

## Specifications

| Model                          | CR22N<br>(CE Model)   | CR22N<br>(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 to 22,000 rpm   |                         |
| Temperature Control Range      | -20 to +40 °C   |                         |
| Acceleration/Deceleration Mode | Acceleration : 9 modes, Deceleration : 9 modes with coasting.<br>Deceleration mode changeable in decelerating to shift mode or free coasting.                         |                         |
| Program Function               | 30 programs, with RCF(g) / g x sec function   |                         |
| Drive Unit                     | Induction Motor (Inverter)  |                         |
| Refrigerator                   | Inverter-controlled Hermetic Rotary Compressor (Refrigerant : R410A)  |                         |
| Safety Functions               | Interlock Door, Dual Over Speed Detection<br>Non-contact Imbalance Detection, Abnormal Temp. Detection.   |                         |
| User Lockout Function          | Yes   |                         |
| Data Communication             | USB port<br>(Operating history can be output through USB port.)   |                         |
| Operating Log Management       | LAN : Selectable option from Factory Option, or on-site Modification<br>PC and optional himac LogManager Ver. 5.0 network edition are required.<br>Supporting GLP/GMP |                         |
| Display                        | High-resolution 5.7 inch color LCD  |                         |
| Keypad                         | Touch-sensitive LCD panel<br>(with GUI icons)   |                         |
| Noise                          | 64 dB(A) at 1m front<br>(at 22,000 rpm)   |                         |
| 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 760 x 915<br>(height to chamber : 853)  |                         |
| Weight                         | 260 kg  |                         |
| Power Requirements             | Single Phase, AC 200, 208, 220, 230, 240V +/-10%, 30A (50/60Hz)   |                         |
| Part No.                       | 913350C1  | 91335001                |

Note : \* LVD : Low Voltage Directive, MD : Machinery Directive

# himac



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

- This catalogue is for international reference and not intended for a specific country.
- Orders are subject to product-availability in each country.
- 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 specifications
- For further information, please contact us.

## himac

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We change our brand, himac from Hitachi, effective on June 2018. And change our company name, "Koki Holdings Co., Ltd." from "Hitachi Koki Co., Ltd." on June 2018.

HLI-8F | 2018.11 | Printed in Japan



# CR22N

High-Speed Refrigerated Centrifuge





# himac CR22N

High-Speed Refrigerated Centrifuge

## Appearance



Top view



Front view



Side view



Display & Operational Panel (Enlarged)

## Technologies

### Compact body, Larger Capacity

In the past, 6 Liter capacity rotor was available only for large-capacity refrigerated centrifuge or high-end model of the high-speed refrigerated centrifuges. 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 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 easily to 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 simplest 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 install the rotor by screw or push the button to lock or unlock the rotor like other models available in the markets.

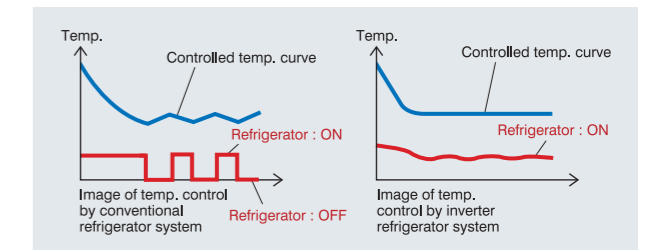


### Non-Contact Imbalance Detection System

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

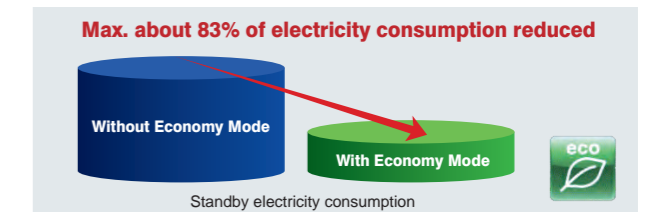
### All Standard Rotors Maintained at 4°C

CR22N is the first centrifuge equipped with inverter refrigerator system in this class\*. The inverter refrigerator system provides you 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 noise, because there is no start-up noise 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 for a specific time period while the rotor is not spinning, the system automatically lowers backlight and stops its refrigerator. And it reduces maximum 83% of standby Electricity consumption\*\*. 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 to power source by maximum 40% of electricity consumption which is used in whole operation.

### Environment Friendly Design

CR22N is designed according to our "Design for Environment Assessment System" standard. The more than 80% materials of the product are reusable or recyclable. It has reduced use of harmful substance in materials and components. Also, the refrigerant of CR22N is nil in ODP (Ozone Depletion Potential).

\* First in October 2012 as of high-speed refrigerated centrifuge  
 \*\* Comparing with standby electricity consumption without Economy Mode under in-house conditions



# Functions



## Automatic Rotor Identification

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

## RCF Calculation and Display



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

## Actual Run Timer

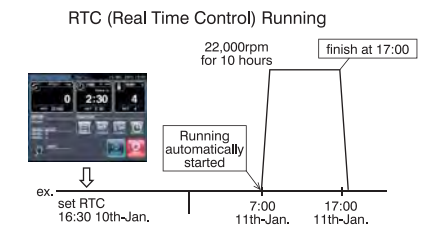


Conventional run timer starts when the rotor starts acceleration. But himac original Actual Run Timer starts when the set speed is attained. It enables users to control actual net run time and obtain higher reproducibility of the separation.

## RTC (Real-Time Control) Function



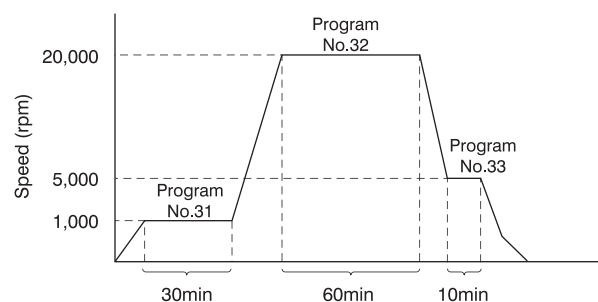
himac original RTC function makes timer setting easier than conventional delay time setting. You can simply set date and time when you want to start or finish the centrifugation, as calendar and clock are equipped with the system.



## 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

It detects status of a fixed angle rotor covered or uncovered by ultrasonic sensor on the door. It prevents from unexpected accident caused by uncovered rotor in advance.

## Pre-Cool Function



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



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, Personal Identification Number 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



### Run Screen

Color touch-sensitive LCD enables users easily to operate the system. Menu screen is displayed by just touching the menu tab.



### RTC function

You can set a timer to start programmed operation.

### Alarm indication

Indicating a cause and corrective action of the alarm by text.



### Setting parameters

Pop-up keyboard is displayed by touching the screen.



## Menu Screen

Menu Icon



### Manager (Admin)

Setting administrative parameters



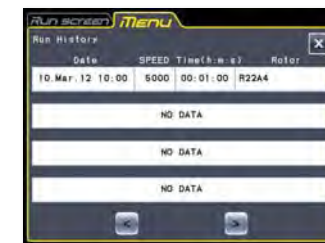
### Rotor Catalog

Referring applicable model and spec. of rotors



## Run History

Recording previous running parameters automatically and loading it for new run.



## CUSTOM Screen



### Zoom

Zooming speed and time indication on run screen

### Stop Signal

5 melodies and an electronic beep are selectable.

### Pre-Cool

Keeping rotor chamber temperature at 15°C to avoid the chamber icing.

### Backlight

Adjusting brightness of the screen. Setting to dim the backlight

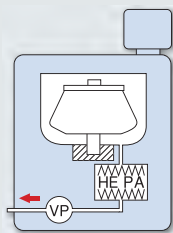
### Economy Mode (auto standby)

Reducing electricity consumption of the backlight, fan, and refrigerator in waiting.



## Biosafety Option

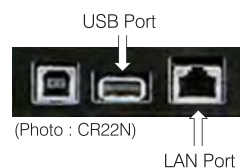
Biosafety is the first priority in all laboratories. This is why we design and offer multiple options for biosafety. Not only biosafety rotors or special-sealed type fixed angle rotor, but also the Micro Filter can be assembled in the CR22N system for enhanced level of biosafety at your option. This Micro Filter modification of the CR22N system is our factory option (option part number S102549B).



## 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 (optional part number S205392A or S205392B). You can link CR22N to your PC through ethernet or internet. Optional software "himac LogManager Ver. 5.0 (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. 5.0 for Windows® (Network Edition)

-Optional log management software

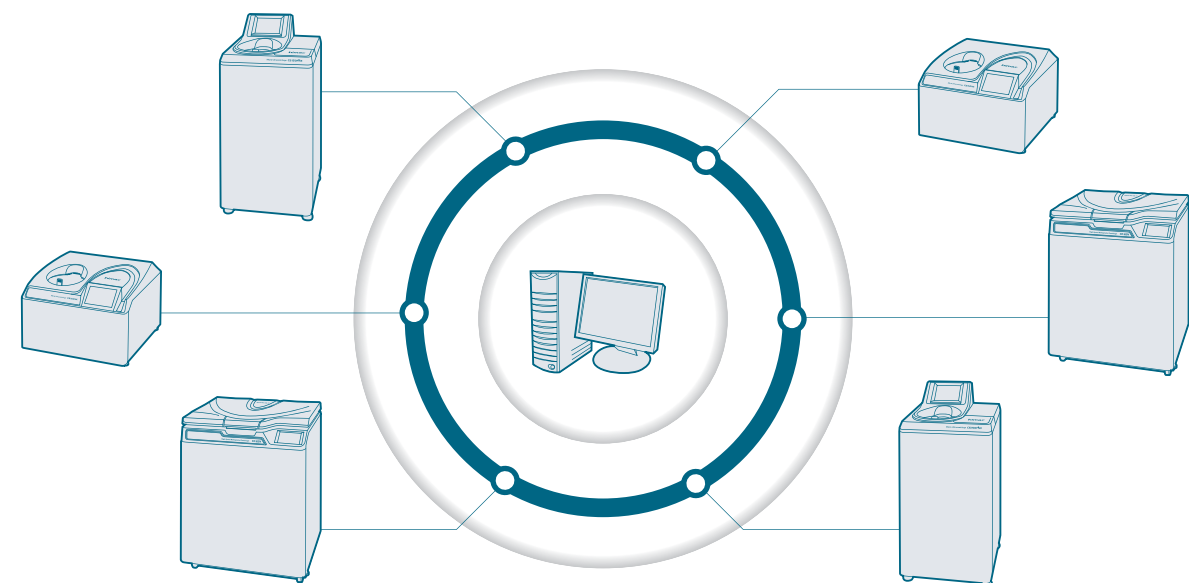
himac LogManager Ver. 5.0 for Windows® (Network Edition) is useful and convenient software to manage real time operating log of himac CP-NX series, CS150NX, CS150FNX, CR30NX, CR22N and CR7N series. Maximum 16 units of the abovementioned centrifuges can be registered to the software. As data communication 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

Required Operating System  
Windows® 7, Windows® 8, and Windows® 10

Windows®, Windows® 7, Windows® 8, and Windows® 10 are registered trademarks of Microsoft Corporation in the United States and other countries.



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

We proudly introduce the newly developed 1500PP Bottle (WM) with a wide mouth. We are the first manufacturers developed unique 1.5L triangular bottle for high-speed refrigerated centrifuge use. The unique bottle has the wide mouth so that it is easy to collect separated sample (pellet) and clean the bottle inside. We could minimize the size and weight of our new 6L capacity fixed angle rotor with 1.5L triangular bottle.



R9A2 rotor and 1500PP Bottle (WM) including its cap can be sterilized by autoclave (at 121°C for 20min.) The R9A2 rotor includes 4 sets of 1500PP Bottle (WM), their Cap, Cap Support, Inner Cap and O-ring as of standard accessories.

### Specifications of Rotor R9A2

|                   |                     |
|-------------------|---------------------|
| 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            | 17.1 kg             |
| Product No.       | 914374D0            |

### Configuration of 1500PP Bottle (WM)

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





# Standard Fixed Angle Rotors

## New Rotors

**R21A2**

Auto  
clave



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.

| Specifications    |                  |
|-------------------|------------------|
| Max. Speed        | 21,000 rpm       |
| Max. RCF          | 50,000 xg        |
| Nominal Capacity  | 30ml x 6 bottles |
| Tube Cavity Angle | 40°              |
| K-factor          | 487              |
| Weight            | 5.4 kg           |
| Product No.       | 914373D0         |

**R22A6**

Auto  
clave



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.

| Specifications    |                   |
|-------------------|-------------------|
| Max. Speed        | 22,000 rpm        |
| Max. RCF          | 55,100 xg         |
| Nominal Capacity  | 10ml x 12 bottles |
| Tube Cavity Angle | 45°               |
| K-factor          | 319               |
| Weight            | 4.8 kg            |
| Product No.       | 914375D0          |

## High-capacity Light Weight Rotors

### Innovative aluminum alloy made light weight rotor

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

Auto  
clave



**R9A2**

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

Auto  
clave

Bio  
safety



**R9A**

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

Auto  
clave

Bio  
safety



**R10A5**

Net weight: 15.5kg  
10,000 rpm / 18,800 xg  
500ml x 6 bottles

Auto  
clave

Bio  
safety



**R12A6**

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

Auto  
clave

Bio  
safety



**R10A3**

Net weight: 14.6kg  
10,000 rpm / 18,800 xg  
500ml x 6 bottles

Auto  
clave

Bio  
safety

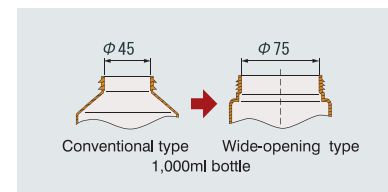


**R13A**

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

### Wide Mouth Bottle

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



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

Auto  
clave



**R18A**

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

Auto  
clave



**R15A**

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

### "himac 50TC tube" applicable in high centrifugal force!

(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 space are proof against ethanol and methanol.

\*With R18A fixed angle rotor



## Fixed Angle Rotors (Standard model)



**R22A4**

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

Auto  
clave

Bio  
safety



**R20A2**

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

Auto  
clave



**R14A**

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



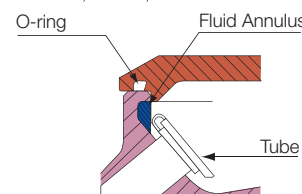
**R12A3**

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, the overflowed sample is dwelled in the fluid annulus.

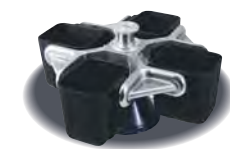
Model : R13A, R22A4, R12A6



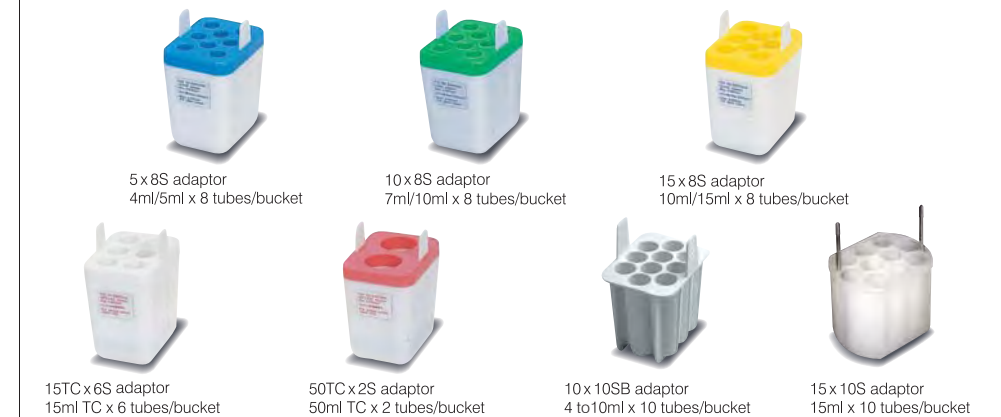
# Standard Swinging Bucket Rotors

## General-purpose Swinging Bucket Rotor

**R4SS**



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



5 x 8S adaptor  
4ml/5ml x 8 tubes/bucket

10 x 8S adaptor  
7ml/10ml x 8 tubes/bucket

15 x 8S adaptor  
10ml/15ml x 8 tubes/bucket

15TC x 6S adaptor  
15ml TC x 6 tubes/bucket

50TC x 2S adaptor  
50ml TC x 2 tubes/bucket

10 x 10SB adaptor  
4 to 10ml x 10 tubes/bucket

15 x 10S adaptor  
15ml x 10 tubes/bucket

## Versatile Swinging Bucket Rotor

**R3S**



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



Tube Rack GR  
10ml x 24 tubes/bucket

Tube Rack BL  
3ml to 5ml x 30 tubes/bucket

Tube Rack YE  
15ml x 18 tubes/bucket

Tube Rack OR  
10ml x 4 tubes/bucket  
50ml x 4 tubes/bucket

Tube Rack 61 x 1  
225ml x 1 tube/bucket  
175ml x 1 tube/bucket

Tube Rack 62 x 1  
250ml (Nalgene®) x 1 tube/bucket

Tube Rack 15.5 x 18  
10ml x 18 tubes/bucket

Tube Rack 13.2 x 18  
7ml x 18 tubes/bucket

Tube Rack 17 x 10  
15ml TC x 10 tubes/bucket

50T7S adaptor  
50ml x 7 tubes/bucket

500PA tube  
500ml x 1 tube/bucket

M bucket  
96-hole microplate x 1 pc/bucket

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

**R8S**

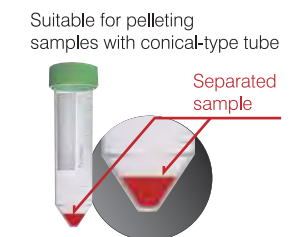
Auto  
clave\*



Max. Speed : 8,000 rpm  
Max. RCF : 11,500 xg  
No wind-sealed shell design offers easy operation to users.  
Nominal Capacity : 50ml TC tube (conical-type) x 4 tubes  
Availability of rotor R8S is restricted by country.



Bucket sealing cap  
for biosafety (option)  
(Part No. S309124A : 4 pcs/set)



Suitable for pelleting  
samples with conical-type tube

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

## Swinging Bucket Rotor for Micro Plate

Auto  
clave

Bio  
safety



**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)

Auto  
clave

Bio  
safety

The rotor marked with this icon can be sterilized by autoclave at 121°C for 20 minutes.  
Biosafety of rotors marked with this icon is complied with standards, IEC 61010-2-020 : 2006, (2nd Edition). That is certificated by PHE, Public Health England, UK.  
\* Sample may be leaked from the rotor if o-ring is deteriorated, or operation is not appropriate.

For detail of biosafety about the other rotors, contact us.



# Standard Rotor : Rotors and Accessories List

| Type                   | Model             | Part No. | Maximum speed (rpm) | Maximum RCF (xg) | Weight (kg)       | For tubes                               |                             | Standard accessories        |
|------------------------|-------------------|----------|---------------------|------------------|-------------------|---|-----------------------------|-----------------------------|
|                        |                   |          | CR22N               |                  |                   | Nominal capacity (ml) x number of tubes | Tube dimensions (dia. x mm) | Tube/bottle                 |
| Fixed angle rotors     | R22A6             | 914375D0 | 22,000              | 55,100           | 4.2               | 10 x 12                                 | 16 x 82                     | 10PA bottle (with cap) x 12 |
|                        | R22A4             | 914363D0 | 22,000              | 55,200           | 3.3               | 2 x 30                                  | 11 x 42                     | -                           |
|                        | R21A2             | 914373D0 | 21,000              | 50,000           | 5.4               | 30 x 6                                  | 26 x 97                     | 30PA bottle (with cap) x 6  |
|                        | R20A2             | 914295D0 | 20,000              | 48,000           | 6.8               | 50 x 8                                  | 29 x 103                    | 50PA tube x 8               |
|                        | R18A              | 914359D0 | 18,000              | 42,200           | 8.2               | 50 x 8                                  | 30 x 115                    | himac 50TC tube x 300       |
|                        |                   |          | 12,000              | 18,760           |                   | 50 ml culture tube                      |                             |                             |
|                        | R15A              | 914360D0 | 15,000              | 32,300           | 10.5              | 50 x 10                                 | 30 x 115                    | himac 50TC tube x 300       |
|                        |                   |          | 12,000              | 20,670           |                   | 50 ml culture tube                      |                             |                             |
|                        |                   |          | 11,000              | 17,380           |                   | 15 ml culture tube                      |                             |                             |
|                        | R14A              | 914306D0 | 14,000              | 30,240           | 16.8              | 250 x 4                                 | 62 x 124                    | 250PP bottle x 4            |
|                        | 50TA300 adapter   | S408203A | 12,000              | 18,800           | -                 | 50 x 4                                  | 30 x 115                    | 50 ml culture tube          |
|                        | R13A              | 914366D0 | 13,000              | 26,400           | 11.0              | 250 x 6<br>11 x 6                       | 62 x 124<br>16 x 82         | 250PP bottle x 6            |
|                        | R12A6             | 914357D0 | 12,000              | 22,500           | 14.8              | 500 x 4                                 | 73 x 163                    | 500PA bottle x 4            |
|                        | R12A3             | 914325D0 | 12,000              | 23,800           | 16.0              | 250 x 6                                 | 62 x 124                    | 250PP bottle x 6            |
|                        | R10A5             | 914365D1 | 10,000              | 18,900           | 15.5              | 500 x 6                                 | 69.5 x 169                  | 500 ml bottle (Nalgene®)    |
|                        | R10A3             | 914345D1 | 10,000              | 18,800           | 14.6              | 500 x 6                                 | 73 x 163                    | 500PA bottle x 6            |
|                        | R9A2              | 914374D0 | 8,500               | 15,100           | 17.1              | 1,500 x 4                               | 126 x H175                  | 1500PP bottle(WM) x 4       |
| R9A                    | 914364D0          | 9,000    | 15,300              | 13.7             | 1,000 x 4         | 98 x 168                                | 1000PP bottle(WM) x 4       |                             |
| Swinging bucket rotors | R8S               | 914371D0 | 8,000               | 11,500           | 7.2               | 50 x 4                                  | 30 x 115                    | 50 ml culture tube          |
|                        | R5S4              | 914369D0 | 4,700               | 3,100            | 5.2               | 96DWx4/96MPx12                          | W128xD86xH90                | -                           |
|                        | R4SS              | 914370D0 | 4,000               | 2,900            | 4.9               | -                                       | -                           | -                           |
|                        | 15 x 10S adapter  | S308546A | 4,000               | 2,860            | -                 | 15 x 40                                 | 16.5 x 110                  | -                           |
|                        | 15 x 8S adapter   | S307334A | 4,000               | 2,860            | -                 | 15 x 32                                 | 16.5 x 110                  | -                           |
|                        | 10 x 10SB adapter | S308695A | 4,000               | 2,800            | -                 | 10 x 40                                 | 15.4 x 100                  | -                           |
|                        | 10 x 8S adapter   | S307333A | 4,000               | 2,860            | -                 | 10 x 32                                 | 13.2 x 100                  | -                           |
|                        | 5 x 8S adapter    | S307332A | 4,000               | 2,380            | -                 | 5 x 32                                  | 13.2 x 78                   | -                           |
|                        | 50 x 2S adapter   | S308844A | 3,500               | 2,120            | -                 | -                                       | 35 x 100                    | -                           |
|                        | 15TC x 6S adapter | S307335A | 4,000               | 2,900            | -                 | 15 x 24                                 | 17 x 120                    | -                           |
|                        | 50TC x 2S adapter | S307336A | 4,000               | 2,860            | -                 | -                                       | 30 x 115                    | -                           |
|                        | R3S               | 914315D0 | 3,000               | 1,940            | 6.0               | -                                       | -                           | -                           |
|                        | 500PA tube        | S303830A | 3,000               | 1,940            | -                 | -                                       | 98 x 100                    | -                           |
|                        | Tube rack BL*     | 336821A  | 3,000               | 1,870            | -                 | 10 x 120                                | 12 x 120                    | -                           |
|                        | Tube rack GR*     | 336822A  | 3,000               | 1,870            | -                 | 7 x 96                                  | 13-14 x 120                 | -                           |
|                        | Tube rack YE*     | 336823A  | 3,000               | 1,870            | -                 | 15 x 72                                 | 16.5 x 120                  | -                           |
|                        | Tube rack OR*     | 336824A  | 3,000               | 1,870            | -                 | 50 x 16<br>10 x 16                      | 36.5 x 120<br>12 x 120      | -                           |
|                        | Tube rack BL(B)** | S307165A | 3,000               | 1,870            | -                 | 10 x 120                                | 12 x 120                    | -                           |
|                        | Tube rack GR(B)** | S307167A | 3,000               | 1,870            | -                 | 7 x 96                                  | 13-14 x 120                 | -                           |
|                        | Tube rack YE(B)** | S307164A | 3,000               | 1,870            | -                 | 15 x 72                                 | 16.5 x 120                  | -                           |
|                        | Tube rack OR(B)** | S307166A | 3,000               | 1,870            | -                 | 50 x 16<br>10 x 16                      | 36.5 x 120<br>12 x 120      | -                           |
|                        | Tube rack 61 x 1  | S303580A | 3,000               | 1,870            | -                 | -                                       | Falcon® culture tube+       | 225/175 ml culture tube     |
| Tube rack 62 x 1       | S303896A          | 3,000    | 1,870               | -                | -                 | Nalgene bottle                          | 250 ml bottle               |                             |
| Tube rack 17 x 10      | S304528A          | 3,000    | 1,940               | -                | 15 x 40           | 17 x 120                                | 15 ml culture tube          |                             |
| Tube rack 13.2 x 18    | S304666A          | 3,000    | 1,800               | -                | 7 x 72            | φ13 vacuum blood collecting tube        | -                           |                             |
| Tube rack 15.5 x 18    | S304667A          | 3,000    | 1,800               | -                | 10 x 72           | φ15 vacuum blood collecting tube        | -                           |                             |
| 50T7S adapter          | S305213A          | 3,000    | 1,870               | -                | 50 x 28           | 30 x 115                                | 50 ml culture tube          |                             |
| Tube rack 29.5 x 5 (B) | S307253A          | 3,000    | 1,830               | -                | 50 x 20           | 30 x 115                                | 50 ml culture tube**        |                             |
| M bucket               | 346977A           | 2,000    | 700                 | -                | Microplate x 4pcs | W128 x D86 x H10-30                     | 96-hole microplate          |                             |
| MP bucket              | S305521A          | 3,000    | 1,650               | -                | Microplate x 4pcs | W128 x D86 x H10-55                     | -                           |                             |

Notes: 1.   Indicates tubes available on the market. Purchase directly from your local supplier.  
 2.\* For tube length 65 mm - 120 mm. \*\* Suitable for tube length 85 mm - 120 mm.  
 3. Automatic identification type rotors can be used with previously delivered centrifuges (CR-Gill or earlier series). Depending on the centrifuge model, ROM is required exchange, or upgrade by over-write.  
 4. It is possible to use rotors you currently own in CR22N by inputting the rotor data. With regard to any rotor within the warranty period, upgrades to the automatic identification type (for a nominal fee) will be accepted. (R12A2, R15S, R15S2, R6S, R20V, R11D, R18C, R13C and R10C rotors cannot be remodeled.)  
 5. For information on product compatibility, please contact us.  
 representative if one of these rotors is used in a previously delivered (old-type) centrifuge or if a previously delivered (old-type) rotor is used in a new centrifuge.  
 6. \*\* Both 50ml free standing culture tubes and 50ml V-bottom culture tubes can be used.

7. R9A2 rotor is an exclusive model for CR22N. It cannot be used with our former models.  
 8. When the above rotors are used with our former model, their max. speed may be restricted. For more detailed information, please contact us.  
 9. The rotor warranty period is 7 years.  
 10. Fixed angle rotors, models R10A3, R10A5, R19A and R22A are changed to be "Autoclavable" with their serial numbers on and after 2001. Their Part Nos. are revised as shown above after this revision.  
 11. Nalgene® is a registered trademark of Nalgene Nunc International Corporation.  
 12. Falcon is a registered trademark of Becton Dickinson and Company. For prevention of deformation, a cushion produced by Falcon (Falcon part No.2090) is also required.

# Made-to-Order Rotors

## Fixed Angle Rotors

**R22A2**  
22,000 rpm / 51,200 xg  
50ml x 6 tubes

**R22A**  
22,000 rpm / 54,700 xg  
7ml x 18 tubes

**R21A**  
21,000 rpm / 54,700 xg  
11ml x 16 tubes

**R20A**  
18,000 rpm / 33,200 xg  
16ml x 32 tubes  
(Sales discontinued)

**R19A**  
19,000 rpm / 40,940 xg  
80ml x 6 tubes

**R17A** Non-CE  
17,000 rpm / 27,700 xg  
50ml x 14 tubes

**R14A3**  
14,000 rpm / 29,100 xg  
100ml x 10 tubes

**R12A4**  
12,000 rpm / 23,800 xg  
2ml x 72 tubes

## Swinging Bucket Rotors

**R15S3**  
15,000 rpm / 28,700 xg  
11ml x 4 tubes

**R10S**  
10,000 rpm / 16,470 xg  
50ml x 4 tubes

**R7S**  
7,000 rpm / 9,420 xg  
300ml x 4 tubes

**R6S**  
5,700 rpm / 5,010 xg  
96-hole microplate x 1pc/bucket

## Special Sealed-type Fixed Angle Rotors

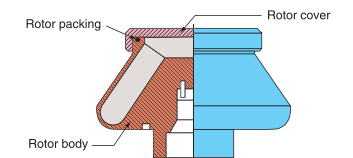
himac Special Sealed-type Rotor prevents leakage of sample, by design that rotor cover screwed into the rotor body for higher sealing ability.

**R18AY**  
18,000 rpm / 38,800 xg  
50ml x 8 tubes

**R12AY**  
12,000 rpm / 22,200 xg  
250ml x 4 tubes

**R16AY**  
16,000 rpm / 32,300 xg  
80ml x 6 tubes

**R8AY**  
8,000 rpm / 12,000 xg  
500ml x 6 tubes



## Horizontal Rotor

**R10H**  
10,000 rpm / 13,000 xg  
96-hole microplate x 4pcs

## Soil Dehydration Rotor

**R11D2**  
11,000 rpm / 15,800 xg

## Continuous Flow Rotors

**R18C**  
18,000 rpm / 34,960 xg  
1,000ml (500ml\*\*)

**R13C**  
13,000 rpm / 21,260 xg  
2,200ml (1,600ml\*\*)

**R10C** Non-CE  
10,000 rpm / 14,590 xg  
3,200ml (2,300ml\*\*)

## Continuous flow rotors: R18C, R13C and R10C

**Continuous flow rotors**  
The sample is introduced into the rotor through the inlet pipe. The supernatant liquid after separation is taken up by the impeller (like a vane wheel of a centrifugal pump) and discharged from the rotor.

**Batch rotors**  
Batch rotors centrifugally separate samples introduced directly into the rotor. There is no need to establish balance. Four blades protect the sample from disturbance.

Note: If a continuous flow rotor is used in centrifuges compatible with conventional type equipment, please contact us.

| Type                                   | Model  | Part No.                                     | Maximum speed (rpm) | Maximum RCF (xg)   | Weight (kg)     | For tubes                              |                             | Standard accessories               |
|--|--|--|---------------------|--------------------|-----------------|--|-----------------------------|------------------------------------|
|  |  |  | CR22N               |                    |                 | Nominal capacity(ml) x number of tubes | Tube dimensions (dia. X mm) | Tube/bottle                        |
| Fixed angle rotors                     | R22A   | 914299D1                                     | 22,000 (21,000)     | 54,700 (49,800)    | 7.0             | 7 x 18                                 | 16 x 60                     | 7PA tube x 18                      |
|  | R22A2  | 914300D0                                     | 22,000              | 51,200             | 5.4             | 50 x 6                                 | 29 x 103                    | 50PA tube x 6                      |
|  | R21A   | 914301D0                                     | 21,000 (20,000)     | 43,600 (48,300)    | 8.5             | 11 x 16                                | 16 x 82                     | 11PA tube x 16                     |
|  | R20A (sales discontinued)                    | 914302D0                                     | 18,000 (17,000)     | 33,200 (37,510)    | 10.0            | 16 x 32                                | 18 x 99                     | 16PP tube x 40                     |
|  | R19A   | 914303D1                                     | 19,000 (18,000)     | 40,940 (40,900)    | 10.4            | 80 x 6                                 | 38 x 104                    | 80PA bottle x 6                    |
|  | R17A   | Non-CE 914305D0                              | 17,000 (16,000)     | 27,700 (32,600)    | 11.0            | 50 x 14                                | 29 x 103                    | 50PA tube x 14                     |
|  | R14A3  | 914322D0                                     | 14,000              | 29,100             | 12.9            | 100 x 10                               | 38 x 104                    | 80PA bottle x 10                   |
|  | R12A4  | 914327D0                                     | 12,000              | 23,800             | 7.7             | 2 x 72                                 | 11 x 41                     | Eppendorf® tube (marketed product) |
| Swinging bucket rotors                 | R15S3  | 914339D0                                     | 15,000              | 28,700             | 5.8             | 11 x 4                                 | 16 x 82                     | 11PA tube x 4                      |
|  | R10S   | 914312D0                                     | 10,000              | 16,470             | 6.0             | 50 x 4                                 | 29 x 103                    | 50PA tube x 4                      |
|  | R7S  | 914313D0                                     | 7,000               | 9,420              | 9.0             | 300 x 4                                | 62 x 137                    | 300PA bottle x 4                   |
|  | R6S  | 914334D0                                     | 5,700               | 5,010              | 10.7            | Microplate x 2 pcs                     | W128 x D86 x H10-55         | 96-hole microplate                 |
|  | 2 x 48S adapter                              | S408787A                                     | 5,700               | 5,010              | -               | 2 x 96                                 | 11 x 41                     | Microtube                          |
|  | 0.2 x 96MP adapter                           | S408786A                                     | 5,700               | 5,010              | -               | -                                      | -                           | 96-hole microplate for PCR         |
| Special sealed-type fixed angle rotors | R18AY  | 914328D0                                     | 18,000              | 38,800             | 6.9             | 50 x 8                                 | 29 x 103                    | 50PA bottle x 8                    |
|  | R16AY  | 914329D0                                     | 16,000              | 32,300             | 8.7             | 80 x 6                                 | 38 x 104                    | 80PA bottle x 6                    |
|  | R12AY  | 914330D0                                     | 12,000              | 22,200             | 14.3            | 250 x 4                                | 62 x 124                    | 250PP bottle x 4                   |
|  | R8AY   | 914331D0                                     | 8,000               | 12,000             | 24.1            | 500 x 6                                | 73 x 163                    | 500PA bottle x 6                   |
| Horizontal rotor                       | R10H   | 914348D0                                     | 10,000              | 13,000             | 10.6            | Microplate x 4 pcs                     | W128 x D86 x H15-45         | 96-hole microplate                 |
| Soil dehydration rotor                 | R11D2  | 914353D0                                     | 11,000              | 15,800 (PF2.6-4.2) | 12.0            | 100 x 4                                | 50 x 51                     | Dehydration tool x 4               |
| Continuous flow rotors                 | R18C*  | Non-CE 91431900                              | 18,000              | 34,960             | 7.5             | 1,000 (500**)                          | -                           | -                                  |
|  | R18C seal unit (E) for CR22N                 | (Part No. S203036A), 18 batch unit for CR22N | (Part No. 217247A)  | -                  | -               | -                                      | -                           | -                                  |
|  | R13C*  | Non-CE 91432000                              | 13,000              | 21,260             | 9.2             | 2,200 (1,600**)                        | -                           | -                                  |
|  | R13C seal unit (E) for CR22N                 | (Part No. S203037A), 13 batch unit for CR22N | (Part No. 217248A)  | -                  | -               | -                                      | -                           | -                                  |
| R10C*                                  | Non-CE 91432100                              | 10,000                                       | 14,590              | 11.8               | 3,200 (2,300**) | -                                      | -                           |                                    |
| R10C seal unit (E) for CR22N           | (Part No. S203038A), 10 batch unit for CR22N | (Part No. 217250A)                           | -                   | -                  | -               | -                                      | -                           |                                    |

Notes: 1.   Indicates tubes available on the market. Purchase directly from your local supplier.  
 2.\* Collector units for rotors, R18C, R13C and R10C cannot be used on CR22N and CR-Gill series.  
 \*\* : Maximum pellet capacity (ml).  
 3. Values in parentheses in the maximum speed and maximum RCF columns are those at which the rotor temperature can be cooled at 4°C. At the maximum speed, the rotor temperature can be cooled below 15°C (when room temperature is 25°C).  
 4. Automatic identification type rotors can be used with previously delivered centrifuges (CR-Gill or earlier series). Depending on the centrifuge unit, however, there may be cases in which a ROM exchange or upgrade (for a nominal fee) is required.  
 5. It is possible to use rotors you currently own in CR22N by inputting the rotor data. With regard to any rotor within the warranty period, upgrades to the automatic identification type (for a nominal fee) will be accepted. (R12A2, R15S, R15S2, R6S, R20V, R11D, R18C, R13C and R10C rotors cannot be remodeled.)  
 6. For information on product compatibility, please contact us if one of these rotors is used in a previously delivered (old-type) centrifuge or if a previously delivered (old-type) rotor is used in a new centrifuge.  
 7. When the above rotors are used with our former model, their max. speed may be restricted. For more detailed information, please contact us.  
 8. Non-CE rotors cannot be used with CR22N (CE model), due to higher kinetic energy and rotor ID identification. Therefore Non-CE rotors are not sold in EU countries.  
 9. The rotor warranty period is 7 years.  
 10. Fixed angle rotors, models R10A3, R10A5, R19A and R22A are changed to be "Autoclavable" with their serial numbers on and after 2001. Their Part Nos. are revised as shown above after this revision.  
 11. Eppendorf® is a registered trademark of Eppendorf AG.