



Operation Manual
UNICO-LX Centrifuge



United Products & Instruments, Inc


Dayton, NJ USA


info@unicosci.com 732-274-1155





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


Safety Notice

The symbol  is the internationally accepted 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.

Specifications

Max. rotation speed	4000rpm(300-4000rpm), step: 100rpm	
Max. relative centrifugal force	1860×g	
Capacity	15ml×8	
Timing	1 min-99 min-HOLD (continuous operation)	
Noise	≤60dB(A)	
Drive motor	Brushless DC motor	
Safety mechanism	Lid 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)	287 (L) × 367 (D) × 225 (H)	
Weight	9.2kgs	
Other functions	operation process display, sound reminder	

DECLARATION OF CONFORMITY

In compliance with the following safety standards:

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**1.1 Basic operational environment**

(1) Power supply: 100V-240V, 50Hz/60Hz, 0.95A/115VAC, 0.56A/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.

1.2 Transport and storage conditions

(1) Storage temperature: -40°C~55°C.

(2) Relative humidity: ≤93%.

1 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.

1.1 Location

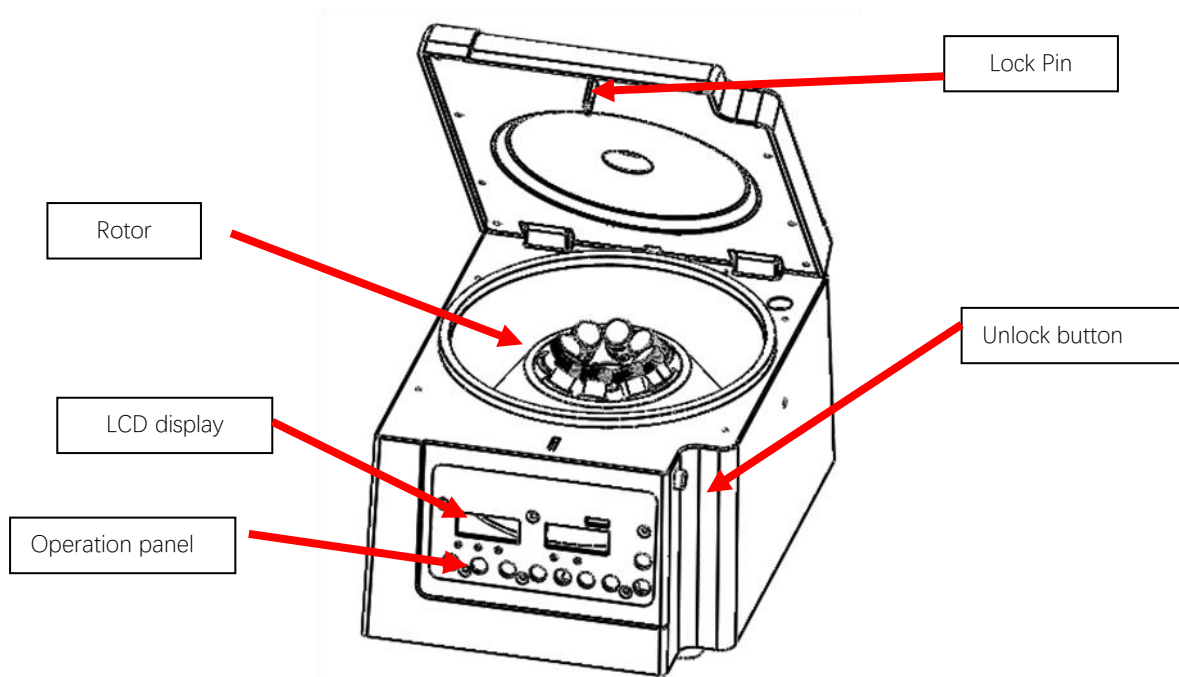
- (1) Place the centrifuge on a firm, flat and level bench top, ensure the four feet of this centrifuge stand on the table firmly. Avoid slippery surface or surface prone to vibration.
- (2) The recommended ambient temperature is 20°C±5°C. Avoid temperature over 30 °C
- (3) Keep clear of the centrifuge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

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.

2 NOMENCLATURE



Front view

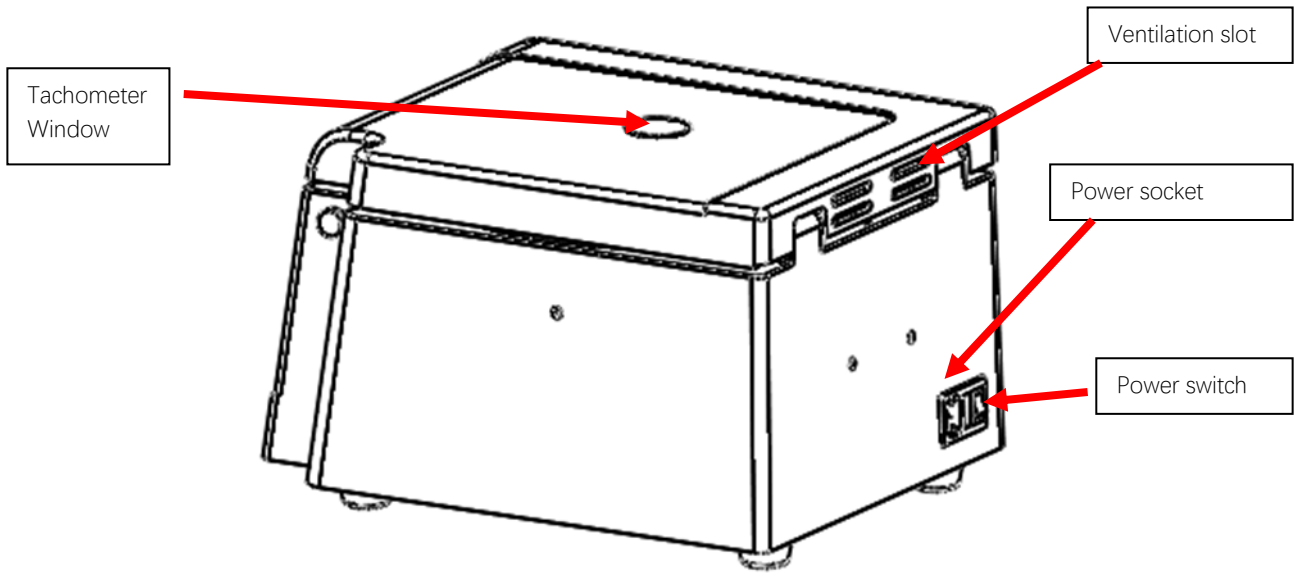
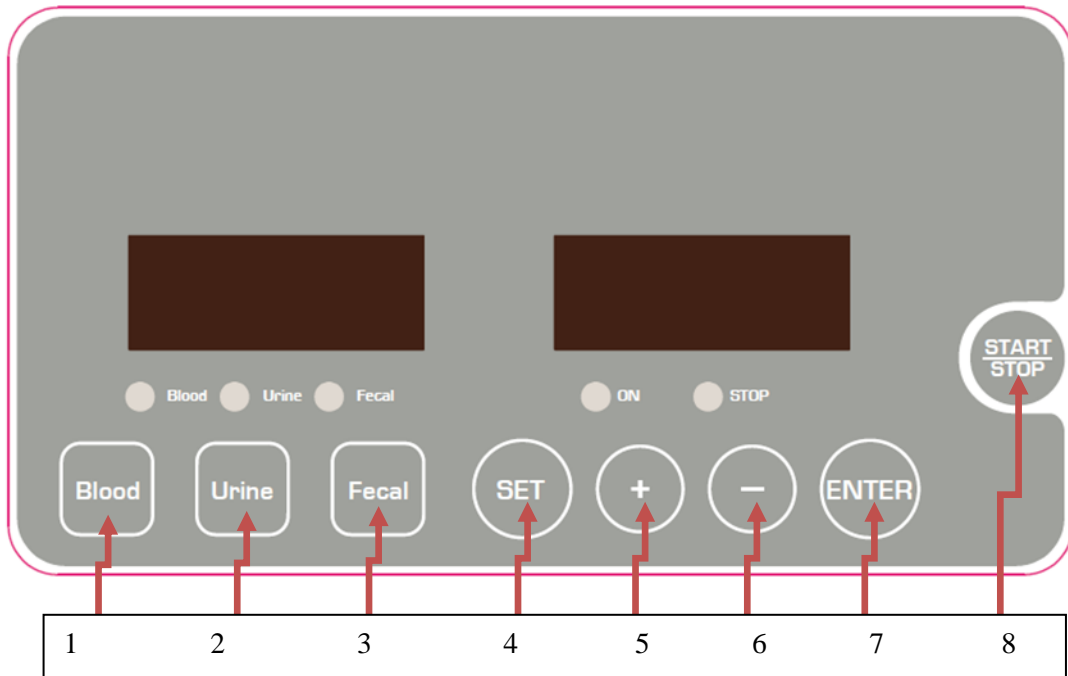







Figure 6.2 Rear view of centrifuge

3 OPERATION PANEL

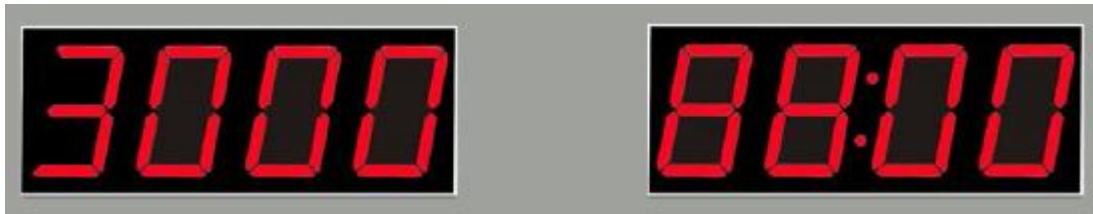


Item	Icon	Name	Function
1		Blood program key	Press to load the parameter settings for blood separation.
2		Urine program key	Press to load the parameter settings for urine separation.
3		Fecal program key	Press to load the parameter settings for fecal separation.

4		SET key	Press to enter spin parameters
5		Plus key	Parameter increase
6		Minus Key	Parameter decrease
7		ENTER key	Confirm the parameter.
8		Start/Stop key	Press to start or stop the spinning cycle

Speed display area

Time display area




4 Rotor Preparation


4.1 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.

4.2 Rotor inspection

Check the rotor for corrosion or structural damage before using.

<p> Caution</p> <ul style="list-style-type: none"> ● If any corrosion or cracks is found on the rotor – replace it immediately ● Only use rotors from the manufacturer.
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<p> Caution</p> <ul style="list-style-type: none"> ● Do not press the unlocking button while the rotor is in motion.
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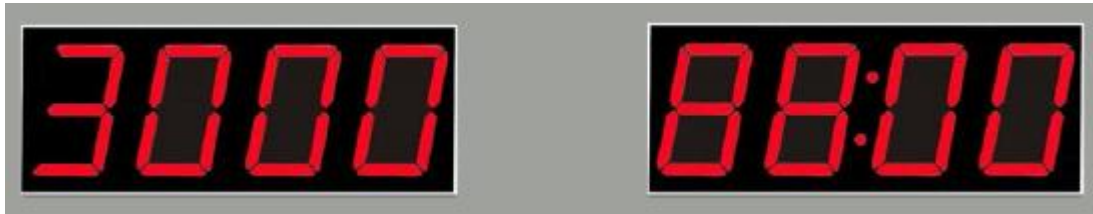
5 OPERATION

**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.


5.1 Normal operation

Turn on the power switch and the self-test will launch automatically. Then the most recent program setting is loaded and displayed as shown below












1) Set the operating parameters


Press the SET key  to switch between time and speed settings. The LCD display will flash when selected. Press the parameter input keys to increase or decrease the selected parameter. Press and hold the parameter input keys, the value of the selected parameter will change faster. Press the parameter input keys briefly to change the parameter value slowly.

The increment is 100rpm for the rotation speed, and 1 minute for the timer. Press the ENTER key  to confirm the parameters.


Preset program setting

- Press the blood program key  to load parameter settings for the blood sample.
 - Press the urine program key  to load the parameter settings for the urine sample.
 - Press the fecal program key  to load the parameter settings of the fecal sample.
- (d) Modify the preset mode parameter
- After setting the speed and running time, press and hold the SET key  + blood program key  for over 5s to save the current parameter settings as the blood presetting program.
 - After setting the speed and running time, press and hold the SET key  + urine program key  for over 5s to save the current parameter settings as the urine presetting program.
 - After setting the speed and running time, press the SET key  + fecal program key  for over 5s to save the current parameter settings as the fecal presetting program.

2) Start the run

- (a) Press the run key  to start operation.
- When lid is locked, the rotor will start and LCD will reflect the speed.
 - The time display indicating the remaining running time.
- (b) Error
- Centrifuge will automatically stop if any failure occurs in the running process, with the error code indicated on the time display window. Error can be found in the table below and appropriate action may be taken.


3) Stop the run

- (a) When the running time is out or by pressing the key , the centrifuge begins deceleration to stop.
- When the rotor fully stops, the buzzer will beep to remind the user that the operation is over.

- After the rotor fully stops, the red LED and green LED indicators will blink continuously, and you will see a flashing text “OPEN” in the time display area to remind you that the operation is over. 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.
- (b) The lid is opened.
- After the end of operation, the lid may be opened by pressing the lid-opening button.
- After the end of operation, the program will automatically save the set parameters of this operation. When the device is started up again, the program will automatically retrieve the set parameters of the last operation.

6 MAINTENANCE

6.1 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

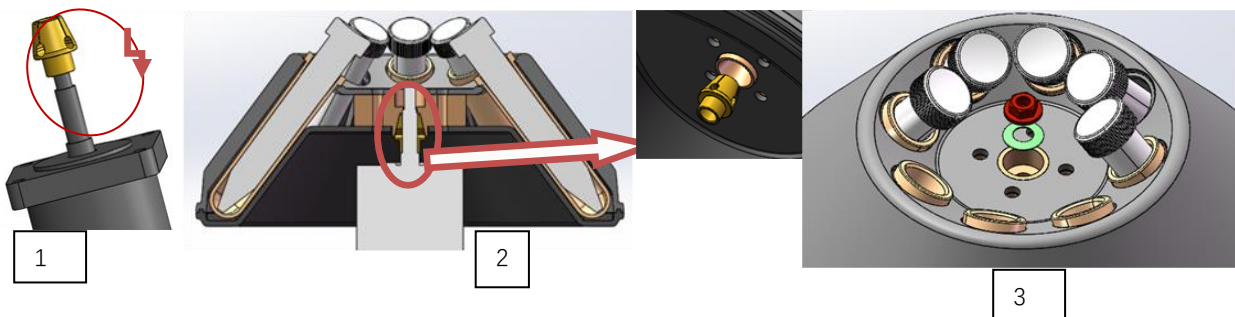
 **Caution**

- 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

6.2 Rotor installation

(1) Installation




7 COMMON FAILURES AND SOLUTIONS

7.1 List of common failures

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

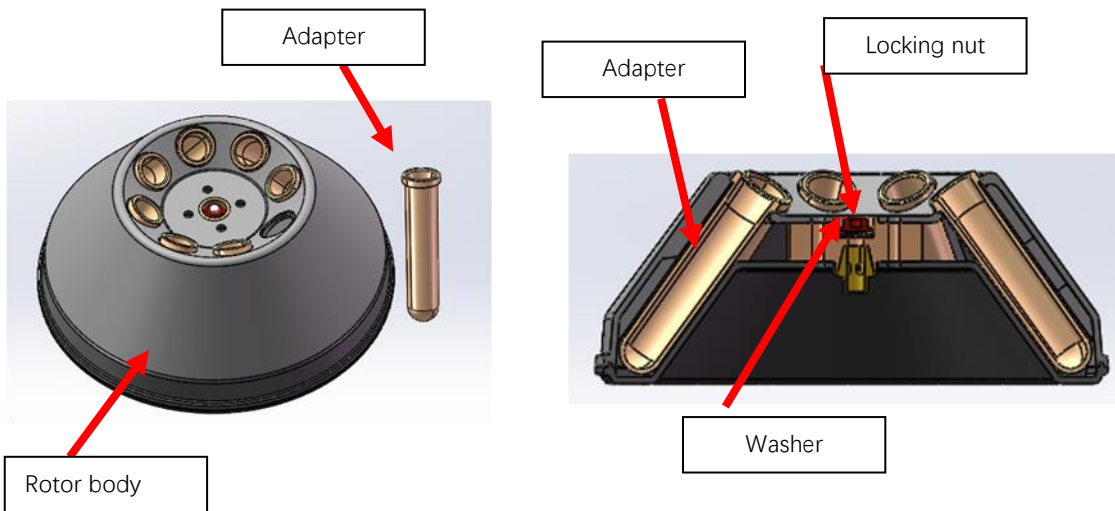
Failure	Possible cause	Solution
No display after powering on	No power supply to power socket.	Check the power and reconnect the power supply.
Abnormal vibration of centrifuge	The rotor does not match with the drive shaft. The sample installed asymmetrically	Reinstall the rotor. Weigh using a balance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

Error code shown in the time display area	E-02 Upper cover 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 in operation after the error is reset.

8 INTRODUCTION TO ROTOR

1) Rotor structure



2) Rotor and adaptor

Rotor model	Centrifuge tube	Holding capacity	Max. rotation speed (rpm)	Max. relative centrifugal acceleration (×g)	Adaptive
A8-15P	15ml	8	4000	1860	Standard
12-10P	10ml	12	4000	1860	Optional

9 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