



UNICO-DX Centrifuge

Operation Manual



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Before operating and using the centrifuge, please carefully read this manual and carefully review safety precautions.


Safety Notice

The symbol  is the internationally recognized safety icon. Please carefully read and fully understand the following safety rules.


- Comply with the operating requirements of the manual to ensure correct and safe use of this centrifuge.
- Carefully read all safety information and safety tips.
- Safety information is marked as follows and safety sign  is combined with warnings and cautions respectively to remind users of potential danger. These combinations are defined as follows:

 **WARNING: Personal danger**
Warning notes indicate any condition or practice, which if not observed, could result in personnel injury.

 **CAUTION: Possible damage to instrument**
Caution notes indicate any condition or practice, which if not observed or remedied, could result in damage to the instrument.

 **WARNING:**

- This centrifuge is not explosion-proof. Never use explosive or flammable samples.
- Do not install the centrifuge in or near places where flammable gases are generated,
- Do not place dangerous material within 12" around the centrifuge.
- If the instrument, rotor and/or accessories that has been contaminated by solutions with toxic or pathogenic materials, clean it according to the decontamination procedure.
- Do not handle the power cord or turn on or off the power switch with wet hands to avoid electric shock.
- While the rotor is rotating, never release the lid lock by force.
- Do not repair, disassemble the centrifuge, or carry out other maintenance without proper authorization. Please contact the service center or nearest distributor if you need service.

 **CAUTION**

- This centrifuge must be located on solid and level workbench top.
- Do not put your fingers or hands under the lid when you press the door to close it.
- Do not move or relocate this centrifuge while it is running.
- If fluid spills in the rotor chamber, please promptly clean according to the decontamination procedure
- Rotor cautions:
- Always check for corrosion and damages on the rotor surface before using it. Do not use the rotor in question.
- Always balance the rotor.
- Do not overfill centrifuge tubes.
- In case of strange noises during operation, please stop it immediately and contact service center. Keep a record of the error code if displayed and inform the service personnel of the code.

1 SPECIFICATIONS

Max. rotation speed	4000rpm (500-4000rpm), step: 100rpm	
Max. relative centrifugal acceleration	2508xg, step: 100xg	
Capacity	15ml×6	
Timing	1min-99 min-HOLD (continuous operation)	
Noise	≤62dB(A)	
Drive motor	Brushless DC motor	
Safety mechanism	Door lock, over speed and status diagnosis system	
Power supply	100V-240V, 50Hz/60Hz	
Ambient conditions -place -altitude -ambient temperature -humidity -over-voltage category -contamination level	Indoor No more than 2,000 m 2°C - 40°C 80% II 2	
Protection class	I	
EMC -radiated interference -radiation immunity	EN/IEC 61326-1 Class A	FCC Class A
Dimensions (mm)	364 (L) × 440 (D) × 268 (H)	
Weight	14.5kg	
Other functions	Rotation speed/acceleration switchover, operation process display, sound reminder	

2 DECLARATION OF CONFORMITY

This centrifuge is certified to follow the safety standards listed below:

UL 61010-1:2012 R4.16

CAN/CSA-C22.2 NO.61010-1-12+GI1+GI2

IEC 61010-2-020:2016

In compliance with the following electromagnetic compatibility standards:

FCC Part 15 Subpart B: 2017 IECS-001: 2006

SUGGESTED ENVIRONMENT

Basic operational conditions

(1) Power supply: 100V-240V, 50Hz/60Hz, 3A/115VAC, 1.7A/230VAC.

(2) Ambient temperature: 2°C~40°C.

(3) Relative humidity: ≤80%.

(4) No vibration or airflow around.

(5) No airborne dust with charge, explosive and corrosive gases around.


Transport and storage conditions

(1) Storage temperature: -40°C~55°C.

(2) Relative humidity: ≤93%.

3 INSTALLATION

Users must comply with the installation instructions contained in this chapter.


 **Warning**

- Improper power supply may damage centrifuge.
- Make sure the power source conforms to the requirement before connecting.

3.1 Location

- (1) Place the centrifuge on a firm, flat and level bench top, ensure the four feet of this centrifuge stand on the table firmly. Avoid slippery surface or surface prone to vibration.
- (2) The recommended ambient temperature is $20^{\circ}\text{C}\pm 5^{\circ}\text{C}$. Avoid temperature over 30°C
- (3) Keep clear of the centrifuge at least 10cm on all sides
- (4) Keep away from heat

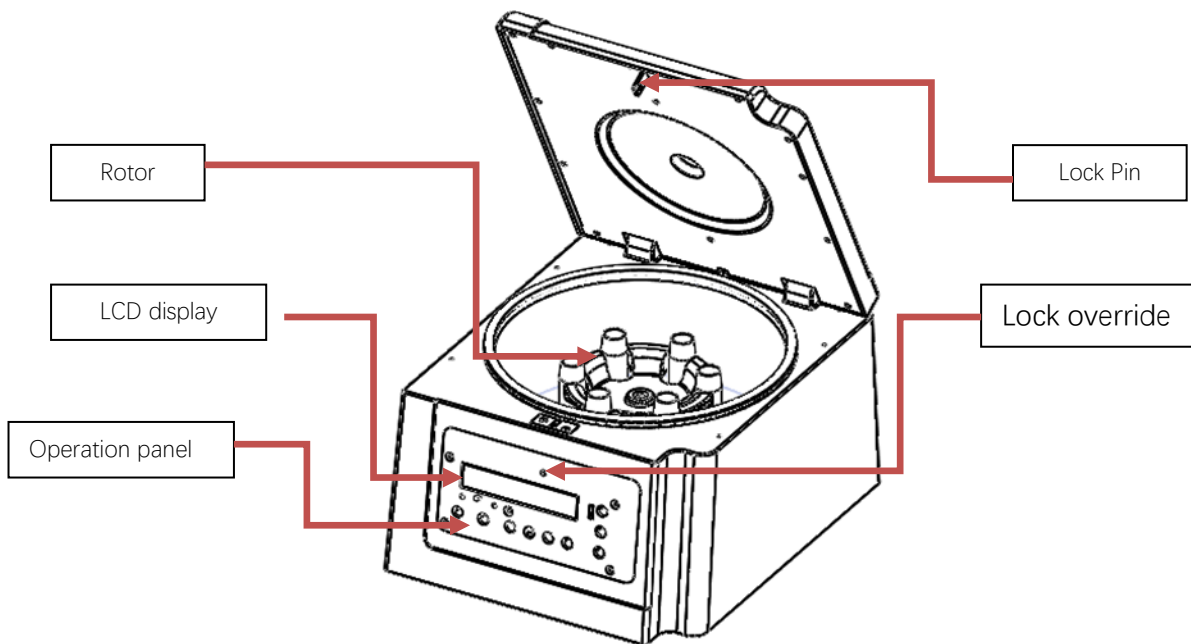
3.2 Connection of power cord and grounding

 **Warning:**

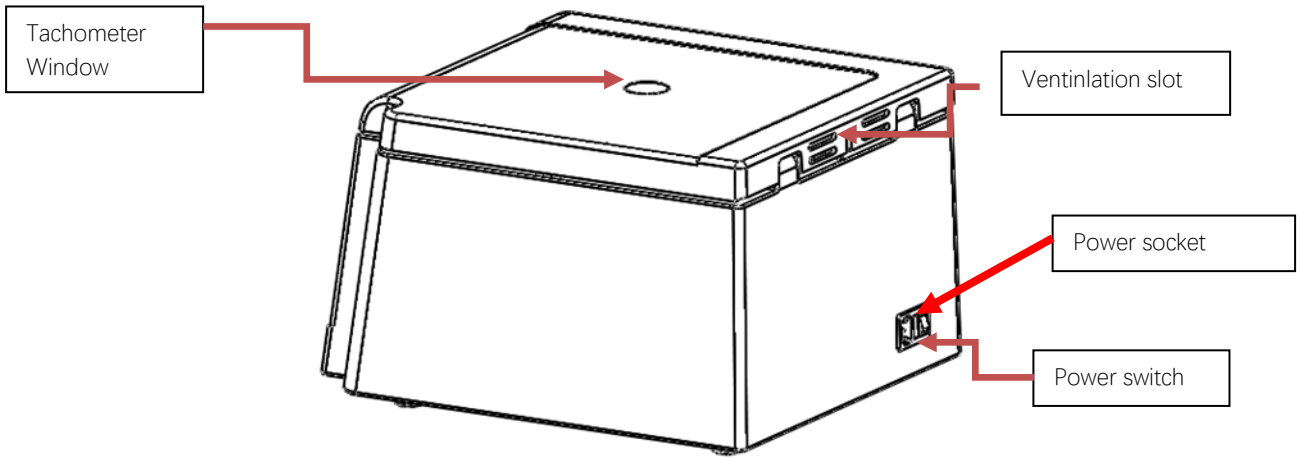
- To avoid electrical shocks, ensure your hands are dry when touching the power cord.
- This centrifuge must be properly grounded.

A power outlet rated for 10A or above, with proper ground protection and in compliance with safety requirements is essential.

4 NOMENCLATURE

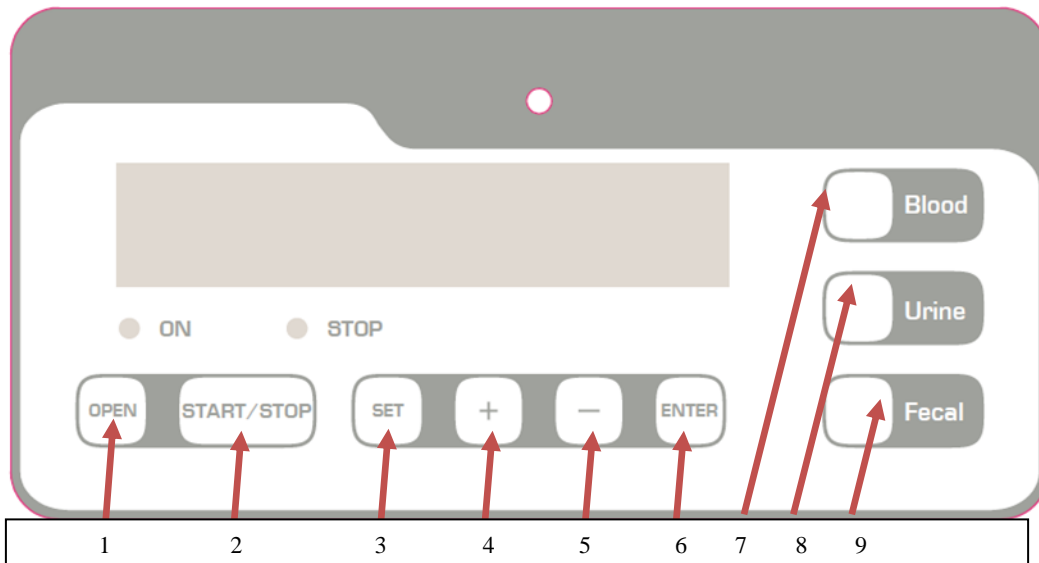


Front View



Rear view

5 OPERATION PANEL



Item	Icon	Name	Function
1		Open key	Press to open the lid. This key is locked while rotor is in motion.
2		Start/Stop key	Press to start or stop the spinning cycle
3		SET key	Press to enter spin parameters
4		Plus key	Parameter increase
5		Minus key	Parameter decrease
6		ENTER key	Confirm the parameter.
7		Blood program key	Press this key to load the parameter settings for blood separation.
8		Urine program key	Press this key to load the parameter settings for urine separation.
9		Fecal program key	Press this key to load the parameter settings for fecal separation.

Speed

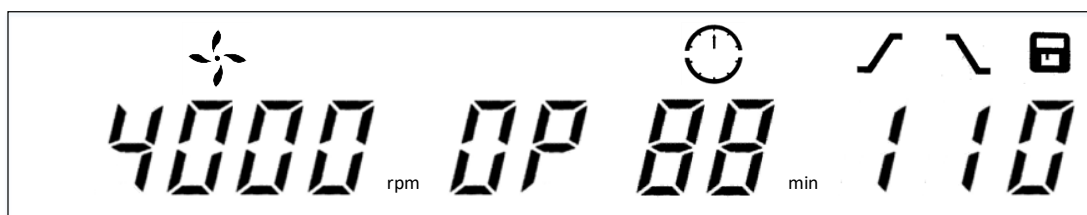
Lid lock status



Time

ACC

DEC

PROG



The LCD display above show speed set at 4,000rpm, the lid is open (OP) and time set to 88min. The acceleration is set to level 1 (slowest), the deceleration is set to level 1(slowest) and the current program is No. 0. Speed icon  will rotate when the centrifuge is running. The time icon  displays the ratio of elapsed time vs. set time.

6 ROTOR PREPARATION

6.1 Balance the rotor

- Although this centrifuge may be used with visually confirmed balance, we recommend that samples be weighed using a balance to ensure balanced centrifuge tube in order to prolong the service life of centrifuge, with the deviation of no more than $\pm 1.5g$.
- Never intentionally run the centrifuge with unbalanced rotor.

6.2 Rotor inspection

Check the rotor for corrosion or structural damage before using.



Caution

- If any corrosion or cracks is found on the rotor – replace it immediately
- Only use rotors from the manufacturer.



Caution

- Never press the unlocking button while the rotor is in motion.

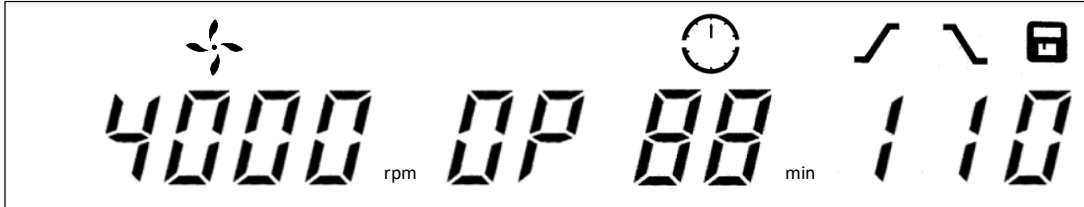
7 OPERATION

**Caution**

- While the centrifuge is in operation, do not move the centrifuge or lean against it.
- Before running the centrifuge, keep the centrifugal chamber clean and be sure to remove any foreign object from the centrifugal chamber.
- If any abnormal phenomenon such as strange noise occurs during the operation, please immediately stop the centrifuge, contact the service center, and inform them of the error code on the LCD display.

7.1 Normal operation

Turn on the power switch and the self-test will launch automatically. The last used program settings will be loaded and displayed as shown below



- Speed setting: 4000rpm. Time setting: 88 min, the acceleration setting is level 1, deceleration setting is level 1 and current program slot is No. 0. The lid is open.

SET THE OPERATING PARAMETERS

Press the SET key to switch between settings. The parameter will flash on the LCD display when selected. Press Plus or Minus keys to increase or decrease the selected parameter. Press and hold Plus or Minus key – data will change faster..

Set the centrifugation speed

- Press the SET key and select the centrifugation speed – current speed display will flash when selected.
- Change the speed in 500 - 4000rpm range in 100rpm increments or press SET again to change RPM to RCF (g) and then make changes.
- Press Enter if finished or Set to select next parameter

Set the running time

- Press the SET key and select time – current time display will flash when selected.
- Press Plus or Minus key to set time in 1min-99 min range in one-minute increment. HD setting is for continues run
- Press Enter if finished or Set to select next parameter

Set ACC

- Press the SET key to select ACC (acceleration rate) – current value will flash when selected.
- Press Plus or Minus key to set the acceleration to level 1 through 3.
- Press Enter if finished or Set to select next parameter

Set DEC

- Press the SET key to select DEC (deceleration rate) – current value will flash when selected.
- Press Plus or Minus key to set the deceleration to level 1 through 3.
- Press Enter if finished or Set to select next parameter

Preset program setting

- Press the Blood key to load parameter settings for the blood sample.
- Press the Urine key load the parameter settings for the urine sample.
- Press the Fecal key to load the parameter settings of the fecal sample.

Modify the preset mode parameter

- Setting the speed/time/ACC/DEC as desired. Press and hold SET + Blood key for over 5s to save as Blood program
- Setting the speed/time/ACC/DEC as desired. Press and hold SET + Urine key for over 5s to save as Urine program
- Setting the speed/time/ACC/DEC as desired. Press and hold SET + Fecal key for over 5s to save as Fecal program

START CENTRIFUGE RUN

Verify selected settings and make sure rotor is balanced.

Close the lid – the Lock Status will change to CL

Press START/STOP key to start the run. The Speed Icon will rotate, and the timer will begin the count down.

Error display

- Centrifuge will automatically stop if failure occurs in the running cycle, the error code will flash on display. Find the code in the error table below and take appropriate action.


STOP CENTRIFUGE RUN

When the timer runs out or the centrifuge will begin deceleration. When the rotor fully stops, the beeping signal will let the user know that the run is finished.

- After the rotor fully stops, the red LED and green LED indicators will blink continuously and the flashing message "OPEN" will appear on LCD display. If there is no operation within 1 minute, the red LED indicator goes out and the green LED indicator stays on. If there is any operation within 1 minute, both the red and the green LED indicators will go out.
- After the end of operation, the lid may be opened by pressing the Open key.


8 MAINTENANCE

8.1 Cleaning

 **Caution**

- Not following cleaning instructions contained herein might cause damage to the centrifuge.

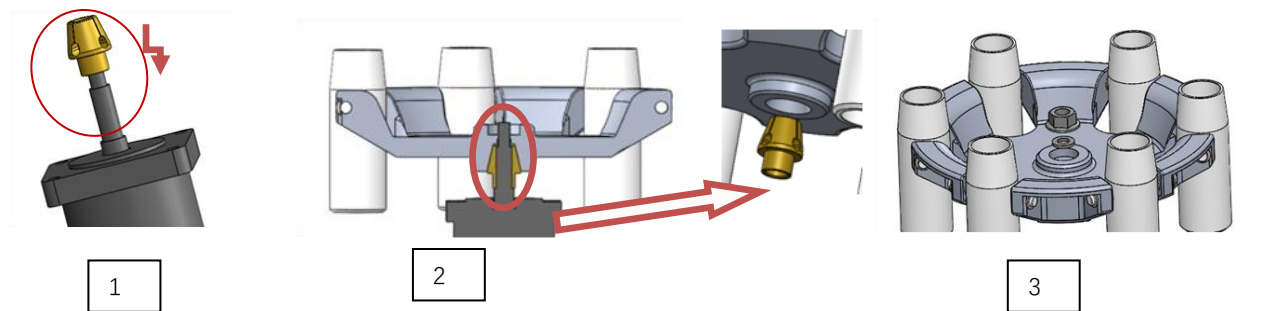
- (1) Centrifuge
 - Please clean the centrifuge using cloth or sponge soaked with neutral cleaning agent or 70% alcohol
- (2) Centrifugal chamber
 - Clean the chamber using cloth or sponge soaked with neutral cleaning agent or 70% alcohol

 **Caution**

- Never pour water or other solvents directly into the centrifugal chamber, otherwise these solvents might enter the drive unit and cause corrosion or damage to the bearing.

- The rotor needs periodical maintenance. We recommend cleaning the rotor every three months

8.2 Rotor installation




9 COMMON FAILURES AND SOLUTIONS

9.1 List of common failures

This centrifuge is capable of self diagnosis. When the centrifuge fails, the time display area will show the error code to identify the cause of failure.

Failure	Possible cause	Solution
No display after powering on	No power supply to power socket.	Check the power and reconnect the power supply.
Abnormal vibration of centrifuge	The rotor does not match with the drive shaft. The sample installed asymmetrically	Reinstall the rotor. Weigh using a balance and install it symmetrically.

Error code shown in the time display area	E-02 Lid door failed	Door opened during operation Press the key  when the door is open.	Immediately close the cover door. Close the cover door and start operation.
	E-10-86	See the service manual.	Contact the service representative.

Error code E-02 is related to erroneous operation. The centrifuge may continue operation after the errors is reset.

10 INTRODUCTION TO ROTOR

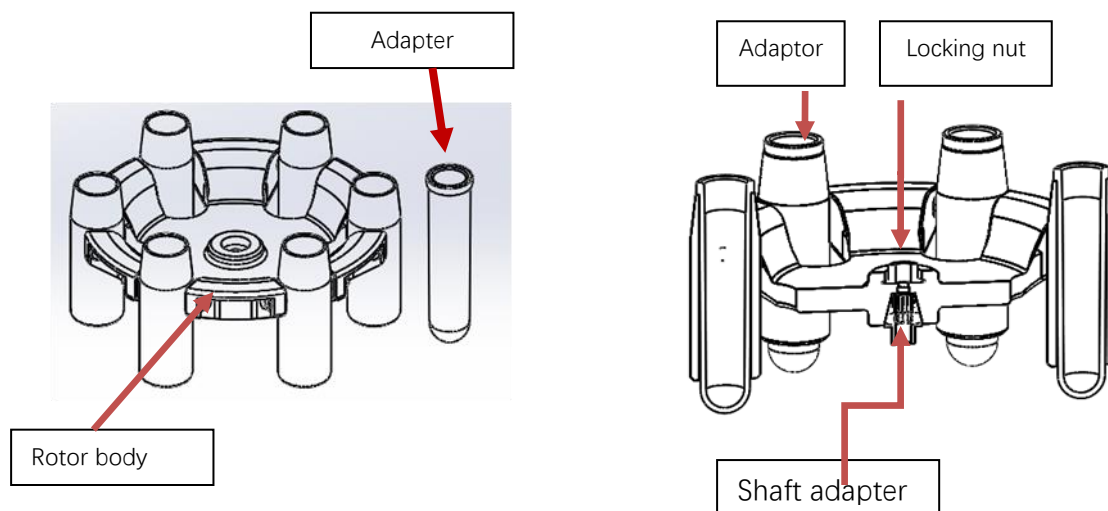


Figure 12-1 Rotor structure
2) Rotor and adaptor

Rotor model	Centrifuge tube	Holding capacity	Max. rotation speed (rpm)	Max. relative centrifugal acceleration (×g)	Adaptive
S6-15P	15ml	6	4000	2508	Standard
S4-50P	50ml	4	4000	2508	Optional
A8-15P	15ml	8	4000	2508	Optional
A24-10P	10ml	24	4000	2508	Optional
12-10P	10ml	12	4000	2508	Optional

RCF calculation

Relative centrifugal force (RCF) can be calculated using the following formula:

$$RCF=1.118 \times r \times n^2 \times 10^{-5}$$

r-rotation radius, unit: cm; n-rotation speed, unit: rpm