
CLEMENTS

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Orbital 160 Benchtop Centrifuge

**CEN 90200
240V 50Hz**



User Manual

Manual No. CEN 90200 017
Issue 4

Safety

Thank you for purchasing this Clements Orbital 160 Centrifuge. For your safety it is imperative that this unit only be operated by authorised personnel in accordance with the instructions as described in this manual. Operated in this way, the Orbital 160 Centrifuge will provide the standard of service specified.

Due to continual improvements in product design, the Orbital 160 Centrifuge may vary in detail from the descriptions in this manual. In the event of further questions please contact your local distributor or BMDi TUTA Healthcare direct.

User Manual Orbital 160 Centrifuge

Manual Number CEN 90200 017 Issue 4

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Description

The Orbital 160 Centrifuge is a versatile, compact and reliable benchtop centrifuge. It is designed for clinical and small laboratory applications where precise digital control of speed and time is required.

Features

- Brushless DC motor technology for low maintenance operation
- Accurate digital control of speed and time for repeatable processing
- High visibility LED display with touch control panel
- Electronic lid interlock to ensure that centrifuge can be started and run only with lid locked
- Moulded one-piece bowl
- Adjustable acceleration and deceleration for sensitive samples
- Selectable rpm or RCF display
- Previous parameters maintained through power off/on

Specifications

Speed Range	100 to 16,500 rpm
Maximum RCF	18,360 x g
Speed Accuracy	±1% (500 - 16,500 rpm)
Time Range	1 to 99 minutes
Angle Rotors	12 x 1.5 ml 8 x 5 ml
Microhaematocrit Rotor	12 x 1.75 mm
Power Requirement	220-240V 50/60Hz 5A
Electrical Protection	Class I
Noise	< 65dB(A)
Dimensions	195 (W) x 305 (H) x 255 (D) mm
Weight	8kg
Environment	Indoor 10 to 35°C, RH < 85%

Warnings and Cautions

For safe operation ensure that users read, understand and observe the instructions and recommendations in this user manual.

Power

Ensure that the mains power supply matches that shown on the rating label of the centrifuge.

Flammable Samples

The centrifuge is not flameproof. Do not use flammable samples in the centrifuge. Do not store flammable or volatile material within 300mm of the centrifuge.

Biohazardous Samples

Local protocols must be observed when handling potentially biohazardous materials. Carriers with aerosol protection are to be used.

Fluid Spill

Do not allow fluids to enter the centrifuge. If a spill occurs wipe clean, paying attention to the nature of the material.

Balancing

The centrifuge must always be run with a full complement of buckets or carriers. Balance samples either *by eye* or by weighing. Fill unused tubes with an equivalent amount of fluid as in sample tube.

Operating

Do not stand within 300mm of centrifuge while it is running.
Do not move centrifuge while the rotor is spinning.
Do not open lid while rotor is spinning.
Do not attempt to stop rotor by hand.

Installation

Unpacking

Keep centrifuge horizontal while removing it from carton. Retain packaging for transporting centrifuge. With power off, release lid lock by inserting manual release tool in small hole on top right hand side of centrifuge. Keep tool parallel to front of panel and press release plate. Remove tool.

Remove packing, carriers etc from centrifuge bowl. Ensure that bowl is clean.

Location

The centrifuge should be placed on a solid level surface in a well ventilated area. The back of the centrifuge must be at least 10cm away from any wall or vertical surface.

Power Requirements

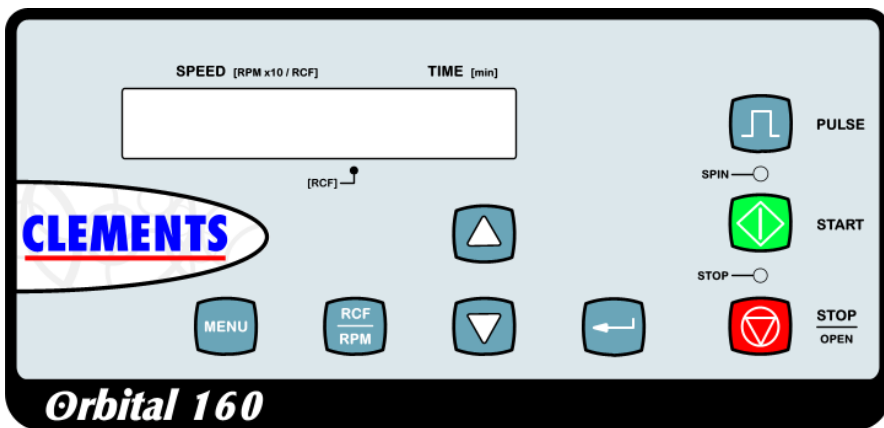
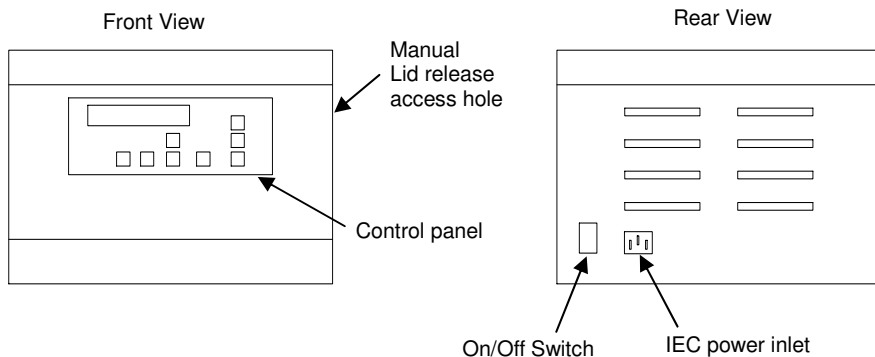
Before connecting the centrifuge to the mains power supply, ensure that the electricity supply conforms to the requirements for voltage and frequency shown on the rating label on the back of the unit.

The power supply should be stable, clean and free of surges and brownouts.

Connect the centrifuge to the mains power supply using the supplied earthed power cable.




For extended periods of non-use, switch off main power switch on rear panel of centrifuge.

Controls



Condition	LED Display Shows
In Spin Cycle	Actual Values of Speed / RCF and Time Remaining
Rotor Stopped	Set Values of Speed / RCF and Time
Setting Mode	Set Values of Parameter
Error	Error code n of form En

Controls

Item	Function
On/Off Switch	Switches mains power to centrifuge.
IEC Inlet	Mains power inlet. Also contains fuse holder.
Lid release access hole	Access for manual lid release tool. Centrifuge must be disconnected from power.
LED Speed Display	Shows actual and set speed in either rpm or RCF.
LED Time Display	Shows set time and time remaining in minutes. Shows error code <i>n</i> of form <i>En</i> .
RCF Indicator	Decimal point of right-most digit of speed display indicates RCF when lit and spinning.
STOP / OPEN Button	Stops spin cycle. When rotor has stopped acts as lid release button. Cancels error condition.
START Button	Starts spin cycle.
PULSE Button	Spins rotor when held down.
ENTER Button 	Enters and saves changed parameters. Exits parameter setting mode.
INC Button 	Increases value of set parameters.
DEC Button 	Decreases value of set parameters.
RCF / RPM Button	Switches between display of RCF and rpm. Times out after 10 seconds.
MENU Button	Steps through parameter change menu in circular fashion.
SPIN LED (Green)	Indicates that spin cycle is in progress.
STOP LED (Red)	Indicates that spin cycle is stopping.

Operation

Rotor Fitting

1. Open lid and switch off centrifuge.
2. Remove carriers from rotor.
3. While supporting rotor with one hand, unscrew (CCW) rotor-retaining cap screw.
4. Lift off rotor being careful not to bend or apply side load to motor shaft.
5. Select a compatible rotor, align the slot in the rotor shaft with the drive pin in the motor shaft and fit together.
6. Fit cap screw and washer to rotor.
7. While supporting rotor with one hand, hand tighten (CW) rotor-retaining cap screw - again being careful not to bend or apply side load to motor shaft..
8. Confirm that rotor rotates smoothly and evenly by hand.

Carrier Fitting (swing-out style rotors)

1. Fit a full complement of compatible carriers to the rotor.
2. Ensure that carriers are fully seated and can swing freely.
3. Switch centrifuge power on.

Tube Fitting

Select a full complement of compatible tubes with an RCF rating in excess of the maximum RCF of the centrifuge.

Balancing of Samples

It is important that the samples are correctly balanced within the centrifuge prior to starting the unit. For correct balance there are two requirements:

1. Balance the weight of the samples
2. Balance the location of the samples

1. Balance the weight of the samples

For every sample in the centrifuge there must be a balancing sample of equal weight. The samples may be balanced 'by eye' i.e. two samples appear to contain the same volume and are therefore approximately the same weight.

Where delicate samples are involved, it is recommended that the samples be placed in Tube Carriers and balanced by weighing them. This will ensure that vibration during the centrifugation process will be kept to a minimum.

2. Balance the location of the samples

The samples must be placed on the Rotor so that the weight of the samples is equally distributed. To do this the equally weighted samples must be placed in diametrically opposite positions on the rotor.

Note: Even though the Orbital 160 is designed to absorb considerable out-of-balance forces, running the centrifuge with out-of-balance samples will cause excessive vibration. This will disturb the samples, affect the overall performance of the unit and may lead to mechanical damage.

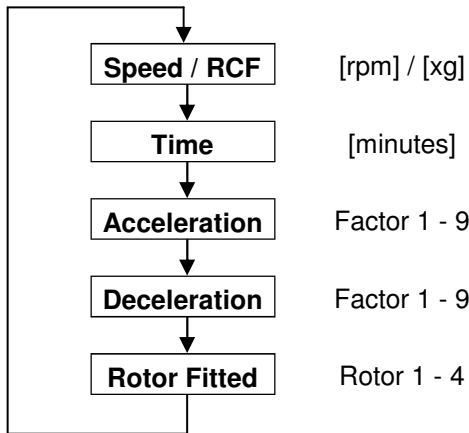
Parameter Setting Menu

Press **MENU** to select parameter setting mode.

Each press of the **MENU** button advances to the next parameter.

Press **ENTER** to save the parameters and exit the parameter setting mode.

Parameter setting mode is automatically cancelled after a 5 second timeout with no button pressed.



Set Rotor Fitted

Note: It is essential that the rotor setting matches the rotor fitted. Otherwise the rotor could be subject to speeds in excess of its rating leading to damage to the rotor.

1. Ensure the rotor is stopped.
2. Press the **MENU** button until the display shows *rot*.
3. Press the **INC** or **DEC** buttons until the rotor number matches the rotor that is fitted to the centrifuge.
4. Press the **ENTER** button to save the setting.

Select RPM or RCF

The decimal point of the right-most digit of the speed display indicates RCF when lit.

Press the **RCF / RPM** button to toggle between RCF and rpm display modes.

The **RCF / RPM** mode can be changed at any time while spinning. Display mode reverts to RPM after 10 seconds.

Set Speed

1. Press **MENU** button until 4-digit speed display flashes.
2. Press **INC** or **DEC** to select required speed. Note that speed changes in steps of 100rpm and will auto-increment or auto-decrement if the **INC** or **DEC** button is held down.
3. Press the **ENTER** button to save the setting.

Set Time

1. Press **MENU** button until 2-digit time display flashes.
2. Press **INC** or **DEC** to select required time. Note that time changes in steps of 1 minute and will auto-increment or auto-decrement if the **INC** or **DEC** button is held down.
3. Press the **ENTER** button to save the setting.

Set Acceleration Profile

1. Press the **MENU** button until the display shows *ACC*.
2. Press the **INC** or **DEC** buttons to select the required acceleration profile. Acceleration profiles range from a minimum of 1 to a maximum of 9.
The default acceleration profile is 5.
3. Press the **ENTER** button to save the setting.

Set Deceleration Profile

1. Press the **MENU** button until the display shows *dEC*.
2. Press the **INC** or **DEC** buttons to select the required deceleration profile. Deceleration profiles range from a minimum of 1 to a maximum of 9.
The default deceleration profile is 5.
3. Press the **ENTER** button to save the setting.

Operation Summary

See previous sections for details of individual steps.

1. Confirm that correct rotor is selected.
2. Load a balanced and evenly distributed set of sample tubes.
3. Close lid.
4. Confirm acceleration and deceleration profiles.
5. Set required speed.
6. Set required spin time.
7. Press START button.
 - The rotor will automatically accelerate to the set speed using the set acceleration profile.
 - The rotor will spin for the set time with the time display counting down to zero.
 - The rotor will automatically decelerate to zero using the set deceleration profile.
 - When the rotor has stopped the beeper will signal the end of the spin cycle.
8. Press the STOP / OPEN button to unlock the lid.

Note: For repeat operations using the same settings, the only steps required are to load the samples, close the lid and press the START button.

The previous settings are automatically restored at power-on.

Rotor Setting

Rotor	Type	Carriers / Tubes	Max rpm	Max x g	Rotor Setting
CEN 90200 001	Angle	12 x 1.5ml	16,500	18,360	1
CEN 90200 002	Angle	8 x 5ml	13,500	12,300	2
CEN 90200 003	Micro haematocrit	24 x 1.75mm	11,000	11,200	4

Angle Rotor CEN 90200 001

12 x 1.5ml Tubes

Max rpm: 16,500

Max RCF: 18,360

Rotor Setting: 1



Angle Rotor CEN 90200 002

8 x 5ml Carriers

Max Speed: 13,500rpm

Max RCF: 12,300

Rotor Setting: 2



Microhaematocrit Rotor CEN 90200 003
12 x 1.75mm Carriers
Max Speed: 11,000
Max RCF: 11,200
Rotor Setting: 4



Accessories and Spares

Accessories

CEN 90200 001	Angle Rotor for 12 x 1.5ml Tubes for Orbital 160
CEN 90200 002	Angle Rotor for 8 x 5ml Tubes for Orbital 160
CEN 90200 003	Microhaematocrit Rotor 12-place for Orbital 160

Spares

CEN 91800 010	Motor Drive PCB Assembly for Orbital 160 / 260
CEN 91800 012	LED Display PCB for Orbital 160
CEN 91800 015	Electronic Lid Lock for Orbital 160 / 260
CEN 90200 006	DC Brushless Motor for Orbital 160
CEN 90200 007	Hinge set for Orbital 160
CEN 90200 008	Power Transformer for Orbital 160 (240V)
CEN 90200 017	User Manual for Orbital 160
CEN 96226	Linear Capillary Reader

Cleaning

The centrifuge should be regularly cleaned to maintain its appearance and to ensure that dust or other damaging materials do not build up and affect the performance of the unit.

- Before cleaning the centrifuge disconnect it from the mains power supply.
- Clean the exterior surfaces using a proprietary furniture polish.
- Wipe the bowl and Rotor with a clean soft cloth dampened in a solution of warm water and a mild detergent.
- Most sterilising agents can be used on the interior bowl but avoid flooding the interior and never operate the centrifuge with disinfectant in the bowl.
- Solvent-based cleaning agents and abrasive cleaning agents should never be used on the Orbital 160.

Maintenance

The Orbital 160 is designed to provide extended and reliable operation. To ensure proper operation and maximise the life of the centrifuge the following requirements must be observed:

- The centrifuge should be inspected by authorised service personnel every six months as part of your routine maintenance plan
- Confirm that lid interlock prevents starting when lid is unlocked and also prevents opening lid before rotor has stopped
- Using an optical tachometer confirm that the speed remains within specification
- Use only genuine Clements spare parts

Fuse Replacement

1. Switch off mains power to centrifuge using switch on rear panel.
2. Remove power cable from centrifuge IEC mains power inlet.
3. Slide out fuse holder and remove blown fuse from U-shaped holder.
4. Replace fuse with one matching fuse rating on rating label.
(A spare fuse is normally fitted to the fuse holder.)

Error Conditions

Error Code	Fault	Action
E4	Lid not closed when <i>START</i> button pressed	Close lid. Adjust <i>Lid Closed</i> limit switch.
E6	Overspeed condition: Incorrect rotor setting Power control PCB fault Motor fault	++ SWITCH OFF ++ Verify correct rotor setting Replace power PCB Replace motor
E7	Underspeed condition: Mains power fault Power control PCB fault Tachometer circuit fault	++ SWITCH OFF ++ Check transformer Replace power control PCB Check tachometer circuit
E9	Communication fault: Fault in cable between display PCB and power control PCB	++ SWITCH OFF ++ Check cable and connections

Note:

When error conditions E6, E7 or E9 occur, the centrifuge must be SWITCHED OFF and the fault corrected before proceeding.

Troubleshooting

Symptom	Possible Cause	Action
LED display not lit when power switched on.	Power cable not plugged in securely.	Plug in power cable.
	No power supply.	Confirm power supply.
	Fuse has blown.	Replace fuse.
	Loose connecting cables.	Check and re-seat connectors.
Rotor does not spin when <i>START</i> button pressed.	Lid not closed.	Close lid.
	Loose connecting cables.	Check and re-seat connectors.
	Power transformer fault.	Replace power transformer.
	Motor fault.	Replace motor.
	PCB fault.	Replace PCB.
Excessive vibration.	Imbalanced carriers or sample tubes.	Rebalance.
	Broken sample tube.	Clean and replace sample tube.
	Unequal weight samples.	Make samples equal weight.
	Damaged platform shock absorber.	Replace shock absorber.

Warranty

BMDi TUTA Healthcare Pty Limited ("BMDi TUTA Healthcare") warrants that this product is free from defects in workmanship and materials for a period of 12 months from the date of shipment by BMDi TUTA Healthcare or its authorised agent to the purchaser. Subject to the conditions of this warranty, if the product fails to operate for any reason within the warranty period and the product is returned to the place of purchase at the purchaser's expense, BMDi TUTA Healthcare will repair or replace the product free of charge.

If a valid warranty claim is made within 30 days from the date of shipment, then BMDi TUTA Healthcare will also reimburse the purchaser for reasonable freight costs in returning the product to the place of purchase.

Conditions of Warranty

1. The product must be returned to the place of purchase with proof of purchase.
2. This warranty is only available to the original purchaser of the product.
3. The product must not have had its serial number removed, defaced or changed, its casing opened, its power supply altered or have been tampered with in any other way.
4. This warranty does not cover :
 - inadequate or incorrect site preparation;
 - improper installation;
 - connection to the wrong voltage;
 - failure of the product due to misuse;
 - the use or operation of the product outside of the physical, electrical or environmental specifications of the product;
 - use in a manner or environment in which the product is not designed to be used;
 - improper adjustment, calibration or operation by the purchaser;
 - the use of accessories including consumables, hardware or software which were not manufactured or approved in writing by BMDi TUTA Healthcare ;

- any modifications of the product which were not authorised in writing by BMDi TUTA Healthcare ;
 - any contamination or leakages caused or induced by the purchaser; and
 - inadequate or improper maintenance of the product.
5. This warranty does not cover normal wear and tear.
 6. BMDi TUTA Healthcare will not be responsible for damage or loss caused during shipping.
 7. In Australia, apart from any warranties implied by the Trade Practices Act 1974 all other warranties expressed or implied and whether arising by virtue of statute or otherwise are hereby excluded.
 8. Outside Australia, all other warranties expressed or implied and whether arising by virtue of statute or otherwise (including any warranties implied by the Vienna Convention) are hereby excluded.
 9. BMDi TUTA Healthcare's obligations under this warranty are limited to the repair or replacement of the product, within the terms of this warranty and the total liability of BMDi TUTA Healthcare for loss or damage of every kind whether arising pursuant to the terms of the sale of the product or otherwise in connection with the product is limited to the amount paid by the purchaser to BMDi TUTA Healthcare for the product.
 10. Apart from any liability imposed by Part VA of the Trade Practices Act, BMDi TUTA Healthcare accepts no other liability for any loss or damage occasioned (including consequential loss or damages) in any way as a result of the use of the product.
 11. The warranty does not extend to cover damage to the following parts as they are inherently prone to wear :
 - motor brushes
 12. This warranty does not extend to cover corrosion due to any cause nor to any damage to painted or anodised surfaces.
 13. BMDi TUTA Healthcare will give the purchaser the benefit of any manufacturer's warranty in respect of any components in the product which were not manufactured by BMDi TUTA Healthcare , if such a manufacturer's warranty is available.

