CENTURION
SCIENTIFIC LIMITED

LCD display centrifuges

Ambient & Refrigerated instruction manual

PrO-Research

IMPORTANT Read before using

- Check the Centrifuge and the Packaging for any shipping damage.
  Inform the shipping company and Centurion Scientific immediately
- Check the order for completeness, if not contact Centurion Scientific

Location

The Centrifuge should only be operated indoors.

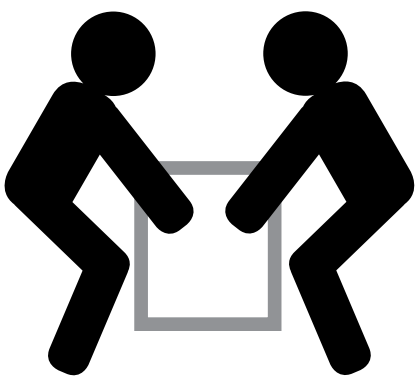
The set up location must fulfil the following requirements

- **A safety zone of at least 30Cm must be maintained around the Centrifuge**
- **People and hazardous substances must be kept out of this zone during centrifugation**
- The bench or supporting structure must be stable and free from resonance
- The Bench or supporting structure must be suitable for horizontal use of the centrifuge
- The Centrifuge should Not be exposed to heat or strong sunlight
- Ultra violet rays can damage the stability of plastics and coatings
- Do not subject the Polypropylene, Delrin rotors or accessories to direct sunlight
- The Zone location must be well ventilated at all times

- Store the original packaging, Keep this for future service to base , if required.

Transporting the Centrifuge

- Always remove the Rotor before transportation
- Due to its weight the Centrifuge should be carried by several people
- Transport the Centrifuge upright and if possible in its packaging
- Always lift the centrifuge at both sides (see below). NOT front to rear.



Fixing of rotor

Fixing for micro and fixed angle rotors

BRK5401. BRK54XXseries. BRK53XX series. BRK52XX series

Locate 3 pins of fixing,into 3 holesat the top of the rotor
Push down firmly into holes.

Lift and fit rotor onto the motor shaft. M

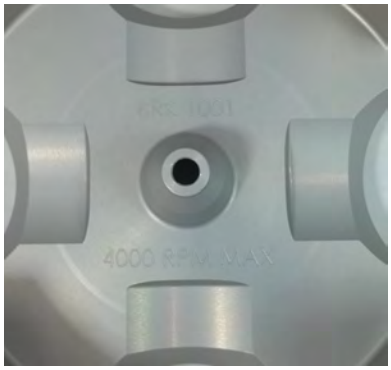
Fit theScrew and spring washer, screw down tightwith the supplied tool.

Checktightness regularly.

Motor shaft

Fixing for Swing out rotors.

BRK5508, BRK5506, BRK1001, BRK3000, BRK5540, BRK5740.



Lift and fit rotor onto the motor shaft.M

Fit the Screw and spring washer, screw down tight with the supplied tool.

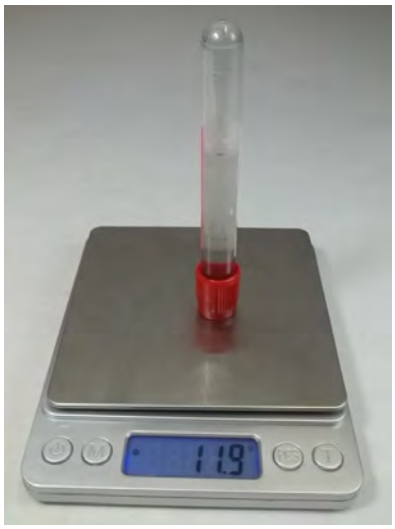
Check tightness regularly

Rotor balancing. Very Important

Balancing of tubes for Micro and Fixed angle rotors

Tare (zero) your scales first

Weigh a tube , note its weight Weigh another and match its weight to within 0.1 gram



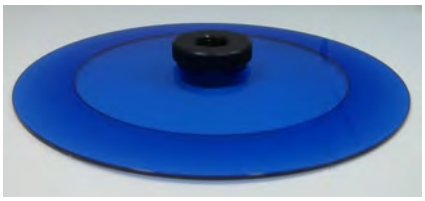
Swing out rotor, buckets. Balancing

Place all your required tubes in all 4 buckets.
Equal amount per bucket.
Weigh each bucket containing tubes

Match other 3 buckets, with tubes to within 1 gram of each other

For BRK5506 rotor use the adaptor

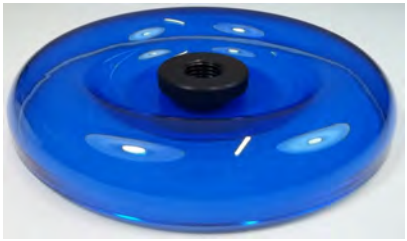
Tube placement micro rotors



Haematocrit Rotor

Always fit the lid supplied, as shown to the left

ALWAYS load your tubes opposite to each other
ALWAYS weigh samples to within**0.1** Gram. For best separations. (see page 4)
ALWAYS fit the lid supplied
CHECK the Rim seal gasket and replace **every 2 months** (Part number 8011)
CHECK the rotor screw fixing tightness regularly



Micro tube Rotor

Always fit the lid supplied, as shown to the left

ALWAYS load your tubes opposite to each other
ALWAYS weigh samples to within**0.1** Gram For best separations. **(seep page 4)**
ALWAYS fit the lid supplied
CHECK the two top seals and replace regularly (Part number 8044)
CHECK the rotor screw fixing tightness regularly

Tube placement Fixed angle rotors

Small fixed angle Rotors

Always fit the lid supplied, as shown to the left

ALWAYS load your tubes opposite to each other
ALWAYS weigh samples to within 0.1 Gram. For best separations. (see page 4)
CHECK The rotor screw fixing tightness regularly

Large fixed angle Rotors

Always fit the lid supplied, as shown to the left

ALWAYS load your tubes opposite to each other
ALWAYS weigh samples to within 0.1 Gram. For best separations. (see page 4)
CHECK The rotor screw fixing tightness regularly

Tube & bucket placements Swing out rotors

Small Swing out rotor

ALWAYS load your tubes opposite to each other
ALWAYS weigh samples to within **0.1** Gram. For best separations
ALWAYS fit ALL the Tube Holders and any supports
CHECK The rotor screw fixing tightness regularly

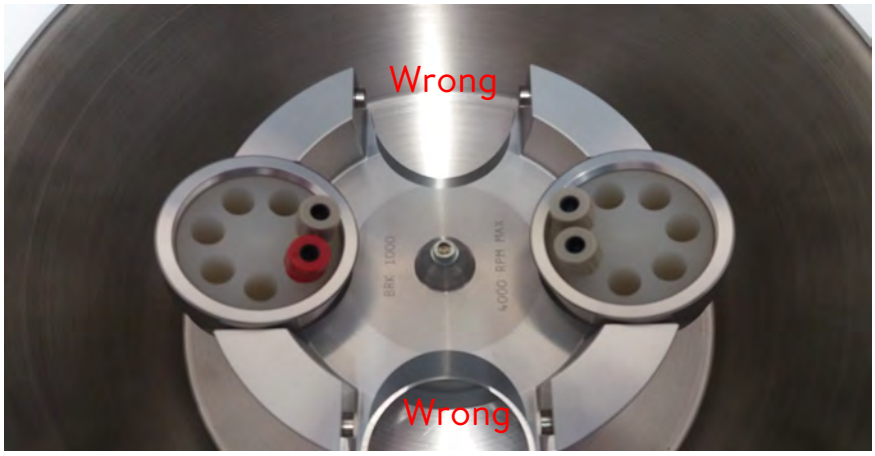
Medium – Large Swing out Rotors

ALWAYS load your tubes opposite to each other
ALWAYS Weigh **Bucket and all** samples within to 1.0 Gram
ALWAYS fit ALL 4 Buckets and 4 Adaptors supplied
CHECK the rotor screw fixing tightness regularly

Microtitor Rotor

ALWAYS load your plates opposite to each other
ALWAYS weigh samples to within 1.0 Grams. For best separations
ALWAYS fit **both** Buckets supplied **(2)**
CHECK the rotor screw fixing tightness regularly

Tube placements Swing out rotor



This is not balanced!

Even though there are two samples in two buckets opposite to each other it is not balanced.

NEVER run swing out rotors with only two buckets

All four buckets must be used at all times

C

A

B

Always use the same size tubes as in A per bucket.

NEVER use different size tubes as in B per bucket
Check they fit and do not hit the centre as shown in C

Tube placement Cytology & Cell wash rotors

Cytology Rotors

Always fit the lid supplied, as shown below

ALWAYS load your holders opposite to each other
ALWAYS weigh samples to within **0.5** Gram. For best separations
ALWAYS fit the lid supplied
Check the two top Gaskets and replace regularly (Part Number 8055)
CHECK the rotor screw fixing tightness regularly

Manual Cell W ashing Rotor

ALWAYS load your tubes opposite to each other
ALWAYS weigh samples to within **0.2** Gram. For best separations Regularly smear a small amount of Silicon grease over the O rings
Check the inner and outer O rings and replace regularly (Part Number 8066)
CHECK the rotor screw fixing tightness regularly

GENERAL SAFETY

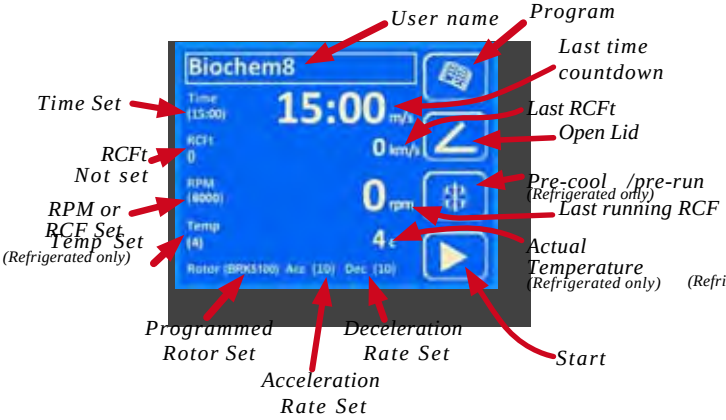
To ensure that the centrifuge is operated in a safe manner, avoiding the hazard of injury to personnel or damage to material goods, the following safety precautions should be followed at all times:

• The centrifuge must only be opened by trained personnel competent in its use
• Never use the centrifuge unless the rotor is properly mounted and secure
• Never open, or attempt to open the lid while the centrifuge rotor is still turning.
• Only use original parts for the centrifuge
• Never operate the centrifuge if components are missing or damaged.
• If the rotor shows visible signs of wear its use must be discontinued and replacement fitted.
• The rotor must not be over loaded, the maximum allowed density of samples at full operating speed is 1.2g/cm3.
• Always endeavour to make sure that opposite tubes are of the same weight to avoid rotor imbalance. If the tubes are filled with the same material they must, therefore, be filled with the same amount.
• No changes should be made to the mechanical or electrical components without prior consultation with and the written permission of Centurion Scientific.
• The centrifuge's has not been manufactured from inert materials or to be explosion proof. Ensure that it is not operated within an environment, or with materials that makes these a requirement.
• During operation a "safe" zone of 30cm must be maintained around the centrifuge. This zone should be clear of personnel and hazardous materials at all times during the run.
• Substances of a radioactive, flammable or explosive nature must not be centrifuged.
• Substances prone to react briskly with each other must not be centrifuged at the same time.
• Toxins and pathogenic micro-organisms must not be centrifuged unless the proper precautions for their handling have been taken. These may include, but are not limited to, biological seals. Should toxins or pathogens enter the centrifuge or its parts the proper procedures for disinfecting the centrifuge should be carried out.
• Strongly corrosive substances that may cause damage to or impair the mechanical strength of the rotor may only be centrifuged inside protective vessels. Should any doubt exist regarding the substance or the suitability of a particular vessel for use with it, consult the Safety Inspector.

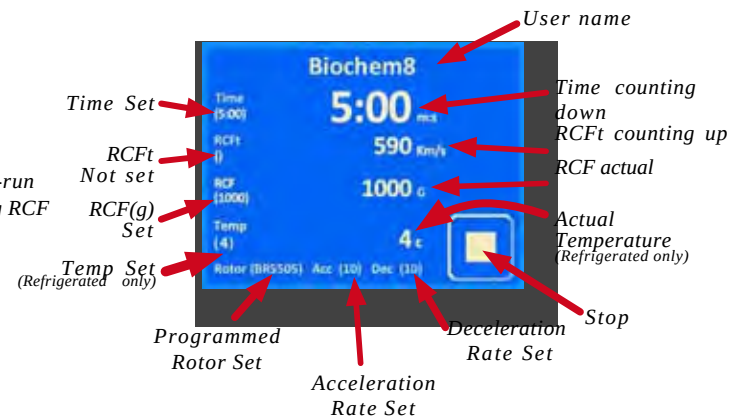
Key to Displays

(See pages 5-9 of this manual for programming instructions - a larger copy of this KEY is included in an appendix)

Start Screen



Screen when running



Start point

FIRST build a program

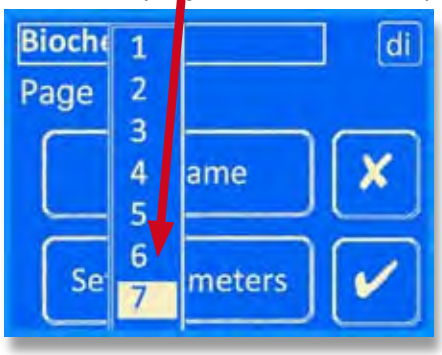
Display shown at turn on

PRESS program key
(book emblem top right)

Display shown when program key pressed

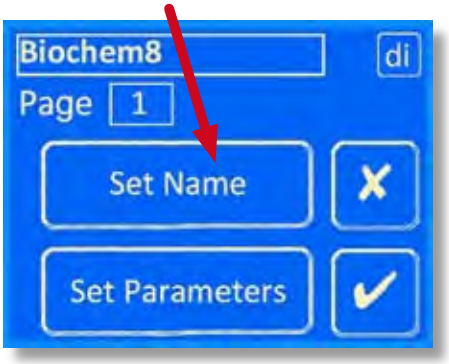
PRESS Page number

SELECT page number required
1-9 pages with 12 names per page (a total of 108 programs can be stored)



Display shown when Page key pressed

PRESS Set Name



KEY in name required
Up to 14 characters, letters & numbers (we have chosen Biochem8 for these illustrations)

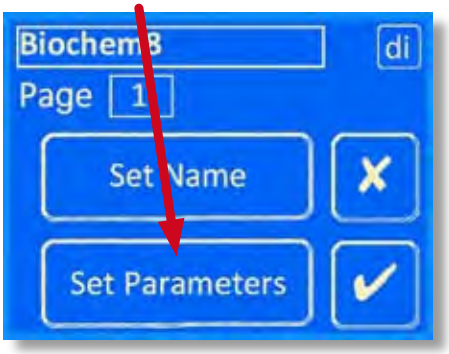
Display shown when Set Name pressed

PRESS tick if correct

Display shown when chosen name is being entered

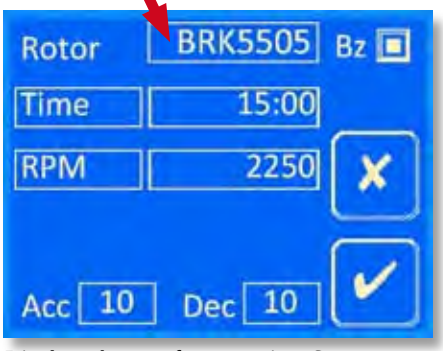
ROTOR PROGRAMMING

PRESS Set Parameters



Display shown after pressing Tick on name settings

PRESS Rotor rectangle



Display shown after pressing Set Parameters

SELECT rotor required by pressing down and

Display shown after pressing Rotor rectangle

continued...

Correct rotor should be shown in Rotor display

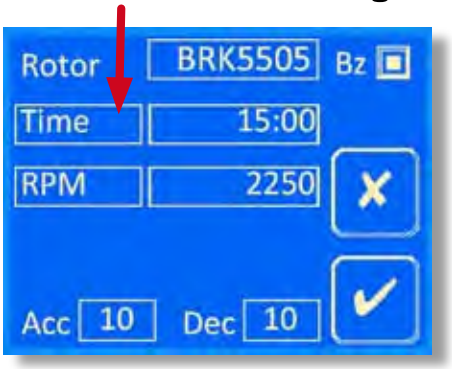
Display shown after selecting rotor

- Turn ON Shows white square in centre

Turn end of run buzzer off by PRESSING Bz
(Top right of display)

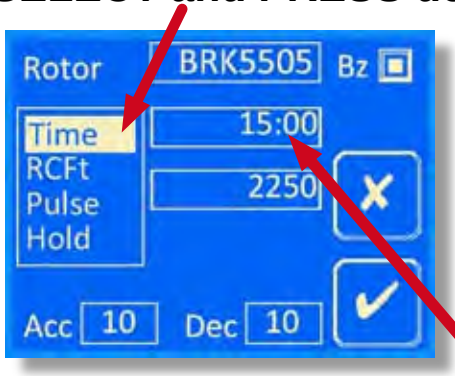
TIME PROGRAMMING

PRESS Time rectangle



Display shown

SELECT and PRESS desired timer type:



Display shown when timer rectangle key pressed

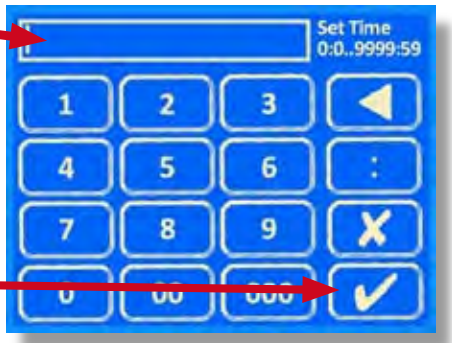
Time 0 - 9999 minutes
RCFt See W2t document for explanation
Pulse Timer counts up in seconds when START button held down. (90 seconds max)
Hold Timer is held on till stop button is pressed

PRESS Rectangle next to Time box

SELECT Time required in minutes & seconds

Hold and Pulse cannot be changed
Or select RCFt number from previous
run

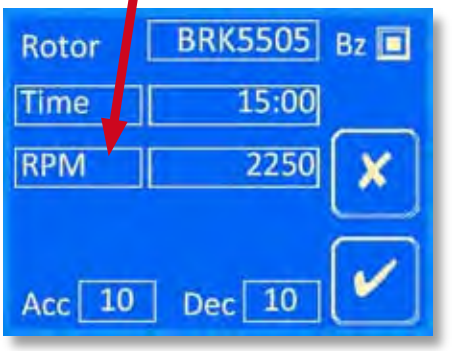
PRESS Tick after selection



Display shown when Time Numerical rectangle is selected

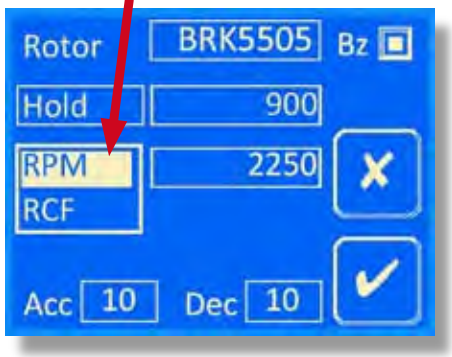
RPM PROGRAMMING

PRESS RPM square



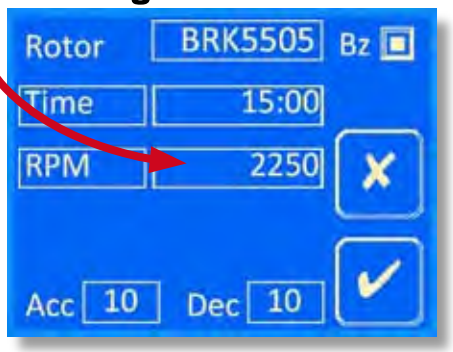
Display shown

SELECT RPM (speed) or RCF (G Force)



Display shown when RPM pressed

PRESS Numerical rectangle next to box



Display shown after selecting RPM

continued...

SET Speed (RPM) or RCF in numerical

Display shown after pressing numerical rectangle

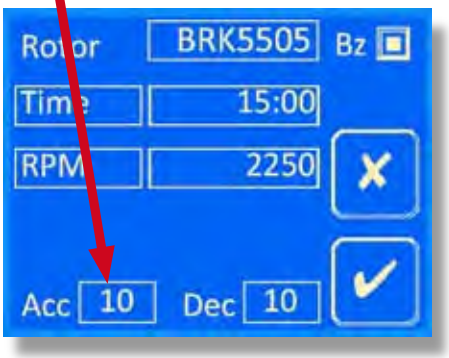
PRESS Tick after selection.

for REFRIGERATED MODELS only SET Temperature - SEE following page 7A, then return to set Acceleration and Deceleration rates below

ACCELERATION and DECELERATION rates

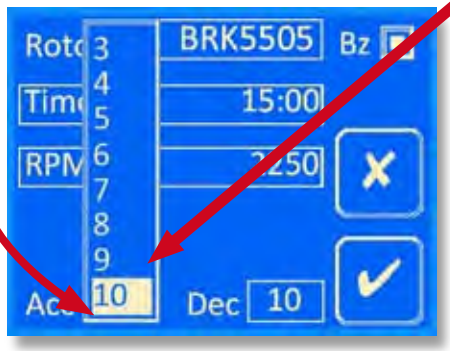
SET Acceleration rate

PRESS Acc Square



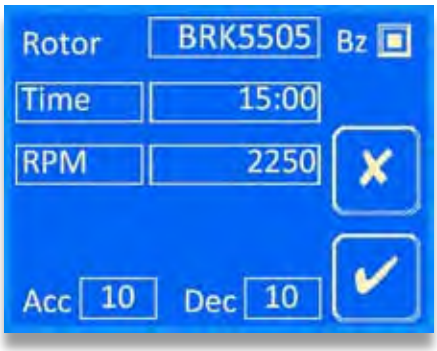
Display

SELECT Rate 1-10



Display shown when Acc pressed

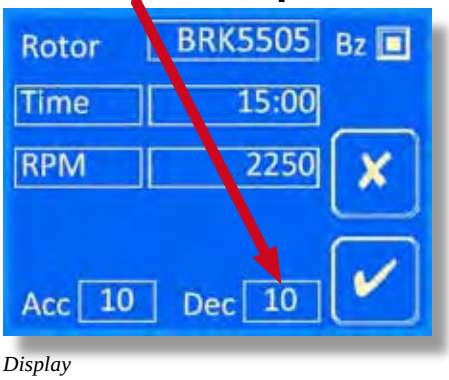
PRESS number required & release



Display after selecting Acc

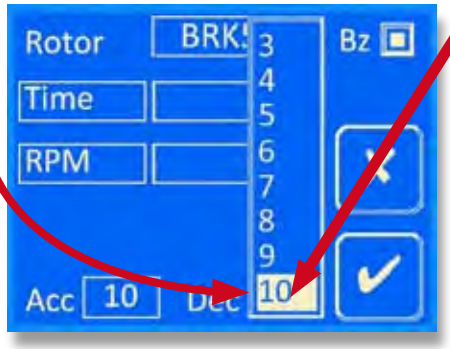
SET Deceleration (Brake) rate

PRESS Dec Square



Display

Select rate 1-10

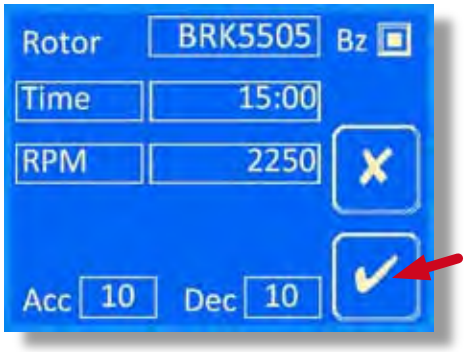


Display shown when Dec pressed

PRESS number required & release

Display after selecting Acc and Dec rates

If you are satisfied with all parameters Check Rotor, timer type, RPM or RCF Acc &



Then PRESS Tick box (bottom right)

continued page 8...

Refrigerated Centrifuges only

K2015R,K241R, K242R and K243R

Centurion Scientific refrigerated centrifuges have a range of **-10 - +40C**

We accurately control this temperature by running the refrigeration unit and pulsing heat via a loop close to the coils.

PID system is used to control.

Imagine a bath at home, to control the temperature accurately you would run both hot and cold taps together. This is far more effective than filling with cold water and topping up with hot as the temperature difference would be enormous.

By using this method our chamber temperature control is unsurpassed.

Note Due to the efficient management of temperature control you may see some ice patches or in turn, notice some slightly hotter areas. This is quite normal and it is the overall chamber temperature that matters.

For accurate temperature control we recommend you use the Pre-cool /pre-run facility.

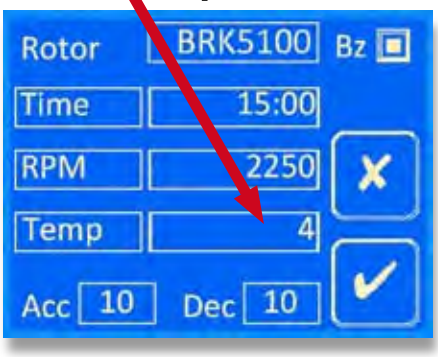
Fit your desired rotor and securely fasten as per our Instructions.

After programming your desired parameters, IE selection of a rotor, speed, time, acceleration & deceleration rates, (as an example). Leave the centrifuge to reach the desired temperature and then press the Pre-cool symbol. This will run the centrifuge at 20% of the maximum speed of the rotor for 20 minutes, a will show in the Rpm section to show the Pre-cool mode is in operation. It is advisable to let the time run to 20 minutes, but you can stop at any time. Once stopped load your samples (which should be at your set temperature) and press the start arrow button.

For ease it is advisable to set your samples to the desired centrifuge temperature before placing in the centrifuge and separating, otherwise allow sufficient time for them to reach the temperature in the chamber.

TEMPERATURE PROGRAMMING (Refigerated models only - K2015R,K241R, K242R and K243R)

PRESS Temperature numeric square



Display shown K2015R,K241R, K242R and K243R (all our illustrated screens show a chosen and actual temperature of 4°C)

SET Temp (-10 - +40 C) in numerical form

Display shown when Temp is pressed

Note: *See rotor appendix for minimum possible temperature at maximum speed per rotor.*

PRESS Tick after selection.

Note: *Displays illustrated elswhere in this manual do not show the Temp square or the Temperature numeric square however they will be present on all refigerated model displays as will set temperature and actual temperature where appropriate (see Key to Displays on page 1)*

Pre-cool /pre-run START button.

See instructions above detailing use of this feature - note that this screen will show your selected parameters.

return to page 7 to set Acceleration and Deceleration rates...

NOW LOAD THE CENTRIFUGE

Display

PRESS Central button on right to open lid

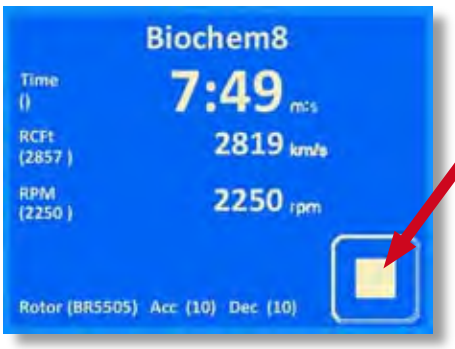
LOAD your samples evenly
(see Safety Instructions, page2)

FIT LID to rotor (if part of rotor type)

CLOSE Centrifuge lid pressing both sides down firmly.

PRESS Start button (arrow triangle, bottom right)

RUNNING screen display

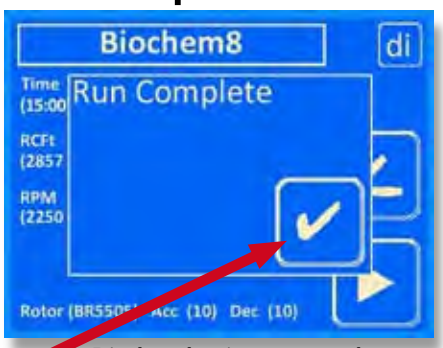


Display showing running screen

If you require early termination
Time, Hold, RCFt
PRESS Square bottom right.

OR in pulse mode
RELEASE when counter (seconds) has reached desired number

Run Complete



Display showing screen when run finished (with Buzzer selected)

PRESS run complete Tick
(only shows IF Buzzer is selected)

PRESS lid open button
(centre right)

You may now retrieve your samples

HOW TO RETRIEVE SET PROGRAMS

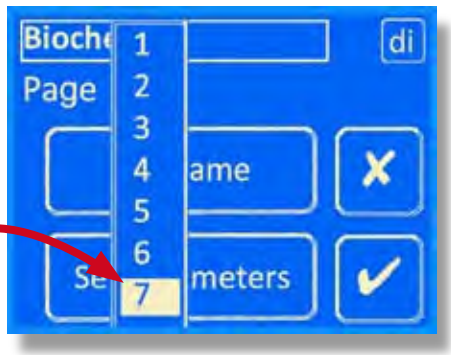
PRESS program button
(top right)

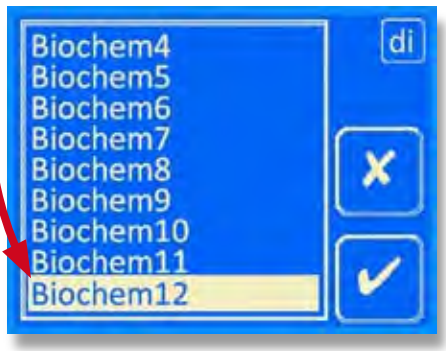
Display

Note:

Centurion K3 range centrifuges can store up to 108 programs, these are convieniently grouped into 9 pages with up to 12 names available per page, each name can consist of up

PRESS & SELECT required name then **PRESS desired name (12 names availble)**

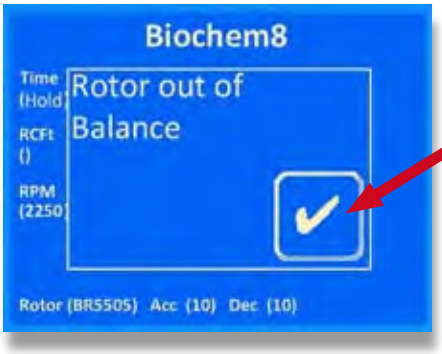




PRESS Page numerical box (9 pages available)

your stored program will now be retrieved.

ERROR CODES ON DISPLAY



Error code shown on display

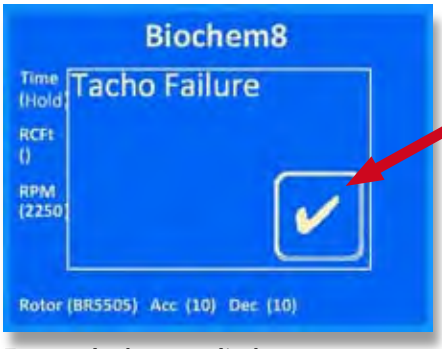
If Display shows Rotor out of balance

An imbalance has occurred

When centrifuge has stopped PRESS tick button

PRESS Lid open button

Check for:
Improperly loaded tubes
(see Safety pages)
Broken tubes or
incorrectly measured tube



Error code shown on display

If Display shows Tacho failure

PRESS Tick button

PRESS Lid open button

Check rotor for free rotation
Are the tubes too tall?

CALL service department

Lid Open! Error code shown on display

If Display shows Lid Open!

Check lid is closed correctly

PRESS down firmly on lid (at both sides near front)

If not then CHECK SENSOR as below
Or CALL Service Department

To check sensors go to parameters page.

First make sure Centrifuge lid is open.
Press 'di' (top right small button) for Diagnostics screen. *(Shown below)*
It reads as follows: *(either 0 or 1 may show when this screen first appears, follow instructions below to perform diagnostic checks)*

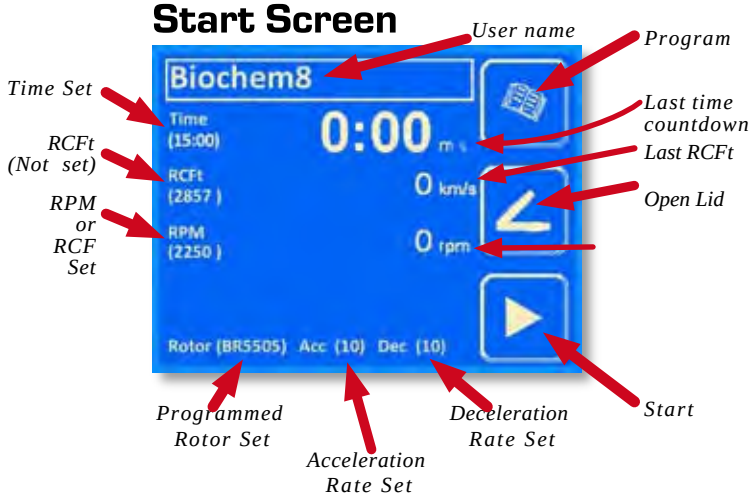
....or greater *(version number of installed firmware)*

.... or greater *(version number of installed firmware)*
.....0 or 1.....By rotating rotor Tacho will show 0 or 1 as rotor turns if so Tachometer is working
.....0 or 1.....By rotating rotor Rotor Rec will show 0 or 1 as rotor turns if so sensor is working
.....0 or 1.....By pressing rotor firmly or shaking hard Balance will show 0 or 1
.....0 or 1.....By shutting the lid the Lid switch will go from 0 to 1 showing correct sensing

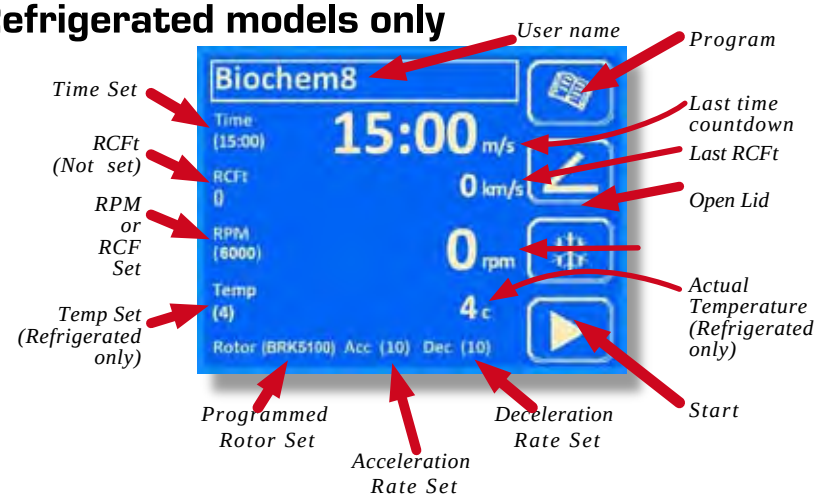
Key to Displays

(See previous pages for programming instructions)

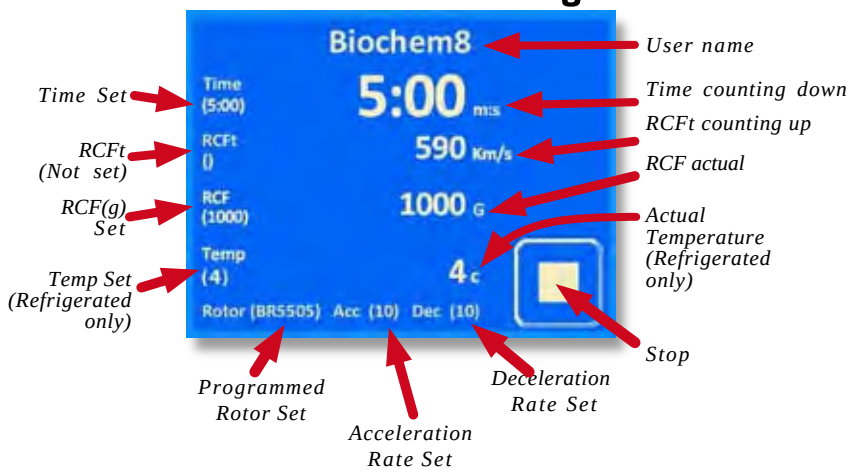
Start Screen



Start Screen Refrigerated models only



Screen when running



Emergency Lid release

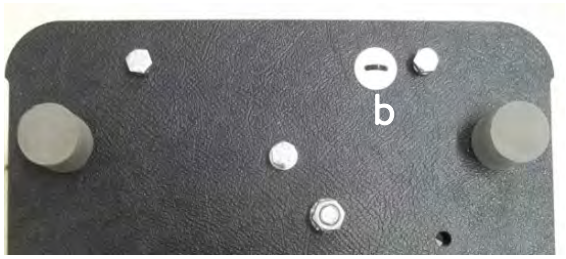
Mechanical Emergency Door release

During a power failure, you will not be able to open the Centrifuge lid via the Display button
Mechanical override is provided to allow sample recovery
However this is for Emergency use only
This should Not be used for normal use.

Warning

The rotor can still be spinning at a high speed, if touched it can cause serious injuries.
Always wait till the rotor has stopped.
Proceed as follows

- Make sure the Rotor has stopped (view via the port in the Lid)
- Once stopped turn off the power via the inlet Switch
- Pull the Centrifuge slightly over the bench (as shown in **(a)**
- You will notice one **(b)** or some models two plastic plug **(c). Plug** *
- Pop open with a screwdriver (tool) and pull downwards .
- The lid will pop open You can now retrieve your samples



After replace the Plastic plugs back into their original position.
Reconnect the centrifuge power line once the mains power has been restored.
Check all is working correctly by closing the lid, wait 5 seconds then press lid open.
If not working refit or Contact your Distributor

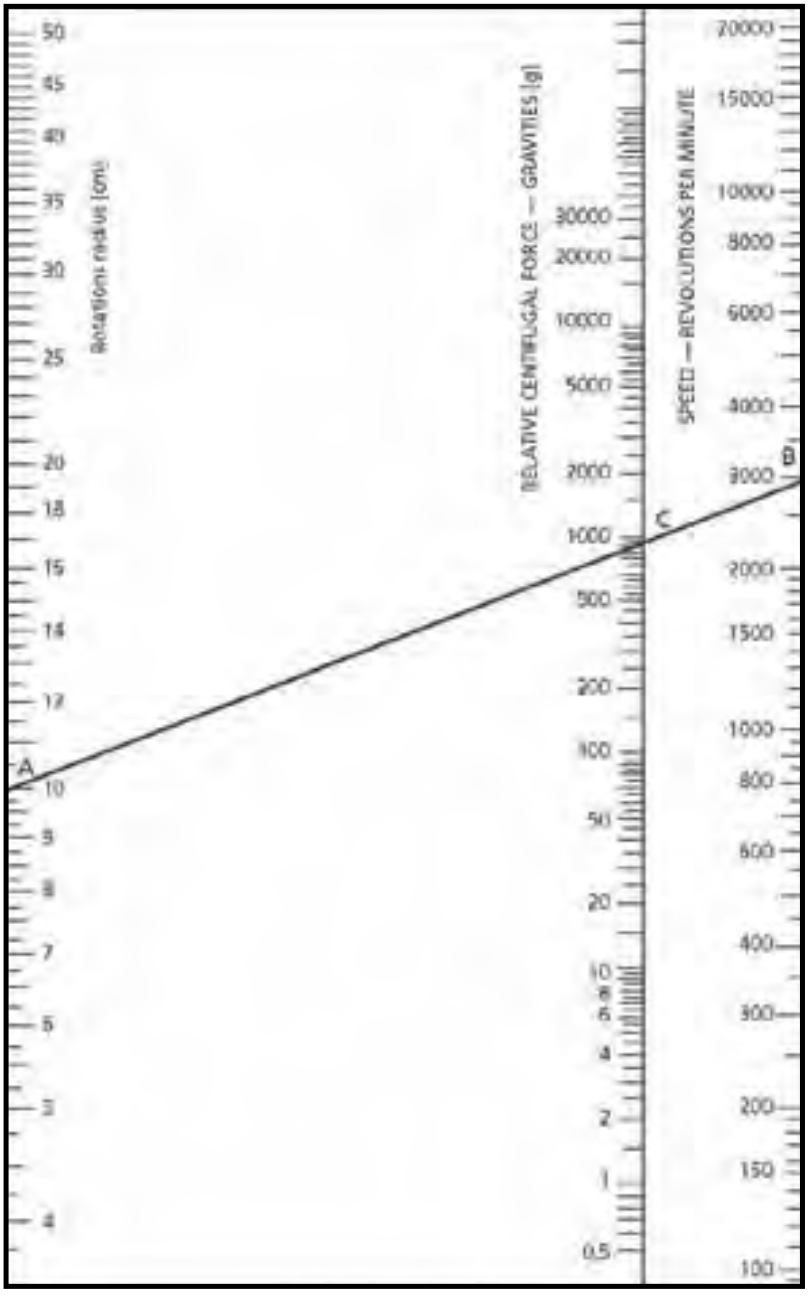
Nomograph. For Rcf evaluation.
NOTE centrifuges can be programmed in Rcf(G)

Example

To find the relative centrifugal force at a radial distance of 10 cm from the center of rotation when operating the centrifuge at a speed of 3000 r.p.m., place a straightedge on the chart connecting the 10cm point on the Rotating Radius Scale (A) with the 3000 r.p.m. point on the Speed Scale (B).

Read the point at which the straightedge intersects the Relative Centrifugal Force Scale (C) – in this case, 1000 x gravity.

Similarly, if the desired "r.c.f." is known, the necessary speed for a given rotating radius may be determined by connecting the two known points and reading the intersection of the straightedge with the Speed Scale.



Equation for Calculating R.C.F.

R.C.F. = .00001118 x r x N^2
R.C.F. = relative centrifugal force (gravities)
r = radius from center of rotation to bottom of tube (cm)
N = rotating speed (rev. per minute)

Care & maintenance. Centrifuge

Always keep your Centrifuge clean and free from moisture at all times, this will help prevent corrosion.

Do not use any kind of scourers or abrasive material to clean the Centrifuge and ensure that a pH neutral cleaner is always used.

It is recommended that your centrifuge is switched off and the lid left open overnight to ensure that any moisture build up can evaporate.

Keep a 30Cm distance around your Centrifuge.
Do not site the unit in sunlight

Always ensure that lids and accessories are correctly tightened before running the unit.

Use only official Centurion Scientific Ltd accessories with your centrifuge.

It is recommended that regular maintenance and cleaning of the unit and accessories is carried out.

Yearly servicing is required to validate your warranty and increase the life of your Centrifuge and accessories. See PrO-Care pages

Care & maintenance. Rotor

Always check rotors for cracks and damage, if found replace your rotor. DO NOT USE as dangerous

Autoclave for the maximum number of times shown in the sales literature. In brackets(20)

Rotors have a Seven year lifespan and must be replaced .

DO NOT USE beyond their Lifespan

It is recommended that regular maintenance and cleaning of the rotor and accessories is carried out.

Ensure that all buckets are present in the rotor when running your centrifuge, as using the unit with an unbalanced rotor can cause distortion and excessive wear. Read tube placements section in the previous section

Do not use any kind of scourers or abrasive material to clean the buckets and ensure that a pH neutral cleaner is always used.

Aluminium buckets should be kept clean and moisture free to keep them in a good, safe operating condition.

Yearly servicing is required to validate your warranty and increase the life of your rotor and accessories

EC Declaration of Conformity

CENTURION SCIENTIFIC LIMITED · CERTIFICATE OF CONFORMITY · CENTURION SCIENTIFIC LIMITED ·

Device Classification:Laboratory Equipment
Centurion Scientific Ltd.
Centrifuge ranges and accessories
PrO-Research

Conform to the following Product specifications:

Directives	Standards
2006/42/EC	EN 1SO 12100
2014/35/EU	EN61010-1. IEC 61010-2-020
2014/30/EU	EN 61326-1, EN55011. CFR 47 FCC Part 15 class a
2014/65/EU	EN 378-1
2014/65/EU	EN 378-2 For Refrigerated versions
2011/65/EU	EN 50581

Certified by:
Company Representative
K Cooper QA manager

ISO 9001 :2015

bsi.

ISO 13485 : 2016

CENTURION SCIENTIFIC LIMITED

The Old Stables, Church Farm, Stoughton, Chichester, West Sussex. PO18 9JL. United Kingdom.

Certificate of Origin

CENTURION SCIENTIFIC LIMITED • CENTURION SCIENTIFIC LIMITED •
CERTIFICATE OF ORIGIN

Centurion Scientific Ltd of The Old Stables, Church Farm, Stoughton, Chichester, West Sussex, PO18 9JL, UNITED KINGDOM.

Hereby confirm that all centrifuges and accessories supplied by us are of UNITED KINGDOM origin.

Signed for and on behalf of Centurion Scientific Ltd
Granted 2019 onwards

Company Representative

ISO 9001 :2015 bsi. ISO 13485 : 2016

CENTURION SCIENTIFIC LIMITED

The Old Stables, Church Farm, Stoughton, Chichester, West Sussex. PO18 9JL. United Kingdom.

PrO-Care

Service, Warranty & Maintenance pakages

The lifespan of a centrifuge depends upon how well it is looked after and maintained.
Many of our centrifuges have lived a life of over 15 years.

This is not only due to our stringent manufacturing process and high quality components but also to a yearly servicing package. Making them a cost effective solution of centrifugation.

Whilst our centrifuges come with a confidence giving warranty, yearly services are imperative to ensure your warranty is valid, this also ensures your machine is working to its best ability and lengthens its life span. Also as centrifuges are a dangerous machine, safety checks are required too.

For UK customers we offer a back to base service package including carriage to us and return all within 48 hours. Centrifuge seals , fuses & other parts are replaced, adjustments made, rotor checked for stress cracks, seals changed if necessary (extra charge) PAT (portable appliance test) is included Obligatory in UK.

For worldwide customers we offer a full parts package per model. The designated country distributor services the units accordingly.

Call our Office to discuss or visit our Service website

WWW.ServicePrO-Care.com

www.Centurionscientificglobal.com

Switchboard. 0044 (0) 2392 631225

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Farm Stoughton
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