HERMLE
LABORTECHNIK

Operating Manual for Small Centrifuge Z 206 A

1. PRODUCT DESCRIPTION

1.1 Safety Instructions

This symbol indicates safety instructions and points of potential dangerous situations. Before using the centrifuge for the first time, please read the operating manual.

Failure to follow these instructions can result in personal injury and/or property damage .

Intended use includes: the observation of all instructions, in the instruction manual, and administering inspection and maintenance.

1.2 Intended Purpose

This Hermle centrifuge was designed only for the separation of materials or mixtures with different densities, specifically for the preparation and processing of samples, from the human body, in context of an in-vitro-diagnostic use, to allow the use of in-vitro-diagnostic in accordance to its' intended purpose. The designated device and its' accessories listed, in the technical documentation, are in compliance with Directive 98/79/EC for In-Vitro-Diagnostic Medical Devices.

Hermle Centrifuges are intended exclusively for indoor use and for the use of qualified personnel.

Only Hermle original rotors and accessories should be used. Any other use or intended use is strictly prohibited. For any resulting damage, the company, Hermle Labortechnik, is not liable.

1.3 Brief Description

The unit type Z 206 A is a non refrigerated universal centrifuge, which we offer in two voltage variations 230V or 120V.

The centrifuge can be used with swing-out and angle rotors.

All parameters are accessible via buttons and selected with the potentiometer. All pre-selected and current values will be shown permanently on the LCD-display.

The centrifuge is powered by a maintenance-free brush motor.

Detailed technical data are in "table 1 Technical data" (see APPENDIX S.IV).

1.4 Delivery Package

- 1 Centrifuge Z 206 A
- 1 Instruction Manual Z 206 A

1.5 Installation of the Centrifuge

1.5.1 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 be kept with the centrifuge, at all times!

1.5.2 Space Requirements

The centrifuge should be installed on an even, solid surface, if possible on a laboratory cabinet / table or some other solid vibration free surface.

During centrifugation, the centrifuge must be placed in a way, that there is a minimum space of 30 cm/11.81in on each side of the unit, according to EN 61010-2-020 standards.

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/73.4°F.

1.5.3 Installation

Follow these steps:

• Check whether the power supply corresponds with the one specified on the manufacturer's rating label, mounted on the rear panel.

• The line voltage circuit breaker is max. 10 A (Type K), slowly release for commonly used instruments.

• In case of emergency, there must be an emergency switch off installed outside of the room, in order to disconnect the power supply from the unit.

• Connect the centrifuge, with the mains.

(The socket for the power cord must be easy to reach, respectively easy to disconnect).

-Switch on, by using the mains power switch (2.2).

Open the lid, by using the button LID.

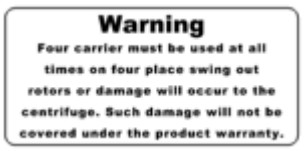
• Remove the transport securing device of the motor.

1.6 Signs and Indications of the Centrifuge

1.6.1 Product Nameplate (Example)

Company Address:	Hermle Labortechnik GmbH, Siemensstr. 25, D-78564 Wehingen
TYPE:	Type Designation of the Product
REF:	Order No. of the Product
SN:	Serial No. of the Product
	Manufacturer
	Date of Manufacture
MAX. Drehzahl:	Max. Speed Allowed of the Unit
KIN. EN.:	Max. Kinetic Energy with Corresponding Roto
U/I/f:	Allowable Voltage / Max. Current / Frequency
P:	Electrical Input Power
	Operating Manual Indication
	Labeling, Standards and Guidelines
	Instructions for Disposal
	RoHS Conformity

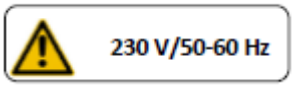
1.6.2 Warning and Information Signs



Four carrier must be used at all times on four place swing out rotors or damage will occur to the centrifuge. Such damage will not be covered under the product warranty

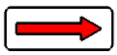
Attention! Check the fastening of the rotor nut before each run

Take off mains plug before opening the housing or the emergeny release



Power Input

Rotation Direction Emergency Release



Direction of Rotation – clockwise rotation for the rotor drive

Biohazard Warning

1.6.3 Declaration of ATEX (94/9/EG)

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/12in 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! If used in such environment, this is at the users own expense.

- Never spin toxic or pathogenic material without adequate safety precautions, i.e. centrifugation of buckets / tubes with or without defective hermetic sealing, is strictly prohibited. The user is obliged 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 not manufactured for this unit.
- Under no circumstances open the lid of the centrifuge, while the rotor is still running or rotating with a speed of > 2m/s.

This device may only be operated by a trained professional. Carefully, read the operating manual and be familiar with the functions of the device.

1.6.4 Following Rules:

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

- Do not run the centrifuge, if mechanical or electrical assembly groups have been tampered with, by unauthorized personnel.
- Do not use accessories such as rotors and buckets, that are not 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, that 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 to 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.

1.6.5 Warranty

The centrifuge has been subjected to thorough testing and quality control. In the unlikely case of any manufacturing faults occurring, the centrifuge and rotors are covered by warranty, for a period of two years, from date of delivery. This warranty becomes invalid in any case of mishandling, damage and/or negligence and further in any 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 regards to technical improvement!

1.7 Operating and Display Elements

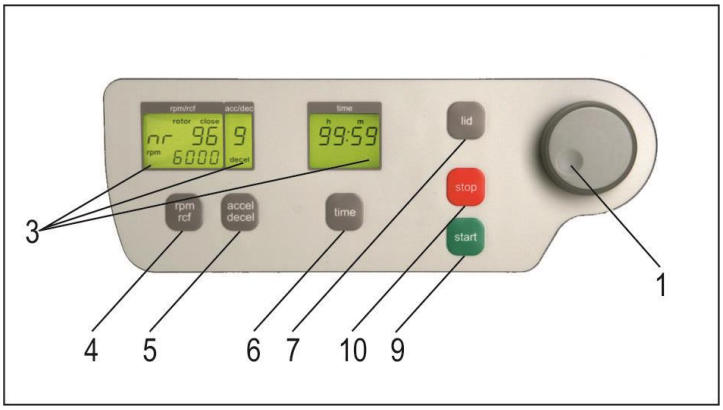


Figure 1

1	**potentiometer**	Run Parameters
3	**LCD**	Control Panel Display
4	**rpm/rcf**	Speed/ g-force
5	**accel/decel**	Acceleration/Deceleration Intensity
6	**time**	Centrifugation Time
7	**lid**	Lid Release
9	**start**	Start Centrifugation
10	**stop**	Stop Centrifugation

1.7.1 LCD-Display

The following picture shows the individual elements of the LCD-Display.

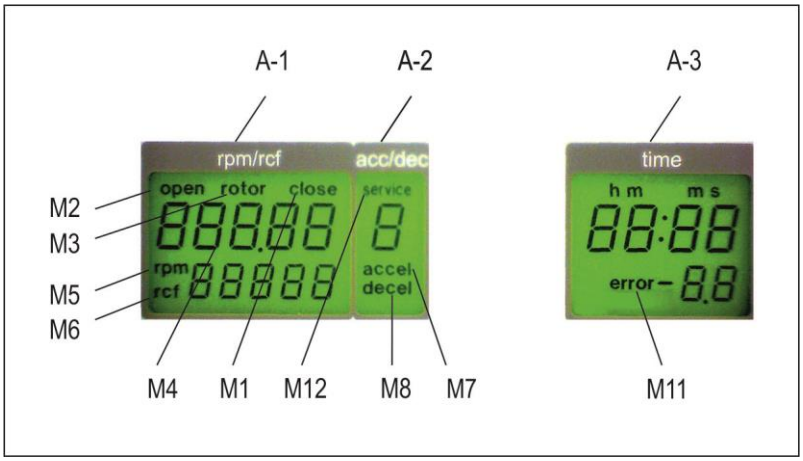


Figure 2

Display Fields:

A-1	Display Field – "rpm/rcf"
A-2	Display Field – "acc/dec"

A-3 Display Field– "time"

Messages/Logo of the Display Field:

M1	"close"	M6	"rcf"
M2	"open"	M7	"accel"
M3	"rotor"	M8	"decel"
M4	Rotor-No.	M11	"error"
M5	"rpm"	M12	"service"

1.8 Basic Adjustment

1.8.1 Adjustment of the Rotor Type

Before the first operation resp., after each rotor change, choose the rotor type needed.

Find the rotor type on the printed order number, on the rotor.

Example:

Angle Rotor: 220.96 V01 ≙ rotortype "96"

Swing-Out Rotor: 220.68 V04 ≙ rotortype "68"

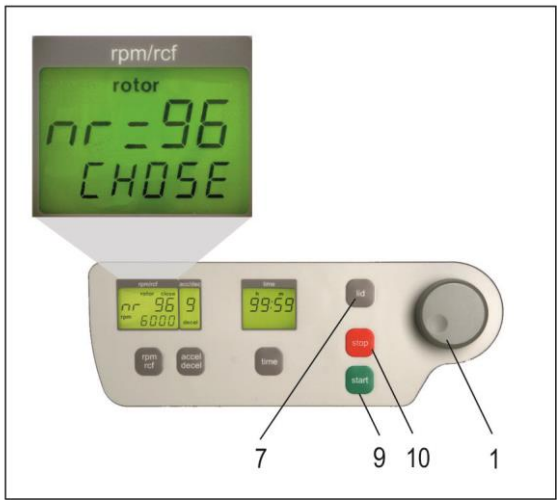


Figure 3

Switch on the unit and open the lid. Press simultaneously, the keys “lid“ (7) and “stop” (10). In the display, “rpm/rcf” (A-1) appears the old previous rotor type, i. e. “96”. Now the buttons can be released.

With the potentiometer (1), choose the used rotor now, (see Figure 3). To select the data in the unit, please press the “start” (9) key.

*Now all important rotor parameters are stored in the centrifuge.

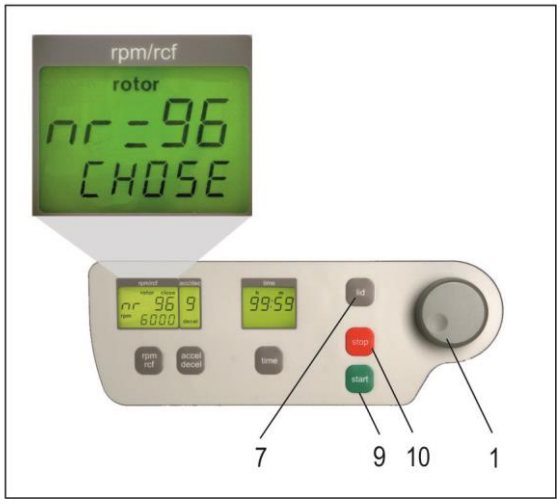


Figure 4

Attention: Set rotor must always match with the used rotor, otherwise the unit can be damaged.

The rotor type can be checked during the run by pressing the key "lid" (7).

1.8.2 Access to the Mode: "Operating Data"

In this model, the following points can be reviewed:

- Number of Starts
- Operating Hours of Centrifuge
- Operating Hours of Motor
- Software Version
- Error List
- Function of the Imbalance Switch
- Operation of Keyboard
- Display Tests

If the centrifuge is still turned off, press the keys, "time" (6) and "lid" (7) simultaneously, turning on the main switch of the centrifuge. Now release both keys. As a result, a display test is administered for approx. 5 seconds. All possible indications will appear at the same time (see Figure 5).

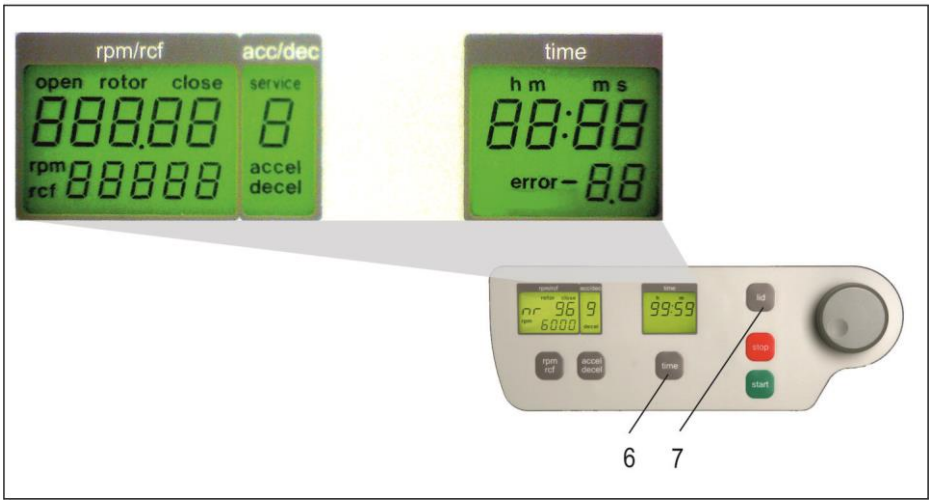


Figure 5

1.8.3 Retrieving Operating Data

In the function, "Basic Adjustments" the operating data, of the centrifuge, can be retrieved. Please proceed as described, under point 1.8.2, to enter this program mode.

Press the key "accel/decel" (5). In the display, "accel/decel" (A-2) flashes the word, "service".

With the potentiometer(1) the following information can be retrieved:

A = Previous Starts of the Centrifuge
H = Previous Operating Hours
S = Software Version
E = List of Previous Error Messages
h = Running Time of the Motor

The list of the last 99 error messages can be looked over by pressing the key „rpm/rcf“ (4) and leaf through it by the potentiometer(1). The respective error codes appear in the display „rpm/rcf“ (A-1) (seeFigure 6). The first two numbers indicate the appeared errors ongoing from 00 to 99, the last two numbers indicate the error code. Please look up in "table 5: error messages" (See APPENDIX VI).

Switch off the centrifuge, to change back to the normal program mode.

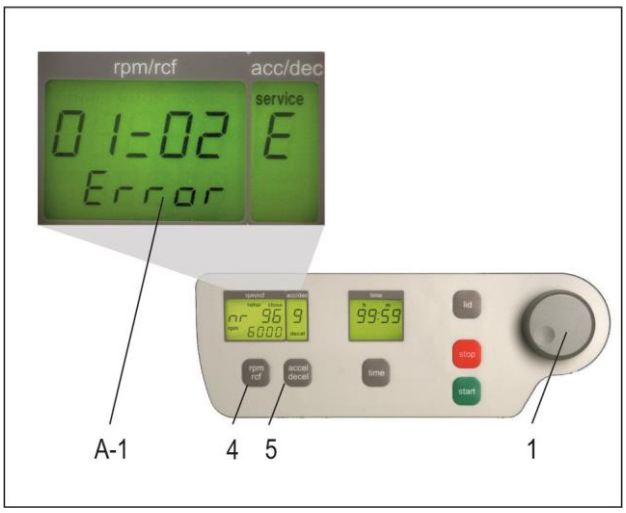


Figure 6

2. OPERATION

2.1 Mounting and Loading the Rotor

2.1.1 Installation of the Rotor

Clean the drive shaft and the collet with a clean, grease-free piece of cloth. Place the rotor onto the drive shaft,(see Figure 7). Please be sure that the rotor is fully installed onto the motor shaft)

Please be sure that the rotor shaft is completely plugged into the rotor slot, (see Figure 8).

Figure 7

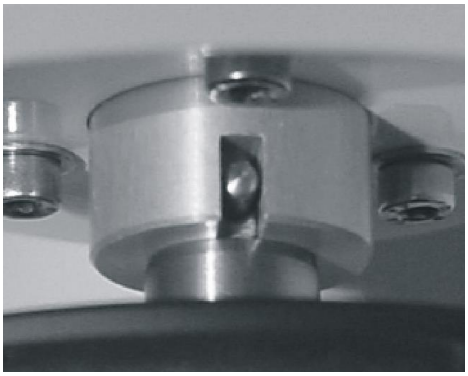


Figure 8

Figure 9

Hold the rotor with one hand (see Figure 9).

ATTENTION:

For safety reasons, check the fixing screw before each run.

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

Do not operate with extremely corrosive substances, that could damage the rotor, buckets and materials.

In case of any questions, please contact the manufacturer!

2.1.2 Loading Angle Rotors

It is recommended to operate, e.g. a 12-place-rotor, with 2, 4 or 8 loaded tubes only.
But the loaded borings must be opposite of each other, (see Figure 11).

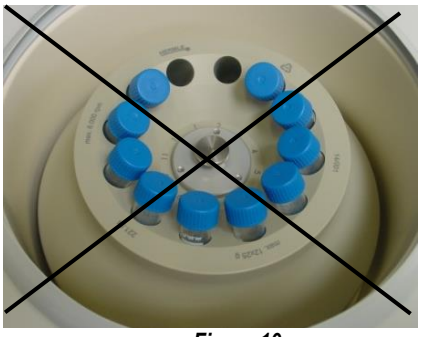


Figure 10

wrong

Figure 11

right

Rotors must be loaded symmetrically and with equal weight, (see Figure 11). The adapter may only be loaded with the appropriate vessels. The weight differences between the filled vessels should be kept as low as possible. Therefore, we recommend to weigh with a balance. This reduces the wear of drive and the acoustic operating noise.

2.1.3 Loading Swing Out Rotors

Loading of the buckets / vessels must be in accordance to Figure 13. It is recommended to operate, e.g. a 6-place swing out rotor, with 4 loaded buckets only. But, the loaded buckets must be opposite of each other. Make sure that the unloaded buckets are placed inside the rotor.

In principle, swing out rotors should not be used in operation, until all buckets or racks are placed inside the rotor.

ATTENTION:

Swing Out Rotors can be removed during operation, only if all locations are filled in with either 4 buckets or 4 carriers – do not mix up buckets and carriers!!

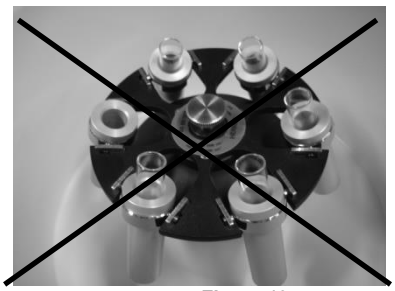


Figure 12

w*rong*

Figure 13

right

2.1.4 Loading and Overloading of Rotors

All approved rotors are listed with their maximum speed and maximum filling weight, in Table 2: "Permissible Net Weight", (see APPENDIX P. V).

The maximum load permitted for a rotor is determined by the manufacturer, as well as the maximum speed allowed for this rotor (see label on rotor), must not be exceeded. The liquid the rotors are loaded with, should have a max. 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:

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

Example:

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

In case of any questions, please contact the manufacturer!

2.1.5 Removing the Rotor

Completely, untighten the rotor fixing nut (2. screw over the stiff point) and lift the rotor vertically out of the centrifuge, (see Figure 7).

2.2 Power Switch

The power switch is located on the left-hand side of the ground plate, on the unit, (see Figure 14.)

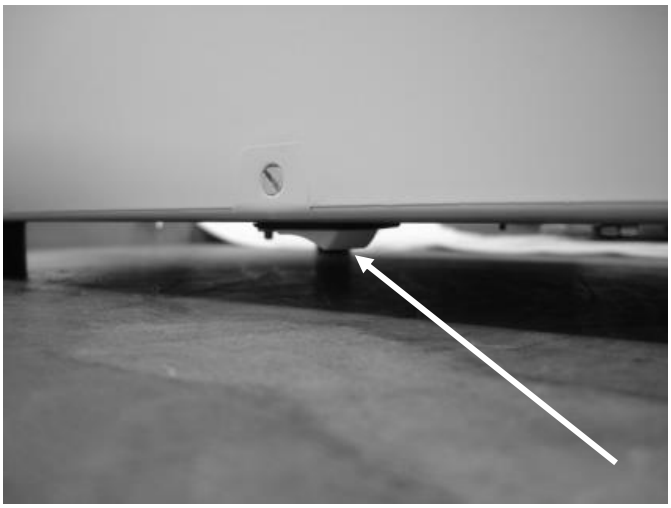


Figure 14

ATTENTION:

After turning on the power switch, open the centrifuge lid first, before starting the centrifuge.

2.3 Lid

2.3.1 Lid Release

After the run, properly close the lid of the centrifuge, appearing in the display, "rpm/rcf"(A-1) with the word, "close" (M1). If there is a rotor in the centrifuge, the word, "rotor" (M3) appears, as well as the code number of the specified rotor, which is in the centrifuge, for example "221.28" (M4). If there is no rotor in the centrifuge, it flashes the word, "rotor" (M3) and an additional word, "no" (M4).). By

pressing the key, "lid" (7), the lid of centrifuge can be released. As soon as the electromagnetic lid is completely released, the word, "open" (M2) appears. The lid of the centrifuge is now able to be opened.

For all number marked text, please refer toFigure 15.

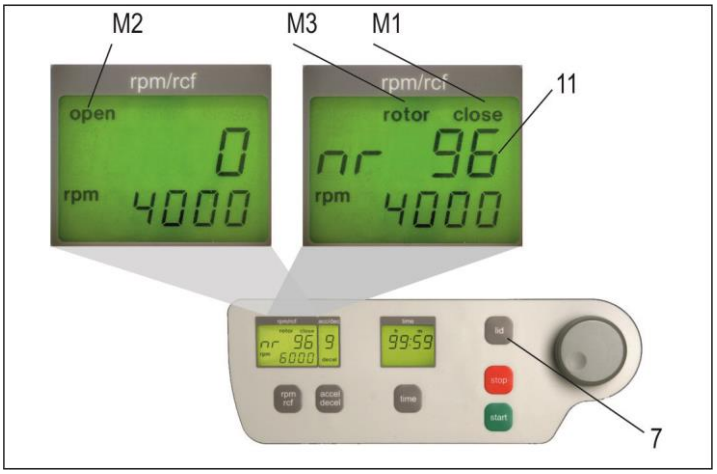


Figure 15

2.3.2 Lid Lock

The lid must only be closed slightly. An electromagnetic lid lock closes the lid, the word "open" (M2) will no longer be displayed. As a sign that the centrifuge is ready for starting, appearing in the display, "rpm/rcf"(A-1), the word "close" (M1). Simultaneously, the word "rotor" (M3) appears, as well as the code number of the rotor, which is in the centrifuge, i. e. „nr 96“ (11) along with all rotor specific data, for example: max. speed, acceleration etc., are available, (see Figure 15).

ATTENTION

Before closing the lid, please check if the rotor is tightened, and all 6 buckets are inside the swing out rotor.

2.4 Pre-Selection

2.4.1 Pre-Selection of Speed and RCF

By Selecting the key, "rpm/rcf" (4), pre-selection is activated. By pressing the key once, the word "rpm" (M5) flashes. By pressing the key again, the pre-selection of the centrifugal forces can be chosen. The flashing word, "rcf" (M6), will appear.

The desired values can be selected, with the adjustable knob (1). In the display (A-1), the regulated value is shown permanently: before, during and after the run.

This pre-selected value will be stored, as long as a new pre-selection is made.

For all number marked text, please refer to Figure 16.

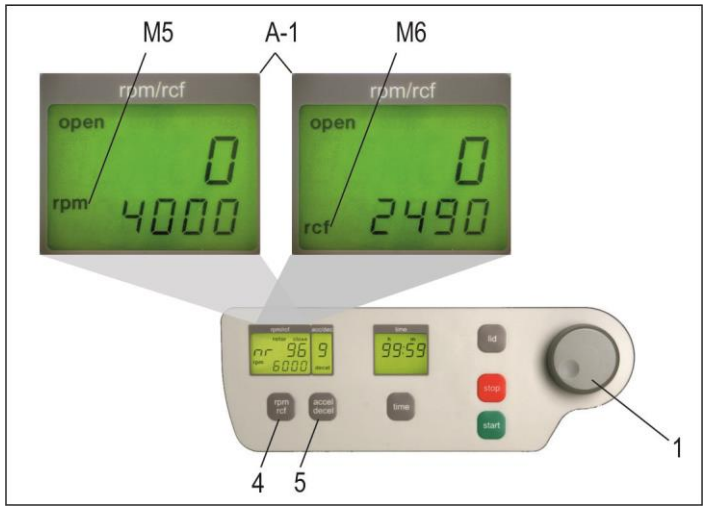


Figure 16

The speed is adjustable between 200 rpm and the maximum revolution of the centrifuge resp. of the maximum permissible revolution, of the pre-selected rotor.

The pre-selection, of the RCF-value, is the same 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 6,000 rpm resp. 4,427 xg.

Please refer to: "Table 3: Max. Speed and RCF", (See APPENDIX V). This table shows the approved rotors with their max. permitted speed and RCF values.

ATTENTION:

Please notice the maximum permissible revolutions of the test tubes!!, (Producer Indication). Please refer to: Chapter 3.1.6, for more information.

2.4.2 Pre-Selection of Running Time

The running time can be pre-selected in 3 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", can be interrupted by the key, "stop" (10).

   -The running time can be pre-selected, with the lid opened or closed.
   -To activate the setting of the running time, press the key "time" (6).
   -In the display, "time" (A-3) flashes the indication: "m : s" or "h : m", depending on the previous setting.

To set the desired value, use the adjustable knob (1). After exceeding 59 min 50 sec, the indication changes automatically to, "h : m". After exceeding 99 hours 59 min, the word "cont" appears in the display, "time" (A-3).

The continuous run can only be interrupted by pressing the key, "stop" (10). The time counts down, as soon as the set speed is reached.

For all number marked text, please refer to Figure 17.

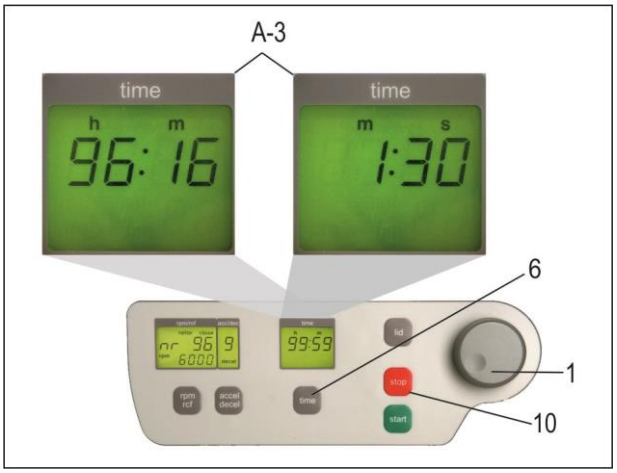


Figure 17

2.4.3 Pre-Selection of Brake Intensity and Acceleration

Selecting the key, "accel/decel" (5), this function is activated.

By pressing the key once, the word "accel" (M7) flashes, in the display "accel/decel" (A-2). The desired acceleration can be pre-selected, with the adjustable knob (1). The value 0 is equivalent to the lowest acceleration and the value 9 is equivalent to the highest acceleration.

By pressing the key "accel/decel" (5) twice, in the display "accel/decel" (A-2), indicates the word "decel" (M8). Now the desired brake intensity can be pre-selected, with the adjustable knob (1). The value 9 is equivalent to the shortest possible brake time and the value 0 to longest possible brake time.

See Table 5: "Acceleration and Deceleration Times", (See APPENDIX V). This table shows the acceleration and deceleration times, for the acceleration and deceleration stages 0 to 9, for each rotor.

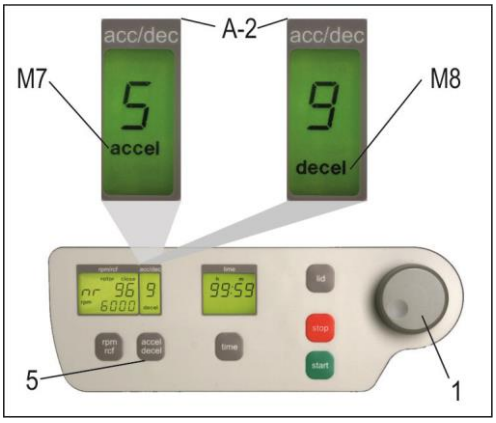


Figure 18

2.5 Starting and Stopping the Centrifuge

2.5.1 Starting the Centrifuge

After closing the lid, start the centrifuge with the key, "start" (9). With the key "start" (9), runs can be started, with manually pre-selected parameters. When the respective pre-selected running time has ended, the centrifuge will stop automatically or the run can be interrupted, with the “stop” (10) key.

For all number marked text, please refer to Figure 19.

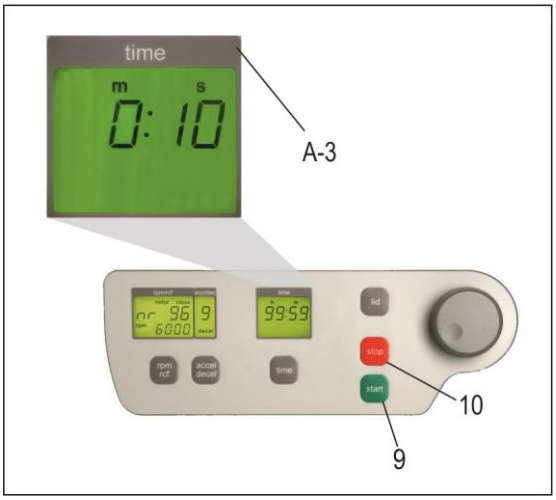


Figure 19

2.5.2 The "STOP" Key

With the "stop" key (10) (see Figure 20), the run can be interrupted at any time. After pressing the key, the centrifuge decelerates, with the respective pre-selected intensity, down to a standstill.

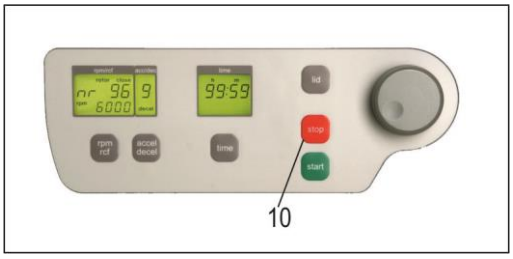


Figure 20

2.6 Imbalance Detection

If the rotor is not equally loaded, the drive will turn off, during acceleration. The rotor decelerates to a standstill.

When in the display, “time” (A-3), the word “error” (M11) along with the number “01” (Figure 21) may appear, the weight difference of the samples is too large. Weigh out the samples, precisely.

Load the rotor as described in: Chapters 2.1.2 and 2.1.3.

When in the display, “time” (A-3), the word “error” (M11) along with the number “02“ may appear, for the following reason:

*The imbalance sensor is defective.

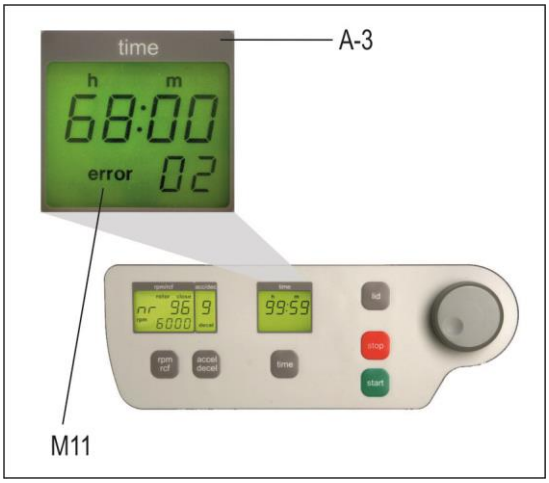


Figure 21

3. MAINTENANCE

3.1 Maintenance and Cleaning

3.1.1 General Care:

Maintenance of the centrifuge is dependent on prolonging the life of the rotor, the rotor chamber and the rotor accessories. Please be sure to clean the accessories, especially the sealing of the aerosol-tight rotors and insert bolts, of swing out rotors. Following, lubricate the bolts or sealing, with the recommended HERMLE Rotorgrease - Order No.: 38-5656.

Please pay special attention to anodized aluminum parts. Breakage of rotors can be caused by the slightest damages.

In case of rotors, buckets or tube racks becoming in touch with corrosive substances, the affected area must be cleaned, thoroughly.

Corrosive substances, such as, must be avoided: alkalis, alkaline soap solutions, alkaline amines, concentrated acids, solutions containing heavy metals, water-free chlorinated solvents, saline solutions, e.g. salt water, phenol, halogenated hydrocarbons.

Cleaning – Unit, Rotors, Accessories:

- Turn the device off and disconnect from the power supply, before beginning any cleaning or disinfecting. Do not pour liquids into the housing interior.
- Spray disinfectant on the device.
- Thorough cleaning not only has its purpose in hygiene, but also in avoiding pollution based 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 must not be used, (pH-value > 8).
- After cleaning, please ensure all parts are dried thoroughly, either by hand or in a hot-air cabinet (Max. Temperature + 50°C/122°F).
- It is necessary to coat anodized aluminium parts with anti-corrosion oil regularly, in order to increase their life-span and reduce corrosion predisposition.
- Due to humidity or not hermetically sealed samples, condensation may form. The condensation 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 at week!

- Connect the unit to the power supply, after the equipment is completely dry.
- Do not implement disinfection with UV-, beta- and gamma-rays or other high energy radiation.
- Metal rotors can be autoclaved.
- Rotor lid and adapters can also be autoclaved, (Max. 121°C/250°F, 20 min).
- The tube racks are made of PP and **cannot** be autoclaved, at 134°C/273°F.

For additional information on aerosol-tight rotors, lids and buckets, please see below.

The aerosol tightness of rotors, rotor lids, buckets and caps have been tested and certified by the "TÜV Nord CERT GmbH, Certification Body Consumer Products, Essen (Germany)", in accordance with Annex AA of IEC 61010-2-020. The certificates can be downloaded on our webpage, **www.hermle-labortechnik.de**. Aerosol-tight rotors and buckets are marked with the label, "aerosol-tight".

ATTENTION: Autoclaving, mechanical stresses and contamination, by chemicals or other aggressive solvents, can impair the aerosol-tightness of the rotors and buckets.

- Check the integrity of the seals of the aerosol-tight rotor lids or caps, before each use.
- Use only aerosol-tight rotor lids or caps, if the seals are undamaged and clean.
- Replace the seals of aerosol-tight lids and caps, after 5 autoclaving cycles.
- **Never** store aerosol-tight rotors or buckets closed.

3.1.2 Cleaning and Disinfecting of the Unit

1. Open the lid, before turning off the unit. Disconnect from the power supply.
2. Open the rotor nut, by turning the rotor key counter-clockwise.
3. Remove the rotor.
4. For cleaning and disinfecting of the unit and the rotor chamber, use the cleaner previously described, (see Chapter 3.1.1).
5. Clean all accessible areas of the device and its accessories, including the power cord, with a damp cloth.
6. Wash the rubber seals and rotor chamber thoroughly, with water.
7. Rub the dry rubber seals with glycerol or talc, to prevent these from becoming brittle. Other components of the unit, e.g. the lid lock, motor shaft and rotor, should **not** be greased.
8. Dry the motor shaft with a soft, dry and lint-free cloth.
9. Examine the unit and accessories for damage.

Remove adherent dust, at least every 6 months, from the ventilation slots in the centrifuge, by using a soft brush.

*Before doing so, please switch off the unit and disconnect from the power supply.

3.1.3 Cleaning and Disinfecting of the Rotor

1. Clean and disinfect the rotors, rotor lids and adapters with the cleaner mentioned in: (Chapter 3.1.1).
2. Use a bottle brush to clean and disinfect the rotor bores.
3. Rinse the rotors, rotor lids and adapters with clear water. Particularly, the drillings of the angle rotors.
4. When drying the rotors and accessories, set on a towel. Place the angle rotors, with bores down, to dry.
5. Dry the rotor cone with a soft, dry and lint-free cloth, check for damage. Do not grease the rotor cone.

3.1.4 Disinfection of Aluminium - Rotors

In case of infectious material spilling into the centrifuge, the rotor and rotor chamber have to be disinfected, promptly after the run. Rotors may be autoclaved, at a maximum temperature of 121°C/250°F.

.

3.1.5 Disinfection of PP-Rotors

The recommended time for autoclaving: 15 – 20 min at 121°C/250°F, (1 bar)

ATTENTION: The sterilization time of 20 min. must not be exceeded. Continuous sterilization will cause reduction in the mechanical resistance, of the plastic material.

Before autoclaving the PP-rotor and adapter, thoroughly clean to avoid the burning of dirty residues.

Please disregard any consequences of chemical residues to plastic materials, at ambient temperatures. At high temperatures, autoclaving residue may corrode and destroy the plastic. The objects must be thoroughly washed with distilled water, after the cleaning, but before the autoclaving. Residues of any cleaning liquids, may cause fissures, whitening and stains

Gas Sterilization

Adapters, bottles and rotors may be gas sterilized, with Ethylenoxyd. According to the duration of the application, allow items to properly air out, after the sterilization and before usage.

ATTENTION: The temperature may rise during the sterilization; rotors, adapters and bottles should not be fully closed, keep completely unscrewed.

Chemical Sterilization

Bottles, adapters and rotors may be treated, with the usual liquid disinfectants.

ATTENTION: Before applying any other, Cleaning Resp. Decontamination Method, other than what was recommended by the manufacturer, contact the manufacturer to ensure that it will not damage the unit or the rotor.

3.1.6 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 severely pollute the rotor chamber, the rotor, the buckets, and the samples.

If necessary, replace the adapters, tubes and accessories, to avoid further damage. Check the rotor bores regularly, for residue and damage.

ATTENTION: Please check the relevant specifications of the tubes centrifuges with the manufacturer!

3.2 Service Life of Rotors, Round and Rectangular Buckets, accessories

Rotors and rotor lids made of aluminum or stainless steel have an operating time of, **a max. of 7 years,** from first time use.

Transparent rotor lids and caps, made of PC or PP, as well as rotors, tube racks and adapters of PP, have a maximum operating time of up to **3 years,** from first time use.

Conditions for the Operating Time:

Proper use, damage-free condition, recommended care.

4. TROUBLE SHOUTING

4.1 Error Messages: Problem / Solution

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

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

Always keep us informed about any kind of error occurring, which is not listed in this chapter. With this information provided, we are able to improve and complete this operation manual.

Many thanks in advance for your support.

HERMLE Labortechnik GmbH

4.2 Survey of Possible Error Messages and 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 samples.

Please proceed as follows:

- Switch the centrifuge off and unplug the power cord.
- At the left-hand side of the centrifuge housing, there is a plastic stopper, (see Figure 22). Remove the stopper, fastened to it, is a string which is connected to the electronic lid lock.
- Pull the string slightly and the lid will open.

ATTENTION: Don't put your hands in the rotor chamber, while it is still spinning!

- Push the plastic stopper back into the unit, to continue normal function.

Figure 22

4.2.2 Description of the Error Message System

The error message is shown in the "time" (A-3) display through a two-digit number . At the same time the word “error” (M11) is indicated in the display (see figure 18, chapter 2.6 Imbalance). More details see "table 5: error messages" (see APPENDIX S.VI).

5. REPAIR

Health risk from contaminated equipment, rotors and accessories

In case of returning the centrifuge for repairing, to the manufacturer, please know the following:

The centrifuge **must** be decontaminated and cleaned, before shipment, for the protection of persons, environment and material.

Decontamination certificate at goods return delivery (see APPENDIX P. VIII)

We reserve the right to accept contaminated centrifuges.

Furthermore, all costs that may have occurred during the cleaning and disinfection of the units, will go to the debit of the customer’s account.

Return of Power Cords

In case of a return of a centrifuge, we also ask you to send its power cord. This eliminates the risk of a faulty power cord. If no power cord is attached to the centrifuge, a new one will be delivered and charged.

We ask for your understanding.

6. TRANSPORT, STORAGE, DISPOSAL

6.1 Transport

- Before transporting, take out the rotor.
- Only transport the unit in its' original packaging.
- Use a transport aid, for transporting over longer distances, to fix the motor shaft.

	Air Temperature	Rel. Humidity	Air Pressure
General Transportation	-25 to 60 °C	10 to 75 %	30 to 106 kPa
	-13°F to 140°F		

-

6.2 Storage

During storage of the centrifuge, the following environmental conditions must be observed:

	Air Temperature	Rel. Humidity	Air Pressure
Transport Packaging	-25 to 55 °C	10 to 75 %	70 to 106 kPa
	-13°F to 131°F		

6.3 Disposal

In the event of disposing of the product, please observe the applicable legal requirements.

Information on the disposal of the electrical and electronic devices, in the European Community:

The disposal of the electrical devices is regulated within the European Community, by national regulations, based on EU Directive 2002/96/EC pertaining to waste electrical and electronic equipment (WEEE).

In accordance with this, any devices delivered after 08/13/2005 on a business-to-business basis, including the product, may no longer be disposed of, as a household waste. To document this, the devices have been marked with the following identification:

Because disposal regulations may differ from one country to another, within the EU, please contact your supplier, if necessary.

RoHS II Compliance

HERMLE Labortechnik GmbH, Siemensstraße 25, 78564 Wehingen, hereby declares and certifies that all components manufactured are RoHS II compliant, according to the definition and restrictions given by the European Parliament Directive 2011/65/EC. This restricts the use of certain hazardous substances in electrical and electronic equipment.

7. APPENDIX

EC Conformity Declaration

EG Konformitätserklärung
EC Conformity Declaration

CE

Hermle Labortechnik GmbH - Siemensstr. 25 - D-78564 Wehingen – Germany

Das bezeichnete Produkt entspricht den einschlägigen grundlegenden Anforderungen der aufgeführten EG-Richtlinien und Normen. Bei einer nicht mit uns abgestimmten Änderung des Produktes oder einer nicht bestimmungsgemäßen Anwendung verliert diese Erklärung ihre Gültigkeit.

The Product named below fulfills the relevant fundamental requirements of the EC directives and standards listed. In the case of unauthorized modifications to the product or an unintended use this declaration becomes invalid.

Produkttyp
Product Type

Laborzentrifugen mit Zubehör nach „IVD (sonstige Produkte)"
Laboratory centrifuge with accessories to "IVD (other device)"

Typenbezeichnung
Typ Designation

Z 206 A; Z 207 A; Z 207 H, Z 167 M; Z 207 M, Z 216 M; Z 287 A; Z 306; Z 326; Z 366; Z 446; Z 216 MK; Z 32 HK; Z 326 K; Z 366 K; Z 36 HK; Z 446 K, ZK 496

Einschlägige EG-Richtlinien / Normen
Relevant EC Directives / Standards

98/79/EG (Anhang/Annex III); 2014/35/EU; 2014/30/EU, RoHS II 2011/65/EG, 2006/42 EG ; DIN EN 61010-1: 2011-07; DIN EN 61010-2-020: 2017; DIN EN 61010-2-101: 2002
DIN EN ISO 14971: 2013-04; DIN EN ISO 13485: 2016-08

HERMLE
LABORTECHNIK

Wehingen, 22.12.2018
(gültig bis/valid until 21.12.2021)

Alexander Hermle
Geschäftsführer - Managing Director

Table 1: Technical Data

Manufacturer	**HERMLE Labortechnik GmbH, 78564 Wehingen**			
Type	**Z 206 A**			
Dimensions				
Width	28 cm			
Depth	37 cm			
Height	26 cm			
Weight without rotor	10,5 kg			
Max. Speed	6000 min^{-1}			
Max. Volume	6 x 50 ml			
Max. RCF	4427 x g			
Allowable Density	1,2 kg/dm^3			
Allowable Kinetic Energy	2427 Nm			
Mains Power Connection AC	230 V / 50 Hz 1 ph		120 V / 60 Hz 1 ph	
Voltage Fluctuation	±10%		±10%	
Current Consumption	0,55 A		1,1 A	
Power Consumption	100 W		100 W	
Radio Interference	IEC 61326-1			
Audit Requirement (BGR 500)	no			
Ambient Conditions (EN/IEC 61010-1)				
Environment	For Indoor Use Only			
High	Use up to an altitude of 2000 m above MSL			
Ambient Temperature	2°C up to 35 °C			
Max. Relative Humidity	Max. relative humidity 80 % for temperatures up to 31°C, decreasing linearly to 50% relative humidity up to 35°C			
Overvoltage Category (IEC 60364-4-443)	II			
Degree of Contamination	2			
Class of Protection I	Class of Protection (DIN EN 60529) IP 20			
Not suitable for use in hazardous environments				
EMV Interference Emission, Noise Immunity	EN / IEC 61326-1	FCC Class B	EN / IEC 61326-1	FCC Class B
Noise Level (depending on the rotor)	60 ±2 dB(A)			
Write from Operator				
Inventory-No.:				
Monitoring-No.:				
Environment:				
Maintenance Contract:				
Responsible Service Office	**HERMLE Labortechnik GmbH** **Siemensstraße 25** **78564 Wehingen** **Tel.: (49)7426 / 96 22-17** **Fax: (49)7426 / 96 22-49**		**or dealer service office**	
Responsible Dealer				

Table 2: Permissible Net Weight

Rotor-Number	Max. Speed	Permissible Net Weight
220.68 V04	4000 min^{-1}	240 g
220.95 V06	6000 min^{-1}	43.2 g
221.54 V01	6000 min^{-1}	300 g
221.55 V01	6000 min^{-1}	432 g
220.96 V01	6000 min^{-1}	220 g
220.97 V01	6000 min^{-1}	360 g
221.37 V01	6000 min^{-1}	72 g

Table 3: Max. Speed and RCF-Values for Permissible Rotors

Rotor-number	Max. speed	value
220.68 V04	4000 min^{-1}	1896 x g
220.95 V06	6000 min^{-1}	2938 x g
221.54 V01	6000 min^{-1}	4427 x g
221.55 V01	6000 min^{-1}	4427 x g
220.96 V01	6000 min^{-1}	4180 x g
220.97 V01	6000 min^{-1}	3820 x g
221.37 V01	6000 min^{-1}	4467 x g

Table 4: Acceleration and Deceleration Times

	Acceleration Values		Deceleration Values	
Rotor-Number	Level 0	Level 9	Level 0	Level 9
220.68 V04	35	8	25	7
220.95 V06	60	11	30	10
221.54 V01	95	33	257	51
221.55 V01	91	41	247	52
220.96 V01	70	40	150	35
220.97 V01	80	35	150	35
221.37 V01	105	16	23	12
	in seconds			
	Acceleration Time from 0 min^{-1} -> n_{max}		Deceleration Time from n_{max} -> 0 min^{-1}	

Table 5: Error Messages

Error-No.:	Description
1	Imbalance
2	Imbalance sensor is defective
14	Leap of speed is to large between two measurements
30	Motor is blocked or detective
33	Open lid while the rotor is running
55	Over-speed
60	Under-voltage in the intermediate circuit
70	Sticking relay

Table 6: Symbol / Abbreviations

Symbol / Abbreviation	Unit	Description
n (=rpm)	[min^{-1}]	Revolutions Per Minute
RZB(=rcf)	[x g]	Relative Centrifugal Force
PP	-	Polypropylene
PC	-	Polycarbonate

Decontamination Certificate of Goods Returned upon Delivery

Enclose all returned shipping items and modules necessary!

The completely full declaration about the decontamination is prerequisite for the assumption and further processing of the return. If no corresponding explanation is enclosed, we carry out decontamination with costs at your expense.

Surname; Last name: _____

Organization / Company: _____

Street: _____

ZIP CODE: _____ **place:** _____

Telephone: _____ **fax:** _____

E-Mail: _____

Please fill out in block capitals!

Pos.	Quantity	Decontaminated Object	Serial No.	Description / Comment
1				
2				
3				
4				

Are the parts listed above in touch with the following substances?

Health endangering watery solutions, buffers, acids, alkalis:……..... ☐ Yes ☐ No

Potentially infectious agents: …….. ☐ Yes ☐ No

Organic reagents and solvent: ……..……..... ☐ Yes ☐ No

Radioactive substances: ……..…☐ α..☐ β..☐ γ.. ☐ Yes ☐ No

Health endangering proteins: ……..... ☐ Yes ☐ No

DNA: ……. ☐ Yes ☐ No

Have these substances reached the equipment/assembly? …….. ☐ Yes ☐ No

If so, which ones:

_____

Description of the measures for the decontamination of the listed parts:

I confirm the proper decontamination:

Company/Dept ._____ Place and Date: _____

Signature of the authorized person: _____

Notes

HERMLE Labortechnik GmbH
Siemensstraße 25
78564 Wehingen
Tel: +49 (0) 74 26-96 22-17
Fax: +49 (0) 74 26-96 22-49
Email: vertrieb@hermleLT.de
Internet: http://www.hermle-labortechnik.de