

# Specifications

Model	CR22N (CE Model)	CR22N (Non-CE Model)
Max. Speed	22,000 rpm	
Max. RCF	55,200 xg (R22A4)	
Max. Capacity	1,500ml x 4 bottles (R9A2)	
Speed Control Range	300 ~ 22,000 rpm	
Temperature Control Range	-20 ~ +40 °C	
ACL/DCL Mode	ACL: 9 modes, DCL: 9 modes with coasting	
Program Function	30 programs, with RCF(g) / g x sec function	
Drive Unit	Induction Motor (Inverter)	
Refrigerator	Closed Inverter Rotary (Refrigerant : R410A)	
Safety Functions	Interlock Door, Dual Over Speed Detection Non-contact Imbalance Detection, Abnormal Temp. Detection etc.	
Variable Deceleration Slope	Yes (beside DCL mode, moderate deceleration or free coast is selectable.)	
User Lockout Function	Yes	
Data Communication	USB port (Operating history can be output through USB port.)	
Operating Log Management	LAN :Factory Option PC and optional himac Log Manager Ver.3.1 network edition is required. Supporting GLP/GMP	
Display	High-resolution 5.7 inch color LCD	
Keypad	Touch-sensitive LCD panel (with GUI icons)	
Noise	64 dBA at 1m front (at 22,000rpm)	
Economy Mode	Yes	
Standard	CE marking	N/A
(1) EMC Directive	EN61326-1	
(2) LVD and MD*	EN61010-1, EN61010-2-020	
Dimensions (W x D x H : mm)	700 x 810 x 915 (height to chamber : 853)	
Weight	290 kg	
Power Requirements	Single Phase, AC 200, 208, 220, 230, 240V +/-10%, 30A (50/60Hz)	
Part No.	903350C1	90335001

Note : 1. Please note that LCD panel may contain a few dead or stuck pixels.  
2. \* LVD : Low Voltage Directive, MD : Machinery Directive

## Appearance



Top view



Front view



Slide view



Display & Operational Panel  
(Enlarged)

**CAUTION:**  
For safe and proper use of your machine, carefully read and follow the instructions in the instruction manual.

- All specifications are subject to change without advanced notice.
- Actual color may vary from the color of the photos on this catalogue, due to printing conditions.
- Due to safety reasons, installation environments, operating environments and conditions may be restricted.
- Unless specially mentioned, products and/or operation panel of the photos are standard specification.
- For further information, please contact your nearest Hitachi Koki's representative.



Hitachi Koki Co., Ltd. is certified International Standard ISO14001 (Environmental Management System) by International Organization for Standard



Scientific Instruments Division of Hitachi Koki Co., Ltd. is certified Quality Management and Quality Assurance Standard (ISO 9001) by International Organization for Standard



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**CR22N**  
High-Speed Refrigerated Centrifuge





# himac CR22N

## High-Speed Refrigerated Centrifuge

## Technologies

### Compact body, Larger Capacity

6L rotor was available only for large-capacity refrigerated centrifuge or high-end model of the high-speed refrigerated centrifuges in the past. With newly developed drive unit and 1.5L bottle, now you can use 6L rotor (1.5L x 4 bottles) with a new standard model of the high-speed refrigerated centrifuge model CR22N. In addition, the CR22N has a more compact body than the one of our former model CR-GIII series.

### Easy Operation with Color Touch-Sensitive LCD

High resolution color touch-sensitive LCD and GUI (graphic user interface) with high contrast against back screen in black color enable users to easily operate the system or select various menus and function by touching the icon on the display. Of course, operation status is identified at a glance by intelligible screen design.



### Self-Locking Rotor System

himac original "self-locking rotor system" is the most simple system to place the rotor onto the drive shaft. You just simply place the rotor on the drive shaft and that's all. The rotor is locked by centrifugal force automatically. You do not need to fix the rotor by screw or push the button to lock or unlock the rotor like other models available in the markets.

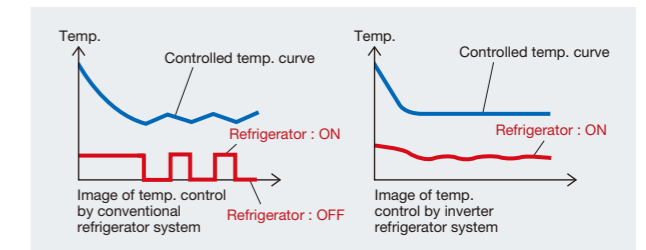


### Non-Contact Imbalance Detection System

The himac original imbalance sensor continuously measures oscillation over the entire rpm range. The system immediately detects abnormal vibrations caused by the imbalance of the rotor and stops the rotation of the rotor automatically.

### All Standard Rotors maintained at 4°C

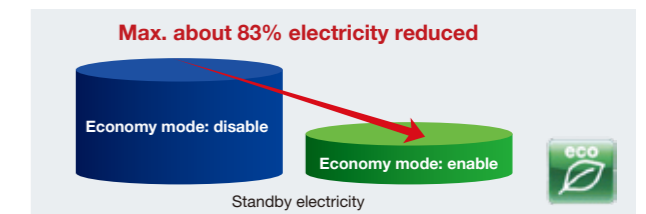
CR22N is the 1st model equips inverter refrigerator system in this class\*. The inverter refrigerator system provides you high efficient temperature control of the rotor and less electricity consumption is anticipated. Also the refrigeration capacity was improved, so now all standard rotors can be maintained at 4°C at their maximum speed without vacuum system. (under room temperature at 25°C) (There are some exceptions about made-to-order rotors.) In addition, inverter refrigerator system has reduced operating sound, because there is no start-up sound of conventional refrigerator system.



### Energy Saving and Environment Friendly Design

#### Economy mode (automatic standby function)

CR22N has Economy mode (automatic standby function) in it. If the display is not touched over the set wait time, the system automatically deepens backlight of the LCD and stop refrigerator (except at running) so that system reduces maximum 83% of standby electricity\*\*. Just press a button, so you can contribute to the energy saving.



#### Re-generating Brake System

The drive unit has a re-generating brake system. It changes the kinetic energy, which was exhausted into the room as a heat in deceleration, to electricity. So it can reduce the temperature increment and return maximum 40% electricity, which is used in whole operation, to power source.

#### Environment Friendly Design

CR22N is designed according to Hitachi Group's "Design for Environment Assessment System" standard. Over 80% materials of the product are reusable or recyclable. It has reduced use of harmful substance in materials and components. Also, the refrigerant used in CR22N has ODP (ozone depletion potential) equals to 0.

\* as of October 2012  
 \*\* comparing with standby electricity without Economy mode under in-house conditions

# Functions



## Automatic Rotor Identification **PAT.**

This function automatically adjusts optimized running condition based on the rotor automatically identified by compensating for air friction and implement temperature control etc..

## RCF Calculation and Display **RCF**

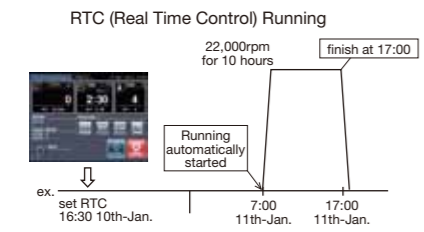
CR22N automatically calculates and displays RCF(xg) value and eliminates many troublesome and time-consuming manual calculations using many parameters, such as speed and R(max.) etc.. You can start operation by entering RCF(xg) value, instead of running speed.

## Actual Run Timer

Conventional run timer starts when the rotor starts acceleration. But himac original Actual Run Timer starts when the set speed is attained. It enables users to control actual net run time and obtain higher reproducibility of the separation.

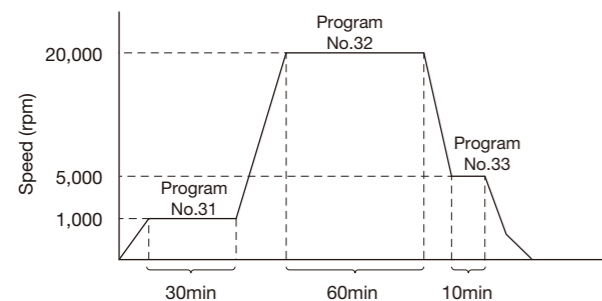
## RTC (Real-Time Control) Function

himac original RTC function makes timer setting easier than conventional delay time setting. You can simply set date and time when you want to start or finish the centrifugation, as calendar and clock are equipped with the system.



## Programmed Operation

You can program 30 operations into the memory. You can set another three programs with three-step-mode operation. (total 33 programs)



## Automatic Rotor Cover Detector **PAT.**

It detects rotor cover status by ultrasonic sensor on the door. It prevents from unexpected accident caused by without rotor cover in advance.

## Pre-Cool Function **PAT.**

This function maintains temperature inside rotor chamber at 15°C with preventing from icing, in order to reach target temperature shortly, when the rotor is not set on the drive shaft. When the rotor is set on the drive shaft, refrigerator control the temperature inside the rotor chamber at the set temperature.

## Zoom Function **PAT.**

Display of running speed and time is enlarged on the screen in order to find the operating status from a distance. Screen is switch from "Run Screen" to "Zoom Display" automatically at 20 sec. after reaching the set speed.

## User Administration

You can register up to 40 users into the memory. You can set access level and PIN of each user. There are two access level, "Administrator" or "User". "Administrator" can access all function, but "User" cannot access administrator function when the user lockout function is on.

## User Lockout Function

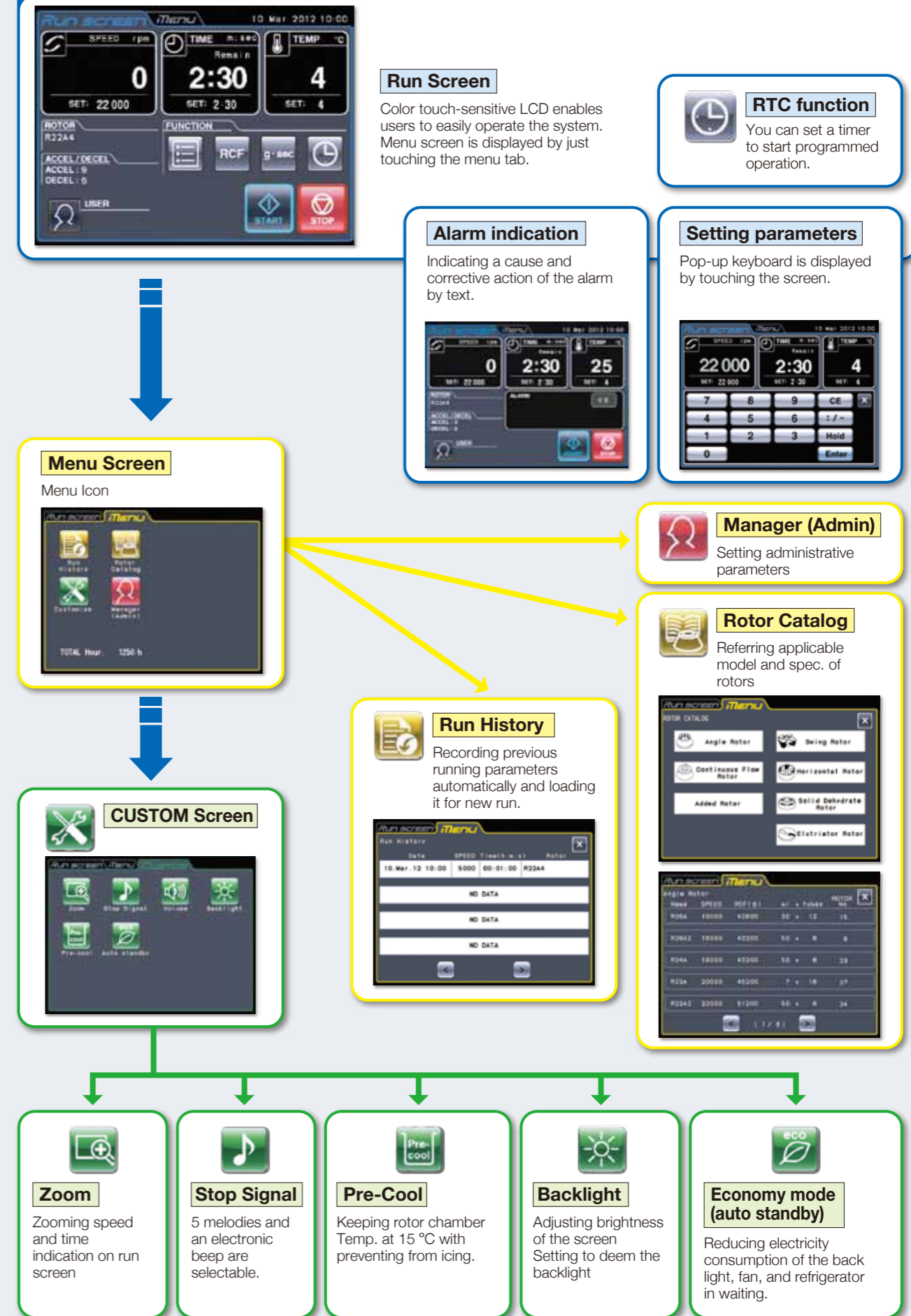
In case the user lockout function is enabled, only registered user can login the system by entering registered 4 digit PIN. It is useful function to control user access based on the groups or laboratories.

## Rotor Management

Your rotors can be registered to the system in order to manage followings;  
 \* Serial number of each rotor  
 \* Total accumulated operating time (hours)  
 \* Total number of operation (runs)

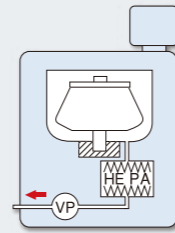
# Operation Flow Diagram

## Color touch-sensitive LCD



## Biosafety Option

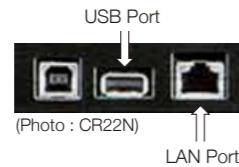
Biosafety is the 1st priority in all laboratories. This is why we design and offer multiple options for biosafety compatibility. Not only biosafety rotors or special-sealed type fixed angle rotor, but also the Micro Filter can be assembled in the CR22N system for enhanced level of biosafety at your option. This Micro Filter modification of the CR22N system is our factory option.



## Data Communication and Operating Log Management

### USB

USB port is equipped as standard specification. The system records up to 100 operating histories in its memory. Operating data can be output in CSV format through the USB port.



### LAN

Optional LAN board is also available. You can link CR22N to your PC through ethernet or internet. Optional software "himac LogManager Ver. 3.1 (network edition)" can be installed in your PC and operating history and data of CR22N can be easily managed by your PC.

### himac LogManager Ver. 3.1 for Windows® (Network Edition) -Optional log management software

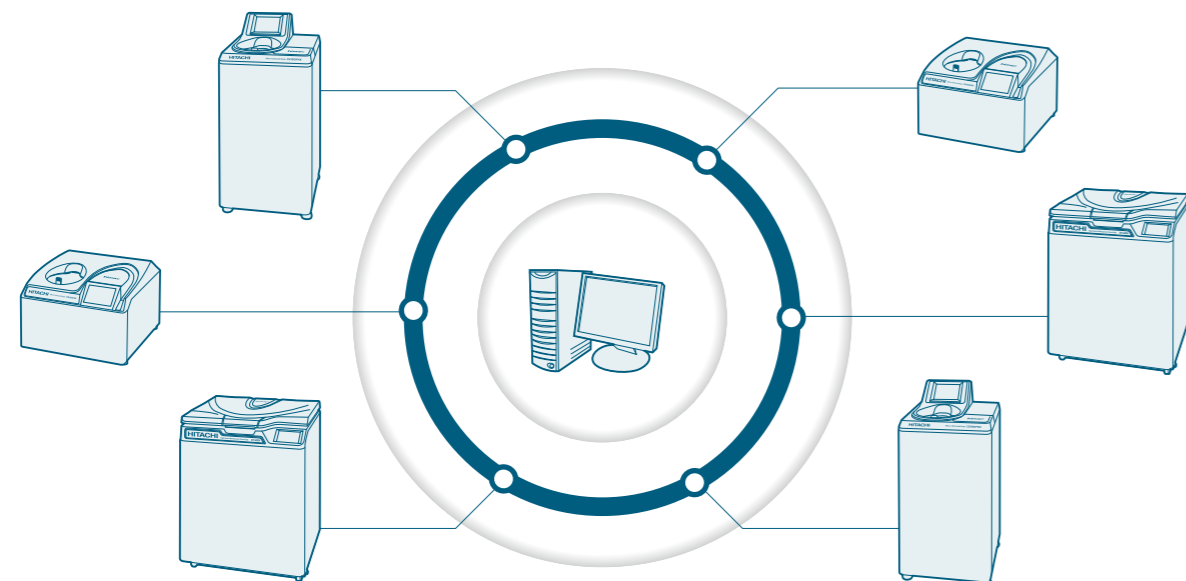
himac LogManager Ver. 3.1 for Windows® (Network Edition) is useful and convenient software to manage real time operating log of himac CP-WX series, CS150NX, CS150FNX, CR22N and CR-Gill series. Maximum 16 units of the abovementioned centrifuges can be registered to the software. As data communication between the centrifuge and PC is done via LAN or Ethernet, so there is no distance limitation to establish a network. You can easily establish the network configuration and relocation with commercially available LAN devices. (Optional LAN board is required for the centrifuges.) It means you can manage the operating log at the different location from the installation site of the centrifuges.

The software is real-time log management software; recording period is selectable from 10 seconds to 5 minutes interval. Of course, the software supports U.S. FDA 21 CFR Part 11, following functions are available;

- Digital Signature
- Audit Trail
- Encrypted Data Files etc.

Compatible OS;  
Windows® XP, Windows Vista®, Windows® 7

Windows®, Windows® XP, Windows Vista® and Windows® 7 are registered trademark of Microsoft Corporation in the United States and other countries.



## Unique 6L Rotor model R9A2 & 1500PP Bottle (WM)



We proudly introduce the newly developed 1500PP Bottle (WM). Hitachi Koki is the 1st manufacturer developed unique 1.5L triangular bottle for high-speed refrigerated centrifuge use. The unique 1.5L triangular bottle has a wide mouth so that it is easy to collect separated sample (pellet) and clean the bottle. We could minimize the size and weight of our new 6L capacity fixed angle rotor with 1.5L triangular bottle. Comparing with R7A fixed angle rotor (1L x 6 bottles) for large-capacity refrigerated centrifuge, R9A2 rotor is lighter than R7A rotor and R9A2 rotor can offer higher g force.

R9A2 : 17.1kg / 15,100 xg (8,500rpm)  
R7A : 18.7kg / 11,100 xg (7,000rpm)

R9A2 rotor and 1500PP Bottle (WM) including its cap can be sterilized by autoclave (at 121°C for 20min.)  
4sets 1500PP Bottle (WM) including cap, cap support, inner cap and O-ring are supplied as standard accessories with R9A2 rotor.

### Configuration of 1500PP Bottle (WM)

Part No.	Description
S310087A	1500PP Bottle (WM) (4pcs/set : bottle only)
S310071B	1500AL Cap (2pcs/set : cap only)
S412932A	Cap Support (4pcs/set : cap support only)
S412933A	1000 Inner Cap (WM) 2 (4pcs/set : inner cap only)
S412935A	O-ring (10pcs/set : O-ring only)

### Specification

Max. Speed	8,500 rpm
Max. RCF	15,100 xg
Nominal Capacity	1,500ml x 4 bottles
Tube Cavity Angle	22°
K-factor	4,313
Weight (kg)	17.1
Product No.	904374D0



# Standard Fixed Angle Rotor

## New Rotors

### R21A2



The R21A2 rotor is designed for 30ml x 6 tubes and has 40° tube cavity angle. It is suitable for pelleting. 40SS tube and 40Ti tube (for ultracentrifuge) can be used.

Specification	
Max. Speed	21,000 rpm
Max. RCF	50,000 xg
Nominal Capacity	30ml x 6 bottles
Tube Cavity Angle	40°
K-factor	487
Weight (kg)	5.4
Product No.	904373D0

### R22A6



The R22A6 rotor is designed for 10ml x 12 tubes and has 45° tube cavity angle. It is suitable for pelleting. 12SS tube and 12 Ti tube (for ultracentrifuge) can be used.

Specification	
Max. Speed	22,000 rpm
Max. RCF	55,100 xg
Nominal Capacity	10ml x 12 bottles
Tube Cavity Angle	45°
K-factor	319
Weight (kg)	4.8
Product No.	904375D0

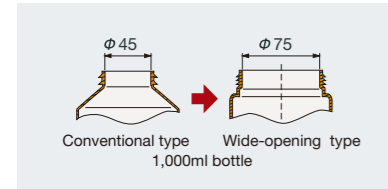
## High-capacity Light Weight Rotor

### Innovative aluminum alloy made light weight rotor

This series' rotors are half the weight of conventional rotors in the same capacity. They greatly reduce acceleration/deceleration time. They can be rotated at Max. speed with bottles filled with any volume, as long as balanced.

### Wide Mouth Bottle

It is easy to collect separated sample and clean the bottle.



### R9A2

Net weight: 17.1kg  
8,500 rpm / 15,100 xg  
1500ml x 4 bottles



### R9A

Net weight: 13.7kg  
9,000 rpm / 15,300 xg  
1000ml x 4 bottles



### R10A5

Net weight: 15.5kg  
10,000 rpm / 18,900 xg  
500ml x 6 bottle

### R12A6

Net weight: 14.8kg  
12,000 rpm / 22,500 xg  
500ml x 4 Bottles



### R10A3

Net weight: 16.9kg  
10,000 rpm / 18,800 xg  
500ml x 6 bottles

### R13A

Net weight: 11.0kg  
13,000 rpm / 26,400 xg  
250ml x 6 bottles

## Fixed Angle Rotor for 50ml TC (Conical-Bottom) Tube



### R18A

18,000 rpm / 42,200 xg  
50ml x 8 tubes



### R15A

15,000 rpm / 32,240 xg  
15/50ml x 10 tubes each

### "himac 50TC tube" applicable to high xg is available!

(Part No. S307904A : 300 pcs/set)

Max. RCF : 42,200 xg\*

Max. Speed : 18,000 rpm\*

Sterilized by electron beam for immediate use to culture and process fungus

Scale indication and writing spare are ethanol/methanol proof.

\*with R18A fixed angle rotor



## Fixed Angle Rotor (Standard model)



### R22A4

22,000 rpm / 55,200 xg  
1.5/2ml x 30 tubes



### R20A2

20,000 rpm / 48,000 xg  
50ml x 8 tubes



### R14A

14,000 rpm / 30,240 xg  
250ml x 4 tubes



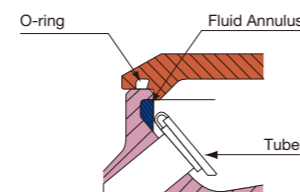
### R12A3

12,000 rpm / 23,800 xg  
250ml x 6 tubes

## Fixed Angle Rotor with Fluid Annulus

Even if a sample is overflowed from a tube inside the rotor during centrifugation, overflowed sample is dwelled in the fluid annulus.

Model : R13A, R22A4, R12A6



# Standard Swinging Bucket Rotors

## General-purpose Swinging Bucket Rotor

### R4SS



5ml ~ 10ml x 40 tubes  
50ml TC (conical bottom) x 8 tubes  
15ml TC (conical bottom) x 24 tubes



## Versatile Swinging Bucket Rotor

### R3S



50ml TC (conical bottom) x 28 tubes  
15ml TC x 40 tubes



## High-speed Swinging Bucket Rotor for TC (conical bottom) Tube

### R8S

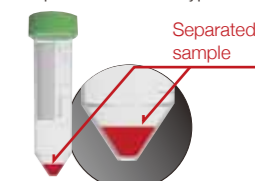


Max. Speed : 8,000 rpm  
Max. RCF : 11,500 x g  
No wind-sealed shell design offers easy operation to users.  
Nominal Capacity : 50ml TC tube (conical-type) x 4 tubes



Bucket sealing cap for biosafety (option)  
(Part No. S302194A : 4pcs/set)

Suitable for pelleting samples with conical-type tube



\*Buckets are autoclavable. (121°C, for 20minutes)  
\*Optional bucket sealing cap is available for your biosafety.  
\*Optional bucket sealing cap is also autoclavable. (121°C, for 20minutes)

## Swinging Bucket Rotor for Micro Plate



### R5S4

DWP x 4 pcs  
MP x 12 pcs

## Balancer



S302859A : Scale Balancer (for 1,000ml bottle)  
349981A : 500g Balancer (up to O.D. 73mm)  
349981B : 250g Balancer (up to O.D. 38mm)



The rotor marked with this icon can be sterilized by autoclave at 121°C for 20 minutes.



Biosafety of the rotor marked with this icon was verified by in-house test according to the procedure modified IEC61010-2-020 Annex AA, using Bacillus subtilis containing  $\geq 1 \times 10^6$  spores/ml.

\* Sample may be leaked from the rotor if o-ring is deteriorated or operation is not appropriate.

