The Right Solution for Every Application

Newton Scientific

EVO 10 Floor Centrifuge

Instruction Manual

CEN0721-MAN1801

Newton Scientific

Table of Contents

Preface

Before starting to use the centrifuge, read through this instruction manual carefully and follow the instructions.

Failure to follow the instructions and safety information in this instruction manual will result in the expiration of the warranty.

Items Supplied

Item	Quantity
Newton Scientific EVO 10 Centrifuge	1
Power Supply Cable	1
Tool Kit for Rotor Exchange and Installation	1

If any parts are missing, please contact the nearest Newton Scientific representative.

Intended Use

This centrifuge is a laboratory product used to separate substance mixtures of different densities.

This centrifuge must be operated by trained specialists only.

Precautions

WARNING

Observe the safety instructions. Not following these instructions can cause damage.

The centrifuge is to be used for its intended use only. Improper use can cause damages, contamination, and injuries with fatal consequences.

The centrifuge should be operated by trained specialists only.

To ensure safe operation of the Newton Scientific Avante 8 / 8R Centrifuge, general safety regulations must be followed. Mind the regulations in your country.

Set Up Conditions

WARNING

- Connect the power cord of the centrifuge to isolator/switch which have been properly grounded.
- Turn off the centrifuge using the power switch located by the right-hand side on the centrifuge.
- As safety zone maintain a clear radius of at least 30 cm around the centrifuge. Do not place any dangerous substances within this security zone.
- Set up in a well-ventilated environment, on a horizontally levelled and rigid surface with adequate load-bearing capacity.

Preparation

WARNING

- It is the obligation of the operator to make sure, that the proper protective clothing is used. Mind the “Laboratory Biosafety Manual” of the World Health Organization (WHO) and the regulations in your country.
- Do not make any changes to the mechanical components of the rotor.

- Do not touch the electronic components of the centrifuge nor alter any electronic or mechanical components.
- Use only with rotors which have been properly installed.
- Do not use rotors, buckets or accessories which show any signs of corrosion or cracks. Contact technical support for further advice or inspections.
- Use only with rotors which have been loaded properly.
- Never overload the rotor.
- Always balance the samples.
- Use only rotors and accessories for this centrifuge which have been approved by Newton Scientific. Exceptions to this rule are commercially available glass or plastic centrifuge labware, provided they have been designed to fit rotor or adapter cavities and are approved for the speed or the RCF value of the rotor.
- Make sure the rotor is locked properly into place before operating the centrifuge.
- Implement measures which ensure that no one can approach the centrifuge for longer than necessary while it is running.

Hazardous Substances

WARNING

- Especially when working with corrosive samples (salt solutions, acids, bases), the accessory parts and vessel must be cleaned thoroughly.
- Do not centrifuge explosive or flammable materials or substances.
- The centrifuge is neither inert nor protected against explosion. Never use the centrifuge in an explosion-prone environment.
- Do not centrifuge toxic or radioactive materials or any pathogenic micro-organisms without suitable safety precautions.

For materials in a higher risk group, extra safety measures have to be taken.

- If toxins or pathogenic substances have contaminated the centrifuge or its parts, appropriate disinfection measures must be taken.
- Extreme care should be taken with highly corrosive substances which can cause damage and impair the mechanical stability of the rotor. These should only be centrifuged in fully sealed tubes.
- If a hazardous situation occurs, turn off the power supply to the centrifuge and leave the area immediately.

Operating

WARNING

- Never use the centrifuge if parts of its cover panels are damaged or missing.
- Never start the centrifuge when the centrifuge door is open.
- Do not move the centrifuge while it is running.
- Do not lean on the centrifuge.
- Do not place anything on top of the centrifuge during a run.
- Never open the centrifuge door until the rotor has come to a complete stop and this has been confirmed in the display.
- The emergency door release may be used in emergencies only to recover the samples from the centrifuge, e.g. during a power failure (see section "Mechanical Emergency Door Release" on page 27). Do not open the centrifuge, while it is running.

In any case of severe mechanical failure, such as rotor or bucket crash, the centrifuge is not aerosol tight. In case of rotor failure, the centrifuge can be damaged. Leave the room. Inform technical support.

Maintenance

WARNING

The centrifuge housing is not to be opened by the operator. For user perform maintenance and care, refer to page 24.

Symbols used in the manual

This symbol refers to general hazards.

CAUTION means that material damage could occur.

WARNING means that injuries or material damage or contamination could occur.

This symbol refers to biological hazards.

Observe the information contained in the instruction manual to keep yourself and your environment safe.

This symbol refers to electrical hazards.

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Technical Specifications

Technical Data

	Newton Scientific EVO 10
Cat. No.	87001000
Max RPM (rpm)	10,000 rpm
RPM accuracy	±20 rpm
Max RCF	18,300 × g
Max Capacity	6×1000 ml
Set Time	1s to 99h 59min 59s
Temp Range	-20℃ ~ 40℃
Temp Accuracy	±2.0℃
Power Supply	AC 200-240V, 50Hz, 19.6A
Sound Level	≤ 65dBa

Refrigerants

Article No.	Centrifuge	Refrigerant	Quantity	Pressure	GWP	CO_2e
88001801	Newton Scientific Avante 8R	R-134a	1.25 kg	26 bar	1430	1.75 t

Contains fluorinated greenhouse gases in a hermetically sealed system.

Rotor Selection

The Newton Scientific Avante 8 / 8R Centrifuge is supplied without a rotor. Various rotors are available. If not stated otherwise the rotors can be used in the Newton Scientific Avante 8 centrifuge as also in the Newton Scientific Avante 8R centrifuge.

Cat. No.	Type	Capacity	Max Speed (rpm)	RCF (x g)
87160250	NSA-6.250	6 x 250ml	10,000	18,300
87160500	NSA-6.500	6 x 500ml	8,000	11,620
87161000	NSA-6.1000	6 x 1000ml	8,000	13,765
87241000	NSS-4.1000	4 x 1000ml	4,200	4,430
87261000	NSS-6.1000	6 x 1000ml	4,200	5,100

For further details on rotor use and safety, additional accessories, adapters and spare parts, please visit our website at http://www.newton-scientific.com/centrifuge

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Transport and Set Up

Before Setting Up

- Check the centrifuge and the packaging for any shipping damage. Inform the shipping company and Newton Scientific immediately if any damage is discovered.

- Remove the packaging by first removing the bolts use to secure the wooden box using a spanner. Remove the box top cover and then the side covers. The unit can now be removed from the wooden base and position onto the floor. Remove all protection foam and plastic wrapped.

- Check if the items supplied are complete. See “Items Supplied” on page 6 or your delivery note. If the items supplied are incomplete, please contact Newton Scientific.

Location

The centrifuge is only to be operated indoors. The set-up location must fulfill the following requirements:

- A safety zone of at least 30 cm must be maintained around the centrifuge. People and hazardous substances must be kept out of this safety zone while centrifuging.
- The supporting structure must be stable and free of resonance.
- The supporting structure must be suitable for horizontal setup of the centrifuge.
- The centrifuge is not to be exposed to heat and strong sunlight.

WARNING

UV rays reduce the stability of plastics.

Do not subject the centrifuge, rotors and plastic accessories to direct sunlight.

- The set-up location must be always well-ventilated.

Transporting/Moving

WARNING

Always ensure all rubber foot are off the ground by unscrewing using a spanner. Once the wheels are in contact with the floor, you can move the centrifuge by rolling. Never lift the centrifuge by its front panel, its back panel or at its door. Always remove the rotor before moving the centrifuge.

Due to its weight, the centrifuge should be controlled/moved by at least two people.

To prevent possible injuries at least two people should lift and carry the centrifuge by holding it at the bottom from opposite sides.

Transport the centrifuge and accessories upright within the associated packaging, if possible.

NOTICE

Store the original centrifuge packaging. Contact a shipping company or the technical support for the transport.

Always remove the rotor before moving the centrifuge. If you do not remove the rotor you might damage the centrifuge drive or centrifuge spindle.

Setting up & Leveling

Once the centrifuge is in its final position screw the rubber feet entirely down. First use your hand then the wrench to lower the feet. The casters should be 5-15 mm off the ground.

Level the centrifuge as follows:

1. Place the enclosed bubble level on the top surface of the rotor.
2. Adjust the centrifuge feet until the bubble inside the level is completely inside the marked area.
3. Turn the rotor with the bubble level around a full 360°.

When 50 % of the bubble remains within the marked area, the leveling of the centrifuge is OK. If more than 50 % of the bubble leaves the marking, the centrifuge must be leveled again

CAUTION

If the centrifuge isn't leveled, imbalances can occur and the centrifuge can be damaged. Never place anything under the centrifuge feet to level the centrifuge.

The centrifuge is to be placed on horizontal and level supporting structures or floor. Horizontal level is to be checked when moving the centrifuge to a new location.

Mains Connection

NOTICE

Only connect the centrifuge power cable to grounded electrical socket/isolator.

1. Turn off the power supply switch when not in use. Power supply switch is on the right-hand side of the EVO 10 centrifuge.
2. Check whether the cable complies with the safety standards of your country.
3. Make sure that the voltage and frequency correspond to the figures on the rating plate.
4. Establish the connection to the power supply with the supplied power cable.

Storage

WARNING

When removing the centrifuge and accessories from use if necessary clean, disinfect or decontaminate the entire system. In doubt contact the Newton Scientific technical support.

- Before storing the centrifuge and the accessories, it must be cleaned and if necessary disinfected and decontaminated. Centrifuge, rotors, buckets and accessories have to be thoroughly dried before storage.
- Store the centrifuge in a clean, dust-free location.
- Be sure to place the centrifuge on its feet.
- Avoid direct sunlight.

Shipping

WARNING

Before shipping the centrifuge, please bear the following in mind:

- The centrifuge must be clean and decontaminated.
- The decontamination must be confirmed in a decontamination certificate. Contact technical support for more details.
- Ensure that the rotor is removed before moving the centrifuge.

Lifting and Transporting

• Use a forklift to lift the centrifuge is possible.

• The centrifuge can be damaged by impact.

• Transport the centrifuge upright and if at all possible in packaging.

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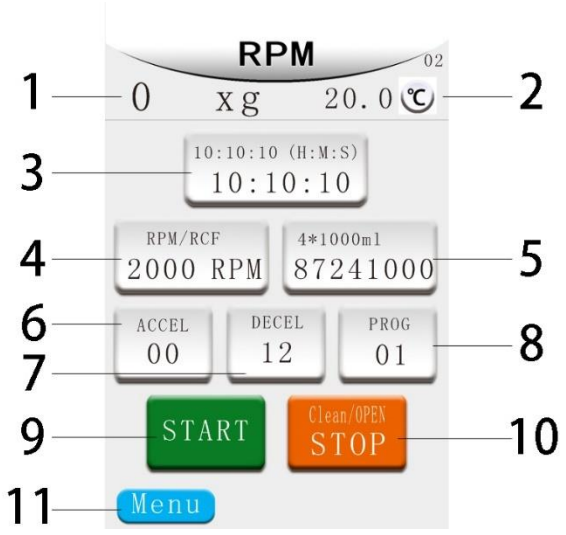
Touchscreen Control Panel

Control Panel

The touchscreen control panel contains all the keys required for you to operate the centrifuge (only the power switch is located on the right-hand side of the centrifuge).

1. Actual RCF
2. Current temperature inside the chamber
3. Time set and display
4. Set RPM (rotating speed)
5. Rotor selected
6. Acceleration rate
7. Deceleration rate
8. Program number
9. Start
10. Stop / Door Open
11. Menu



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Operation

Switching on the Centrifuge

1. Turn on the power switch of the device. The device performs a self-check of its software.

    a) When the centrifuge door is closed the display shows:

    The speed and time displays read “0” and “00:00:00”; the current temperature inside the rotor chamber is displayed.

Open the Centrifuge Door

Press the <Open> key.

WARNING

Do not reach into the gap between the centrifuge door and the housing.

Use the emergency release only for malfunctions and power failures (see “Mechanical Emergency Door Release” on page 27).

Keep hands and objects well clear of the underside and side of the centrifuge door when closing.

Close the centrifuge door by pressing down on it lightly in the middle or on both sides of it. The centrifuge door mechanism will click and lock in place. Lids should not be slammed as excessive force may cause damage or disrupt samples.

NOTICE

The centrifuge door should audibly click into place.

Rotor Installation

The approved rotors for the Newton Scientific EVO 10 are listed in section “Rotor Selection” on page 12. Use only the rotors from this list in the centrifuge.

CAUTION

Unapproved or incorrectly combined accessories can cause serious damage to the centrifuge.

Use the supplied tools to tighten or release the rotor from the centrifuge spindle.

Proceed as follows:

1. Open the centrifuge door and if necessary, remove any dust, foreign objects, or residue from the chamber.

2. Place the rotor over the centrifuge spindle and lower vertically and slowly down the centrifuge spindle. Use the locking nut provided to tighten the rotor onto the spindle. Hand tight is sufficient.

   CAUTION: Do not over tighten the rotor onto the centrifuge spindle.

3. Check if the rotor is properly installed by lifting it slightly on the handle or from beneath the rotor. If the rotor can be pulled up, then it must be adjusted and retighten to the centrifuge spindle.

   WARNING: If the rotor cannot be properly secured in place. Check for any damage to the rotor and the spindle: Damaged rotors must not be used. Keep the centrifuge spindle area of the rotor clear of objects.

   If in doubt, please contact Newton Scientific Technical support.

   CAUTION: Check that the rotor is properly locked on the centrifuge spindle before each use by pulling it from beneath the rotor. The rotor must be locked tight.

4. Close the centrifuge door.

Acceleration / Deceleration Rates

The Newton Scientific Evo 10 offers you 10 selections for each plus the ability to have the option to set to “0” brake. The setting is displayed above the ACCEL / DECEL button on the touchscreen.

Press the ACCL / DECL button to key in the desired rates. Press Enter to confirm. The last profile is saved when you restart the centrifuge.

Pre-Selecting Speed/RCF

RPM stands for Revolutions Per Minute.

RCF stands for Relative Centrifugal Force and allows better transfer of protocols between centrifuges and rotors of differing size.

Ensure that the rpm or RCF is correctly set.

1. Press the RPM/RCF button to select RPM or RCF.

2. Enter the desired value by using the number keypad and press Enter to confirm. RPM / RCF can be viewed during a run on the top left-hand corner of the screen.

NOTICE

The minimum motor speed is 150 rpm. Any extremely low RPM settings will be automatically increased to the minimum RPM at 150 rpm.

Running Time Pre-Selection

1. Press the Time display window to access the number keypad.

2. Enter the desired runtime in hh:mm:ss.

3. Press Enter to confirm.

Preselecting the Temperature

You can preselect temperatures between -20 °C and +40 °C. To set the temperature, proceed as follows:

1. Press the TEMP display area to access the number keypad.

2. Key in the desired temperature.

3. Press Enter to confirm.

Precooling the Centrifuge

Ensure the rotor, buckets and accessories are correctly in place and securely attached in the chamber. For setting the pretemp value for the centrifuge proceed as follows:

1. Press the TEMP display area to access the number keypad. On the bottom left corner of the screen, press the Pre-cool button.

2. The centrifuge motor will start and a specific speed defined by the rotor. This improves air circulation within the chamber, resulting in improved temperature control throughout the chamber and rotor. The rotor chamber is cooled down to the preset temperature.

Programs

The Newton Scientific EVO 10 Centrifuge is able to save up to 99 programs. It is only possible to save a program if the centrifuge is in standstill. Loading or saving of programs is not possible if the centrifuge is spinning.

Saving a Program

1. Press the <PROG> button and select Program number that you wished to manage.

2. Proceed to modify the speed, time and temperature to the desired values.

3. Saving is confirmed when the changed parameter stops blinking.

Selecting a Program

Press on the <PROG> button and scroll through the list to select the desired program. Press <Start> to run the selected program.

Centrifugation

Maximum Loading

 **WARNING:** Injuries with fatal consequences can occur when using substance mixtures with a higher density than 1.2 at maximum speed .

Rotors can run at high speeds. Each rotor is specifically designed to run at its maximum speed with a defined load. For further details refer page 12 to find maximum speed allowed for the corresponding rotor.

The rotors are designed to work with substance mixtures with a density of up to 1.2 g/ml. Above this density or if total load is above the maximum weight the following steps should be taken:

- Reduce the fill level.
- Reduce the speed.

Use of Tubes and Consumables

Care should be taken to ensure that the tubes and bottles used in the centrifuge are:

- Rated to or above the selected RCF to be spun at
- They are being used at or above the minimum fill volume
- They are not being used above their design life (age or number of runs)
- They are inspected for damage

Refer to the tubes and consumables manufacturers data sheets for further information.

Starting the Centrifuge Run

Press the <Start> button on the control panel. The centrifuge accelerates to the pre-set speed with the time display active.

Imbalance Indicator

The centrifuge is fitted with an imbalance detector, to ensure safety. If an imbalance is detected at speeds higher than approx. 200 rpm an error message will be displayed. The run will terminate.

Imbalance at high speed may indicate a tube breakage or leak or rotor crash. Therefore additional care should be taken depending on the samples loaded.

Stopping the Centrifuge Run

With Pre-Set Running Time

If the run time is preset, the centrifuge will run at the selected speed until the desired run time is reached. It will then automatically decelerate and stop. Once stopped, access to the chamber and rotor can be gained by pressing the OPEN key. If selected the door will open automatically.

You can also stop the centrifuging program manually at any time by pressing the STOP key.

Removing the Rotor

To remove the rotor, proceed as follows:

1. Open the centrifuge door.

2. Use the tool provided to loosen the nut on the spindle.

3. Remove the rotor by pulling upwards or use supplied rotor removal tool to assist to unlock the rotor from the spindle.

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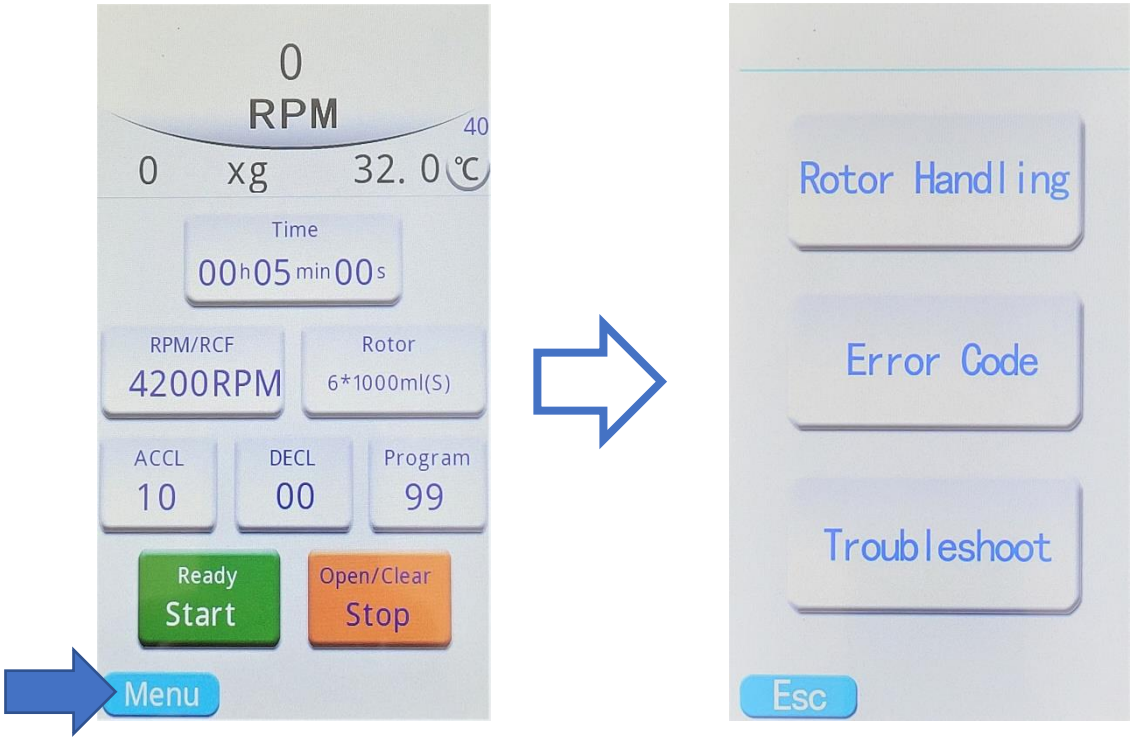
System Menu

To get into the system menu, press the Menu key on the display. Navigate through the system menu by pressing on the buttons.



Rotor Handling

Illustration on how rotor should be handled is displayed on the touchscreen.

Error Code

All error code and corresponding description will be displayed (or refer to page 29).

Troubleshoot

Provide diagnosis on possible causes and recommendations to resolve an error (or refer to page 28).

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Maintenance and Care

Cleaning Intervals

For the sake of personal, environmental, and material protection, it is your duty to clean and if necessary, disinfect the centrifuge on a regular basis.

Maintenance	Recommended Interval
Rotor Chamber (Bowl)	Daily or when polluted
Rotor	Daily or when polluted
Accessories	Daily or when polluted
Filter Mat (Capacitor)	Every six weeks or when polluted
Cabinet	Once per month
Ventilation Holes	Every six months

Basics

1. Use warm water with a neutral detergent that is suitable for use with the materials. If in doubt contact the manufacturer of the cleaning agents.
2. Never use caustic cleaning agents such as soap suds, phosphoric acid, bleaching solutions or scrubbing powder.
3. Remove rotor and clean bowl with a small amount of cleaning agent, applied to a clean cloth.
4. Use a soft brush without metal bristles to remove stubborn residue. Afterwards rinse with a small amount of distilled water and remove any excess with absorbent towels.
5. Use only disinfectants with a pH of 6-8.

CAUTION:

- Not rated procedures or agents could deteriorate the materials of the centrifuge and lead to malfunction.
- Refrain from using any other cleaning or decontamination procedure than those recommended here, if you are not entirely sure that the intended procedure is safe for the equipment.
- Use only approved cleansers.
- If in doubt, contact Newton Scientific.

Rotor and Accessories Inspection

After thoroughly cleaning rotors, they should be inspected for damage, wear and corrosion.

Metal Parts

Ensure that the black protective coating is complete. It can be removed through wear and chemical attack and can lead to unseen corrosions. Any signs of corrosions, such as rust, the rotor or accessories should be immediately removed from service. Particular attention should be taken with the bottom of buckets on swing out rotors and tube cavities on fixed angle rotors.

Plastic Parts

Check for signs plastic crazing, fading, bruising or cracking.

 **CAUTION**

- Do not run any rotor or accessories with sign of damage.
- Ensure that the rotor, buckets and accessories are within the service life and number of cycles.
- It is recommend that you have rotors and accessories inspected yearly as part of your routine service to ensure safety.

Cleaning

1. Clean rotor, buckets and accessories outside of the centrifuge bowl.
2. Separate all rotors, buckets, lids, adapters and tubes to allow thorough cleaning.
3. Rinse rotor and all accessories with warm water and a neutral detergent that is suitable for use with the materials. If in doubt contact the manufacturer of the cleaning agents. Ensure grease on rotor trunnions (pivot point for swinging buckets) is cleaned away.
4. Use a soft brush without metal bristles to remove stubborn residue.
5. Rinse rotor and all accessories with distilled water.
6. Allow rotor and accessories to fully drain and dry.
7. Once clean and dry, inspect the rotor and accessories.

 **CAUTION:** Before using any cleaning methods except those recommended by the manufacturer, users should check with the manufacturer of the cleaning agents that the proposed method will not damage the equipment.

Shipping and Disposal

 **WARNING:**

When removing the centrifuge and accessories from use for disposal you have to clean and if necessary, disinfect or decontaminate the entire system. In doubt contact the Newton Scientific technical support.

For the countries of the European Union the disposal is regulated by the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2012/19/EU.

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Troubleshooting

Mechanical Emergency Door Release

During a power failure, you will not be able to open the centrifuge door with the regular electric door release. A mechanical override is provided to allow sample recovery in the case of an emergency. This is only to be used in emergencies and after the rotor has come to a complete stop.

WARNING

- Spinning rotor can cause serious injuries when touched. In case of power outage, the rotor can still be spinning.
- Do not open the centrifuge before the rotor has stopped. Do not touch the spinning rotor. Do not attempt to brake the rotor using hands or other tools.

Always wait until the rotor has come to a stop without braking. The brake does not work when there is no current. The braking process lasts much longer than usual.

Proceed as follows:

1. Make sure the rotor has stopped (view port in the centrifuge door).

2. Ensure the power supply isolator is switched off.

3. Pull the release cord (on the bottom side of the panel, is one black plastic plug which can be removed from the panel with a small flat screwdriver. Once the plug is removed it will expose the release cord).

4. Pulling the release cord trigger the mechanical door release. The centrifuge door will open and the samples can be removed.

Troubleshooting Guide

If problems occur other than those listed in this table, the authorized technical support representative must be contacted.

General Errors	Causes	Actions
Display does not light up when the power is switched on	No power supply to the centrifuge	Check cable connections.
		Check there is power at socket.
	Blown fuse	Replace fuse.
Abnormal vibration during run	Rotor is off balance	Check the loading of the rotor and load the rotor symmetrically.
	Tube rupture	Visual inspection of tubes.
	Rotor is not tightened	Tighten the rotor nut by turning clockwise using the supplied rotor key.
	Swing-rotor buckets does not swing smoothly	Clean the pivots and grooves and apply grease.
	Damage shock absorber	Contact a service technician.
Centrifuge run cannot be started	Control system error	Switch the centrifuge off and on again. If the problem persists, contact a service technician.

Error Code

Error Code	Description
E01	Imbalance
E02	Overspeed
E04	Door open during run
E05	Temperature sensor error
E06	Over temperature
E07	Motor stall
E08	Communication error
E09	System error
E10	Abnormal voltage
E11	Over current protection
E12	Motor fault
E13	Brake resistance
E15	Rotor error

When to contact technical support

If you need to contact technical support, please provide the order no. and the serial no. of your centrifuge. This information can be found on the nameplate at the left-hand side of the centrifuge. cable.

In addition, the technical support also needs the Software version. Both are available in the system menu.

Limited Warranty

Newton Scientific Ltd. warrants that this product will be free from defects in material and workmanship for a period of one (1) year from date of purchase. This warranty is valid only if the product is used for its intended purpose and within the guidelines specified in the supplied instruction manual.

Should this product require service, contact Newton Scientific technical support department. All items returned for service should be sent postage prepaid in the original packaging or other suitable carton and padded to avoid damage. Newton Scientific will not be responsible for damage incurred by improper packaging. Newton Scientific may elect for onsite service for larger equipment.

This warranty does not cover damage caused by accident, neglect, misuse, improper service, natural forces, or other causes not arising from defects in original material or workmanship. This warranty does not cover motor brushes, fuses, light bulbs, batteries, or damage to paint or finish. Claims for transit damage should be filed with the transportation carrier. All warranties including the implied warranty of merchantability and fitness for a particular purpose are limited in duration of 12 months from the original date of purchase.

Newton Scientific's sole obligation under this warranty is limited to the repair or replacement, at c Newton Scientific's discretion, of a defective product. Newton Scientific is not liable for incidental or consequential damage, commercial loss, or any other damages resulting from the use of this product.

No individual may accept for, or on behalf of Newton Scientific, any other obligation of liability, or extend the period of this warranty. For your reference, make a note of the model and serial number, date of purchase, and supplier here.

Model No.:

Serial No.:

Date Purchased:

Supplier:

Newton Scientific

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