HERMLE
LABORTECHNIK

Instruction manual
for
filtration centrifuge
SIEVA-2

1. General Information

1.1 Danger, precautions and warranty

Before putting the centrifuge into operation, please read this instruction manual carefully.

This device may only be operated by trained specialist stuff. They must have carefully read the operating manual and be familiar with the function of the device.

To protect people and environment the following precautions should be observed:

- During centrifugation, the presence of people and the setting up of hazardous materials is prohibited within 30 cm around the centrifuge according to the regulations of EN 61010-2-020.
- The HERMLE **SIEVA 2** is non explosion-proof and must therefore not be operated in explosion-endangered areas or locations. Centrifugation of flammable, explosive, radioactive, or such substances, which chemically react with high energy, is strictly prohibited. The final decision on the risks associated with the use of such substances is the responsibility of the user of the centrifuge.
- 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 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 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 > 2m/s

The following rules must be strictly 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 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.

1.2 Description

The model SIEVA-2 is a filtration centrifuge which covers many fields of applications by offering a wide range of accessories.
The centrifuges are equipped with the Hermle Standard-Control panel.
Speed and running time are set with easy to use control knobs.
The precise parameters selected are shown on the large digital LED display.

1.3 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 two years 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!

1.4 Accessories supplied with each centrifuge unit

2 Replacement fuses, 1 Instruction manual

2. Installation

2.1 Unpacking the centrifuge

The centrifuges are supplied in a carton Remove the strap retainer, open the carton, and remove the padding.

Lift the centrifuge on both sides (see Figure 1) with an appropriate number of helpers and place it on the laboratory table.

Attention! Do not lift the centrifuge from under the lid or by the front panel!

Figure 1

The instruction manual must be kept with the centrifuge, at all times!

2.2 Required space

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 on each side of the unit according to the standards EN 61010-2-020.

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.

2.3 Installation

- Check that the power supply corresponds to that on the manufacturer´s rating label which is mounted on the rear panel or left side, then connect the power cord of the centrifuge to the socket.
- The line voltage circuit breather is maximum at 16 Amp. type K slow release for commonly used instruments.
- That an emergency switch is installed outside the room to disconnect the power supply in case of a troubled run.
- The digital indications on the display are lighting up.
- Press key "lid". You can open the centrifuge lid now.

3. How to install and load a rotor

3.1 Installing the centrifugal basket

Clean the hub, as well as the mounting hole of the centrifugal basket with a piece of cloth. Then place the basket on the hub, ensuring that the pins align correctly with the slots of the basket. Tighten the screw of the basket.

3.2 Overloading of rotor

The max. load permitted for a rotor, which is determined by the manufacturer, as well as the max. speed allowed with the rotor must not be exceeded.

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

To spin liquids of a higher density, the speed should 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:

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

4. Operation

4.1 Power up

Connect the cord plug to the appropriate wall socket.
After connecting the digital displays will light up.
The control panel is equipped with a stand by function.

4.2 Lid Release

When the green control lamp of the key "lid" lights (4), the rotor stands still and centrifuge lid is ready to open.
Press key "lid" (3) (see Figure 2) to open the lid. The green control lamp will extinguish as soon as the lid will be opened or the unit started.

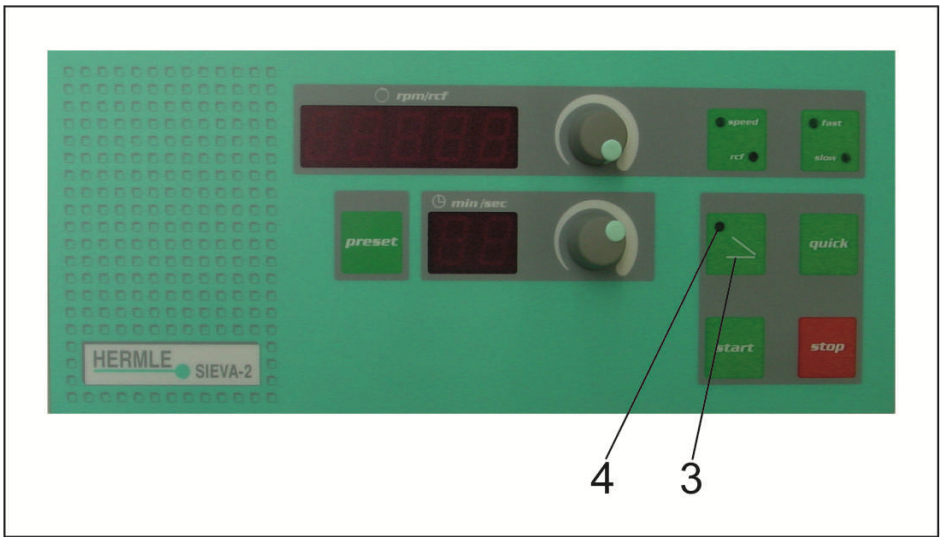

Figure 2

4.3 Lid lock

Close the centrifuge lid, after the rotor has been fixed correctly as described.
The centrifuge can only be started when the lid is closed correctly.
The green control lamp of the key "lid" will light as soon as the lid is closed correctly.
When the rotor starts accelerating the control lamp of the key "lid" extinguishes and the lid be opened.

4.4 Preselection of speed / RCF

You can preset the speed between 250 rpm and 10000 rpm in steps of 250 rpm

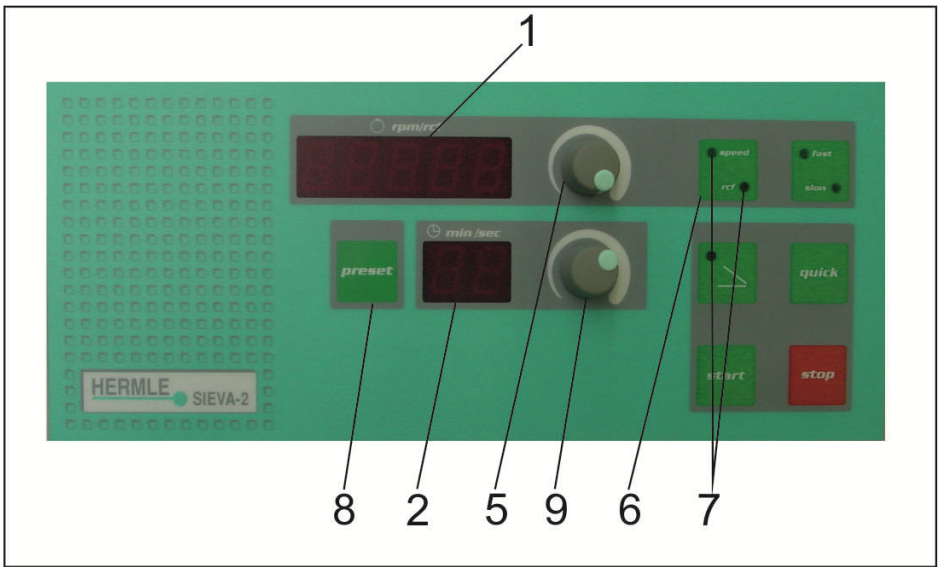

Figure 3

When the centrifuge lid is open, you can preset the required speed or rcf with the knob (5).
If the centrifuge lid is closed and during the run, the speed can be changed as follows:
Press key "preset" (8), hold it and at the same time change speed with the knob (5).
The preselected speed will be indicated in the speed display (1).
The allowed max. speed for all rotors please see table under.

SIEVA-2

Rotor	max. speed
221.07 V02	10000 rpm
221.07 V04	10000 rpm

4.5 Preselection of operating time

You can adjust the desired operating time between 1 and 60 minutes or hold.
With the centrifuge lid open you can preset the operating time with the knob (9). During the run and with the centrifuge lid closed you have to press additionally key "preset" (8) to change operating time during the run.
The preselected running time will be indicated on the time display (2).
At the end of a run the preset operating time will be kept for further runs.
For continuous runs turn the knob clockwise to the limit stop. The continuous run will be indicated on the digital indication with two minus signs "--".
You can stop a continuous run with key "stop".

4.6 Keyboard - Starting the centrifuge - "quick"-key

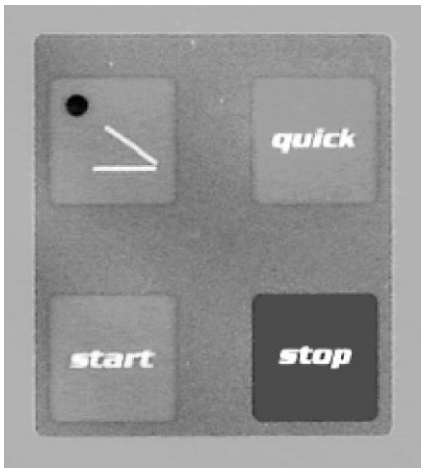

Figure 4

Key : To open the lid of the centrifuge.

when the control lamp on the key is flashing, the lid is closed correctly.

Key "QUICK": For short spins.

Centrifuge is running as long as you hold the key.

Key "START": To start the pre-set run of the centrifuge

Key "STOP": To stop the centrifuge before the pre-set operating time has expired or to stop the centrifuge at continuous run.

Starting the centrifuge
Close the centrifuge lid. As soon as the green LED of the key "lid" is lighting the centrifuge can be started. Therefore press key "start".

"quick" - key - short time runs
For short centrifuge runs you can start the run with the key "quick". Press the key "quick". The centrifuge starts and keeps running as long as you press the "quick"-key. The operating time will be indicated in seconds on the digital indication "time".

4.7 Key "stop"

Press the key "stop" if you want to interrupt a centrifuge run. The centrifuge decelerates according to the fix adjusted brake intensity. You cannot change the brake intensity.

5. Temperature Features

5.1 Temperature

During centrifugation, heat is generated by air friction between the rapidly spinning centrifugal basket and the air inside the rotor camber.
The temperature rise depends on the rotor (swing-out or angle rotor), bucket type, ambient temperature, running time and the speed of the rotor.

The continuous air flow through the centrifuge housing restricts the temperature rise of the samples to the standards value of 40 °C even at maximum speed.

6. Safety facilities

6.1 Imbalance

If the centrifugal basket is loaded too fast during the acceleration phase, there can appear an imbalance in the basket. In that case the operation will be interrupted and the centrifugal basket will be decelerated to standstill. Additionally the error message "ERROR" and 01 flashes alternately on the preset display "speed".

7. Service and Maintenance

7.1 Service and inspection of the centrifuge

Centrifuge service and inspection should be done regularly and only by authorized and qualified personnel. **Use only original spare parts!**

7.2 Maintenance and cleaning

General

Care:

Maintenance of the centrifuge is confined to keeping the rotor, the rotor chamber and the rotor accessories. Clean as well the accessories especially the sealings of the aerosol-tight rotors and insert bolts of swing out rotors. Afterwards lubricate the bolts or sealings with the recommended HERMLE lubrication grease - order no. 38-5686.

Please pay special attention to anodized aluminum 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, phenol, halogenated hydrocarbons.

Cleaning – units, rotors, accessories:

- Turn the device off and disconnect it from the power supply before you begin any cleaning or disinfecting. Do not pour liquids into the housing interior.
- Do spray disinfectant on the device.
- 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!

- Connect the unit to the power supply, after the equipment is completely dry.
- Do not carry out 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, 20 min).
- The tube racks are made of PP and **cannot** be autoclaved at 134°C.

Additional information for aerosol-tight rotors, lids and buckets

The aerosol tightness of rotors, rotor lids, buckets and caps has 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 five autoclaving cycles.

Never store aerosol-tight rotors or buckets closed.

Cleaning and disinfection of the unit

1. Open the lid before you turn off the unit. Disconnect it from the power supply.
2. Open the rotor nut by turning the rotor key counter clockwise.
3. Remove the rotor.
4. For cleaning and disinfection of the unit and the rotor chamber using the above mentioned cleaner.
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 to becoming brittle. Other components of the unit, e.g. the lid lock, motor shaft and rotor must **not** be greased.
8. Dry the motor shaft with a soft, dry and lint-free cloth.
9. Control the unit and accessories for damage.

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

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

Cleaning and disinfection of the rotor

1. Clean and disinfect the rotors, rotor lids and adapters with the above mentioned cleaner.
2. Use a bottle brush to clean and disinfect the rotor bores.
3. Rinse the rotors, rotor lid and adapter with clear water. Particular the drillings of angle rotors.
4. For drying of the rotors and accessories set them on a towel. Place the angle rotors with bores down, to dry them to.
5. Dry the rotor cone with a soft, dry and lint-free cloth and look for damage. Do not grease the rotor cone.

Disinfection of aluminum 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.

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.

Gas sterilization

Adapters, bottles and rotors may be gas sterilized 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, adapters and bottles must not be closed respectively must be totally unscrewed

Chemical sterilization

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

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

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.

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

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

Life time of rotors, round and rectangular buckets, accessories

Rotors and rotor lid made of aluminum or stainless steel, have a operating time of **max. 7 years** from first 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 up to **3 years** from first use.

Condition for the operating time:

Proper use, damage-free condition, recommended care.

8. Trouble Shooting

8.1 Emergency lid release

In case of power failure or any malfunction, the lid can be opened manually to protect your samples. Please proceed as follows:

- Switch off the centrifuge and unplug the power cord.
- There is a plastic plug at the left side of the centrifuge housing. Behind that plastic plug there is a red cord.
- Remove the plastic plug and pull the red cord.
- The lid can then be opened (see Figure 4).

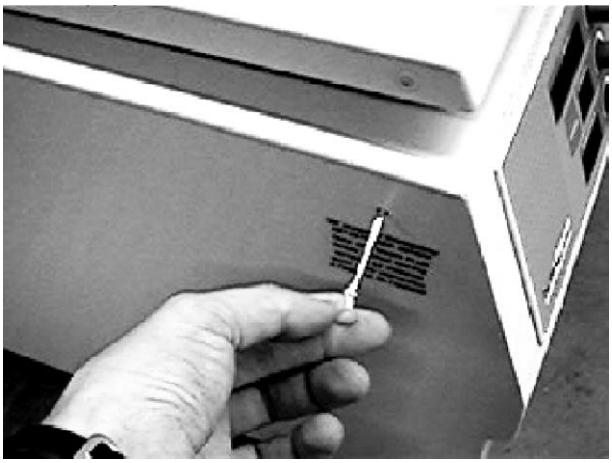

Figure 5

8.2 Check list / Trouble shooting

The error message will be indicated by a certain number on the digital speed display. At the same time "ERROR" appears on the preset display.

There is a distinction between two different kinds of errors. The digits on the indication "speed" have the following meaning:

Error no. 1-49 (Forced stop)
If one of those errors occurs, the rotor will be braked from the preset speed to 0. As soon as the rotor has stopped, the error message can be reset by opening and closing the centrifuge lid.

Error no. 50 - 99 (Emergency stop)
If this occurs, the frequency converter will be switched off. This means that the rotor will be stopped brakeless. To reset the error message you have to plug off and plug in the power cord.

If the unit stops due to an error indication you should restart the unit to check if the error occurs again.

The error numbers which are not listed in this chapter are not in use at the time of publication and they are reserved for future use in widening the error recognition program.

Detailed information about possible error messages are in "table 4: error messages"
(see Appendix VII)

9. TRANSPORT, STORAGE AND DISPOSAL

Transport

- Before transporting, take out the rotor.
- Only transport the unit in the 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 bis 60 °C	10 bis 75 %	30 bis 106 kPa

Storage

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

	Air temperature	rel. Humidity	Air pressure
in transport packaging	-25 bis 55 °C	10 bis 75 %	70 bis 106 kPa

Disposal

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

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 13/08/2005 on a business-to-business basis, which includes the product, may no longer be disposed of in household waste. To document this they 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 on the restriction of use of certain hazardous substances in electrical and electronic equipment.

10. 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

SIEVA-2

Einschlägige EG-Richtlinien / Normen
Relevant EC directives / standards

2006/95/EG, 2004/108/EG, RoHS II 2011/65/EG,
EN 61 010-1; EN 61 010-2-020; EN 61 010-2-101
ISO 9001:2008

HERMLE
LABORTECHNIK

Wehingen, den 15.10.2015

Alexander Hermle
Geschäftsführer, Managing Director

Table 1: Technical Data

Manufacturer	**HERMLE Labortechnik GmbH 78564 Wehingen**			
Type	**Sieva-2**			
Dimensions				
Width	35,5 cm			
Depth	49 cm			
Height	33 cm			
Weight without rotor	25 kg			
max. speed	10000 rpm			
max. volume	500 ml			
max. RCF	7826 xg			
allowable density	1,2 kg/dm^3			
allowable kinetic energy	5788 Nm			
Mains power connection AC	230 V / 50 Hz 1 ph		120 V / 60 Hz 1 ph	
Voltage fluctuation	± 10%		± 10%	
Current consumption	3,2 A		4,0 A	
Power consumption	0,58 kW		0,36 kW	
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	EN / IEC 61326-1 Category B	FCC Class B	EN / IEC 61326-1 Category B	FCC Class B
Noise level (depending on the rotor)	≤ 59 +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: Max. speed and RCF-values for permissible rotors

Rotor-Number	Max. Speed	RCF value
221.07 V02	10000 min^{-1}	7826 x g
221.07 V04	10000 min^{-1}	7826 x g

Table 3: Permissible net weight

Rotor-Number	Max. Speed	Permissible weight
221.07 V02	10000 min-1	600 g
221.07 V04	10000 min-1	600 g

Table 4: Error message

Error-No.:	Description
1	Imbalance
2	Imbalance switch constantly pressed
10	Chamber temperature > set over temperature (only at colled units)
25	Motor shaft turns when switching on (start) the centrifuge.
36	Lid can not be opened
40 + 41	Processor fault (writing mistake E-Prom)
50	Processor fault (internal RAM faulty)
51	Processor fault (external RAM faulty)
53	PIC not work
54	Jumper setting wrong
55	Over speed (rotor speed higher than allowed)
60	Speed step jumps between 2 measuring
61	Rotor identification siganl at speed signal = 0
70	From the serial interface communication to the frequency converter
82	Low voltage - frequency converter
83	Over voltage - frequency converter
84	Over temperature - frequency converter
85	Over temperature - motor
86	To big current - frequency converter
87	Frequency converter release
88	No release - frequency converter
90	Lid of the centrifuge got open as long as the rotor turned
94	Low voltage - main plug
98	E-Prom fault (memory)
99	Processor fault - Stack over flow

Table 5: Abbreviations used

Symbol/Abbreviations	Unit	Description
U (=rpm)	[min^{-1}]	revolutions per minute
RZB(=rcf)	[x g]	relative centrifugal force
PP	-	Polypropylen
PC	-	Polycarbonat
accel	-	acceleration
decel	-	deceleration
prog	-	program

APPENDIX

Redemption form / Decontamination certificate

Decontamination certificate at goods return delivery

Enclose at all returns of equipment and assemblies absolutely!

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 these 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

These substances have reached the equipment/assembly? ……..☐ Yes ☐ No

Which one, if yes:

_____

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:_____

APPENDIX

11. Notes

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