HERMLE
LABORTECHNIK

Instruction Manual
for
Small Centrifuge
Z 206 A

CONTENTS

1 PRODUCT DESCRIPTION

1.1 Usage in accordance with safety standards

1.1.1 General information

This unit is a medicine product according to the IVD guide line 98/79/EG.

1.1.1.1 Hazards and precautions

Before setting the centrifuge into operation, please read this instruction manual carefully!

This centrifuge must not be operated by unqualified personnel not being familiar with the correct use of the unit.
Always, use the original accessories only!

For your personal safety, please pay attention to following precautions:

- The HERMLE Z 206 A is not explosion-proof and must therefore not be operated in explosion-endangered areas or locations. During centrifugation, it is prohibited to stay 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 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.

Following rules must strictly be adhered to:

- Do not operate the centrifuge in case it is not installed correctly.

- Do not operate the centrifuge when dismounted (e.g. without housing).

- 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 HERMLE Labortechnik GmbH, except commercially available centrifuge tubes made of glass or plastic.

- Do not spin extremely corrosive substances, as they may cause material damages and impair mechanical resistance.

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

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 HERMLE-authorized personnel and the electrical installation of the related location corresponds to the IEC-regulations.

1.1.1.2 Brief description

Model Z 206 A is a compact small centrifuge. You can use swing out and angle rotors in this centrifuge. All relevant run parameters can easily be set with keys and be pre-selected with the main adjusting knob. All pre-selected, respectively actual values are permanent displayed on large LED's
The lid is latched and released with an electronic lid lock.
The centrifuge has a powerful, maintenance-free motor with a low noise level.

1.1.1.3 Safety standards

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

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 BGR 500; Chapter 2.11; Part 3
- 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 Extent of supply

Following parts are supplied as accessories with each centrifuge:
• 1 Instruction manual

1.1.1.5 Warranty

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

In the unlikely case of any manufacturing faults occurring, the centrifuge and rotors are covered by warranty for a period of one year from date of delivery.

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

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

1.2 Installation

1.2.1 Installation of the centrifuge

1.2.1.1 Unpacking the centrifuge

Model Z 206 A is supplied in a carton.
Remove the strap retainer, open the carton and remove 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 placed in a way, that there is 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 disposed to excessive heat, as the performance of the unit is based on an ambient temperature of 23°C.

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

Follow these steps:

- Check whether power supply corresponds with the one named on the manufacturer's rating label which is mounted on the rear panel.
- The line voltage circuit breaker is max. 10 A (type K) slow release for commonly used instruments.
- In case of emergency, there must be an emergency switch off installed outside the room in order to disconnect the power supply of the unit.

(•Remove the transport spacer blocks from the motor shaft (see chapter 2.2.2).)

The socket for the power cord must be easy to reach respectively easy to disconnect!

1.3 Technical Data

Manufacturer	HERMLE Labortechnik GmbH	
Type / Model	Z 206 A	
Dimensions Width Depth Height	 28 cm 37 cm 26 cm	
Weight	15 kg	
Noise level (max.)	60 +2,0 dB (A)	
Max. speed Max. volume Max. RCF Admissible density Admissible kinetic energy	6000 rpm 6 x 50 ml 4185 x g 1,2 kg/dm^3 1694 Nm	
Electrical connection AC Current Connected load	230 V / 50 Hz 1 ph 0,55 A 100 Watt	120 V / 60 Hz 1 ph 1,1 A 100 Watt
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	HERMLE Labortechnik GmbH Siemensstrasse 25 78564 Wehingen Phone: +49-7426 / 96 22-17	
Your agent		

1.4 Conformity declaration

We, the company

Hermle Labortechnik GmbH
Siemensstrasse 25
78564 Wehingen

declare in mere responsibility that our product

Centrifuges

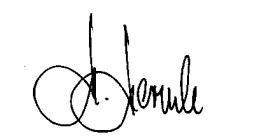
of models

Z 100 M; Z 160 M
Z 206 A
Z 233 M-2; Z 216 MK
Z 300; Z 300 K; SIEVA-2; Z 323; Z 323 K;
Z 366; Z 36 HK; Z 383; Z 383 K
Z 400; Z 400 K; Z 513; Z 513 K
SETA Oil test centrifuge

as from month/year of construction 06 / 07

to which this declaration refers to, have been manufactured according to the following standards or according to normative documents.

DIN EN 61 010-1; EN 61 010-2-020;
EN 61000-6-1 ; EN61000-6-2 ;
EN 61000-3-2 ; EN 61000-3-3;
EN 55011
89/336/EWG ; 92/31/EWG ; 93/68/EWG ;
93/42/EG ; 98/37/EG; 98/79/EG;
DIN EN ISO 12100-1; DIN EN ISO 12100-2



Wehingen/Germany, 13th July 2007

Harald Hermle
President

1.5 Basic adjustments

Before the first operation resp. after each rotor change, you have to settle the respective rotor type. You find each rotor type in the printed order number on the rotor.
Example:

Angle rotor	220.96 V01 ≙ Rotor type „96“
Swing out rotor	220.68 V04 ≙ Rotor type „68“

Switch on the unit and open the lid. Now press simultaneously the keys “lid “ (1) and “stop” (2). In the display “rpm/rcf” then appears the old settled rotor type, i. e. “96”. With the adjustment knob (7) you can settle the used rotor now. (See photo 1) To adopt the data in the unit please press the “start” key. Inside the display the stroke “store” appears to the confirmation.

Now all important rotor parameters for the centrifuge are stored.

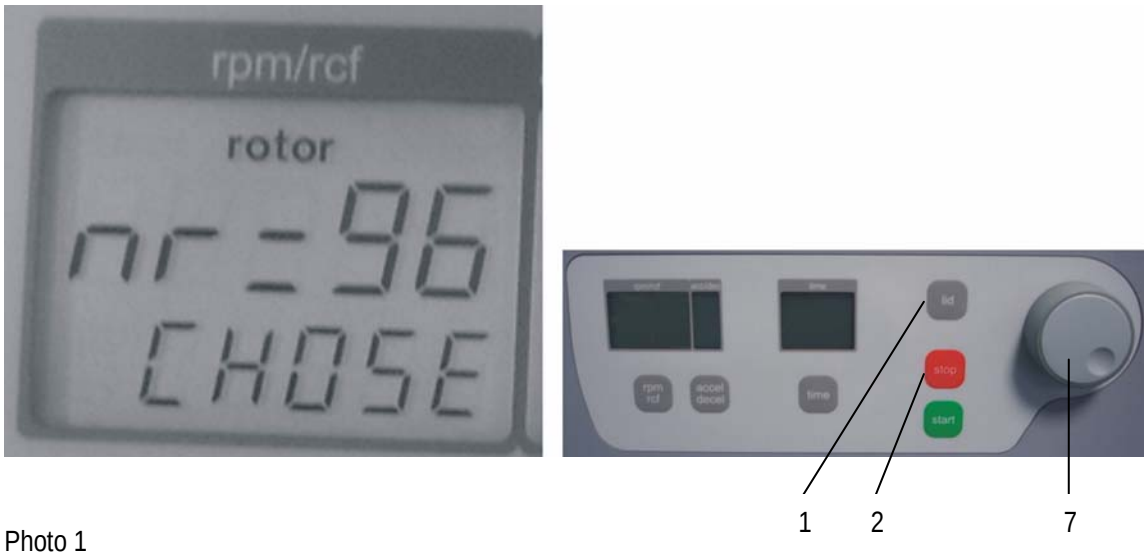


Photo 1

1.5.1 Access to mode „Operating Data“

In this mode you can check the following ponis:
These are in detail:

1. Number of starts
2. Operating hours of the centrifuge
3. Software-version
4. Error list
5. Operation of imbalance sensor
6. Operation of keyboard
7. Display test

If the centrifuge is still turned off, press simultaneously the keys „time“ (4) and „lid“ (1) and turn on the main switch of the centrifuge. Now release both keys again. As a result a display test is executed for approx. 5 seconds. All possible indications will appear at the same time (see photo 2).

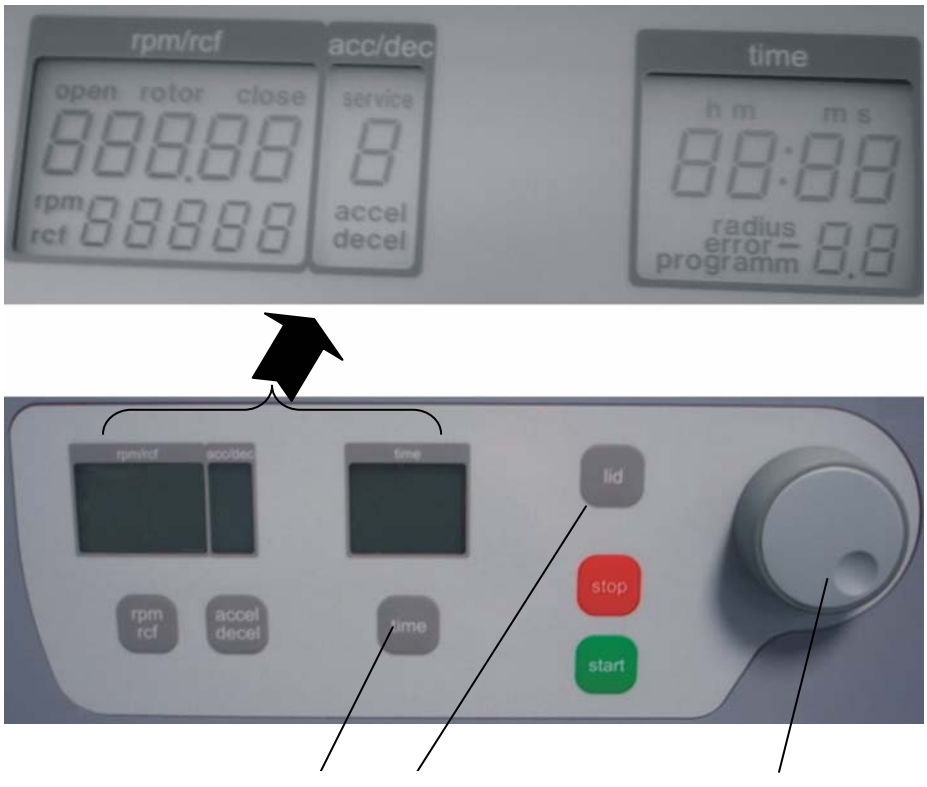


Photo 2

ATTENTION:
Please notice that you must enter the program as described under point 1.5.1 to change the adjustments of the points 1.5.2. After you have stored the settings you change to the normal program mode again by switch off the centrifuge for a short while.

1.5.2 Call up of operating data

In the mode „Basic Adjustments“ you can call up the operating data of the centrifuge.
Please proceed as described under point 1.5.1 to enter this program mode.
Press the key „accel/decel“ (5). In the display „accel/decel“ flashes the word „service“.
With the adjusting knob (7) the different information can be called up:

A = previous starts of the centrifuge (see photo 3a)
H = previous operating hours
S = software version
E = list of previous error messages
F, U, P, C } only for service purpose

The list of the last 99 error messages can be looked over by pressing the key „rpm/rcf“ (6) and leaf through it by the adjusting knob (7). The respective error codes appear in the display „rpm/rcf“ (see photo 3b). Please look up in chapter 4.2.3 of this instuction manual for the relevant meanings. The first two numbers (X) indicate the appeared errors ongoing from 00 to 99, the last two numbers (Y) indicate the error code (i. e. 02 = imbalance sensor is defective).
Here as well you must shortly switch off the centrifuge for changing to the normal program mode again.

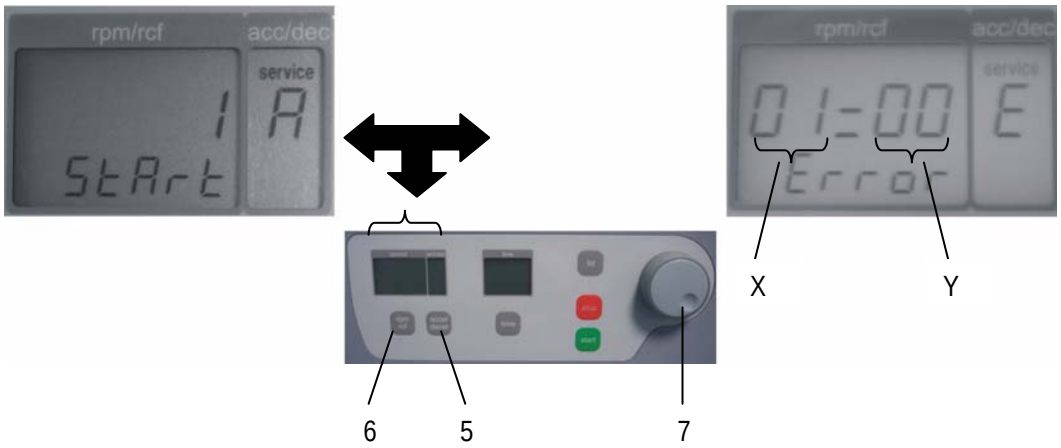


Photo 3a Photo 3b

2.1 Installation of rotors

2.1.1 Mounting and loading angle rotors

Clean the drive shaft as well as the location hole of the rotor with a clean, grease-free piece of cloth.
Place the rotor onto the drive shaft. (see photo 4)
Take care that the motor shaft is pluged completely in the rotor nute.

Photo 4

Photo 5

ATTENTION:
For reasons of safety you should check the fixing screw before each run!! (see photo 5)

2 OPERATION

Hold the rotor with one hand and secure the rotor to the shaft by turning the fixing screw (1)

clockwise. (see photo 6).

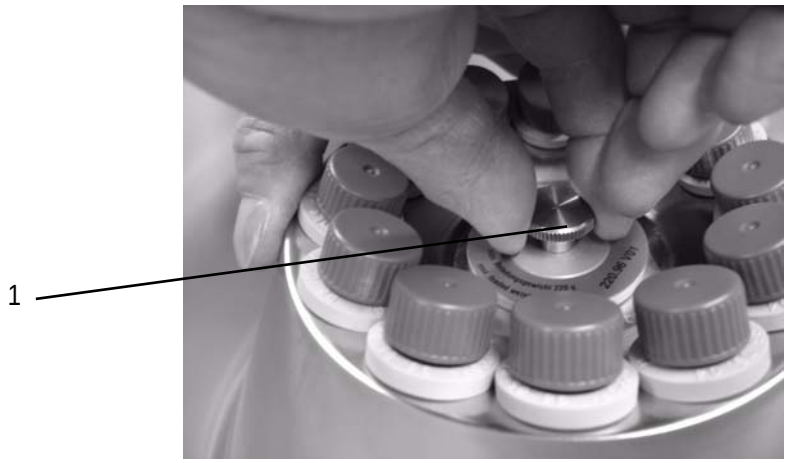


photo 6

ATTENTION:
For reasons of safety you should check the fixing screw before each run!! (see photo 6)

It is allowed to operate e.g. a 12-place-rotor with 2 or 4 loaded tubes only.
But the loaded borings must be opposite each other.

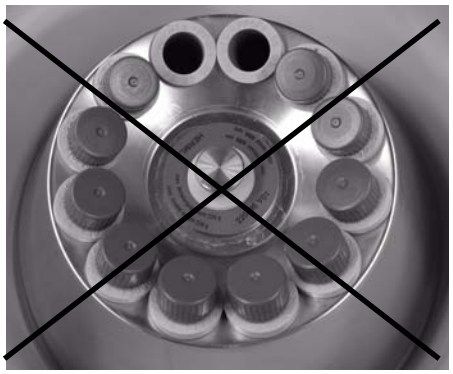


Photo 7: wrong

Photo 8: correct

2.1.2 Mounting and loading swing out rotors

Clean the drive shaft, as well as the location hole of the rotor with a clean and grease-free cloth. Put the rotor to the motor shaft. Take care that the motor shaft is pluged completely in the rotor nute.

Hold the rotor with one hand and secure the rotor to the shaft by turning the rotor screw (1) clockwise.

The charging of the buckets and the adapters must be done appropriately photo 10.
In principle swing out rotors may not be taken in operation untill all buckets or racks are put into the rotor.
The bolts at the rotor must be easily greased with silicone grease.
The sample tubes have to be filled evenly by eye and put into the drillings or tube racks. The weight difference of the loaded buckets should not exceed approx. 1.0 g.

It is allowed to operate e.g. a 6-place-rotor with 2 loaded buckets only. But the loaded buckets must be opposite to each other. Make sure that the unloaded buckets also be put inside the rotor (see photo 9 and 10).

ATTENTION:
Swing out rotors may be taken in operation only if all places are filled in with four buckets!!

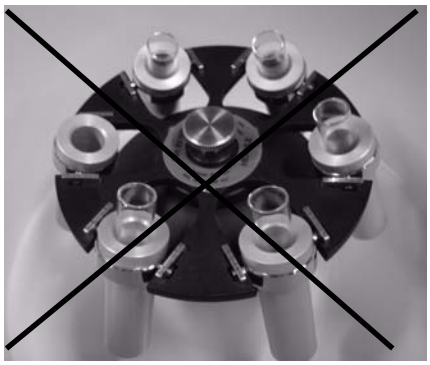


Photo 9: wrong

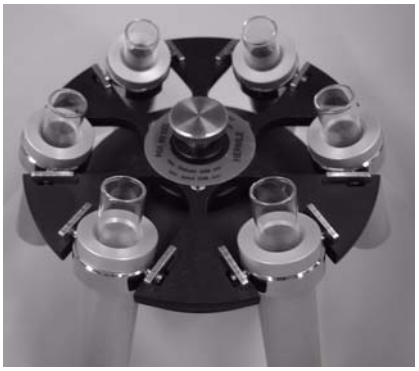


Photo 10: right

2 OPERATION

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 this rotor (see label on rotor), must not be exceeded.

The liquids the rotors are loaded with, should have an average homogeneous density of 1,2 g/ml or less when the rotor is running at maximum speed.

In order to spin liquids with a higher density, the speed has to be reduced according to the following formula:

$$\text{Reduced speed } n_{red} = \sqrt{\frac{1{,}2}{\text{higher density}}} \times \text{max. speed } (n_{max}) \text{ of the rotor}$$

Example:

$$n_{red} = \sqrt{\frac{1{,}2}{1{,}7}} \times 4.000 = 3.360 \text{ rpm}$$

In case of any questions, please contact the manufacturer!

2.1.4 Removing the rotor

Untighten the rotor fixing screw and lift the rotor vertical out of the centrifuge.

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

2.2 Operation

2.2.1 Power switch

The power switch is down on the bottom on the left side of the unit.

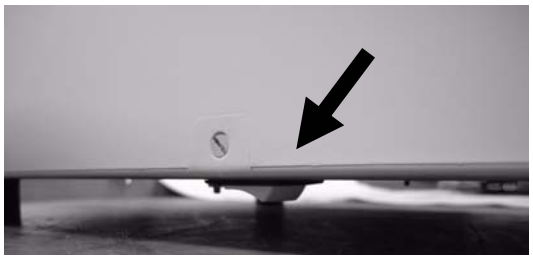


Photo 11

Attention:
After turn on the power switch you have to open the lid of the unit first, before starting the centrifuge.

2.2.2 Lid release

After the run, respectively closing the lid of the centrifuge, it appears in the display „rpm/rcf“ the word „close“ (8). At the same time the pre-selected rotor type is indicated, too, i. e. “nr 96” (11). During the run

you can call up the rotor type at any time by pressing the key “lid” (1). By pressing the key „lid“ (1) you can release the lid of centrifuge. As soon as the electronic lid is completely released, it appears the word „open“ (9). Now you can open the lid of the centrifuge.(see photo 12)

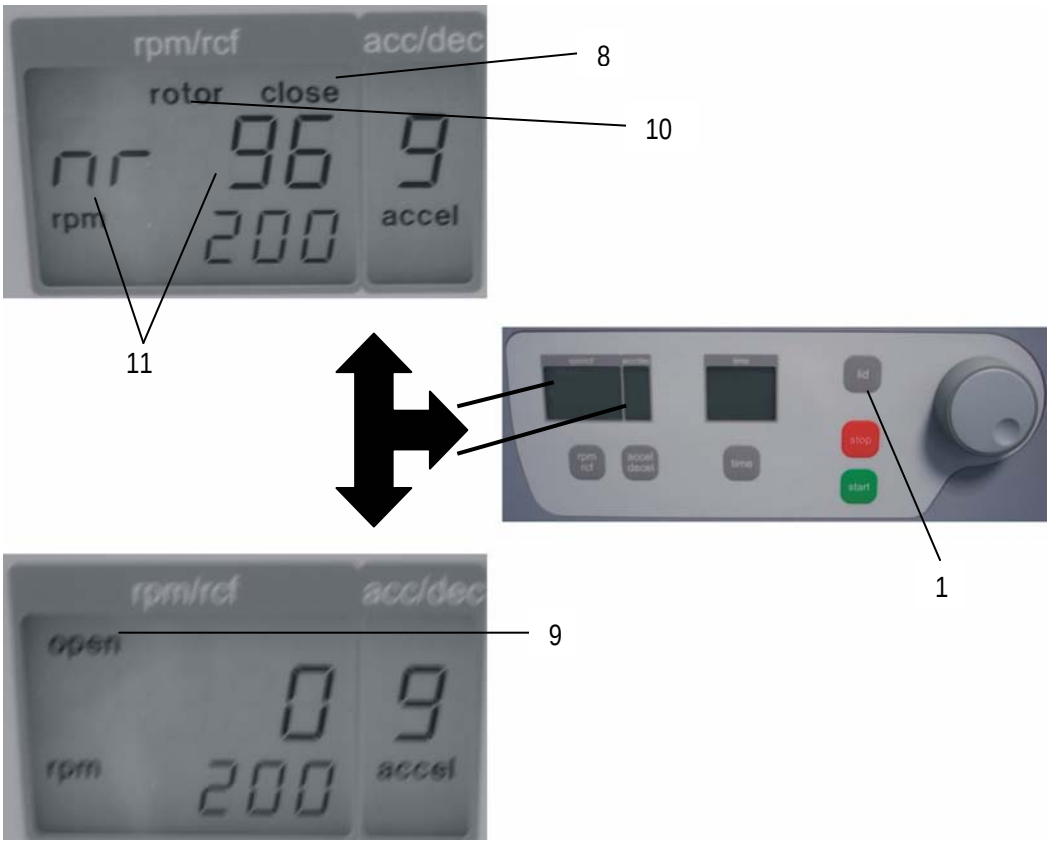


Photo 12

2.2.3 Lid lock

Attention: Before closing the lid please check if the rotor is tighten, and that all 6 buckets have been put in the swing out rotor.
The lid must only be lay down slightly. An electronic lid lock closes the lid automaticaly, at the same time disappears the word „open“ (9).
As a sign that the centrifuge is ready for starting it appears in the display „rpm/rcf“ the word „close“ (8). Simultaneously it appears in that display the word „rotor“ (10), as well as the code number of the rotor, which is in the centrifuge i. e. „nr 96“ (11).
With that all rotor specifically datas, like e. g. max. speed, acceleration etc., are adopted. (see photo 12)

2 OPERATION

2.2.4 Pre-selection of speed / RCF-value

Through the key „rpm/rcf“ (6) this pre-selection is activated. By pressing the key once the word „rpm“ (12) flashes.

By pressing the key once again the pre-selection of the centrifugal forces may be chosen. Then it appears the flashing word „rcf“ (13).
You can set the desired values with the adjusting knob (7). In the display (14) the regulated value is shown permanently, before, during and after the run.
The speed is adjustable between 200 rpm and maximum revolution of the centrifuge resp. the maximum permissible revolution of the pre-selected rotor.
It is the same with the pre-selection of the RCF-value. The setting range is between 20 xg and the maximum permissible centrifugal force of the rotor.
The maximum speed of the Z 206 A is 6000 rpm resp. 4180 xg.

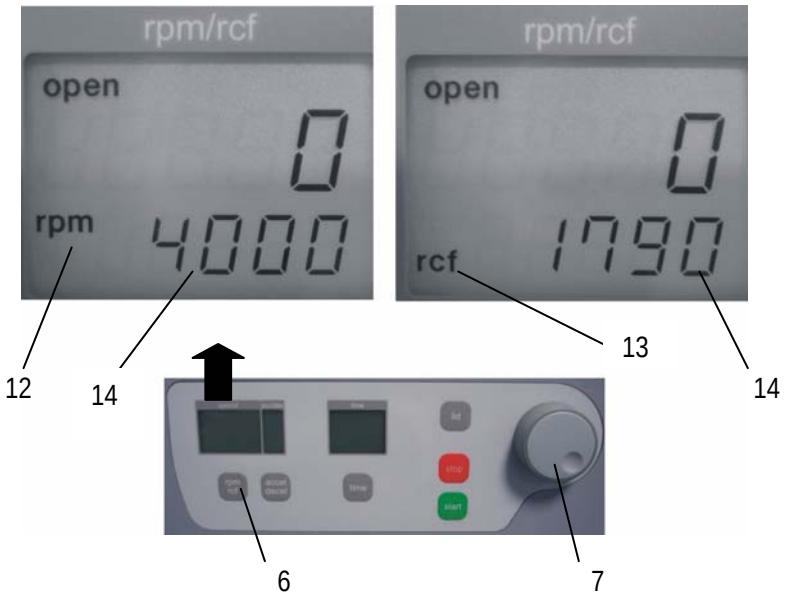


Photo 13

Max. Revolution per minutes of the valid rotors Z 206 A

Rotor-Number	Max. Revolution	RCF Value
220.96 V01	6000 rpm	4180 xg
220.97 V01	6000 rpm	3820 xg
220.95 V06	6000 rpm	2930 xg
220.68 V04	3500 rpm	1450 xg

Attention:
Please notice the maximum permissible revolutions of your test tubes!! (Producer Indication)

2.2.5 Pre-selection of running time

The running time can be pre-selected in three different ranges from 10 seconds up to 99 hours 59 minutes.

1. Range from 10 seconds up to 59 minutes 50 seconds in steps of 10 seconds

2. Range from 1 hour up to 99 hours 59 minutes in steps of 1 minutes
3. Range continuous run „cont", which can be interupted by the key "stop" (2).

The running time can be pre-selected whether with open or closed lid of the centrifuge.
To activate the setting of the running time press the key „time" (4).
In the display „time" flashes the indication „m : s" or „h : m" (15), depending on the previous setting.
To set the desired value use the adjusting knob (7). After exceeding of 59 min 50 sec the indication (15) changes automatically in „h : m". After exceeding of 99 hours 59 min the word „cont" appears in the display „time". That continuous run can only be interupted by pressing the key „stop" (2).
The display shows always the remaining running time.

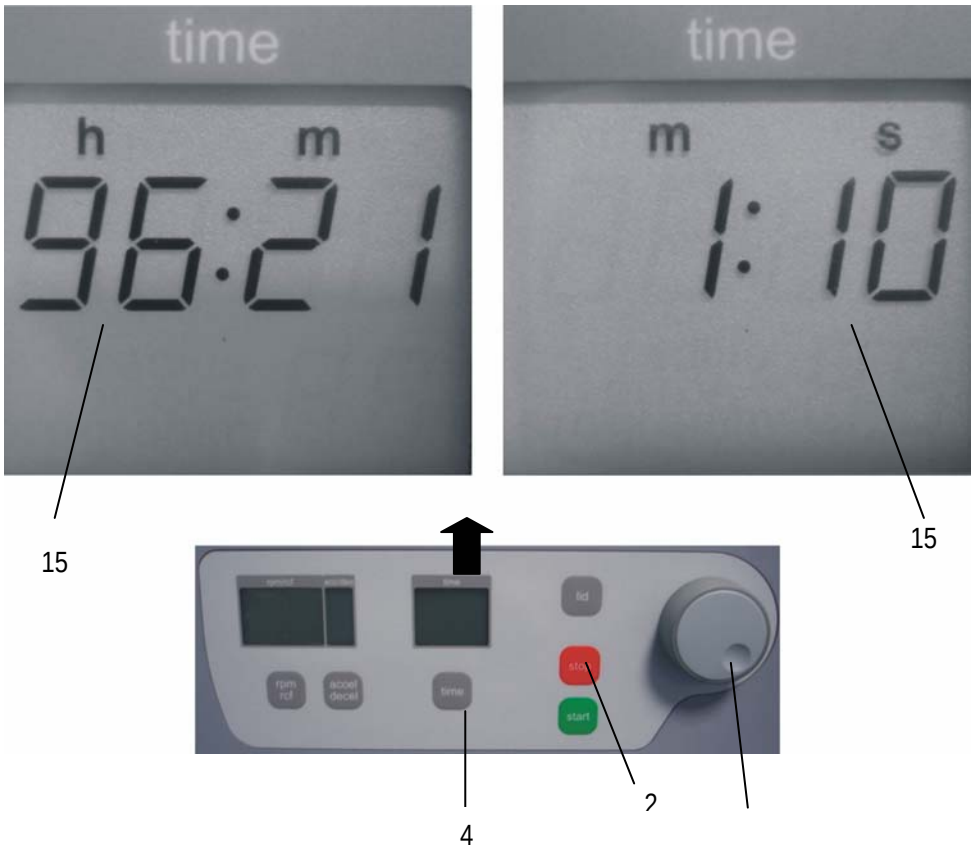


Photo 14

2 OPERATION

2.2.6 Pre-selection of brake intensity and acceleration

Through the key „accel/decel" (5) this function is activated.
By pressing the key once the word „accel" (16) flashes in the display „acc/dec". The desired acceleration can be pre-selected by the adjusting knob (7). The value 0 is equivalent to the lowest and the value 9 to the highest acceleration.

By pressing the key „accel/decel“ (5) twice, in the display „acc/dec“ indicates the word „decel“ (17). Now the desired brake intensity can be pre-selected by the adjusting knob (7). The value 9 is equivalent to the shortest and the value 0 to longest possible brake time.

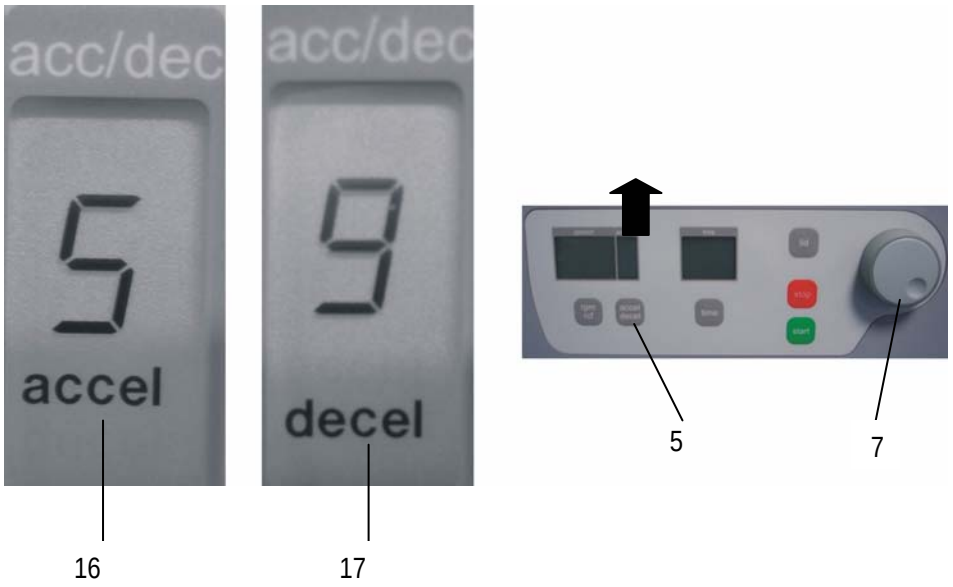


Photo 15

Acceleration- and deceleration times Z 206 A(120 V / 230 V) in seconds

	Acceleration values		Deceleration values	
Rotor-Number	Level 0	Level 9	Level 0	Level 9
220.96 V01	70	40	150	35
220.97 V01	80	35	150	35
220.95 V06	60	11	30	10
220.68 V04	35	8	25	7

2 OPERATION

2.2.7 Starting the centrifuge

After closing the lid you can start the centrifuge with the key „start“ (3).
By the key „start“ (3) you can start runs with manually pre-selected parameters.
When the respective pre-selected running time has ended then the centrifuge will stop automatically or you can interupt the run in the mode “cont” with the key “stop” (2).

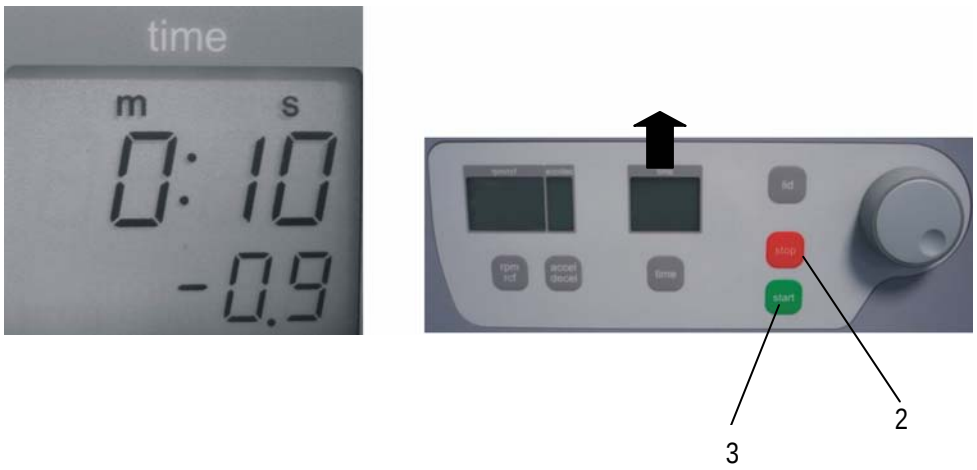


Photo 16

2.2.8 The „STOP“ key

By the „stop“ key (2) you can interrupt the run at any time. After pressing the key the centrifuge decelerates with the respective pre-selected intensity down to stand still.

Photo 17

2 OPERATION

2.3 Safety features

2.3.1 Imbalance detection

In case of the rotor not being equally loaded, the drive will turn off during acceleration. The rotor decelerates to stand still.

When in the display “time” the word “error” together with the number “01” (18) appear, the weight difference of the samples is too huge. Weight out the samples exactly.
Load the rotor as described in chapter 2.1.1.

When in the display “time” the word “error” together with the number “02“ (18) appear, there could be following reasons:

- The imbalance switch is defective.

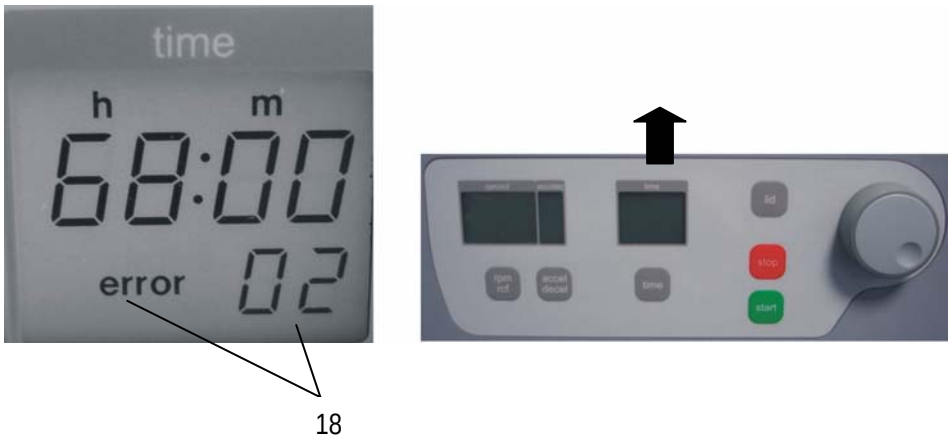


Photo 18

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, available in nearly each store, 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 slightest damages.

In case of rotors, buckets or tube racks getting in touch with corrosive substances the concerned spots have to be cleaned carefully.

Corrosive substances are for instance:

- 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 based on pollution.

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).

It is necessary to coat anodized aluminium parts with anti-corrosion oil regularly in order to increase their life-spans and reduce corrosion predisposition.

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

The maintenance procedure has to be repeated every 10 to 15 runs, but at least once a week.

3 MAINTENANCE

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 extremely pollute the rotor chamber, the rotor, the buckets and the samples.

ATTENTION:
Please notice the producer indication!

3.1.3 Disinfection of alu-rotors

In case of infectious material spilling into the centrifuge, the rotor and rotor chamber have to be disinfected right 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. on formalin base. A disinfection spray is most suitable in order to easily reach all difficult to access spots.

ATTENTION:
Before applying any other cleaning resp. Decontamination method than recommended by the manufacturer, contact the manufacturer to ensure yourself, you would not damage the unit or the rotor by applying the designated method!

3.1.4 Disinfection of PP-rotors

Autoclaving
The recommended time for autoclaving: 15 – 20 min at 121°C (1 bar)
ATTENTION: The sterilization time of 20 min. must not be exceeded. Sterilization again and again will cause reduction of the mechanical resistance of the plastic material.

Before the autoclaving the PP-rotor and adapter must thoroughly be cleaned to avoid the burning in of dirty residues.
You can disregard the consequences of some chemical residues to plastic materials at ambient temperatures. But at the high temperatures of the autoclaving those residues may corrode and destroy the plastic. The objects must be thoroughly washed up with distilled water after the cleaning but before the autoclaving. Residues of any cleaning liquids may cause fissures, whitening and stains.

Gassterilization
Boxes, bottles and rotors may be gassterilized with Ethylenoxyd. According to the duration of the application you may give long enough an airing to the items after the sterilization and before using them again.
ATTENTION: Because the temperature may rise during the sterilization, rotors, boxes and bottles must not be closed respectively must be totally unscrewed.

Chemical sterilization
Bottles, boxex and rotors may be treated with the usual liquid disinfectants.

4 TROUBLE SHOOTING

4.1 Error messages: cause / solution

Preface:

The error messages are listed to help localize possible errors faster.

The diagnose referred to in this chapter may not always be the case, as they are only theoretically occurring errors and solutions.

4.2 Survey of possible error messages and their solutions

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 protect 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 stopper. Remove this stopper, fastened to it there is a string which is connected to the electronic lid lock.
- If you pull the string slightly the lid will open.
  ATTENTION: Don't put your hands in the rotor chamber as long as the rotor is still spinning!
- Push the plastic stopper back in the unit again, for go on working.
  (see photo 19)

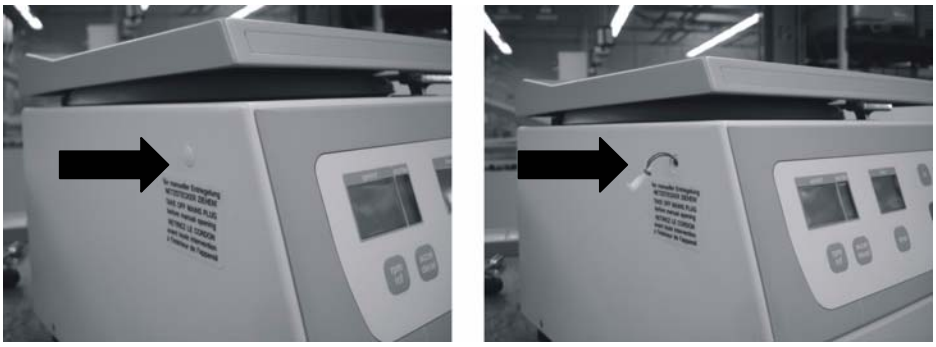


Photo 19

4.2.2 Description of the error message system

The error message is shown in the "time" display through a two-digit number (19). At the same time the word "error" (20) is indicated in the display (see photo 20).

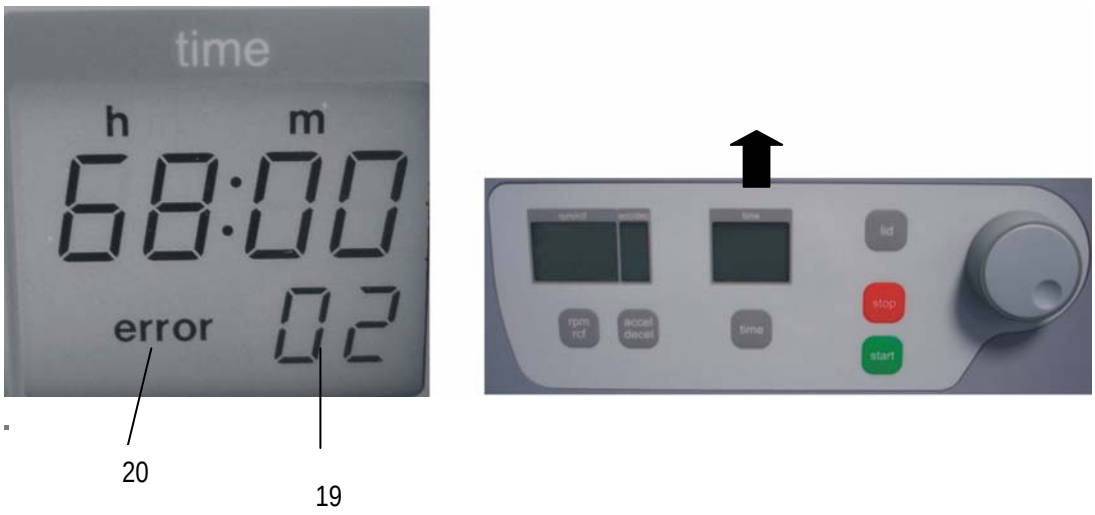


Photo 20

4.2.3 Error messages

Errors that may be indicated in the LCD display:

Error No.:	Description
01	Imbalance arose
02	Imbalance sensor is defective
14	Leap of speed is too big between 2 measurements
30	Motor is blocked or defective
33	Open lid while the motor is running
34	Lid contact defective
55	Overspeed
60	Undervoltage in the intermediate circuit
70	Blackout of the relay

