

Ultracentrifuges



himac CP-WX SERIES Hitachi Ultracentrifuge
CP100WX/CP90WX/CP80WX

These general-purpose ultracentrifuges have the highest performance in their class* — 100,000 rpm (CP100WX) — making them ideal for the wide range of separation tasks used in cell biology, biochemistry and nano-material fields. For reliability and efficiency to match their speed and quiet operation, they incorporate automatic rotor-life management (RLM), a large color LCD display and positive-feedback (click-type) touch pad entry. Other standard features include RCF (x g) computation and display functions and real-time control (RTC) for direct entry of start/stop times and other parameters. A log options list permits connection with a PC (for simulations and logging of rotor and centrifuge operation histories), printer connection, user security functions and more.

*As of May 2009

Easy operation

Microcomputer control functions

The liquid crystal screen simultaneously displays set values and the actual operating conditions.

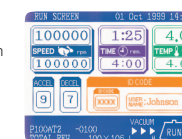
Color liquid crystal display and touch-sensitive panel

Keypad input is enhanced by gentle "click" feedback to confirm correct entry. Operation errors or faults are immediately indicated by means of an alarm display.



User name is shown on screen, linked to user ID code

The user name can be shown through ID code input. This function allows interactive verification of users.



Powerful customization functions

These functions can be selected through the interactive screen display.

- Setting of date
- Setting of time
- Identification number of the centrifuge unit
- Print-out function (optional)
- User time reservations
- User registration
- Screen contrast adjustment
- Setting of the zonal rotation speed (2,000 – 3,000 rpm)

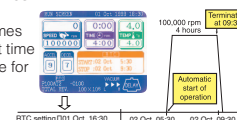
Low table height easier rotor handling

The operating height of the work top was lowered to 85 cm, making the large-sized rotors easier to load and unload.

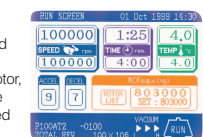


Real-time control (RTC) simplifies timer settings

Operators input desired start times directly and can input both start time and operating profile in advance for unattended operation.



Operating parameters are automatically computed and displayed, based on selected RCF
RCF max. and RCF avg. at the selected rotational speed are automatically calculated and displayed for a given rotor, reducing bothersome calculations. The rpm and operating profile are calculated simply by setting the desired RCF.



Specifications

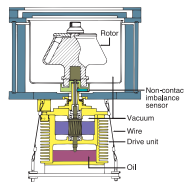
Model	CP100WX	CP90WX	CP80WX
Max. speed (rpm)	100,000	90,000	80,000
Max. RCF(xg)	803,000 (P100AT2 rotor)	700,000 (P90AT rotor)	615,000 (P80AT rotor)
Speed control accuracy (rpm)	±10 (1,000 to maximum speed)		
Set speed (rpm)	1,000 to maximum speed in increments of 100		
Displaying and setting RCF	Applicable (RCF max. or RCF average)		
ω·T run	Applicable		
Drive unit warranty	10 years		
Rotor temperature control accuracy (°C)	±0.5 (set temperature is from 0 to +40)		
Cooling method	Thermo-module cooling (CFC/HCFC/HFC-free)		
Operation panel	· Color liquid crystal display (256 color) and keyboard · Touch-sensitive panel (run screen only)		
Rotor life management	RLM rotor: automatic management, Rotor with optical adaptor: management by registration system		
Operation results management system / calculation & simulation system	Optional software (CD-ROM, OS: Windows® XP Professional / 2000 Professional) This option requires a PC and RS232C cross cable on the market.		
Vacuum system	Oil-rotary vacuum pump with moisture removal function and oil diffusion pump.		
HEPA filter	Option		
Operational noise (dB(A))	53		
Heat radiation into the room	1 kW or less		
Dimensions (mm)	790 (W) x 690 (D) x 1,000 (H), depth with safety cover: 890, height to the table: 850		
Floor area (m²)	0.81 (900 x 900 mm)		
Weight (kg)	400		
Power requirements	Single phase, 50/60 Hz, AC 200/208/220 V ±10%, 20 A max. (normally 8 A) AC 230/240 V ±10%, 16 A max. (normally 7A)		
Conformity to EMC* standards	The CP-WX series ultracentrifuges conform to the following EMC standards: EN61326, EN61000-3-2, and EN61000-3-3		

Note: *Electro-Magnetic compatibility

Advanced technology

The highest acceleration and RCF for its class 100,000 rpm, and RCF to 803,000 x g

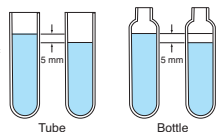
The highly efficient and compact drive unit can reach maximum acceleration of 100,000 rpm in 5 minutes. The motor spins in a vacuum, with a unique wire-suspension design **PAT.**



Drive unit warranted for 10 years

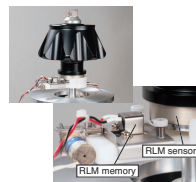
Powerful imbalance protection

Automatic balance compensation requires only that samples are visually balanced to within 5 mm. If faulty bucket installation or excessive rotor imbalance occurs, a fast-acting imbalance detector shuts down the centrifuge.



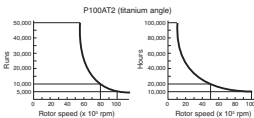
Rotor life is automatically managed **PAT.**

Operation records of each rotor are stored in the RLM (Rotor Life Management) memory and the RLM element embedded in the rotor, eliminating need for manual rotor logbook entries. (Naturally, non-RLM rotors still require manual logging.)



Rotor life is automatically extended **PAT.**

Automatic rotor life management system records rotor type, serial number, total number of runs and accumulated run time of the rotor. By precise automatic tracking of the rpm profile and operation time to the nearest 0.1 hours and 0.1 times means, the rotor life is extended as much as 10 times longer than as conventional calculation.



Safety and environmental impact reduction

0°C is maintained by electronic cooling

An electronic cooling system, based on a thermo-module maintains samples at 0°C, even at maximum acceleration (ambient temperatures to 30°C).

Energy savings

Power consumption is reduced by 10% (in-house comparison) through the use of an IGBT inverter.

Exceptionally low noise -- 53 dB or less

Based on EU requirements for mechanical and electrical safety and electromagnetic compatibility

Brake control system for reverting motor electric power to the power source side
Heating during deceleration is thus curbed.

Environment friendly product

About 80% of the centrifuge proper is composed of recyclable materials.

Options

Option	Part No.
Option 1 himac Log manager and himac ASSIST Windows® XP Professional/2000 Professional**, NT CD-ROM for PC-based logging and management of operating parameters, separation simulations, rotor data	S203638A
Option 2 Printer Kit* for printout of centrifuge operation parameters	S204364B
Option 3 User lockout Adds security functions to restrict use to authorized users	96002996

1. *Contains thermal printer (with AC adapter and paper roll included), printer cable, printer battery, base and operation manual.
2. **Operation under Windows® XP Home Edition/2000 Home Edition has not yet been confirmed. Operation is not possible under Windows® 95/98/Me.
3. Option 1 requires a PC and RS232C cross cable. Options 1 and 2 cannot be used simultaneously.

• Specifications of RS232C cable for option 1 (This cable is available on the market.)

CP 100WX/90WX/80WX 9-pin D-Sub male	9-pin D-Sub female Inch screw #4-40	RS232C cable (cross)	9-pin D-Sub female Inch screw #4-40	Windows-type PC 9-pin D-Sub male
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- Notes: 1. The above cable is applicable to most Windows-type PCs. Mac OS is not supported.
2. Recommended cable: RS232C cable
9-pin D-Sub (DB-9) female serial (RS232C) cross cable with the correct connector for the computer [usually 9-pin D-Sub (DB-9) female or 25-pin D-Sub (DB-25) female].
3. Be sure to use the cross (reverse) type RS232C cable. Note that a straight type cable cannot establish a communication between the centrifuge and the PC.
4. Note that some notebook PCs have no serial port.

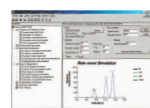
■ Option 1: himac Log manager and himac ASSIST

— himac Log manager

With this software and a PC (Windows® XP Professional/2000 Professional) connected to the centrifuge, it is possible to maintain records of centrifuge and rotor usage online. This simplifies management with multiple users by maintaining records of centrifuge use, use history by individuals, rotor use, and detailed rotor life.

• Rate zonal simulation

Example: rRNA separation based on the P40ST swing rotor; 40,000 rpm, 4", 5 to 20% sucrose density gradient, 500 min.

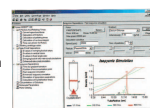


— himac ASSIST

- Calculations of K factor and pelleting time
- Calculation of the allowable rpm with high-density liquids
- Rate zonal simulation
- Isopycnic simulation
- Solvent concentration conversion
- Mutual conversion of molecular parameters
- Rotor database

• Isopycnic simulation

Example: Plasmid DNA separation with P40ST swing rotor;
CsCl $r = 1.55$ g/ml, 35,000 rpm
(Note: crystallization warning mark [s] showing that parameters are unsuitable.)

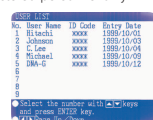


■ Option 2: Printer

After the run, connect this printer to capture a permanent record of operating parameters and rotor life. You can use this option without a connected PC for post-operation data control.

■ Option 3: User lockout

When sharing a centrifuge under joint utilization or in RI facilities, the optional lockout system limits utilization to registered personnel only.



Optional accessories: Rotors

Type	Model	Part No. (automatic)	Max. speed (rpm)	Max. RCF (x g)	Nominal capacity (ml) x number of samples	K-factor
Fixed angle	P100AT2*	9023112M	100,000	803,000	6.5 x 8	18
	P90AT*	9023052M	90,000	700,000	12 x 8	25
	P80AT*	9023092M	80,000	615,000	12 x 8	27
	P70AT*	9022622M	70,000	505,000	40 x 8	44
	P70AT2*	9022752M	70,000	452,000	12 x 12	36
	P65A*	9022312M	65,000	370,000	12 x 10	48
	P50AT2*	9022632M	50,000	303,000	40 x 12	70
	P50A3	9023140M	50,000	252,000	1.5 x 24	33
	P50AT4*	9024110M	50,000	316,000	6.5 x 44	32
	P45AT*	9022642M	45,000	235,000	94 x 6	130
P100AT2	P42AT	9022650M	42,000	223,000	0.23 x 72	12
	P32AT	9023150M	32,000	111,000	12 x 32	186
	P27A	9023120M	27,000	106,000	160 x 6	352
Neo angle	P19A	9022220M	19,000	55,100	230 x 6	754
	P90NT*	9023072M	90,000	646,000	5 x 8	10
	P65NT*	9024152M	65,000	402,000	12 x 10	23
P90NT	P65NT2*	9023102M	65,000	431,000	5 x 18	15
	P100VT*	9023062M	100,000	700,000	5 x 8	6
	P65VT2*	9023022M	65,000	416,000	5 x 16	10
Vertical	P65VT3*	9023032M	65,000	402,000	12 x 10	13
	P50VT2*	9023082M	50,000	243,000	40 x 8	36
P100VT	P65ST	9022390M	65,000	419,000	5 x 3	48
	P56ST	9022550M	56,000	409,000	4 x 6	54
	P55ST2	9022770M	55,000	366,000	5 x 6	50
Swinging bucket	P40ST	9022370M	40,000	284,000	13 x 6	139
	P28S	9022880M	28,000	141,000	40 x 6	252
	P28S	9022880M	28,000	141,000	40 x 6	252
P28S	P35ZT	9022520M	35,000	122,000	1,690 ml	303
	P35ZT	9022520M	35,000	122,000	1,690 ml	303
Zonal	P35ZT	9022520M	35,000	122,000	1,690 ml	303
Continuous flow	P32CT	9022660M	32,000	102,000	430 ml	42
	P32CT	9022660M	32,000	102,000	430 ml	42

Notes:

- Automatic life management rotors, CP- α , CP-MX and CP-WX series-compatible only (automatic RLM system).
- These rotors do not include any tubes or caps as a standard accessories. They can be purchased from the list of "Rotors and tubes catalog" (Part No. 999511).
- All the rotors above are also compatible with the CP- α , CP-MX and CP-WX, series.
- Rotors with model names that include the letter T are made of titanium alloy.
- When model names do not include the letter T, rotors are made of aluminum alloy.
- Buckets for swinging bucket rotors are made of titanium alloy.
- When using the zonal rotor P35ZT, the RPZ-S zonal rotor seal attachment ass'y., Part No. 90130600, is required (order separately). Please refer to p. 7.
- When using a seal tube, please place a separate order for STP2 tube sealer and tube rack (refer to p. 8).
- indicates a made-to-order rotor.
- Capacity in the above table shows nominal capacity of tubes. Actual capacity in actual use may be smaller than the nominal capacity depending on rotor structure, tube shape, etc.
- As for P32CT, refer to p. 8.
- The P28S rotor can also be used for 16 ml x 6 pcs., with optional 16 Ti bucket ass'y. (Part No. 347607A, order separately).

New Rotors



NEW P50A3
The P50A3 fixed angle rotor can separate samples contained in twenty-four 1.5ml microtubes at a time. It is suitable for speedy pelleting of minimal volume samples in nano-order. Fluid annulus prevents the sample leakage even if the sample overflows from a tube in the rotor during the spinning. Applicable microtube is "himac 1.5ml microtube" (S308892A, 300pcs/box) only.



NEW P32AT
The P32AT fixed angle rotor can separate samples contained in thirty-two 12ml tubes at the same RCF at a time. It is suitable for separation of many samples in nano-order at 100,000 x g or higher RCF. Fluid annulus prevents the sample leakage even if the sample overflows from a tube in the rotor during the rotor is spinning. Tube cavity angle 35° in two layers provide the same RCF to all tubes (32 tubes) for efficient pelleting.

Applications

● Rotor: P90NT (neo angle rotor)
● Tube: 5PA seal tube
● Mode: Normal mode

85,000 rpm
3 hours
Acceleration: 9
Deceleration: 7
20°C

CsCl: $\rho = 1.57 \text{ g/cm}^3$ (49.3% (W/W))
Ethidium bromide (10 mg/ml): 100 μl
10% sodium N-lauryl sarcosinate: 50 μl
Crude sample of plasmid DNA in TE buffer (pH8.0)
Total: about 5 ml

Linear DNA
Plasmid DNA
RNA

After centrifugation

● Rotor: P100AT2 (fixed angle rotor)
● Tube: 4.7PC thick-walled tube
● Mode: Normal mode

Step 1 Separation of VLDL
Layer 1 ml of 1.06M NaCl
Centrifugation
100,000 rpm
2 hours, 16°C
Acc.: 5
Dec.: 7

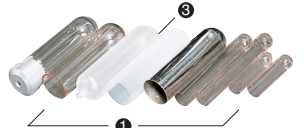
VLDL
LDL, HDL
Albumin, etc.

Step 2 Separation of LDL
Serum 2 ml
Add 1 ml of 1.063M NaCl to 2 ml of the lower layer solution of Step 1
Centrifugation
100,000 rpm
3 hours, 16°C
Acc.: 9
Dec.: 7

LDL
HDL
Albumin, etc.

Also see our homepage (<http://www.hitachi-koki.com/himac/>).

Accessories



1 Tubes Materials: PA—Polyallomer, PC—Polycarbonate, PE—Polyethylene, PET—Polyethylene-terephthalate, SS—Stainless steel
In an angle rotor, tubes must be used with caps (order separately). In a swing rotor, caps are unnecessary. Tubes should be filled to full capacity during operation, except in the case of stainless steel tubes, for which volume is arbitrary.
Thick wall tube: Wall thickness of 1 mm or more. It can be used in a capless state in both angle and swing rotors.
For swing rotor use, the liquid volume should be full.



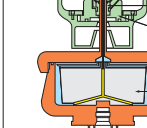
2 Bottles Materials: PA—Polyallomer, PC—Polycarbonate
Screw cap types are called bottles. Bottles with plugs and caps are high-speed bottles, while bottles with plastic caps are classified as B-type bottles, and those with metal caps, C-type bottles. If centrifugal acceleration above 100,000 x g is required, the liquid volume must be up to the shoulder, but at 100,000 x g or less, liquid volume is arbitrary.




3 Seal tubes Material: PA—Polyallomer
These are widely used in secondary biological applications (for containment purposes). They are disposable tubes which are used after their tops are sealed with the dedicated STF2 tube sealer (option).



4 Cleaning kit (Centrigent, cleaning brush x 3: Part No. S305166A) (Centrigent: Part No. S408349A)
This kit consists of a cleaning liquid for dedicated use with centrifugal rotors and tubes, as well as a cleaning brush. The cleaning liquid is a genuine product suitable for polycarbonate tubes and aluminum alloy rotors, which are sensitive to chemicals.




5 S-cap series
Improves reliability and operability of caps for open top tubes and allows 12 and 40 ml open top tubes to be driven at higher revolutions.
- There are only three parts and three steps to assembling the whole unit.
- It contains no consumable parts, such as O rings, and, aside from occasional cleaning, requires no maintenance.
- It is also designed for use with highly chemically resistant PE tubes.



S cap tool set

For 12 ml For 40 ml
Open top tube (order separately)

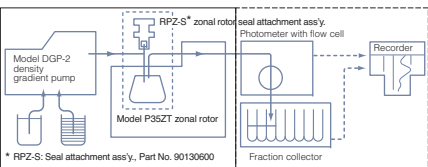
P35ZT: Zonal centrifugation system



P35ZT
Zonal rotor
Part No. 9022520M

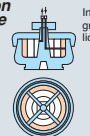
In zonal centrifugation, a density gradient is developed within the zonal rotor running at low speed. Next, the samples to be separated are loaded through the center of the zonal rotor and are separated at a preset high speed. After separation, the gradient is unloaded and collected through the center by injecting high-density fluid from the outside wall of the zonal rotor while the rotor is running. The desired fractions are moved into the fraction collector via a spectrophotometer using a flow cell which monitors and records the optical density of the fractions.

System flow diagram

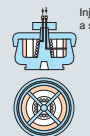


* RPZ-S: Seal attachment ass'y, Part No. 90130600

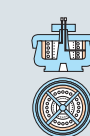
Separation procedure



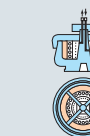
Injection of gradient liquid



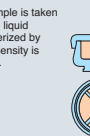
Injection of a sample



Rotor revolution is accelerated to the specified number of revolutions, and desired centrifugation is implemented.




The sample is taken out, and liquid characterized by higher density is injected.



Under the state in which the rotor is revolved at a low speed in the air, liquid characterized by higher density is injected from the exterior of the rotor, and the separated sample is taken out of the central portion of the rotor.

P32CT: Continuous flow centrifugation system



P32CT
Continuous flow rotor
Part No. 9022660M

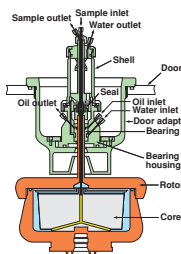
The Model P32CT Continuous Flow Rotor, designed for use with Hitachi preparative ultracentrifuges, enables you to perform highly efficient continuous flow separation and purification of large volumes under high centrifugal force.

Product made to special specification

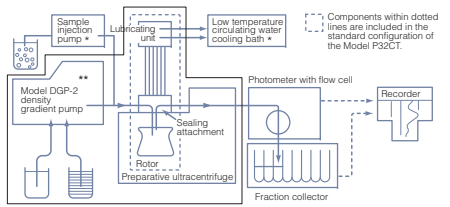
940 ML core ass'y.
Part No. 348333A

For separating samples containing much sediment or performing separation after increasing the density gradient, the 940 ML core ass'y increases the rotor capacity to 940 ml. The flow volume performance is about 35% less than that of standard cores.

Configuration of P32CT

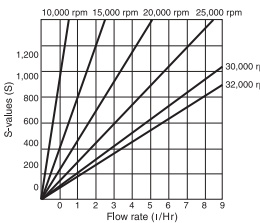


System flow diagram




*Necessary for the use of P32CT. Please make this pump and bath ready before installing a P32CT. Regarding its specifications, please consult us.
**Necessary in the case of density gradient centrifugation.

Flow rate (l/hr)




STF2*: Tube sealer



STF2*
Tube sealer
Part No. 90132400


Simple to use, this welding sealer employs a heating element to seal tubes quickly and effectively. An indicator lamp turns off once sealing is complete. (Tube rack is an optional item)



Tube rack (option)

Item	Part No.	Tube to be used
Tube rack (G2)	S201778G	1.5PA seal tube
Tube rack (G)	S201778F	2PA seal tube
Tube rack (B2)	S201778E	3.5PA seal tube
Tube rack (B3)	S201778H	4PA seal tube
Tube rack (B)	S201778A	5PA seal tube
Tube rack (B4)	S201778J	6.5PA seal tube
Tube rack (C2)	S201778L	8PA seal tube
Tube rack (C)	S201778B	12PA seal tube
Tube rack (E)	S201778C	40PA seal tube
Tube rack (F2)	S201778M	94PA seal tube
Multi rack	S201778K	2, 4, 6.5, 12, 40PA seal tubes

DGP-2*: Density gradient preparation unit




DGP-2*
Density gradient preparation unit
Part No. 90131100

This instrument can be used for preparing gradients for zonal centrifugation and unloading the gradients after fractionation. It also permits cooling the density gradient solution with ice.

Special accessory
When absorbance is measured and recorded using a spectrophotometer equipped with flow cell after zonal rotor centrifugation, accurate data cannot be obtained if there is pulsating flow. In such a case, please order a buffer tank assembly, which is a special accessory.

Item	Buffer tank ass'y.
Part No.	103592A


DGF-U*: Density gradient fractionator



DGF-U*
Density gradient fractionator
Part No. 90130701

This instrument can be used for preparing gradients and unloading them after separation. Pouring and unloading can be performed from the liquid surface. The flow rate is selectable from 0 to 5 ml/min. Density gradient solutions can be prepared simultaneously in six tubes (also, in one or three tubes).

TSU2*: Tube slicer



TSU2*
Tube slicer
Part No. 90130800

This instrument slices sample tubes and collects lipoprotein which floats on the surface after centrifugation. Motorized rotation slicing greatly simplifies operation.

Note: *As the accessories marked with an asterisk require a 100-volt power source, a step-down transformer, Part No. 337501, is required in areas where the mains voltage is not 100 V.