



Velocity 15HR

Micro Centrifuge



Instruction manual

Model Velocity 15HR High Speed Micro Centrifuge

Version: 1.0
Revision: D01-201802



**Dynamica Velocity 15HR
Refrigerated
Microcentrifuge**

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Safety Reminder


Common safety precautions

The centrifuge is designed to separate liquid-suspended materials having different densities and particle size.

Carefully read the following safety precautions for a thorough understanding.

- Follow the instructions and procedures described in this manual to operate this centrifuge safely.
- Carefully read all safety messages in this manual and safety instructions on your equipment.
- Safety messages are labeled as indicated below. They are in combination with signal words of “WARNING” and “CAUTION” with the safety alert symbol to call your attention to items or operations that could be dangerous to you or other persons using this equipment. The definitions of signal words are as follows:

 **WARNING** : Warning notes indicate any condition or practice, which if not strictly observed, could result in serious injury or possible death.

 **CAUTION** : Caution notes indicate any condition or practice, which if not strictly observed or remedied, could result in personal injury, damage or destruction of the equipment.

NOTE : Notes indicate an area or subject of special merit, emphasizing either the product’s capabilities or common errors in operation or maintenance.

- Do not operate this centrifuge in any manner not described in this Instruction Manual. Should you have any troubles with this centrifuge, call a Dynamica authorized sales/service representative.
- The precautions described in this Instruction Manual are carefully developed in an attempt to cover all the possible risks. However, it is also important that you are alert for unexpected incidents. Be careful when operating this centrifuge.

 **Safety Reminder**

 **WARNING**

1. This centrifuge is not explosion-proof. Never use explosive or flammable samples or materials that chemically react vigorously.
2. Do not install the centrifuge in or near places where inflammable gases are generated or chemicals are stored.
3. Take all necessary safety measures before using samples that are toxic or radioactive, or blood samples that are pathogenic or infectious. You use such samples at your own responsibility.
 - 1) If the centrifuge, rotor, or an accessory is contaminated by samples that are toxic or radioactive, or blood samples that are pathogenic or infectious, be sure to decontaminate the item according to good laboratory procedures and methods.
 - 2) If there is a possibility that the centrifuge, rotor, or an accessory is contaminated by samples that might impair human health (for example, samples that are toxic or radioactive, or blood samples that are pathogenic or infectious), it is your responsibility to sterilize or decontaminate the centrifuge, rotor or the accessory properly before requesting repairs from a Dynamica authorized sales/service representative.
 - 3) It is your responsibility to sterilize and/or decontaminate the centrifuge, rotor, or parts properly before returning them to a Dynamica authorized sales/service representative.
4. Your centrifuge must be grounded properly.
5. To avoid electrical shocks, do not handle the power cord or turn on or off the POWER switch with wet hands.
6. For safety purposes, do not go within 30 cm of this centrifuge while it is in operation.
7. While the rotor is rotating, never forcedly release the door lock.
8. Repairs, disassembly, and other modifications to the centrifuge are strictly prohibited unless performed by a Dynamica authorized sales/service representative.



Safety Reminder



CAUTION

1. Be careful not to get your fingers or hands caught between the door hook and the table when closing the door. Do not insert your fingers or an object into the door hook hole.
2. Do not move or relocate this centrifuge while the rotor is rotating.
3. Do not pour any solution such as water, detergent, or disinfectant directly into the rotor chamber. If you do so, the bearings of the drive unit might corrode or deteriorate.
4. Before running this centrifuge, remove any dropped objects and tube fragments from inside the rotor chamber.
5. Prevent dew drops in the centrifuge. When moving the centrifuge from the cold room to the ordinary room, perform a) or b).
 - a) Warm up the centrifuge by performing the continuous operation for more than 30 minutes.
 - b) Place the centrifuge for more than three hours in a dried room without connecting the power cord into the inlet of the centrifuge.
6. Cautions on rotors
 - 1) Carefully read the rotor instruction manual before use.
 - 2) Always check for corrosion and damage on the rotor, adapters, and tubes before using them. Do not use the rotor, adapters, or tubes if you find such a problem.
 - 3) Place the rotor in position until it contacts the drive shaft. You should feel a click when the rotor is properly placed on the drive shaft. If you do not feel anything, there might be foreign matter stuck between the rotor and the drive shaft, and the rotor might be tilted. Check and remove foreign matter if found.
 - 4) Before running this centrifuge, check whether the nut for fixing the rotor to the drive shaft and the rotor cover have been tightened firmly. If the nut has not been tightened sufficiently, the rotor might be improperly installed and come off during operation.
 - 5) Do not run this centrifuge over the allowable maximum speed of the rotor, adapters, and tubes. If their maximum speeds vary, run the centrifuge at the lowest maximum speed among them.
 - 6) Do not exceed the allowable imbalance. For the details, refer to section 3.1 or the rotor instruction manual.
 - 7) Use the rotor tubes within their actual capacities.
 - 8) Be sure to cap the microtubes if caps are provided.
 - 9) When using filters attached to microtubes, use microtubes specifically designed for use with filters. If you use an ordinary microtube with a filter and the microtube is not capped, the rotor might abnormally vibrate or come off.
 - 10) When storing the rotor on a shelf, make sure that the shelf is secured (for example, to avoid the rotor from dropping during an earthquake).
 - 11) Check the chemical resistance chart attached to the rotor, and do not use any sample inapplicable to the rotor, adapters, tubes, tube caps, etc. Using such a sample could corrode or deteriorate such parts.
7. If you observe some abnormality in this product, stop using it immediately and contact a Dynamica authorized sales/service representative. Notify the service representative of the alarm code if displayed.
8. If the centrifuge will not be used for a long time, remove the power cord from the receptacle.
9. Depending on the magnitude, an earthquake might damage the centrifuge.

If you observe some abnormality, contact a Dynamica authorized sales/service

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APPENDIX

Decontamination Sheet

WEEE Compliance

Marking for the restriction of the use of hazardous substances in electrical and electronic product (THE PEOPLE'S REPUBLIC OF CHINA)

Rotor Guide

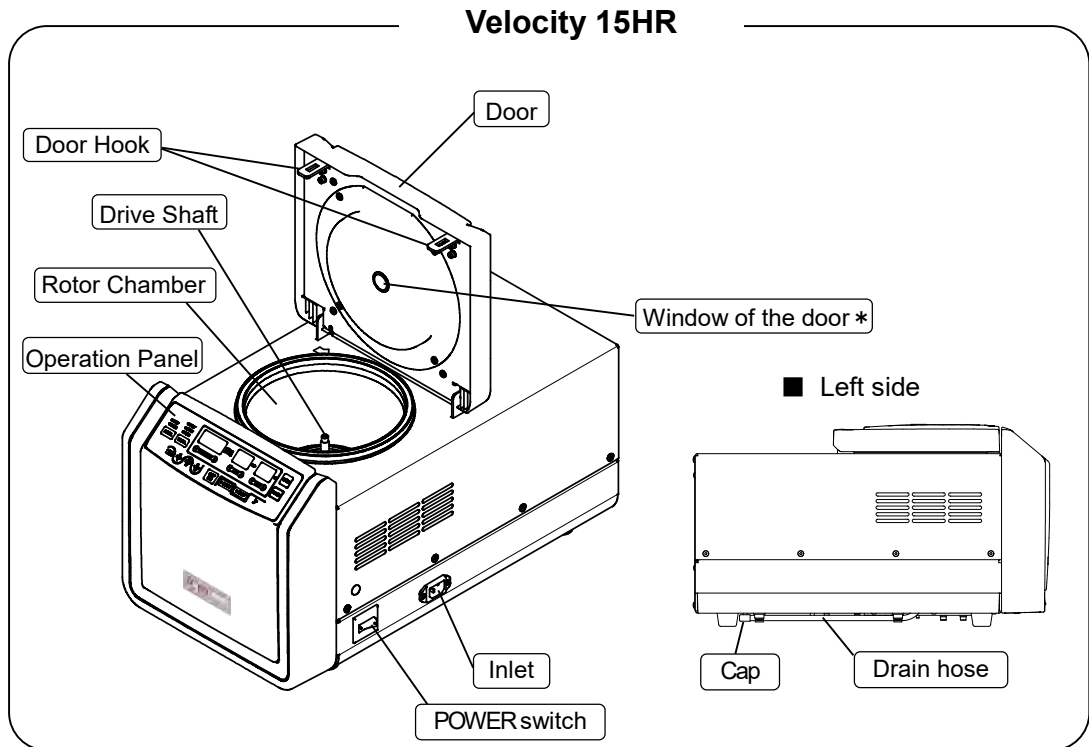
Rotor Instruction Manual

Warranty _____ back cover

After-sales Service _____ back cover

1. Structure

1.1 Location of the component

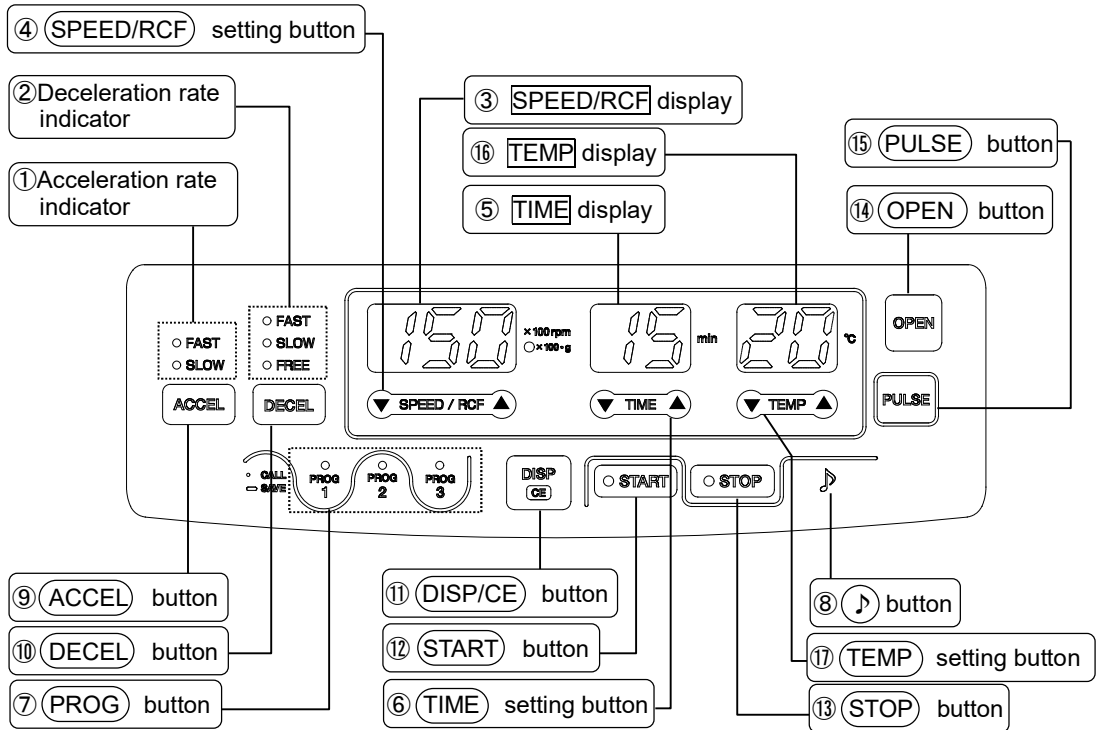


* You can measure the rotor speed through the window of the door by a optical reflection type rotation meter.

1. Structure

1.2 Operation panel

Velocity 15HR



1. Structure


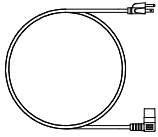
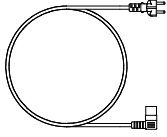

No.	Name	Function
①	Acceleration rate indicator	Indicates the rate of acceleration from the stop to 1,000 rpm by two LEDs.
②	Deceleration rate indicator	Indicates the rate of deceleration from 1,000 rpm and coasting deceleration state by three LEDs.
③	SPEED/RCF display	<p>(1) Displays a speed or RCF setting or status value.</p> <p>1)SPEED (speed indicator)</p> <ul style="list-style-type: none"> The speed is displayed in increments of 100-rpm. <p>2)RCF(RCF indicator)</p> <ul style="list-style-type: none"> The RCF is displayed in increments of 10- xg when RCF is less than 1,000xg. The RCF is displayed in increments of 100- xg when RCF is 1,000xg or more. <p>(2) Displays an alarm code if any abnormality in the centrifuge is observed.</p>
④	SPEED/RCF setting button	Sets the speed or the RCF. When you keep pressing this button, the value of the speed or the RCF changes rapidly.
⑤	TIME display	<p>(1) Displays the setting or status value of the running time. (Not sets the time)</p> <ul style="list-style-type: none"> The running time is displayed in increments of 1-second when it is below 1 minute. When the running time is between 1 minute and 99minutes, it is displayed in increments of 1- minute . <p>"Hd" is displayed when the centrifuge is run continuously.</p>
⑥	TIME setting button	Sets a running time. When you keep pressing this button, the value of the running time changes rapidly.
⑦	PROG button	Stores and recalls running conditions.
⑧	STOP button	Changes rotor stop signal.
⑨	ACCEL button	Sets an acceleration rate.
⑩	DECEL button	Sets a deceleration rate.
⑪	DISP/CE button	<p>(1) Shifts between the running and the setting status and fixes the setting value.</p> <p>(2) Clears an alarm code.</p>
⑫	START button	Rotor rotation start button
⑬	STOP button	Rotor rotation stop button
⑭	OPEN button	Door lock release button (only when the rotor is stopping)
⑮	PULSE button	Accelerates the rotor while this button is pressed.
⑯	TEMP display	<p>Displays the setting or status value of the temperature.</p> <p>The temperature is displayed in increments of 1°C when the temperature is between -19°C and 50°C.</p> <p>(When the temperature is -20°C or less, it displays "Lo".)</p>
⑰	TEMP setting button	<p>Sets a temperature. When you keep pressing this button, the value of the temperature changes rapidly.</p> <p>Temperature setting range : from "Lo"(-20°C) to 40°C.</p>

1. Structure

1.3 Standard accessories

- The standard accessories of the Velocity 15HR centrifuge are listed in Table 1.3. Check that all the standard accessories are provided before installation.

Table 1.3 Standard accessories for Velocity 15HR

Item name	Part No.	Q'ty	Item drawing
Instruction manual	D3-S999931	1	
Power cord*	S204746 (Velocity 15HR) (120V)	1	
	S204816 (Velocity 15HR) (220-230V)	1	
Tool for setting a rotor	S413606	1	

* The provided power cord is different depending on the country.

2. Installation

⚠ CAUTION :

- Before moving the centrifuge, the rotor must be removed.

This section describes instructions that you need to follow when installing the centrifuge. The instructions ensure your safety and maximum performance.

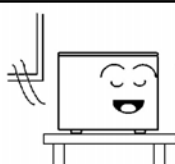
(1) Location

- Position this centrifuge on a firm and level floor. Avoid installing it on a slippery floor, or on a floor that conveys vibrations (for example, from people's footsteps).
- This centrifuge can be used at the ambient temperature range of 2°C to 32°C. We recommend that this centrifuge will be used at the ambient temperature range of 15°C to 25°C to ensure maximum performance. Do not position this centrifuge in direct sunlight.
- This centrifuge has an air-cooling system. To secure efficient cooling, keep clearances of at least 10 cm on both sides of the centrifuge, and at least 30 cm behind it.
- Do not install near a heat-generating device or water source from where water might drip or splash. Such a location might increase the temperature of samples or cause the centrifuge to malfunction.
- Do not dew the centrifuge. When moving the centrifuge from the cold room to the ordinary room, perform a) or b).
 - a) Warm up the centrifuge by performing the continuous operation for more than 30 minutes.
 - b) Place the centrifuge for more than three hours in a dried room without connecting the power cord into the inlet of the centrifuge.

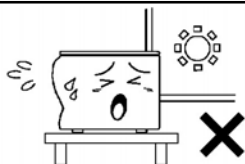
On a firm and level floor.



A room with a good ventilation



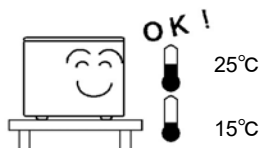
A room that is not exposed to the direct sunlight



A room with no chemicals and no inflammable gas



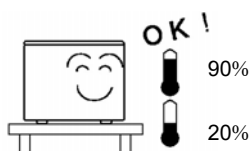
Room temperature:
From 15°C to 25°C



A place where water do not drip or splash



Humidity
From 20% to 90%



Noncondensing
(Be careful when moving the centrifuge from a cold room to a ordinary room.)



2. Installation

This section describes instructions you need to follow when installing the centrifuge. These instructions ensure your safety and the maximum performance.

(2) Power source

Velocity 15HR:

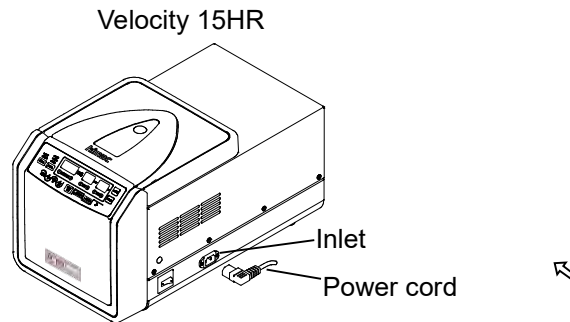
120 V instrument: 108-126 V AC, 15 A, 60 Hz

220-230 V instrument: 198-253 V AC, 10 A, 50 Hz ; 198-242 V AC, 10 A, 60 Hz

- Install an emergency switch (circuit breaker) that turns off the main power supply in the event of a malfunction. Optimally, install the emergency switch outside the room or near the exit.

(3) Connection of the power cord

- Connect the attached power cord to the inlet of the centrifuge.



- Check that the POWER switch is turned off. Then plug in to the outlet.

⚠ WARNING :

- To avoid electrical shocks, do not touch the power cord with wet hands.
- Do not hold the cord when disconnecting the power cord from the outlet. Hold the plug when disconnecting it.
- This centrifuge must be grounded properly. The power cord plug has a three-prong plug. One of the three prongs is provided for grounding. This centrifuge can be grounded just by putting the three-prong plug into a three-prong outlet. Do not connect the three-prong plug to a two-prong outlet using an adapter.



⚠ CAUTION :

- For connection to a different outlet, the power cord may be needed to be replaced. Follow local electrical codes.

(4) Removing the packing for transportation from the rotor chamber

- Unlock the door by pressing the **OPEN** button after turning on the POWER switch. Remove the packing for transportation from the rotor chamber after opening the door.

3. Preparation

3.1 List of Applicable Rotors

⚠ CAUTION :

- Only rotors listed in Table 3.1 can be used in the Velocity 15HR centrifuge.
- To use the rotor properly, read its instruction manual carefully.
- Do not run the centrifuge over the allowable maximum speeds of the rotor, adapters, tubes. Some adapters and tubes cannot withstand the speed of the rotor in use.
- Never use any rotor and adapter that is not designated for the centrifuge by Dynamica.
- Check the chemical resistance chart attached to the rotor, and do not use any sample inapplicable to the rotor, the adapters, tubes, tube caps, etc. Using such a sample could corrode or deteriorate such parts.
- If it is necessary to use commercial tubes or adapters other than those recommended by Dynamica, contact a Dynamica authorized sales/service representative.

Table 3.1 List of applicable rotors of the Velocity 15HR centrifuge

Rotor type (Shape)	Maximum speed (Maximum RCF)	Tube (mL)	Allowable imbalance
			Mass difference (g)
FAS15E (T15A61)	15,000rpm (21,500 × g)	1.5mL / 2.0mL X 24tubes	0.2 g/tube
FAS15F (T15A62)	15,000rpm (21,500 × g)*	1.5mL / 2.0mL X 24tubes or 0.5mL X 24tubes	0.2 g/tube***
FAS15G (T15A63)	15,000rpm (21,500 × g)**	0.2mL X 32tubes (8-strip tubes)	0.1 g/tube

*The FAS15E rotor used with 0.5mL tube has a maximum RCF of 18,100xg.

**The FAS15G rotor has a maximum RCF of 21,500xg when a tube is loaded in the corner tube cavity of the rotor.

***Allowable imbalance is 0.2g / tube when the same kinds of tubes are loaded in the rotor. Allowable imbalance is 0.1g / tube when both the 1.5/2 mL micro tubes and the 0.5ml micro tubes are loaded in the rotor at the same time.

3. Preparation

3.2 Installing the rotor

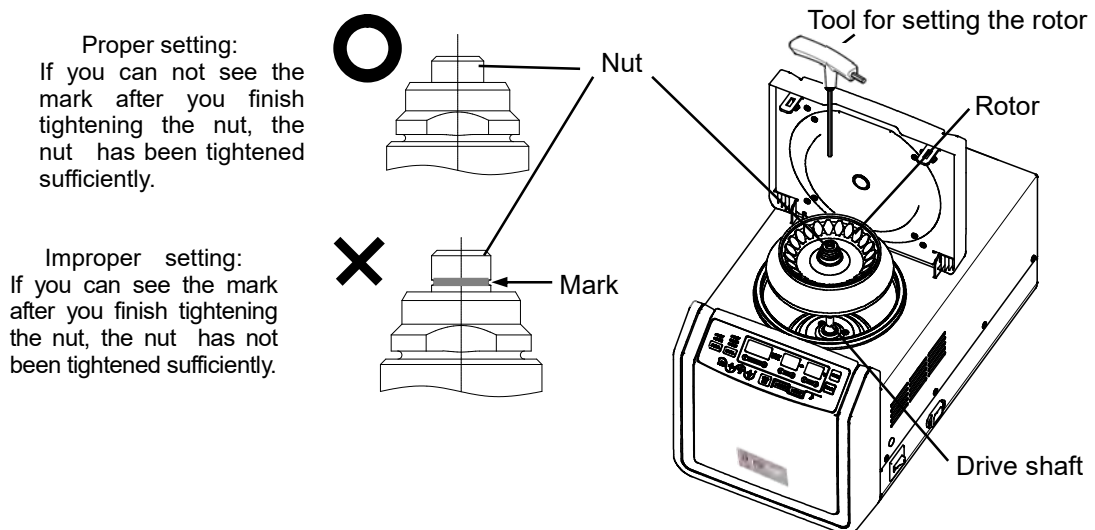
- (1) Check the rotor for corrosion or crack before use. The rotor is corroded if the surface is discolored, dented or cracked.

⚠ CAUTION :

- If any abnormality such as corrosion or crack is found, stop using the rotor and contact a Dynamica authorized sales/service representative.

- (2) Remove the rotor cover from the rotor and check that there is no foreign matter in tube cavities.
- (3) Place the rotor body on the drive shaft without the rotor cover. Then hold the rotor body to avoid moving the rotor body and tighten the nut with the tool for setting rotor.

- There is the mark in the side of the nut. If you can see the mark after you finish tightening the nut, the nut has not been tightened sufficiently.
Tighten the nut sufficiently until you can not see the mark on the side of the nut.



⚠ CAUTION :

- Place the rotor in position until it contacts the drive shaft. You should feel a click when the rotor is properly placed on the drive shaft. If you do not feel anything, there might be foreign matter stuck between the rotor and the drive shaft, and the rotor might be tilted. Check and remove foreign matter if found.
- When the rotor is installed improperly, the rotor may abnormally vibrate or come off. If the nut is tightened insufficiently, the rotor may stick in the drive shaft. As the result, the rotor may not be able to be removed from the drive shaft.
Alarm **E20** and Alarm **E21** may be displayed when the rotor is installed improperly. These alarm codes are displayed when the drive shaft is rotated at high speed without the rotor. When these alarm codes are displayed, turn off the POWER switch to clear the alarm code.
- Be careful not to injure your fingers or hands with the threaded portion of the rotor when holding the rotor.

3. Preparation

3.3 Preparing samples

(1) Prepare the sample to be centrifuged.

 **WARNING :**

- This centrifuge and the rotor are not explosion-proof. Never use explosive or flammable samples.
- There are restrictions on the usage of biological samples and radioactive substances that require biological isolation such as pathogens and recombinant DNA for safety purposes. User must prepare necessary safety measures at user's responsibility before treating samples containing such substances.

 **CAUTION :**

- Be careful that imbalance operation may occur in the following cases. Fill the same sample in the tubes/bottles and load them in the buckets that are placed symmetrically with respect to the drive shaft in the rotor.
- If samples that are equal in volume but different in composition are used, the precipitation levels may be different by centrifugation and such operation may increase the level of imbalance.
- If samples that are equal in weight but different in volume (density) are used or if the tubes/bottles are different in inside diameter or shape, there may be variations in position of center of gravity and such operation may cause imbalance.

(2) Inject the sample into the tubes.

- Balance the tubes which are loaded into the rotor symmetrically with respect to the center of rotation of the rotor.

 **CAUTION :**

- Use the rotor tubes within their actual capacities. Depending on the kind of tubes used, a sample might leak from the gap between a tube and its cap if the tube is full.
- Do not exceed the allowable imbalance. For the details, refer to section 3.1 or the rotor instruction manual.
- Never wittingly run under unbalanced condition even though the allowable imbalance is not exceeded.

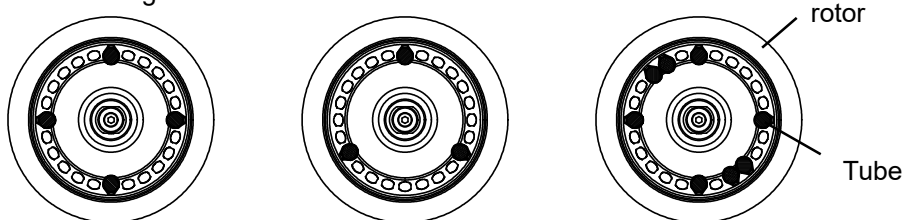
3. Preparation

(3) Load the tubes into the tube cavities of the rotor.

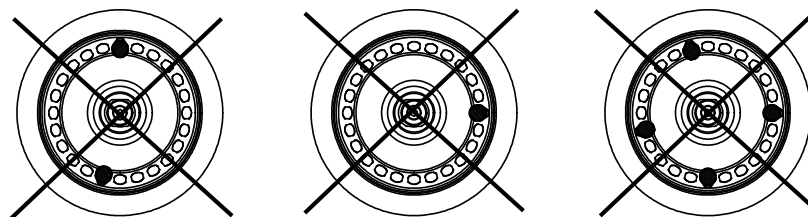
- Load the tubes which are balanced symmetrically in the step (2) into the tube cavities.

Example of correct tube settings and incorrect tube settings

Correct settings:



Incorrect settings:



⚠ CAUTION :

- Be sure to cap the micro tubes if caps are provided, otherwise it may cause the contamination of the sample with dust or water.
- When using filters attached to micro tubes, use micro tubes specifically designed for use with filters. If you use an ordinary micro tubes with a filter and the micro tube is not capped, the rotor might abnormally vibrate.

4. Operation

4.1 Setting the operating conditions





 WARNING :

- Never open the door while the rotor is rotating or touch the rotating rotor.
- For your purposes, do not go within 30 cm of this centrifuge while it is in operation.

 CAUTION :

- Do not place any object or your hands on the centrifuge.
- Do not push or lean against the centrifuge while it is running.
- Do not place containers holding liquid on or near the centrifuge. If they spill, liquid may get into the instrument and damage electrical or mechanical components.
- Do not run the centrifuge with fragments of tubes or dew drops left in the rotor chamber. The foreign matter might get mixed with samples or might become the cause of rise in the rotor retention temperature. Keep the interior of the rotor chamber always clean.
- When operating the rotor at high speed after turning on the POWER switch in the Velocity 15HR centrifuge, the temperature of the rotor chamber might increase temporarily. However something is not wrong with the Velocity 15HR. To cool the rotor chamber completely, wait for at least three minutes after turning on the POWER switch.
- If this centrifuge makes peculiar sound during its operation, stop it immediately and contact a Dynamica authorized sales/service representative.

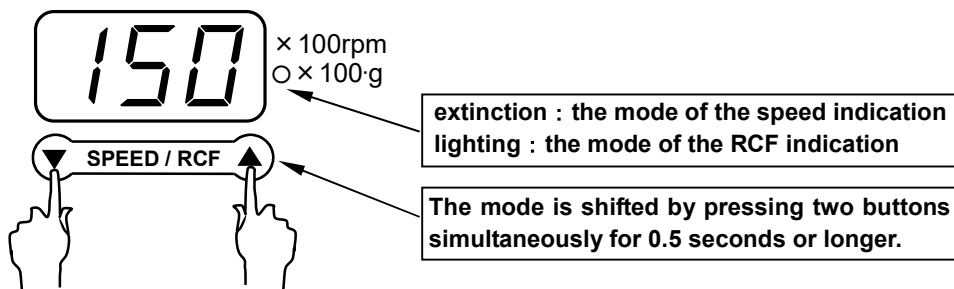
NOTE :

- The setting value can be indicated by pressing **DISP/CE** button. By pressing it again, the status value can be indicated.
- When changing the setting value, press the  button or  button (These buttons are placed at the lower of the display) to blink the indication. If three seconds elapses without operation, the indication does not blink and the centrifuge does not accept the intended value. Press the  button or  button again to blink the indication.

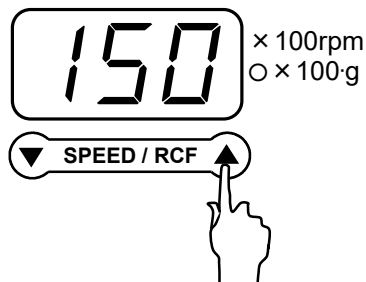
4. Operation

4.1.1 Setting the speed

- ① Check whether LED (color:green) at the right of the **SPEED/RCF** display has been extinguished. When the LED has been extinguished, perform the step ③.
- ② When the LED described in step ① lights, shift the mode from the RCF indication to the speed indication by pressing the **▼** button and **▲** button (of **SPEED/RCF** setting) for 0.5 seconds or longer simultaneously (see the below). Then the LED is extinguished and you can hear the short electronic sound.



- ③ Press the **▲** button or **▼** button once at the lower of the **SPEED/RCF** display.
 - **SPEED/RCF** display blinks which indicates that the centrifuge is in the speed input waiting mode.



- ④ Press the **▼** button or **▲** button to set the intended speed.
(When pressing the button continuously, the value of the speed changes rapidly.)

■ When pressing the button, the value changes as follows.

▼ button : 150 → 149 → → 4 → 3 → 150 → 149 →

▲ button : 3 → 4 → 5 → → 149 → 150 → 3 → 4 →

■ The speed is set in 100-rpm intervals.

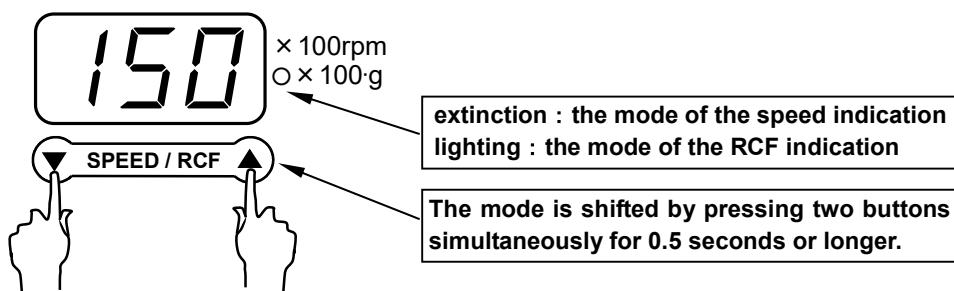
- ⑤ Confirm the entered setting by pressing **DISP/CE** button.

■ Even if neglecting to press **DISP/CE** button, the entered setting is confirmed after about three seconds.

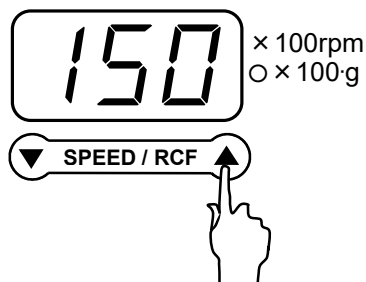
4. Operation

4.1.2 Setting the RCF

- ① Check whether LED (color:green) at the right of the **SPEED/RCF** display has been lit. When the LED has been lit, perform the step ③.
- ② When the LED described in step ① is extinguished, shift the mode from the speed indication to the RCF indication by pressing the **▼** button and **▲** button (of **SPEED/RCF** setting) for 0.5 seconds or longer simultaneously (see the below). Then the LED is extinguished and you can hear the short electronic sound.



- ③ Press the **▼** button or **▲** button once at the lower of the **SPEED/RCF** display.
■ **SPEED/RCF** display blinks which indicates that the centrifuge is in the RCF input waiting mode.



- ④ Press the **▼** button or **▲** button to set the intended RCF.
(When pressing the button continuously, the value of the RCF changes rapidly.)

■ When pressing the button, the value changes as follows.

▼ button : 215 → 214 → ... → 0.2 → 0.1 → 215 → 214 → ...

▲ button : 0.1 → 0.2 → ... → 214 → 215 → 0.1 → 0.2 → ...

■ The RCF which is less than 1,000xg is set in 10xg intervals and the RCF which is 1,000xg or more is set in 100xg intervals. "0.1" is displayed when the value of RCF is 10xg, because the indicated unit in this centrifuge is x100 · g.

- ⑤ Confirm the entered setting by pressing **DISP/CE** button.



■ Even if neglecting to press **DISP/CE** button, the entered setting is confirmed after about three seconds.

4. Operation

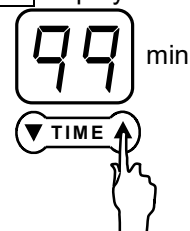
4.1.3 Setting the running time



NOTE :

● This centrifuge has two kinds of timers. One is “Normal timer mode”, and the other is “Actual run timer mode”. When you choose “Normal timer mode”, the run time is counted as soon as the rotor is accelerated. When you choose “Actual run timer mode”, the run time is counted as soon as the speed of the rotor reaches the setting speed. “Normal timer mode” has been chosen in your centrifuge by the manufacturer. You can choose one between two (see the section 5.3).

- ① Press the  button or  button once at the lower of the **TIME** display.


■ **TIME** display blinks which indicates that the centrifuge is in the time input waiting mode.




- ② Press the  button or  button to set the intended running time.

(When pressing the button continuously, the value of the running time changes rapidly.)

■ When pressing the button, the value changes as follows.

 button : Hd → 99 → 98 → ···· → 2 → 1 → Hd → 99 → 98 → ···

 button : 1 → 2 → 3 → ···· → 98 → 99 → Hd → 1 → 2 → ···

■ The running time you can set is from 1 to 99 minutes. The running time is set in 1-minute intervals. (The continuous running is indicated as “Hd”.)

- ③ Confirm the entered setting by pressing **DISP/CE** button.

■ Even if neglecting to press **DISP/CE** button, the entered setting is confirmed after about three seconds.

NOTE :

● The following describes the condition that **TIME** display of a status value indication indicates the running time by the second.



1) When the elapsed time is less than 1 minute at the continuous running

2) When the remaining time is less than 59 seconds



A dot stays lit at the lower right of number when **TIME** display indicates the running time by the second.



4.1.4 Setting the rotor temperature

- ① Press the  button or  button once at the lower of the **TEMP** display.

■ **TEMP** display blinks which indicates that the centrifuge is in the temperature input waiting mode.

- ② Press the  button or  button to set the intended temperature time.

(When pressing the button continuously, the value of the temperature changes rapidly.)

■ When pressing the button, the value changes as follows.

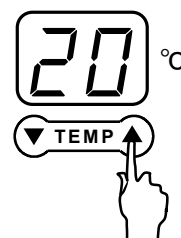
 button : 40 → 39 → 38 → ···· → -18 → -19 → Lo → 40 → ···

 button : Lo → -19 → -18 → ···· → 39 → 40 → Lo → -19 → ···

■ The temperature you can set is from Lo(-20)°C to 40°C. The temperature is set in 1-°C intervals. (Depending on the room temperature, the rotor temperature might not reach the set temperature.)

- ③ Confirm the entered setting by pressing **DISP/CE** button.

■ Even if neglecting to press **DISP/CE** button, the entered setting is confirmed after about three seconds.



4. Operation

4.1.5 Setting the acceleration and deceleration rate

You can select acceleration and deceleration curves tailored to your jobs from two acceleration stages (FAST, SLOW), three braked deceleration stages (FAST, SLOW, FREE (coasting deceleration)). Acceleration and deceleration control has the time from 0 to 1,000 rpm variable, excluding the coasting deceleration. The chart below depicts the relationships between the acceleration and deceleration times against the speed.

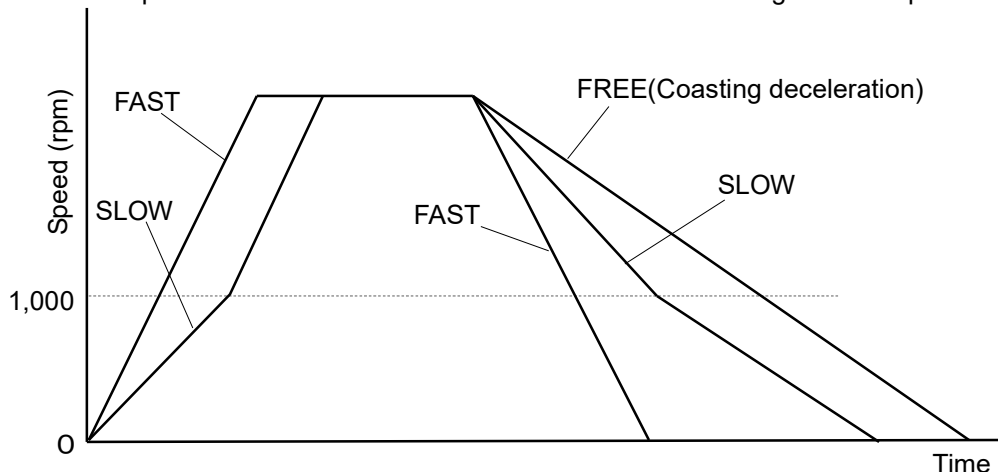


Figure 4.1.5 Relationships between acceleration and deceleration rates and curves

- To collect precipitate that is difficult to whirl up, set acceleration and deceleration rate “FAST” to efficiently separate it.
- To avoid a disturbance during acceleration or deceleration, choose “SLOW” or “FREE”.

[Procedure for setting the acceleration and deceleration rate]

- ① Press the **ACCEL** button once to blink the LED of the acceleration rate indicator.
- ② Press the **ACCEL** button again to blink the intended LED of the acceleration rate indicator.

■ The blinking LED switches from “FAST” to “SLOW” alternately by pressing the **ACCEL** button repeatedly.

- ③ Press the **DECEL** button once to blink the LED of the deceleration rate indicator.
- ④ Press the **DECEL** button again to blink the intended LED of the deceleration rate indicator.

■ By pressing the **DECEL** button repeatedly, the blinking LED changes as follows.

FAST→SLOW→FREE→FAST

- ⑤ Confirm the entered setting by pressing **DISP/CE** button.

■ Even if neglecting to press **DISP/CE** button, the entered setting is confirmed after about three seconds.

☀ FAST
○ SLOW



☀ FAST
○ SLOW
○ FREE



4. Operation

4.2 Normal Operation

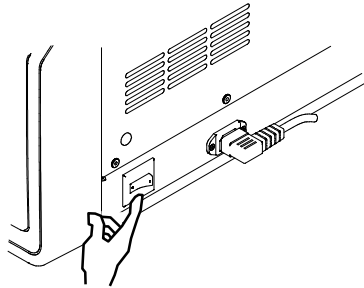
(1) Turn on the POWER switch.

■ All indicators on the operation panel stay lit for about 3 seconds for self-checking.

NOTE :

- As soon as the power switch is turned on, the function of self-checking works. Any button does not work during self-checking.

Velocity 15HR (the right side of the centrifuge)



(2) Open the door and then set tubes into the rotor (see Chapter 3).

■ Door lock is released by pressing the **OPEN** button while the door is locked.
(Even if pressing the **OPEN** button, the door lock can not be released when the rotor is rotating or the door is open.)

(3) Close the door to start running.

⚠ CAUTION :

- Do not insert your fingers or a object into the door hook hole. If the door lock functions by inserting your fingers into the door hook hole, you might injure your fingers with the door lock of this centrifuge. Malfunction of this centrifuge might be caused by inserting a object into the door hook hole.
- Be careful not to get your fingers or hands caught between the door hook and the table when closing the door.

■ When closing the door of the centrifuge like pressing the door lightly, the door is locked automatically. If you need to open the door again, press the **OPEN** button to unlock the door.

4. Operation

(4) Set the operating condition (see section 4.1).

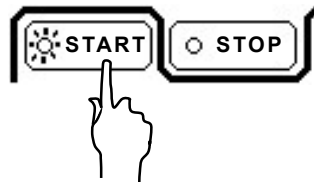
⚠ CAUTION :

- Some tubes that are sold on the market have lower allowable speeds (allowable RCF) than the rotor in use. Use them at the lowest allowable speed or less.

(5) Start the operation.

Press the **(START)** button.

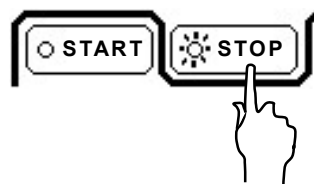
- The **(START)** LED starts blinking.
- When it reaches the set speed, **(START)** LED stops blinking and stays lit.



(6) End the operation.

Wait until the **(TIME)** indicator shows "0" or press the **(STOP)** button.

- As the rotor starts decelerating, the **(STOP)** LED starts blinking.
- When the rotor stops, the **(STOP)** LED stops blinking and stays lit. Stop signal starts sounding. If you select "no tune", all indicators blink upon halt of the rotor.
- In the Velocity 15HR centrifuge, the door lock is not released automatically to prevent dew drops. When using Velocity 15HR, press the **(OPEN)** button to unlock the door.



(7) Open the door gently and take out the sample.

- Do not open the door roughly, otherwise the separated sample might be disturbed.

(8) Turn off the POWER switch.

- In the Velocity 15HR centrifuge, turn off the POWER switch with its door open to dry the rotor chamber at the end of daily operation.
If the Velocity 15HR centrifuge will not be used for a long time, turn off the POWER switch with its door open as well as the above.

4. Operation

4.3 Programmed Operation

This centrifuge is featured with programmed operation that is able to store three running conditions in its memory and recall the condition by simply pressing a button. By using this feature, you are able to save a step for setting conditions.

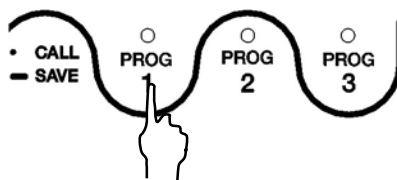
(1) Programming run conditions

- ① Turn on the POWER switch and set a desired condition to be programmed according to section 4.1.
- ② Choose one of three (PROG) buttons and press it for 3 seconds or longer.

NOTE :

- When programming a new condition, do not release the (PROG) button until you can hear the electronic sound. Otherwise, the newly programmed condition is canceled and the preprogrammed condition is recalled.

- You can hear the short electronic sound when pressing the (PROG) button. Keep pressing it for about 3 seconds or longer to complete the programming the process.



(2) How to perform a programmed operation

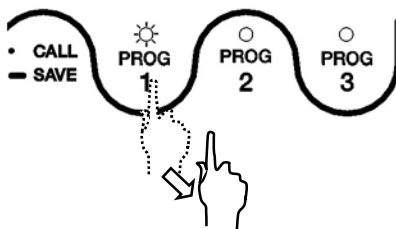
- ① Preparing the operation (see Chapter 3).
- ② Press the desired (PROG) button (one of the three buttons) and release it immediately.

NOTE :

- Do not keep pressing the (PROG) button for a long time when recalling the programmed condition. Otherwise programmed condition is canceled.

- You can hear the short electronic sound when pressing the (PROG) button, and the programmed condition is displayed on the corresponding display.

- The selected (PROG) LED stays lit during a programmed operation.



- ③ Press the (START) button to start the operation.

4. Operation

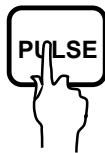
4.4 Spin-down Operation

This feature is useful to remove the adhered samples on the interior walls of the tubes.

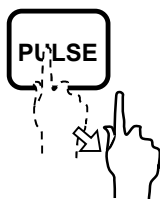
NOTE :

- In the spin-down operation, the speed is at the maximum for acceleration and deceleration, regardless of the settings.
- The centrifuge accelerates up to the set speed. This is not the maximum speed of the rotor in use.
- If you release the **PULSE** button during acceleration, the centrifuge discontinues acceleration and starts deceleration.
- The **PULSE** button works only while the rotor is stopped.

- ① Turn on the POWER switch. Check the speed of the rotor and change the setting as necessary (see section 4.1).
- ② Open the door and then set tubes into the rotor (see Chapter 3).
- ③ Close the door to start running.
- ④ Press the **PULSE** button.
 - The rotor continues accelerating while pressing this button, and when the centrifuge reaches the set speed, it continues to operate.



- ⑤ Release the **PULSE** button.
 - The rotor starts decelerating by releasing the button. Upon halt of the rotor, the door lock is released automatically in the Velocity 15HR centrifuge, and the door is opened to a few cm automatically.



4. Operation

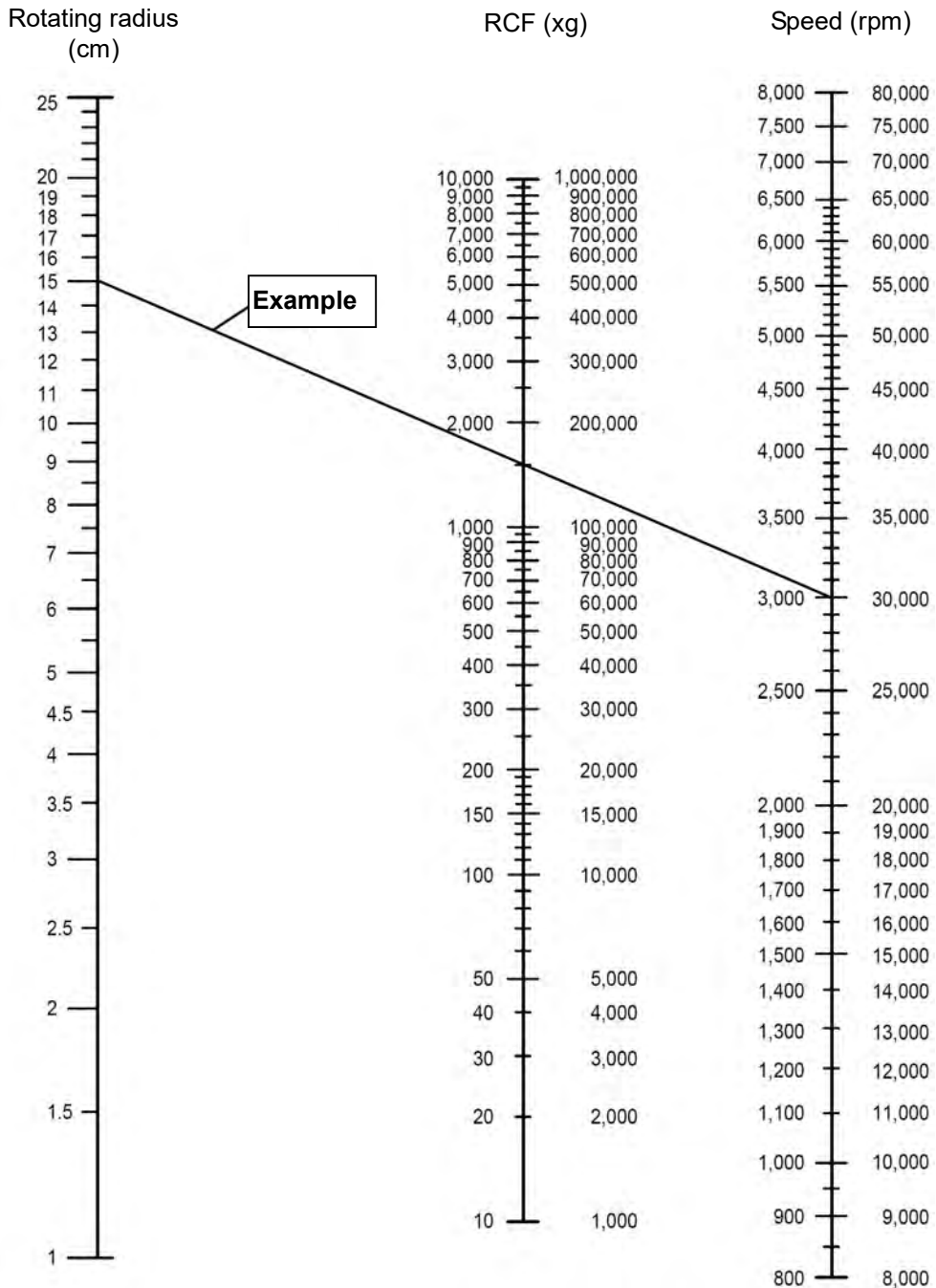
4.5 Calculating Relative Centrifugal Force (RCF)

An RCF can be determined by calculation or by referring to the graph provided below. The rotating radius of each rotor is given in the rotor instruction manual.

■ Calculation formula: $RCF = 1,118 \times \text{Rotating radius (cm)} \times \text{Rotating speed}^2 \text{ (rpm)} \times 10^{-8}$

■ Calculation graph is shown below. The point of intersection between the rotating radius and the speed indicates the corresponding RCF.


The example shows an RCF of 1,500xg with a rotating radius of 15 cm and a speed of 3,000 rpm.



5. Other Functions

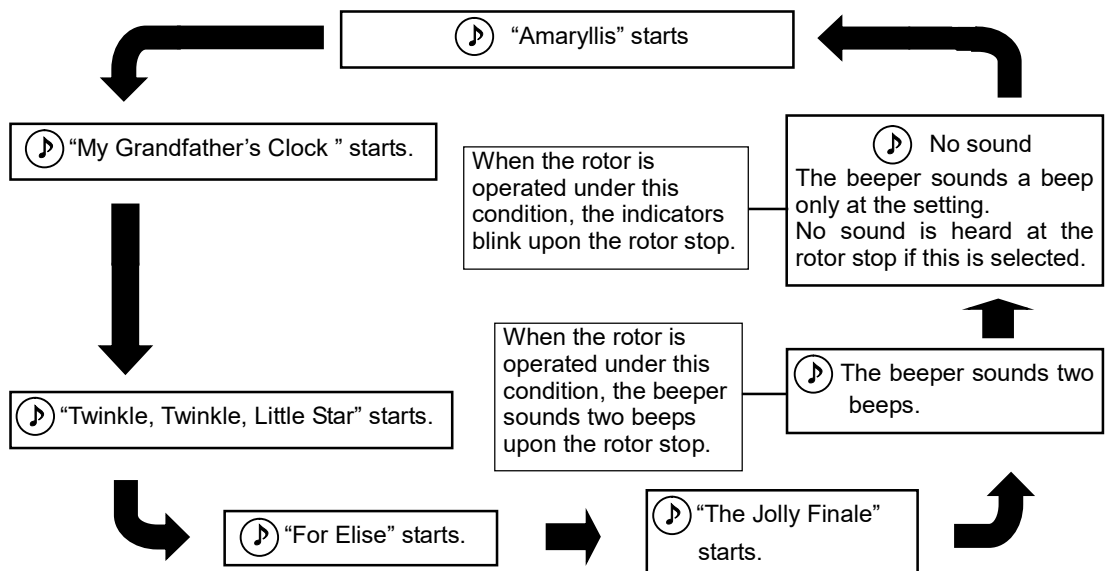
5.1 Selecting Rotor Stop Signal

The rotor stop signal can be selected from seven kinds of sounds including five tunes, electronic beep, and no sound.

Currently selected sound starts as the  button is pressed. Press again before the sound ends to move to the next sound and the last played sound is chosen as the rotor stop signal.

NOTE :

- The rotor stop signal can be selected only while the rotor is stopped.



- The tune stops by pressing any button on the operation panel while the selected tune continues.
- When no sound is selected, the indicators blink upon the rotor stop instead of a tune or beep. By pressing any button on the operation panel, the indicators stop blinking and stays lit.

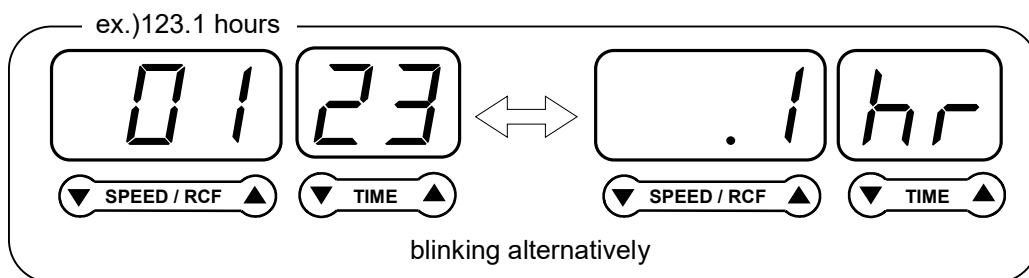
5. Other Functions

5.2 Indicating the total run hours

- The total run hours can be indicated in this centrifuge. The total run hours can be displayed on the operation panel. Inspect the centrifuge periodically by referring it.
- The total run hours of the centrifuge includes the time for which the rotor reaches the set speed whether you select the actual run timer or not.

(1) Checking the total run hours

- Press the **ACCEL** button while pressing **▶** button to display the total run hours. You can check the total run hours whether the rotor is stopped or not.
- The total run hours is displayed on the SPEED/RCF display and the time display. The integer part (four-digits) of the total run time and the decimal part (one-digit) of it blink alternately. When the decimal part is displayed, the unit (hr) of the total run time is also displayed.

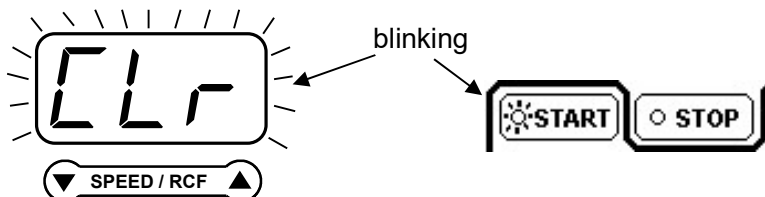


(2) How to finish indicating the total run hours

- Return the normal display by selecting one from the following.
 - Wait for 15 seconds.
 - Press one button on the operation panel.
 - Turn off the POWER switch and turn on the POWER switch again.

(2) Procedure for clearing (resetting) the total run hours

- ① Press the **DISP/CE** button for three seconds when the total run hours is displayed. Then the following are displayed and blinking.






- ② Press the **START** button within 10 seconds to clear (reset) the total run hours. The total run hours is displayed again if you do not press any button or you press a button except the **START** button.

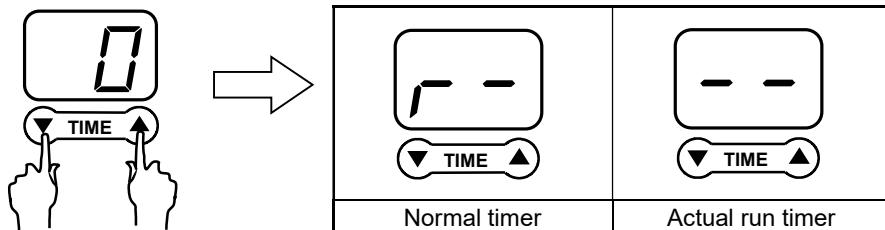
5. Other Functions

5.3 Actual run timer

- This centrifuge has two kinds of timers. One is normal timer and the other is actual run timer. The time for which the rotor reaches the set speed varies depending on rotor types or your samples. Actual run timer is effective to get stable separation of your samples because as soon as the rotor reaches the set speed the actual run timer works.
- After you have chosen between the normal timer and actual run timer, this is registered in this centrifuge even if the POWER switch is turned off. Follow the below procedures when checking or changing the timer mode.




(1) Checking the timer mode

- ① Press the  button and  button (under TIME display) for 0.5 seconds or longer simultaneously (see the below). Then the setting mode is displayed and you can hear the short electronic sound.
- ② The original indication is displayed when you press any button except  setting button.



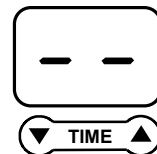
The setting mode is displayed by pressing two buttons simultaneously for 0.5 seconds or longer.

(2) Changing the timer mode

- ① After displaying the setting mode (see the step (1)), press the  button or  button (under TIME display) to display the intended timer mode.
- ② The original indication is displayed when you press any button except  setting button.

NOTE :

- Normal timer mode is chosen in the factory.
- You can not check and change the setting mode during operation.
- When you choose the actual run timer, the right figure shows the TIME display at acceleration time.

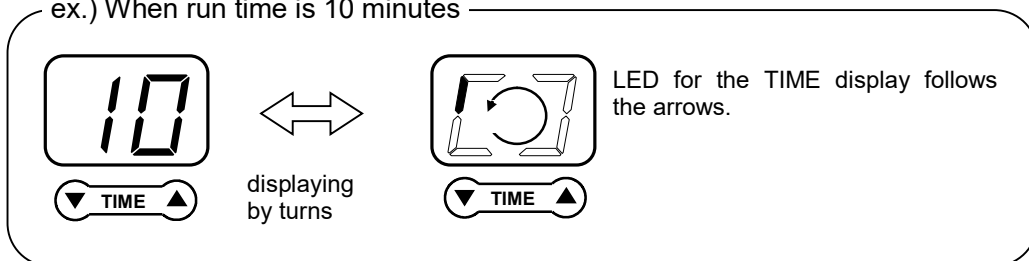


5. Other Functions

5.4 Rotor condition indicator

- When you choose the rotor condition indicator, you can see easily that the rotor is rotating at the set speed. After the rotor reaches the set speed, the run time and the rotor condition indicator are displayed by turns.

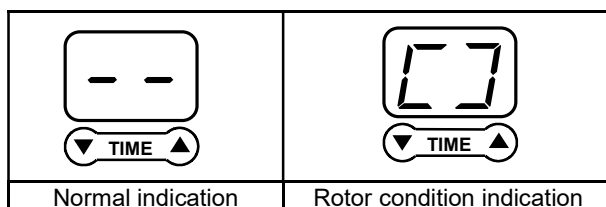
ex.) When run time is 10 minutes



- After you have chosen the rotor condition indicator, this is registered in this centrifuge even if the POWER switch is turned off. Follow the below procedures when checking or changing the indication.

(1) Checking the rotor condition indicator

- ① Press the **DECEL** button while pressing **▶** button to display the setting indication on the TIME display.



- ② The original indication is displayed when you perform either of the following.
 - You press any button except **TIME** setting button.
 - You do not press **TIME** setting button for three seconds.

(2) Procedure for clearing (resetting) the total run hours

- ① After displaying the setting indication (see the step (1)), press the **▼** button or **▲** button (under TIME display) to display the intended indication.
- ② The original indication is displayed when you press any button except **TIME** setting button.

NOTE :

- Normal indication is chosen in the factory.
- Rotor condition indication is not displayed in the following cases, because the unit of the rotor condition indication is "minute".
 - The first one minute when the "HOLD" is selected as the run time setting.
 - The last one minute when the "HOLD" is not selected as the run time setting.

6. Troubleshooting

6.1 Corrective actions when alarm code is displayed

⚠ WARNING :

- Unspecified repairs, remodeling or disassembly of the centrifuge that is not listed below is strictly prohibited other than a Dynamica authorized service representative.
- Close the door immediately if the rotor is still rotating when the door is opened after releasing the alarm status.

An alarm code is indicated on the **SPEED/RCF** display of the operation panel with a beep if any abnormality is found in the centrifuge. Take the corrective actions specified in the table below.

Alarm code	Probable cause	Action
E 1 POWER	<ul style="list-style-type: none"> • While the rotor was rotating, a power failure occurred or power supply voltage was decreased. 	<ul style="list-style-type: none"> • The centrifuge stops the rotor upon recovery from the power failure. Retry operation as needed. • Contact a power company if abnormality is found about the power supply voltage.
E 2 DOOR	<ul style="list-style-type: none"> • The (START) button is pressed while the door is open. • The door is opened while the rotor is rotating. (E-48 might be indicated.) 	<ul style="list-style-type: none"> • Press the (START) button after closing the door. <p>⚠ WARNING: : Never unlock the door while the rotor is rotating.</p>
E 4 TEMP	<ul style="list-style-type: none"> • Cooling ability is degraded. • The air inlet of the centrifuge is blocked • The cap at the tip of the drain hose removed. 	<ul style="list-style-type: none"> • Lower the room temperature. If there is a heat source nearby, move the centrifuge away from it. • Keep clearances of at least 10 cm from the air inlet of the centrifuge. • Put the cap on.
E 9 IMBALANCE	<ul style="list-style-type: none"> • The allowable imbalance is exceeded. • The centrifuge is shocked during operation. 	<ul style="list-style-type: none"> • Balance the sample keeping the allowable imbalance. • An alarm code may be indicated when the centrifuge is shocked during operation.
E 10 } E 99	<ul style="list-style-type: none"> • Alarm codes to report control errors. • For the E13, E15, E20, E21, refer to (1). 	<ul style="list-style-type: none"> • Contact a Dynamica authorized sales/service representative. Remember to provide the alarm code and the situation.

6. Troubleshooting

(1) When an alarm code is displayed

- Alarms E-1 to 9 are mainly related to handling errors. You can continue using the centrifuge if the cause is removed. If alarm codes can not be cleared by taking the proper action, contact a Dynamica authorized sales/service representative.
- Alarm **E-13** indicates a rotation sensor error. Once this alarm code is displayed, the alarm code cannot be cleared and the door cannot be opened for six minutes – a time that allows all the rotors to come to a halt with the coasting deceleration. Wait at least six minutes keeping the power on and press the **(DISP/CE)** button to remove the rotor. (When turning off the POWER switch, you can not clear the alarm code for six minutes after turning on the POWER switch.)
- Alarm **E-15** indicates a motor over-temperature. When the room temperature is high or the rear of the centrifuge is covered, this alarm code is displayed even if the centrifuge is not out of order. Lower the room temperature or keep clearances of at least 30 cm behind the centrifuge. And then clear the alarm code.
- Alarm **E20** and **E21** are indicated when the drive shaft is rotated at high speed without the rotor. When these alarm codes are indicated, turn off the POWER switch to clear the alarm code.


(2) How to clear alarm codes

- Alarm codes can be cleared by pressing the **(DISP/CE)** button after removing the cause.
- When the alarm code is displayed during operation, the door is not unlocked automatically even though the rotor has stopped. After clearing the alarm code, unlock the door by pressing the **(OPEN)** button.
- If alarm codes can not be cleared by taking the proper action, contact a Dynamica authorized sales/service representative.

6. Troubleshooting

6.2 Troubleshooting when no alarm code is displayed

If the centrifuge cannot operate properly even though no alarm code is displayed, take the corrective actions specified in the table below.

Symptom	Probable cause	Action
Nothing appears on the display when the POWER is turned on.	Building power circuit breaker trips or the fuse is blown out.	Remove the cause of the trouble and turn on the circuit breaker or replace the fuse. If alarm codes can not be cleared by taking the proper action, contact a Dynamica authorized sales/service representative.
Building power circuit breaker trips or the fuse is blown out while it is running.	Power is wired from a single outlet to multiple devices.	The power capacity may be exceeded. Supply power for this centrifuge and other devices from different sources.
	The centrifuge may be out of order.	Set the rotor and start operation to check for successful rotation (look at the SPEED/RCF display). If normal, continue using the centrifuge.  CAUTION : Turn off the power if any abnormality is found on the centrifuge and contact a Dynamica authorized sales/service representative.
The centrifuge does not accept the entries on the operation panel.	The centrifuge may be out of order.	When the rotor does not stop even if pressing the (STOP) button, turn off the POWER switch and turn on the switch again. Take out the rotor after the rotor stops. Contact a Dynamica authorized sales/service representative.

6. Troubleshooting

6.3 Opening the door during power outage

⚠ WARNING :

- Opening the door while the rotor is rotating is very dangerous. Never unlock the door while the rotor is rotating.

The door cannot be opened except when the centrifuge is powered on (POWER switch on) and the rotor is stopped. If the door cannot be opened due to a power outage, open the door according to the following steps. (Below are the illustrations about the Velocity 15HR centrifuge.)

(1) Check that the rotor is not rotating.

⚠ WARNING :

- Before opening the door, wait more than six minutes until the rotor comes to a complete stop.

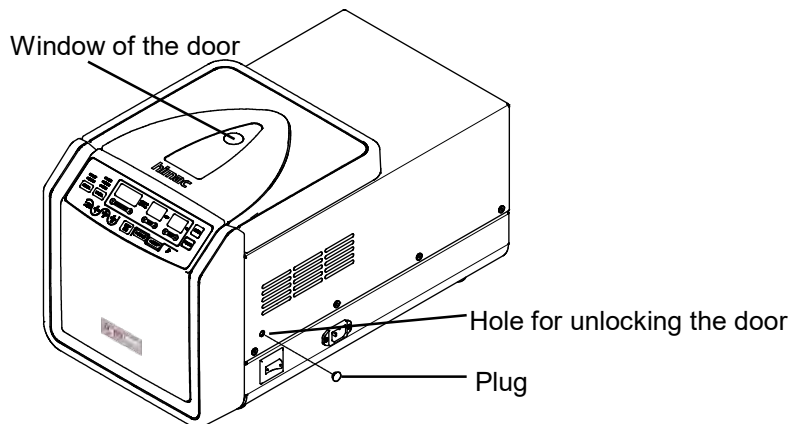
- Observe the rotor through the window of the door and check the halt of the rotor. Listen carefully to make sure that no rotating sound is heard, because you might think that the rotor does not rotate although the rotor rotates at a high speed. As it might be difficult to observe the rotor through the window of the door due to dew- drops and frost, listen carefully to make sure that no rotating sound is heard.
- Touch the centrifuge carefully to make sure that vibration is not felt on the centrifuge.

(2) Remove the plug after turning off the POWER switch.

⚠ WARNING :

- Be sure to turn off the POWER switch before performing this work. Otherwise it may cause electrical shock hazards and the centrifuge may be damaged.

- There is a plug at the right side of the centrifuge.

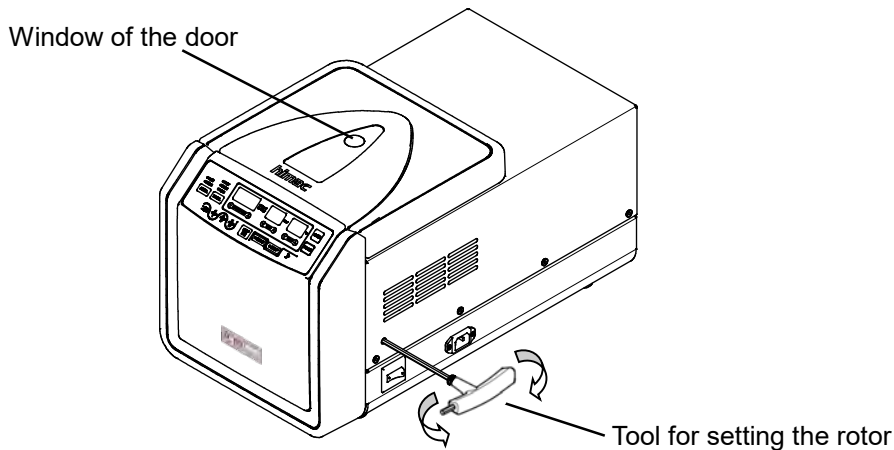


6. Troubleshooting

- (3) Insert the attached tool for setting the rotor horizontally into the hole for unlocking the door to fit the tool for setting rotor into the shaft inside the centrifuge.

NOTE :

- You can not see the shaft for unlocking the door, because it is inside the centrifuge. Insert the attached tool for setting the rotor horizontally until the tool contacts the shaft. Then fit the tool for setting rotor into the shaft for unlocking the door by turning the tool clockwise or counterclockwise slowly.



- (4) By turning the tool for setting the rotor at 180°, the door is unlocked automatically in the centrifuge and the door is opened to a few cm automatically.
- After the door is opened, remove the tool for setting the rotor. Then be sure to position the plug into the hole for unlocking the door. It is not necessary to place the shaft to the original position.
- (5) Open the door and take out the samples.

⚠ WARNING :

- When you first turn on the POWER switch after you unlock the door as described above, the door lock might work automatically to adjust its position. Do not insert your fingers or an object into the door hook hole. Otherwise your fingers might be injured or the centrifuge might be damaged.
- Be sure to remove the tool for setting the rotor from the centrifuge if it is not necessary to insert it to the centrifuge. It is very dangerous because the tool contacting the shaft rotates if the tool is being inserted into the centrifuge when you close the centrifuge door after turning on the POWER switch.

7. Maintenance

7.1 Maintenance after operation

⚠ CAUTION :

- Using cleaning or sterilization methods other than recommended in this instruction manual may cause in corrosion or deterioration of this centrifuge. Refer to chemical resistance chart attached to the rotor or contact Dynamica.
- Unplug the main power cord before cleaning or sterilizing the instrument.

(1) Centrifuge

⚠ CAUTION :

- If the centrifuge is exposed to ultraviolet rays for a long time, the color of the covers may be changed or the coating may be peeled off. After use, cover the centrifuge with a cloth to protect it from direct exposure.
- Do not sprinkle water, neutral detergent or disinfectant solution directly on the centrifuge. Otherwise fluids might leak into the inside of the centrifuge from the door hook hole and it might cause corrosion or deterioration of the centrifuge.

- If the centrifuge is heavily stained, clean it with a cloth or sponge moistened with a dilute solution of neutral detergent. Sterilize the centrifuge by wiping with a cloth moistened with 70% ethanol solution.

(2) Rotor chamber

⚠ CAUTION :

- Do not expose the rotor chamber to acids, salts, etc. Use of these materials can cause a chemical reaction that initiates corrosion such as rust. When samples contain these materials, remove the rotor from the centrifuge after the operation and clean the rotor chamber thoroughly.
- Do not pour water, neutral detergent or disinfectant solution directly into the rotor chamber. Otherwise fluids may leak into the inside of the centrifuge and cause corrosion or deterioration of the centrifuge.

- Wipe frost or moisture in the rotor chamber with a soft cloth to prevent getting in the sample or corrosion. If the rotor chamber is dirty, clean with a cloth or sponge moistened with a neutral detergent solution. Sterilize the centrifuge by wiping with a cloth moistened with 70% ethanol solution.
- When the tubes are broken, remove the rotor and then clean the bottom of the rotor chamber, because there might be the fragments of the tubes or the sample on the bottom of the rotor chamber.

(3) Drive shaft

- Wipe the drive shaft with a soft cloth if the surface is dirty.
- To prevent scuffing of the rotor, apply a thin coat of lubricant for screws to the drive shaft once a month (purchase the lubricant for screw (Part No. 84810601) separately).

(4) Door

- Clean and sterilize the door in the same manner as specified in the step (1).
- The door packing may have been deformed if air leaks through the door or the door rattles. Contact a Dynamica authorized sales/service representative for an inspection.

(5) Rotor

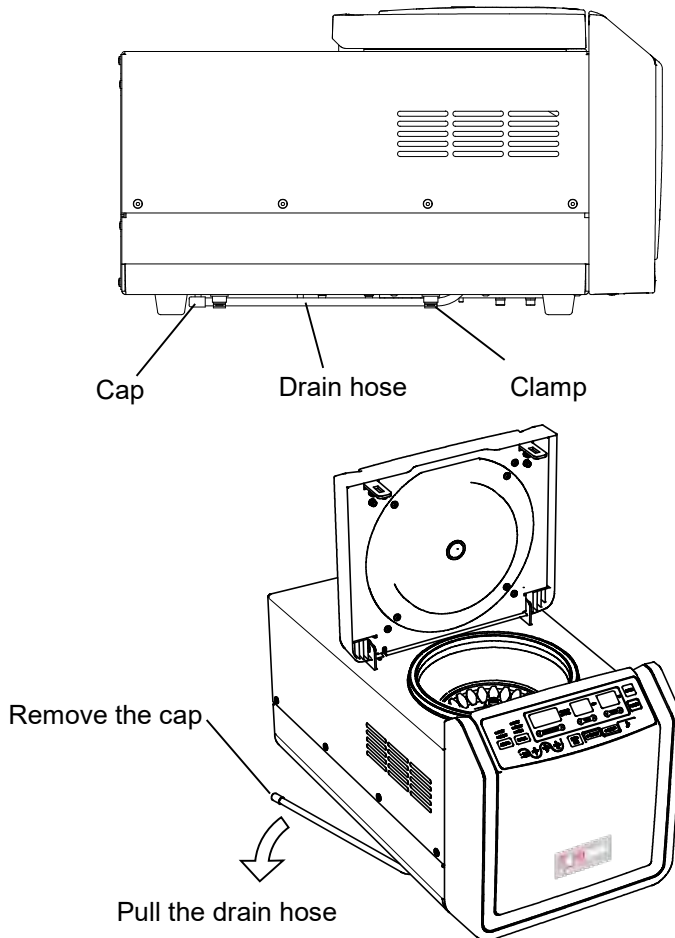
For more details, refer to the rotor instruction manual.

7. Maintenance

7.2 Defrosting (Velocity 15HR)

■ When the rotor chamber is frosted, the cooling ability might be degraded. Defrost the rotor chamber by performing the following procedures.

- (1) Open the door of the centrifuge and turn off the POWER switch.
- (2) Hold up the left side of the centrifuge a little. Then remove two clamps on the bottom of the centrifuge and pull the drain hose.



- (3) Remove the cap of the tip of the drain hose and put the drain hose in a beaker etc. for drain.
- (4) Leave centrifuge with the door open until you observe that the rotor chamber is defrosted.
- (5) After completing defrosting the rotor chamber, cap the drain hose and place the drain hose to the original position.

NOTE :

- Be sure to cap the drain hose during the operation. The cooling ability degrades if you operate this centrifuge whose drain hose is not capped.

7. Maintenance

7.3 Tubes and bottles

(1) Cleaning and sterilizing tubes and bottles

Use the best method for cleaning and sterilizing tubes and bottles referring to the table below.

Cleaning and sterilizing conditions for tubes and bottles ○: Applicable ×: Inapplicable

Condition		Material	PA	PC	PP
Cleaning	Cleaning fluids	Acidic (pH5 or lower)	×	×	×
		Acidic (higher than pH5)	○	○	○
		Alkaline (higher than pH9)	○	×	○
		Alkaline (pH9 or lower)	○	○	○
		Neutral (PH7)	○	○	○
		Warm water (up to 70°C)	○	○	○
	Ultrasonic cleaning	Neutral detergent (pH7)	○	○	○
Sterilization	Autoclaving	115°C (0.7kg / cm ²) 30 minutes	○	○	○
		121°C (1.0kg / cm ²) 20 minutes	×	○	○
		126°C (1.4kg / cm ²) 15 minutes	×	×	×
	Boiling	15 to 30 minutes	○	○	○
	Ultraviolet sterilization	200 to 300 nm	×	×	×
	Gas sterilization	Ethylene oxide	○	×	○
Formaldehyde		○	○	○	

PA: Polypropylene copolymer PC: Polycarbonate PP: Polypropylene

(2) Cleaning PC tubes and bottles

PC materials have low in chemical resistance to alkaline solutions. Avoid using neutral detergents higher than pH9. Note that some neutral detergents are still higher than pH9 even if diluted according to the instruction in the maker's catalog. Use detergents between pH7 and pH9.

(3) Autoclaving PA, PC and PP tubes and bottles

PA begins softening at about 120°C, and PC and PP at about 130°C. Autoclave PA tubes/bottles at 115°C (0.7 kg/cm²) for 30 minutes and PC and PP tubes/bottles at 121°C (1.0 kg/cm²) for 20 minutes. If a certain temperature is exceeded, the tubes/bottles may be deformed. Observe the following instructions when using a sterilizing chamber:

- Place bottles in a vertical position, mouths facing up. If bottles are placed sideways, they may deform into an oval shape due to their own weight.
- Remove screw caps and inner covers to prevent deformation or rupture.
- Wait until the sterilizing chamber cools down to room temperature before removing the bottles.

7. Maintenance

(4) Conditions and life expectancy of tubes and bottles

⚠ CAUTION :

- Do not use tubes/bottles that have exceeded their life expectancy. Failure to do so could result in damage of tubes/bottles and the rotor and the centrifuge.

The life expectancy of tubes/bottles depends on factors such as the characteristics of samples, speed of the rotor used, and temperature.

Always check for deterioration and damage (cracks, deformation, and so on) on tubes/bottles before using them. Do not use the tubes/bottles if you find such a problem.

The life expectancies of plastic tubes and bottles depend on factors such as the characteristics of samples, speed of the rotor used, and temperature. When plastic tubes/bottles are used for centrifugation of ordinary aqueous samples (between pH5 and pH9), their life expectancies are specified as follows.

When operated for 1 hour at the maximum speed:

Tubes (PA, PC, PP): 5 operations

Thick-walled tubes and bottles (PA, PC, PP): 50 operations

himac 50 TC tube and tubes on the market: 1 operation

The life expectancies of the PC bottles are specifically specified as follows according to the pretreatment conditions such as cleaning and sterilization.

Sample	Cleaning and sterilization	Gas sterilization and cleaning with warm water	Autoclaving at 121°C for 20 min.
Neutral (PH7)		50 operations	10 operations
Alkalescent (PH7 to 9)		30 operations	5 operations

Do not use crazed (cracked) tubes or bottles.

The life expectancy of a plastic tube/bottle as the above is an approximate guide. We do not warrant the life expectancies of tubes/bottles.

7. Maintenance

7.4 Service decontamination policy

 WARNING :

- If the centrifuge, rotor, or an accessory is contaminated by samples that are toxic or radioactive, or blood samples that are pathogenic or infectious, be sure to decontaminate the item according to good laboratory procedures and methods.
- If there is a possibility that the centrifuge, rotor, or an accessory is contaminated by samples that might impair human health (for example, samples that are toxic or radioactive, or blood samples that are pathogenic or infectious), it is your responsibility to sterilize or decontaminate the centrifuge, rotor or the accessory properly before requesting repairs from a Dynamica authorized sales/service representative. Note that Dynamica cannot repair the centrifuge, rotor or the accessory unless sterilization or decontamination is completed.
- It is your responsibility to sterilize and/or decontaminate the centrifuge, rotor, or an accessory properly before returning to a Dynamica authorized sales/service representative. In such cases, copy the decontamination sheet at the end of this manual and fill out the copied sheet, then attach it to the item to be returned. Dynamica may ask you about the treatment for the centrifuge, rotor or the part if the decontamination is checked and judged as insufficient by Dynamica. It is your responsibility to bear the cost of sterilization or decontamination. If you have any question, please send e-mail to "info@dynamica-eu.com". Note that Dynamica cannot repair or inspect the centrifuge, the rotor or the accessory unless sterilization or decontamination is completed.

 CAUTION :

- Do not operate this centrifuge in any manner not described in this instruction manual. Should you have any troubles with this centrifuge, call a Dynamica authorized sales/service representative.

(1) Storage period of service parts

Service parts are kept in stock for seven years after the discontinuation of production. The term "service parts" means the parts that are necessary to ensure the correct functioning of the centrifuge.

8. Specifications

	Velocity 15HR
Maximum speed	15,000 rpm
Maximum RCF	21,500 × g
Maximum capacity	2 mL x 24 tubes + 0.5 mL x 24 tubes (FAS15E rotor)
Range of speed control	300 to 15,000 rpm in 100-rpm increments
Temperature	-20 to 40 °C ("Lo" is displayed as -20 °C)
Refrigerator	Hermetically sealed (refrigerant: HFC134a) (For further information, see the instrument labels*1.)
Timer	1-99 minutes (in 1-minute intervals) with HOLD function
Acceleration/deceleration control	2-stage variable acceleration control, 2-stage braked deceleration, plus coasting deceleration control
Driving motor	Brushless DC motor (inverter-controlled)
Memory-based programmed operation	Selectable three programmed operations (SPEED/RCF, TIME, TEMP (ACCEL, DECEL, and rotor stop signal)
Rotor stop signal	Selectable from seven kinds of sounds including five tunes, electronic beep, and no sound
Safety devices	Door interlock, dual-overspeed detector, imbalance detector and detector for over-temperature of motor
Applicable standard	CE marking
Heat dissipation	500 W
Power requirements	120 V instrument: 108-126 V AC, 15 A, 60 Hz 220-230 V instrument: 198-253 V AC, 10 A, 50Hz ; 198-242 V AC, 10 A, 60Hz
Dimensions	290 (W) × 538 (D) × 307 (H) mm
Weight	40 kg
Ambient temperature	Ambient Temperature Range : 2 °C - 32 °C Ambient Temperature Range for performance guarantee : 15 °C - 25 °C

*1: Because the instrument labels may differ from one country to another, please contact your local dealer or a Dynamica authorized sales/service representative.



The Velocity 15HR centrifuges satisfy CE marking requirements. The CE marking is an international symbol, which shows that the product conforms to EU directives.

Standards concerning these directives are as follows:

- Product Safety (EN61010-1 and EN61010-2-020)
 - Environment requirements:
 - indoor use;
 - altitude up to 2000 m;
 - maximum relative humidity of 80 % for temperature up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C;

Pollution degree	2
Installation category	II

- Electromagnetic compatibility (EN61326-1)

APPENDIX

It is requested that you return the faulty product with this Decontamination Sheet in order to repair it safely in our plant. Be sure to decontaminate the product according to good laboratory procedures and methods, and fill out this Decontamination Sheet and attach it to the product to be returned to Dynamica for repair.

Attention: Dynamica Scientific Ltd.

Decontamination Sheet

Date: _____

Name : _____

Name of company(organization) or school : _____

Division or faculty/Subject of study : _____

Telephone number : _____

Address : _____

I performed decontamination to remove biological or chemical contaminants (including radioactive isotope) from this product as follows.

Model of centrifuge : _____ Serial number _____

Model of rotor : _____ Serial number _____

Accessory : _____ Serial number _____

Contaminants used : _____

Decontamination methods(conditions) : _____

Date of decontamination : _____ Signature _____

WEEE Compliance

The mark is in compliance with the Waste Electrical and Electronic Equipment Directive 2012/19/EU (WEEE).

The mark indicates the requirement NOT to dispose the equipment as unsorted municipal waste, but use the return and collection systems available.

For further information regarding return, collection, recycle or disposal, please contact your local dealer or a Dynamica authorized sales/service representative.



Marking for the restriction of the use of hazardous substances in electrical and electronic product

(THE PEOPLE'S REPUBLIC OF CHINA)

The mark and separated sheet "Names and Contents of Hazardous Substances in Each Component of This Centrifuge" are in compliance with "People's Republic of China Electronic Industry Standard SJ/T11364-2014" requirements.

The mark indicates that this electrical and electronic product contains certain hazardous substances, and can be used safely during its environment-friendly use period. The number in the middle of the mark indicates the environment-friendly use period of the product. The outer circle indicates that the product can be recovered.



Names and Contents of Hazardous Substances in Each Component of This Centrifuge
(Model of centrifuge: Velocity 15HR)

Name of Component	Hazardous Substances					
	Pb	Hg	Cd	Cr(VI)	PBB	PBDE
Printed wiring board Ass'y	x	✓	✓	✓	✓	✓
Cover	✓	✓	✓	x	✓	✓
Drive unit	x	✓	✓	✓	✓	✓
Parts for electric machine	x	✓	✓	x	✓	✓
Parts for power source	x	✓	✓	✓	✓	✓
Cables	x	✓	✓	✓	✓	✓
Screws	✓	✓	✓	x	✓	✓
Refrigerator	x	✓	✓	✓	✓	✓
Parts for refrigerator piping	x	✓	✓	✓	✓	✓

This table is prepared in accordance with the provisions of SJ/T 11364.

✓ : Indicates that this hazardous substance contained in all of the homogeneous materials for this component is below the limit requirement of GB/T 26572.

x : Indicates that this hazardous substance contained in at least one of the homogeneous materials used for this component is above the limit requirement of GB/T 26572.

产品中有害物质的名称及含量
(产品型号 : Velocity 15HR)

部件名称	有害物质					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr (VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板组件	x	○	○	○	○	○
外壳部件	○	○	○	x	○	○
驱动部分	x	○	○	○	○	○
电源部件	x	○	○	x	○	○
电机部件	x	○	○	○	○	○
各种电缆	x	○	○	○	○	○
各种螺丝	○	○	○	x	○	○
冷冻机	x	○	○	○	○	○
冷冻配管部件	x	○	○	○	○	○





本表格依据SJ/T 11364 的规定编制。

○ : 表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。

x : 表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。



ROTOR GUIDE

Rotor	Factory rotor code	Part number	Specification	
FAS15E	T15A61	D3-90591900	Max Speed: 15,000 rpm, Max RCF: 21,500 x g Tube Capacity: 1.5/2ml x 24 With plastic cover	
FAS15F	T15A62	D3-90592000	Max Speed: 15,000 rpm, Max RCF: 21,500 x g Tube Capacity: 1.5/2ml x 24 With metal cover	
FAS15G	T15A63	D3-90592100	Max Speed: 15,000 rpm, Max RCF: 21,500 x g Tube Capacity: 1.5/2ml x 24 With metal cover	
FA15S.AC	N/A	D3-S308839B	Metal cover for FAS15E rotor	

Angle rotor for Tabletop High-Speed Micro Centrifuge **FAS15E/15F/15G**

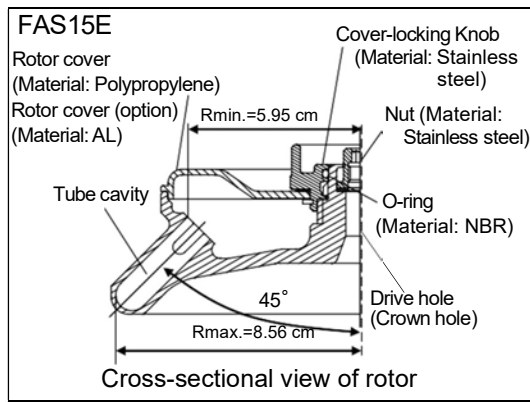
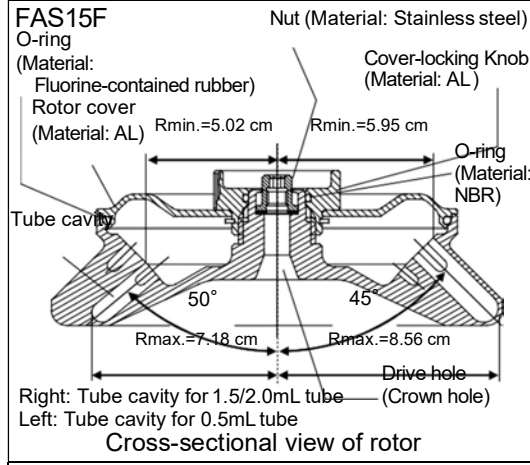
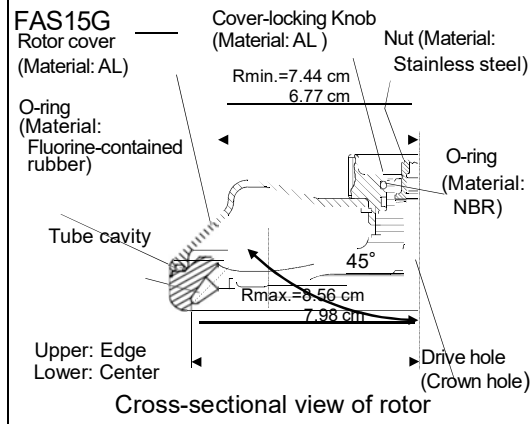
⚠ Safety Reminder

- Centrifuge rotors rotating at high speed have considerable potential for damage to personal properties if used improperly. For safe and proper use of this rotor, carefully read the centrifuge instruction manual and this rotor instruction manual before use and observe the instructions.

⚠ WARNING: and **⚠ CAUTION:** notes are used to call your attention in this manual to prevent personal injury or damage to the rotor and the centrifuge. These notes are defined as follows.

⚠ WARNING: indicates a potentially hazardous situation which, if not avoided, could result in personal severe injury or possible death.
⚠ CAUTION : indicates a hazardous situation which, if not avoided, could result in personal injury or severe damage to the instrument.

Specifications

<p>FAS15E</p>  <p>Cross-sectional view of rotor</p>	<p>Applicable centrifuge: Velocity 15HR Max. speed: 15,000rpm Max. RCF: 21,500 × g Allowable mean density of sample: 1.2g/mL Nominal rotor capacity: 2.0mL x 24tubes = 48mL Material of rotor: Aluminum alloy Dimensions of rotor: φ 17.5cm x6.1cm Weight: 0.9 kg</p>
<p>FAS15F</p>  <p>Cross-sectional view of rotor</p> <p>Right: Tube cavity for 1.5/2.0mL tube (Crown hole) Left: Tube cavity for 0.5mL tube</p>	<p>Applicable centrifuge: Velocity 15HR Max. speed: 15,000rpm Max. RCF: 1.5/2.0mL :21,500 × g 0.5mL :18,100 × g Allowable mean density of sample: 1.2g/mL Nominal rotor capacity: 60mL: 2.0mLx24tubes=48mL 0.5mLx24tubes=12mL Material of rotor: Aluminum alloy Dimensions of rotor: φ 17.5cm x6.1cm Weight: 1.1 kg</p>
<p>FAS15G</p>  <p>Cross-sectional view of rotor</p> <p>Upper: Edge Lower: Center</p>	<p>Applicable centrifuge: Velocity 15HR Max. speed: 15,000rpm Max. RCF: Corner tube hole :21,500 × g Center tube hole :20,100 × g Allowable mean density of sample: 1.2g/mL Nominal rotor capacity: 0.2mLx32=6.4mL Material of rotor: Aluminum alloy Dimensions of rotor: φ 17.5cm x5.6cm Weight: 0.9 kg</p>

- This rotor can separate sample whose mean density is 1.2g/mL or less.
When the mean density of the sample to be separated is over 1.2g/mL, calculate the allowable speed according to the following equation.

$$\text{Allowable speed (rpm)} = 15,000(\text{rpm}) \times \frac{1.2 \text{ (g/mL)}}{\sqrt{\text{Mean density of sample (g/mL)}}}$$

- To find the RCF: Substitute the rotation radius (Rmax., Rmin., etc.) and the speed in the following equation.
 $\text{RCF (x g)} = 1.118 \times 10^{-5} \times \text{Rotation radius (cm)} \times (\text{Speed (rpm)})^2$

⚠ CAUTION : Use the FAS15E/FAS15F/FAS15G rotor only in the Velocity 15HRE centrifuge.
These rotors can not be used in other centrifuges.

Applicable Tubes and Adapters

⚠ CAUTION : When using tubes outside 4-25°C, tubes may be broken or deformed during operation.
Test them before actual operation and perform actual operation after checking that there is no inconvenience such as the above.

- Maximum speeds listed are guidelines only. Because of variances in user methodologies, no guarantee of performance is expressed or implied.

FAS15E

Adapter		Tube					Max. speed (Max. RCF)
Part No.	Name	Nominal capacity	Part No.	Name	Actual capacity	Size (mm)	
—	—	2.0 mL	(Marketed) *	2.0 mL micro tube	1.7 mL	(D) 10.8 × (L) 39	15,000 rpm (21,500 xg * 3)
—	—	1.5 mL	(Marketed) *	1.5 mL micro tube	1.4 mL	(D) 10.8 × (L) 39	
S413789A	1GA2 adapter (2 pcs.) (Material: * 1)	1.0 mL	489241A	1.0 round-bottom glass tube (100 pcs.)	0.7 mL	(D) 9.0 × (L) 35	
—	—	0.7 mL	(Marketed) *	0.7 mL micro tube	0.6 mL	(D) 10.8 × (L) 25	
S413789A	1GA2 adapter (2 pcs.) (Material: * 1)	0.5 mL	489240A	0.5 glass tube (100 pcs.)	0.5 mL	(D) 9.0 × (L) 35	
487293A	0.75 adapter (4 pcs.) (Material: * 2)	0.5 mL	(Marketed) *	0.5 mL micro tube	0.5 mL	(D) 7.8 × (L) 30	
487292A	0.4 adapter (4 pcs.) (Material: * 2)	0.4 mL	(Marketed) *	0.4 mL micro tube	0.4 mL	(D) 5.7 × (L) 46	
487292A	0.4 adapter (4 pcs.) (Material: * 2)	0.25 mL	(Marketed) *	0.25 mL micro tube	0.25 mL	(D) 5.7 × (L) 30	
—	—	—	(Marketed) *	Centrifugal filter unit	—	(D) 12.3 × (L) 45	

Unit (mm)

* : When using tubes on the market, perform operation under the allowable speed or the allowable RCF specified by the manufacturer. Otherwise the tubes may be broken during operation.

* 1: PP

* 2: ABS

* 3: Max. RCF is 21,500xg, when Rmax. is 8.56cm.

FAS15F

0.5mL tubes can be used without adapters in this rotor.

Adapter		Tube					Max. speed (Max. RCF)
Part No.	Name	Nominal capacity	Part No.	Name	Actual capacity	Size (mm)	
—	—	2.0 mL	(Marketed) *	2.0 mL micro tube	1.7 mL	(D) 10.8 × (L) 39	15,000 rpm (21,500 xg * 3)
—	—	1.5 mL	(Marketed) *	1.5 mL micro tube	1.4 mL	(D) 10.8 × (L) 39	
S413789A	1GA2 adapter (2 pcs.) (Material: * 1)	1.0 mL	489241A	1.0 round-bottom glass tube (100 pcs.)	0.7 mL	(D) 9.0 × (L) 35	
—	—	0.7 mL	(Marketed) *	0.7 mL micro tube	0.6 mL	(D) 10.8 × (L) 25	
S413789A	1GA2 adapter (2 pcs.) (Material: * 1)	0.5 mL	489240A	0.5 glass tube (100 pcs.)	0.5 mL	(D) 9.0 × (L) 35	
487292A	0.4 adapter (4 pcs.) (Material: * 2)	0.4 mL	(Marketed) *	0.4 mL micro tube	0.4 mL	(D) 5.7 × (L) 46	
487292A	0.4 adapter (4 pcs.) (Material: * 2)	0.25 mL	(Marketed) *	0.25 mL micro tube	0.25 mL	(D) 5.7 × (L) 30	
—	—	—	(Marketed) *	Centrifugal filter unit	—	(D) 12.3 × (L) 45	
—	—	0.5 mL	(Marketed) *	0.5 mL micro tube	0.5 mL	(D) 7.8 × (L) 30	15,000 rpm (18,100 xg * 4)

Unit (mm)

* : When using tubes on the market, perform operation under the allowable speed or the allowable RCF specified by the manufacturer. Otherwise the tubes may be broken during operation.

* 1: PP

* 2: ABS

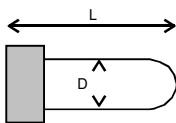
* 3: Max. RCF is 21,500xg, when Rmax. is 8.56cm.

* 4: Max. RCF is 18,100xg, when Rmax. is 7.18cm.

FAS15G

Single or 8-strip tubes and caps can be used in this rotor.

Adapter		Tube					Max. speed (Max. RCF)
Part No.	Name	Nominal capacity	Part No.	Name	Actual capacity	Size (mm)	
—	—	0.2 mL	(Marketed) *	0.2 mL PCR tube (single)	* 1	(D) 6 × (L) 24	15,000 rpm (21,500 xg * 2) (20,100 xg * 3)
—	—	0.2 mL	(Marketed) *	0.2 mL PCR 8-tube strip	* 1	(D) 6 × (L) 24	

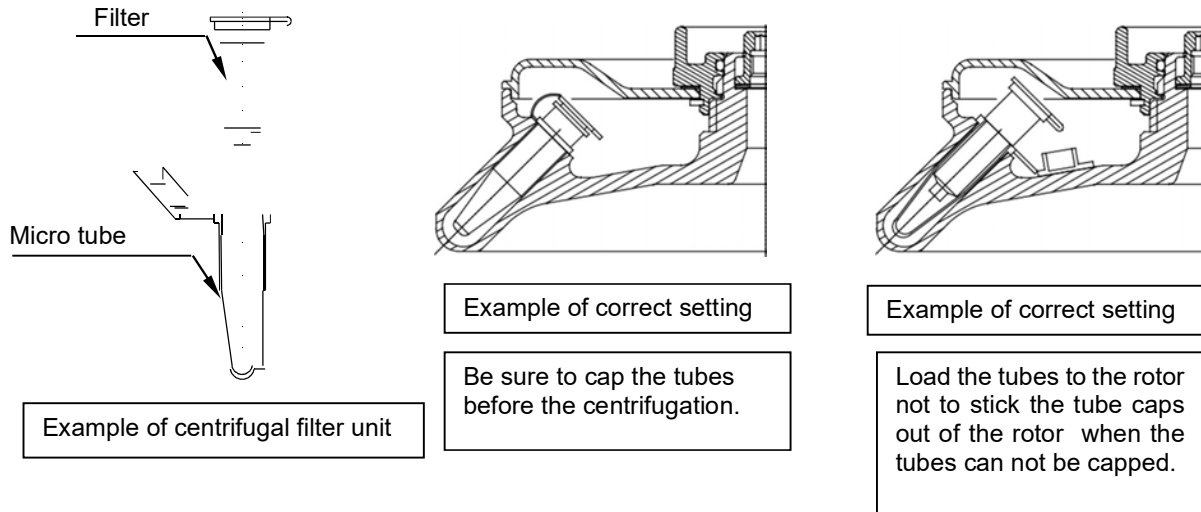
Unit (mm)
 

- * : When using tubes on the market, perform operation under the allowable speed or the allowable RCF specified by the manufacturer. Otherwise the tubes may be broken during operation.
- * 1: Actual capacities of PCR tubes on the market may vary depending on the specifications. Refer to the manufacturer's catalog.
- * 2: Max. RCF is 21,500xg, when Rmax. is 8.56cm (Corner tube hole).
- * 3: Max. RCF is 20,100xg, when Rmax. is 7.98cm (Center tube hole).

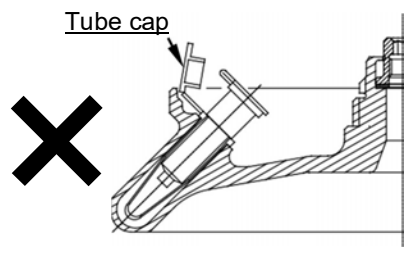
- When using tubes on the market, perform operation under the allowable speed or the allowable RCF specified by the manufacturer. Otherwise the tubes may be broken during operation.

⚠ CAUTION : When using tubes outside 4-25°C, tubes may be broken or deformed during operation. Test them before actual operation and perform actual operation after checking that there is no inconveniences such as the above.

- Precautions in using centrifugal filter unit when using the FAS15E/FAS15F rotor. 1
- Be sure to cap the tubes before the centrifugation when the tubes can be capped.
 - Load the tubes to the rotor not to stick the tube caps out of the rotor when the tubes can not be capped.



⚠ CAUTION : When using the marketed centrifugal filter unit, load the tubes to the rotor not to stick the tube caps out of the rotor if the tubes can not be capped. Otherwise the rotor may abnormally vibrate depending on the tube shape during the centrifugation.



Example of incorrect setting

Spare parts

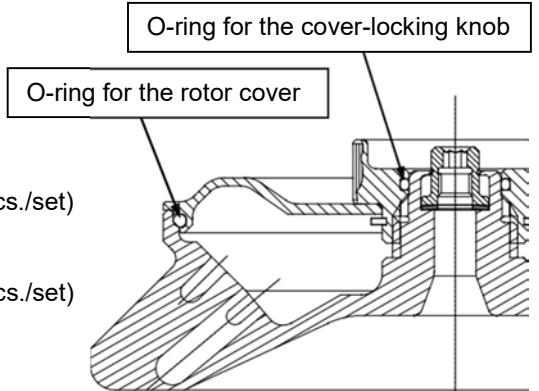
Lubricant for O-rings or the threaded portion of the rotor is not included in this rotor. Please order applicable ones selecting from the following list (designate the part numbers). O-rings are consumable parts. We recommend that O-rings are replaced with new ones periodically.

- For FAS15E/FAS15F/FAS15G rotor
 - Part No. 483719 Silicone grease (vacuum grease)
 - Part No. 84810601 Lubricant for screw

- For FAS15E rotor
 - Part No. 84521015 O-ring for the cover-locking knob (5pcs./set)

- For FAS15F rotor
 - Part No. 84521015 O-ring for the cover-locking knob (5pcs./set)
 - Part No. 4348812 O-ring for the rotor cover (1pc./set)

- For FAS15G rotor
 - Part No. 84521015 O-ring for the cover-locking knob (5pcs./set)
 - Part No. 84522007 O-ring for the rotor cover (1pc./set)

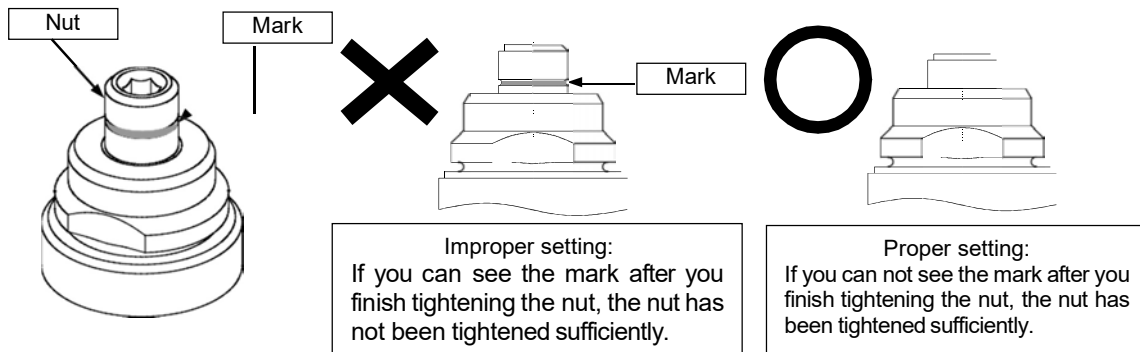


Operating Procedure

1. Install the rotor according to the procedures specified in the centrifuge instruction manual.

⚠ CAUTION : Be sure to tighten the nut with the attached tool for setting the rotor. Be sure to use the attached tool to tighten the nut. Otherwise it might be difficult to remove the tool from the nut. If you tighten the nut insufficiently, the rotor might abnormally vibrate or come off. There is the mark in the side of the nut. If you can see the mark after you finish tightening the nut, the nut has not been tightened sufficiently.

Tighten the nut sufficiently until you can not see the mark on the side of the nut.



2. Inject the sample into the tubes.

⚠ CAUTION : Check the attached chemical resistance chart, and do not use any sample inapplicable to the rotor, adapters, or tubes. Using such a sample could corrode or deteriorate them.

⚠ CAUTION : Do not exceed the actual capacity specified in "Applicable Tubes and Adapters". Otherwise the sample leakage may occur during operation.

⚠ CAUTION : Use of tubes with caps is recommended to prevent contamination of the sample with dust or water.

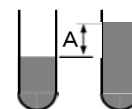
3. Balance the tubes that are symmetrically arranged.

⚠ CAUTION : Balance between symmetrically arranged tubes filled with the same-density sample. Variations in sample density cause imbalance operation.

The allowable imbalance of this rotor is specified in the following list.

(Allowable imbalance : Difference in weight of contents(the tube and the sample) in the tube cavities that are arranged symmetrically.)

	FAS15E/15F	FAS15G
Weight of difference	Within 0.2 g	Within 0.1 g
Level difference	Within 5 mm	

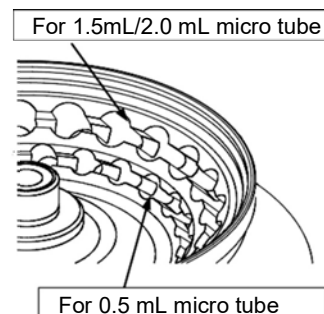


[A :Level difference of sample]

* Level difference is a guide for balancing samples. Note that the weight difference does not necessarily agree with the level difference.

⚠ CAUTION : The FAS15F rotor has two kinds of tube cavities(for 1.5mL/2.0mL micro tube and for 0.5mL micro tube). Check the tube size before operation and load the tubes into the tube cavities corresponding to the tube.

⚠ CAUTION : The caps of the 0.5mL micro tube and 1.5mL/2.0mL micro tube may overlap depending on the kinds of tubes. Do not load 1.5mL/2.0mL micro tube and 0.5mL micro tube together in this rotor when the caps of them overlap. Otherwise the tubes may be damaged during the operation.



4. Check that there is no crack or deterioration on the rotor. If the tube cavities are deteriorated, the strength of the rotor may be significantly decreased. Pay special attention when checking the tube cavities. The rotor is deteriorated if the surface is discolored, dented or cracked.

⚠ CAUTION : If there is any abnormality such as deterioration or crack, stop use of the rotor and contact an authorized sales/service representative.

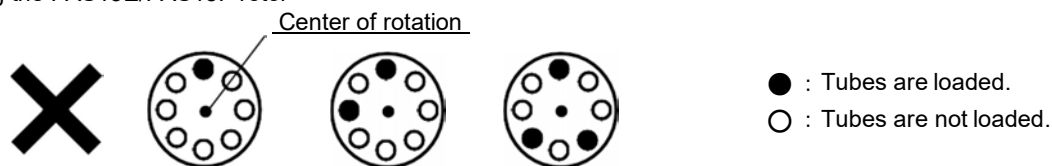
Check that there is no foreign matter in tube cavities.

5. Load the balanced tubes and adapters in the rotor symmetrically with respect to the center of rotation of the rotor .

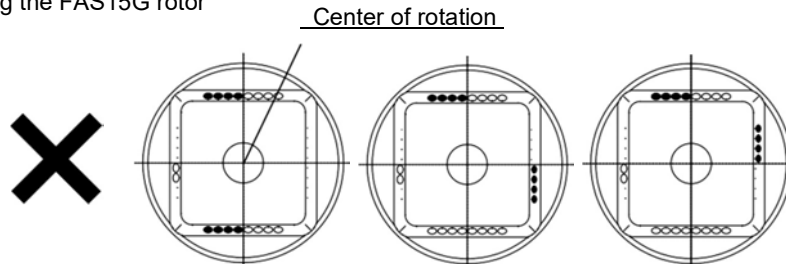
⚠ CAUTION : Do not load the tubes asymmetrically. Asymmetrical loading may cause imbalance operation and the centrifuge may be damaged.

Examples of incorrect tube setting are shown below.

When using the FAS15E/FAS15F rotor



When using the FAS15G rotor



6. Mount the rotor cover to the rotor. This rotor is available without setting the rotor cover to the rotor. It is recommended that the rotor cover is set to the rotor in order to prevent contamination of the sample with dust or water and avoid dispersing the sample to the rotor chamber when the sample leakage occurs. We recommend that you mount the rotor cover to the rotor because it will prevent the temperature of the sample from increasing and it will prevent the noise of the centrifuge from increasing during the operation.

Mounting the rotor cover (Polypropylene) on FAS15E rotor

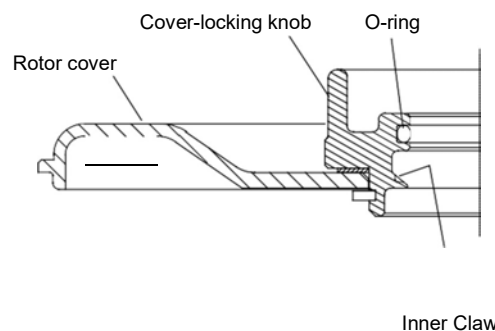
(1) Apply silicone grease (vacuum grease) (Part No.483719) to the rotor packing (O-ring) and then fit the rotor packing in the groove of the cover-locking knob.

Replace the rotor packing with new one if damaged or deteriorated.

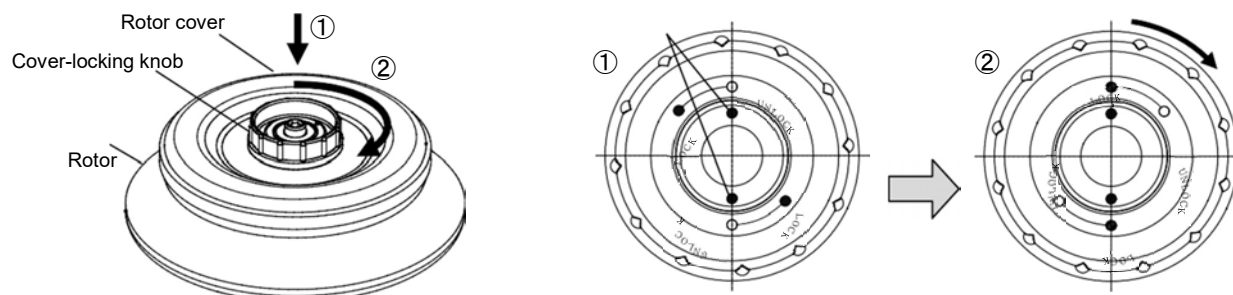
(2) Apply lubricant for screw (Part No. 84810601) to the inner claw of the cover-locking knob.

(3) Set the rotor cover onto the rotor. Adjust UNLOCK of the cover-locking knob to the match marks of the rotor. Then, push down the cover-locking knob and rotate it for adjusting LOCK to the match marks of the rotor.

(4) Check that the rotor cover cannot be rotated.



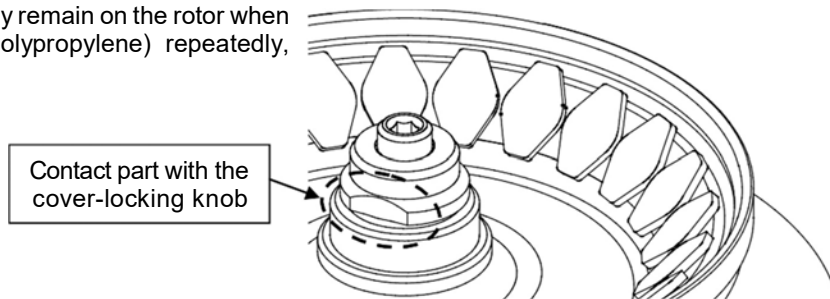
Match marks (Rotor)



⚠ CAUTION : In using FAS15E rotor whose cover is made of polypropylene, hold the rotor body when tightening the cover-locking knob. Holding the rotor body avoids moving the rotor body.

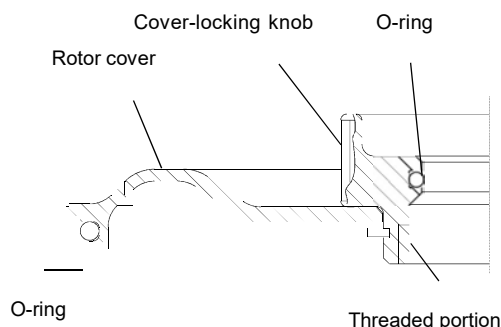
! CAUTION : Be sure to adjust LOCK (of the cover-locking knob) to the match marks of the rotor. Otherwise the rotor cover might be removed during operation and result in damage to the centrifuge and the rotor. If you can rotate the rotor cover after adjusting LOCK to the match marks of the rotor, the rotor cover may have deteriorated or been transformed. In that case, replace it with new one.

* Although the contact mark may remain on the rotor when you use the rotor cover (Polypropylene) repeatedly, there is no problem.



Mounting the rotor cover (AL) on FAS15E/15F/15G rotor

- (1) Apply silicone grease (vacuum grease) (Part No.483719) to the rotor packing (O-ring) and then fit the rotor packing in the groove of the cover. Replace the rotor packing with new one if damaged or deteriorated.
- (2) Apply lubricant for screw (Part No. 84810601) to the threaded portion of the cover-locking knob. Place the rotor cover on the rotor body.



Tighten the cover-locking knob to fix the rotor cover to the rotor body securely.

⚠ CAUTION : Be sure to tighten the cover-locking knob securely before operation when mounting the rotor cover to the rotor body. Otherwise the rotor cover might be removed during operation and result in damage to the centrifuge and the rotor.

7.Run the rotor according to the procedures specified in the centrifuge instruction manual.

8.After the operation, gently remove the rotor cover from the rotor. Take out the tubes from the rotor and then take out the sample in a proper manner.

Precautions in Cleaning

- Wipe the inside of the drive hole (crown hole) of the rotor with a soft cloth dampened with water sufficiently.
- Use tap water or neutral detergent (pH5~pH9) for cleaning the rotor and the adapters.
- If sample is spilled in the rotor, wash the stains off and dry it well to avoid corrosion.
- In the event a tube is broken while the rotor is running and the fragments or foreign matter remains in the tube cavities, remove the fragments or foreign matter completely.

Precautions in Sterilization

- Sterilize the rotor in any of the following methods; autoclaving (121°C, 20 minutes), gas sterilization (ethylene oxide or formaldehyde), chemicals sterilization (ethanol (70%), hydrogen peroxide (3%) or formalin (3%)), or ultraviolet rays sterilization.
- Sterilize the adapters in the following method; chemicals sterilization (hydrogen peroxide (3%)).

⚠ CAUTION : Do not dip the rotor in the formalin (3%) solution more than 2 hours.

⚠ CAUTION : Be sure to sterilize the rotor after removing the rotor cover from the rotor.

⚠ CAUTION : Inspect the cover-packing (O-rings) after sterilization. If you observe deterioration of the cover-packing (O-rings), replace them with new ones.

Sterilizing the rotor cover (material: Polypropylene) of the FAS15E rotor

- Sterilize the rotor cover (material: Polypropylene) in the following method; chemicals sterilization (ethanol (70%) and hydrogen peroxide (3%)).

⚠ CAUTION : Never sterilize the rotor cover by autoclaving. Otherwise the rotor cover might be deteriorated.

Maintenance

- ⚠WARNING :**
- If the rotor or an accessory is contaminated by samples that are toxic or radioactive, or blood samples that are pathogenic or infectious, be sure to decontaminate the item according to good laboratory procedures and methods.
 - If there is a possibility that the rotor or an accessory is contaminated by samples that might impair human health (for example, samples that are toxic or radioactive, or blood samples that are pathogenic or infectious), it is your responsibility to sterilize or decontaminate the rotor or the accessory properly before requesting repairs from an authorized sales/service representative. Note that we cannot repair the centrifuge, rotor or the accessory unless sterilization or decontamination is completed.
 - It is your responsibility to sterilize and/or decontaminate the rotor or parts properly before returning them to an authorized sales/service representative. In such cases, copy the attached decontamination sheet and fill out the copied sheet, then attach it to the item to be returned. We may ask you about the treatment for the rotor or parts if the decontamination is checked and judged as insufficient by us. It is your responsibility to bear the cost of sterilization or decontamination. Note that we cannot repair or inspect the rotor or the accessory unless sterilization or decontamination is completed.

Rotor Life

- ⚠WARNING :** Do not use rotors that have exceeded their lifetime: to do so might cause the rotor failure and the centrifuge might be damaged.
- The life expectancy of rotors depends on factors such as the speed of the rotor and temperature.
- Always check for deterioration and damage (cracks, deformation, and so on) on rotors before using them. Do not use the rotors if you find such a problem.

After many years of use, there will be inevitably some corrosion or stress corrosion. At some points, the combination of such damage and metal fatigue could make the rotor vulnerable to a failure. Although a rotor may appear to be in a good condition, you should follow the rotor retirement recommendation shown in Table 1 (see below).

Table 1. Retirement Recommendation

	Retire After Years
Rotor	7

Warranty

Dynamica warrants its compact centrifuge rotors under the terms and conditions set forth below.

1. Scope of Application

This warranty applies to failure or damage to the rotor due to rotor defects, in materials or workmanship, that are attributable to Dynamica.

Note: This warranty covers the rotor only, and Dynamica shall not be liable for damage to samples or other items that may arise from failure of or damage to the rotor.

2. Warranty Period

This warranty is valid for seven years from the date of delivery of the rotor by Dynamica or a Dynamica dealer.

3. Notes

- (1) This warranty extends only to the original buyer from Dynamica or the original buyer from a Dynamica dealer. Rotors whose ownership passes from the original buyer to a third person due to resale, transfer or the like are not covered by this warranty. Neither does this warranty cover cases where the ownership of a rotor is reacquired subsequently by the original buyer.
- (2) The warranty for the rotor proper (warranty period and terms) shall continue to apply in cases where buckets and rotor parts and the like are additionally purchased.
In such cases, the warranty period shall continue to be measured from the date of delivery of the rotor. If such parts are subject to a restricted warranty period, this warranty shall only cover failure or damage involving such parts that occurs both within the rotor warranty period and within the warranty period for the parts concerned.
- (3) This warranty does not cover any of the following, even during the warranty period:
 - ① Failure or damage due to abuse or misuse.
 - ② Failure or damage due to operation or maintenance in a manner contrary to the instructions in the operator's manuals for the rotor and centrifuge.
 - ③ Failure or damage due to disassembly or modification without the permission of Dynamica.
 - ④ Failure or damage due to use of a bucket, adapter, tube, bottle, or the like, other than those approved by Dynamica for use with the product.
 - ⑤ Failure or damage due to disaster such as fire or earthquake.
 - ⑥ Failure or damage due to use with a centrifuge not of Dynamica manufacture without the permission of Dynamica.
 - ⑦ Failure or damage due to use with a centrifuge that has been modified without the permission of Dynamica.
 - ⑧ Failure or damage due to a failed or damaged part (including a tube, bottle, adapter, etc.) not submitted to Dynamica.
 - ⑨ Replacement of consumable items.
 - ⑩ Parts subject to a restricted warranty period that has expired.

MEMO

Warranty

● Warranty of the centrifuge

This centrifuge is warranted for one (1) year from the date of delivery provided that it has been operated and maintained properly.

● Warranty of the rotor

For information on the warranty on rotors, refer to the instruction manuals of each rotor.

Incidental conditions

We do not warrant this centrifuge and the rotor under the following conditions even before the warranty period expires:

- (1) Failures caused by incorrect installation
- (2) Failures caused by rough and/or improper handling
- (3) Failures caused by operation or maintenance in any manner not described in the rotor instruction manual and the centrifuge instruction manual
- (4) Failures caused by conveyance or relocation after installation
- (5) Failures caused by modification or disassembly without Dynamica's permission
- (6) Failures caused by use of rotors, buckets, adapters, tubes and bottles that are not designated for the centrifuge by Dynamica
- (7) Failures caused by fire, earthquakes, or other natural disaster
- (8) Consumable parts and parts having a limited warranty period
- (9) Failures caused by use of a rotor that is out of warranty

This warranty does not apply to samples or other damage caused by a failure of this centrifuge or the rotor.

After-sales Service

Periodic inspection of the centrifuge is recommended to assure safe and efficient operation. If the centrifuge fails to function normally, do not attempt to repair it yourself. Contact a Dynamica authorized sales/service representative.



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