VWR INTERNATIONAL

Instruction Manual

for

VWR Clinical 200 Centrifuge

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1.1.1 General information

1.1.1.1 Hazards and precautions

Before operating the centrifuge, please read this instruction manual carefully!

This centrifuge must not be operated by unqualified personnel not familiar with the correct use of the unit.

• Use the original accessories only!

• The centrifuge is not explosion-proof and therefore must not be operated in areas where there is a risk of explosion. During centrifugation, it is prohibited to stay or place hands within the safety zone of 30 cm around the centrifuge or deposit hazardous substances within this area.

• Centrifugation of flammable, explosive and radioactive substances or substances which chemically react with high energy is strictly prohibited!

• Never spin toxic or pathogenic material without adequate safety precautions, i.e. centrifugation of buckets / tubes without or with defective hermetic sealings is strictly prohibited. The user is obligated to perform appropriate disinfection procedures in case dangerous substances have contaminated the centrifuge and / or its accessories. When centrifuging infectious substances, always pay attention to the General Laboratory Precautions. If necessary, contact your safety officer!

• It is prohibited to run the centrifuge with rotors other than those listed for this unit.

• Under no circumstances open the lid of the centrifuge while the rotor is still running or rotating with a speed of > 2 m/s.

The following rules must strictly be adhered to:

• Do not operate the centrifuge if it is not installed correctly.

• Do not operate the centrifuge when disassembled (e.g. without metal cover).

• Do not run the centrifuge when mechanical or electrical assembly groups have been tampered with by unauthorized persons.

• Do not use accessories such as rotors and buckets, which are not exclusively approved by the manufacturer, except commercially available centrifuge tubes made of glass or plastic.

• Do not spin extremely corrosive substances, as they may damage the centrifuge and rotors and impair mechanical resistance.

• Do not operate the centrifuge with rotors or buckets which show any signs of corrosion or mechanical damage.

1 PRODUCT DESCRIPTION

The manufacturer is responsible for safety and reliability of the centrifuge, only if:

• the unit is operated in accordance with this instruction manual.

• modifications, repairs or other adjustments are performed by factory-authorized personnel and the electrical installation of the related location corresponds to the IEC-regulations.

1.1.1.2 Brief description

This centrifuge is a tabletop model. Various rotors are available for this unit.
Speed and running time can easily be set with control buttons and are displayed on large LED's.
The preset run parameters are stored after the end of each run.
The lid is latched and released with an electromagnetic lid lock.
The centrifuge has a maintenance-free, low noise, brushless induction motor.

1.1.1.3 Safety standards

The centrifuge corresponds with the General Requirements for Medical Units Regulations (MedGV) (group 3).

The following standards have been considered for the production of our centrifuges:

• Accident Prevention Regulation for electrical units and installations UVV VBG 4

• Accident Prevention Regulation for centrifuges as per UVV VBG 7 z

• DIN 58970 part 1, 2 and 4 for centrifuges and tubes

• Electrical Interference Suppression according to interference degree B as per VDE 0871

• Electrical Safety as per IEC 1010-1 and IEC 1010-2-D

• European Standard PR EN 61 010-1 and PR EN 61 010-2-2

1.1.1.4 Included items

Following parts are supplied as accessories with each centrifuge:
• 2 fine-wire fuses 1,25 AT (230 V)
• 1 fine-wire fuse 0,50 AT (230 V)
• 2 fine-wire fuses 2,50 AT (120 V)
• 1 fine-wire fuse 0,10 AT (120 V)
• 1 instruction manual

Spare fuses are behind the control panel inside of the centrifuge.

1.1.1.5 Warranty

The centrifuge has been subjected to thorough testing and quality controls.

In the unlikely case of any manufacturing defects, the centrifuge and rotors are covered by warranty for a period of two years from date of delivery.

This warranty becomes invalid in case of mishandling, damage and negligence and further in the case of the use of inappropriate spare parts and / or accessories or unauthorized modification of the unit.

Technical modification rights are reserved by the manufacturer with respect to technical improvement.

1.2 Installation

1.2.1 Installation of the centrifuge

1.2.1.1 Unpacking the centrifuge

The centrifuge is supplied in a carton.
Open the carton, remove the cover carton and the centrifuge. The instruction manual must always be kept with the centrifuge.

1.2.1.2 Space requirements

The centrifuge should be installed on an even and solid surface, if possible on a laboratory cabinet / table or some other solid vibration free surface. In order to enable a safe and smooth operation, level the centrifuge with a spirit level. The centrifuge must be located with a minimum space of 30 cm on each side of the unit in order to ensure necessary heat dissipation. Do not place the centrifuge next to a window or a heater, where it could be exposed to excessive heat.

Safety regulations require that the safety area of 30 cm around the unit is marked in order to indicate that neither hazardous substances nor persons should be within this area during centrifugation.

1.2.1.3 Installation

Be sure to check the following before installation:
• Check that the power supply corresponds the the information on the manufacturer's rating label which is mounted on the rear panel.
• The line voltage circuit breaker is 15A minimum.
• An emergency switch off is installed outside the room in order to disconnect the power supply of the unit.
• The wooden motor shaft transport brace block has been removed.
The socket for the power cord must be easy to reach and respectively easy to disconnect!

1.3 Technical Data

Type / Model	VWR Clinical 200	
Dimensions		
Width	28 cm	
Depth	37 cm	
Height	26 cm	
Weight	15 kg	
Noise level (max.)	60 +2.0 dB (A)	
Max. speed	6,000 rpm	
Max. volume	6 x 50 ml	
Max. RCF	4,185 x g	
Admissible density	1.2 kg/dm^3	
Admissible kinetic energy	2.060 Nm	
Electrical connection AC	120 V / 60 Hz 1 ph	230 V / 50 Hz 1 ph
Current	1.7 Amps	0.8 Amps
Connected load	200 Watts	180 Watts
Interference suppression	VDE 0871, Funkentstörgrad B	
Test obligations	no	
To be filled in by purchaser:		
Inventory-No.:	_____	
Check-No.:	_____	
Location:	_____	
Maintenance contract:	_____	
Your service department	VWR International Phone 800-932-5000 or 610-431-1700 www.vwr.com	
Your agent	_____	

Manufacturer reserves the right to alter product specifications without notice.

2 OPERATION

2.1 Installation of rotors

2.1.1 Mounting and loading angle rotors

Clean the motor shaft as well as the rotor mounting boring with a clean, grease-free piece of cloth. Place the rotor onto the motor shaft, ensuring that the cross pin aligns correctly with the rotor slot (see photos 1 and 2).

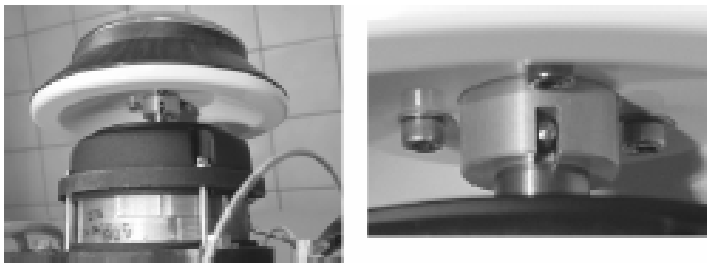


Photo 1: Correct

Photo 2: Incorrect

Hold the rotor with one hand and secure the rotor to the shaft by turning the rotor nut clockwise. Tighten rotor nut.

A partially loaded rotor may be used (ie an 8 place rotor with 2 or 4 tubes loaded). The load must be balanced and the tubes must be opposite each other. See image below

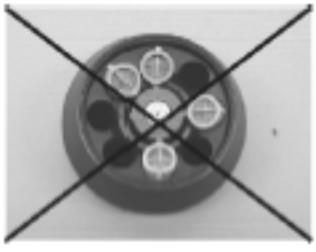


Photo 4: Incorrect

Photo 5: Correct

2.1.2 Mounting and loading swing out rotors

Clean the motor shaft, as well as the shaft hole in the rotor with a clean and grease-free cloth. Place the rotor on the motor shaft, taking care that the cross pin is sitting in the rotor slot (photo 1 and photo 2). Hold the rotor with one hand and secure the rotor to the shaft by turning the rotor nut clockwise. Tighten rotor nut by hand.

The loading of the buckets and the adapters must be done appropriately so that the load is balanced with tubes in opposing tube holders. Tubes must be filled evenly by eye. Weight difference of loaded tubes should not exceed 1g.

2.1.3 Overloading of rotors:

The maximum load permitted for a rotor, which is determined by the manufacturer, as well as the maximum speed allowed for thie rotor (see label on rotor), must not be exceeded. Liquids to be centrifuged should have an average homogeneous density of 1.2 g/ml or less when the rotor is spinning at maximum speed. In order to centrifuge liquids with a higher density, the speed must be reduced according to the following formula:

$$\text{Reduced speed } n = \sqrt{\frac{1.2}{\text{higher density}}} \times \text{max. speed } (n_{max}) \text{ of the rotor}$$

Example

$$n_{red} = \sqrt{\frac{1.2}{1.7}} \times 4{,}000 = 3{,}360\text{rpm}$$

If in doubt, contact the manufacturer!

2.1.4 Removing the rotor

Hold the rotor with one hand. Loosen the rotor nut byturning it conterclockwise.

ATTENTION:
Do not operate the centrifuge with rotors which show any signs of corrosion or mechanical damage.
Do not centrifuge extremely corrosive substances which could damage the rotor.

2.2 Operation

2.2.1 Power

The centrifuge has a power switch located on the undermount of the left side.
You can connect the unit by plugging in the main plug or disconnect it by unplugging.

2.2.2 Control Panel

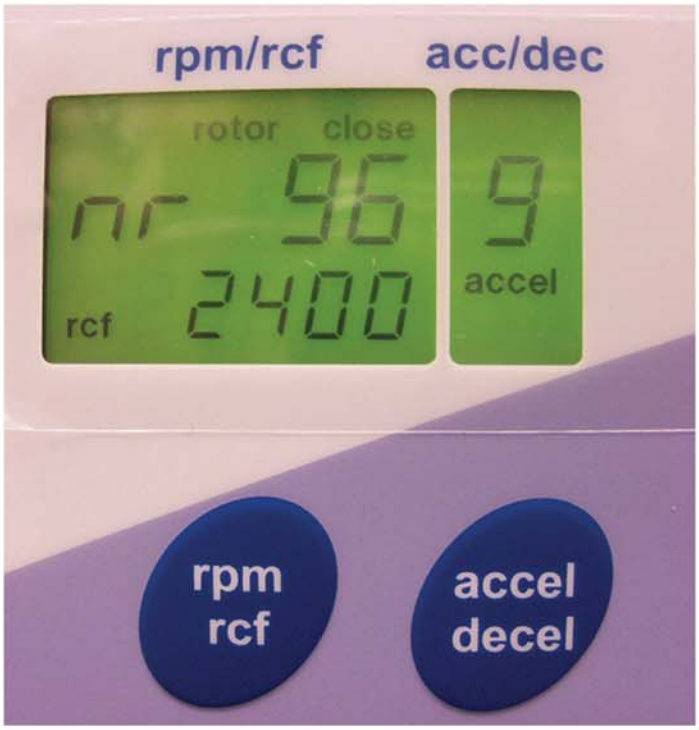
- **Arrow buttons**: to adjust speed, accel/decel, and time
- **open**: to open lid
- **start**: to begin run
- **stop**: to stop run
- **rpm/rcf**: Press to set speed
- **accel/decel**: Press to set acceleration and deceleration
- **time**: Press to set time

2.2.3 Lid release/lock

When the rotor begins accelerating the lid will be impossible to open.
When the rotor is standing still press the "open" button to release the lid

2.2.4 Pre-selection of speed

To select speed, press rpm/rcm button, then use arrows to adjust. When the lid of the centrifuge is closed or during a run,speed can be changed as follows: Press the rpm/rcm button, when the set speed blinks, use arrows to adjust. Maximum speed is 6,000 rpm.



Preset to 2400 rcf
Lid closed
rotor standing still

Preset to 2400 rcf
Lid closed
Rotor speed is 1289 rcf

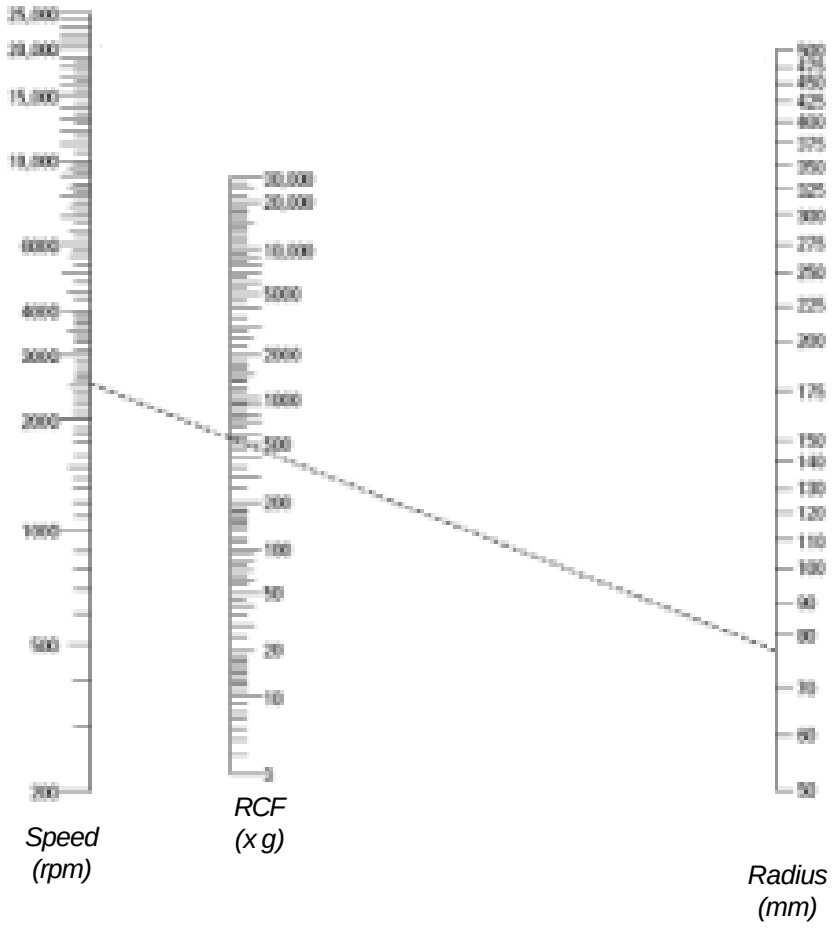
Maximum RPM of valid rotors

Rotor	Max. Radius	Max. Speed
82013-816	10.4 cm	6,000 rpm
82013-822	9.5 cm	6,000 rpm
82013-828	10.5 cm	3,500 rpm

2.2.5 Nomogram – to convert Speed into RCF-value

CHART

to determine the relative centrifugal force (RCF-value).
This value is the multiplier to the gravitational pull of earth (g).



Example:
Measure the distance in mm from the center of the rotor (radius) to the most outer part (bottom of the tube) in the used bucket, tube rack or rotor . Set your ruler in the “radius” column to the corresponding radius. Position the left part of your ruler to the desired speed and read off the according RCF-values. When you know the required RCF-value, you can determine the correct speed.

The correct value is based on the following formula:

$$RCF = 11.18 \times r \times \left(\frac{n}{1000}\right)^2$$

RCF = Relative centrifugal force (multiplier to the gravitational pull of the earth)

r = radius in cm

n = speed (rpm)

2.2.6 Pre-selection of running time

Running time is adjustable from 0.1 min. to 99h 59 min. or continuous.
Running time can be preset by pressing the “TIME” button, then adjusting with arrows. Increments of 0.1 min. up to one hour, then increments of 1 min up to 99:59.
In order to change running time during a run, press the "Time" button and adjust using arrows

The preset running time will be shown in the display in minutes and seconds up to one hour, then hours and minutes after one hour. The preset running time will be stored after the run.

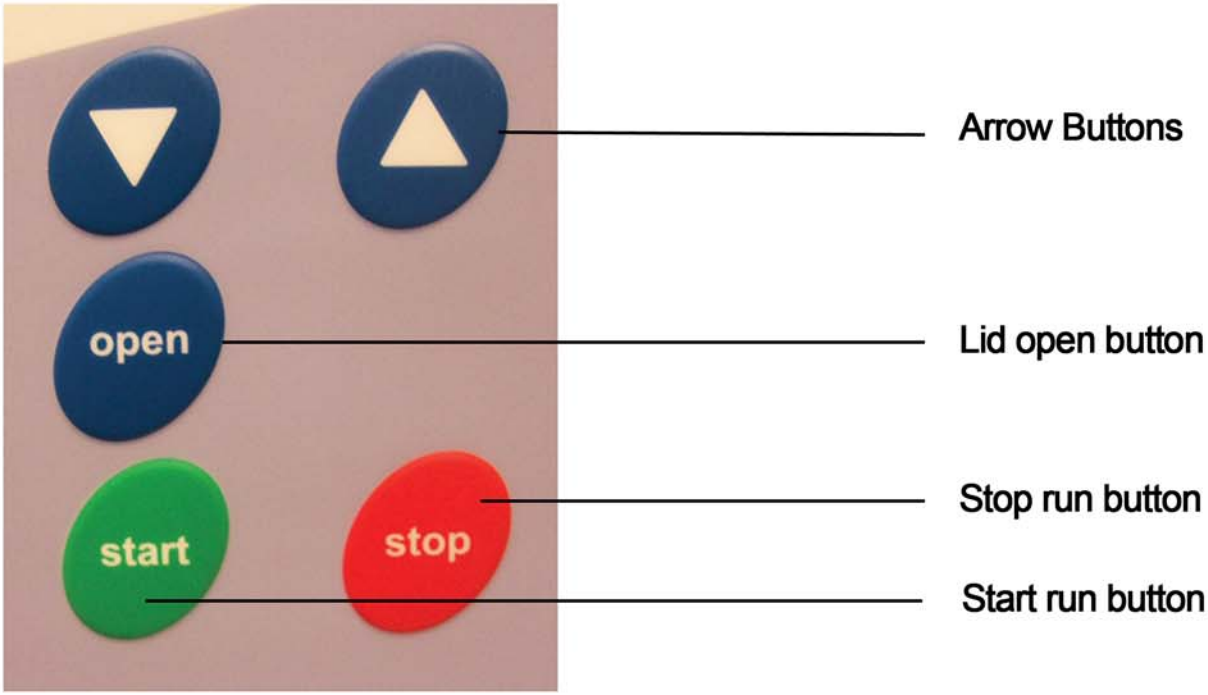
Time set to 30 seconds

For continuous run the display indicates **continuous run** with “ cont”.

During continuous run, the running time passed can be read off as follows:

ATTENTION:
A run in continuous mode can only be finished by pressing the “STOP” key.

2.2.6 Keyboard – Starting the centrifuge



Starting the centrifuge
Insert a correctly and fully loaded rotor and tighten it to the motor shaft. Close the lid of the centrifuge. As soon as the "rotor close" is visible, the centrifuge run can be started. Press “START” button.

ATTENTION: The rotor must to be checked and rotor nut tightened prior to each run!

2.3 Safety features

2.3.1 Imbalance detection

If a rotor is not properly loaded or balanced (see chapter 2.1.1 and 2.1.2), the drive will turn off during acceleration and the rotor will decelerate to stand still.

When error message “1” appears in the “SPEED” display, the weight difference of the samples is too large. Weigh out the samples exactly.
Load the rotor as described in chapter 2.1.1.

When error message “2” appears in the “SPEED” display, the cause is usually one of the following::

• The imbalance switch is not correctly adjusted.

• The imbalance switch is defective.

3 MAINTENANCE

3.1 Service and maintenance

3.1.1 Maintenance and cleaning

Maintenance:
Maintenance of the centrifuge is confined to keeping the rotor, the rotor chamber and the rotor accessories clean as well as to regularly lubricating the rotor insert bolts of a swing out rotor (if available). Vaseline, readily available, is the most suitable lubricant. The Vaseline must be free of resin and acids. Lubricants containing molycote and graphite are not allowed.

Please pay special attention to anodized aluminium parts. Breakage of rotors can be caused even by the slightest damage.

If rotors, buckets or tube racks come in contact with corrosive substances, they must be cleaned carefully and immediately. Corrosive substances include:
- Alkalis
- Alkaline soap solutions
- Alkaline amines
- Concentrated acids
- Solutions containing heavy metals
- Water-free chlorinated solvents
- Saline solutions, e.g. salt water

Cleaning:
Thorough cleaning not only has its purpose in hygiene but also in avoiding corrosion.

In order to avoid damaging anodized parts such as rotors, reduction plates etc., only pH-neutral detergents with a pH-value of 6-8 may be used for cleaning. Alkaline cleaning agents (pH-value > 8) must not be used.

After cleaning, please ensure all parts are dried thoroughly, either by hand or in a hot-air cabinet (max. temperature + 50°C).

Due to humidity and not hermetically sealed samples, condensate may be formed. The condensate must to be removed regularly from the rotor chamber with a soft cloth.

The maintenance cleaning procedure must be repeated every 10 to 15 runs or at least once a week.

3.1.2 Glass breakage

With high g-values, the rate of glass tube breakage increases. Glass splinters have to be removed immediately from rotor, buckets, adapters and the rotor chamber itself. Fine glass splinters will scratch and therefore damage the protective surface coating of a rotor.

If glass splinters remain in the rotor chamber, fine metal dust will build up due to air circulation. This very fine, black metal dust will contaminate the rotor chamber, the rotor, the buckets and the samples.

3.1.3 Disinfection

Should infectious material by spilled in the centrifuge, the rotor and rotor chamber must be disinfected immediately after the run. Rotors may be autoclaved at a maximum temperature of 121°C.

The rotor and rotor chamber should be cleaned with a universal, neutral disinfection agent, e.g. with a formalin base. A disinfection spray is most suitable in order to easily reach all locations.

ATTENTION:
Before applying any cleaning or decontamination method other than those recommended by the manufacturer, contact the manufacturer to ensure that the cleaning method will not damage the unit or the rotor .

4. TROUBLE SHOOTING

4.1 Error messages: cause / solution

Preface:
The error messages are listed to help identify possible errors. The diagnosis referred to in this chapter may not always be the right one, but is the most common cause of the error.

4.2 Lid release and the error message system

4.2.1 Lid release during power failure (Emergency Lid Release)

In case of power failure or malfunction, the lid of the centrifuge can be opened manually in order to retrieve your samples.

Please proceed as follows:

• Switch the centrifuge off and unplug the power cord.

• At the left side of the centrifuge housing there is a plastic plug attached to a cord.

• Pull the plastic plug out of the housing and pull the cord to open the lid of the centrifuge (see photo 16).

4.2.2 Description of the error message system

Error messages are shown in the “SPEED” display (see photo 17).

There are two different kinds of errors.

• Errors No. 1 – 49 (forced stop)

If one of these errors occur, the rotor decelerates from preset speed down to 0. As soon as the rotor stops, the error message can be reset by opening and closing the lid of the centrifuge.

• Errors No. 50 – 99 (emergency stop)

If one of these errors occur, the frequency converter switches off. The rotor will stop without the brakes being applied, To reset the error, the centrifuge must be un-plugged and then plugged in again.

In case the unit stops due to an error indication, you should restart the unit to check whether the error occurs again.

The error message figures not listed in this chapter are currently not in use. They are reserved for future use in completing the error message recognition program

4.2.3 Error messages

Error No. 1: Imbalance

• Cause: Incorrect loading of the rotor (see chapter 2.1.1 and 2.1.2)
• Solution: Balance your samples
• Cause: Incorrect adjustment of the imbalance sensor
• Solution: Imbalance sensor has to be readjuste. (call service department)

Error No. 2: Permanent imbalance signal

- Cause: Incorrect positioning of imbalance sensor
- Solution: Imbalance sensor needs to be readjusted (call service department)

- Cause: Imbalance sensor is defective
- Solution: Imbalance sensor needs to be replaced (call service department)

Error No. 11: Temperature sensor is defective

- Cause: Temperature sensor is defective
- Solution: Call service department. Temperature sensor needs to be changed.

Error No. 25: Power failure

- Cause: Power failure while rotor was in motion
- Solution: Open and close the lid of the centrifuge, restart the unit; check tightness of plug (loose contact)

Error No. 36: Relay of the frequency converter cannot be released / lid cannot be opened

- Cause: Power board malfunction
- Solution: Call service department

- Cause: Lid of the centrifuge is jammed
- Solution: With the rotor stopped, open the lid of the centrifuge manually Lightly grease the lid lock. If the error occurs again, call for service.

- Cause: Lid lock is defective
- Solution: Call service department, replace lid lock

- Cause: Speed sensor wire is broken
- Solution: Call service department, replace speed sensor wire

Error No. 50 / 51: Memory failure

- Cause: Internal or external memory failure
- Solution: Restart the unit. If this error occurs again, call service department; replace control panel

Error No. 54: Wrong configuration

- Cause: Jumper is placed at the wrong position on control panel
- Solution: Replace jumper

Error No. 55: Over speed

- Cause: Speed sensor is defective
- Solution: Restart the unit. In case this error occurs again, call service department. Possibly a loose speed magnet, fix with super glue

Error No. 60: Motor speed sensor signal is missing

- Cause: Speed sensor is defective or cable is broken at speed sensor, possibly loose magnet
- Solution: Call service department; check speed magnet, fix with super glue

Error No. 82: Cut off power board – frequency converter

- Cause: Over current or under voltage due to power supply fluctuations
- Solution: Restart the unit, take care the power supply is stable

Error No. 83: Preset speed cannot be reached

- Cause: Preset speed cannot be reached
- Solution: Call service department

Error No. 84: Over temperature frequency converter

- Cause: Frequency converter cut off due to over temperature
- Solution: Be sure the centrifuge is properly ventillated.

Error No. 85: Over temperature motor

- Cause: Temperature protection switch of motor turns off
- Solution: Be sure the centrifuge is properly ventillated.
  Motor mounting is defective, replace motor

Error No. 90: Emergency switch off lid lock

- Cause: The lid of the centrifuge has been opened while centrifuge was running
- Solution: Close the lid of the centrifuge immediately. The lid should never be opened while the rotor is in motion.

- Cause: Control switch of lid lock is defective
- Solution: Call service department

VWR International, Inc.
Goshen Corporate Park West
1310 Goshen Parkway
PO Box 2656
West Chester, PA 19380-0906

VWR INTERNATIONAL