USER MANUAL

DM0412S

Clinical Centrifuge

DLAB Laboratory Instruments

www.dlabsci.com

Before using centrifuge, please carefully read this user manual for efficient operation and safety.

Contents

Copyright:

We can not be responsible to inform at real-time if the outline and specifications of centrifuge are subject to change for improvement.

VERSION1.0

2012 August release

Safety Reminder

Common safety precautions

Carefully read the following safety precautions for a thorough understanding.

- Follow the instructions and procedures described in this manual to operate this centrifuge safely.
- Carefully read all safety messages in this manual and the safety instructions on the centrifuge.
- Safety messages are labeled as indicated below. They are in combination with signal words of "WARNING" and "CAUTION" with the safety alert symbol to call your attention to items or operations that could be dangerous to you or other persons using this centrifuge. The definitions of signal words are as follows:

 WARNING：Personal Danger

Warning notes indicate any condition or practice, which if not strictly observed, could result in personal injury or possible death.

 CAUTION：Possible damage to centrifuge

Caution notes indicate any condition or practice, which if not strictly observed or remedied, could result in damage or destruction of the centrifuge.

NOTE：Notes indicate an area or subject of special merit, emphasizing either the product's capability or common errors in operation or maintenance.

- Do not operate the centrifuge in any manner not described in this User Manual. When in doubt or have any troubles with this centrifuge, ASK FOR HELP.
- The precautions described in this User Manual are carefully developed in an attempt to cover all the possible risks. However, it is also important that you are alert for unexpected incidents. Be careful operating this centrifuge.

 WARNING

- This centrifuge is not explosion-proof. Never use explosive or flammable samples.
- Do not install the centrifuge in or near places where inflammable gases are generated or chemicals are stored.

- Do not place dangerous materials within 30cm of the centrifuge.
- Prepare all necessary safety measures before using samples that are toxic, radioactive or contaminated with pathogenic micro-organisms. Use of these is at your own responsibility.
- If the centrifuge, rotor and accessories that have been contaminated by solutions with toxic, radioactive or pathogenic materials, clean it according to the decontamination procedure as specified.
- If you require service at site, please sterilize and decontaminate the centrifuge in advance, and then notify the service center the details of the materials and procedure.
- To avoid electrical shocks, insure hands are dry before handling the power cord or turning on/off the power switch.
- For safety purposes, do not enter within 30cm around this centrifuge when it is in operation.
- While the rotor is rotating, never release the door lock.
- Unauthorized repairs, disassembly, or modifying the centrifuge except by our service center are strictly prohibited.

⚠ CAUTION

- This centrifuge must be located on a firm and level table.
- Make sure the centrifuge is horizontal before running.
- Do not move or relocate the centrifuge when it is running.
- If fluid spills in the rotor chamber, please promptly clean and dry with a dry cloth to avoid sample contamination.
- Ensure to remove any objects and fragments of the tubes dropped inside the rotor chamber before running the centrifuge.
- Cautions with rotor

  (1) Always check for corrosion and damage on the rotor surface before using it. Do not use the rotor if an abnormality is found.

  (2) Do not set the speed beyond the allowable minimum speed of the rotor kits (rotor and adapters). Make sure to run it below the allowable maximum speed.

  (3) Do not exceed the allowable imbalance.

  (4) Use the rotor and tubes within their actual capacities.

  If any abnormal condition occurs during operation, please stop it immediately and contact our service center. Notify the service center is a warning code if displayed.
- Vibrations are likely to damage the centrifuge, contact our service center if abnormality observed.

1. Specifications

Maximum speed	4500rpm(500-4500rpm), increment: continue
Maximum RCF	2490×g
Maximum capacity	10ml×12, 15ml×8
Timer	1min -30minutes
Noise	56dB(A)
Driving Motor	DC motor
Safety devices	Door interlock, Over-speed detector
Power requirements	Single-phase, 110V-120V, 50Hz/60Hz, 3A. 220V-240V, 50Hz/60Hz, 3A
Ambient condition -Set-up site -Altitude -Ambient temperature -Humidity -Excess-voltage category -Pollution degree	 Indoor only Up to 2000 m above sea level 2℃ ～ 40℃ 80% II 2
Device protection class	I
Dimensions（mm）	（L）280×（W）364×（H）266
Weight	6kg

2. Required Operational Conditions

2.1 Basic operational conditions

（1）Power: 110V-120V, 50Hz/60Hz, 3A.
220V-240V, 50Hz/60Hz, 3A.
（2）Ambient temperature: 2℃~40℃.
（3）Relative humidity: ≤80%.
（4）No vibration and airflow around.
（5）No electric dust, explosive and corrosive gases around.

2.2 Transport and storage conditions

（1）Storage temperature: -40℃~55℃.

（2）Relative humidity: ≤93%.

3. Installation

This section describes the instructions that you should abide when install the centrifuge to ensure your safety and the optimum performance. Before moving the centrifuge, the rotor must be removed.

⚠ WARNING

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

3.1 Location

（1）Place this centrifuge on a firm、flat and level surface, ensure the four feet of this centrifuge stand on the counter firmly. Avoid installing on a slippery surface or surface prone to vibration.

（2）Ideal ambient temperature is 20℃±5℃, avoid placing the centrifuge in direct sunlight if temperature exceeds 30℃.

（3）Keep clear of the centrifuge at least 10cm on both sides and at least 30cm behind it to guarantee the cooling efficiency.

（4）Keep away from heat or water to avoid sample temperature issues or centrifuge failures.

3.2 Connection of the power cord and grounding

⚠ WARNING

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

An minimum 10A outlet providing a sufficient ground is required, and this must meet local safety requirements.

4. Structure

Figure 4.1 Front view of the centrifuge

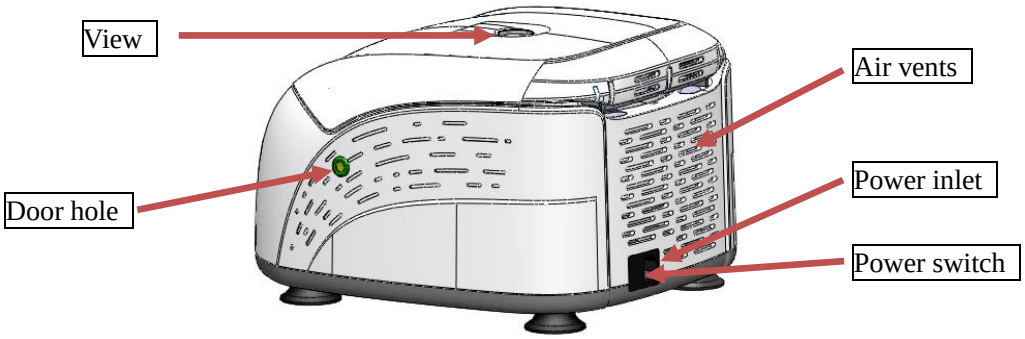
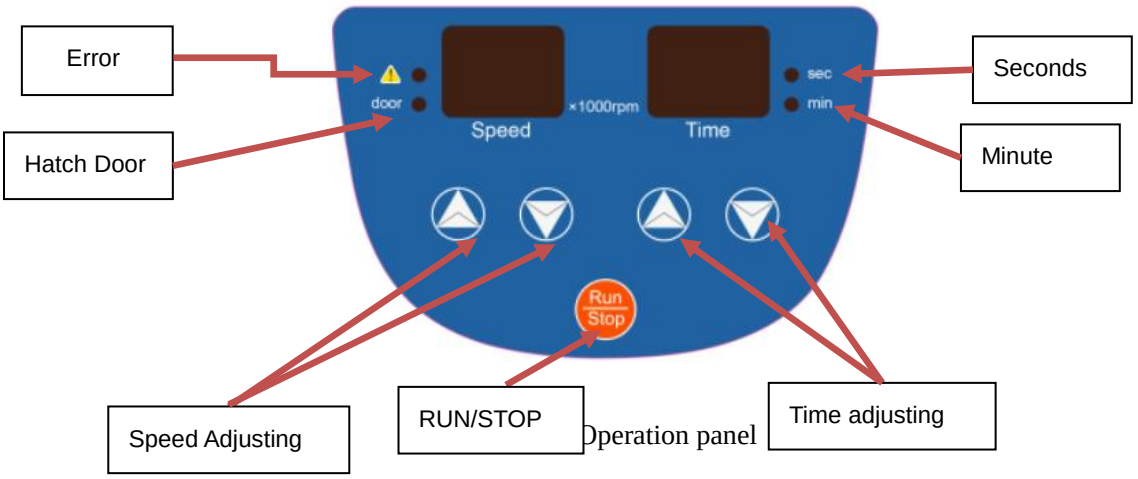


Figure 4.2 Rear view of the centrifuge

5. Operation panel



Operation panel

Main interface is as figure 6-1. Left knob is setting speed, rotate the knob at the scale you want to set; right knob is setting the time, rotate the time knob at the scale you want to set, then the centrifuge will run. At the same time, the speed lamps will display when the speed arrives at the position.

6. Rotor Preparation

6.1 Prepare the samples

6.2 Inject the samples into tubes

⚠ CAUTION

- Do not overload samples into the centrifuge which will cause leaking.

- Do not exceed the actual capacity allowed in the user manual.

6.3 Keep the tubes balanced

- Although the centrifuge can accept sample balancing by eye, we recommend that you keep this centrifuge in a well-balanced condition to extend its life expectancy.
- Never intentionally run the centrifuge under an unbalanced condition even though the allowable imbalance is not exceeded.

6.4 Inspect the rotor

Check the rotor for corrosion or scratches before using.

⚠ CAUTION

- If any abnormality such as scratches are found, stop using the rotor and contact our service center.
- Only manufacturer’s rotors must be used with the unit.

6.5 Symmetrically load centrifuge tubes into rotor

⚠ CAUTION

- Make sure the rotor is securely fixed on the shaft. Otherwise, the rotor may be moved off while rotating and cause damage to the centrifuge and rotor.

7. Operation

⚠ CAUTION

- If the centrifuge makes strange noise during operation, stop it immediately and contact our service center.

7.1 Start the operation

Turn on the power, waiting the display screen light up.

- Press the speed button to do the speed adjusting.
- Press the time button to do the time adjusting(set up time more than 60 seconds, the “MIN” light will be light up. Less than 60 seconds, the “SEC” light will be light up).
- Press the “RUM/STOP” button, starting the centrifuge.

7.2 Stopping the centrifuge

- The centrifuge will be stop running when set up time is out.
- Press the “RUN/STOP” button to shut down the centrifuge.
- Open the hatch door during the centrifuge is running, the centrifuge will braking and stop,

8. Maintenance

8.1 Cleaning

⚠ CAUTION

- If do not follow the recommended instructions for cleaning or disinfecting this may damage the centrifuge.

（1）Centrifuge

- If the centrifuge is exposed to ultraviolet rays for a long time, the color of the door may be changed or the label may be peel off. After using, cover the centrifuge with a piece of cloth to protect it from direct exposure.
- If the centrifuge needs cleaning, clean it with a cloth or sponge moistened with a neutral detergent solution.
- Sterilize the centrifuge by wiping with a cloth moistened with 70% ethanol solution.

（2）Rotor chamber

⚠ CAUTION

- Do not directly pour water, neutral detergent or disinfectant solution into the rotor chamber, otherwise fluids may leak into the drive units and cause corrosion or deterioration to the bearings.

- If the rotor needs cleaning, clean with cloth or sponge moistened with a neutral detergent solution. Sterilize the centrifuge by wiping with a cloth moistened with 70% ethanol solution.

（3）Drive shaft

- We recommend regular maintenance for drive shaft. You can wipe the drive shaft with soft cloth, and then apply a thin coat of silicon grease.

（4）Door

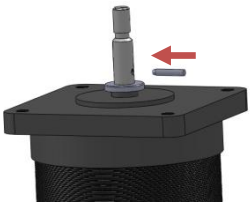
- Clean and sterilize the door using the same method as the section（1）above.

（5）Rotor

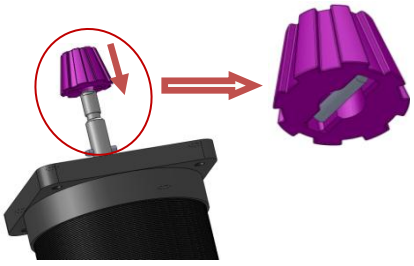
- For sample leaks in the rotor, rinse the rotor with water，and dry it completely.
- The rotor should be checked every 3 months to ensure the tube and rotor holes keep are clean.

8.2 Rotor Installation

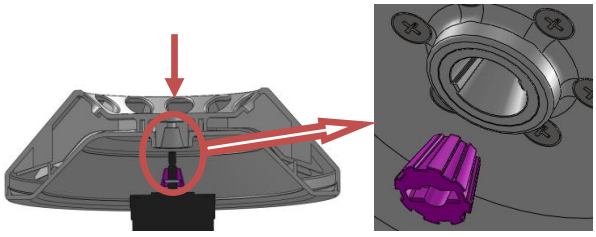
（1）Installation



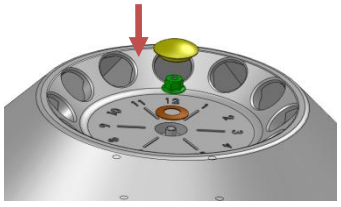
①



②



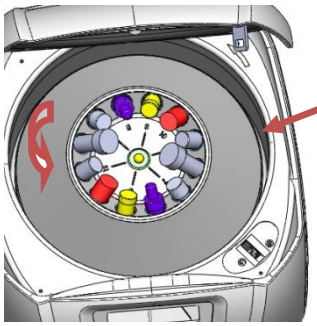
③



④

（2）Adjustment

Observe here!



Before lock the rotor, rotate it, and observe carefully if there is obvious vibration, if so, please take off the rotor, turn some angle and install it again, until the rotor rotates smoothly, then, lock it firmly.

9. Trouble shooting

Symptom		Causes	Solutions
Power lamp does not light when the POWER is turned on.		• Building power circuit breaker trips.	• Remove the trouble and turn on the POWER.
Abnormal vibration		•Rotor do not match with spindle • Samples are imbalance	• Install again the rotor • Weighting scales, install symmetrically
Possible reasons that the centrifuge can not work well	Door fault	• The door opened in running. • Door switch failure.	• Close the door immediately. • Replace the door switch
	No speed signal	• The centrifuge runs at very low speed	• Check the speed sensor, reconnect it again or replace it.
	Over speed	• The centrifuge runs at much bigger than the maximal speed	• Contact with service center

Table 9-1 Possible problems and solutions

10. Instructions for the rotor and tubes

⚠ CAUTION

- Read the instructions thoroughly, to properly load and use rotor.
- Do not exceed the allowable maximum speed of rotor、tube and adapters etc. Ensure the allowable maximum speed of adapters is lower than the rotor's maximum speed.

10.1 Rotor instructions

1) Rotor structure

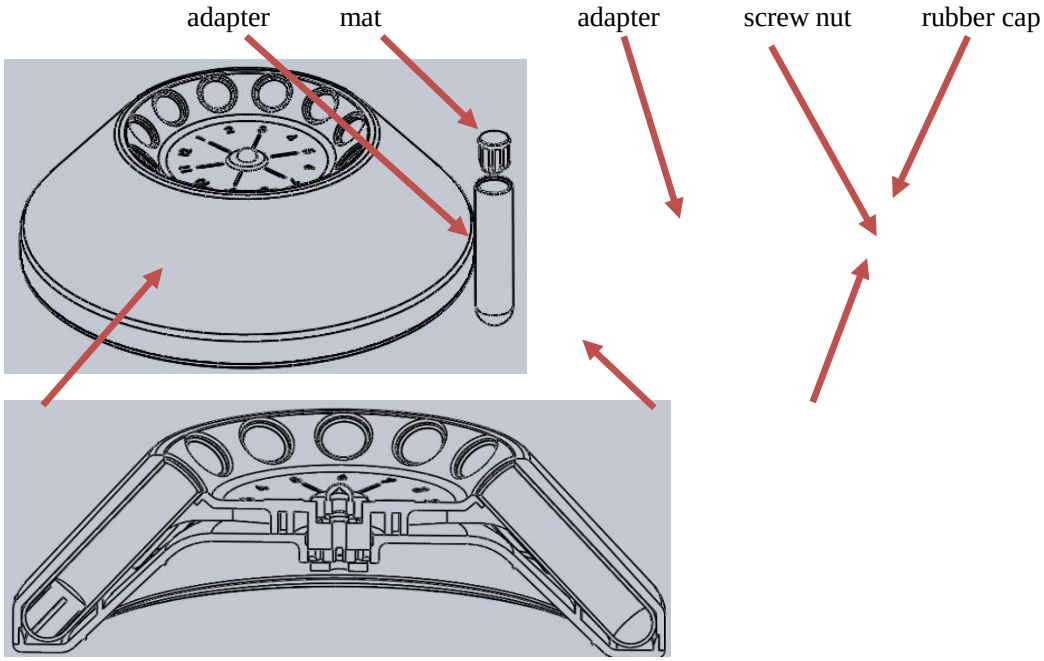


Figure 10-1 The rotor structure

1) **Available rotors and adapters**

Rotor type	Tubes	Tubes Per Rotor	Dimension (Φ×L mm)	Adapters	Maximum speed（rpm）	Radius cm	Maximum RCF (×g)
A12-10P	15ml con	8	17×120		4500	11	2490
	1.5-5ml vacu	12	13×82	A10P15 mat	4500	9.8	2218
	4-7 ml vacu	12	13×106	A10P15	4500	11	2490
			16×75	A10P15 Mat		9.8	2218
	8.5-10 ml vacu	12	16×107	A10P15	4500	11	2490
	2.7-3 (EU) ml collection tube	12	11×66	A10P15 mat	4500	9.8	2218
	7.5-8.2 (EU) ml collection tube	12	15×92	A10P15	4500	11	2490

Table 10.1 Rotors and adapters

2) Notice

- The centrifuge rotor can separate samples with a density lower than 2.0g/ml. If the samples density is over 2.0g/ml, please calculate allowable speed depending on the following formula.

$$allow\ speed(rpm) = \max speed \times \sqrt{\frac{2.0(g/ml)}{sample\ density(g/ml)}}$$

● Calculate RCF

An RCF can be determined with the following calculation formula.

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

r—rotating radius, unit: cm; n—rotating speed, unit: rpm

3) Autoclaving

A12-10P rotor is made of plastic, cannot be high-pressure sterilization and UV irradiation, only ordinary sterilization can be used.

10.2 Tubes

1) Cleaning and sterilizing tubes

O：Applicable X：Inapplicable

Conditions		Materials	PA	PC	PP
Cleaning	Cleaning fluids	Acidic（pH5 or lower）	X	X	X
		Acidic（higher than pH5 ）	O	O	O
		Alkaline（higher than pH9 ）	O	X	O
		Alkaline（pH9 or lower）	O	O	O
		Neutral（pH7）	O	O	O
		Warm water(up to 70℃)	O	O	O
	Ultrasonic cleaning	Neutral detergent（pH7）	O	O	O
Sterilization	Autoclaving	115℃（0.7kg/cm^2）30minutes	O	O	O
		121℃（1.0kg/cm^2）20 minutes	X	O	O
		126℃（1.4kg/cm^2）15 minutes	X	X	X
	Boiling	15 to 30 minutes	O	O	O
	Ultraviolet sterilization	200-300nm	X	X	X
	Gas sterilization	Ethylene oxide	O	X	O
		Formaldehyde	O	O	O

PA: Polyallomer PC: Polycarbonate PP: Polypropylene

Table 10.2 Cleaning and sterilizing conditions for tubes

1) Cleaning PC tubes

PC material is low in chemical resistance against alkaline solutions. Avoid using neutral detergents with pH higher than 9. Note that pH of some neutral detergents are still higher than 9 even if diluted according

to the manufacturer's instructions. Use detergent with its pH between 7 and 9.

2) Autoclaving PA、PC and PP tubes

PA begins softening at about 120℃, PC and PP at about 130℃. Autoclave PA tubes at 115℃（0.7kg/cm^2）for 30 minutes, PC and PP tubes at 121℃（0.1kg/cm^2）for 20 minutes. If a certain temperature is exceeded, the tubes may be deformed.

When use a sterilizing chamber, please operate as follows:

(1) Place tubes in vertical position, mouths upward. If tubes are placed sideways, they may deform into an oval shape due to gravity.

(2) Remove locking nut and lid to prevent from deformation or rupture.

(3) Wait until the sterilizing chamber cools down to the room temperature before removing tubes.

4) Conditions and life expectancy of tubes

The life expectancy of plastic tubes depends on the characteristics of samples, speed of the rotor used, temperature applied and so on. When the plastic tubes are used for ordinary aqueous samples (pH between 5.0 and 9.0), their life expectancies are defined as follows.

Be operated at the maximum speed:

High quality tubes (PA、PC、PP): 30-50 operations

Ordinary tubes(PA、PC、PP): around 10 operations（Using in low speed can extend the tube life）.

Life expectancy of tubes also depends on the pretreatment conditions such as cleaning and sterilization, lifetime can be cut down.

Notice: Do not use damaged or cracked tubes.

11. Returning and Disposal

11.1 Returning Devices

⚠	Before returning the device, a transport securing device has to be installed.

If the device or its accessories are returned back, in order to provide protection for people, the environment and materials, it has to be decontaminated and cleaned before being shipped.

11.2 Disposal

Before disposal, the device must be decontaminated and cleaned to protect people, the environment and property. When you are disposing of the device, the respective statutory rules must be observed.

Pursuant to guideline 2002/96/EC (WEEE), all devices supplied after August 13,2005 may not be disposed

as part of domestic waste. The device belongs to group 8 (medical devices) and is categorized in the business-to-business field.

The icon of the crossed-out trash can shows that the device may not be disposed as part of domestic waste.

The waste disposal guidelines of the individual EC countries might vary. If necessary, contact your supplier.

12. Ordering information

Cat. No.	Model	Descriptions
943083437777	DM0412S	Clinical Centrifuge, with A12-10P rotor kits, US plug, 110V-120V/50Hz/60Hz
943183427777	DM0412S	Clinical Centrifuge, with A12-10P rotor kits, Cn plug, 220V-240V/50Hz/60Hz
943283427777	DM0412S	Clinical Centrifuge, with A12-10P rotor kits, Euro plug, 220V-240V/50Hz/60Hz
943383427777	DM0412S	Clinical Centrifuge, with A12-10P rotor kits, UK plug, 220V-240V/50Hz/60Hz
Accessories		
19200358	A12-10P	Rotor kits, 4500rpm, 15ml*8, used with DM0412E
19400027	A10P15	Rotor adapter, used with A12-10P, 12pcs/pk
19400028	A10P15 mat	Rotor adapter mat, used with A10P15, 12pcs/pk

13. Warranty

13.1 Warranty of centrifuge

This centrifuge is guaranteed for one years from the date of delivery provided that it has been operated and maintained properly.

13.2 Warranty of the rotor

The rotor is guaranteed for 3 years from the date of delivery upon manufacturer. Please pay attention, do not use the rotor once it has been corrosion or fatigue damage. The warranties of the centrifuge and the rotor become invalid in the case of the following conditions even if within the guarantee period expires:

(1) Failures caused by incorrect installation.

(2) Failures caused by rough or improper handling.

(3) Failures caused by conveyance or relocation after installation.

(4) Failures caused by unauthorized disassembly or modification.

(5) Failures caused by using non-standard spare parts or accessories and unauthorized modification of the rotor or centrifuge.

(6) Failures caused by natural disasters including fire, earthquakes and so on.

(7) Consumables and parts have a limited guarantee period.

After-sales service

In order to ensure to operate centrifuge safely and efficiently, it is necessary for regular maintenance. If centrifuge has problems, do not attempt to repair it by yourself. Contact our sales or service center.

DLAB Scientific Instrument Inc.
2311 E. Locust Court, Ontario, CA 91761 United States.
Office: +1-747-230-5179
Fax: +1-909-230-5275
Sales contact: info@dlabsci.com
Service contact: service@dlabsci.com
www.dlabsci.com