

ROTOFIX 32 A



Inhalt des Dokuments / content of the document

Operating instructions (EN)

Rotoren und Zubehör / Rotors and accessories

Operating instructions

ROTOFIX 32 A



Translation of the original operating instructions



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Andreas Hettich GmbH & Co. KG

Föhrenstrasse 12

D-78532 Tuttlingen, Germany

Telephone: +49 (0)7461 705-0

Fax: +49 (0)7461 705-1125

Email: info@hettichlab.com, service@hettichlab.com

Internet: www.hettichlab.com

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1 About this document

1.1 Use of this document

- Read this document carefully and in full before commissioning the device for the first time.
Observe other enclosed instruction sheets where necessary.
- This document is part of the device and must be kept within easy reach.
- This document must be included if the device is passed on to a third party.
- The current version of the document in the available languages can be found on the manufacturer's website: ➔ <https://www.hettichlab.com/de/download-center/>







1.2 Gender reference

The employed masculine or feminine language form is to facilitate reading. In the spirit of equal treatment, corresponding terms apply in principle to all genders and do not imply any valuation.

1.3 Symbols and labels in this document

General symbols

The following markers are used in this document to highlight instructions, results, listings, references and other elements:

Marker	Explanation
1.  2.  3.  ... 	Step-by-step instructions
	Results of action steps
	References to sections of the document and other applicable documents
■ ... ■ ...	Listings without a fixed order
<i>[Buttons]</i>	Controls (for example: buttons, switches)
<i>'Indicator'</i>	Indicator elements (for example: signal lights, screen elements)

2 Safety

2.1 Intended use

Intended use

The centrifuge **ROTOFIX 32 A** is an in vitro diagnostic medical device in accordance with the In Vitro Diagnostic Medical Devices Regulation (EU) 2017/746. The device is used for centrifugation as well as enrichment of sample material of human origin for subsequent further processing for diagnostic purposes. The user can set each of the variable physical parameters within the limits set by the device.

The centrifuge may only be used by qualified personnel in closed laboratories. The centrifuge is only intended for the use referred to above. Intended use also includes observing all instructions in the user manual and compliance with inspection and maintenance. Any other use or use beyond this is considered improper. Andreas Hettich GmbH & Co. KG shall not be liable for any damage arising from this.

Non-intended use

- The centrifuge is not suitable for use in explosive or radioactive, or biologically or chemically-contaminated atmospheres.
- The user must take appropriate actions when centrifuging hazardous substances or mixtures of substances that are toxic, radioactive or contaminated with pathogenic microorganisms.
The manufacturer generally recommends using only centrifuge tubes with special screw caps for hazardous substances.
Use sealable centrifuge tubes with a biosafety system for materials of risk groups 3 and 4.
- The manufacturer does not recommend centrifugation with flammable or explosive materials.
- The manufacturer does not recommend centrifugation with materials that react chemically with one another with high energy.


Foreseeable misuse

The manufacturer recommends using only accessories that it has approved for the intended purpose.
Only operate the centrifuge under supervision.

2.2 Personnel requirements

Required qualifications

The user has read the user manual in full and familiarised themselves with the device.



NOTICE

Damage to the device by unauthorised personnel

- Tampering with and modifications to devices by unauthorised persons are at the operating organisation's own risk and will result in the loss of all warranty and liability claims.

Trained user

The user is trained in laboratory practice and able to carry out the work assigned to them, and to recognise and prevent potential hazards independently.

Personal protective equipment

Lack of personal protective equipment or unsuitable personal protective equipment increases the risk of impaired health and injury.

- Only use personal protective equipment that is in proper condition.
- Only use personal protective equipment that is adapted to the person (correct size, for example).
- Observe instructions on other protective equipment for specific activities.

2.3 Operator's responsibility



Follow the instructions in this document for proper and safe use of the device.

Keep the user manual for future reference.

Provide information

- Following the instructions in this document will help:
 - To avoid dangerous situations.
 - To minimise repair costs and downtime.
 - To increase the reliability and service life of the device.
- The operator is responsible for compliance with company regulations, standards and national laws.
- Note and keep the revision of the document separate from the document. If lost, the document can be replaced in the correct revision.
- Keep the user manual available at the place where the device is used.
- Pass the user manual on to the buyer when the device is sold.

Training of personnel

Lack of knowledge when working with the device may result in serious injury or death.

- Instruct personnel on their tasks and the associated risks in accordance with the instruction.

2.4 Safety instructions



Reporting serious incidents and notifiable incidents

In the event of serious incidents or notifiable incidents involving the device or its accessories, these must be reported to the manufacturer and, where applicable, to the competent authority where the user and/or the patient is registered.



DANGER

Risk of contamination for the user due to inadequate cleaning or failure to observe the cleaning instructions.

- Observe cleaning instructions.
- Wear personal protective equipment when cleaning the device.
- Observe laboratory regulations (e.g. TRBAs, the German Protection against Infection Act, hygiene plan) for handling biological agents.



DANGER

Fire and explosion hazard due to hazardous substances in samples.

- Observe relevant regulations and directives for handling chemicals and hazardous substances.
- Do not use aggressive chemicals (for example: dangerous, corrosive extraction agents such as chloroform, strong acids).

**WARNING**

Dangers due to insufficient maintenance or maintenance not carried out on time.

- Follow maintenance intervals.
- Check the device for visible damage or defects.
If any visible damage or defects are present, take the device out of service and inform a service technician.

 **WARNING**

Risk of electric shock due to ingress of water or other liquids.

- Protect the device against external liquids.
- Do not pour any liquids into the interior of the device.
- Transport using original transport packaging.

 **WARNING**

Contamination with hazardous substances and substance mixtures!

Observe the following actions for substances and substance mixtures that are toxic, radioactive and/or contaminated with pathogenic microorganisms:

- As a rule, use only centrifuge tubes with special screw caps for hazardous substances.
- Use sealable centrifuge tubes with a biosafety system for materials of risk groups 3 and 4.
- If no biosafety system is used, the device is not micro-biologically tight in the sense of standard EN / IEC 61010-2-020.
- Contact the manufacturer if necessary.

**WARNING**

Risk of injury and damage to the device due to a loose rotor.

- The driver of the rotor shaft must be correctly seated in the groove of the rotor when mounting the rotor.
- Hand-tighten the nut securing the rotor.
- Check that the rotor is firmly seated.
- Follow maintenance intervals.

**CAUTION**

Risk of injury due to rotating rotor

Long hair and items of clothing can get caught on the rotor if the rotor is moved manually.

- Tie long hair back.
- Do not allow garments to hang in the centrifuging chamber.


NOTICE

Damage to the device electronics due to incorrect voltage or frequency at the device circuit breaker.

- Operate the device with the correct mains voltage and mains frequency.
The value can be found in the technical data and on the rating plate.


NOTICE

Damage to the device and samples due to premature program termination.

Premature program termination is caused by power failure, switching off during the program or pulling out the mains plug.

- Do not switch off the device while the program is running.
- Do not trigger the emergency release on the device while the program is running.
- Do not pull out the mains plug while the program is running.

3 Device overview

3.1 Technical data

Manufacturer	Andreas Hettich GmbH & Co. KG, D-78532 Tuttlingen	
Model	ROTOFIX 32 A	
Type	1206 1206-34	1206-01 1206-33
Mains voltage ($\pm 10\%$)	208-240 V 1~	100-127 V 1~
Mains frequency	50-60 Hz	50-60 Hz
power consumption	300 VA	300 VA
Power consumption	1.4 A	3.0 A
max. capacity	4 x 100 ml / 32 x 15 ml	
max. permissible density	1.2 kg/dm ³	
max. speed (RPM)	6000	
max. acceleration (RCF)	4226	
max. kinetic energy	3160 Nm	

Obligation to perform checks (DGUV Rules 100-500) (valid only in Germany)	No	
Ambient conditions (EN / IEC 61010-1):		
Installation site	indoors only	
Altitude	up to 2000 m above sea level	
Ambient temperature	2 °C to 40 °C	
Humidity	maximum relative humidity 80% for temperatures up to 31 °C, decreasing linearly to 50% relative humidity at 40 °C.	
Overvoltage category (IEC 60364-4-443)	II	
Pollution level	2	
Device protection class	I not suitable for use in potentially explosive atmospheres.	
EMC:		
Emitted EM interference, EM interference immunity	EN / IEC 61326-1 Class B	FCC Class B
Noise level (rotor-dependent)	≤57 dB(A)	
Dimensions:		
Width	366 mm	
Depth	430 mm	
Altitude	257 mm	
Weight	approx. 23 kg	

Rating plate

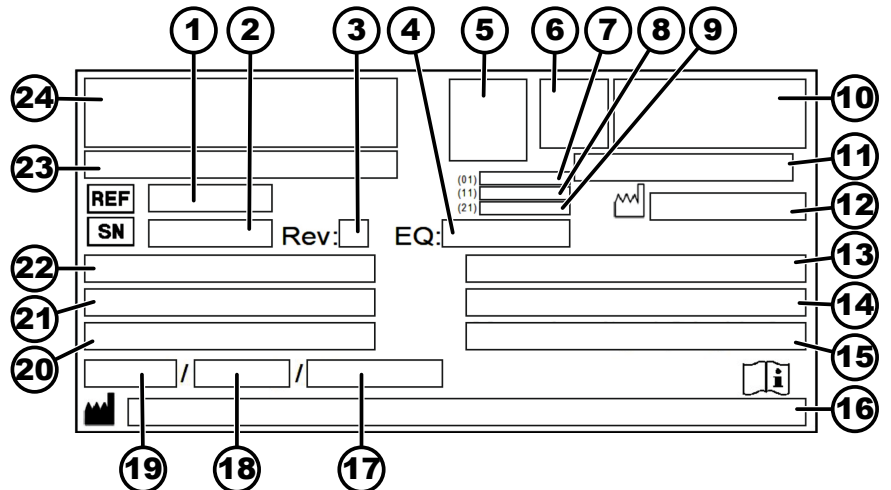


Fig. 1: Rating plate

- 1 Item number
- 2 Serial number
- 3 Revision
- 4 Equipment number
- 5 Data matrix code
- 6 any labelling indicating whether medical device or in vitro diagnostic medical device
- 7 Global Trade Item Number (GTIN)
- 8 Date of manufacture
- 9 Serial number
- 10 any EAC mark, CE mark
- 11 Country of manufacture
- 12 Date of manufacture
- 13 Mains frequency
- 14 Maximum kinetic energy
- 15 Maximum permissible density
- 16 Manufacturer's address
- 17 any Coolant circuit pressure
- 18 any Coolant capacity
- 19 any Coolant type
- 20 Revs per minute
- 21 Performance values
- 22 Mains voltage
- 23 any Device designation
- 24 Manufacturer's logo

3.2 European registration

Device conformity

Device conformity according to EU directives.


Single Registration Number

SRN: DE-MF-000010680


Basic-UDI-DI

Basic-UDI-DI	Device assignment
040506740100129P	ROTOFIX 32 A (in vitro diagnostic medical device)


3.3 Important labels on the packaging



TOP
This is the correct upright position of the shipping container for transport and/or storage.



FRAGILE GOODS
The contents of the shipping container are fragile, so it must be handled with care.



PROTECT FROM MOISTURE
The shipping container must be kept away from rain and kept in dry conditions.




TEMPERATURE LIMITATION
The shipping container must be stored, transported and handled within the indicated temperature range (-20 °C to +60 °C).




HUMIDITY LIMITATION
The shipping container must be stored, transported and handled within the indicated air humidity range (10% to 80%).

nicht kondensierend
non-condensing
sans condensation



STACK LIMITATION BASED ON QUANTITY
Maximum number of identical packages that may be stacked on the lowest package, "n" standing for the number of packages allowed. The lowest package is not included in "n".

3.4 Important labels on the device



The labels on the device must not be removed or covered, or have anything pasted over them.



Attention, general danger area.

Ensure you read the instructions for commissioning and operation and observe the safety instructions before using the device.



Biohazard warning.



Direction of rotation of the rotor.

The orientation of the arrow indicates the rotor's direction of rotation.



Symbol for the separate collection of electrical and electronic equipment, in accordance with Directive 2012/19/EU (WEEE).

Use in European Union countries, Norway and Switzerland.

3.5 Operating and indicator elements

3.5.1 Control

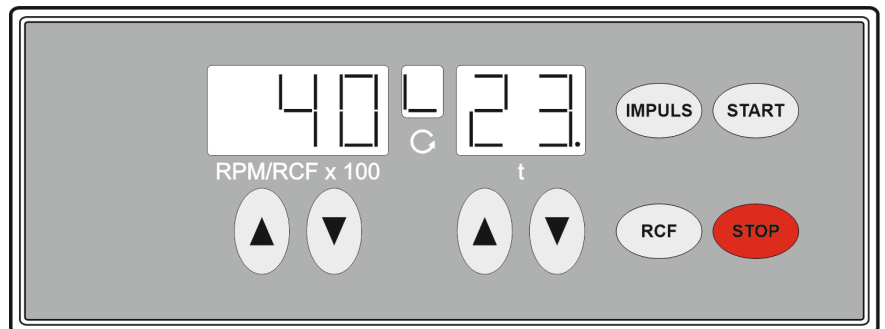


Fig. 2: Control

3.5.2 Indicator elements

Fig. 3: 'Lid closed' indicator



Fig. 4: 'Lid open' indicator



Fig. 5: 'Rotation' indicator

- The indicator appears when the lid is closed.
- If the 'Lid closed' and 'Lid open' indicators flash alternately, further operation of the centrifuge is only possible after opening the lid once.
- The indicator appears when the lid is open.
- The indicator light rotates when the rotor is turning.

3.5.3 Controls



Fig. 6: [Mains switch]

- Switch the device on and off.



Fig. 7: [IMPULSE] button

- Short-term centrifugation. The centrifugation run takes place as long as the button is being pressed.
- Display the brake level and centrifuging radius.



Fig. 8: [RCF] button

- Relative centrifugal force, parameter RCF. The relative centrifugal force (RCF) is displayed for as long as the button is pressed.



Fig. 9: [START] button

- Start centrifugation run.



Fig. 10: [STOP] button

- End the centrifugation run. The rotor ramps down to a stop at the preselected brake level.
- Save the brake level and centrifuging radius.

RPM/RCFx100



Fig. 11: [RPM/RCFx100] button

- A numerical value from 500 RPM to the maximum rotor speed can be set. Adjustable in increments of 100 (RPM = displayed value x 100).
- Display the brake level and centrifuging radius.

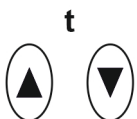


Fig. 12: [t] button

- Enter runtime. Adjustable from 1 to 99 minutes in 1 minute increments.
- Centrifuging radius. Input in centimetres. Adjustable from 5 to 16 centimetres, in 1 centimetre increments.
- Brake level 0 or 1. Level 1 = short ramp-down time. Level 0 = long ramp-down time.

3.6 Original spare parts

Only use original spare parts from the manufacturer and approved accessories.

3.7 Scope of supply

The following accessories are supplied with the centrifuge:

- 1 Release pin
- 1 hex key (SW5 x 100)
- 1 grease for the trunnions

- 1 power cable
- 2 Fuse links
- 1 user manual
- 1 instruction sheet, transport lock

Rotors and the corresponding accessories are supplied depending on the order.

3.8 Returns

An original Return Material Authorisation (RMA) form from the manufacturer must always be requested for a return. Secure and reliable acceptance and booking in of the goods with the manufacturer is not possible without an original RMA form from the manufacturer. The Return Material Authorisation (RMA) form contains a Declaration of No Objection (UBE), which must be completed in full and enclosed with the return.

If the device and/or accessories are returned to the manufacturer, the complete return shipment must be cleaned and decontaminated by the sender. If returns are not cleaned and/or decontaminated or are insufficiently cleaned and/or decontaminated, this will be performed by the manufacturer and charged to the sender.

The original transport locks must be attached for return shipment, see [↪ Chapter 4 'Transport and storage' on page 15](#). The device must be shipped in its original packaging.

4 Transport and storage

4.1 Transport and storage conditions

Transport conditions



NOTICE

Damage to the device due to failure to use the transport locks.

- Secure the transport locks before transporting the device.



NOTICE

Damage to the device due to condensation.

There is a risk of condensation forming on electrical components when component surfaces are cold and the surrounding air is warmer. The condensation that forms may cause a short circuit and/or destroy electronics.

- Warm the device up for at least 3 hours in a warm room before connecting it to the mains.
or
- Warm up for 30 minutes in a cold room.

- Before transporting, fasten the transport lock and disconnect the device from the mains socket.
- The transport temperature must be between -20 °C and +60 °C.
- Humidity must not be condensing. Humidity must be between 10% and 80%.
- Be aware of the weight of the device.

- When transporting using a transport aid (e.g., a pallet truck), the transport aid must be able to carry at least 1.6 times the transport weight of the device.
- Secure the device to prevent it tipping over and falling down during transport.
- Never transport the device sideways or upside down.

Storage conditions

- The device must be stored in the original packaging.
- Only store the device in dry rooms.
- The storage temperature must be between -20 °C and +60 °C.
- Humidity must not be condensing. Humidity must be between 10% and 80%.

4.2 Fastening the transport lock

Personnel:

- Trained user

The lid is closed.

The mains cable is disconnected from the device.

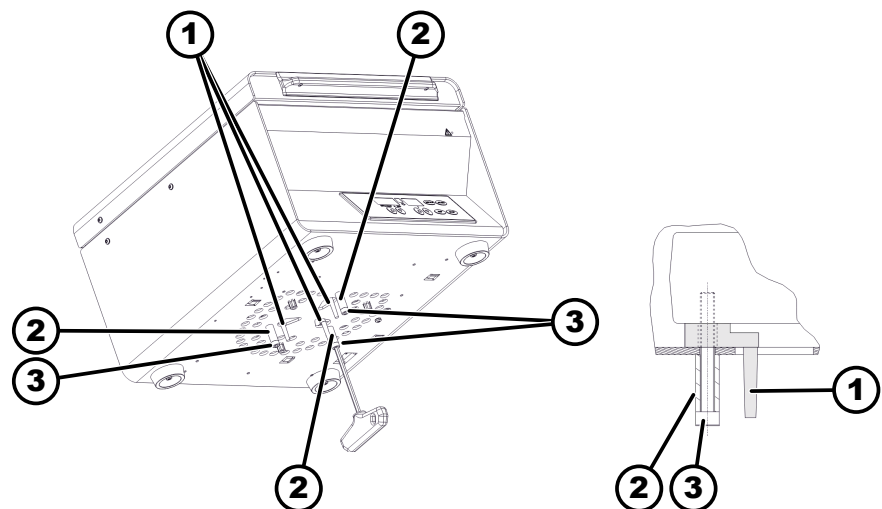


Fig. 13: Transport lock

- 1 Transport lock
- 2 Spacer sleeves
- 3 Screws

1. ➤ Tilt the device on the back of the device.
2. ➤ Insert 3 transport locks (1).
3. ➤ Screw in 3 screws (3) with spacer sleeves (2).

5 Commissioning

5.1 Unpacking the centrifuge



CAUTION

Danger of crushing due to parts falling out of the transport packaging.

- Keep the device balanced during the unpacking process.
- Only open the packaging at the points provided for this purpose.



CAUTION

Risk of injury from lifting heavy loads.

- Provide an adequate number of helpers.
- Note the weight. See → *Chapter 3 'Device overview' on page 9.*



NOTICE

Damage to the device due to improper lifting.

- Do not lift the centrifuge by the control panel or the control panel holder.

Personnel:

- Trained user

1. If present: Remove the packaging tapes.
2. Lift the box up and remove the padding.
3. Remove the accessories and store them safely.
4. Place the device on a stable and level surface.

5.2 Remove the transport lock

Personnel:

- Trained user

The lid is closed.

The mains cable is disconnected from the device.

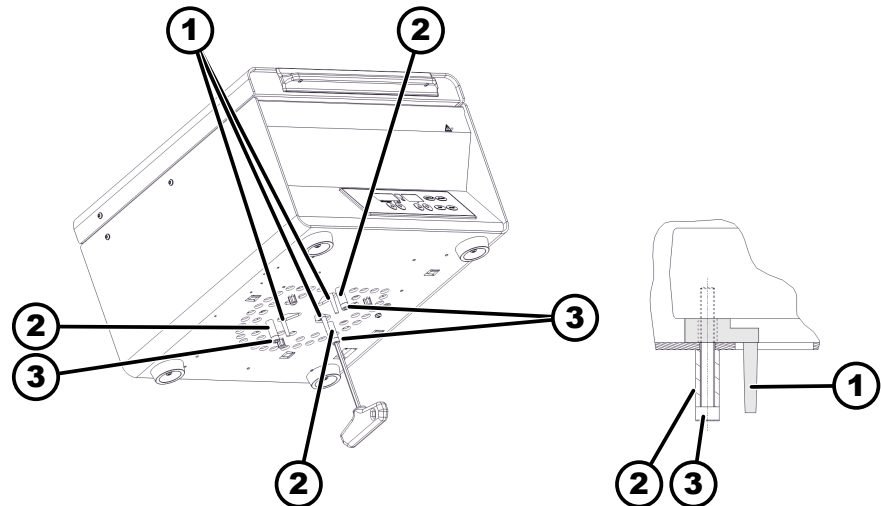


Fig. 14: Transport lock

- 1 Transport lock
- 2 Spacer sleeves
- 3 Screws

1. ➤ Tilt the device on the back of the device.
2. ➤ Unscrew 3 screws (3) with spacer sleeves (2).
3. ➤ Remove 3 transport locks (1) and store them safely.
4. ➤ Keep the screws, spacer sleeves and transport lock in a safe place.

5.3 Setting up and connecting the centrifuge

Setting up the centrifuge



WARNING

Risk of injury due to failing to maintain a sufficient distance to the centrifuge.

- As per EN / IEC 61010-2-020, no persons, hazardous materials or objects may be present within a **safety zone of 300 mm** around the centrifuge during a centrifugation run.
- A distance of **300 mm** from the ventilation slots and ventilation openings of the centrifuge must be maintained.



CAUTION

Risk of crushing and damage to the device due to it falling down because of vibration-induced position alterations.

- Place the device on a stable and level surface.
- Select the installation surface dependent on the weight of the device.



NOTICE

Damage to the samples and the device if the ambient temperature exceeds or falls below the respective maximum/minimum permissible ambient temperature.

- Comply with the maximum and minimum permissible ambient temperatures for installation of the device.
- Do not place the device next to a heat source.
- Do not expose the device to direct sunlight.
- Do not expose the device to frost.

Personnel:

- Trained user

1. Place the device on a stable and level surface.
2. Maintain a distance of 300 mm around the device.
3. Comply with the ambient conditions in the technical data (→ Chapter 3 'Device overview' on page 9).

Connecting the centrifuge



NOTICE

Damage to the device by unauthorised personnel

- Tampering with and modifications to devices by unauthorised persons are at the operating organisation's own risk and will result in the loss of all warranty and liability claims.



NOTICE

Damage to the device due to condensation.

There is a risk of condensation forming on electrical components when component surfaces are cold and the surrounding air is warmer. The condensation that forms may cause a short circuit and/or destroy electronics.

- Warm the device up for at least 3 hours in a warm room before connecting it to the mains.
or
- Warm up for 30 minutes in a cold room.

Personnel:

- Trained user

1. A type B residual current circuit breaker must be used if the device is additionally protected with a residual current circuit breaker in the building installation.

When using a different type, the residual current circuit breaker may either not switch off the unit if there is a fault on the unit, or it may switch off the unit even though there is no fault on the unit.

2. Check whether the mains voltage matches the specification on the rating plate.
3. Connect the device to a standard mains socket using the mains cable.

5.4 Switching the centrifuge on and off.

Switching the centrifuge on

Personnel:

- Trained user

→ Set the mains switch to [I].

- ➔ The buttons flash, depending on the centrifuge type.

The last centrifugation data used is displayed.

Switching off the centrifuge

The rotor is stationary.

→ Set the mains switch to [O].

6 Operation

6.1 Opening and closing the lid

Opening the lid

Personnel:

- Trained user

The centrifuge is switched on.

The rotor is stationary.

1. → Swivel the handle strip on the lid upwards.

- ➔ The 'Lid open' indicator appears.

2. → Open the lid.

Closing the lid

**NOTICE**

Damage to the device caused by the lid slamming.

- Close the lid slowly.
- Do not slam the lid.

Personnel:

- Trained user

→ Close the lid and swivel the handle strip downwards

- ➔ The 'Lid closed' indicator appears.

6.2 Removing and installing the rotor

Removing the rotor with a clamping nut

Personnel:

- Trained user

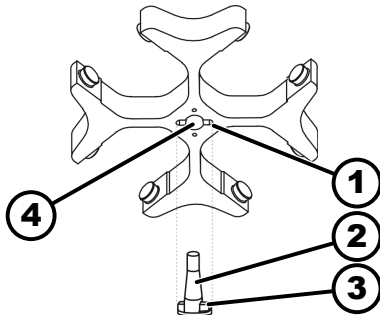


Fig. 15: Rotor installation and removal

- 1 Groove
- 2 Motor shaft
- 3 Driver
- 4 Hole

1. ➤ Open the lid.
2. ➤ Loosen the rotor clamping nut using the supplied spanner.
 - After passing the working point for lifting the rotor, the rotor detaches from the cone of the motor shaft (2).
3. ➤ Turn the clamping nut until the rotor can be lifted off the motor shaft.
4. ➤ Remove the rotor.

Installing the rotor with a clamping nut

Personnel:

- Trained user

The lid is open.

1. ➤ Clean the motor shaft (2) and rotor hole (4).
2. ➤ Lightly grease the motor shaft (2), see ➔ Chapter 8.2 'Cleaning and disinfection instructions' on page 31.
3. ➤ Place the rotor vertically on the motor shaft (2).

The driver (3) of the motor shaft must be in the groove (1) of the rotor. The orientation of the groove is marked on the rotor.
4. ➤ Hand-tighten the rotor clamping nut using the supplied spanner.
5. ➤ Check that the rotor is firmly seated.

Removing the rotor without a clamping nut

Removing the rotor

Personnel:

- Trained user

- Hold the rotor by the rotary handle (1) of the lid and lift it off the hub (2).

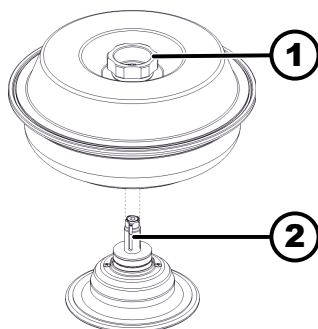
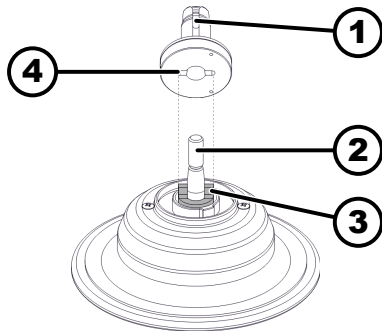


Fig. 16: Rotor installation and removal

- 1 Rotary handle
- 2 Hub

Removing the hub



1. → Open the lid.
2. → Unscrew the clamping nut.
 - ➔ After passing the working point for lifting the rotor, the hub (1) detaches from the cone of the motor (2).
3. → Remove the hub.

Fig. 17: Hub installation and removal

- 1 Hub
- 2 Motor shaft
- 3 Driver
- 4 Groove

Installing the rotor without a clamping nut

Installing the hub

Personnel:

- Trained user

1. → Open the lid.
2. → Clean the motor shaft (2) and rotor hole.
3. → Lightly grease the motor shaft (2), see ➔ Chapter 8.2 'Cleaning and disinfection instructions' on page 31.
4. → Place the hub (1) vertically on the motor shaft (2).
The driver (3) of the motor shaft must be in the groove (4) of the hub.
Check that the hub is firmly seated.
5. → Hand-tighten the clamping nut of the hub using the supplied hex key.
6. → Check that the hub is firmly seated.

Installing the rotor

1. → Clean the hub (2).
2. → Lift the rotor by the rotary handle and place it vertically on the hub (2).
3. → Push the rotor down as far as it will go.

6.3 Inserting and removing buckets

Inserting buckets



NOTICE

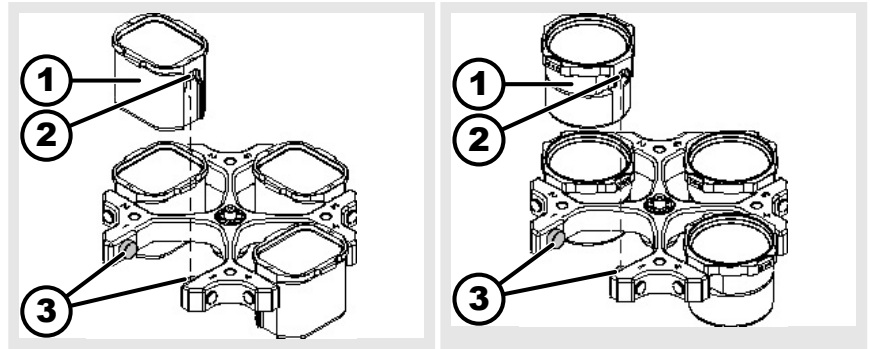
Damage to the device due to imbalances caused by incorrect loading of the rotor.

- Load all swing-out rotor locations with the same buckets.



Buckets marked with the number of the rotor location may only be used there.

Buckets marked with a set number may only be used together.



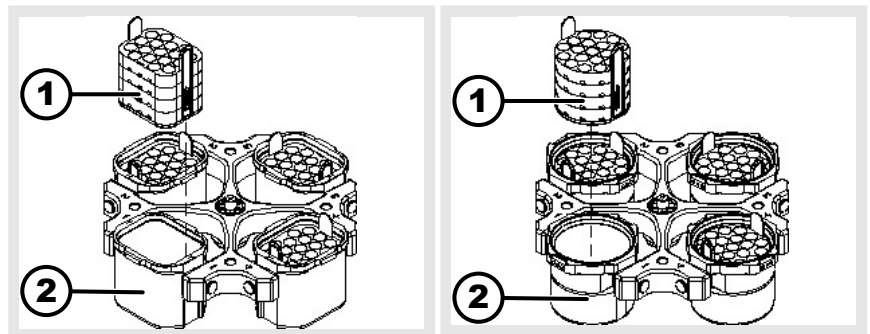
1. ➤ Check that the rotor is firmly seated.
2. ➤ Grease the trunnions (3).
3. ➤ Insert the bucket (1) into the rotor from above. The trunnions (3) must be in the grooves (2).
4. ➤ Push the bucket (1) down as far as it will go.

Removing the bucket

- Pull the bucket (1) vertically upwards out of the rotor.

6.4 Inserting and removing adapters

Inserting



the adapter

- Insert the adapter (1) vertically into the bucket (2) from above.

removing

- Remove the adapter (1) vertically upwards out of the bucket (2).

Adapter with positioning pin

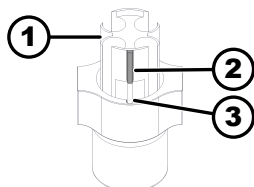


Fig. 18: Adapter with positioning pin

- 1 Inserting
- 2 Positioning pin
- 3 Groove

the adapter

- Insert the adapter (1) into the bucket
The positioning pin (2) must be in the groove (3) of the bucket.

removing

→ Remove the adapter (1) vertically upwards out of the bucket.

6.5 Loading

Filling centrifuge tubes



WARNING

Risk of injury from contaminated sample material.

Contaminated sample material escapes from the sample tube during centrifugation.

- Use centrifuge tubes with special screw caps for hazardous substances.
- For risk group 3 and 4 materials, use a biosafety system in addition to the sealable centrifuge tubes (see WHO's 'Laboratory Biosafety Manual').



NOTICE

Damage to the device due to highly corrosive substances.

Highly corrosive substances may impair the mechanical strength of rotors, buckets and accessories.

- Do not centrifuge highly corrosive substances.



Standard glass centrifuge tubes can be loaded up to RCF 4000 (DIN 58970 part 2).

Personnel:

- Trained user

→ Fill centrifuge tubes outside the centrifuge.

The maximum capacity of the centrifuge tubes specified by the manufacturer must not be exceeded.

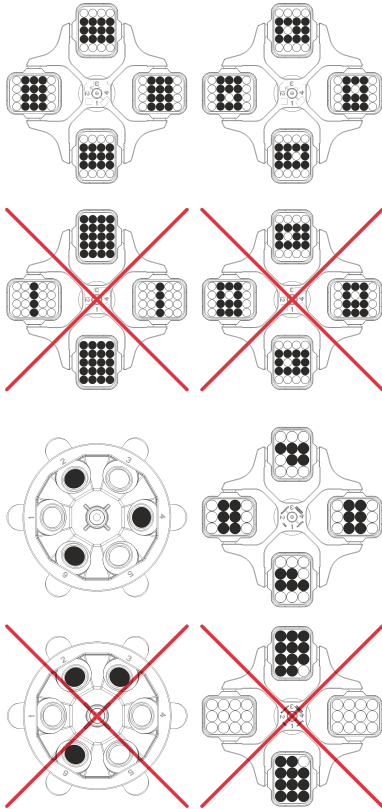
With angle rotors, the centrifuge tubes must only be filled to the extent that no liquid can be ejected from the tubes during the centrifugation run.

It must be ensured that there is a uniform fill level in the tubes in order to keep the weight differences in the centrifuge tubes as low as possible.

Loading the swing-out rotors

Personnel:

- Trained user



1. ▶ Check that the rotor is firmly seated.
2. ▶ The centrifuge tubes must be distributed symmetrically across all rotor locations.

The weight of the permissible filling capacity is indicated on each rotor. The weight must not be exceeded.

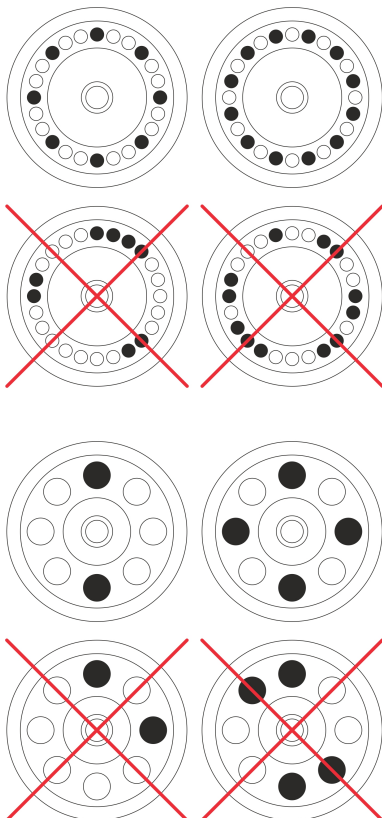
No liquid must be allowed to enter the buckets and the centrifuging chamber when loading the buckets and swinging them out during the centrifugation run.

For containers with rubber inserts, there must always be the same number of rubber inserts under the centrifuge tubes.

All rotor locations must be filled with the same buckets. Certain buckets are marked with the number of the rotor location. The buckets must only be inserted in the corresponding rotor location.

Buckets marked with a set number (for example S001/4) must only be used in the set.

Loading the angle rotors



Personnel:

- Trained user

1. ▶ Check that the rotor is firmly seated.
2. ▶ The centrifuge tubes must be distributed evenly over all locations on the rotor.

No liquid must be allowed to enter the rotor and the centrifuging chamber when loading the rotor.

With rotors, the centrifuge tubes must only be filled to the extent that no liquid can be ejected from the tubes during the centrifugation run.

The weight of the permissible filling capacity is indicated on each rotor. The weight must not be exceeded.

6.6 Opening and closing the biosafety system

6.6.1 Explanation

The user must take appropriate actions when centrifuging hazardous substances or mixtures of substances that are toxic, radioactive or contaminated with pathogenic microorganisms.

Centrifuge tubes with special screw caps for hazardous substances must always be used.

For materials of risk group 3 and 4, a biosafety system must be used in addition to the sealable centrifuge tubes (see the World Health Organisation's "Laboratory Biosafety Manual").

In a biosafety system, a bioseal (sealing ring) prevents droplets and aerosols from escaping.

If the bucket of a biosafety system is used without the lid, the sealing ring must be removed from the bucket to prevent damage to the sealing ring during the centrifugation run.

Damaged biosafety systems are no longer microbiologically tight.

If no biosafety system is used, a centrifuge is not microbiologically tight in the sense of the EN / IEC 61010-2-020 standard.

Storage of biosafety systems

Biosafety systems must only be stored with the lid open to avoid damage to the sealing rings during storage.

6.6.2 Lid with screw cap

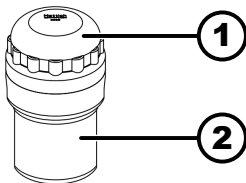


Fig. 19: Biosafety system

- 1 Lid
- 2 Bucket

Closing

1. Place the lid (1) centrally on the bucket (2).
2. Turn the lid (1) clockwise until it is tightly closed.

Opening

1. Turn the lid (1) anticlockwise until it is open.
2. Remove the lid (1) from the bucket (2).


6.7 Centrifugation

6.7.1 Centrifugation in continuous operation

Personnel:


- Trained user

1. Use the $[RPM/RCF \times 100]$ buttons to set the desired speed.
2. Use the $[t]$ buttons to set the time to zero.
 - ➔ "--" is displayed.

3.  Press the *[START]* button.
 - The centrifugation run is started.

The 'Rotation' indicator light rotates while the rotor is turning.

Timing starts at 0. The first minute is counted up in seconds, then the time is displayed in minutes. A dot flashes next to the number if the time is displayed in minutes.

The rotor speed or the resulting RCF value and the elapsed time are displayed during the centrifugation run.
4.  Press the *[STOP]* button to cancel the centrifugation run.




Ramp-down takes place with the set brake level. The brake level is displayed.

An audible signal sounds when the rotor comes to a standstill.

6.7.2 Centrifugation with time preselection


Personnel:

- Trained user

1.  Use the *[RPM/RCF x 100]* buttons to set the desired speed.
2.  Use the *[t]* buttons to set the desired time.
3.  Press the *[START]* button.
 - The centrifugation run is started.

The 'Rotation' indicator light rotates while the rotor is turning.

The time is displayed in minutes. The last minute is counted down in seconds. A dot flashes next to the number if the time is displayed in minutes.



The rotor speed or the resulting RCF value and the remaining time are displayed during the centrifugation run.
4.  Ramp-down takes place with the selected brake level after the time has elapsed or if the centrifugation run is cancelled by pressing the *[STOP]* button.

An audible signal sounds when the rotor comes to a standstill.

6.7.3 Short-term centrifugation


Personnel:

- Trained user

1.  Use the *[RPM/RCF x 100]* buttons to set the desired speed.
2.  Press and hold the *[IMPULSE]* button.
 - The centrifugation run is started.

The 'Rotation' indicator light rotates while the rotor is turning.

Timing starts at 0. The first minute is counted up in seconds, then the time is displayed in minutes. A dot flashes next to the number if the time is displayed in minutes.






The rotor speed and the elapsed time are displayed during the centrifugation run.
3.  Release the *[IMPULSE]* button to end the centrifugation run.
 - Ramp-down takes place with the set brake level. The brake level is displayed.



An audible signal sounds when the rotor comes to a standstill.

7 Software operation

7.1 Centrifugation parameters

7.1.1 Set the brake level

1.  Switch off the mains switch.
2.  Press and hold down the  *[RPM/RCF x 100]* button and the *[IMPULSE]* button simultaneously.
3.  Switch on the mains switch and release the buttons.
 - Press the  *[RPM/RCF x 100]* button repeatedly until the speed indicator shows the machine version and the time indicator shows the brake level set (and/or '0' or '1').

The machine version is set ex works and cannot be changed.
The machine version is set ex works and cannot be changed.
4.  Use the *[t]* buttons to set the desired brake level.
 - Level 1 = short ramp-down time.
 - Level 0 = long ramp-down time.
5.  Press the *[STOP]* button to save the settings.

7.1.2 Relative centrifugal force, RCF

The relative centrifugal force RCF is dependent on the speed and the centrifuging radius.

The relative centrifugal force RCF is stated as a multiple of the acceleration due to gravity (g).

The relative centrifugal force RCF is a dimensionless numerical value and is used to compare the separation and sedimentation performance.

$$RCF = \left(\frac{RPM}{1000} \right)^2 * r * 1,118$$



$$RPM = \sqrt{\frac{RCF}{r * 1,118}} * 1000$$

RCF = Relative Centrifugal Force

RPM = speed

r = centrifuging radius in mm = distance from the centre of the axis of rotation to the bottom of the centrifuge tube.

Display of the relative centrifugal force (RCF)

1.  Press and hold the *[RCF]* button during the centrifugation run.
 - Relative centrifugal force (RCF) is displayed.
2.  Release the *[RCF]* button.
 - The speed is displayed.

7.1.3 Centrifugation of substances or mixtures of substances with a density higher than 1.2 kg/dm³

The density of the substances or mixtures of substances must not exceed 1.2 kg/dm³ during centrifugation at maximum speed. The speed must be reduced for substances or substance mixtures with a higher density. The permissible speed can be calculated using the following formula:

$$\text{Reduzierte Drehzahl } (n_{red}) = \sqrt{\frac{1,2}{\text{höhere Dichte (kg/dm}^3)}} * \text{maximale Drehzahl (RPM)}$$

For example: Maximum speed 4000 RPM, density 1.6 kg/dm³

$$n_{red} = \sqrt{\frac{1,2(\text{kg/dm}^3)}{1,6(\text{kg/dm}^3)}} * 4000 \text{ RPM} = 3464 \text{ RPM}$$

If, in exceptional cases, the maximum load indicated on the bucket is exceeded, the speed must also be reduced. The permissible speed can be calculated using the following formula:

$$\text{Reduzierte Drehzahl } (n_{red}) = \sqrt{\frac{\text{maximale Beladung (g)}}{\text{tatsächliche Beladung (g)}}} * \text{maximale Drehzahl (RPM)}$$









For example: Maximum speed 4000 RPM, maximum load 300 g, actual load 350 g

$$n_{red} = \sqrt{\frac{300 \text{ g}}{350 \text{ g}}} * 4000 \text{ RPM} = 3703 \text{ RPM}$$

Please contact the manufacturer if you are not sure.

7.1.4 Centrifuging radius

The centrifuging radius must be entered in centimetres.

1.  Switch off the mains switch.
2.  Press and hold down the  [RPM/RCF x 100] button and the [IMPULSE] button simultaneously.
3.  Switch on the mains switch and release the buttons.
4.  Press the  [RPM/RCF x 100] button repeatedly until the centrifuging radius and 'rd' are displayed.
5.  Use the [t] buttons to set the desired centrifuging radius.
6.  Press the [STOP] button to save the settings.

7.2 Rotor detection

- Rotor detection is performed after starting a centrifugation run.
- If the rotor has been changed, the centrifugation run is cancelled after rotor detection. The rotor code (red) is displayed.
- If the maximum speed of the rotor used is less than the set speed, the speed is limited to the maximum rotor speed.

7.3 Machine Menu

7.3.1 Audible signal

7.3.1.1 General

The audible signal sounds:

- after a problem occurs in the 2 s interval.
- after completion of the centrifugation run and rotor standstill in the 30 s interval.

Opening the lid or pressing any button stops the audible signal.

7.3.1.2 Setting an audible signal

1. ➤ Switch off the mains switch.
2. ➤ Press and hold down the ▲ *[RPM/RCF x 100]* button and the *[IMPULSE]* button simultaneously.
3. ➤ Switch on the mains switch and release the buttons.
4. ➤ Press the ▲ *[RPM/RCF x 100]* button repeatedly until 'BEL 1' or 'BEL 0' is displayed.
5. ➤ Use the *[t]* buttons beneath the time indicator to set '0' or '1'.
0 = audible signal disabled.
1 = audible signal enabled.
6. ➤ Press the *[STOP]* button to save the settings.

8 Cleaning and care

8.1 Overview table

Chap.	Task to execute	if required	daily	weekly	Annually	Page
8	Cleaning and care					30
8.3	Cleaning					31
8.3	Cleaning the device		X			31
8.3	Cleaning the biosafety systems			X		31
8.3	Cleaning the accessories			X		32
8.4	Disinfection					32
8.4	Disinfecting the device	X				32
8.4	Disinfecting the accessories	X				32
8.5	Maintenance					33
8.5	Greasing the rubber seal of the centrifuging chamber			X		33
8.5	Greasing the rubber seal of the biosafety system			X		33
8.5	Trunnion greasing			X		33
8.5	Checking the accessories			X		33
8.5	Checking the biosafety system			X		33
8.5	Inspecting the centrifuging chamber for damage				X	33
8.5	Greasing the motor shaft				X	33
8.5	Accessories with a limited service life	X				33

Chap.	Task to execute	if required	daily	weekly	Annually	Page
8.5	Replacing centrifuge tubes	X				34

8.2 Cleaning and disinfection instructions



DANGER

Risk of contamination for the user due to inadequate cleaning or failure to observe the cleaning instructions.

- Observe cleaning instructions.
- Wear personal protective equipment when cleaning the device.
- Observe laboratory regulations (e.g. TRBAs, the German Protection against Infection Act, hygiene plan) for handling biological agents.








- The device and its accessories must not be cleaned in dishwashers.
- Only perform hand cleaning and liquid disinfection.
- The water temperature must not exceed 25 °C.
- To prevent any corrosion due to use of detergents or disinfectants, it is essential to follow the special application instructions provided by the manufacturers of the detergent or disinfectant.

Disinfectant:



- Surface disinfectant (not disinfectant for hands or instruments)
- Ethanol as the sole active substance.
Do not use an ethanol-propanol mixture to disinfect the viewing window in the lid of the device.
- Concentration is not less than 30 %
- pH: 6 – 8
- Non-corrosive

8.3 Cleaning

Cleaning the device

1.  Open the lid.
2.  Switch off the device and disconnect it from the power supply.
3.  Remove accessories.
4.  Clean the centrifuge housing and the centrifuging chamber with soap or a mild detergent and a damp cloth.
5.  Remove any detergent residues with a damp cloth after using detergents.
6.  The surfaces must be dried immediately after cleaning.
7.  Dry the centrifuging chamber with an absorbent cloth if condensation forms.

Cleaning the biosafety systems

1.  Clean the biosafety system using the detergent and a damp cloth.
2.  Remove any detergent residues with a damp cloth after using detergents.

3. Dry the accessories immediately after cleaning using a lint-free cloth and oil-free compressed air. Dry all cavities completely using oil-free compressed air.

Cleaning the accessories

1. Clean the accessories using the detergent and a damp cloth.
2. Remove any detergent residues with a damp cloth after using detergents.
3. Dry the accessories immediately after cleaning using a lint-free cloth and oil-free compressed air. Dry all cavities completely using oil-free compressed air.

8.4 Disinfection



Disinfection must always be preceded by cleaning of the components concerned.

See → Chapter 8 'Cleaning and care' on page 30



Disinfectant concentration and application time according to the manufacturer's instructions.

Disinfecting the device



CAUTION

Risk of injury due to ingress of water or other liquids.

- Protect the device against external liquids.
- Do not disinfect the device using spray.

1. Open the lid.
2. Switch off the device and disconnect it from the power supply.
3. Remove accessories.
4. Clean the housing and centrifuging chamber using disinfectant.
5. Remove any disinfectant residues with a damp cloth after using disinfectants.
6. The surfaces must be dried immediately after cleaning.

Disinfecting the accessories

1. Disinfect the accessories using the disinfectant.
2. Wet all cavities with bubble-free disinfectant.
3. Remove the disinfectant residues or leave them to dry after using disinfectants.

Autoclaving

The following accessories may be autoclaved at 121 °C / 250 °F (20 min):

- Swing-out rotors
- Aluminium angle rotors
- Metal buckets
- Lid with bioseal
- Inserting

No statement can be made about the resulting degree of sterility.

The lids of the rotors and bucket must be removed before autoclaving.

Autoclaving accelerates the ageing of materials. It may cause changes to colours. After autoclaving, the rotors and accessories are to be visually inspected for damage and any damaged parts are to be replaced immediately.

The sealing ring in question is to be replaced if there are signs of cracking, embrittlement or wear. For lids with non-replaceable sealing rings, the whole lid must be replaced.

The sealing rings must be replaced after autoclaving to ensure the tightness of the biosafety systems.

8.5 Maintenance

Greasing the rubber seal of the centrifuging chamber

___> Rub the sealing ring lightly with a rubber care product.

Greasing the rubber seal of the biosafety system

___> Rub the sealing ring lightly with a rubber care product.

Trunnion greasing

1. > Remove accessories.
2. > Clean the trunnions.
3. > Remove any detergent residues with a damp cloth after using detergents.
4. > Grease the trunnions and suspension with Hettich Tubenfett 4051.
5. > Excess grease in the centrifuging chamber must be removed.

Checking the accessories

1. > The accessories are to be checked for wear and corrosion damage.
2. > Check that the rotor is firmly seated.

Checking the biosafety system

1. > Visually check all parts of the biosafety system for damage.
2. > Check the correct installation position of the sealing ring(s) of the biosafety system.
3. > Replace the damaged parts of the biosafety system.
4. > Replace the sealing ring in question immediately if there are signs of cracking, embrittlement or wear. For lids with non-replaceable sealing rings, the whole lid must be replaced.

Inspecting the centrifuging chamber for damage

___> Check the centrifuging chamber for damage.

Greasing the motor shaft

1. > Remove accessories.
2. > Clean the motor shaft.
3. > Remove any detergent residues with a damp cloth after using detergents.
4. > Grease the motor shaft with Hettich Tubenfett 4051.
5. > Excess grease in the centrifuging chamber must be removed.

Accessories with a limited service life

The use of certain accessories is time-limited. For safety reasons, the accessories must no longer be used when either the maximum number of permissible run cycles marked on them or the expiry date marked on them has been reached.

- The maximum permissible number of run cycles or the expiry date can be seen marked on the accessories.

Replacing centrifuge tubes



CAUTION

Risk of injury from broken glass.

Broken glass may cause glass splinters and contaminated liquids to be found inside the centrifuge.

- Wear cut-resistant gloves.
- Wear protective goggles and a face mask.

Broken parts of the tube, glass splinters and spilled centrifuge material must be removed completely in the event of leakage or if a centrifuge tube breaks. Glass splinters that are not removed will cause further glass breakage.

The rubber inserts and the plastic sleeves of the rotors must be replaced after a glass breakage.

Disinfection must be carried out if the material is infectious.

9 Troubleshooting




9.1 Fault description

Customer service must be notified if the fault cannot be rectified based on the fault table. State the centrifuge type and serial number. Both numbers can be seen on the type plate of the centrifuge.

Fault description	Cause	Remedy
no display	No power. Mains input fuses defective.	<ul style="list-style-type: none"> ■ Check the supply voltage. ■ Check the mains input fuse. ■ Set the mains switch to <i>/I/</i>.
-1-	Tacho error. Speed pulse failure.	<ul style="list-style-type: none"> ■ The device must not be switched off while the <i>'Rotation'</i> indicator is lit up and rotating. <p>Wait until the <i>'Lid closed'</i> symbol is displayed (after approx. 100 seconds) and then perform a MAINS RESET.</p>
-2-	Loss of mains power during the centrifugation run. The centrifugation run was not completed.	<ul style="list-style-type: none"> ■ Open the lid and press the <i>[START]</i> button. ■ If required: Repeat the centrifugation run.
-3-	Imbalance. The rotor is unevenly loaded.	<ul style="list-style-type: none"> ■ Open the lid. ■ Check the loading of the rotor. ■ Repeat the centrifugation run.
-4-	Communication. Error in the control section or power section.	<ul style="list-style-type: none"> ■ Perform a MAINS RESET.
-5-	Overload. Motor or motor control defective.	<ul style="list-style-type: none"> ■ Perform a MAINS RESET.

Fault description	Cause	Remedy
-6-	Overvoltage. Mains voltage outside tolerances.	<ul style="list-style-type: none"> ■ Perform a MAINS RESET. ■ Check the mains voltage.
-7-	Overspeed. Error in the power section.	<ul style="list-style-type: none"> ■ Perform a MAINS RESET.
-8-	Undervoltage. Mains voltage outside tolerances.	<ul style="list-style-type: none"> ■ Perform a MAINS RESET. ■ Check the mains voltage.
-9-	Overtemperature. Overtemperature switch in the motor has tripped.	<ul style="list-style-type: none"> ■ Open the lid using the emergency release. ■ Let the motor cool down.
Version Error	Wrong machine version set. The control section skips to the Settings menu.	<ul style="list-style-type: none"> ■ Use the <i>[t]</i> buttons to set the number 7. ■ Press the <i>[STOP]</i> button to save the settings. ■ Perform a MAINS RESET.
no speed indicator. Machine version set in the time indicator.	Version Error. Wrong machine version set. The control section skips to the Settings menu.	<ul style="list-style-type: none"> ■ Use the <i>[t]</i> buttons to set the number 7. ■ Press the <i>[STOP]</i> button to save the settings. ■ Perform a MAINS RESET.
-c-	Controller watchdog. Error in the power section.	<ul style="list-style-type: none"> ■ Perform a MAINS RESET.
-d-	Lid lock error.	<ul style="list-style-type: none"> ■ Perform a MAINS RESET.
-E-	Short circuit in the control section / power section.	<ul style="list-style-type: none"> ■ Perform a MAINS RESET.
-F-	No rotor detection when starting. No rotor inserted or defective tacho.	<ul style="list-style-type: none"> ■ Perform a MAINS RESET.
rot...	A new rotor has been detected.	<ul style="list-style-type: none"> ■ Press the <i>[START]</i> button.
888888 All indicator segments light up.	-	<ul style="list-style-type: none"> ■ Notify customer service.

9.2 Perform a MAINS RESET

1.  Set the mains switch to *[0]*.
2.  Wait 10 seconds.
3.  Set the mains switch to *[I]*.

9.3 Emergency release

The lid cannot be unlocked by the motor in the event of a power failure. Emergency unlocking by hand must be performed.



! WARNING

Risk of electric shock due to maintenance and servicing work on live device.

- Disconnect the device from the mains before carrying out repairs and maintenance.



WARNING

Danger of cutting and crushing due to moving rotor.

- Do not open the lid until the rotor has stopped.

Personnel:

- Trained user

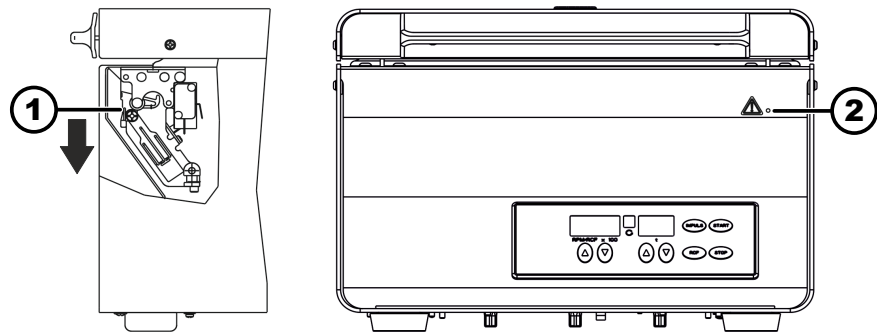


Fig. 20: Emergency release

- 1 Release pin
- 2 Hole

1. Look through the window in the lid to ensure that the rotor is stationary.
2. Insert the release pin (1) horizontally into the hole (2). Push it in until the handle strip can be swivelled upwards when the pin is pressed down.
3. Open the lid.

9.4 Replacing the mains input fuse



! WARNING

Risk of electric shock due to maintenance and servicing work on live device.

- Disconnect the device from the mains before carrying out repairs and maintenance.

Personnel:

- Trained user

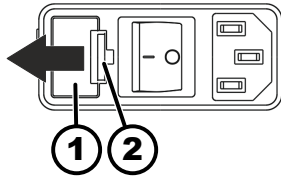


Fig. 21: Mains input fuse

- 1 Fuse holder
- 2 Snap lock

The mains fuses are located next to the mains switch.

The mains switch is in switch position [O]

1. ➤ Disconnect the mains cable from the device plug.
2. ➤ Press the snap lock (2) against the fuse holder (1) and pull it out.
3. ➤ Replace the defective mains input fuses.

Only use fuses with the nominal value specified for the type: see the table below.

4. ➤ Push in the fuse holder (1) until the snap lock engages.
5. ➤ Reconnect the device to the mains.

Model	Type	Fuse	Order no.
ROTOFIX 32 A	1206, 1206-34	T 3.15 AH/250 V	E997
ROTOFIX 32 A	1206-01, 1206-33	T 5 AH/250 V	E914

10 Disposal

10.1 General instructions



The device can be disposed of via the manufacturer.

A Return Material Authorisation (RMA) form must always be requested for a return.

If necessary, contact the Technical Service Department of the manufacturer.

- **Andreas Hettich GmbH & Co. KG**
- Föhrenstrasse 12
- 78532 Tuttlingen, Germany
- Phone: +49 7461 705 1400
- E-mail: service@hettichlab.com



! WARNING

Risk of pollution and contamination for people and the environment.

When disposing of the centrifuge, people and the environment may be polluted or contaminated by incorrect or improper disposal.

- Removal and disposal may be carried out only by a trained and authorised service personnel.

The device is intended for the commercial sector ("Business to Business" - B2B).

According to Directive 2012/19/EU, the devices may no longer be disposed of with household waste.

The devices are assigned to the following groups according to the Stiftung Elektro-Altgeräte Register (EAR (German foundation under civil law)):

- Group 5 (small devices)



The crossed-out wheeled bin symbol indicates that the device must not be disposed of with household waste. Regulations governing disposal of such devices may differ in individual countries. If necessary, contact the supplier.



Fig. 22: Household waste ban

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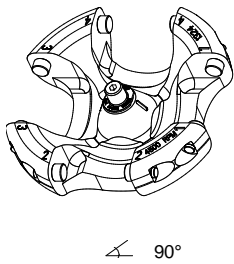
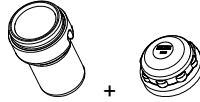

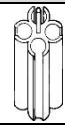
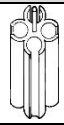






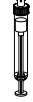




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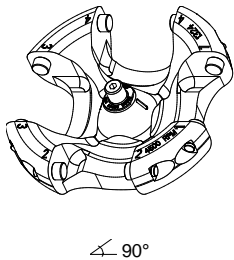
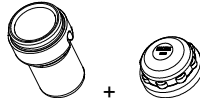










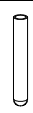




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Rotoren und Zubehör / Rotors and accessories

1324	1490 + 1492							
Ausschwingrotor 4-fach / Swing out rotor 4-times  ↙ 90°	 mit Bioabdichtung / with bio-containment 5)							
	---	0765		1329			1329	1330
	---							
	---	0534 4)	0535	---	---	---	---	---
---								
Kapazität / capacity	ml	30		9	15	9 - 10	10	25
Maße / dimensions Ø x L	mm	44 x 105		14 x 100	17 x 100	16 x 92	15 x 102	24 x 100
Anzahl p. Rotor / number p. rotor	---	4		16	16	16	16	4
Drehzahl / speed	RPM	4000		4000	4000	4000	4000	4000
RZB / RCF	³⁾	2504		2504	2504	2504	2630	2397
Radius / radius	mm	140		140	140	140	147	134
 9 (97%)	sec	27						
 9	sec	30						
Probenerwärmung/Sample temp. rise	K ¹⁾	10						

1324	1490 + 1492									
Ausschwingrotor 4-fach / Swing out rotor 4-times  ↙ 90°	 mit Bioabdichtung / with bio-containment 5)									
	1331	1339	1343	1347	1348					
										
	---	Rhesus	---	---	---	---	---	---		
---										
Kapazität / capacity	ml	50	1	3	4	15	10	8	4 - 4,5	4 - 7
Maße / dimensions Ø x L	mm	34 x 100	6 x 45	10 x 60	10 x 88	17 x 120	16 x 80	16 x 81	15 x 75	16 x 75
Anzahl p. Rotor / number p. rotor	---	4	108	36	4	16	16	16	16	16
Drehzahl / speed	RPM	4000	4000	4000	4000	4000	4000	4000	4000	4000
RZB / RCF	³⁾	2379	2558	2594	2630	2486	2486	2486	2486	2486
Radius / radius	mm	133	143	145	147	139	139	139	139	139
 9 (97%)	sec	27								
 9	sec	30								
Probenerwärmung/Sample temp. rise	K ¹⁾	10								

1) Probenerwärmung bei maximaler Drehzahl und 1 Stunde Laufzeit (nur bei Zentrifuge ohne Kühlung)

3) Angaben des Röhrchenherstellers beachten.

4) nicht mit Stopfen zentrifugierbar, Skal. 10µl-300µl, 15ml, 30ml

5) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitssysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" beachten

7) Die Einlagen entfernen

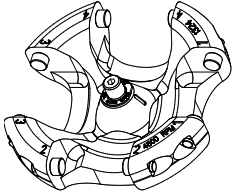
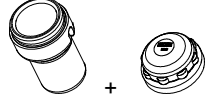






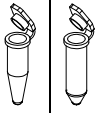






1) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)

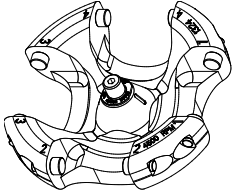
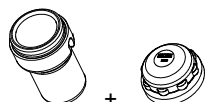











3) Observe the tube manufacturer's instructions.

4) can not be centrifugated when plug is attached, Scal. 10µl-300µl, 15ml, 30ml

5) in conformity with DIN EN 61010, part 2 – 020. Observe the notes for bio safety systems in chapters "Notes on safety" and "Maintenance and servicing".

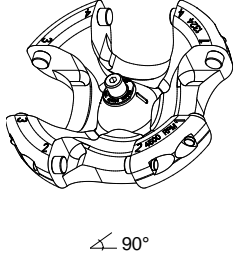
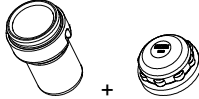





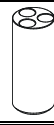










7) Remove the inserts

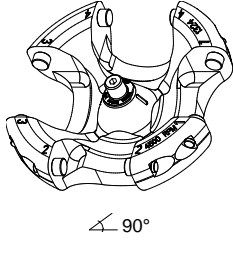

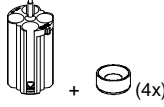











1324		1490 + 1492															
Ausschwingrotor 4-fach / Swing out rotor 4-times  $\angle 90^\circ$		 mit Bioabdichtung / with bio-containment 5)															
		1348		1351		1363		1365		1383							
																	
---		---		---		---		---		---							
																	
Kapazität / capacity	ml	8,5 - 10		1,5 2,0		0,5		25		30		5 6		7		2,7 - 3	
Maße / dimensions $\varnothing \times L$	mm	16 x 100		11 x 38		10,7 x 36		25 x 90		25 x 110		12 x 75 12 x 82		12 x 100		11 x 66	
Anzahl p. Rotor / number p. rotor		16		20		20		4		4		20		20		20	
Drehzahl / speed	RPM	4000		4000		4000		4000		4000		4000		4000		4000	
RZB / RCF	³⁾	2486		2415		2343		2308		2630		2522		2522		2522	
Radius / radius	mm	139		135		131		129		147		141		141		141	
 9 (97%)	sec	27															
 9	sec	30															
Probenerwärmung/Sample temp. rise	K ¹⁾	10															

1324		1490 + 1492															
Ausschwingrotor 4-fach / Swing out rotor 4-times  $\angle 90^\circ$		 mit Bioabdichtung / with bio-containment 5)															
		1383				1384		1396	1457								
																	
---		---		---		---		---									
																	
Kapazität / capacity	ml	2,6 – 3,4		4,9		4,5 - 5		1,6 -5		4 –7		50		85		1,1 – 1,4	
Maße / dimensions $\varnothing \times L$	mm	13 x 65		13 x 90		11 x 92		13 x 75		13 x 100		29 x 115		38 x 106		8 x 66	
Anzahl p. Rotor / number p. rotor		20		20		20		20		20		4		4		28	
Drehzahl / speed	RPM	4000		4000		4000		4000		4000		4000		4000		4000	
RZB / RCF	³⁾	2522		2522		2522		2522		2522		2630		2576		2540	
Radius / radius	mm	141		141		141		141		141		147		144		142	
 9 (97%)	sec	27															
 9	sec	30															
Probenerwärmung/Sample temp. rise	K ¹⁾	10															

- 1) Probenerwärmung bei maximaler Drehzahl und 1 Stunde Laufzeit (nur bei Zentrifuge ohne Kühlung)
- 3) Angaben des Röhrchenherstellers beachten.
- 5) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitsysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" beachten

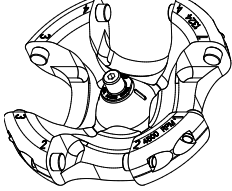


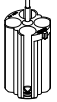










- 1) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
- 3) Observe the tube manufacturer's instructions.
- 5) in conformity with DIN EN 61010, part 2 – 020. Observe the notes for bio safety systems in chapters "Notes on safety" and "Maintenance and servicing".

1324		1490 + 1492															
Ausschwingrotor 4-fach / Swing out rotor 4-times  ∠ 90°		 mit Bioabdichtung / with bio-containment ⁵⁾															
		1459		4416		4417		6311		6318		1356		0761			
																	
										Falcon® 							
Kapazität / capacity	ml	4 – 5,5		7,5 – 8,2		50		30		12		50		15		100	
Maße / dimensions	∅ x L	15 x 75		15 x 92		29 x 107		26 x 95		17 x 100		29 x 115		17 x 120		44 x 100	
Anzahl p. Rotor / number p. rotor		16		16		4		4		4		4		12		4	
Drehzahl / speed	RPM	4000		4000		4000		4000		4000		4000		4000		4000	
RZB / RCF	³⁾	2540		2540		2594		2415		2630		2630		2630		2522	
Radius / radius	mm	142		142		145		135		147		147		147		141	
 9 (97%)	sec									27							
 9	sec									30							
Probenerwärmung/Sample temp. rise	K ¹⁾									10							

1324		1398															
Ausschwingrotor 4-fach / Swing out rotor 4-times  ∠ 90°		 ---															
		1482A + 4x 0716				1482A											
																	
																	
Kapazität / capacity	ml	2,6 – 3,4		4 – 4,5		9 – 10		10		12		4 - 7		8,5 – 10		9	
Maße / dimensions	∅ x L	13 x 65		15 x 75		16 x 92		15 x 102		17 x 100		16 x 75		16 x 100		14 x 100	
Anzahl p. Rotor / number p. rotor		16		16		16		16		16		16		16		16	
Drehzahl / speed	RPM	4000		4000		4000		4000		4000		4000		4000		4000	
RZB / RCF	³⁾	2272		2272		2522		2522		2522		2397		2397		2522	
Radius / radius	mm	127		127		141		141		141		134		134		141	
 9 (97%)	sec									27							
 9	sec									30							
Probenerwärmung/Sample temp. rise	K ¹⁾									10							

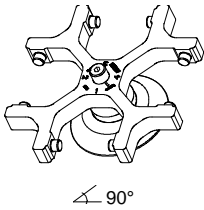
















- 1) Probenerwärmung bei maximaler Drehzahl und 1 Stunde Laufzeit (nur bei Zentrifuge ohne Kühlung)
- 3) Angaben des Rörchchenherstellers beachten.
- 5) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitssysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" beachten
- 8) nicht mit Deckel 1492 verschließbar

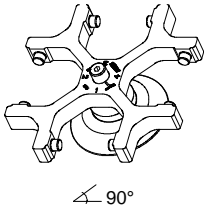




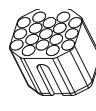







- 1) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
- 3) Observe the tube manufacturer's instructions.
- 5) in conformity with DIN EN 61010, part 2 – 020. Observe the notes for bio safety systems in chapters "Notes on safety" and "Maintenance and servicing".
- 7) not possible to close the lid 1492

1324		1398							
Ausschwingrotor 4-fach / Swing out rotor 4-times  		 ---							
		1482A	1483A	1484	1484	---	---	---	---
		  ohne / without E2110-A  	---	---	---	---	---	---	---
   Falcon®  	---	---	---	---	---	---	---		
Kapazität / capacity	ml	15	15	50	50	---	---	---	---
Maße / dimensions	Ø x L	mm	17 x 100	17 x 120	29 x 115	29 x 115	---	---	---
Anzahl p. Rotor / number p. rotor		16	16	4	4	---	---	---	---
Drehzahl / speed	RPM	4000	4000	4000	4000	---	---	---	---
RZB / RCF	³⁾	2522	2612	2576	2576	---	---	---	---
Radius / radius	mm	141	146	144	144	---	---	---	---
 9 (97%)	sec	27				---	---	---	---
 9	sec	30				---	---	---	---
Probenerwärmung/Sample temp. rise	K ¹⁾	10				---	---	---	---

- 1) Probenerwärmung bei maximaler Drehzahl und 1 Stunde Laufzeit (nur bei Zentrifuge ohne Kühlung)
 3) Angaben des Röhrchenherstellers beachten.

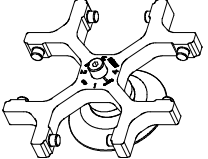
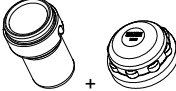







- 1) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
 3) Observe the tube manufacturer's instructions.

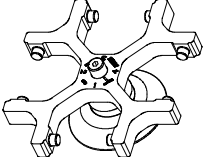
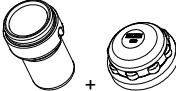






1624	---	1345	1346	1366						
Ausschwingrotor 4-fach / Swing out rotor 4-times  ↙ 90°	---									
	---	---	---	---						
	---	---	---	1326	1357	5277				
	---	---	---							
---	---	---	---	---	Rhe- sus	---	---	---		
---										
Kapazität / capacity	ml	---	45	20	4	0,4	1	3	1,5	2,0
Maße / dimensions	∅ x L	mm	---	31 x 100	21 x 100	12 x 60	6 x 45	10 x 60	11 x 38	
Anzahl p. Rotor / number p. rotor	---	---	4	8	48	120	36	36		
Drehzahl / speed	RPM	---	4000	4000	4000	4000	4000	4000	4000	4000
RZB / RCF	³⁾	---	2361	2361	1932	1950	1968	1968	1968	1968
Radius / radius	mm	---	132	132	108	109	110	110	110	110
 9 (97%)	sec	22								
 9	sec	25								
Probenerwärmung/Sample temp. rise	K ¹⁾	10								

1624	1369	1369-91	1369-92	1370	1372	---			
Ausschwingrotor 4-fach / Swing out rotor 4-times  ↙ 90°						---			
	---	---	---	---	---	---			
	---	---	---	---	---	---	---		
	---						---		
Kapazität / capacity	ml	15	8,5 - 10	5	7	6	9	5	
Maße / dimensions	∅ x L	mm	17 x 100	16 x 100	12 x 75	12 x 100	12 x 82	14 x 100	12 x 75
Anzahl p. Rotor / number p. rotor	---	16	16	16	16	16	20	68	
Drehzahl / speed	RPM	4000	4000	4000	4000	4000	4000	4000	
RZB / RCF	³⁾	2308	2308	2057	2308	2308	2308	2164	
Radius / radius	mm	129	129	115	129	129	129	121	
 9 (97%)	sec	22							
 9	sec	25							
Probenerwärmung/Sample temp. rise	K ¹⁾	10							

- 1) Probenerwärmung bei maximaler Drehzahl und 1 Stunde Laufzeit
- 3) Angaben des Röhrchenherstellers beachten.

- 1) Sample temp. rise during maximum speed and 1 hour running time
- 3) Observe the tube manufacturer's instructions.

1624	1481 + 1492									
Ausschwingrotor 4-fach / Swing out rotor 4-times  ↙ 90°	 mit Bioabdichtung / with bio-containment 5)									
	1329				1330		1331	1339	1347	
										
	---	---	---	---	---	---	---	Rhesus	---	
Kapazität / capacity	ml	9	15	9 - 10	10	25	50	1	15	
Maße / dimensions Ø x L	mm	14 x 100	17 x 100	16 x 92	15 x 102	24 x 100	34 x 100	6 x 45	17 x 120	
Anzahl p. Rotor / number p. rotor		16	16	16	16	4	4	108	4	
Drehzahl / speed	RPM	4000	4000	4000	4000	4000	4000	4000	4000	
RZB / RCF	³⁾	2540	2540	2540	2540	2433	2415	2594	2665	
Radius / radius	mm	142	142	142	142	136	135	145	149	
 9 (97%)	sec	22								
 9	sec	25								
Probenerwärmung/Sample temp. rise	K ¹⁾	10								

1624	1481 + 1492									
Ausschwingrotor 4-fach / Swing out rotor 4-times  ↙ 90°	 mit Bioabdichtung / with bio-containment 5)									
	1348				1351		6311	6318		
										
	---	---	---	---	---	---	---	---	Falcon®	
Kapazität / capacity	ml	10	4 - 7	8,5 - 10	8	1,5 2,0	0,5	12	50	
Maße / dimensions Ø x L	mm	16 x 80	16 x 75	16 x 100	16 x 81	11 x 38	10,7 x 46	17 x 100	29 x 115	
Anzahl p. Rotor / number p. rotor		16	16	16	16	20	20	4	4	
Drehzahl / speed	RPM	4000	4000	4000	4000	4000	4000	4000	4000	
RZB / RCF	³⁾	2522	2522	2522	2522	2451	2379	2665	2665	
Radius / radius	mm	141	141	141	141	137	133	149	149	
 9 (97%)	sec	22								
 9	sec	25								
Probenerwärmung/Sample temp. rise	K ¹⁾	10								

1) Probenerwärmung bei maximaler Drehzahl und 1 Stunde Laufzeit

3) Angaben des Röhrchenherstellers beachten.

5) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitsysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" beachten

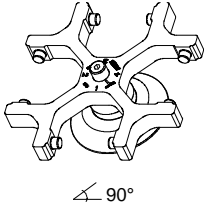
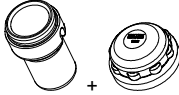

7) Die Einlagen entfernen

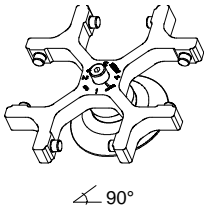
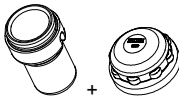
1) Sample temp. rise during maximum speed and 1 hour running time

3) Observe the tube manufacturer's instructions.

5) in conformity with DIN EN 61010, part 2 – 020. Observe the notes for bio safety systems in chapters "Notes on safety" and "Maintenance and servicing".

7) Remove the inserts

1624	1481 + 1492									
Ausschwingrotor 4-fach / Swing out rotor 4-times 	 + mit Bioabdichtung / with bio-containment 5)									
	1383 									
	---	---	---	---	---	---	---	---		
Kapazität / capacity	ml	6	7	4,9	4,5 - 5,0	2,7 - 3,0	2,6 - 2,9	1,6 - 5,0	5	
Maße / dimensions	Ø x L	mm	12 x 82	12 x 100	13 x 90	11 x 92	11 x 66	13 x 65	13 x 75	12 x 75
Anzahl p. Rotor / number p. rotor		20	20	20	20	20	20	20	20	
Drehzahl / speed	RPM	4000	4000	4000	4000	4000	4000	4000	4000	
RZB / RCF	³⁾	2558	2558	2558	2558	2558	2558	2558	2558	
Radius / radius	mm	143	143	143	143	143	143	143	143	
9 (97%)	sec	22								
9	sec	25								
Probenerwärmung/Sample temp. rise	K ¹⁾	10								

1624	1481 + 1492									
Ausschwingrotor 4-fach / Swing out rotor 4-times 	 + mit Bioabdichtung / with bio-containment 5)									
	1383	1384	1396	1457	1343		1363	1365		
	---	---	---	---	---	---	---	---		
Kapazität / capacity	ml	4 - 7,0	50	85	1,1 - 1,4	3	4	25	30	
Maße / dimensions	Ø x L	mm	13 x 100	29 x 115	38 x 106	8 x 66	10 x 60	10 x 88	25 x 90	25 x 110
Anzahl p. Rotor / number p. rotor		20	4	4	28	36	36	4	4	
Drehzahl / speed	RPM	4000	4000	4000	4000	4000	4000	4000	4000	
RZB / RCF	³⁾	2558	2665	2612	2576	2630	2630	2343	2665	
Radius / radius	mm	143	149	146	144	147	147	131	149	
9 (97%)	sec	22								
9	sec	25								
Probenerwärmung/Sample temp. rise	K ¹⁾	10								

1) Probenerwärmung bei maximaler Drehzahl und 1 Stunde Laufzeit

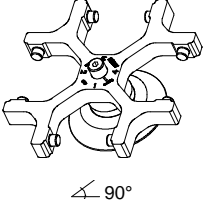
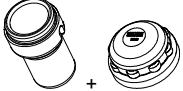

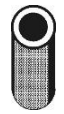







5) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitssysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" beachten

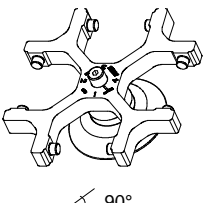







3) Angaben des Röhrchenherstellers beachten.

1) Sample temp. rise during maximum speed and 1 hour running time

5) in conformity with DIN EN 61010, part 2 – 020. Observe the notes for bio safety systems in chapters "Notes on safety" and "Maintenance and servicing".

3) Observe the tube manufacturer's instructions.

1624		1481 + 1492					---		---				
Ausschwingrotor 4-fach / Swing out rotor 4-times  ↙ 90°		 mit Bioabdichtung / with bio-containment 5)					---		---				
		1459		4416		4417	0761	0765		1745	1746		
													
		---		---		---	---	0534 4)	0535	---	---		
Kapazität / capacity		ml	4,0 - 5,5	7,5 - 8,2	50	30	100	30		25	30	50	
Maße / dimensions		Ø x L	mm	15 x 75	15 x 92	29 x 107	26 x 95	44 x 10	44 x 105		24 x 100	26 x 95	34 x 100
Anzahl p. Rotor / number p. rotor			16	4	4	4	4	4		8	4		
Drehzahl / speed		RPM	4000	4000	4000	4000	4000	4000		4000	4000	4000	
RZB / RCF			2576	2630	2451	2558	2540	2540		2451	2451	2451	
Radius / radius		mm	144	147	137	143	142		137	137	137	137	
 9 (97%)		sec					22						
 9		sec					25						
Probenerwärmung/Sample temp. rise		K 1)					10						

1624		1741				1742				1739				
Ausschwingrotor 4-fach / Swing out rotor 4-times  ↙ 90°														
		0701		---		---		---		0716		---		
				---		---		---				---		
		---	---	---	---	---	---	---	---	---	---	---		
Kapazität / capacity		ml	9	1,1 - 1,4	4,9	15	15	15	15	1,6 - 5	4 - 7	2,6 - 2,9	4 - 5,5	4 - 7
Maße / dimensions		Ø x L	mm	14 x 100	8 x 66	13 x 90	17 x 100	17 x 100	17 x 100	13 x 75	16 x 75	13 x 65	15 x 75	13 x 100
Anzahl p. Rotor / number p. rotor			40	40	40	28	28	28	28	28	28	28	28	28
Drehzahl / speed		RPM	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
RZB / RCF			2415	2415	2451	2451	2451	2451	2451	2325	2325	2325	2325	2451
Radius / radius		mm	135	135	137	137	137	137	137	130	130	130	130	137
 9 (97%)		sec												
 9		sec												
Probenerwärmung/Sample temp. rise		K 1)												

1) Probenerwärmung bei maximaler Drehzahl und 1 Stunde Laufzeit

4) nicht mit Stopfen zentrifugierbar, Skal. 10µl-300µl, 15ml, 30ml

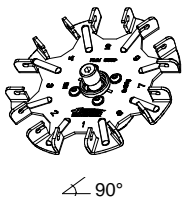




5) Nach DIN EN 61010, Teil 2 – 020. Die Hinweise für Bio-Sicherheitssysteme in den Kapiteln "Sicherheitshinweise" und "Pflege und Wartung" beachten

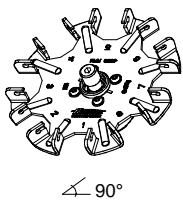




3) Angaben des Röhrchenherstellers beachten.

1) Sample temp. rise during maximum speed and 1 hour running time

4) can not be centrifugated when plug is attached, Scal. 10µl-300µl, 15ml, 30ml
5) in conformity with DIN EN 61010, part 2 – 020. Observe the notes for bio safety systems in chapters "Notes on safety" and "Maintenance and servicing".

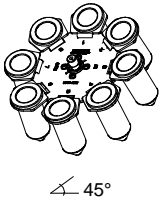





3) Observe the tube manufacturer's instructions.

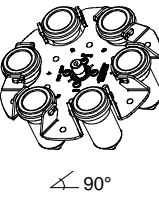





1611	1131-A						1132-A				
Ausschwingrotor 8-fach / Swing out rotor 8-times  $\angle 90^\circ$	---						---				
											
	---	---	---	---	---	---	---	---	---		
Kapazität / capacity	ml	5	6	2,7 - 3,0	2,6 - 2,9	1,6 - 5,0	10	4 - 5,5	4 - 7		
Maße / dimensions	Ø x L	mm	12 x 75	13 x 75	12 x 82	11 x 66	13 x 65	13 x 75	17 x 70	15 x 75	16 x 75
Anzahl p. Rotor / number p. rotor		8									
Drehzahl / speed	RPM	4000									
RZB / RCF	³⁾	1914									
Radius / radius	mm	107									
 9 (97%)	sec	22									
 9	sec	25									
Probenerwärmung/Sample temp. rise	K ¹⁾	6									

1611	1643					1644				
Ausschwingrotor 8-fach / Swing out rotor 8-times  $\angle 90^\circ$	---					---				
										
	---	---	---	---	---	---	---	---	---	---
Kapazität / capacity	ml	7	4 - 7	10	4,5 - 5	15	7,5 - 8,2	8,5 - 10	---	
Maße / dimensions	Ø x L	mm	12 x 100	13 x 100	13 x 100	11 x 92	17 x 100	15 x 92	16 x 100	---
Anzahl p. Rotor / number p. rotor		8								
Drehzahl / speed	RPM	4000								
RZB / RCF	³⁾	2415								
Radius / radius	mm	135								
 9 (97%)	sec	22								
 9	sec	25								
Probenerwärmung/Sample temp. rise	K ¹⁾	6								

- 1) Probenerwärmung bei maximaler Drehzahl und 1 Stunde Laufzeit
- 3) Angaben des Röhrenherstellers beachten.

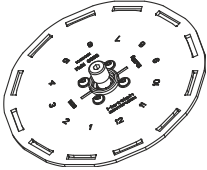



- 1) Sample temp. rise during maximum speed and 1 hour running time
- 3) Observe the tube manufacturer's instructions.









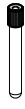


1617		---							
Ausschwingrotor 8-fach / Swing out rotor 8-times  45°	---	---	---	---	---	---	---	---	---
	1462-A	---	---	---	---	---	---	---	---
		---	---	---	---	---	---	---	---
	---	---	---	---	---	---	---	---	---
			---	---	---	---	---	---	---
Kapazität / capacity	ml	15	50	---	---	---	---	---	---
Maße / dimensions	Ø x L	mm	17 x 120	29 x 115	---	---	---	---	---
Anzahl p. Rotor / number p. rotor		8	8	---	---	---	---	---	---
Drehzahl / speed	RPM	4000	4000	---	---	---	---	---	---
RZB / RCF	³⁾	2469	2469	---	---	---	---	---	---
Radius / radius	mm	138		---	---	---	---	---	---
 9 (97%)	sec	22		---	---	---	---	---	---
 9	sec	25		---	---	---	---	---	---
Probenerwärmung/Sample temp. rise	K ¹⁾	11		---	---	---	---	---	---

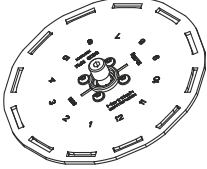

1619		---							
Ausschwingrotor 6-fach / Swing out rotor 6-times  90°	---	---	---	---	---	---	---	---	---
	1462-A	---	---	---	---	---	---	---	---
		---	---						
	---	---	---	---	---	---	---	---	---
			---	---	---	---	---	---	---
Kapazität / capacity	ml	15	50	---	---	---	---	---	---
Maße / dimensions	Ø x L	mm	17 x 120	29 x 115	---	---	---	---	---
Anzahl p. Rotor / number p. rotor		6	6	---	---	---	---	---	---
Drehzahl / speed	RPM	4000	4000	---	---	---	---	---	---
RZB / RCF	³⁾	2701	2701	---	---	---	---	---	---
Radius / radius	mm	151	151	---	---	---	---	---	---
 9 (97%)	sec	22							
 9	sec	25							
Temperatur / temperature	°C ¹⁾	-							
Probenerwärmung/Sample temp. rise	K ²⁾	10							






- 1) Tiefste erreichbare Temperatur bei maximaler Drehzahl, 1 h Laufzeit und 20°C Raumtemperatur (nur bei Kühlzentrifuge)
- 2) Probenerwärmung bei maximaler Drehzahl und 1 Stunde Laufzeit (nur bei Zentrifuge ohne Kühlung)
- 3) Angaben des Röhrchenherstellers beachten.

- 1) Lowest possible temperature during maximum speed, 1 h running time and 20°C ambient temperature (only with cooling centrifuges)
- 2) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
- 3) Observe the tube manufacturer's instructions.

1628	1621			1122			1127-A			
Ausschwingrotor 12-fach / Swing out rotor 12-times  ↙ 80° mit / with 1621 ↙ 60° mit / with 1122 ↙ 55° mit / with 1127-A										

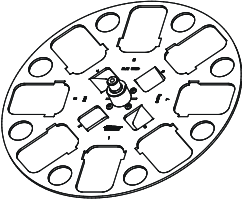

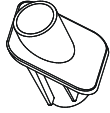












										
Kapazität / capacity	ml	15	7,5 – 8,2	8,5 - 10	10	4 – 5,5	4 – 7	5	1,6 – 5,0	
Maße / dimensions	∅ x L	mm	17 x 100	15 x 92	16 x 100	17 x 70	15 x 75	16 x 75	12/13 x 75	13 x 75
Anzahl p. Rotor / number p. rotor		12	12	12	12	12	12	12	12	
Drehzahl / speed	RPM	4000								
RZB / RCF	³⁾	2683	2683	2683	2254	2254	2254	2236	2236	
Radius / radius	mm	150	150	150	126	126	126	125	125	
 9 (97%)	sec	22								
 9	sec	25								
Probenerwärmung/Sample temp. rise	K ¹⁾	12								

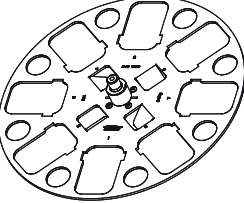

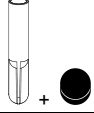


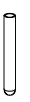










1628	1127-A			---			---		
Ausschwingrotor 12-fach / Swing out rotor 12-times  ↙ 55°				---			---		

				---			---		
Kapazität / capacity	ml	2,7 – 3	2,6 – 2,9	---			---		
Maße / dimensions	∅ x L	mm	11 x 66	13 x 65	---			---	
Anzahl p. Rotor / number p. rotor		12			---			---	
Drehzahl / speed	RPM	4000			---			---	
RZB / RCF	³⁾	2236			---			---	
Radius / radius	mm	125			---			---	
 9 (97%)	sec	16			---			---	
 9	sec	16			---			---	
Probenerwärmung/Sample temp. rise	K ²⁾	14			---			---	

- 1) Probenerwärmung bei maximaler Drehzahl und 1 Stunde Laufzeit (nur bei Zentrifuge ohne Kühlung)
 3) Angaben des Röhrchenherstellers beachten.

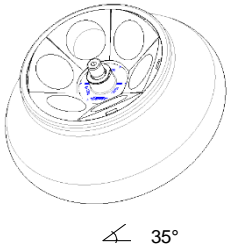
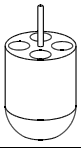












- 1) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
 3) Observe the tube manufacturer's instructions.

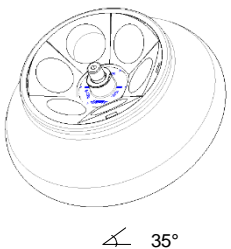















1418	1467				1468					
Winkelrotor 8-fach / Angle rotor 8-times  $\angle 45^\circ$										
	---				---					
	0716		E2109		---		---		E2110-A	
					---		---			
	---	---	---	---	---	---	---	---	---	---
								---	---	---
Kapazität / capacity	ml	15	9 - 10	12	15	50	50	50	---	
Maße / dimensions \varnothing x L	mm	17 x 100	16 x 92	17 x 100	17 x 120	29 x 107	29 x 115	29 x 115	---	
Anzahl p. Rotor / number p. rotor		32	32	32	32	8	8	8	---	
Drehzahl / speed	RPM	4000	4000	4000	4000	4000	4000	4000	---	
RZB / RCF	³⁾	4000	4000	4000	2594	2486	2486	2486	---	
Radius / radius	mm	2540	2540	2594	145	139	139	139	---	
 9 (97%)	sec					36				---
 9	sec					43				---
Temperatur / temperature	$^\circ\text{C}$ ¹⁾					-				---
Probenerwärmung/Sample temp. rise	K ²⁾					16				---

1418	1467											
Winkelrotor 8-fach / Angle rotor 8-times  $\angle 45^\circ$												
	1054-A + 0701		1054-A						0716			
												
	---	---	---	---	---	---	---	---	---	---		
										---		
Kapazität / capacity	ml	4	5	1,1 - 1,4	2,7 - 3	2,6 - 2,9	1,6 - 5	4 - 7	8,5 - 10	12		
Maße / dimensions \varnothing x L	mm	12 x 60	12 x 75 13 x 75	8 x 66	11 x 66	13 x 65	13 x 75	13 x 100	16 x 100	17 x 102		
Anzahl p. Rotor / number p. rotor		32	32	32	32	32	32	32	32	32		
Drehzahl / speed	RPM	4000	4000	4000	4000	4000	4000	4000	4000	4000		
RZB / RCF	³⁾	2129	2182	2182	2182	2182	2182	2540	2540	2540		
Radius / radius	mm	119	122	122	122	122	122	142	142	142		
 (97%)	sec					36				---		
 1	sec					43				---		
Probenerwärmung/Sample temp. rise	K ¹⁾					16				---		

- 1) Probenerwärmung bei maximaler Drehzahl und 1 Stunde Laufzeit (nur bei Zentrifuge ohne Kühlung)
3) Angaben des Röhrchenherstellers beachten.

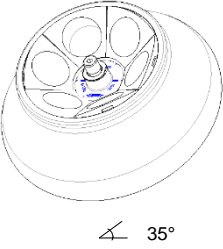














- 1) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
3) Observe the tube manufacturer's instructions.

1620A		1449		---		1451				
Winkelrotor 6-fach / Angle rotor 6-times  35°										
										
Kapazität / capacity	ml	1,5	2,0	0,5	3	15	7,5 – 8,2	9 - 10	10	8,5 - 10
Maße / dimensions	∅ x L	mm	11 x 38	10,7 x 46	10 x 60	17 x 100	15 x 92	16 x 92	15 x 102	16 x 100
Anzahl p. Rotor / number p. rotor		24				6				
Drehzahl / speed	RPM	6000								
RZB / RCF	³⁾	4105				3904				
Radius / radius	mm	102				97				
 9 (97%)	sec	19								
 9	sec	22								
Temperatur / temperature	°C ¹⁾									
Probenerwärmung/Sample temp. rise	K ²⁾	5								

1620A		---		---		---					
Winkelrotor 6-fach / Angle rotor 6-times  35°											
											
Kapazität / capacity	ml	85	15	50	30	50	85	50	50		
Maße / dimensions	∅ x L	mm	38 x 106	17 x 120	29 x 115	26 x 95	29 x 107	38 x 101	35 x 105	34 x 100	
Anzahl p. Rotor / number p. rotor		6	6	3	6	6	6	6	6	6	
Drehzahl / speed	RPM	6000									
RZB / RCF	³⁾	4226	3985		3824	3824	4226	4146			
Radius / radius	mm	105	99		95	95	105	103			
 9 (97%)	sec	19									
 9	sec	22									
Probenerwärmung/Sample temp. rise	K ¹⁾	5									

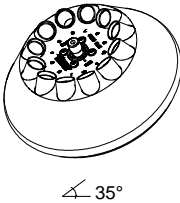

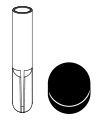


- 1) Probenerwärmung bei maximaler Drehzahl und 1 Stunde Laufzeit (nur bei Zentrifuge ohne Kühlung)
 3) Angaben des Röhrchenherstellers beachten.

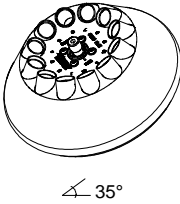
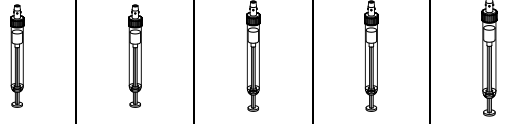


- 1) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
 3) Observe the tube manufacturer's instructions.

1620A		---			---			
Winkelrotor 6-fach / Angle rotor 6-times  \sphericalangle 35°	1448	1403	1646	SK 63.98				
			Set  +  SK 60.92-2 + E1961 (6x)					
	---	---	---	---	---	---	---	
								
Kapazität / capacity	ml	10	4	50	5	6	1,6 - 5	2,6 - 3,4
Maße / dimensions \varnothing x L	mm	16 x 80	12 x 40	29 x 115	12/13 x 75	12 x 82	13 x 75	13 x 65
Anzahl p. Rotor / number p. rotor		12	24	6		12	12	12
Drehzahl / speed	RPM	6000						
RZB / RCF	³⁾	3904	4025	3985	3783	3783	3783	3783
Radius / radius	mm	97	100	99	94	94	94	94
 9 (97%)	sec	19						
 9	sec	22						
Probenerwärmung/Sample temp. rise	K ¹⁾	5						

- 1) Probenerwärmung bei maximaler Drehzahl und 1 Stunde Laufzeit
- 3) Angaben des Röhrchenherstellers beachten.

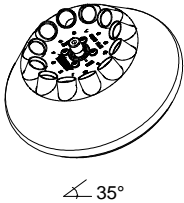




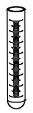







- 1) Sample temp. rise during maximum speed and 1 hour running time
- 3) Observe the tube manufacturer's instructions.

1613		---								
Winkelrotor 12-fach / Angle rotor 12-times  ∠ 35°		1054-A					1054-A /0701	---	---	
								---	---	
		---	---	---	---	---	---	---	---	
Kapazität / capacity	ml	5	1,6 – 5,0	6	2,6 – 2,9	2,7 - 3	1,1 – 1,4	4	8,5 - 10	8
Maße / dimensions	∅ x L mm	12/13 x 75	13 x 75	12 x 82	13 x 65	11 x 66	8 x 66	12 x 60	16 x 100	16 x 125
Anzahl p. Rotor / number p. rotor		12	12	12	12		12	12	12	6
Drehzahl / speed	RPM	6000	6000	6000	6000	6000	6000	6000	6000	6000
RZB / RCF	³⁾	3300	3300	3300	3300	3300	3300	3260	4146	4146
Radius / radius	mm	82	82	82	82	82	82	81	103	103
 9 (97%)	sec	13								
 9	sec	15								
Temperatur / temperature	°C ¹⁾									
Probenerwärmung/Sample temp. rise	K ²⁾	5								

1613		---							
Winkelrotor 12-fach / Angle rotor 12-times  ∠ 35°		---	---	---	---	---	---	---	---
									
		---	---	---	---	---	---	---	---
Kapazität / capacity	ml	4,5 - 5	4,9	7,5 – 8,2	9 – 10	---	---	---	---
Maße / dimensions	∅ x L mm	11 x 92	13 x 90	15 x 92	16 x 92	---	---	---	---
Anzahl p. Rotor / number p. rotor		12	12	12	12	12	---	---	---
Drehzahl / speed	RPM	6000	6000	6000	6000	---	---	---	---
RZB / RCF	³⁾	4146	4146	4146	4146	---	---	---	---
Radius / radius	mm	103	103	103	103	---	---	---	---
 9 (97%)	sec	13							
 9	sec	15							
Temperatur / temperature	°C ¹⁾								
Probenerwärmung/Sample temp. rise	K ²⁾	5							

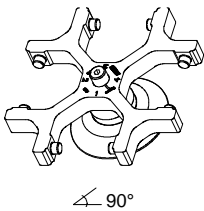
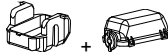

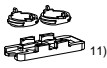








- 1) Probenerwärmung bei maximaler Drehzahl und 1 Stunde Laufzeit
 3) Angaben des Röhrchenherstellers beachten.

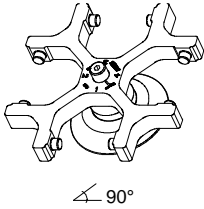


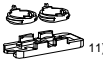






- 1) Sample temp. rise during maximum speed and 1 hour running time
 3) Observe the tube manufacturer's instructions.

1613		---								
Winkelrotor 12-fach / Angle rotor 12-times  $\angle 35^\circ$						6305	1063-6			
										
										
Kapazität / capacity	ml	4 – 7	15	15	---	4	0,5	1,5	2,0	
Maße / dimensions \varnothing x L	mm	13 x 100	17 x 100	17 x 120	---	10 x 88	10,7 x 46	11 x 38	11 x 38	
Anzahl p. Rotor / number p. rotor		12	12	6	---	6	12	12	12	
Drehzahl / speed	RPM	6000	6000	6000	---	6000	6000	6000	6000	
RZB / RCF	³⁾	4146	4146	4146	---	3502	2777	2737	2737	
Radius / radius	mm	103	103	103	---	87	69	68	68	
 9 (97%)	sec	13								
 9	sec	15								
Temperatur / temperature	$^\circ\text{C}$ ¹⁾									
Probenerwärmung/Sample temp. rise	K ²⁾	5								

- 1) Probenerwärmung bei maximaler Drehzahl und 1 Stunde Laufzeit
3) Angaben des Röhrchenherstellers beachten.

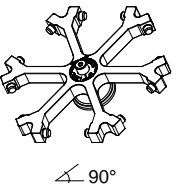













- 1) Sample temp. rise during maximum speed and 1 hour running time
3) Observe the tube manufacturer's instructions.

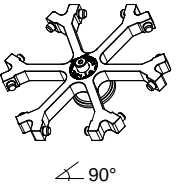


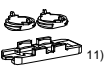








Ausschwingrotor 4-fach / Swing out rotor 4-times  $\angle 90^\circ$	 ---								
	1662 						1670  ¹¹⁾		
	1663	1664	1665	1666	1667	1668	1663	1664	
									
Kapazität / capacity	ml	1	2	4	8	3 x 2	4 x 1	1	2
Maße / dimensions \varnothing / A	mm ²	6,2 / 30	8,7 / 60	12,4 / 120	17,5 / 240	8,7 / 60	6,2 / 30	6,2 / 30	8,7 / 60
Anzahl p. Rotor / number p. rotor		4	4	4	4	4	4	4	4
Filterkarten / filter cards		1675	1675	1675	1676	1677	1678	1692	1692
Drehzahl / speed	RPM	4000							
RZB / RCF	³⁾	1646							
Radius / radius	mm	92							
9 (97%)	sec	22							
9	sec	25							
Probenerwärmung/Sample temp. rise	K ¹⁾	10							

Ausschwingrotor 4-fach / Swing out rotor 4-times  $\angle 90^\circ$	1660 + 1661 				---	1680 				
	1670  ¹¹⁾						---	1662 		
	1665	1666	1667	1668	---	1671	1672	1673		
					---					
Kapazität / capacity	ml	4	8	3 x 2	4 x 1	---	[1] 0,5	[1] 0,5	[1] 0,5	
Maße / dimensions \varnothing / A	mm ²	12,4 / 120	17,5 / 240	8,7 / 60	6,2 / 30	---	6,2 / 30	8,7 / 60	12,4 / 120	
Anzahl p. Rotor / number p. rotor		4	4	4	4	---	4	4	4	
Filterkarten / filter cards		1692	1691	1694	1693	---	[1] 1696	[1] 1697	[1] 1698	
Drehzahl / speed	RPM	4000	4000	4000	4000	---	4000	4000	4000	
RZB / RCF	³⁾	1646	1646	1646	1646	---	1467	1467	1467	
Radius / radius	mm	92	92	92	92	---	82	82	82	
9 (97%)	sec	22								
9	sec	25								
Probenerwärmung/Sample temp. rise	K ¹⁾	10								

- 1) Probenerwärmung bei maximaler Drehzahl und 1 Stunde Laufzeit
- 6) Objektträger nur belastbar bis RZB 1100
- 3) Angaben des Röhrchenherstellers beachten.
- 11) Objektträger nur belastbar bis RZB 1100
- [1] Einschritt-Methode

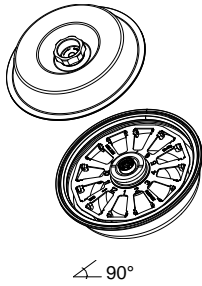






- 1) Sample temp. rise during maximum speed and 1 hour running time
- 6) Object slide will not stand RCF values exceeding 1100
- 3) Observe the tube manufacturer's instructions.
- 11) Object slide will not stand RCF values exceeding 1100
- [1] One-step method

1626	1660 + 1661								
Ausschwingrotor 6-fach / Swing out rotor 6-times  $\angle 90^\circ$	 ---								
	1662 						1670  ¹¹⁾		
	1663	1664	1665	1666	1667	1668	1663	1664	
									
Kapazität / capacity	ml	1	2	4	8	3 x 2	4 x 1	1	2
Maße / dimensions \varnothing / A	mm ²	6,2 / 30	8,7 / 60	12,4 / 120	17,5 / 240	8,7 / 60	6,2 / 30	6,2 / 30	8,7 / 60
Anzahl p. Rotor / number p. rotor		6	6	6	6	6	6	6	6
Filterkarten / filter cards		1675	1675	1675	1676	1677	1678	1692	1692
Drehzahl / speed	RPM	4000							
RZB / RCF	³⁾	2039							
Radius / radius	mm	114							
 9 (97%)	sec	22							
 9	sec	25							
Temperatur / temperature	°C ¹⁾								
Probenerwärmung/Sample temp. rise	K ²⁾	8							

1626	1660 + 1661				---	1680			
Ausschwingrotor 6-fach / Swing out rotor 6-times  $\angle 90^\circ$	 ---				---				
	---					---			
	1670  ¹¹⁾					---	1662 		
	1665	1666	1667	1668	---	1671	1672	1673	
				---					
Kapazität / capacity	ml	4	8	3 x 2	---	[1] 0,5	[1] 0,5	[1] 0,5	
Maße / dimensions \varnothing / A	mm ²	12,4 / 120	17,5 / 240	8,7 / 60	---	6,2 / 30	8,7 / 60	12,4 / 120	
Anzahl p. Rotor / number p. rotor		6	6	6	---	6	6	6	
Filterkarten / filter cards		1692	1691	1694	1693	---	[1] 1696	[1] 1697	[1] 1698
Drehzahl / speed	RPM	4000	4000	4000	4000	---	4000	4000	4000
RZB / RCF	³⁾	2039	2039	2039	2039	---	1842	1842	1842
Radius / radius	mm	114	114	114	114	---	103	103	103
 9 (97%)	sec	22							
 0	sec	25							
Probenerwärmung/Sample temp. rise	K ¹⁾	8							

- 1) Probenerwärmung bei maximaler Drehzahl und 1 Stunde Laufzeit
- 3) Angaben des Röhrchenherstellers beachten.
- 6) Objektträger nur belastbar bis RZB 1100
- 11) Objektträger nur belastbar bis RZB 1100
- [1] Einschritt-Methode

- 1) Sample temp. rise during maximum speed and 1 hour running time
- 3) Observe the tube manufacturer's instructions.
- 6) Object slide will not stand RCF values exceeding 1100
- 11) Object slide will not stand RCF values exceeding 1100
- [1] One-step method

1515-A		1524						
Rotor 12-fach  ↙ 90°								
		1531 / 1534 ¹²⁾	1532 ¹²⁾	1536 ¹²⁾	1538 ¹²⁾	---	---	---
		---	---	1537 ¹²⁾	1539 ¹²⁾	---	---	---
						---	---	---
Kapazität / capacity	ml	0,5	0,2	6 ¹³⁾	0,5	---	---	---
Maße / dimensions Ø / A	mm ²	6 / 28,3	6 / 28,3	-	6 / 28,3	---	---	---
Maße (L x B) / dimensions (L x W)	mm	---	---	13,4 x 22	---	---	---	---
Anzahl p. Rotor / number p. rotor		12				---	---	---
Drehzahl / speed	RPM	2000				---	---	---
RZB / RCF	³⁾	438				---	---	---
Radius / radius	mm	98				---	---	---
 9 (97%)	sec	19				---	---	---
Probenerwärmung/sample temp. rise	K ¹⁾	3				---	---	---

1) Probenerwärmung bei maximaler Drehzahl und 1 Stunde Laufzeit (nur bei Zentrifuge ohne Kühlung)
 3) Angaben des Röhrchenherstellers beachten.

1) Sample temp. rise during maximum speed and 1 hour running time (only with centrifuges without cooling)
 3) Observe the tube manufacturer's instructions.

12)	Bestell-Nr. / Cat. No.	Menge / Quantity	Bestell-Nr. / Cat. No.	Menge / Quantity
	1531, 1532	50 St. / 50 pcs.	1536, 1538	12 St. / 12 pcs.
	1534	500 St. / 500 pcs.	1539	200 St. / 200 pcs.
	1537	100 St. / 100 pcs.		

13) Dies ist das maximale Fassungsvermögen, die empfohlene Füllmenge der Kammern beträgt 4 ml.

13) This is the maximum capacity. The recommended quantity to be used per chamber is 4 ml.