himac

General Catalogue of
Centrifuges for Production

⚠ **CAUTION:**
For safety and proper use of your machine, carefully read and follow 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 condition.
- Due to safety reason, 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 us.

Large-scale Continuous Flow Ultracentrifuge

himac **CC40NX** SERIES

CC40NX / CC40 / CC40SNX / CC40S

Models CC40 and CC40S : Sales discontinued.

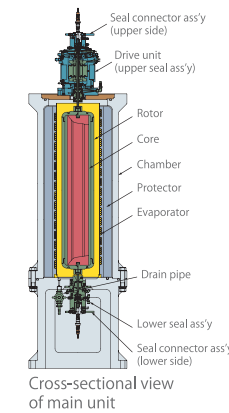The above photo shows model CC40NX with options.

Models

himac CC40NX series is designed expressly to purify large-volume samples such as viral particles or nanosized particles. Depending on the optional cores and sample feed systems selected, the CC40NX series can be used to purify the viral particles or nanosized particles by density gradient centrifugation method, and precipitate particles in large-volume samples by differential pelleting method, either in continuous flow centrifugation or in batch centrifugation.

Stainless chamber as option.

CC40NX

CC40
(Sales discontinued)

Stainless chamber as option.

CC40SNX
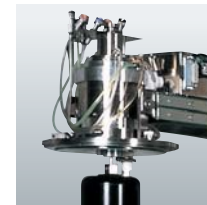
CC40S
(Sales discontinued)

Model CC40NX / CC40

This model is designed expressly to purify large-volume samples such as viral particles or nanosized particles. Its high performance is defined by the 8.0L maximum capacity with batch centrifugation and 7.7L maximum capacity with continuous flow centrifugation, speeds up to 40,000rpm and the maximum RCF of 118,000xg with Titanium alloy made core.

Seal connector ass'y (upper side)
Drive unit (upper seal ass'y)
Rotor
Core
Chamber
Protector
Evaporator
Drain pipe
Lower seal ass'y
Seal connector ass'y (lower side)

Cross-sectional view of main unit

Model CC40SNX / CC40S

With approximately one-half the capacity of the CC40NX / CC40, the CC40SNX / CC40S is ideal for research, development, pilot production and small-volume production of pharmaceuticals and nanosized materials. This model has a maximum rotor capacity of 1.6L, max. speed of 40,000rpm and maximum RCF of 118,000xg with Titanium alloy made core.

Seal connector ass'y (upper side)
Drive unit (upper seal ass'y)
Rotor
Core
Chamber
Protector
Evaporator
Lower seal ass'y
Drain pipe
Seal connector ass'y (lower side)
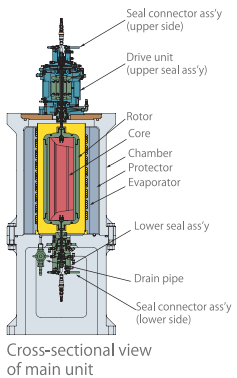
Cross-sectional view of main unit

The highly reliable drive system

A drive system of the CC40NX series is himac original and the latest high-frequency induction motor. We have experience over 30 years to use the high-frequency induction motor for the drive system of the large-scale continuous flow ultracentrifuge since our first generation model was launched into the market. This drive system does not require an extra space for separated utilities, such as an air turbine compressor and chiller which are widely used in conventional type of the one in the market.

Designed with safety in mind
CC40NX series comply with international standards and/or requirements, such as EN60204-1, EN12100, EN61000-6-4, EN61000-6-2.
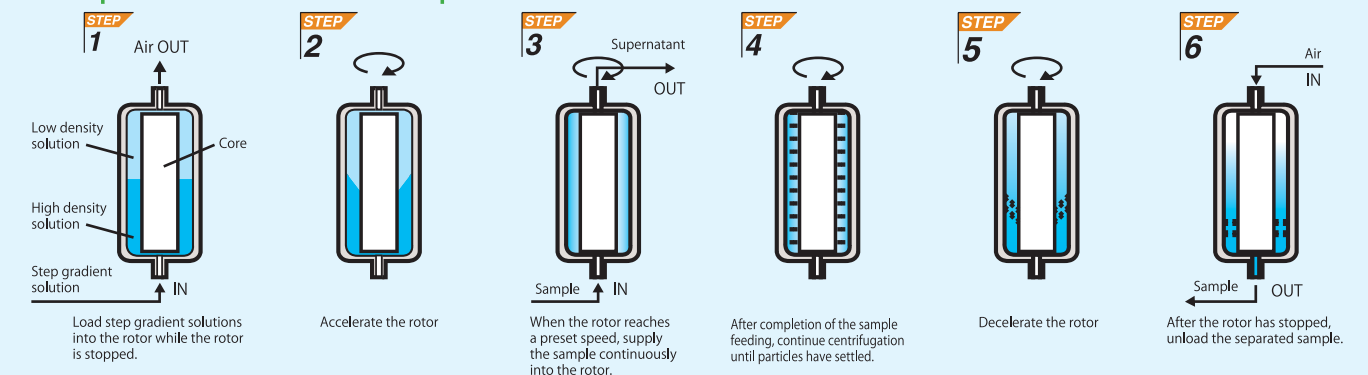Of course, CC40NX series carry CE mark with them.

Stable high speed and high centrifugation force
Our reliable drive system stably offers maximum speed of 40,000rpm and maximum RCF of up to 118,000xg to support a wide variety of separation and density gradient centrifugation applications, even if Titanium alloy made core is used.

Sterilization-in-Place (SIP) [option]
To sterilize the rotor and the parts in contact with a sample, steam or chemical sterilization in the installed place can be practiced with Titanium alloy made core at option.

Example of Gradient Separation

STEP 1
Air OUT
Low density solution
Core
High density solution
Step gradient solution
IN
Load step gradient solutions into the rotor while the rotor is stopped.

STEP 2
Accelerate the rotor

STEP 3
Supernatant
OUT
Sample IN
When the rotor reaches a preset speed, supply the sample continuously into the rotor.

STEP 4
After completion of the sample feeding, continue centrifugation until particles have settled.

STEP 5
Decelerate the rotor

STEP 6
Air IN
Sample OUT
After the rotor has stopped, unload the separated sample.

Control Panel

Touch-sensitive LCD panel [CC40NX / CC40SNX]

himac CC 40NX

Windows® based PC controller offers simplified operation to users with touch-sensitive LCD panel. Our intelligible screen design with GUI (graphic user interface) and high contrast against back screen enables users to identify operating status at a glance and operate the system easily. Of course, the control software supports U.S. FDA 21 CFR Part 11 so that operating data is handled with high security and prevented from corruption or falsification. In addition, operating log data can be output in CSV format via USP port for your data management and analysis by commercially available data base or spreadsheet software. Ethernet communication is also available at option.

* Screen design is subject to change due to upgrade of software without advanced notice.
** Windows® is registered trademark of Microsoft Corporation in the United States and other countries.
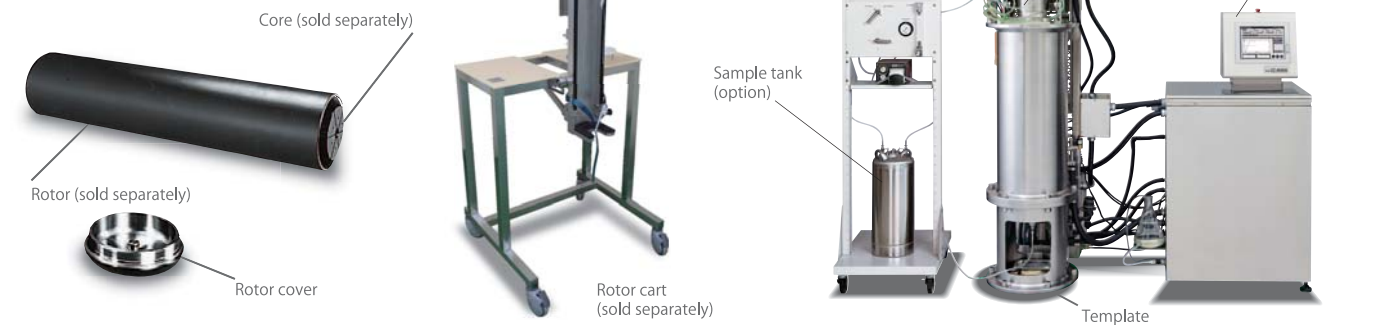Screen images simulated

Conventional Control Panel [CC40 / CC40S]
Sales discontinued

If you are looking for a cost-effective model, the conventional control panel model equipped with LED display and keypad operation is available. The conventional control panel also offers simplified operation to the users. The operation data, such as speed , time, temperature etc., can be output to an optional chart recorder which supports U.S. FDA 21 CFR Part 11 and construct the data logging system comprehensively.

Comparison between CC40NX / CC40SNX and CC40 / CC40S

Models CC40 and CC40S : Sales discontinued

	CC40NX / CC40SNX	CC40 / CC40S
Display and control panel	Color touch-sensitive LCD panel with graphic indication	7 segment LED and keypad
Zonal operation	Yes	Yes
Memory function	9 programmed operations 2-step-mode operation is available.	9 programmed operations 2-step-mode operation is available.
Administration Function	Yes 1. CC Manager * Real-time operation log recording (supporting to U.S. FDA 21 CFR Part 11) 2. Life-time management of consumable parts * Elapsed time and replacement time of the parts are managed and indicated on the display. 3. Speaker sounds are selectable. 4. A dispaly language is selectable. (English, French, Germany or Japanese)	Not available (an optional chart recorder is available.)
USB port	Yes	Not available
SIP Mode †	Yes	Option
Data communication	Ethernet (LAN)	Option (analogue signal)

† Steam generator, steam regulator and/or other utilities for SIP are not included and should be prepared separately.

Configuration

* Control unit (controller, refrigeration unit and vacuum pump etc. are integrated.)
* Main unit (vacuum chamber, motor and lift are included.)
* Rotor cart for installing and replacing the rotor (sold separately)
* Template to anchor the main unit (sold separately)
* Rotor and core (sold separately)
* Sample feed system (option)
* Sample Tank (option)
* Maintenance tool kit (sold separately)

Sample feed system (option)
Main unit
Control unit
Core (sold separately)
Sample tank (option)
Rotor (sold separately)
Rotor cover
Rotor cart (sold separately)
Template

The above photo shows model CC40NX with options.

Various Options

The CC40NX series have many options to offer maximum flexibility to conform to the customer's requirement. These are examples of options available for CC40NX series. Please contact our sales representatives for more details.

Mechanical options
Stainless steel chamber, Remote Operation, Vacuum Filter etc.

After-Installation options
Documentation Support, IQ/OQ Validation, Service Support, Application Support, Periodical Maintenance and GMP Inspection etc.

Specifications

Models CC40 and CC40S : Sales discontinued

Model	CC40NX	CC40SNX	CC40	CC40S
Max. Speed	40,000 rpm			
Max. RCF	118,000 xg (with C40CT series rotor)			
Speed control accuracy	+/- 100 rpm			
Temp. control accuracy	+/- 2 °C			
Speed setting range	from 1,000 to 40,000 rpm			
Temp. setting range	from 0 to 40 °C			
Timer setting rage	from 1 min. to 99 hours 59 min. (with HOLD function)			
Vacuum system	Oil rotary vacuum pump			
Drive system	Induction motor (direct drive)			
Control system	Microcomputer control			
Display / control panel	Color touch-sensitive LCD panel		7 segment LED and keypad controller	
Dimension : (W) x (D) x (H)	1,750 x 1,150 x 2,950 mm Height to top of the controller: 1,400 mm	1,750 x 1,150 x 2,160 mm Height to top of the controller: 1,400 mm	1,750 x 1,150 x 2,950 mm Height to top of the controller: 1,270 mm	1,750 x 1,150 x 2,160 mm Height to top of the controller: 1,270 mm
Weight	900 kg	770 kg	880 kg	750 kg
Power requirements	AC 200, 208, 220, 230, 240 V +/- 10%, Single phase, 30A, 50/60Hz			

Wide Selection of Rotors and Cores

Rotors

Two types of rotors are available for each CC40NX/CC40 and CC40SNX/CC40S. One is a regular flow type and the other is a high flow type. Both types of rotors are made of titanium alloy for strong corrosion resistance and high heat resistance.

Titanium alloy made cores

There are several types of cores available for method of centrifugation or target volume. The titanium alloy shows high heat resistance and is suitable for SIP (Steam In Place) option. Patent approved himac original super light titanium cores*1 are similar to or lighter than Noryl™ Resin made core in the same size. This light weight of core realized the highest RCF 118,000xg at 40,000rpm versus other similar cores available in the market; also it makes its operation easy.

*1 Available in core (D), core(H), core (A) and core(AH).

For details about type of rotors and cores, please refer to the specification chart.

Noryl™ Resin made cores

Noryl™ Resin is a superior material in terms of strength and chemical resistance. It shows satisfactory characteristics in saline solution in the range of pH4 to pH10. However, it can be damaged by hydrocarbon fluids and cannot be used in their presence. In addition, unique himac original scale-up cores are available, if you begin process development with small volume and move to the manufacturing scale later with CC40SNX/CC40S.

O-ring

O-rings contacting to the sample solution are made of material complied with USP Class IV. This material is selected for its high safety with regard to pharmaceutical supply products and so on.

Specification of Rotor and Core : CC40NX/CC40

Rotor model	C40CT4 *1		C40CT3				
Type of core	Core (H) (high-flow type)	Ti Core (H) (high-flow type)	Core (D)	Ti Core (D)	Core (E) *2	Core (F)	Core (G)
External appearance of cores	*3			*4		with preclarifier core	
Max. speed (rpm)	40,000				36,000	40,000	
Max. revolving radius : Rmax (mm)	66						
Max. RCF (xg)	118,000				96,000	118,000	
Rotor weight (kg)	31						
Rotor material	Titanium alloy						
Radius of center body : Rmin (mm)	54.5				21.0	54.5	26.6
RCF (xg) at Rmin	97,500				30,400	97,500	47,600
Core length (cm)	761						
Core material	Noryl™ Resin	Titanium alloy	Noryl™ Resin	Titanium alloy	Noryl™ Resin		
Capacity (L)	3.2				8.0	3.2 (preclarifier: 0.3)	7.7
O-ring material	FKM (Fluorine-contained rubber) *5						
Applications	Density gradient centrifugation of virus, liposome and other nanosized particles etc. (for high viscous sample)		Density gradient centrifugation of virus, liposome and other nanosized particles etc.		Batch centrifugation of HBsAg or nanosized particles etc.	Density gradient centrifugation of virus, liposome etc. The preclarifier core permits separation of cells and aggregation substance.	Rough separation of large-volume samples for pelleting.

Rmax Rmin

Core

Rotor

Cover

※ The C40CT4 / C40CT3 rotors do not include a core.

Note : *1 The C40CT4 rotor assembly, using Core(H) or Ti Core(H), is designed to reduce a pressure in sample feed line at continuous centrifugation by about 30% lower than the one with the C40CT3 rotor assembly using Core(D) or Ti Core(D). It is suitable for purification of large-volume or viscous samples.
*2 The Core(E) is for batch centrifugation, and not for continuous flow centrifugation.

*3. The shape and size are the same as Core(H).
*4. The shape and size are the same as Core(D).
*5. FKM complied with USP Class IV.
For details about himac scale-up cores, please contact us.

Specification of Rotor and Core : CC40SNX/CC40S

Rotor model	C40CTS4 *6		C40CTS3		
Type of core	Core (AH) (High-flow type)	Ti Core (AH) (High-flow type)	Core (A)	Ti Core (A)	Core (B)
External appearance of cores					with preclarifier core
Max. speed (rpm)	40,000				
Max. revolving radius : Rmax (mm)	66				
Max. RCF (xg)	118,000				
Rotor weight (kg)	15				
Rotor material	Titanium alloy				
Radius of center body : Rmin (mm)	54.5				
RCF (xg) at Rmin	97,500				
Core length (cm)	382				
Core material	Noryl™ Resin	Titanium alloy	Noryl™ Resin	Titanium alloy	Noryl™ Resin
Capacity (L)	1.6				1.6 (preclarifier: 0.15)
O-ring material	FKM (Fluorine-contained rubber) *7				
Applications	Density gradient centrifugation of virus, liposome and other nanosized particles etc. (for high viscous sample)		Density gradient centrifugation of virus, liposome and other nanosized particles etc.		Density gradient centrifugation of virus, liposome etc. The preclarifier core permits separation of cells and aggregation substance.

Rmax Rmin

Core

Rotor

Cover

※ The C40CTS4 / C40CTS3 rotors do not include a core.

Note : *6 The C40CTS4 rotor assembly, using Core(AH) or Ti Core(AH), is designed to reduce a pressure in sample feed line at continuous centrifugation by about 30% lower than the one with the C40CTS3 rotor assembly using Core(A) or Ti Core(A). It is suitable for purification of large-volume or viscous samples.
*7 FKM complied with USP Class IV.

For details about himac scale-up cores, please contact us.

* Noryl is a trademark of SABIC Global Technologies B.V..

More centrifuges

Ultracentrifuge model CP-NX series

◇ Easy operation with color touch-sensitive LCD

◇ Low table height for easy loading / unloading the rotor

◇ Automatic rotor life management system

Model	CP100NX
Max. Speed	100,000rpm
Max. RCF	803,000xg
Temp. Setting Range	0 to 40°C
Max. Nominal Capacity	230ml x 6
Weight	390kg
Dimensions (W x D x H)	790 x 690 x 880 mm

LED Indicator
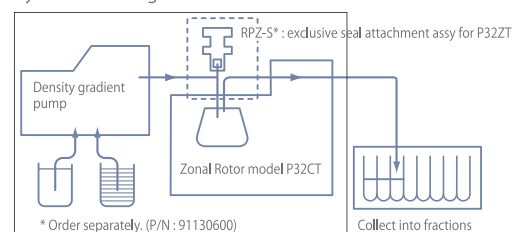**– Operating status is at a glance!**

LED Indicator of 47cm length is mounted in a front of the table.
The LED indicator shows the operating status by different colors, luminous patterns and levels of brightness. You can customize the color, luminous patterns and brightness of the LED Indicator for each status.
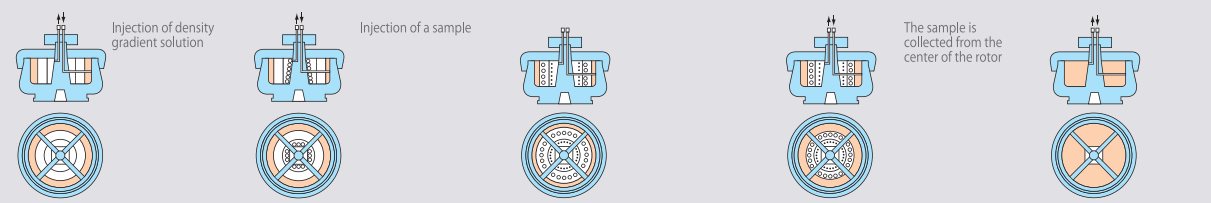
Zonal rotor model model P32ZT (batch centrifugation)

Model	P32ZT
Max. Speed	32,000rpm
Max. RCF	102,000xg
Nominal capacity	1,690ml
K-factor	363
Part No.	9123160M

System flow diagram

RPZ-S* : exclusive seal attachment assy for P32ZT

Density gradient pump

Zonal Rotor model P32CT

Collect into fractions

* Order separately. (P/N : 91130600)

Separation Procedures

Injection of density gradient solution

Injection of a sample

The sample is collected from the center of the rotor

Density gradient solution is injected from outside of the rotor with rotating the rotor at low speed, such as 3,000rpm by a density gradient pump to form linear (or step-wise) density gradient solution in the rotor.

The sample is injected from the center of the rotor with rotating at low speed.

Rotating speed is accelerated to the preset speed to perform the centrifugation for the preset time.
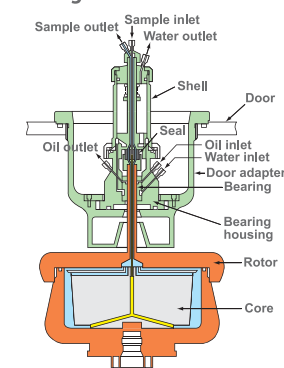
The sample is collected from the center by injecting the highest density solution from the outside of the rotor with rotating at low speed.
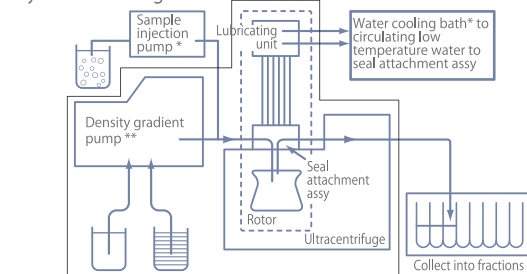
Continuous flow rotor model P32CT

Model	P32CT
Max. Speed	32,000rpm
Max. RCF	102,000xg
Nominal capacity	430ml
K-factor	42
Part No.	9122660M*1

Configuration of P32CT *1

Sample outlet
Sample inlet
Water outlet
Shell
Door
Seal
Oil inlet
Oil outlet
Water inlet
Door adapter
Bearing
Bearing housing
Rotor
Core

System flow diagram

Sample injection pump *
Lubricating unit
Water cooling bath* to circulating low temperature water to seal attachment assy
Density gradient pump **
Seal attachment assy
Rotor
Ultracentrifuge
Collect into fractions

* Required to use P32CT. Please purchase the pump and the water cooling bath separately from your local supplier before installation of P32CT. Please contact us for their detailed required specification.

** Required to use P32CT for density gradient centrifugation.

Components within dotted lines are included in the standard accessory of P32CT and optional accesorry assy (sold separately).

*1 : To use P32CT with CP-NX or other former models, optional accessory assy is mandatory required (sold separately).
Part number of the optional accessory assy for CP-NX series is S205643A and part number of the optional accessory assy for CP-WX and CP-MX series is S205643C.

High-speed refrigerated centrifuge and large-capacity rotors

High-speed Refrigerated Centrifuge model CR22N

◇ Compact Body, Larger Capacity

◇ Easy operation with color touch-sensitive LCD
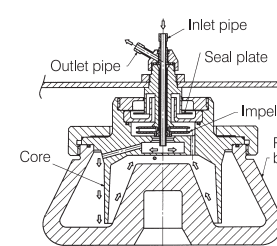
◇ All standard rotors maintained at 4°C

Model	CR22N
Max. Speed	22,000rpm
Max. RCF	55,200xg
Temp. Setting Range	-20 to 40°C
Max. Nominal Capacity	1,500ml x 4
Weight	260kg
Dimensions (W x D x H)	700 x 760 x 915 mm

Self-Locking Rotor System

himac original "self-locking rotor system" is 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 pushing the button to lock or unlock the rotor like other models available in the markets.

Continuous flow rotor model R18C/R13C/R10C

Inlet pipe
Seal plate
Outlet pipe
Impeller
Core
Rotor body

Cross section of a continuous flow rotor

This continuous flow rotor series is designed to separate for micron-size particles, such as bacteria, yeast, metal choroid and adhesive compound.
The sample is introduced into the rotor through the inlet pipe. The supernatant liquid after the separation is taken up by the impeller (like a vane wheel of a centrifugal pump) and discharged from the rotor.

Non-CE To use R18C/R13C/R10C, the CR22N should be "Non-CE" model.

Model	R18C	R13C	R10C
Max. Speed	18,000rpm	13,000rpm	10,000rpm
Max. RCF	34,960xg	21,260xg	14,590xg
Nominal capacity	1,000ml	2,200ml	3,200ml
Max. pellet capacity	500ml	1,600ml	2,300ml
Part No.	91431900	91432000	91432100
P/N of seal unit (E)*1	S203036A	S203037A	S203038A

*1 : To use R18C/R13C/R10C, seal unit (E) is mandatory required (sold separately)

High-capacity light weight rotor

R9A2 : 6L capacity rotor

Auto clave

Unique 1.5L triangular bottle !

The 1500PP bottle (WM) is a unique triangular shape bottle and its actual capacity is 1,500ml.
The bottle has a wide-mouth design, so it is easy to collect separated sample (pellet) and clean the bottle.

Model	R9A2
Max. Speed	8,500rpm
Max. RCF	15,100xg
Nominal capacity	1,500ml x 4
Part No.	914374D0

R9A : 4L capacity rotor

Auto clave
Bio safety

Wide mouth bottle for 1000ml*

1000PC bottle (WM) + 1000PP cap (WM)
1000PA bottle (WM) + 1000PP cap (WM)

The wide mouth bottle has a wider opening mouth comparing to the conventional type and it is easy to collect separated sample (pellet) and clean the bottle. The exclusive cap is designed for easy loading/unloading the bottle into/from the rotor. Depending on the chemical character of the sample, the bottle's material can be selected from PC or PA.

* Nominal capacity

Model	R9A
Max. Speed	9,000rpm
Max. RCF	15,300xg
Nominal capacity	1,000ml x 4
Part No.	914364D0

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

Bio safety — Biosafety of the rotor marked with this icon was certificated by an independent and a third party facility (Public Health England, Porton Down, UK). However, seal performance may be affected by improper operation and maintenance, such as deterioration of an o-ring.

High-capacity centrifuge and high capacity rotors

High-capacity centrifuge model CR7N

◇ Standard model in high-capacity centrifuges

◇ Easy operation with color touch-sensitive LCD

◇ Automatic standby function for saving standby electricity consumption

PILOT Lamp - Optional LED Indicator

Optional pilot lump shows an operating status of the CR7N. High brightness LED lights offer higher visibility, an operating status of the CR7N is easily recognized by the operator at away from the centrifuge. It is useful for a production site. The pilot lamp lights in red, green and blue color and indicate each operating status by colors and luminous patterns.

Model	CR7N
Max. Speed	7,000rpm
Max. RCF	11,100xg
Temp. Setting Range	-20 to 40°C
Max. Nominal Capacity	1,000ml x 6
Weight	320kg
Dimensions (W x D x H)	730 x 845 x 928 mm

High-capacity light weight Fixed Angle Rotor model R7A (1000ml* x 6)

Each tube holder of the R7A rotor has exclusive cap to enclose the leaked sample in a holder even though a bottle is damaged accidentally during a centrifugation.
You can fill your desired volume of the sample in bottles and centrifuge the rotor at Max. speed. (Sample volume in bottles at symmetrical position should be balanced before the centrifugation.)
The rotor is suitable for harvest bacterial cells from culture fluid, large-volume separation of organelle and so on.

Model	R7A
Max. Speed	7,000rpm
Max. RCF	11,100xg
Nominal capacity	1,000ml x 6
Part No.	914367D0

High-capacity Swinging Bucket Rotor model R5S2 (1000ml* x 6)

You can centrifuge 6 bottles of 1000ml bottle at a time.
Swing bucket rotors show better separation result than a fixed angle rotor at the same RCF, so it is suitable for harvest bacterial cells from culture fluid, large-volume separation of organelle, rough-clarification in vaccine manufacturing etc.
Any volume in a bottle is available for a centrifugation as long as the sample volume in bottles at symmetrical position is well balanced before the centrifugation.

Model	R5S2
Max. Speed	4,200rpm
Max. RCF	5,150xg
Nominal capacity	1,000ml x 6
Part No.	91431610*

* Bucket sold separately
  (1000AL bucket (B) (6pcs/set) : P/N S302160A)

Wide mouth bottle for 1000ml*

1000PC bottle (WM) + 1000PP cap (WM)

1000PA bottle (WM) + 1000PP cap (WM)

The wide mouth bottle has a wider opening mouth comparing to the conventional type and it is easy to collect separated sample (pellet) and clean the bottle. The exclusive cap is designed for easy loading/unloading the bottle into/from the rotor. Depending on the chemical character of the sample, the bottle's material can be selected from PC or PA.

* Nominal capacity (Actual capacity is 900mL)

Useful features of centrifuges for production usage
(Available in CP-NX series, CR22N and CR7N)

Intelligible screen design

RUN screen	MENU screen	CUSTOMS screen	ADMIN screen

The above photos are sample screen images of CP-NX series. Screen designs of other models are different from the above design.

Administration functions

Run History

Operation log is automatically recorded to the system. Recorded history can be output in CSV format through USB port.

Model	No. of record
CP-NX series	5,120 runs
CR22N	100 runs
CR7N	100 runs

User Management

Operators can be registered to the system with 2 or 3 levels access level.

Access Level	CP-NX	CR22N	CR7N
User	○	○	○
Supervisor	○	×	○
Administrator	○	○	○
No. of Registered User	50	40	50

User Lockout

Operation functions can be limited by the access level of each operator. Password should be entered to log-in the system.

Economy Mode
(Auto standby function)
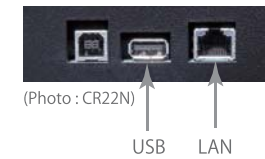
Reducing standby electricity consumption for energy saving.

Note : Design of icons may be different among the models, CP-NX, CR22N and CR7N.

Data Communication and Log Management Software

USB Port   Run history recorded in a centrifuge can be output in CSV format through the USB port.

LAN Port   The centrifuge can be linked to your PC though Ethernet or Internet via LAN port. Optional software "himac LogManager Ver. 4.1 for Windows® - network edition" is available to manage the real-time log data.

(Photo : CR22N)

USB   LAN

	USB Port	LAN Port
CP-NX series	○	○
CR22N	○	option
CR7N	option	option

himac LogManager Ver. 4.1 for Windows®
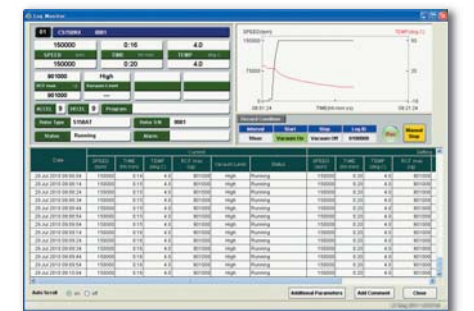**(network edition) – optional log management software**

himac LogManager ver. 4.1 for Windows® (network edition) is a useful convenient software to manage real-time operating log of himac CP-NX series, CP-WX series, CS150NX, CS150FNX, CR22N and CR7N. Maximum 16 units of the above-mentioned centrifuges can be registered to the software and monitored by the software at the same time. The software is installed into the PC and data communication between the centrifuges and the 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 himac CP-WX series, CS150NX, CS150FNX, CR22N and CR7N). It means you can manage the operation log at the different location from the installation site of the centrifuges.

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

Digital Signature
Audit Trail
Encrypted Data Files etc.

Required operating system :
Windows® 7 Professional and Windows® 8 Professional

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

The above photos are sample screen image.
Actual screen design may be different from the aboves.