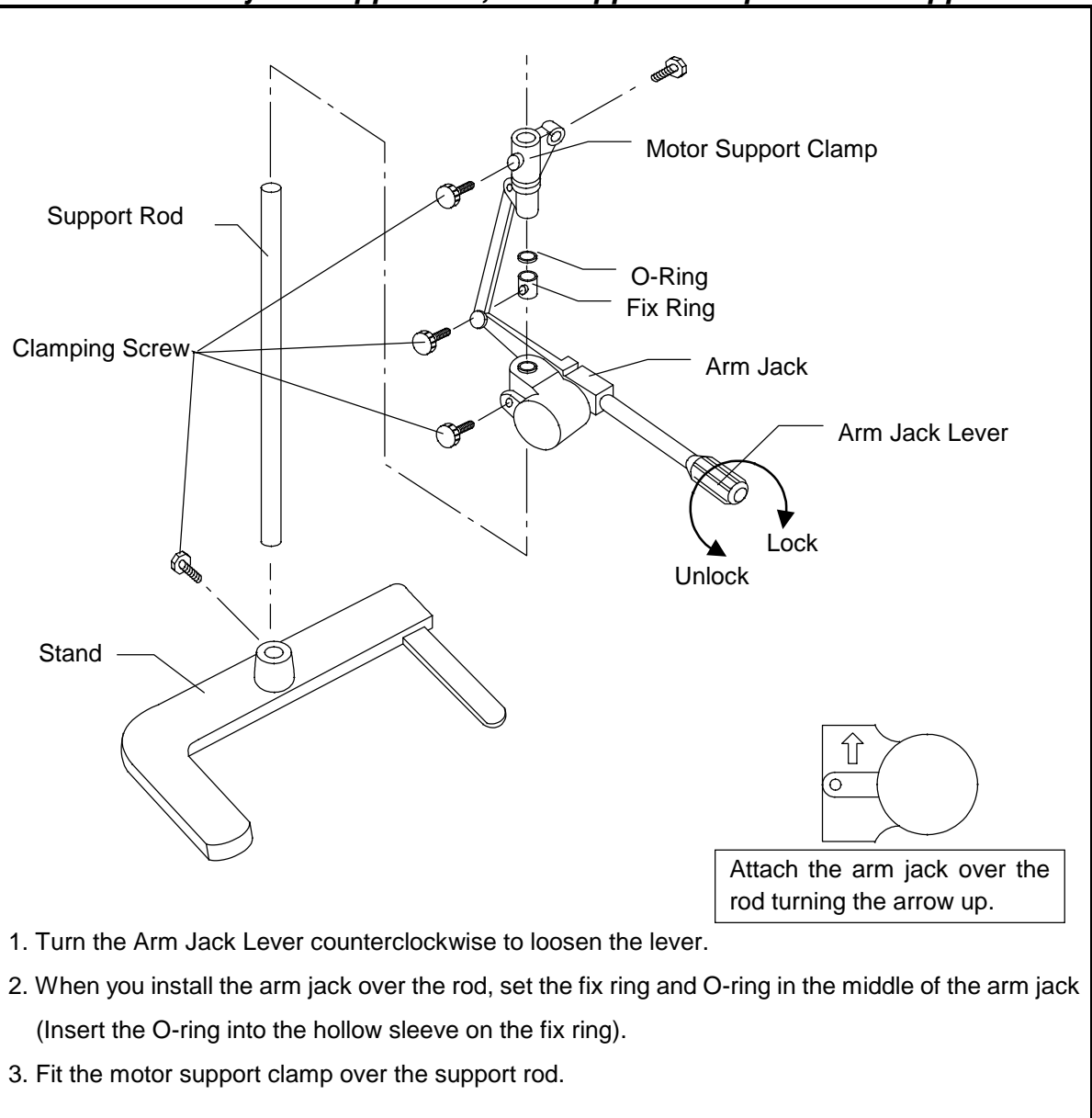
1. Set the stand at a stable place.

Unpack the package and set the stand of the body on a stable place. If you do not set the unit on a stable place, the unit may vibrate or cause strange noises or the unit can fall and get damaged.

2. Insert the rod into support of the stand.

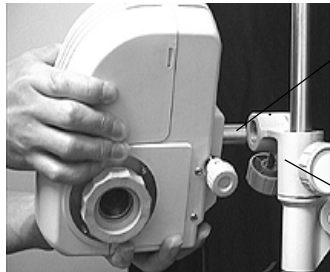
Insert the support rod into support of the stand, and fix by clamping screw.

3. Attach the arm jack if applicable, and support clamp over the support rod.



4. Attach the motor to the motor support clamp.

1. Fit the motor bearing bar to the motor support clamp, and fasten the clamping screw tightly.
Put D-cut surface (flat surface) of the bar perpendicularly to the screw.



Bearing bar

Motor Support Clamp

2. Slant the motor to the right (about 45 °) and finger tightly the motor screw.

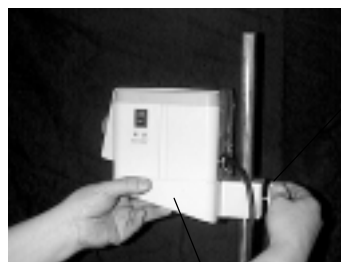


If you do not fasten the screws tightly, vibration may occur preventing accurate measurements or the motor may fall causing the glass apparatus to break.

Motor Screw

5. Attach the controller to the support rod.

Attach the controller to the support rod by attached clamping screw.



Clamping Screw

Controller

6. Set the body at a stable place.

Be sure to set the body at a stable place.

7. 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.



Motor Support Clamp

Motor Screw

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

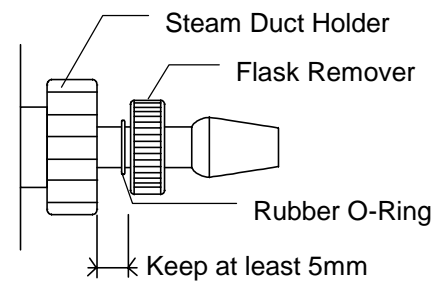
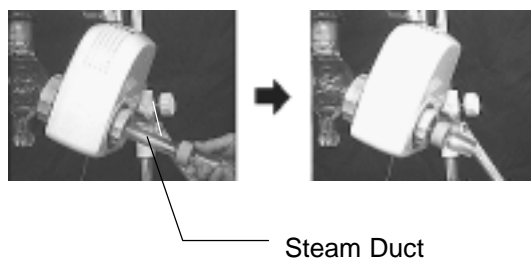


Installation/Assembly

RE210 and RE510 Steam Duct

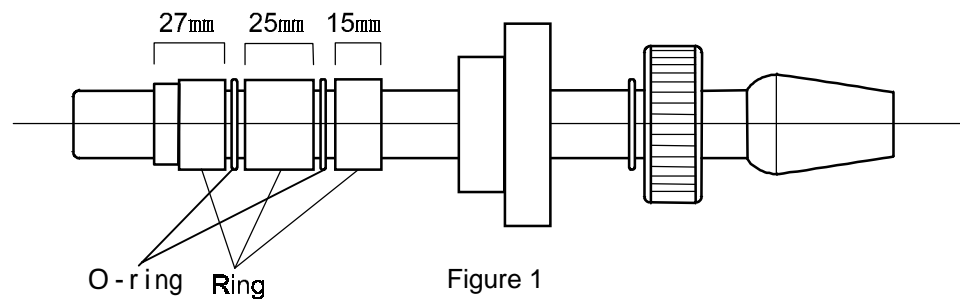
8. Inserting the steam duct into the motor

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.



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

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



2. Connect the cooling condenser nut and then coil ring to the condenser or condenser connector (which ever applies).

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

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

Glass Type A



Glass Type B/C



10. Connect cooling condenser or 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.

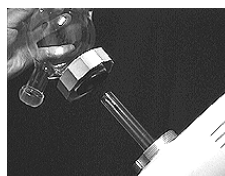


Be careful not to damage the vacuum seal when inserting the steam duct.

Glass Type A



Glass Type B/C



Removing the coil ring from cooling condenser or condenser connector

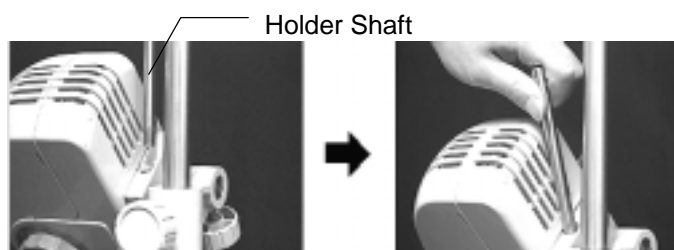


Hook the coil ring by the attached hexagon wrench as shown in the left picture in order to remove the ring easily from the cooling condenser or condenser connector.

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

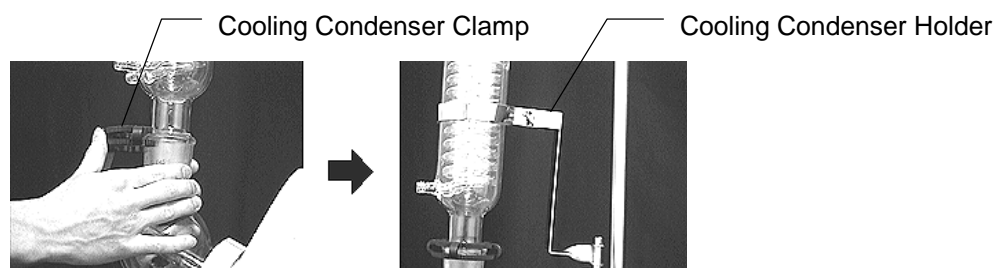
11. Connecting the cooling condenser holder shaft (glass set B and C only).

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.

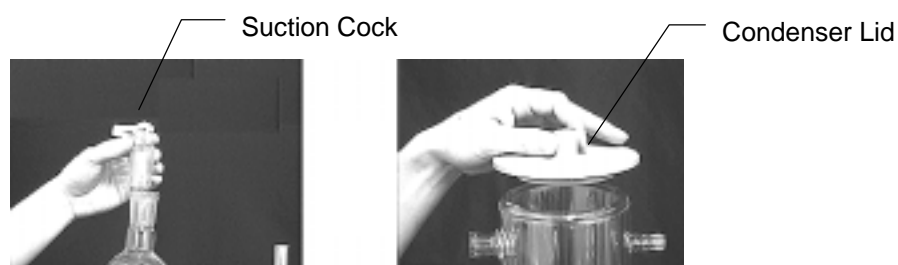


12. Connecting the cooling condenser and condenser holder (B & C condenser only).

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 to type B or the cooling condenser lid to type C.



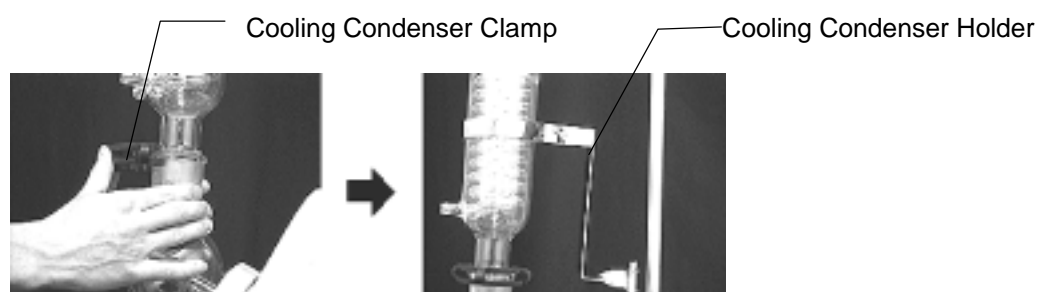
13. Connecting the cooling condenser holder shaft (glass set B & C only)

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.

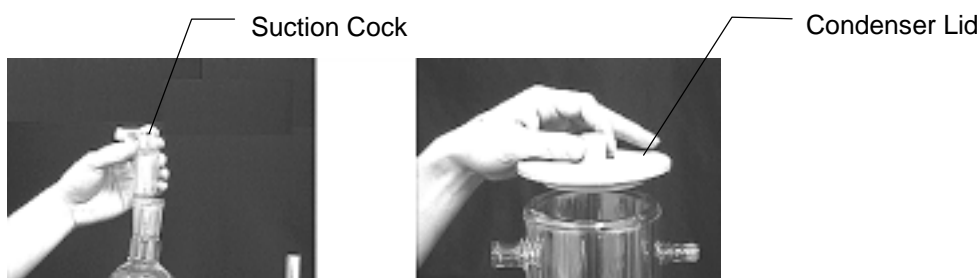


14. Connecting the cooling condenser and condenser holder (B & C condenser only)

1. Connect the cooling condenser to the condenser connector. Attach 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 cooling condenser holder from the bottom of condenser rather than top and connect to the condenser connector)



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



15. Connecting the Evaporation and Receiving Flasks.

Evaporation Flask

1. Turn the blue flask remover upward.
2. Connect the flask to the steam duct, and attach the evaporation flask clamp.



Receiving Flask

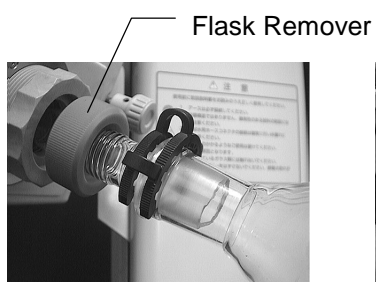
1. Connect the flask to the cooling condenser or the condenser connector, and attach the flask clamp.



For easy evaporation flask removal....

Use the blue flask remover.

1. Remove the clamp while holding the evaporation flask.
2. Turn the remover counter clockwise which will gently push off your evaporation flask.



16. Insert the feed tube into the cooling condenser or cooling condenser connector (which ever applies). Assembly is now complete.



17. Arm jack JK 200(sold separately and exclusively used for RE210)

To set at a certain height

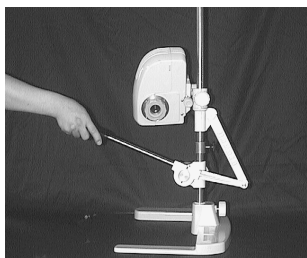
1. Turn the lever counter-clockwise to loosen; move up or down to desired height. Picture 1,2
2. When you determine the position, turn the lever clockwise and fasten firmly. Picture 3
3. Adjust the fixed position ring to desired height.



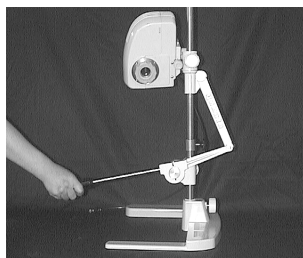
Fasten position ring and lever firmly. Neglecting to fasten tightly may result in motor falling.



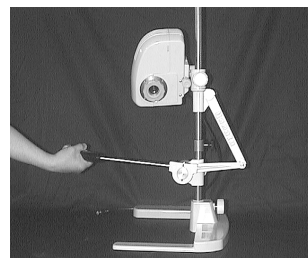
Be cautious when moving the arm lift while glass apparatus is connected or glassware can be damaged.



Picture 1



Picture 2



Picture 3

To change the height

1. Turn the lever counter-clockwise to loosen.
(Support the arm jack securely or the motor will immediately drop downward.)
2. Refer to the above description "To set at a certain height".

18. Manual lift (Supplemental function of RE510)

Adjust the lift by using the two knobs located on the right side of the main assembly.

Lift Knob—lift position knob (larger knob)

Lower Limit Knob—sets a lower limit to prevent glass breakage (smaller knob)



Never operate the larger knob without motor or glass assembly.

1. Loosen the smaller knob (lower limit knob). Picture 1
2. Turn and hold the larger knob to “release”, you may now move the position of the lift.
3. Once you have determined the position of the lift return the larger knob to “Lock”. Picture 2, 3
4. After you determine the lowest position, fasten the small knob. Picture 4, 5

The lift will not go lower than the fixed position. However, this function effectively works only when the small knob is positioned within 5.3 inches (135 mm) from the bottom.



Picture 1



Picture 2



Picture 3



Picture 4



Picture 5

Installation/Assembly

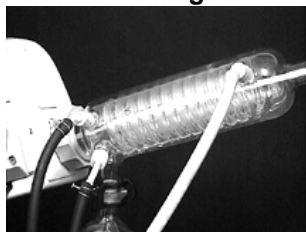
Connecting the Vacuum Hose and Water Supply

19. Connecting the Vacuum Hose and Water Supply

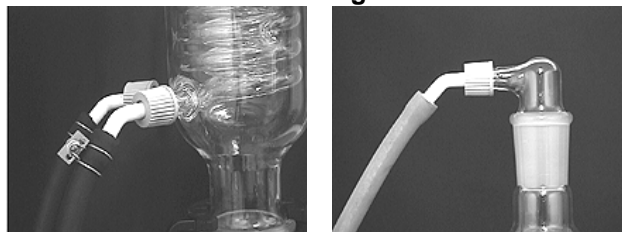
1. Remove plastic threaded joints.
2. Moisten attaching hoses with water for easy attachment.
Do not use any type of lubricating oil.
3. Connect plastic threaded joints to cooling condenser hoses.
(id=9mm)
4. Attach hose clamps to plastic threaded joints.
5. Attach to cooling condenser.
6. Connect plastic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



In case of glass B



Connect the drain hose.
(id= 18mm)

In case of glass C



Installation/Assembly

Power Requirements

20. 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.

21. Prepare bath (separately sold)

Set the bath in front of the body.

*** Be sure to read the attached operation manual supplied with the water bath.**



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 the 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. Move flask down and start rotation.

1. When the bath temperature reaches the set point, move the evaporation flask down into the bath.
2. Turn on the switch on the right side of control box, and turn the control knob to rotate at a required speed.
3. Operate the vacuum device 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.

5. Moving lift position



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

6. End of operation

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

7. Power failure

The unit restarts operation once power is restored.

6. Troubleshooting Guide

Problem Solving Chart

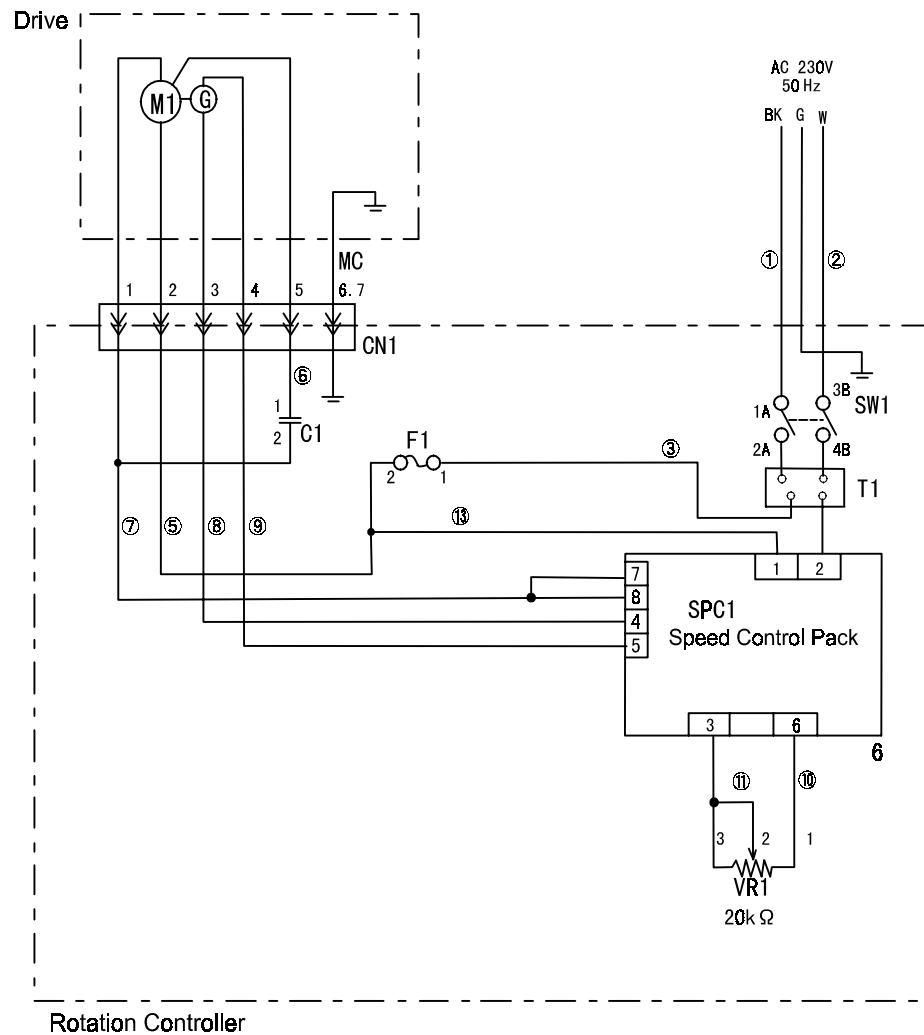
Trouble & Countermeasure

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)
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 switch Turn the 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

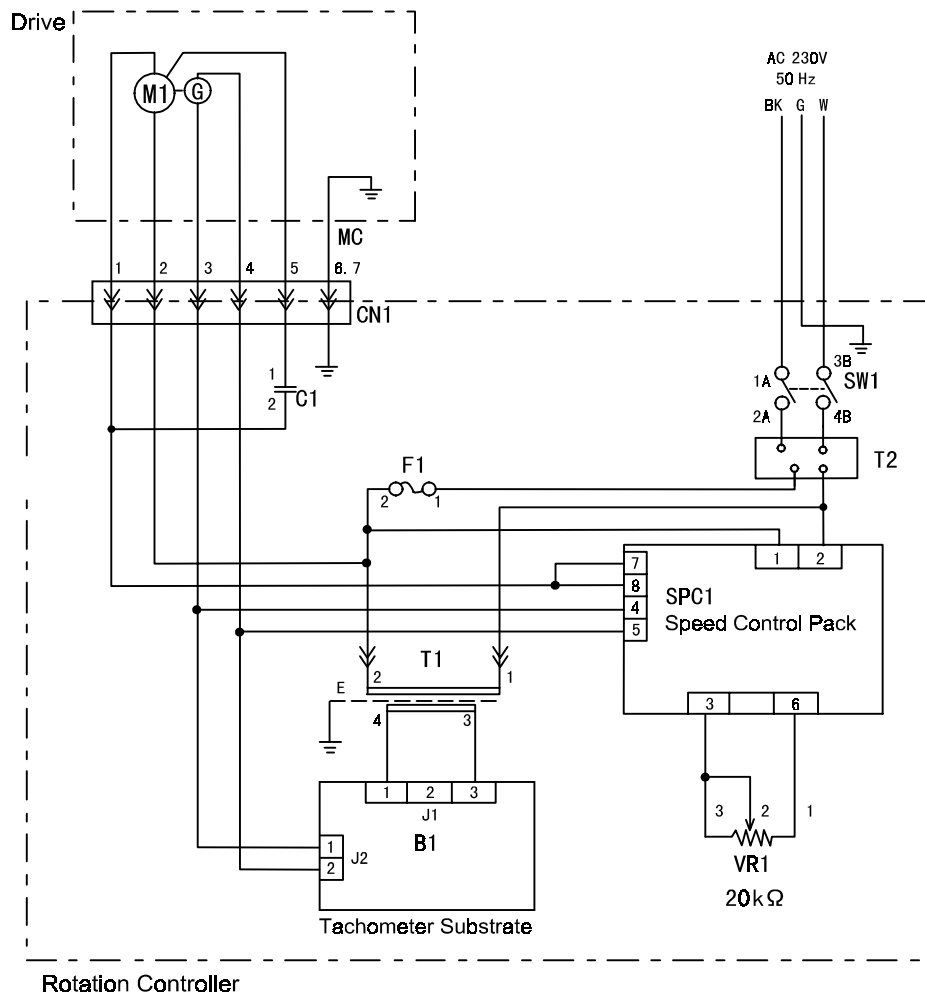
RE210



Symbol	Name of Parts
T1	Transformer
SW1	Power Switch
SPC1	Speed Control Pack
M1	Motor
G	Tachogenerator
C1	Motor Condenser
VR1	Resister to Set Rotation Speed
CN1	Drive Socket
MC	Drive Cable
F1	Fuse

Wiring Diagram

RE510



Rotation Controller

Symbol	Name of Parts
T1	Transformer
SW1	Power Switch
SPC1	Speed Control Pack
M1	Motor
G	Tachogenerator
C1	Motor Condenser
VR1	Resister to Set Rotation Speed
CN1	Drive Socket
MC	Drive Cable
F1	Fuse (2A)
T1	Transformer
B1	Tachometer Substrate

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 ㉔29/38 Steam Duct	Common use for all types
	255183-412-1	For ㉔24/40 Steam Duct	
Receiving Flask	255191-413-1	Common use for all types	
Steam Duct	RG00A-30011	For ㉔29/38 Steam Duct	Common use for all types
	RGY0A-30010	For ㉔24/40 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 ㉔29/38 Steam Duct	Common use for all types (the life is limited)
	KC24	For ㉔24/40 Steam Duct	
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)	RE510-40093	Common use for all types (the life is limited)	
Ring (Middle)	RE510-40061	Common use for all types (the life is limited)	
Ring (Small)	RE510-40073	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	RE510-40090	Common use for all types (the life is limited)	
Fuse	2-10-001-0011	5.2×20 AC125V 2A RE210,510	
Power Switch	2-01-001-0011	RE210,510	
Speed Control Pack	1-09-000-0005	RE210,510	
Motor	2-14-000-0022	RE210,510	
Motor Condenser		RE210,510	
Motor Speed Resistor		RE210,510	
Transformer	2-18-002-0003	RE210,510	
Transformer(Display)	1-01-320-0005	RE510	
Tachometer Substrate	RE510-40120	RE510	

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 Scientific'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.