



Operating Instructions 使用说明书



High Speed Micro Centrifuge
高速离心机
CF0201002 / Planet

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Safety Instructions



For your protection

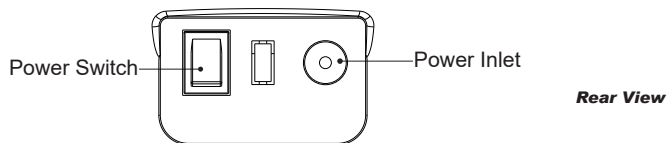
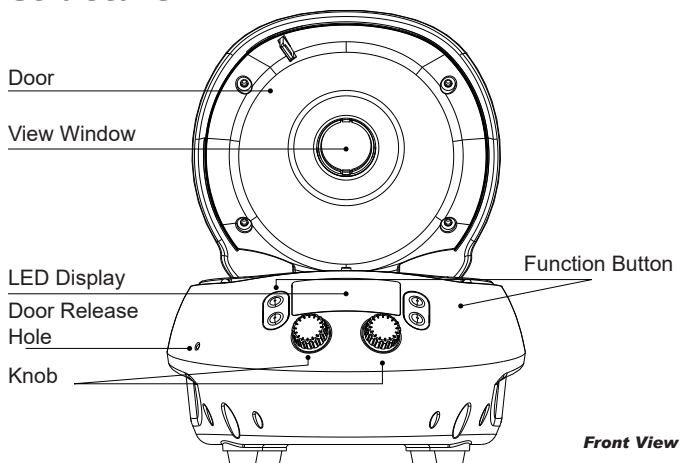
- **Read the operating instructions in full before starting up and follow the safety instructions when in use.**
- Ensure that only trained staff work with the centrifuge.
- Do not operate the device in any manner not described in this user manual. When in doubt or have any trouble, ask for help.
- It's important to be alert for unexpected incidents. Be careful when operating this centrifuge.
- 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 30cm around 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 have been contaminated by solutions with toxic, radioactive or pathogenic materials, clean them per the decontamination procedure specified.
- To avoid electrical shocks, insure hands are dry before handling the power cord when turn on/off the power switch.
- For safety, do not be within 30cm around the centrifuge when it's in operation.
- When the rotor is rotating, never release the door lock.
- Unauthorized repairs, disassembly or modifying the centrifuge are strictly prohibited.
- The centrifuge must be placed on a firm and flat table.
- Make sure the centrifuge is horizontal before running.
- Make sure the angle between the door and the cover is bigger than 70 degrees when the door is open.
- Do not put your fingers or hands between the door and the cover when the door is open.

- Do not move or relocate the centrifuge when running.
- If fluid spills in the rotor chamber, please promptly clean and dry with a dry cloth to avoid sample contamination.
- Make sure to remove any objects and fragments of the tubes dropped inside the rotor chamber before running the centrifuge.
- Be cautious with rotor.
 - Always check corrosion and damages on the rotor surface before using it. Do not use the rotor if an abnormality is found.
 - Do not set the speed beyond the allowable minimum speed of the rotor kits (rotor or adapter). Make sure to run it below the allowable minimum speed.
 - Do not exceed the allowable imbalance.
 - Use the rotor and the tubes within their actual capacities.
 - Make sure the rotor is tightened on the lid

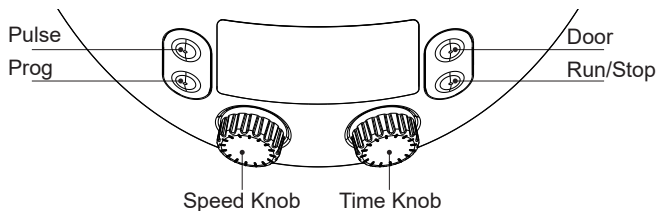
Installation

- Unpack the device carefully and check for any damages which may have arisen during transit. Please contact the manufacturer /supplier for technical support.
- Place the centrifuge on a firm, flat and level platform and make sure it stand firmly.
- Ideal ambient temperature is $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$. Do not place the centrifuge where the temperature exceeds 30°C .
- To avoid electrical shocks, ensure your hands are dry when touching the power cord.
- Make sure the centrifuge to be grounded properly.

Structure



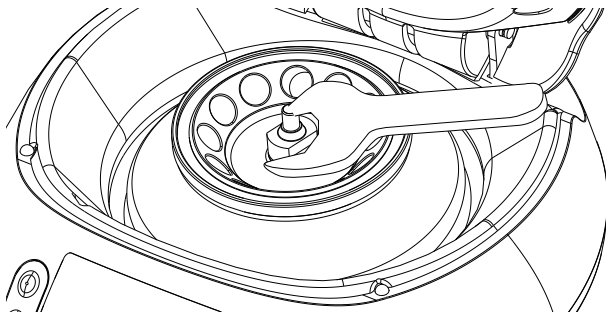
Operation Panel



-  Open the door. It cannot work when the unit is running.
-  Run and stop the centrifuge
-  Quick spins. The centrifuge will keep running by pressing the button and stop running by releasing the button. It only works when the unit stops and cannot work when the unit is running.
-  Select and save the programs. The centrifuge can store up to 10 programs. Select the saved programs by short press and save the new program (speed and time) by long press $\geq 2S$. It only works when the unit stops and cannot work when the unit is running.

Rotor Loading

- Load the supplied rotor onto the shaft and make sure the rotor is in position and connected well with the shaft.
- Hold the rotor with one hand and tighten the nut with the supplied wrench firmly (refer to the below picture)
- Check the rotor is firmly tightened before running.
- Put on the rotor lid



- Close the door and make sure the door is closed completely.
- Symmetrically load centrifuge tubes into the rotor to keep the balance.



Operation

(1) Set the speed RPM/RCF

- Press the speed knob once and the speed value will flash
- The speed range can be set is 500-15000rpm and the increment is 100rpm.
- Rotate the speed knob to set the speed value
- Press the speed knob to confirm the speed value
- Press the speed knob twice, RPM will change to RCF and the RCF value will flash. Rotate and press it to set and confirm the RCF.
- After set the speed without pressing the button for confirmation, the system will stop the value flash and confirm the set value after several seconds.

(2) Set the time

- Press the time knob and the time value will flash
- The time can be set from 30 seconds – 99 minutes
- Rotate the time knob to set the time
- Press the time knob to confirm the time value
- After set the time without pressing the button for confirmation, the system will stop the value flash and confirm the set value after several seconds.

(3) Running

- Press button “Run/Stop” to start running.
- Timer will work as soon as the set speed is reached and the centrifuge displays the remaining run time.
- If an error occurs during the running, the centrifuge will stop automatically and display the error code. The error code can be checked in the Trouble Shooting and the corrective actions can be applied accordingly.

(4) Stop Running

- The centrifuge will stop when the set time is up or by pressing the button “Run/Stop”.
- When running stops, the centrifuge will beep and the door will open automatically.
- If the door is closed, to open it by pressing the button “door”.

Maintenance

- If the centrifuge is exposed to the ultraviolet rays for a long time, the color would probably be changed. It's better to cover the centrifuge from direct exposure.
- Clean the centrifuge with cloth or sponge moistened with a neutral detergent solution.
- Sterilize the centrifuge with cloth moistened with 70% ethanol solution.
- Do not directly pour water, neutral detergent or disinfectant solution into the rotor chamber, otherwise the liquid would leak into the drive unit and cause corrosion or deterioration to the bearings.
- To prevent corrosion, remove the rotor from the rotor chamber.
- If sample links into the rotor, rinse the rotor with water. Apply a thin coat of silicon grease to the rotor when it's completely dry.
- Check the rotor every 3 months to make sure the tube and the rotor holes are clean.

Trouble Shooting

The centrifuge has a self-diagnostic function. If a problem occurs, an error/warning code will be displayed on the screen and the operator can determine the malfunction with the warning code below

Cause and Symptom	Proposed Solutions	Remark
Error1 Abnormal running without rotor	Load the rotor and restart the machine	
Error 2 Hall cable failure	Check if the Hall cable connector is loose.	
Error 3 Over heating inside the motor	Power off to cool the machine and re-start at lower speed.	
Error 4 Motor over speed	Check circuit board/ motor	
Error 5 Abnormal vibration	Load the rotor again Load the tubes Symmetrically Tighten the rotor lid firmly	
Error 6 Door motor stalling	Check door motor	
Error 7 Abnormal Hall of door motor	Check Hall structure of door motor	
Error 8	/	
Error 9 External EEPROM failure	Replace mainboard	
Error 10 Other faults	Other faults	Other faults except E1~E9

Open the door

(1) If powered on

- The door will open automatically after the running completed.
- Open the door by pressing the button “Door”

(2) If power outage

- The door cannot open automatically if there's a power outage. It can be opened manually.

- Make sure the running stops completely
- Insert a screw driver into the hole on the top left side of the unit and push forward to open the door.

Accessory

- 1* rotor (1.5mL/2mLx 12)
- 1* rotor locking nut
- 1 * rotor lid
- 1* wrench
- 1* screw driver (to open the door)
- 1* power adapter

Specifications

Items	CF0201002
Maximum Speed (rpm)	15000rpm (500-15000rpm), increment:100rpm
Maximum RCF (g)	15100 x g, increment: 100 x g
Speed Accuracy	±20rpm
Rotor Capacity	0.2ml/0.5ml/1.5ml/2ml×12
Time Range	30sec-99min-HOLD (Continuous Operation)
Driving motor	Brushless DC motor
Safety devices	Door interlock; Over-speed detector; Over-temperature detector; Automatic Internal Diagnosis
Power	Single-phase, AC 100V-240V, 50Hz/60Hz 2.5A
Acceleration/ Braking time [Sec]	30s↑10s↓
Additional features	Speed/RCF switch Short-time run function; sound-alert function
Noise level (dB)	≤56 (5000rpm)
Dimensions [mm]	256 x 225 x 155
Weight [kg]	6

Warranty

The instrument is warranted to be free from defects in materials and workmanship under normal use and service for a period of 24 months from the date of invoice. The warranty is extended only to the original purchaser.

It doesn't cover the below cases,

- Failures caused by incorrect installation
- Failures caused by rough or improper handling
- Failures caused by conveyance or relocation after installation
- Failures caused by unauthorized disassembly or modification
- Failures caused by using non-standard spare parts or accessories and unauthorized modification of the rotor or centrifuge
- Failures caused by natural disasters including fire, earthquake and so on.
- Consumables and parts have a limited guarantee period

For claims under the warranty please contact your local supplier. You may also send the instrument directly to manufacturer, enclosing the invoice copy and giving reasons for the claim.

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请仔细阅读说明书并在说明书的操作指导下安全使用本仪器。
外形和性能指标如有变动，概不另行通知。

前言

欢迎使用《高速离心机使用说明书》。用户在使用本仪器前应仔细阅读本说明书，了解相关注意事项，并按照说明书中的指导和规范进行操作。

符合性声明

我公司自行负责声明本产品符合

2014/35/EU

2006/42/EG

2014/30/EU

2011/65/EU 指令

并符合以下标准或标准性文档：

EN 61010-1

EN61010-2-051

EN 61326-1

EN 60529

EN ISO 12100

安全说明

- 操作仪器前请认真阅读使用说明并遵守安全操作规范。
- 请将本使用说明放置于使用者方便查阅的地方。
- 确保只有受过相关训练的人员才能操作本仪器。
- 请遵守安全规范、人身安全和事故防止等相关规范。
- 请勿以本用户手册中未描述的任何方式操作设备。如有疑问或有任何困难，请寻求厂家帮助。
- 对意外事件保持警惕非常重要，操作离心机时要格外小心。
- 严禁使用爆炸性或易燃性样品。
- 请勿将离心机安装在产生易燃气体或储存化学品的地方或附近。
- 请勿在离心机周围30cm处放置危险品。
- 在使用有毒、放射性或受致病微生物污染的样品之前，准备好所有必要的安全措施。
- 如果离心机、转子和附件被有毒、放射性或致病性物质的溶液污染，则按照规定的清洁与维护程序进行清洁。
- 为避免发生电击，在打开/关闭电源开关时，在插拔电源线之前，请确保双手干燥。
- 为了安全起见，在离心机运行时，确保安全距离在30厘米或以上。
- 转子旋转时，严禁松开门锁。
- 严禁擅自修理、拆卸或修改离心机。
- 离心机必须放在水平、稳固的工作台上。
- 运行前确保离心机水平。
- 当门打开时，确保门与盖之间的角度大于70度。
- 门打开时，请勿将手指或手放在门和盖之间。
- 运行时请勿移动离心机。
- 如果转子室中有液体溢出，请立即用干布擦干，以避免样品污染。
- 在运行离心机之前，确保清除掉转子室内的任何物体和管碎片。

- 转子使用注意事项：
 - 使用前，务必检查转子表面的腐蚀和损坏情况。如果发现异常，请勿使用转子。
 - 请勿将速度设置为超过转子套件（转子或适配器）允许的最小速度。一定要在允许的最低速度以下运行。
 - 离心管或其他管类放入转子内，需保证转子360°内轴平衡，绝对禁止未配平衡转子工作运行。
 - 在其实际容量范围内使用转子和管。
 - 确保转子紧固在电机轴上。

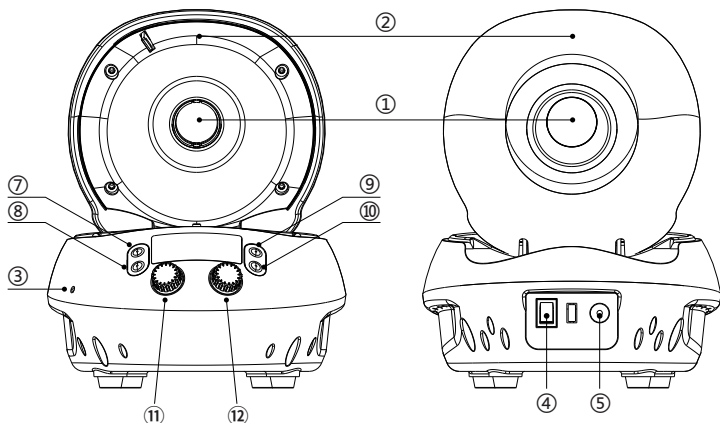


如果仪器的安装或放置场所无法确保电源关闭开关可被随时关闭，必须在工作区域安装操作便利的紧急关闭开关。

安装

- 打开设备包装，仔细检查运输过程中是否有任何损坏。若有，请联系制造商/供应商寻求技术支持。
- 将离心机放在稳固、平坦、水平的平台上。
- 理想使用环境温度为 $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 。请勿将离心机放置在温度超过 30°C 的地方。
- 为避免电击，请确保手在接触电源线时是干燥的。
- 确保离心机正确接地。

操作说明

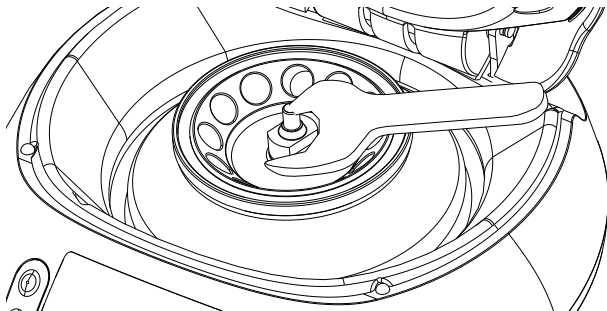


- ①观察窗 ②盖子 ③开盖孔 ④船型开关 ⑤电源接口
⑥LED显示窗 ⑦瞬时离心 ⑧程序选择/记忆 ⑨开盖
⑩运行/停止 ⑪速度设定 ⑫时间设定

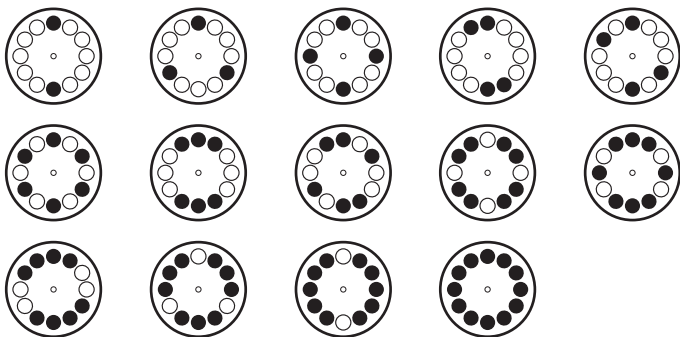
- **Door** 打开盖子。（离心机运行时不能工作。）
- **Run/Stop** 运行/停止离心机。
- **Pulse** 快速旋转。长按按钮，离心机将持续运行；松开按钮停止运行。（离心机运行时不能工作。）
- **Prog** 选取或保存程序。最多可存储10个程序。短按切换选取已保存的程序。长按2s以上保存新程序（速度和时间）。（离心机运行时不能工作。）

转子安装

- 将转子转到电机轴上，确保转子装到正确的位置并跟电机轴连接良好。
- 用一只手固定住转子，用扳手拧紧转子螺丝。（见下图）
- 运行前检查转子是否紧固。若是不够紧固，则重复以上步骤将转子固定好。绝对禁止转子未固定牢固而直接启动离心机。
- 装上转子盖。



- 关上门，确保门完全关闭。
- 将离心管对称装入转子内，以保持平衡。



开机运行

- 设置转速RPM/RCF
 - 按下速度旋钮，速度值由常亮变为闪烁
 - 转速范围可设定范围为500-15000 RPM，增量为100 RPM。
 - 旋转速度旋钮以设置速度值
 - 按下速度旋钮确认速度值
 - 按下速度旋钮两次，转速将变为RCF（相对离心力），RCF值将闪烁。旋转并按下以设置并确认RCF。
 - 设定速度后，不按确认键，系统停止数值闪烁，数秒后确认设定值。
- 设定时间
 - 按下时间旋钮，时间值将闪烁
 - 时间可设置为30秒至99分钟
 - 旋转时间旋钮设置时间
 - 按下时间旋钮确认时间
 - 设定时间后，不按确认键，系统停止数值闪烁，数秒后确认设定值。
- 运行
 - 按下“运行/停止”按钮开始运行。
 - 一旦达到设定速度，计时器开始工作，离心机显示剩余运行时间。
 - 如果在运行过程中发生错误，离心机将自动停止并显示错误代码。可以在故障排除中检查错误代码，并相应地采取纠正措施。
- 停止
 - 当设定时间结束或按下“运行/停止”按钮时，离心机将停止运行。
 - 运行停止时，离心机将发出蜂鸣音，盖子将自动打开。
 - 若盖子未打开，按下“开盖”按钮打开。

清洁与维护

- 如果离心机长时间暴露在紫外线下，颜色可能会发生变化。最好把离心机盖好，避免直接接触。
- 用蘸有中性洗涤剂溶液的布或海绵清洁离心机。
- 用蘸有70%乙醇溶液的布对离心机进行清洁。
- 不要将水、中性洗涤剂或消毒液直接倒入转子室，否则液体会流入到电机总成中，导致轴承腐蚀或变质。
- 为防止腐蚀，将转子从转子室中拆下。
- 每3个月检查一次转子，以确保管道和转子孔清洁。

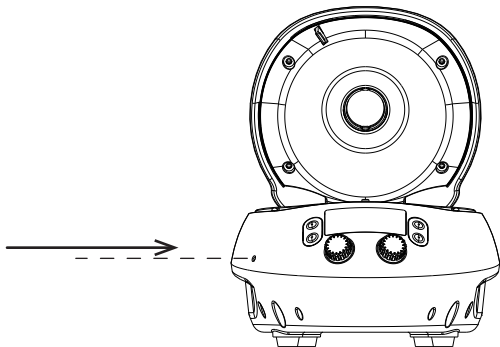
故障排除

离心机具有自诊断功能。如果出现问题，屏幕上将显示错误/警告代码，操作员可以使用以下警告代码确定故障

故障代码	代码含义	处理方式	备注
Er1	无转子/电机接线不良	检查转子状态/电机连接线	
Er2	主电机霍尔异常	检查电机连接线	
Er3	内部电机过热	停止运行，断开电源，冷却一段时间后，降低转速重新运行	
Er4	电机超速	检查电路板/电机	
Er5	电机震动过大	检查转子安装是否正常	
Er6	开门电机堵转	检查开门电机	
Er7	开门电机霍尔异常	检查开门电机霍尔结构	
Er8	/	/	
Er9	外部存储EEPROM故障	更换主板	
Er10	其它故障	其它故障	除E1~E9外的其它故障

盖子开启

- 通电状态
 - 运行结束后，盖子将自动打开。
 - 按“开盖”按钮打开门。
- 断电转态
 - 断电时门无法自动打开。可以使用开门针手动打开。（如下图）
 - 确保运行完全停止。



配件

- 转子*1 (1.5ml/2.0ml×12)
- 适配器 (0.2ml) *12
- 适配器 (0.5ml) *12
- 转子固定螺丝*1
- 转子盖*1
- 扳手*1
- 开门针*1
- 电源适配器*1

技术参数

产品型号	Planet
最高转速[RPM]	500-15000 RPM, 步长: 100 RPM
最大相对离心力[xg]	15100xg, 步长: 100xg
转速精度[RPM]	±20 RPM
转子容量	0.2ml/0.5ml/1.5ml/2.0ml×12
定时	30秒– 99分, 连续运行
电机	直流无刷电机
安全性能	门锁, 超速保护, 过温保护, 状态诊断系统
电压[VAC]	220-240/115/100
频率[Hz]	50/60
功率[w]	120
噪音[dB]	≤56
升速降速[Sec]	30s/110s↓
外形尺寸[长×宽×高mm]	256×225×155
重量[kg]	6
其他功能	转速/离心力转换, 瞬时离心功能, 运行进程显示, 声音提示功能
货号	CF0201002

保修

根据本公司保修规定本机保修 2 年。保修期内如果有任何问题请联络您的供货商, 您也可以将仪器附发票和故障说明直接发至我们公司, 经我方事先确认后运费由贵方承担。保修不包括零件的自然磨损, 也不适用于由于过失、不当操作或者未按操作说明书使用和维护引起的损坏。

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